Handicap Modelling

Summary and Discussion

Extensive modelling of handicaps for fifteen clubs in Phase 1 suggested that Eight20 0.93 was the preferred direction.

Since this result, two other features have been modelled, and a further ten clubs added. The added features are the Cap, and the Anchor.

In summary, the Cap and Anchor mainly impact the higher markers, and their impact on competition is the equivalent of a 0.01 to 0.02 of Bonus For Excellence reduction. Thus including the Cap and Anchor would indicate that 0.95 or 0.94 of BFE are the equivalent of the Phase 1 0.93.

As an example of the impact of these two measures for the men's field, the reduction in handicap that results compared to the calculated Ten20 0.96 Current System is:

	Men	
Handicap Range	**31 to 35**	**Max 36**
Ten20 0.96 Cap Impact	(0.07)	(0.30)
Ten20 0.96 & Cap & Anchor Impact	(0.32)	(0.65)
Eight 20 0.95 & Cap & Anchor Impact	(1.47)	(1.28)
Eight 20 0.94 & Cap & Anchor Impact	(1.79)	(1.48)
Eight 20 0.93 & Cap & Anchor Impact	(2.11)	(1.72)

The anchor does a good job of improving the Level of the playing field. Time and time again in the detailed club analyses, it is seen that the peaks and troughs of handicap bias are less with the anchor than without it. The Level index bears this out:

Impact of Anchor on Playing Field Level			
	Eight20 0.95	Eight20 0.94	Eight20 0.93
Average Level index without Anchor	23	23	23
Average Level index with Anchor	22	22	22

The dynamics of the Eight20 compared to the Ten20 should also be noted. The Ten20 has the property that as form deteriorates or improves, the handicap rises or falls at the same rate. However with the Eight20, as form deteriorates or improves, the handicap rises more slowly, and falls more quickly. This is because when form is improving, it takes only eight rounds to have a completely new handicap. But when form is deteriorating, as the twelve poorest rounds are discarded, it takes twelve rounds before there is a completely new handicap. So handicaps can actually rise 50% more

slowly than they fall. This somewhat asymmetric movement, although far from the asymmetry of the Old System, provides a culturally acceptable dynamic.

For all the reasons displayed in Phase 1, plus the advantages of the Cap and Anchor, the Eight20 with Cap and Anchor is the clear choice.

Next the best BFE needs to be chosen. Here is a summary of the Tilt table that follows later in full for the Men's competition.

Winners Eight20 & Cap & Anchor - Men				
	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.93 No Grade
Average 15	11	1	-6	-14
New South Wales	99	89	86	-8
Victoria	58	47	40	-46
Average 15 ex NSW & Vic	1	-9	-17	-12
Average 10	1	-6	-11	-13
Grand Average	7	-2	-8	-13
Grand Average Ex NSW & Vic	1	-8	-14	-12
Weighted Average	5	-4	-11	-15
Weighted Average ex NSW & Vic	-1	-10	-17	-14
Clubs with Tilt favouring the Low Marker	11	14	17	18
	44%	56%	68%	72%
Clubs with Tilt favouring the Low Marker Ex NSW & Victoria	11	14	17	16
	48%	61%	74%	70%
Level	22	21	22	23

As the BFE varies from 0.95 to 0.94 to 0.93, the average Tilt for the original fifteen clubs is shown to vary from 11 to 1 to -6, a result on which the original 0.93 recommendation was made.

However two clubs, New South Wales and Victoria, stand out in having significantly positive Tilts, favouring the high markers. But when these two clubs have grading removed from a given day's competitions, the Tilt immediately reverts to a more normal negative Tilt.

In other words, it is the practice of grading, in ways which favour the higher markers, which is causing the positive Tilt at these two clubs, not the handicap system.

If they are excluded from the average, the Tilt moves from 1 to -9 to -17.

This is not dissimilar from the Tilt average of the ten new clubs, which move from 1 to -6 to -11.

The Grand average, excluding New South Wales and Victoria moves from 1 to -8 to -14. This average gives each club an equal weighting.

If the clubs' Tilts are weighted by the number of members, then the weighted Tilt moves from -1 to -10 to -17. Not a significantly different result.

The number of clubs with negative Tilt moves from 44% to 56% to 68%, but when New South Wales and Victoria are excluded, from 48% to 61% to 74%.

So if 0.95 is chosen, the Tilt is -1, with Level of 22, and 48% of the chosen clubs (ex NSW & Vic) have a negative bias favouring the low marker.

If 0.94 is chosen, the Tilt is -10, the Level is 21, and 61% of the chosen clubs have a negative bias.

0.93 was a reasonable choice before the Cap and Anchor were modelled, but with a Tilt of -17, a Level of 22, and 74% of clubs with a negative bias, could be seen as going unnecessarily far in Tilting the field in favour of the lower markers. If however the objective is to have hardly any clubs with a positive bias to the high marker, then this will achieve the objective.

With regard to the Women's competition, the fifteen and the ten results are consistent, and all BFE choices show considerable Tilt towards the low marker. Grading is used, particularly by Lake Karrinyup and Victoria, to provide a positive bias to the high markers, but the overall Tilt is still negative, favouring the low marker. BFE 0.95 is the least negative.

Winners Eight20 & Cap & Anchor - Women				
	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.93 No Grade
Average 15	-18	-21	-26	-34
Average 10	-19	-22	-24	-33
Grand Average	-18	-21	-25	-34
Clubs with Tilt favouring the Low Marker	22	22	22	24
	88%	88%	88%	96%
Level	22	21	22	23
Lake Karrinyup	27	20	14	-36
Victoria	16	13	8	-7

The Leaders (top 20% of the field) are significantly tilted in favour of the low marker for all the BFE's, with all but one (Barcaldine) exhibiting this characteristic.

Leaders Eight20 & Cap & Anchor - Men				
	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.93 No Grade
Average 15	-35	-40	-30	-30
Average 10	-23	-30	-19	-19
Grand Average	-29	-35	-25	-25
Clubs with Tilt favouring the Low Marker	24	24	24	24
	96%	96%	96%	96%
Leaders Eight20 & Cap & Anchor - Women				
Average 15	-25	-28	-24	-24
Average 10	-24	-25	-21	-21
Grand Average	-25	-27	-23	-23
Clubs with Tilt favouring the Low Marker	24	24	24	24
	96%	96%	96%	96%

In summary, Eight20 0.95 with Cap and Anchor provides a non-tilted playing field for the Men Winners, somewhat negative in Tilt favouring the low markers for the Leaders, and somewhat negative for both Winners and Leaders in the Women's competition. Due to the "Eight" factor it is more responsive to improved form, and less responsive to deteriorating form. Due to the Cap and Anchor it is less volatile for the higher markers, leading to a somewhat more Level playing field.

If it was seen to be important that more than 48% of the clubs' Men's competitions were negatively tilted in favour of the lower markers, then a 0.94 BFE could be chosen.

Definitions

In this paper, a number of terms are introduced which are briefly described here:

- **Blended** – a handicap system where a variable number of best rounds out of twenty is taken, taking fewer for the high markers, more for the low markers. This has the effect of reducing the handicaps of the higher markers without changing those of the lower markers.
- **Hybrid** – a handicap system where the lower of a fast moving average (say best eight of sixteen) and a slower moving average (say best sixteen of thirty two) is taken. This has the objective of reducing the handicaps of improved form players faster, while reducing the speed with which handicaps are eased for poor form.
- **Handicap Bias** - the proportion of winners in a given handicap range compared to the proportion of the field in that range. 100% is neutral, greater than 100% is favourable, and less than 100% is unfavourable.
- **Weighted Handicap Bias** – the Handicap Bias weighted by the number of competitors in the relevant handicap range. This gives the percentage of the field by which a given handicap range is winning above or below their proportion of the field.
- **Tilt Index** - related to the gradient of a line of best fit to the weighted handicap bias values for the various handicap groups. A negative Tilt implies that the bias favours the low marker; a positive Tilt implies the bias favours the high marker. In the following two tables, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green.
- **Level Index** - related to the standard deviation of these weighted handicap bias values. In the following two tables, green is more Level, orange is more lumpy.
- **Stableford Equivalent** – the score in a round, adjusted to the equivalent stableford score, and adjusted for course rating.
- **Anchor** – a secondary handicap rule where a handicap cannot exceed four more than the lowest handicap over the prior twelve months.
- **Cap** – a secondary handicap rule where the Stableford Equivalent (adjusted for Course Rating) used for handicap calculation cannot exceed 40 for men and 50 for women.

Phase 1

Following an earlier report, in which it was demonstrated that the Old Australian Handicap System was biased in favour of the low markers, and that the Current Australian Handicap System was biased, especially for the men's fields, in favour of the higher markers, a number of different options were considered with the objective of removing some of the current bias.

These ranged from simply changing the Bonus For Excellence (BFE) to reducing the number of flagged rounds, eg take only eight from the last twenty rounds, to more complex systems such as the Blended and the Hybrid.

Fifteen clubs were chosen as representative. Each of the club's home competitions was recalculated on the various handicap methods, using data from December 2007 through November 2010.

A "good" system would be one in which the playing field was tilted neither in favour of the low markers nor the high markers, and where the playing field was relatively smooth.

No system will achieve a perfect zero Tilt and a perfect zero Level. The following analysis, it is hoped, will allow a decision to be made which achieves the best result, or possibly, the least worse result.

At the end of Phase 1, the best eight of twenty rounds, with a BFE of 0.93, (Eight20 0.93), together with the Anchor, was recommended for the following reasons:

- On average, for Men, it has a slightly negative Tilt, slightly favouring the lower marker.
- It achieves this while allowing 12 out of the 15 clubs to meet the goal of allowing the low marker to be competitive, ie have negative Tilt.
- It has one of the lowest values of the Level Index, implying a relatively good fit, or not too many large deviations from the ideal.
- Dynamically it will react to improved form faster than the Ten20.
- The Anchor actually achieves a similar result to the Hybrid, but is less complex. It prevents too rapid an increase in a handicap in the face of poor form.
- It is seen to be adjusting on three fronts, but without the complexity for less or little gain, of the Blended and Hybrid methods.
- In the case of Women golfers, although it increases an already negative Tilt in favour of the low markers, it fits with the culture of seeking aspirational handicaps rather than ones reflecting current form.

Considering the alternatives, Eight20 0.92 goes too far. The Tilt becomes more negative for those clubs where it was already negative, and for the three clubs where it remained positive, they stay positive. Further the Level deteriorates as well.

The Blended at 0.96, gave a similar Tilt result to the less complex Eight20 0.93. Any BFE's here less than 0.96 were far too severe on the high markers, and in all cases the Blended had a less favourable Level Index.

Methods with fewer than eight in the sample start to become more volatile dynamically – especially the higher markers' handicaps would show excess variation over time.

The Hybrid 0.94 gave similar results to the Eight20 0.93, and with a slightly lower (better) Level Index. However it is considerably more complex, and the marginal benefits seem to be more than balanced by the simplicity of the Eight20 0.93 combined with the Anchor.

Modelling shows that 4% of rounds would be "anchored" with 13.8% of men and 15.6% of women having had at least one round anchored over a three years period. As confirmation, it is proposed that a further sample of ten clubs be tested against the recommended method, as an out of sample check. Also the Anchor was not fully assessed in Phase 1 for its impact on competition.

Phase 2

In order to check the Eight20, and the Eight20 with Anchor, the modelling was repeated on the original 15 clubs, plus another 10.

In Phase 1, the Handicap Bias was calculated for the winners under varying handicap methods against the original field distribution based on the original playing handicap. In Phase 2, the winners

under the variations, all of which related to the Eight20 method, were compared to the field handicap distribution based on the relevant method.

Also, in Phase 1, a player's rounds were eliminated if they had not completed 32 rounds – this was in order to compare like with like when the Hybrid (which used 32 rounds) was involved. In Phase 2 they are only eliminated if there is fewer than 20 rounds.

In addition, the Men's and Women's rounds, for handicap purposes, were capped at a differential of 40 and 50 respectively.

This gives rise to small variations between the Tilt and Level between the Phase 2 and Phase 1 results for the Eight20 cases.

In Phase 2 a full set of cases was included which include the Anchor. Here handicaps are not allowed to rise beyond four strokes over the best handicap achieved in the prior twelve month.

In Phase 2 the Prize-winners were also considered as well as the Winners. The leading 20% of the Competition were defined as the "Leaders", and their Bias calculated.

Finally, for the Eight20 0.93 case only, the Bias was calculated assuming that grading was eliminated. If there was more than one competition for a given gender on the same day, the competitions were assumed to be graded. The "No Grade" Bias was calculated with all the competitors assumed to be participating in a single competition. The No Grading result is an indicator of the impact that the grading is having on the pattern of competition.

Tilt & Level

Tilt & Level – Men – Phase 1

Tilt - Men																	Number of Clubs with Tilt Favouring the Low Marker	Level
Club	Belmont	Brisbane	Carnarvon	Cumberland	Kooyonga	Lake Karrinyup	Lakelands	Maitland	Narrabri	New South Wales	Pacific	Royal Canberra	Tea Tree Gully	The Lakes	Victoria	Average		
Method																		
Old System	-48	-78	-53	-43	-78	-83	-36	-15	-17	61	-86	-76	-87	-76	-12	-48	14	34
Ten20 0.96 Apr-Nov 2010	43	17	17	55	-4	19	31	18	23	99	4	18	33	-34	34	25	2	33
Ten20 0.96 Dec08-Mar10	-11	-30	5	22	-21	3	-2	29	3	107	-33	-2	-15	-37	51	5	8	27
Ten20 0.96	0	-9	10	31	-18	5	15	23	9	99	-23	7	3	-32	46	11	4	24
Ten20 0.95	-4	-15	0	26	-21	-1	6	11	7	95	-29	1	-8	-41	32	4	8	23
Ten20 0.94	-11	-20	-9	11	-30	-10	0	3	0	87	-42	-5	-13	-48	29	-4	10	21
Ten20 0.93	-22	-27	-20	12	-42	-17	-10	-2	5	91	-43	-15	-18	-50	21	-9	11	21
Ten20 0.92	-32	-34	-27	0	-42	-27	-14	-11	-3	94	-50	-22	-31	-51	9	-16	12	22
Ten20 0.91	-34	-35	-38	-9	-47	-33	-25	-19	-16	83	-57	-32	-50	-57	1	-25	13	24
Ten20 0.9	-44	-43	-44	-15	-55	-40	-33	-24	-23	81	-67	-37	-57	-61	-8	-31	14	25
Nine20 0.96	0	-11	7	36	-18	-2	14	14	10	99	-24	8	4	-30	39	10	5	23
Nine20 0.93	-24	-23	-19	9	-42	-25	-15	-3	6	90	-44	-15	-30	-45	18	-11	11	21
Nine20 0.90	-47	-40	-49	-24	-65	-44	-30	-21	-13	75	-63	-36	-58	-64	-6	-32	14	26
Eight20 0.96	-6	-4	4	29	-24	2	7	15	7	98	-23	8	-4	-36	37	7	6	20
Eight20 0.95	-9	-8	-4	25	-26	-5	3	10	4	95	-29	3	-11	-39	33	3	8	20
Eight20 0.94	-13	-12	-12	21	-29	-12	0	4	2	93	-36	-2	-19	-41	30	-2	10	20
Eight20 0.93	-16	-16	-19	17	-32	-18	-4	-1	-1	90	-43	-7	-27	-44	26	-6	12	21
Eight20 0.92	-27	-24	-31	3	-42	-26	-15	-10	-6	84	-52	-18	-40	-51	16	-16	12	23
Eight20 0.91	-37	-32	-42	-11	-51	-34	-26	-18	-11	78	-62	-29	-53	-58	6	-25	13	25
Eight20 0.90	-48	-40	-53	-26	-61	-42	-37	-27	-16	72	-71	-40	-66	-65	-4	-35	14	27
Blended 0.96	-14	-19	-9	7	-32	-13	-10	-1	-4	88	-43	-10	-23	-57	24	-8	12	22
Blended 0.94	-34	-29	-37	-7	-48	-25	-24	-18	-7	82	-56	-23	-35	-57	13	-20	13	23
Blended 0.92	-52	-46	-50	-27	-55	-41	-38	-29	-16	77	-67	-42	-60	-71	-4	-35	14	27
Hybrid 0.96	2	-12	0	30	-17	-1	6	17	8	90	-40	3	-4	-39	31	5	6	21
Hybrid 0.95	-10	-19	-9	21	-24	-10	-2	7	5	85	-47	-5	-14	-44	23	-3	10	20
Hybrid 0.94	-23	-26	-19	12	-32	-19	-10	-4	2	79	-53	-13	-25	-49	16	-11	11	19

Tilt & Level – Women – Phase 1

Tilt - Women																		
Club	Belmont	Brisbane	Carnarvon	Cumberland	Kooyonga	Lake Karrinyup	Lakelands	Maitland	Narrabri	New South Wales	Pacific	Royal Canberra	Tea Tree Gully	The Lakes	Victoria	Average	Number of Clubs with Tilt Favouring the Low Marker	Level
Method																		
Old System	-65	-58	-51	-41	-42	19	-34	-23	-25	-30	-105	-28	-25	-18	-3	-35	14	32
Ten20 0.96 Apr-Nov 2010	-10	5	-3	-17	-18	51	3	0	-12	-16	-54	-18	-10	-19	15	-7	10	33
Ten20 0.96 Dec08-Mar10	-31	-33	-25	-30	-30	30	-24	-20	-9	-22	-88	-11	-10	-5	-7	-21	14	26
Ten20 0.96	-23	-23	-18	-27	-29	36	-16	-16	-18	-18	-75	-12	-9	-8	4	-17	13	24
Ten20 0.95	-35	-24	-24	-32	-32	32	-23	-19	-17	-19	-79	-19	-13	-9	4	-21	13	24
Ten20 0.94	-42	-33	-33	-37	-35	29	-21	-20	-21	-24	-84	-22	-16	-14	1	-25	13	25
Ten20 0.93	-52	-33	-39	-37	-38	24	-26	-23	-22	-26	-90	-24	-24	-18	-3	-29	14	27
Ten20 0.92	-57	-40	-40	-42	-37	17	-29	-22	-21	-26	-91	-29	-24	-21	-2	-31	14	28
Ten20 0.91	-61	-49	-49	-46	-40	13	-29	-24	-30	-28	-98	-33	-27	-20	-8	-35	14	29
Ten20 0.9	-73	-54	-56	-43	-47	8	-33	-27	-33	-31	-101	-38	-36	-23	-11	-40	14	32
Nine20 0.96	-36	-27	-20	-30	-29	32	-16	-19	-16	-19	-78	-18	-8	-9	6	-19	13	24
Nine20 0.93	-51	-38	-34	-38	-32	20	-25	-18	-20	-25	-89	-26	-20	-19	-1	-28	14	26
Nine20 0.90	-69	-54	-55	-47	-45	5	-31	-27	-30	-31	-105	-38	-39	-24	-13	-40	14	32
Eight20 0.96	-32	-18	-24	-26	-29	34	-19	-18	-21	-19	-85	-16	-13	-10	4	-19	13	24
Eight20 0.93	-43	-35	-32	-34	-33	21	-24	-16	-23	-24	-87	-26	-19	-19	-3	-26	14	26
Eight20 0.90	-72	-55	-55	-47	-47	10	-32	-27	-36	-33	-104	-37	-37	-24	-13	-41	14	32
Blended 0.96	-39	-35	-34	-33	-35	23	-25	-20	-22	-23	-86	-22	-18	-16	-4	-26	14	26
Blended 0.94	-58	-40	-50	-45	-45	20	-31	-23	-29	-31	-92	-30	-31	-22	-9	-34	14	30
Blended 0.92	-68	-49	-56	-49	-48	11	-39	-29	-34	-33	-102	-36	-35	-26	-12	-40	14	33
Hybrid 0.96	-38	-30	-19	-29	-29	33	-16	-16	-19	-23	-80	-21	-12	-16	7	-20	13	24
Hybrid 0.94	-44	-36	-29	-36	-29	21	-19	-20	-20	-27	-84	-26	-19	-22	2	-26	13	26

Tilt & Level – Men – Phase 2

Tilt - Men																								
Club	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.92	Eight20 0.91	Eight20 0.93 No Grade	Eight20 0.95 Anch	Eight20 0.94 Anch	Eight20 0.93 Anch	Eight20 0.92 Anch	Eight20 0.91 Anch	Eight20 0.93 No Grade Anch	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.92	Eight20 0.91	Eight20 0.93 No Grade	Eight20 0.95 Anch	Eight20 0.94 Anch	Eight20 0.93 Anch	Eight20 0.92 Anch	Eight20 0.91 Anch	Eight20 0.93 No Grade Anch
	Winners						Winners + Anchor						Leaders						Leaders + Anchor					
Belmont	14	10	4	2	-16	4	8	1	-9	-18	-30	-9	-29	-34	-40	-44	-48	-40	-34	-39	-28	-28	-28	-28
Brisbane	1	-7	-11	-20	-30	-13	-5	-15	-19	-28	-36	-38	-37	-41	-46	-52	-55	-46	-39	-44	-35	-35	-35	-35
Carnarvon	5	-5	-12	-28	-34	-12	-2	-10	-14	-29	-40	-14	-38	-42	-45	-51	-56	-45	-41	-46	-37	-37	-37	-37
Cumberland	41	26	15	6	-2	19	30	20	4	-6	-14	6	-31	-36	-40	-44	-47	-38	-33	-38	-30	-30	-29	-30
Kooyonga	-11	-14	-22	-32	-39	-24	-11	-15	-26	-35	-45	-27	-42	-48	-53	-59	-64	-55	-49	-52	-42	-41	-41	-42
Lake Karrinyup	6	-2	-6	-14	-16	-5	4	-7	-10	-17	-20	-11	-34	-40	-43	-47	-52	-40	-37	-43	-33	-33	-33	-33
Lakelands	22	13	9	-5	-10	13	21	11	5	-9	-14	8	-24	-28	-30	-33	-38	-30	-26	-30	-23	-22	-22	-23
Maitland	23	11	4	1	-8	4	20	10	0	-5	-14	-1	-18	-24	-26	-30	-34	-27	-22	-26	-18	-18	-18	-18
Narrabri	26	11	5	-1	-1	5	27	9	-2	-6	-7	-2	-29	-36	-41	-42	-44	-41	-29	-39	-28	-28	-28	-28
New South Wales	116	106	99	92	81	8	99	89	86	80	68	-8	-21	-25	-30	-31	-35	-74	-26	-30	-22	-21	-21	-22
Pacific	-25	-35	-44	-51	-53	-13	-37	-47	-50	-56	-61	-22	-34	-39	-44	-47	-52	-41	-37	-43	-33	-33	-32	-33
Royal Canberra	5	-4	-9	-22	-29	14	-2	-10	-16	-27	-35	7	-31	-37	-42	-48	-52	-35	-34	-40	-31	-31	-30	-31
Tea Tree Gully	-2	-18	-28	-38	-48	-26	-10	-26	-36	-47	-55	-34	-30	-35	-38	-43	-48	-38	-34	-38	-30	-29	-29	-30
The Lakes	-31	-31	-40	-51	-52	-9	-31	-41	-48	-53	-53	-16	-32	-36	-34	-38	-42	-32	-39	-43	-32	-32	-32	-32
Victoria	61	53	46	38	27	-40	58	47	40	32	16	-46	-37	-40	-44	-49	-51	-77	-37	-41	-34	-34	-32	-34
Average 15	17	8	1	-8	-15	-5	11	1	-6	-15	-23	-14	-31	-36	-40	-44	-48	-44	-35	-40	-30	-30	-30	-30
Average 15 ex NSW & Vic	6	-4	-10	-19	-26	-3	1	-9	-17	-26	-33	-12	-31	-37	-40	-45	-49	-39	-35	-40	-31	-30	-30	-31
Barcaldine	30	19	23	26	34	23	30	19	23	26	34	23	30	13	14	9	7	14	30	13	28	25	29	28
Cottesloe	-28	-41	-44	-54	-61	-34	-39	-45	-49	-60	-65	-40	-33	-39	-42	-48	-51	-40	-38	-43	-32	-32	-31	-32
Grange	2	-3	-8	-16	-19	-1	2	-3	-8	-16	-19	-1	-29	-33	-36	-40	-43	-32	-30	-33	-29	-28	-28	-29
Kingston Beach	34	30	22	6	-1	22	19	16	9	-5	-15	9	-24	-29	-32	-34	-38	-32	-30	-35	-24	-24	-23	-24
Kogarah	41	26	15	6	-2	19	30	20	4	-6	-14	6	-31	-36	-40	-44	-47	-38	-33	-38	-30	-30	-29	-30
Launceston	24	7	11	9	-4	-33	7	-1	0	-4	-12	-43	-34	-37	-46	-46	-48	-60	-39	-41	-31	-30	-29	-31
Royal Adelaide	-37	-50	-55	-59	-59	-44	-41	-53	-57	-60	-61	-49	-17	-22	-24	-30	-32	-22	-19	-25	-17	-16	-17	-17
Serpentine	28	22	9	7	11	9	28	22	9	7	11	9	-15	-25	-29	-27	-27	-29	-15	-25	-13	-15	-15	-13
Southern	15	6	0	-5	-17	-3	0	-4	-10	-18	-30	-13	-33	-38	-41	-46	-51	-41	-38	-42	-31	-31	-31	-31
Trentham	-16	-17	-17	-26	-41	-16	-26	-26	-29	-37	-52	-27	-22	-27	-27	-31	-34	-26	-27	-31	-22	-22	-22	-22
Average 10	9	0	-4	-11	-16	-6	1	-6	-11	-17	-22	-13	-21	-27	-30	-34	-36	-30	-24	-30	-20	-20	-20	-20
Grand Average	14	4	-1	-9	-16	-5	7	-2	-8	-16	-22	-13	-27	-33	-36	-40	-43	-39	-30	-36	-26	-26	-26	-26
Grand Avge Ex NSW & Vic	7	-2	-8	-16	-22	-4	1	-8	-14	-22	-28	-12	-27	-33	-36	-40	-43	-35	-30	-36	-26	-26	-26	-26
Weighted Average	12	2	-4	-13	-20	-6	5	-4	-11	-20	-28	-15	-30	-35	-39	-43	-47	-41	-34	-39	-30	-29	-29	-30
Weighted Average ex NSW & Vic	6	-4	-10	-19	-26	-5	-1	-10	-17	-26	-33	-14	-30	-35	-39	-43	-47	-38	-34	-39	-30	-29	-29	-30
Clubs with Tilt favouring the Low Marker	7	12	12	15	21	14	11	14	17	21	21	18	24	24	24	24	24	24	24	24	24	24	24	24
	28 %	48 %	48 %	60 %	84 %	56 %	44 %	56 %	68 %	84 %	84 %	72 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %
Clubs with Tilt favouring the Low Marker excl NSW & Vic	7	12	12	15	21	13	11	14	17	21	21	16	22	22	22	22	22	22	22	22	22	22	22	22
	30 %	52 %	52 %	65 %	91 %	57 %	48 %	61 %	74 %	91 %	91 %	70 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %
Level	23	22	22	22	24	23	22	21	22	22	25	23	15	17	19	21	22	21	16	18	14	15	15	14

Tilt & Level – Women – Phase 2

Tilt - Women																								
Club	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.92	Eight20 0.91	Eight20 0.93 No Grade	Eight20 0.95 Anch	Eight20 0.94 Anch	Eight20 0.93 Anch	Eight20 0.92 Anch	Eight20 0.91 Anch	Eight20 0.93 No Grade Anch	Eight20 0.95	Eight20 0.94	Eight20 0.93	Eight20 0.92	Eight20 0.91	Eight20 0.93 No Grade	Eight20 0.95 Anch	Eight20 0.94 Anch	Eight20 0.93 Anch	Eight20 0.92 Anch	Eight20 0.91 Anch	Eight20 0.93 No Grade Anch
	Winners						Winners + Anchor						Leaders						Leaders + Anchor					
Belmont	-27	-30	-38	-48	-49	-38	-28	-31	-38	-49	-54	-38	-35	-38	-41	-44	-46	-41	-37	-40	-35	-34	-34	-35
Brisbane	-22	-28	-35	-42	-47	-37	-23	-31	-39	-45	-51	-54	-30	-32	-35	-38	-43	-36	-30	-34	-30	-29	-28	-30
Carnarvon	-28	-28	-36	-41	-52	-38	-33	-36	-42	-48	-56	-44	-31	-36	-40	-43	-47	-40	-35	-39	-31	-32	-32	-31
Cumberland	-29	-36	-39	-41	-41	-39	-32	-39	-39	-42	-43	-39	-33	-34	-36	-39	-40	-36	-33	-33	-32	-33	-32	-32
Kooyonga	-16	-20	-24	-29	-28	-33	-17	-22	-26	-30	-28	-36	-16	-21	-22	-23	-23	-25	-18	-22	-15	-15	-14	-15
Lake Karrinyup	28	21	14	10	6	-33	27	20	14	9	4	-36	-18	-22	-25	-28	-31	-55	-18	-23	-19	-19	-18	-19
Lakelands	-13	-17	-21	-20	-24	-21	-12	-16	-22	-20	-24	-23	-17	-22	-21	-28	-29	-22	-18	-23	-18	-18	-17	-18
Maitland	-10	-4	-7	-13	-11	-7	-8	-2	-8	-13	-11	-8	-12	-12	-19	-19	-21	-19	-12	-14	-12	-12	-11	-12
Narrabri	-17	-15	-26	-27	-25	-26	-17	-15	-29	-29	-27	-29	-14	-16	-15	-20	-22	-15	-16	-18	-14	-13	-12	-14
New South Wales	-17	-21	-23	-28	-28	-34	-20	-24	-26	-30	-33	-37	-21	-24	-25	-29	-31	-28	-23	-26	-20	-20	-20	-20
Pacific	-78	-75	-82	-86	-90	-75	-78	-77	-83	-87	-92	-75	-40	-43	-43	-49	-51	-44	-40	-44	-40	-39	-39	-40
Royal Canberra	-19	-24	-24	-31	-34	-20	-20	-25	-26	-32	-36	-23	-23	-28	-29	-32	-36	-30	-26	-29	-24	-23	-23	-24
Tea Tree Gully	-10	-14	-18	-25	-29	-17	-13	-17	-21	-29	-31	-20	-30	-33	-34	-38	-40	-34	-32	-35	-29	-29	-28	-29
The Lakes	-6	-13	-9	-14	-12	-36	-9	-13	-13	-12	-10	-40	-23	-25	-26	-26	-27	-35	-27	-28	-22	-21	-21	-22
Victoria	19	14	8	8	4	-8	16	13	8	7	2	-7	-16	-21	-23	-26	-27	-31	-17	-22	-17	-16	-15	-17
Average 15	-16	-19	-24	-28	-31	-31	-18	-21	-26	-30	-33	-34	-24	-27	-29	-32	-34	-33	-25	-29	-24	-23	-23	-24
Barcaldine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottesloe	-32	-36	-47	-53	-50	-46	-33	-37	-48	-53	-52	-47	-27	-28	-32	-35	-36	-34	-27	-28	-25	-25	-24	-25
Grange	-33	-32	-36	-40	-41	-61	-33	-32	-36	-40	-41	-61	-24	-26	-31	-31	-36	-43	-24	-27	-23	-23	-23	-23
Kingston Beach	-15	-15	-22	-22	-28	-47	-25	-25	-31	-27	-32	-66	-12	-13	-16	-19	-21	-28	-20	-26	-12	-12	-9	-12
Kogarah	-29	-36	-39	-41	-41	-39	-32	-39	-39	-42	-43	-39	-33	-34	-36	-39	-40	-36	-33	-33	-32	-33	-32	-32
Launceston	-1	-5	-10	-14	-23	-42	-11	-14	-14	-17	-25	-48	-63	-68	-67	-71	-75	-69	-70	-73	-62	-61	-62	-62
Royal Adelaide	0	-2	-7	-6	-10	-5	0	-2	-7	-6	-8	-4	-9	-9	-11	-13	-18	-14	-9	-9	-8	-7	-7	-8
Serpentine	-15	-20	-18	-21	-21	-19	-15	-20	-18	-21	-21	-19	-14	-12	-14	-19	-18	-14	-14	-12	-13	-13	-13	-13
Southern	-23	-29	-34	-40	-49	-34	-24	-34	-35	-41	-51	-36	-23	-29	-31	-33	-36	-30	-26	-30	-25	-24	-24	-25
Trentham	-7	-11	-8	-12	-10	-8	-13	-15	-14	-20	-17	-12	-10	-10	-11	-15	-14	-11	-13	-14	-12	-13	-12	-12
Average 10	-16	-19	-22	-25	-27	-30	-19	-22	-24	-27	-29	-33	-22	-23	-25	-28	-30	-28	-24	-25	-21	-21	-20	-21
Grand Average	-16	-19	-23	-27	-29	-31	-18	-21	-25	-29	-31	-34	-23	-25	-27	-30	-32	-31	-25	-27	-23	-23	-22	-23
Clubs with Tilt favouring the Low Marker	22	22	22	22	22	24	22	22	22	22	22	24	24	24	24	24	24	24	24	24	24	24	24	24
	88 %	88 %	88 %	88 %	88 %	96 %	88 %	88 %	88 %	88 %	88 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %	96 %
Level	23	22	22	22	24	23	22	21	22	22	25	23	15	17	19	21	22	21	16	18	14	15	15	14

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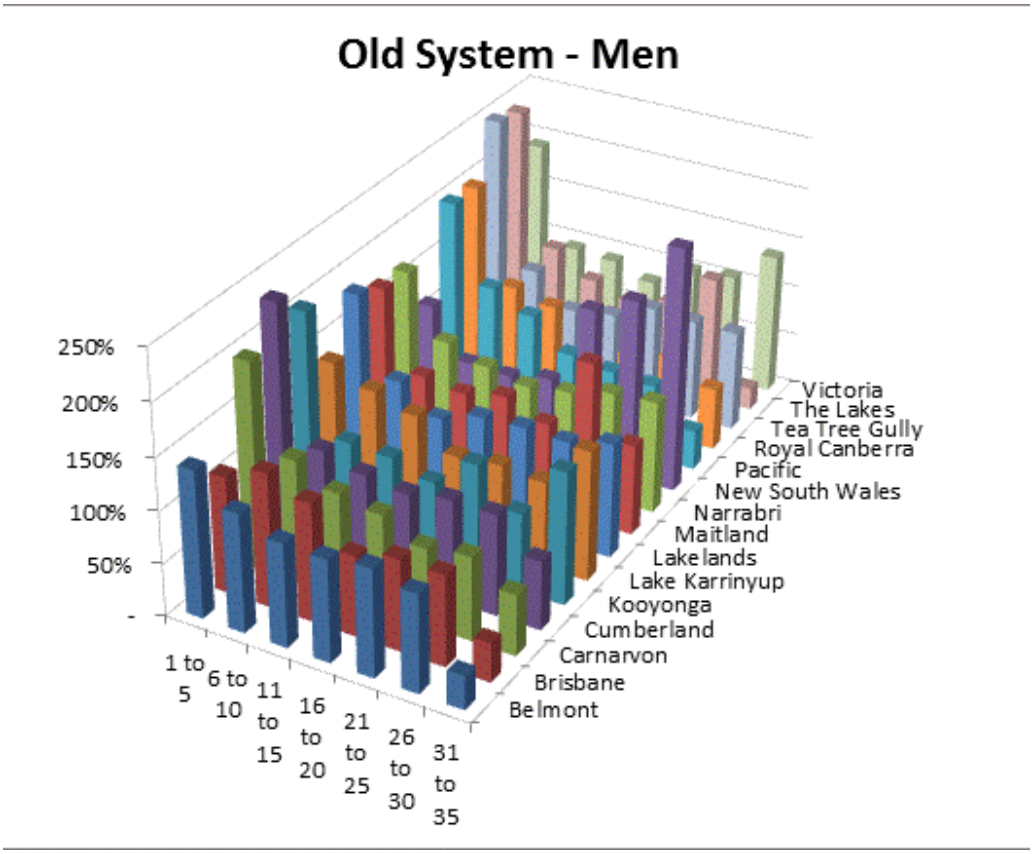
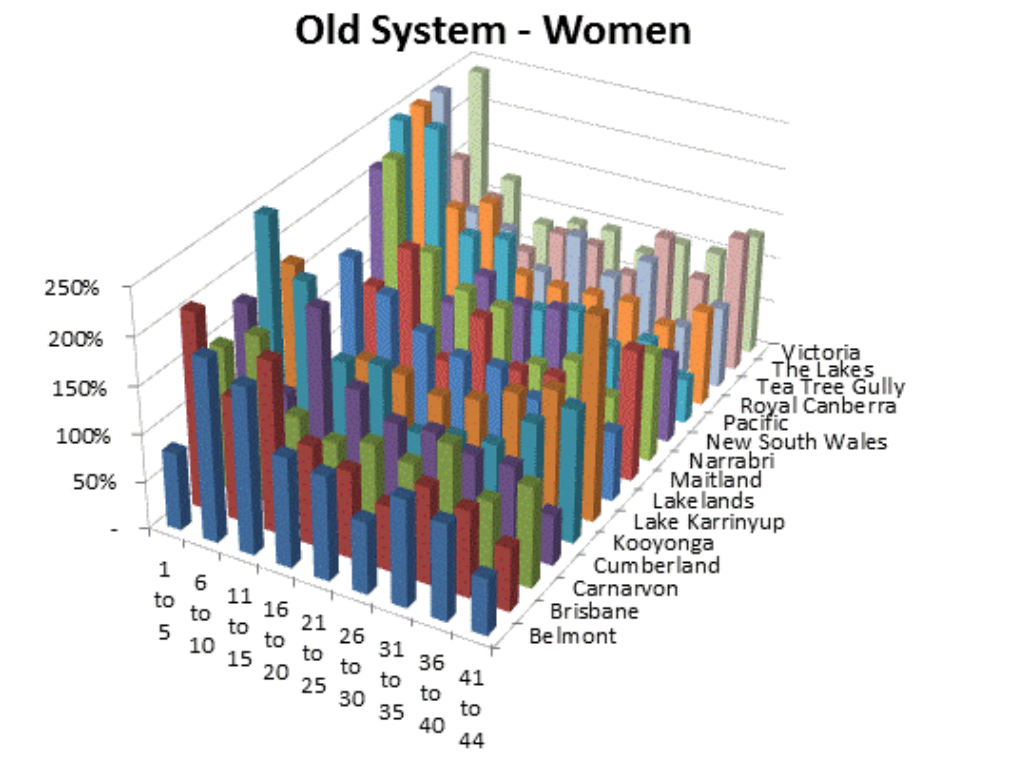
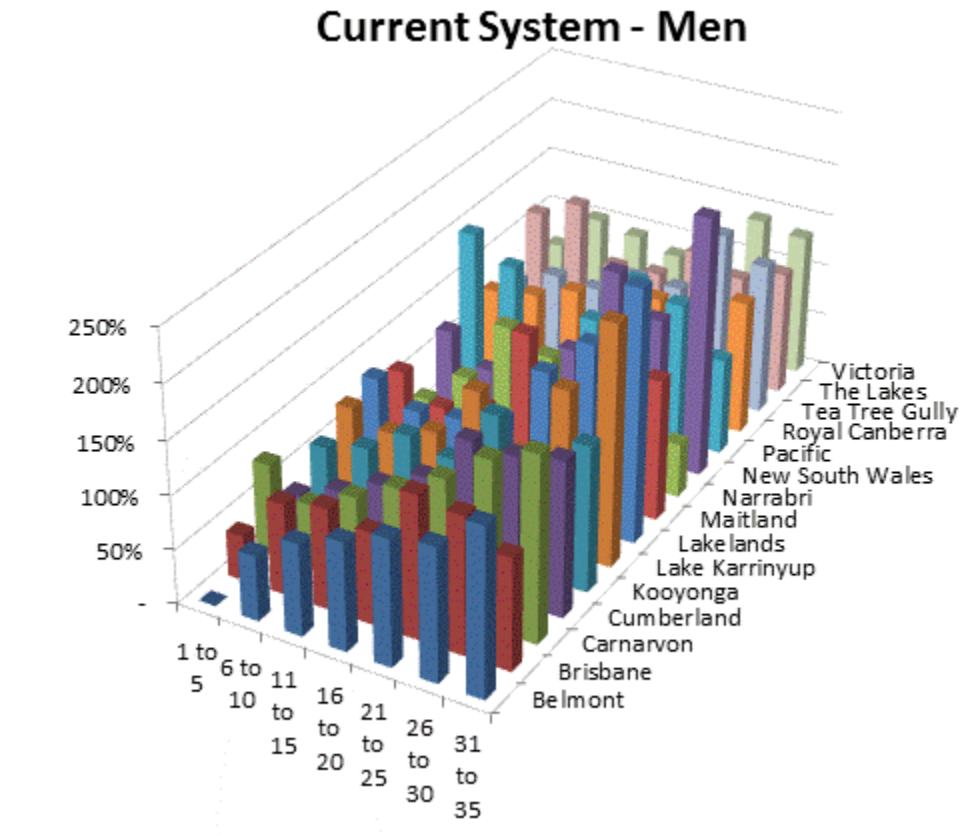
The Playing Field (Handicap Bias by HC Group & Club)

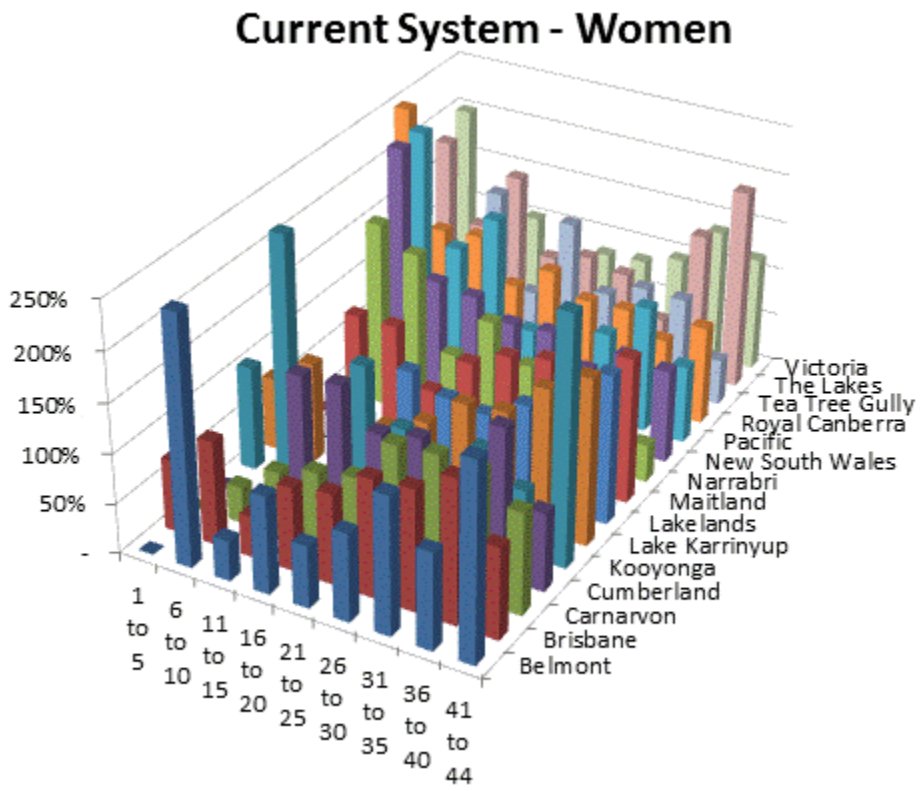
The Playing Field – Old System



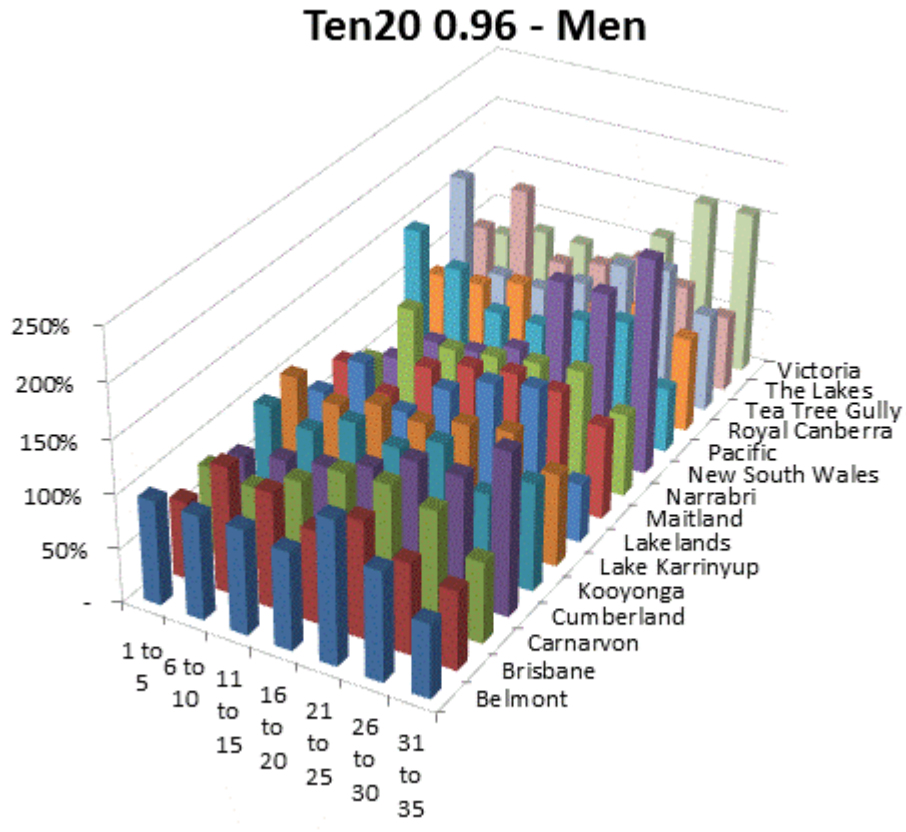


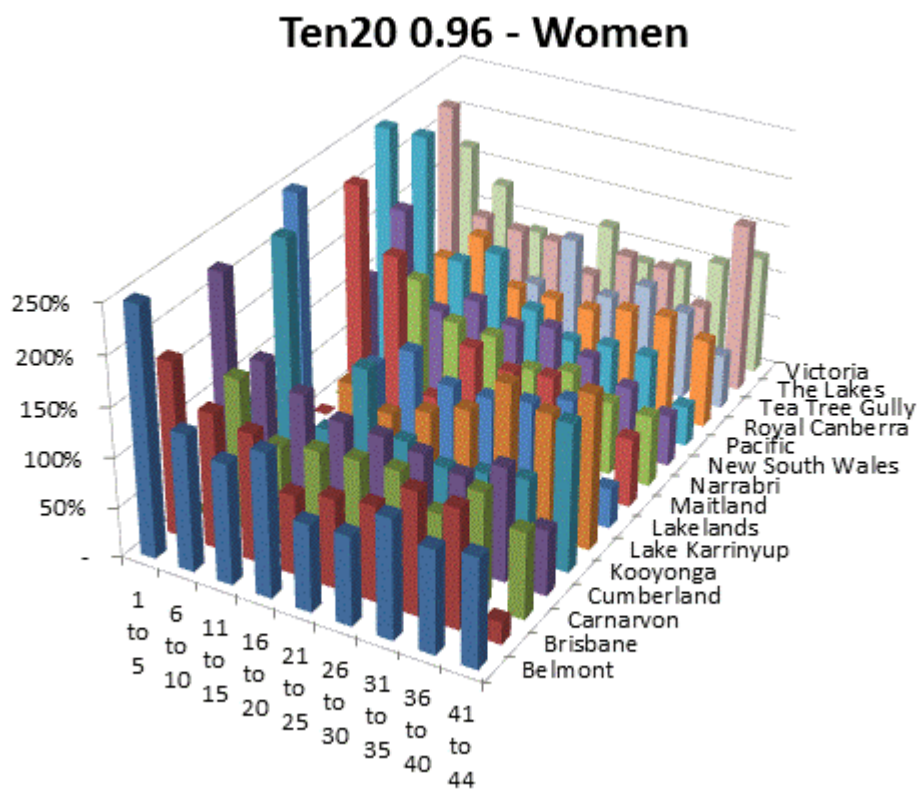
The Playing Field – Current System





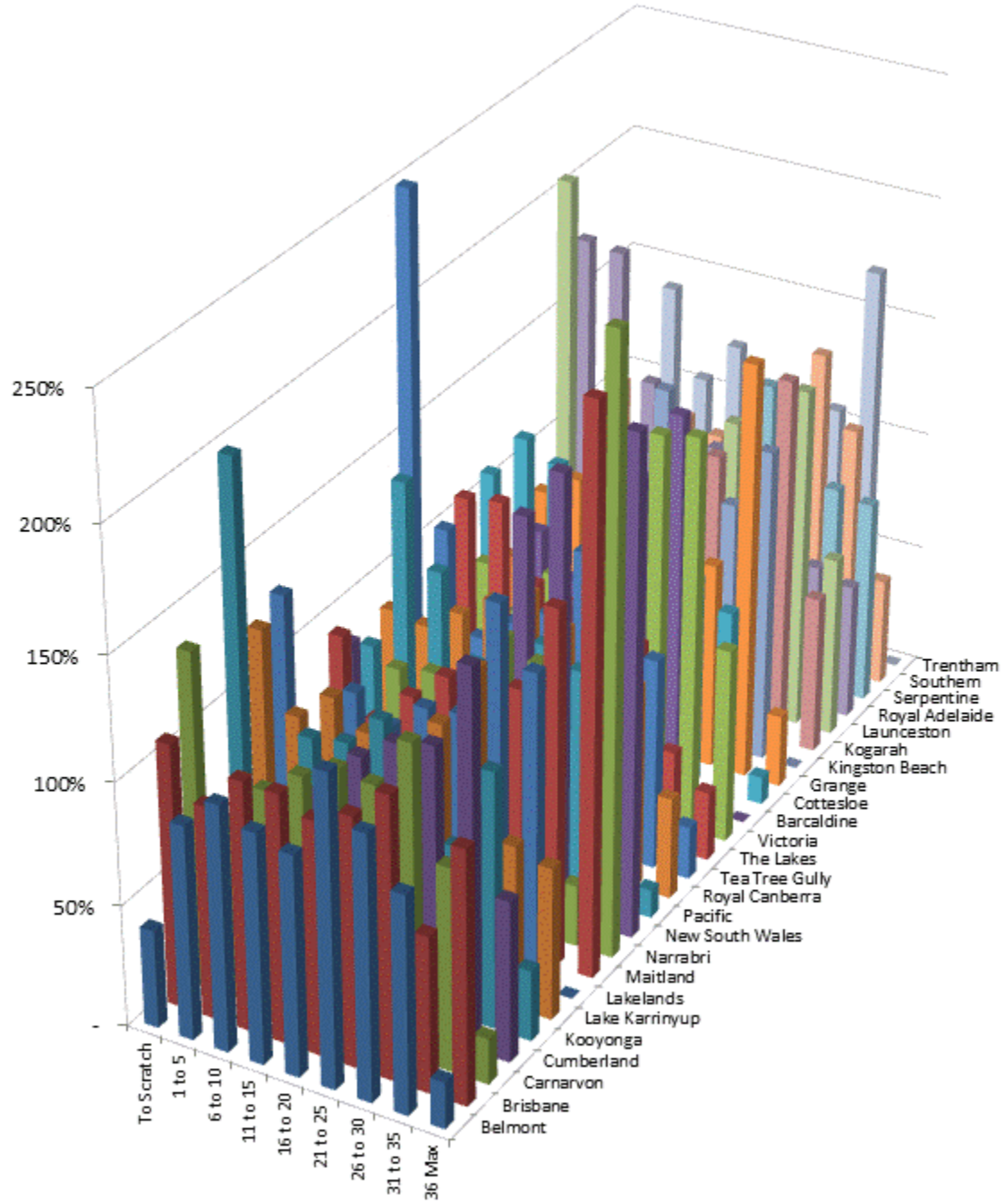
The Playing Field – Ten20 0.96 – 2 Years – Phase 1



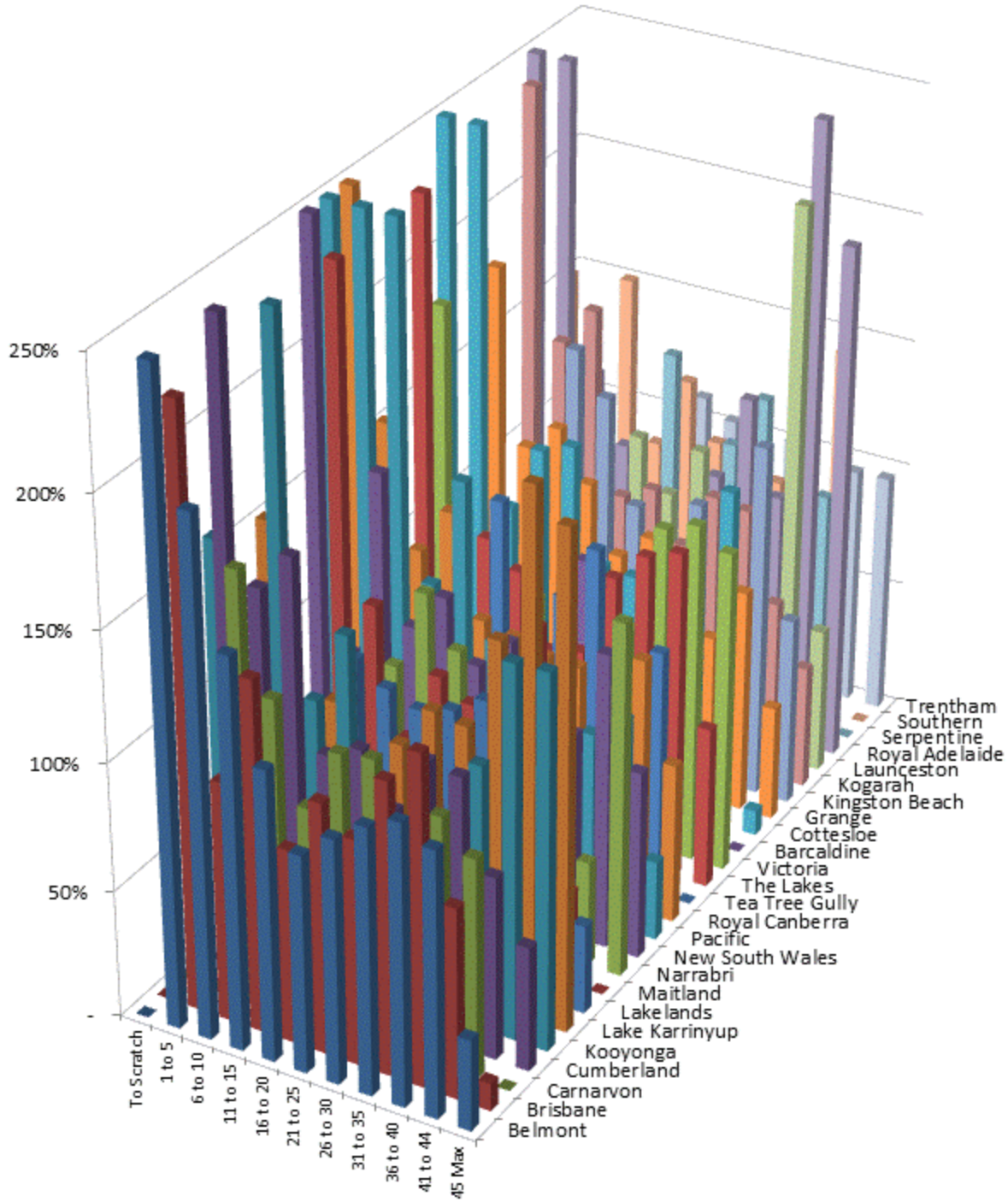


The Playing Field – Eight20 0.95 & Cap & Anchor – Winners – Phase 2

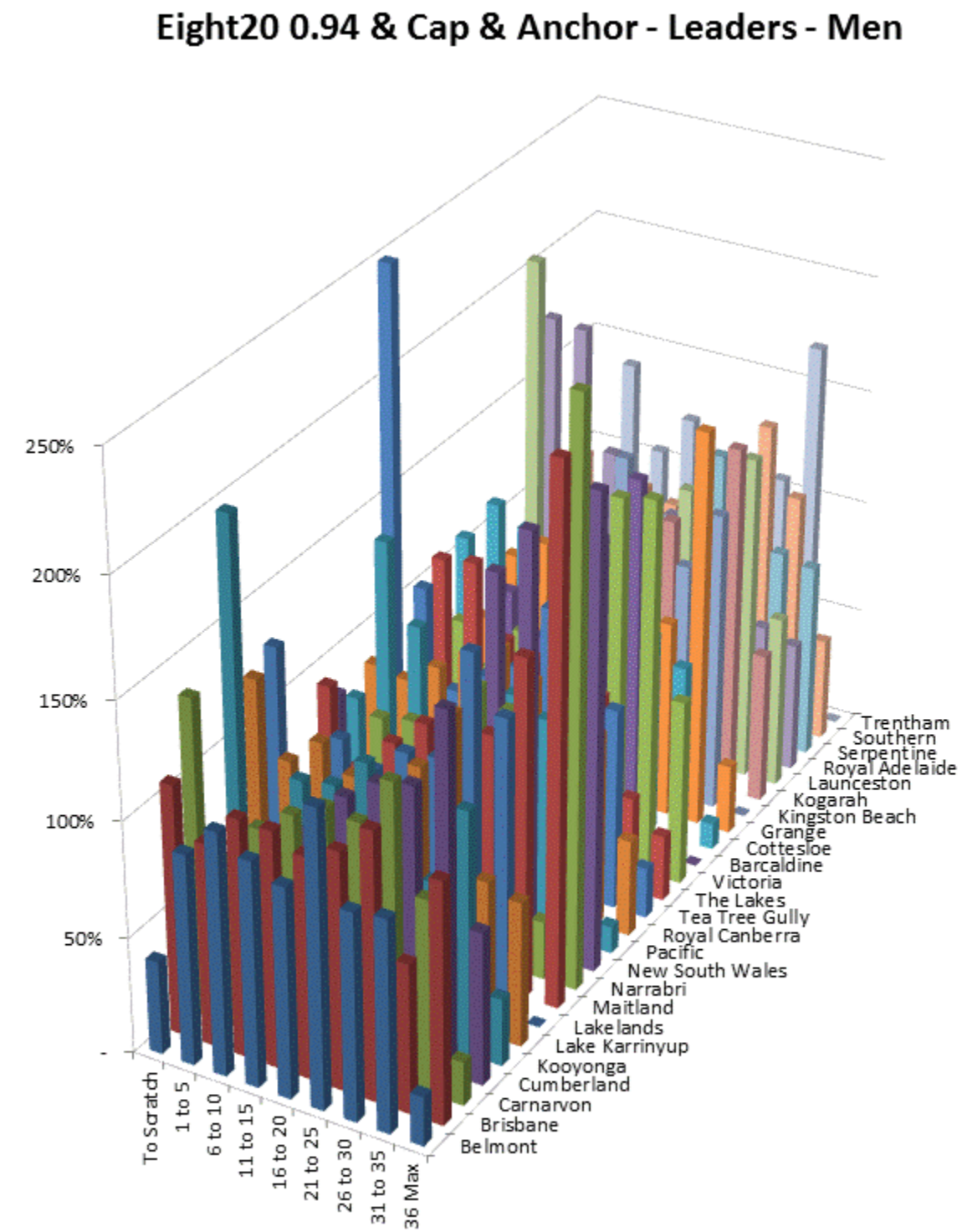
Eight20 0.95 & Cap & Anchor - Leaders - Men



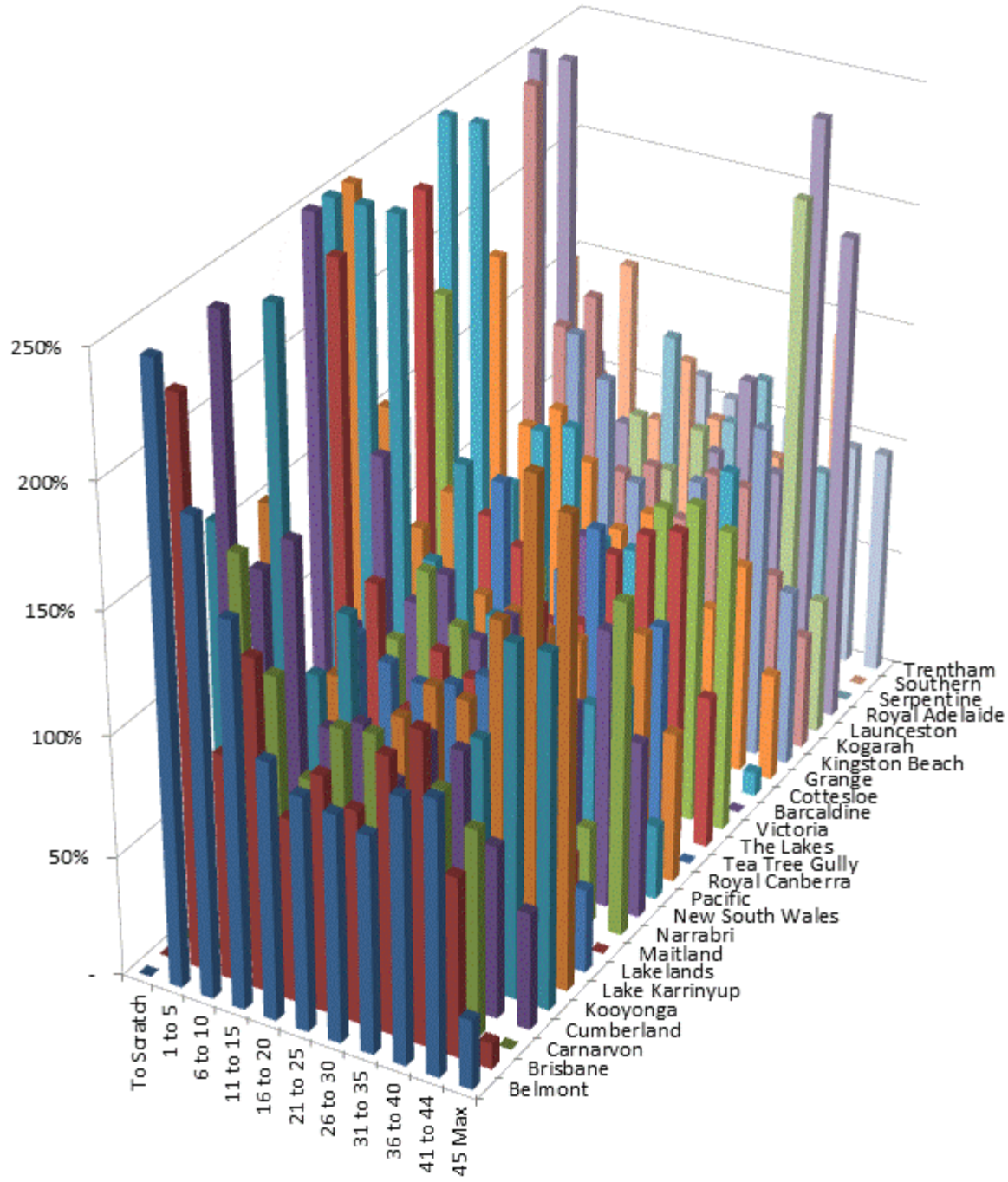
Eight20 0.95 & Cap & Anchor - Winners - Women



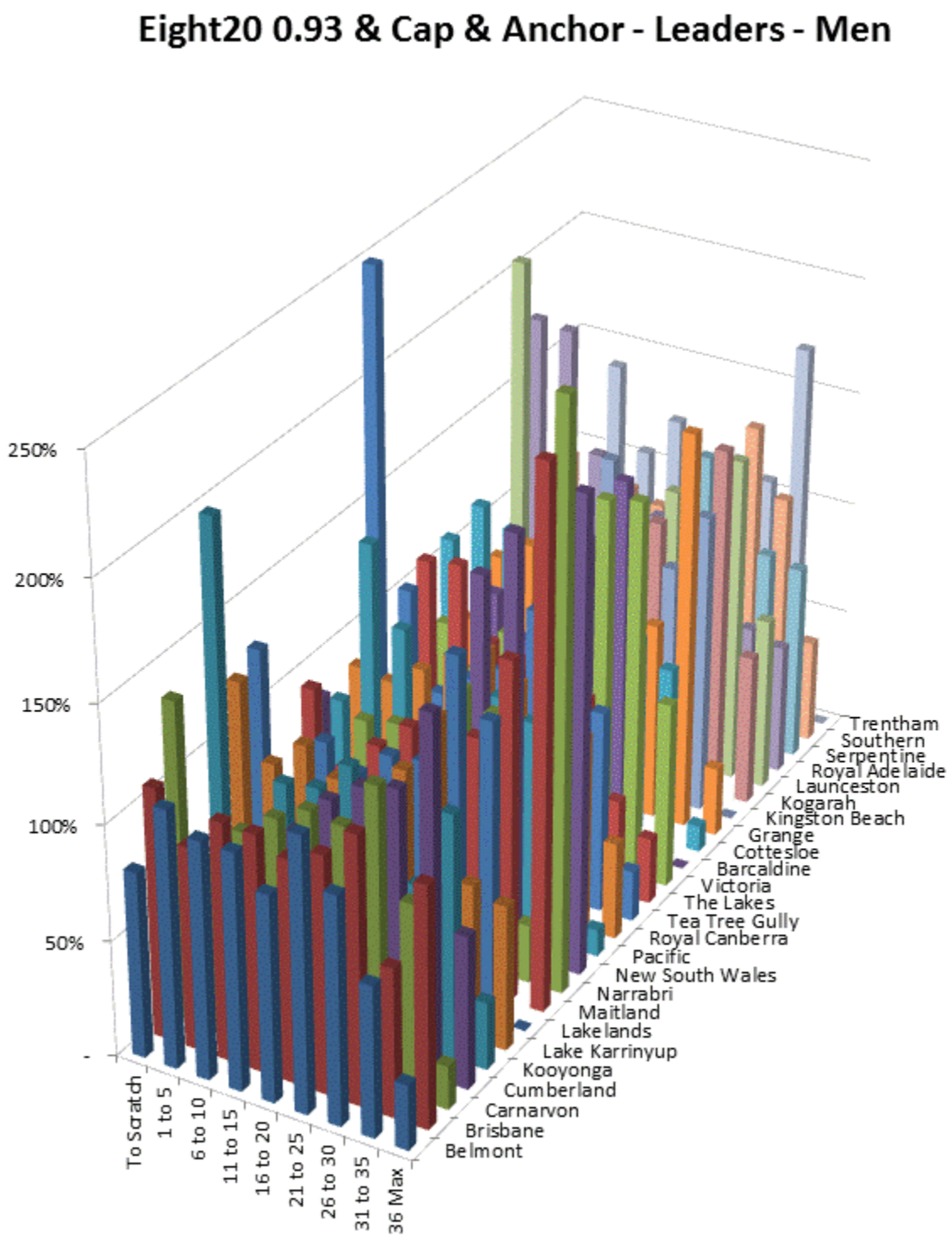
The Playing Field – Eight20 0.94 & Cap & Anchor – Winners – Phase 2



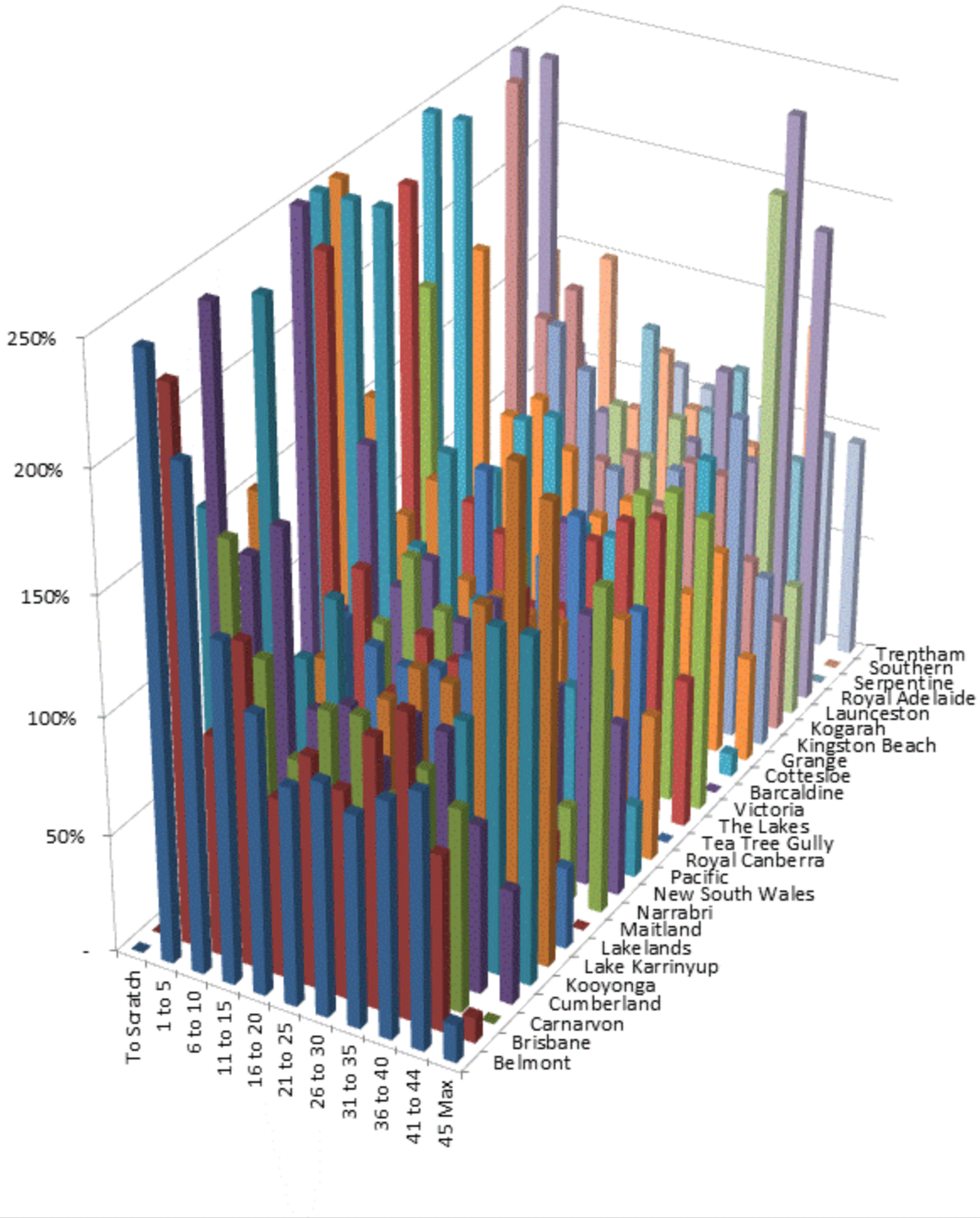
Eight20 0.94 & Cap & Anchor - Winners - Women



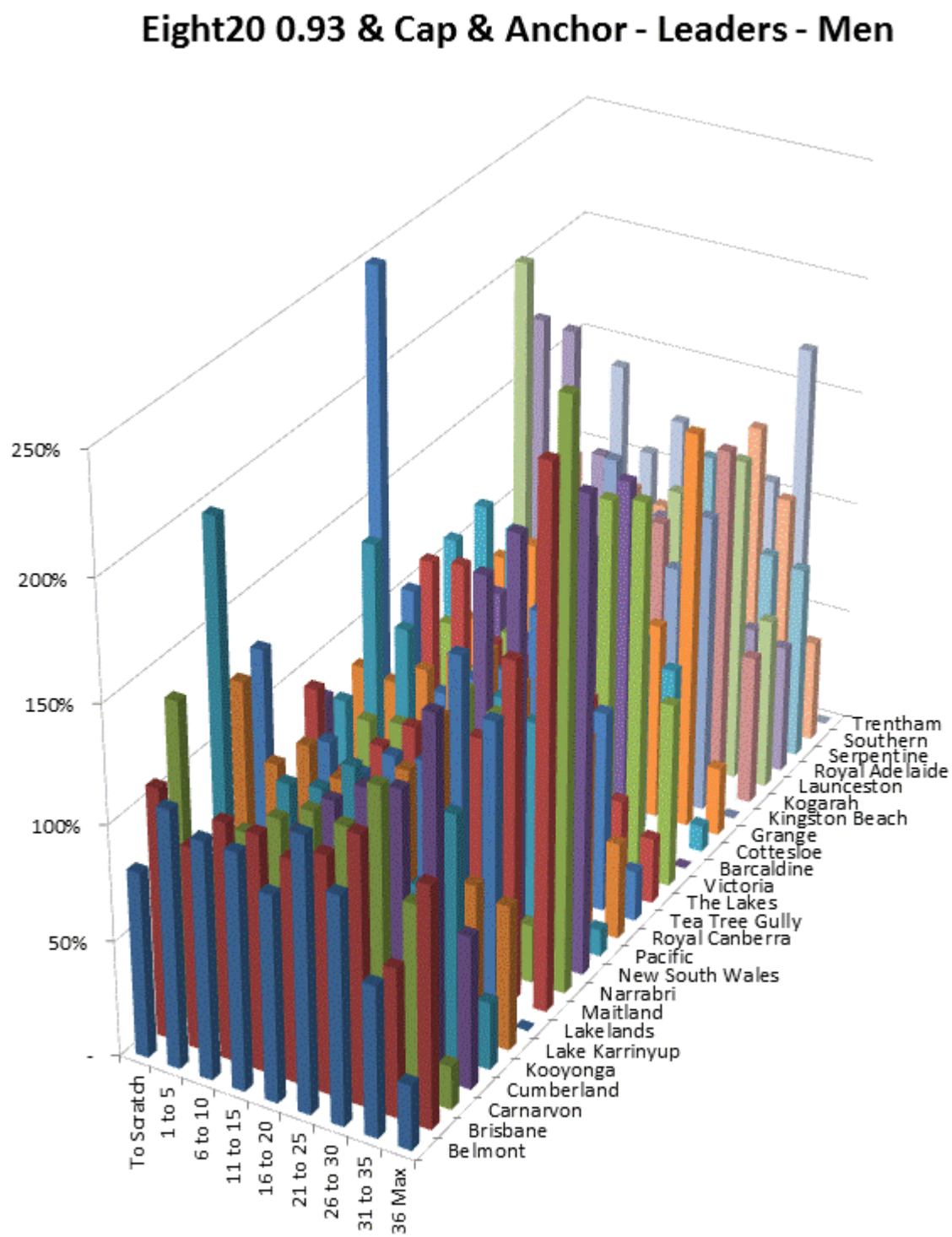
The Playing Field – Eight20 0.93 & Cap & Anchor – Winners – Phase 2



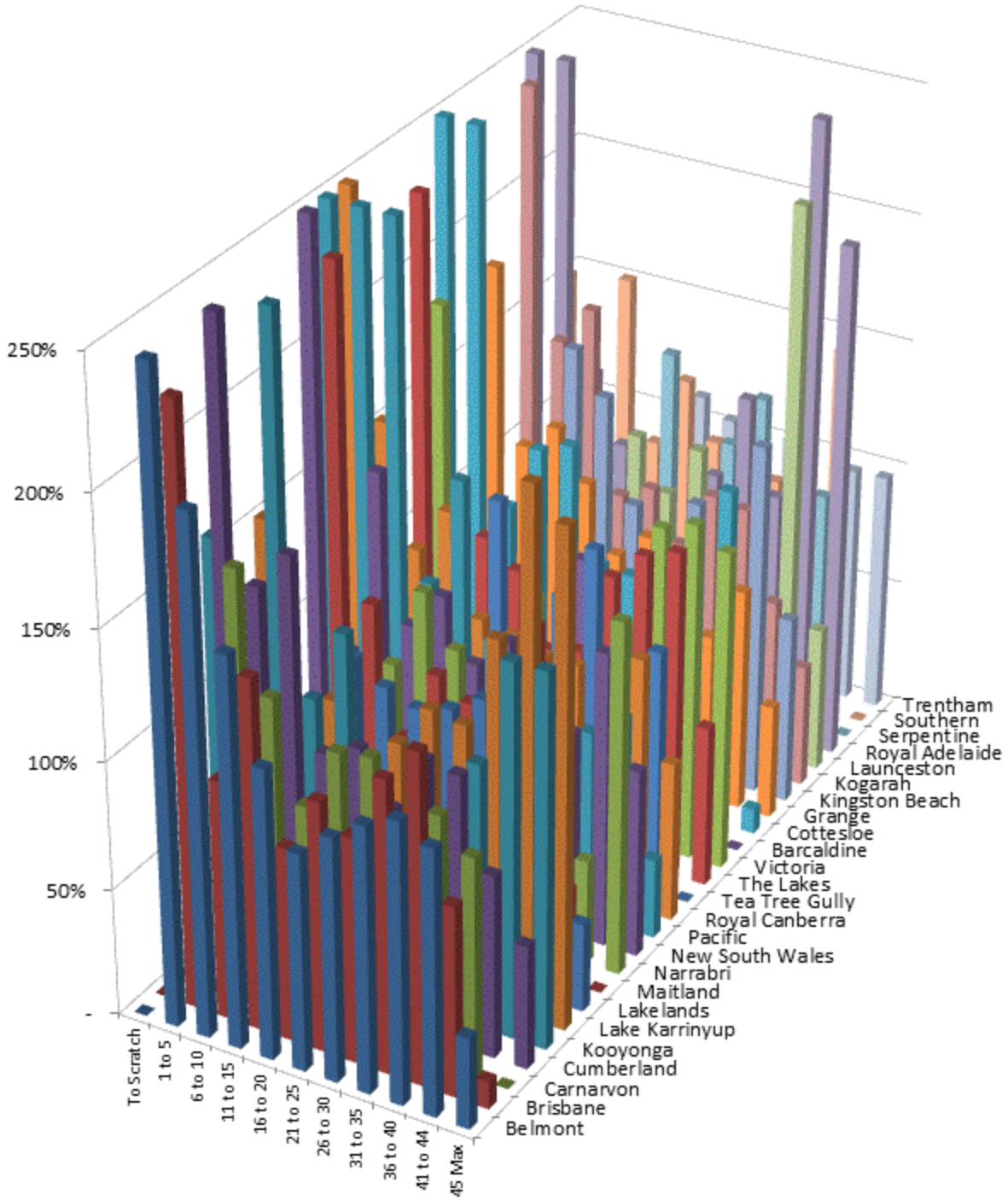
Eight20 0.93 & Cap & Anchor - Winners - Women



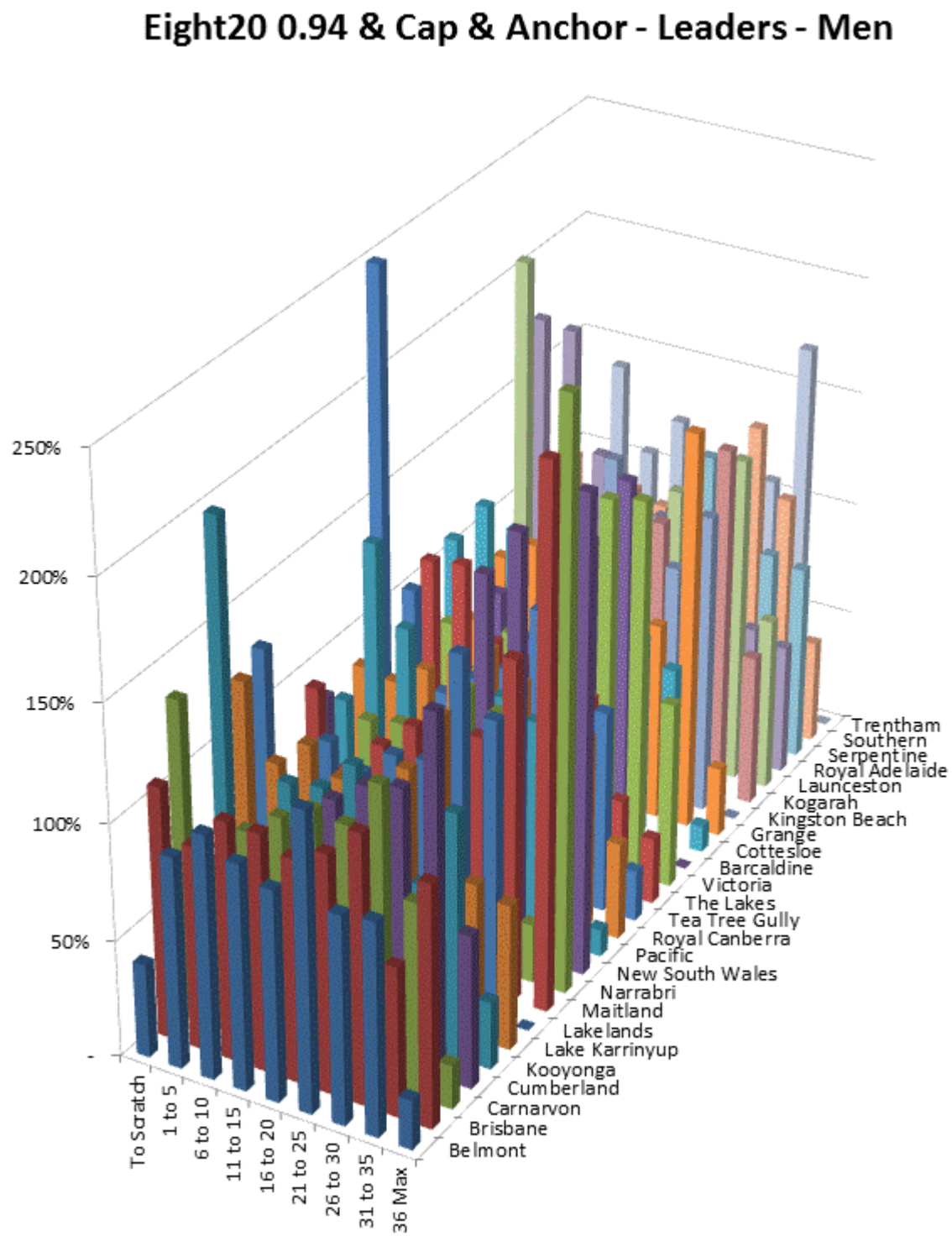
The Playing Field – Eight20 0.95 & Cap & Anchor – Leaders – Phase 2



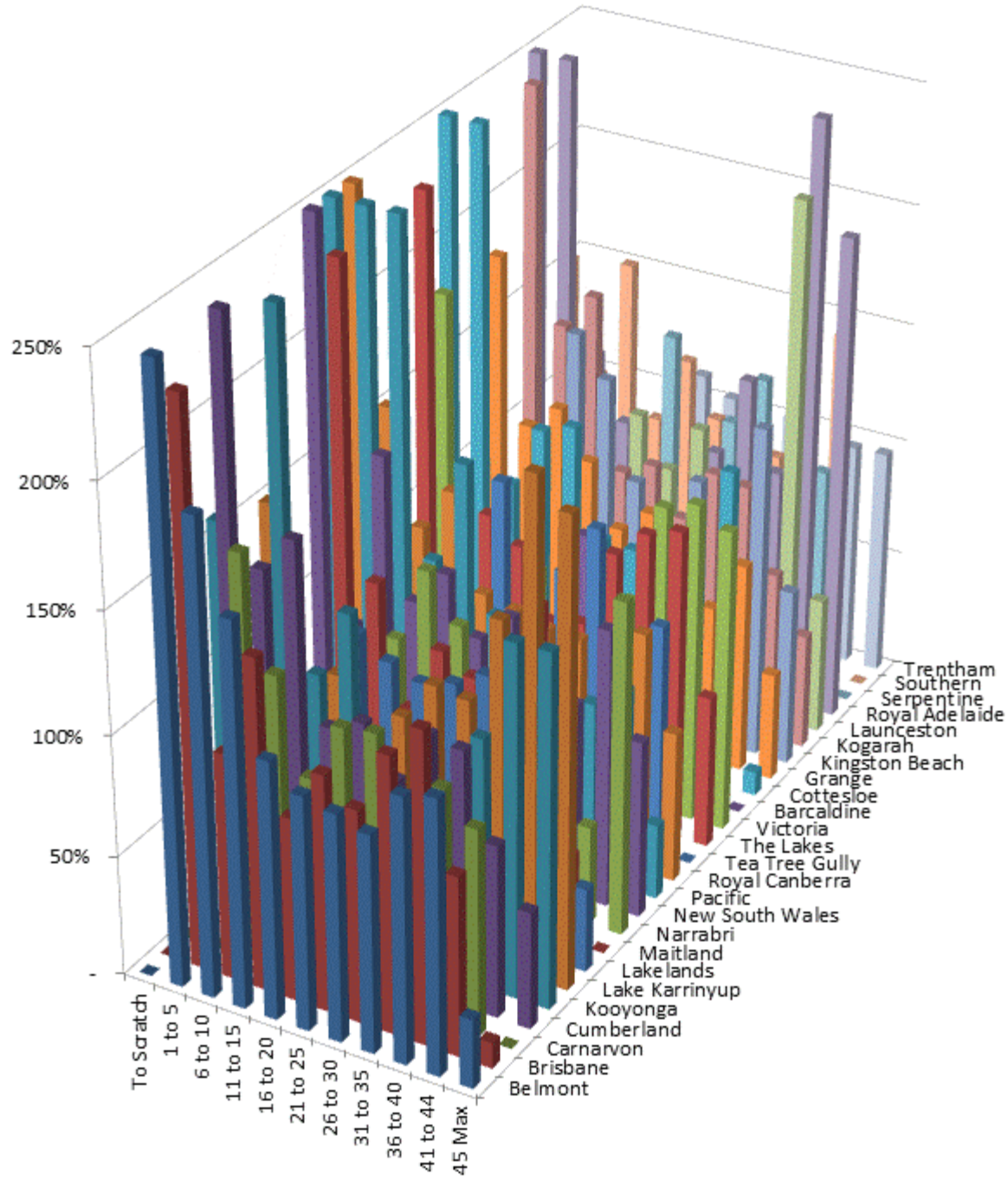
Eight20 0.95 & Cap & Anchor - Leaders - Women



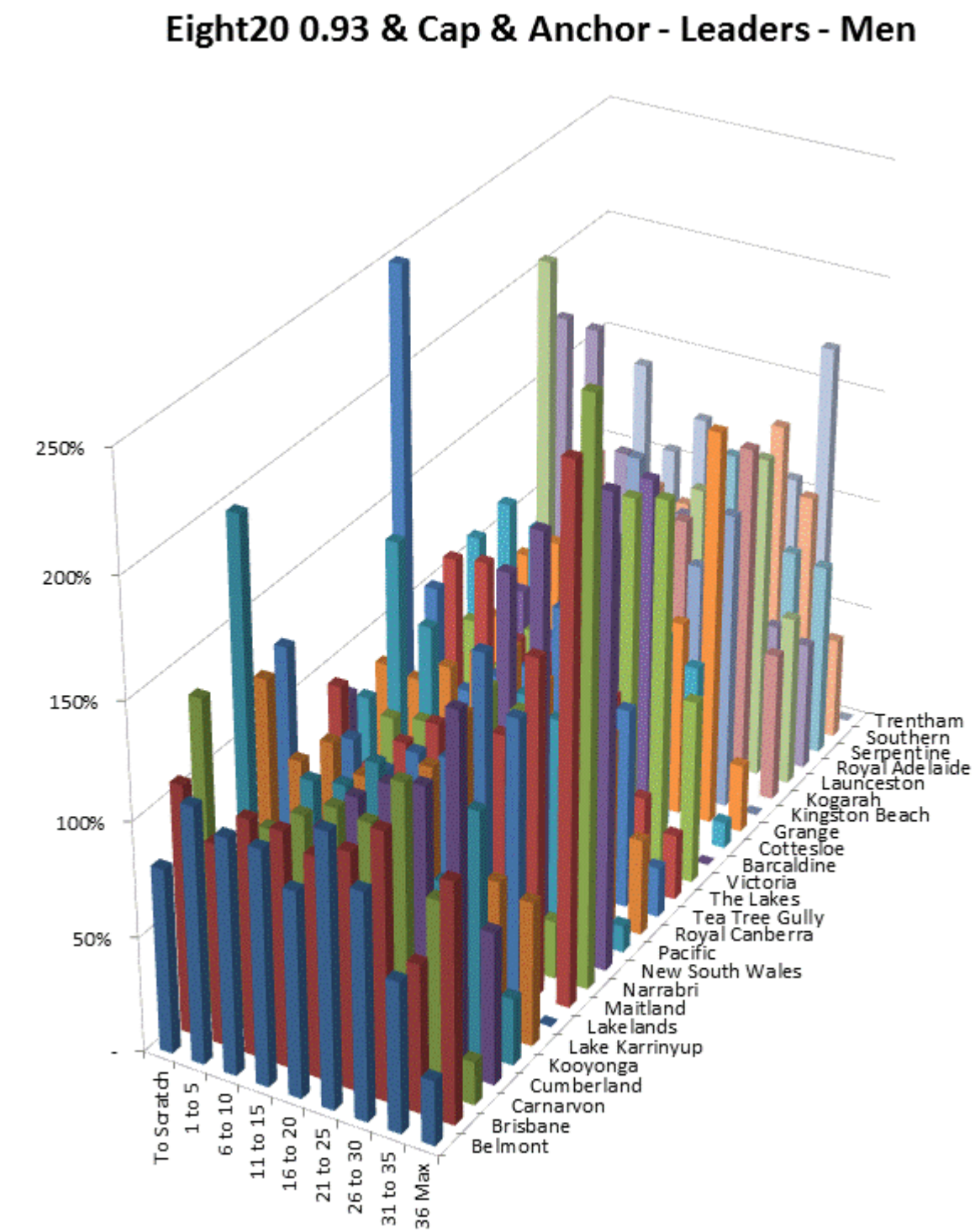
The Playing Field – Eight20 0.94 & Cap & Anchor – Leaders – Phase 2



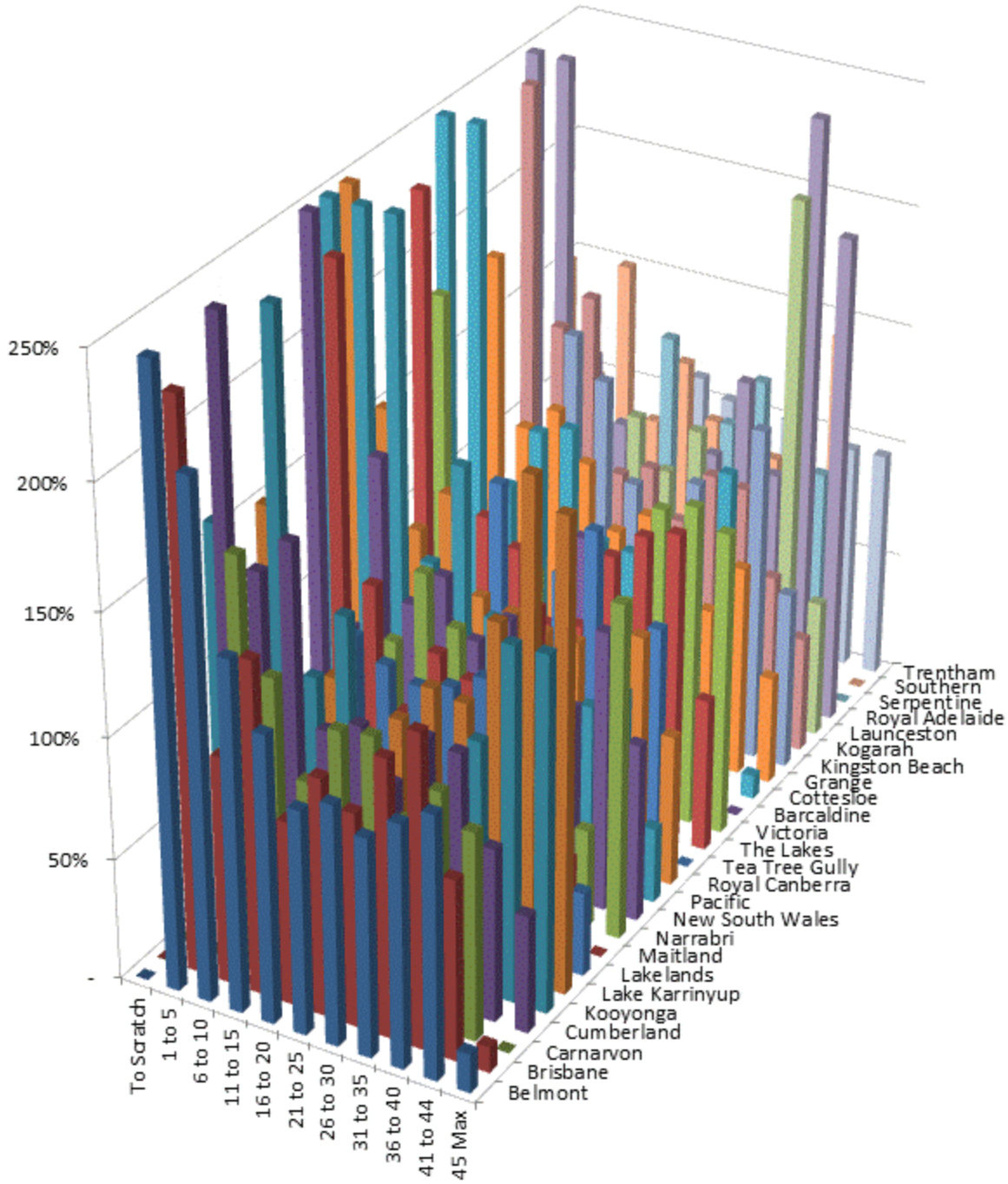
Eight20 0.94 & Cap & Anchor - Leaders - Women



The Playing Field – Eight20 0.93 & Cap & Anchor – Leaders – Phase 2



Eight20 0.93 & Cap & Anchor - Leaders - Women



Methodology

Phase 1

The dataset consisted of all rounds of golf at the club over the three year period to November 2010. There were fifteen clubs.

Rounds away from home were included for calculating members' handicaps. Rounds away from home were not considered in calculating Handicap Bias. (Handicap Bias is the proportion of winners in a given handicap range compared to the proportion of the field in that range. 100% is neutral, greater than 100% is favourable, and less than 100% is unfavourable.)

As a base case, the Handicap Bias was calculated under the Old and Current Systems. As an extension of this, the Handicap Bias was calculated with visitors eliminated from the competitions, ie members only.

For the most part, the remainder of the analysis took all rounds, regardless of old or current system, and recalculated the handicaps under various models.

As we had no history for visitors, we were unable to model their handicaps under the various options, and so they were eliminated from the competitions.

The members were sorted in date order, so that their prior rounds were available. Their handicaps were calculated if they had a minimum number of rounds (32) prior to each competition. Players without sufficient rounds at the time to have a calculated handicap were eliminated from the simulated competitions. Also, since the rounds in the first year for the most part had more players who had not yet reached 32 rounds, with only the more frequent players participating, to eliminate this bias, only competitions from 1/12/2008 were then taken.

As a further extension of the base case, the Handicap Bias was recalculated for Old and Current systems with this reduced field.

There is always the possibility of adjustments in the GolfLink data, so for the period of the current system, the best 10 of 20 current handicap model was also calculated as a check on the Played Off handicaps. The obvious reason for differences here might be that a player played off a different handicap to that calculated.

A competitor's initial result was the Stableford equivalent score based on the actual handicap the player played off, adjusted for course rating. If a different handicap was calculated to what was played off, the difference was added to the score. Eg if a player played off 26, had a Stableford Equivalent (adjusted for Course Rating) of 35, and in the modelling had a calculated handicap of 24, then they are given a new score of 33 points.

The simulated competitions then had all participants ranked according to their calculated results.

The results of Handicap Bias were then computed for the various handicap models.

In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. This is called the Weighted Bias, and is presented in the following as a difference from 100% to that positive and negative bias is highlighted.

A least squares regression line can be fitted to the weighted bias values, and its gradient will be a measure of whether the bias is tilted in favour of the low or the high markers. Multiplying this gradient by 10000, one gets the Tilt Index. An untilted playing field would have a zero Tilt Index. A positive index means the Tilt is in favour of the high marker, a negative Tilt means it is in favour of the low marker.

Similarly, the standard deviation of the Weighted Bias values can be calculated for each series. This is a measure of the "lumpiness" or how Level the playing field is. Multiplying this by 1000, one gets the Level Index. A perfectly flat field would have a zero Level Index.

The Handicap Models

The first model was based on the current system, being the average of the ten best scores from the last 20 rounds, multiplied by a Bonus For Excellence (BFE) ratio. This was called the **Ten20** system. The current system is of course Ten20 with a BFE of 0.96. Other variations were modelled, such as Ten20 0.95, Ten20 0.94, etc.

The second method took fewer than ten of the best scores from the last twenty rounds. Taking only the best nine scores from the last twenty rounds was called the **Nine20** method, and was calculated for various BFEs. Similarly the **Eight20** was calculated.

The third method was based on taking fewer best scores for the higher markers. This was called the **Blended** method, with the number of rounds taken varying from six to ten:

Blended		
Best of 20	Men	Women
10	-5 to 15	-5 to 25
9	16 to 20	26 to 30
8	21 to 25	31 to 35
7	26 to 30	36 to 40
6	31 to 36	41 to 45

A BFE was then applied to the result.

The fourth model was based on taking the lower of two moving averages, the faster moving average being based on the best 8 from 16 rounds, and the slower based on the best 16 of 32 rounds. This was called the **Hybrid** method. Again a BFE was applied.

The objective with the Hybrid is to better manage movement in handicaps, not necessarily to have a different handicap on average. By limiting the rise in handicaps after poor form to the slow moving average, the handicap will rise more slowly. By having a faster moving average apply when form is rapidly improving, the handicap will be less than it would otherwise have been.

Phase 2

The same data bases were used in Phase 2 as in Phase 2, with the addition of another ten clubs.

In Phase 1, the Handicap Bias was calculated for the winners under varying handicap methods against the original field distribution based on the original playing handicap. In Phase 2, the winners under the variations, all of which related to the Eight20 method, were compared to the field handicap distribution based on the relevant method.

Also, in Phase 1, a player's rounds were eliminated if they had not completed 32 rounds – this was in order to compare like with like when the Hybrid (which used 32 rounds) was involved. In Phase 2 they are only eliminated if there is fewer than 20 rounds.

In addition, the Men's and Women's rounds, for handicap purposes, were capped at a differential of 40 and 50 respectively.

This gives rise to small variations between the Tilt and Level between the Phase 2 and Phase 1 results for the Eight20 cases. Also in Phase 1, for the Eight20 method only, the intermediate BFEs of 0.95, 0.94, 0.92,and 0.91 were obtained by interpolation. In phase 2 they are calculated explicitly.

In Phase 2 a full set of cases was included which include the Anchor. Here handicaps are not allowed to rise beyond four strokes over the best handicap achieved in the prior twelve month.

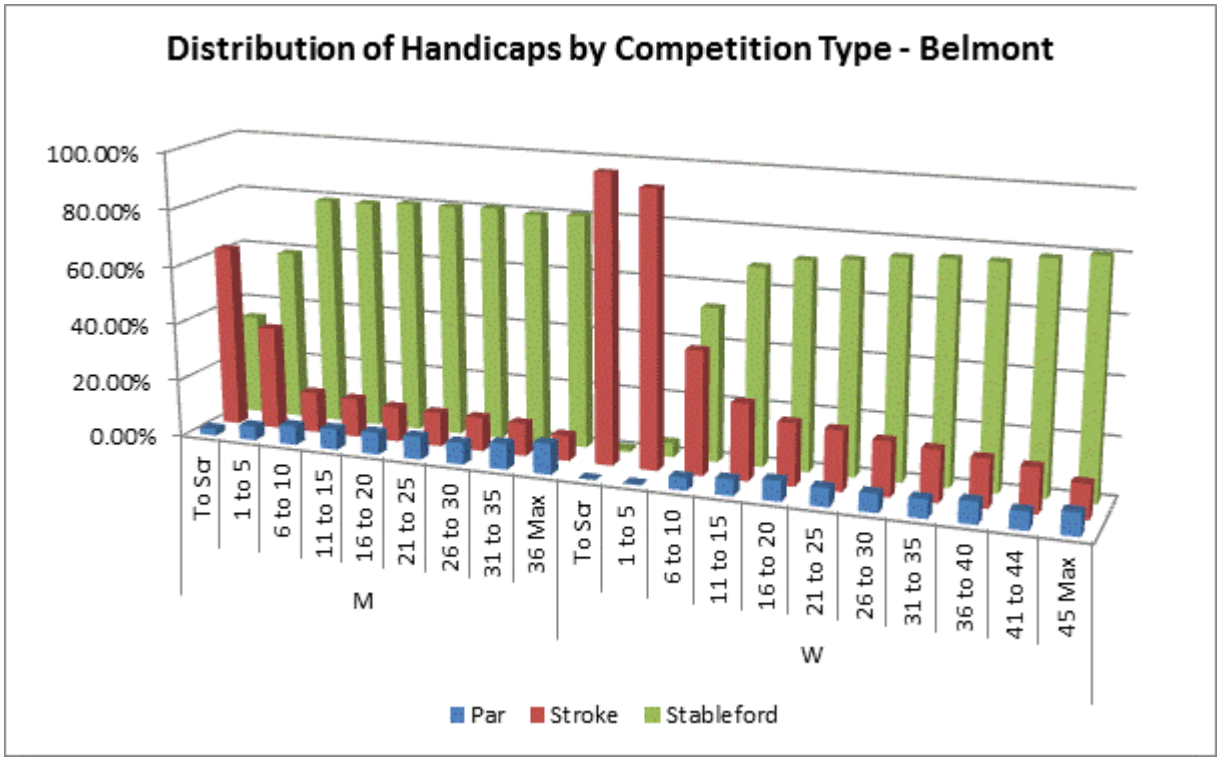
In Phase 2 the Prize-winners were also considered as well as the Winners. The leading 20% of the Competition were defined as the "Leaders", and their Bias calculated.

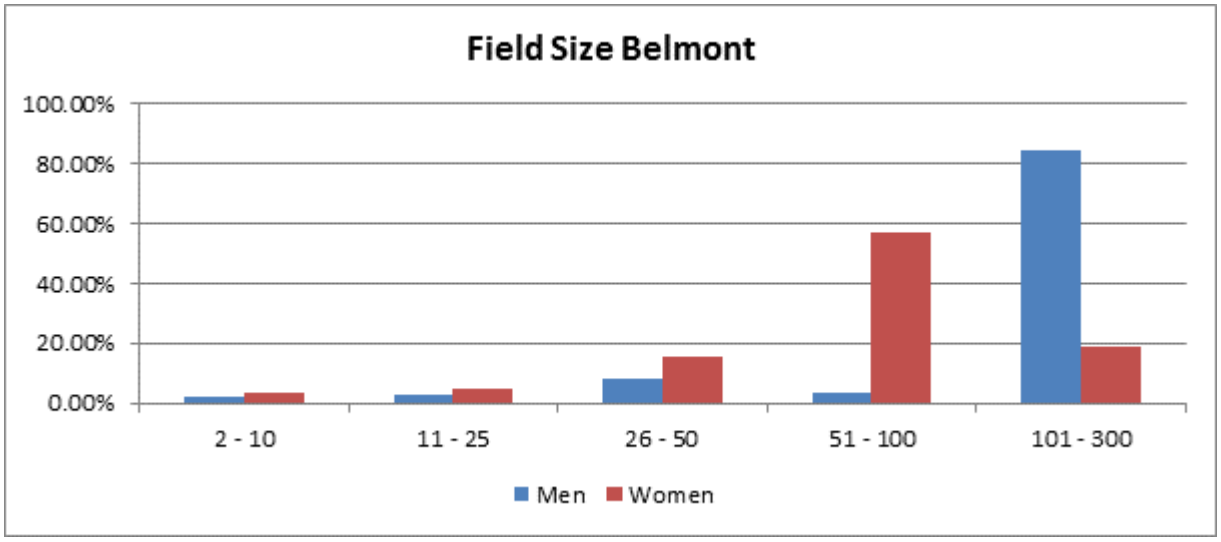
Finally, for the Eight20 0.93 case only, the Bias was calculated assuming that grading was eliminated. If there was more than one competition for a given gender on the same day, the competitions were assumed to be graded. The "No Grade" Bias was calculated with all the competitors assumed to be participating in a single competition.

Appendix 1 – Belmont

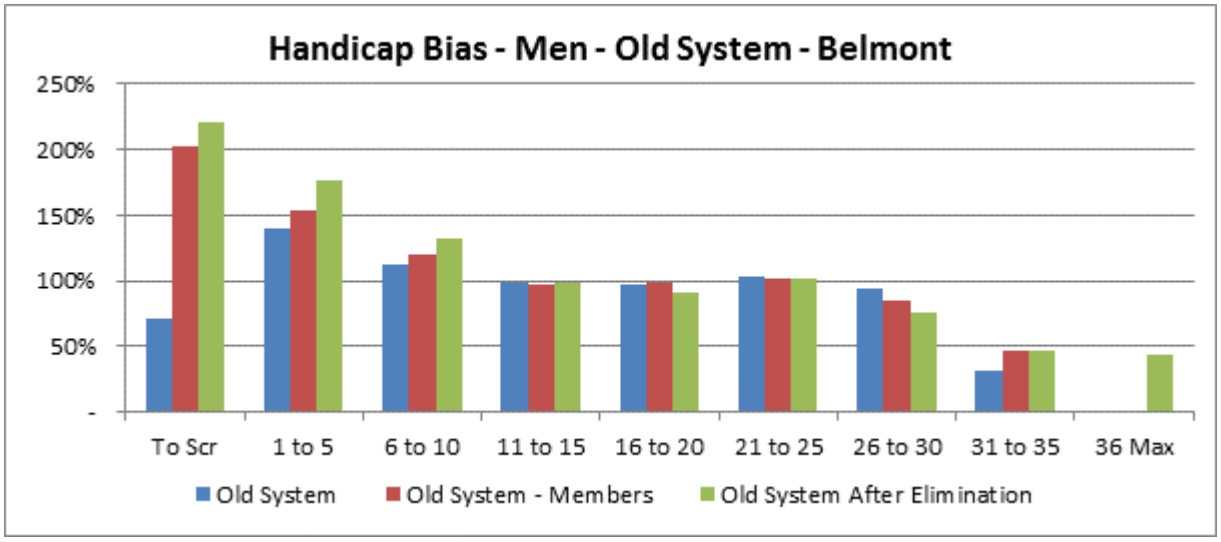
Phase 1

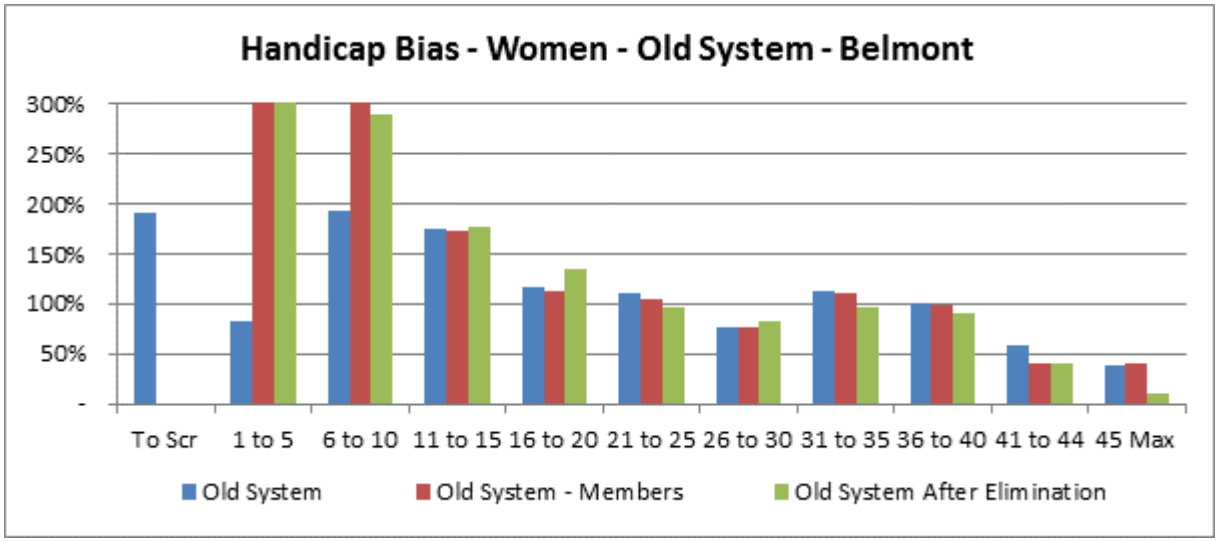
Profile Belmont			
Belmont	Men	Women	Total
Players in Database	2,223	682	2,905
Members	787	298	1,085
Visitors	1,436	384	1,820
Members who have Played 33 Rounds	722	282	1,004
Members with Last Round In Old System	181	50	231
Members with Last Round in Current System	606	248	854
Earliest Round	5/12/2007	21/2/2008	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			294
Number of Home Competitions	460	379	839
Number of Rounds of Golf	65,978	29,065	95,043
Number of Rounds at Home	58,755	26,173	84,928
Number of Rounds at Home Old	45,114	20,576	65,690
Number of Rounds at Home Current	13,641	5,597	19,238
Num Rnds Members at Home	53,774	24,436	78,210
Num Rnds Members at Home Old	40,898	18,920	59,818
Num Rnds Members at Home Cur	12,876	5,516	18,392
Num Rnds After Eliminations	31,805	14,798	46,603
Num Rnds After Eliminations Old	19,987	9,474	29,461
Num Rnds After Eliminations Cur	11,818	5,324	17,142



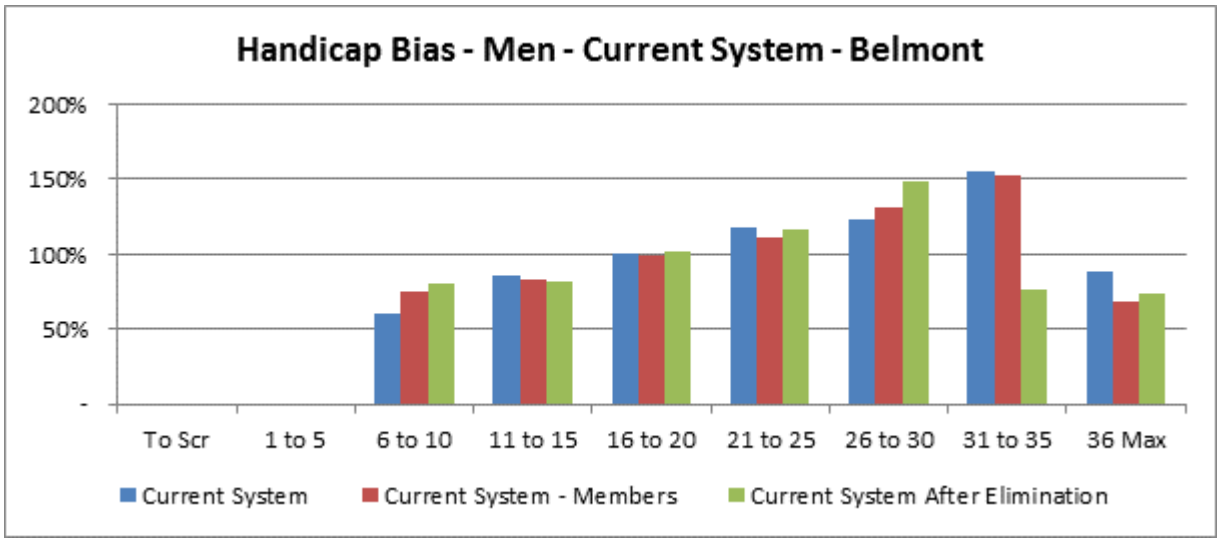


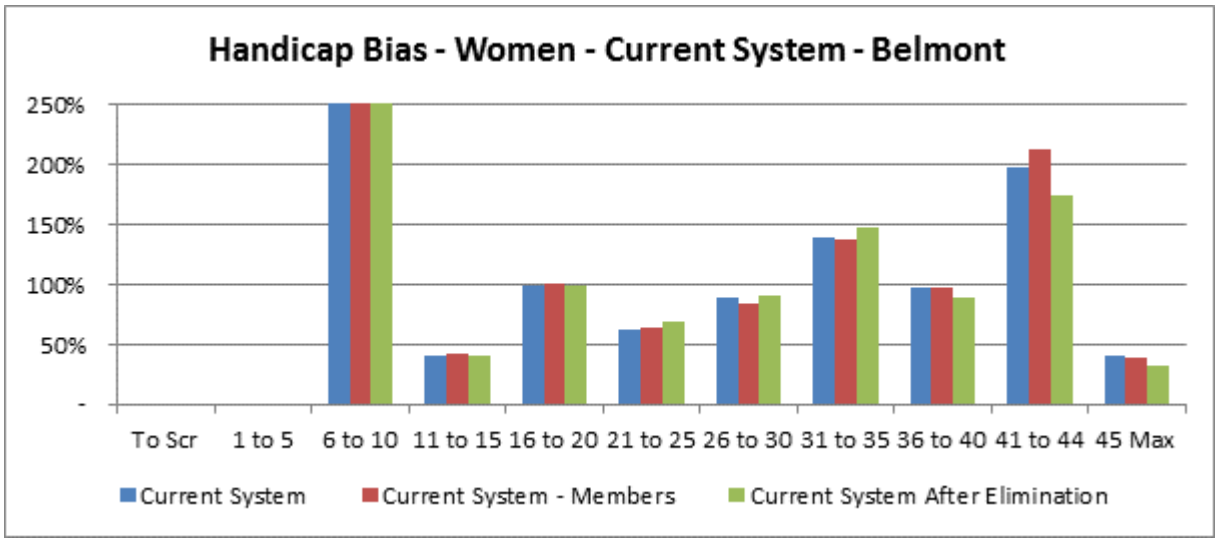
Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.



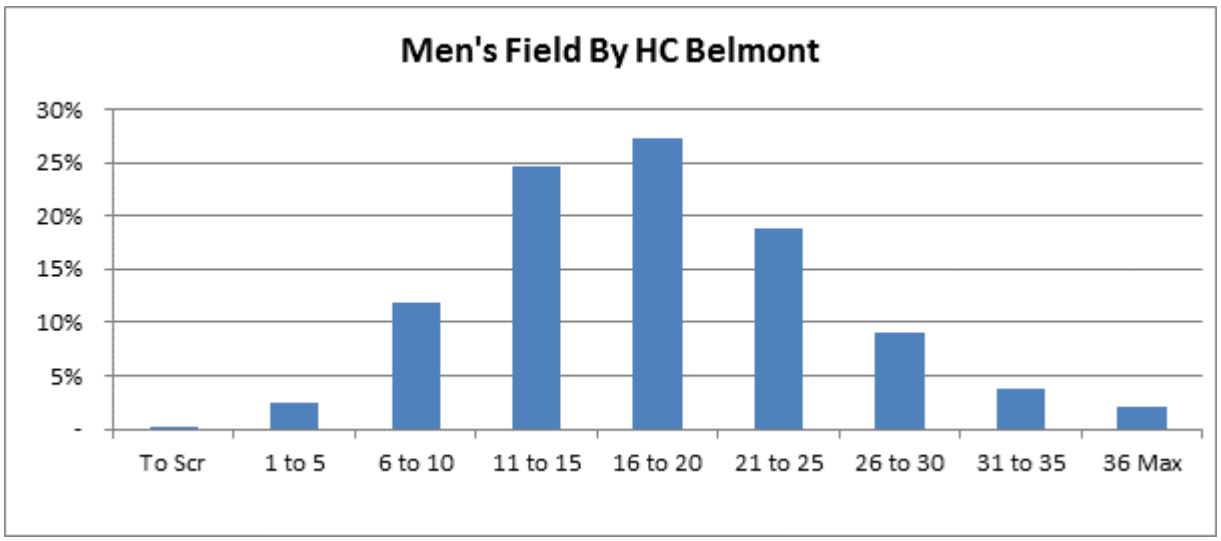


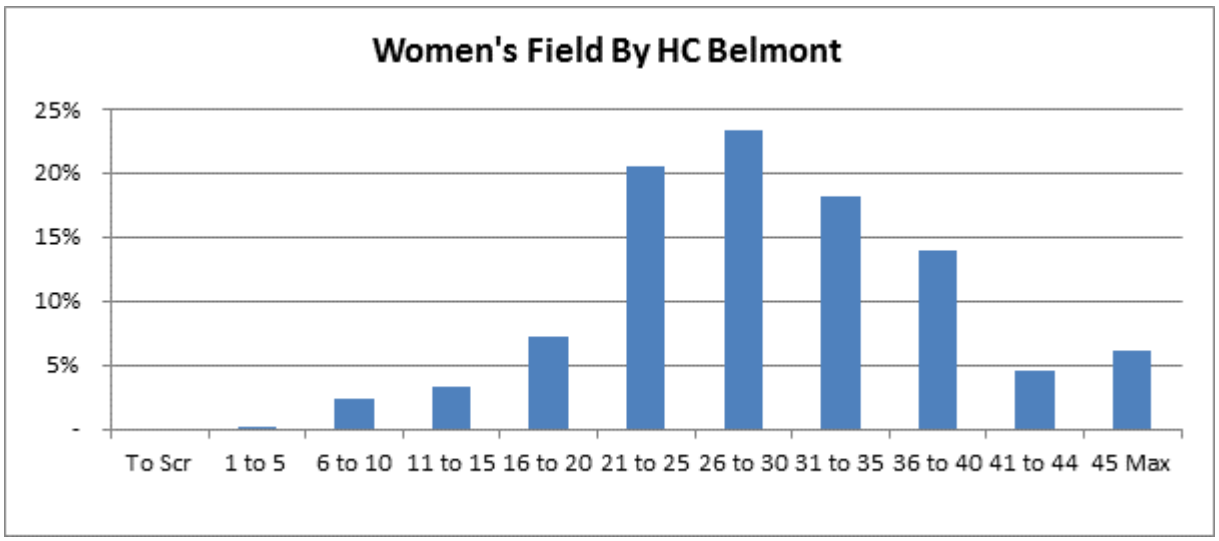
Under the Current System, this bias has reversed, so that there is now a bias in favour of the high markers.





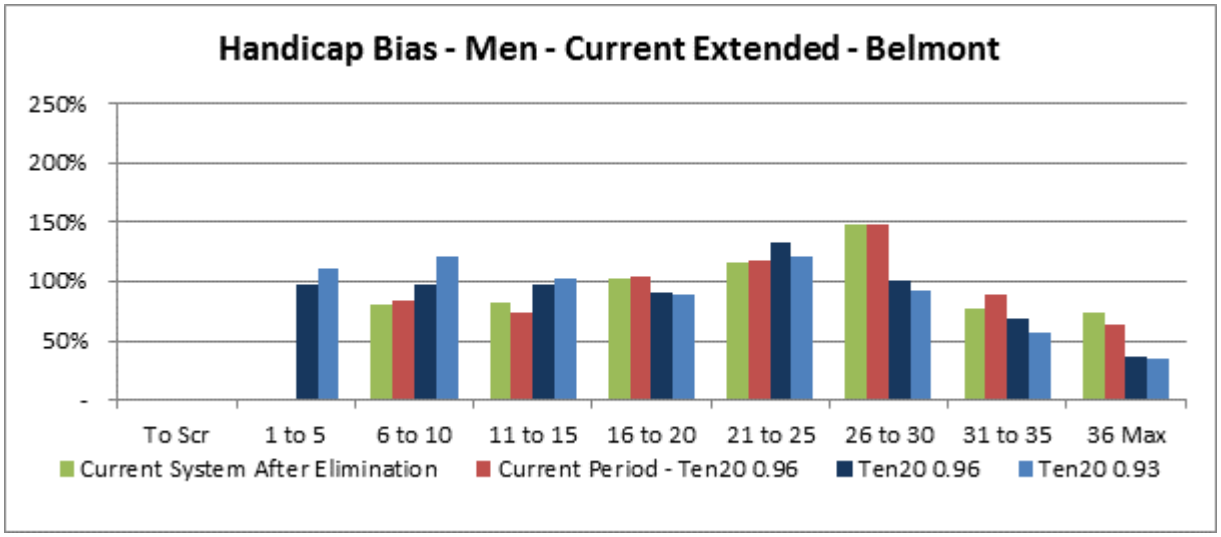
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





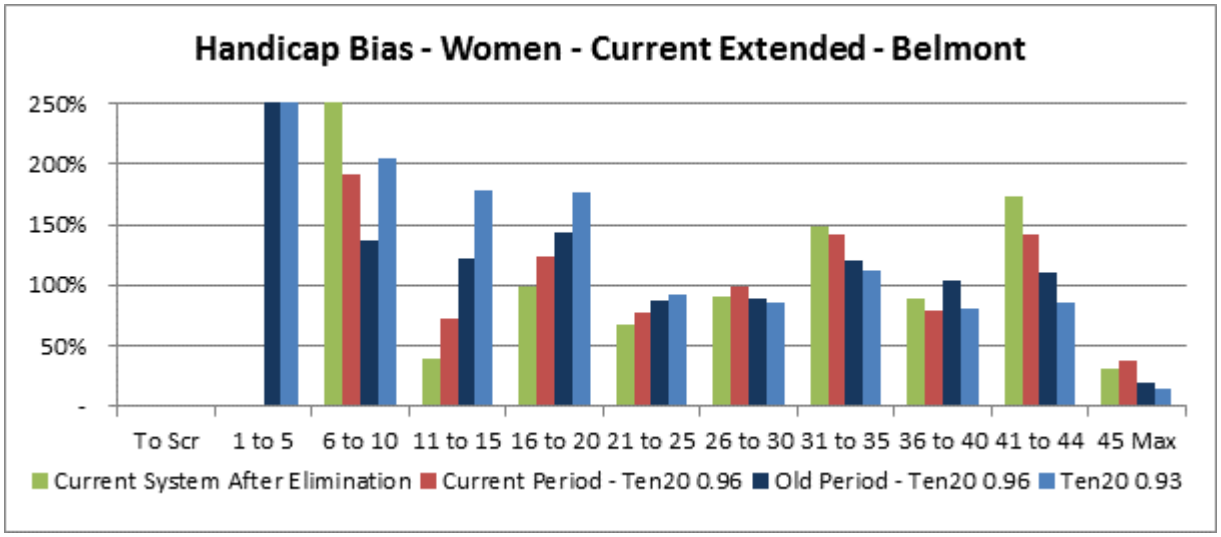
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

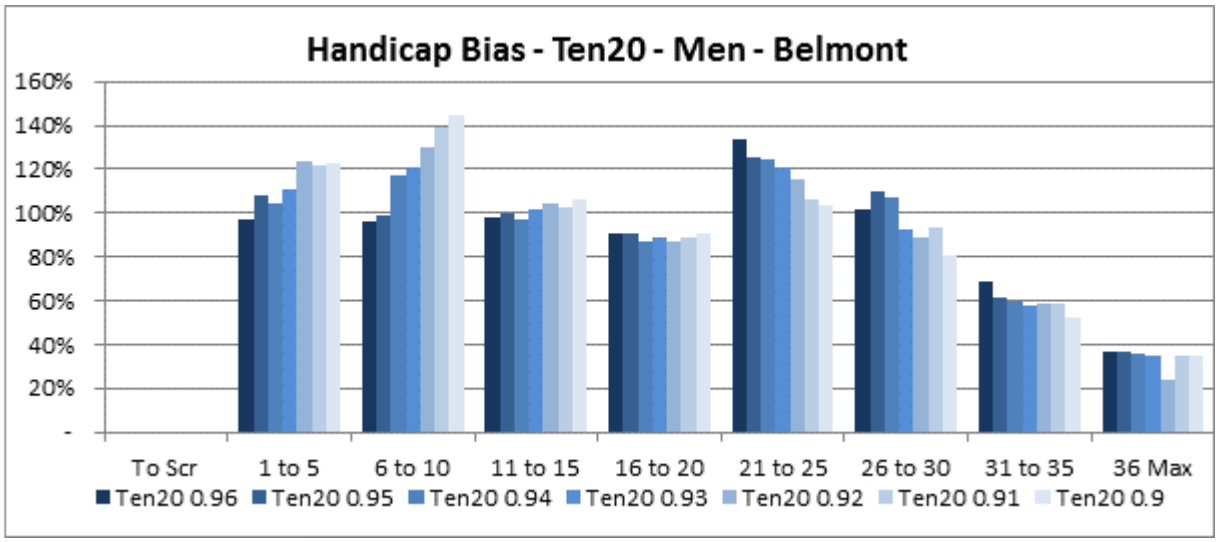


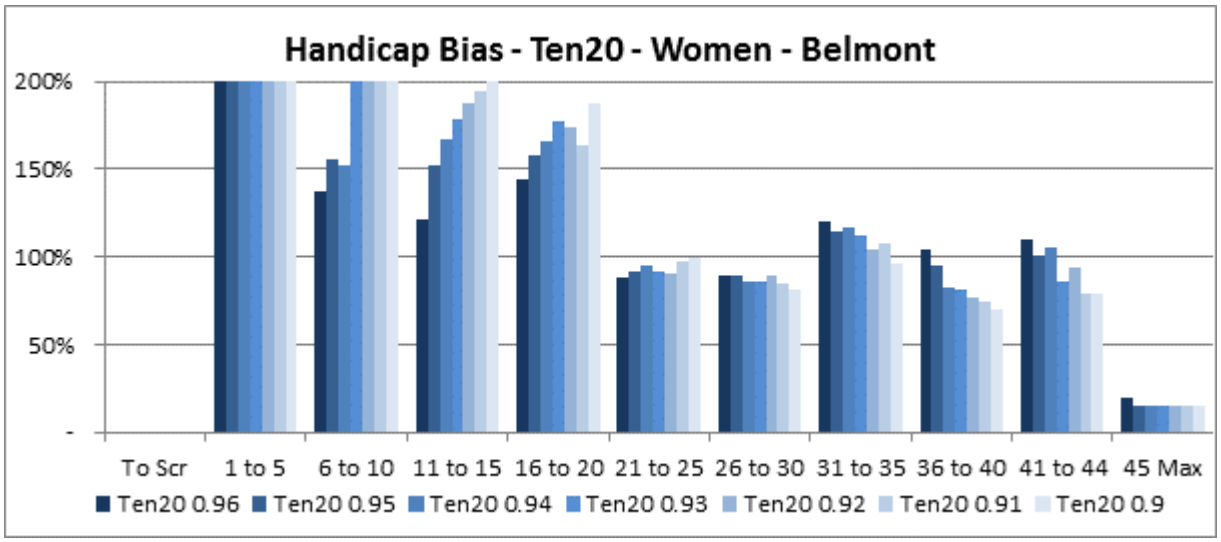
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted.

A similar conclusion applies to the women's competition.

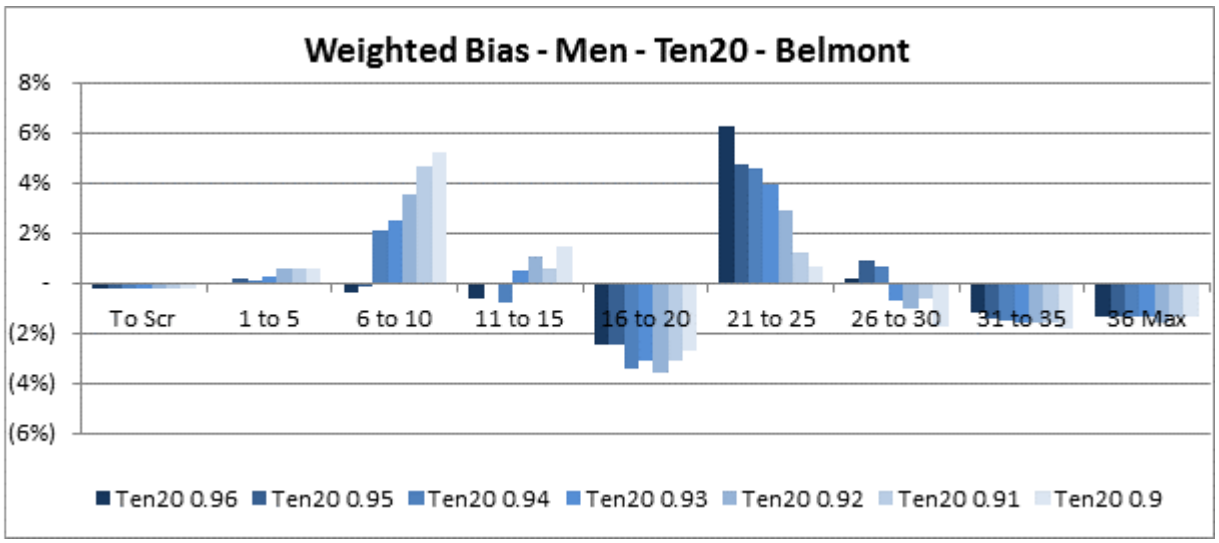


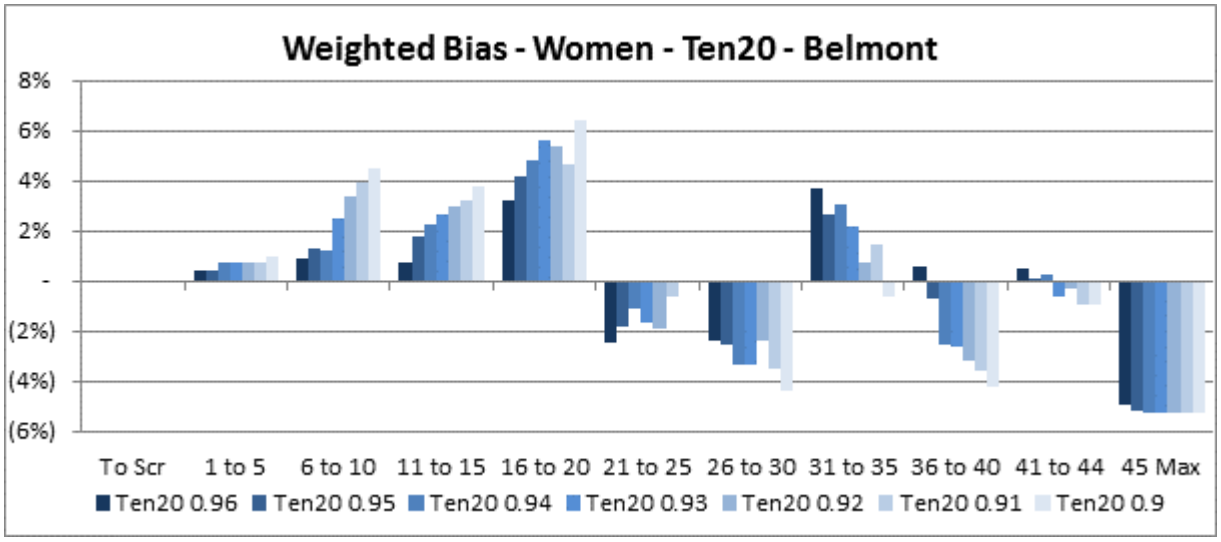
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

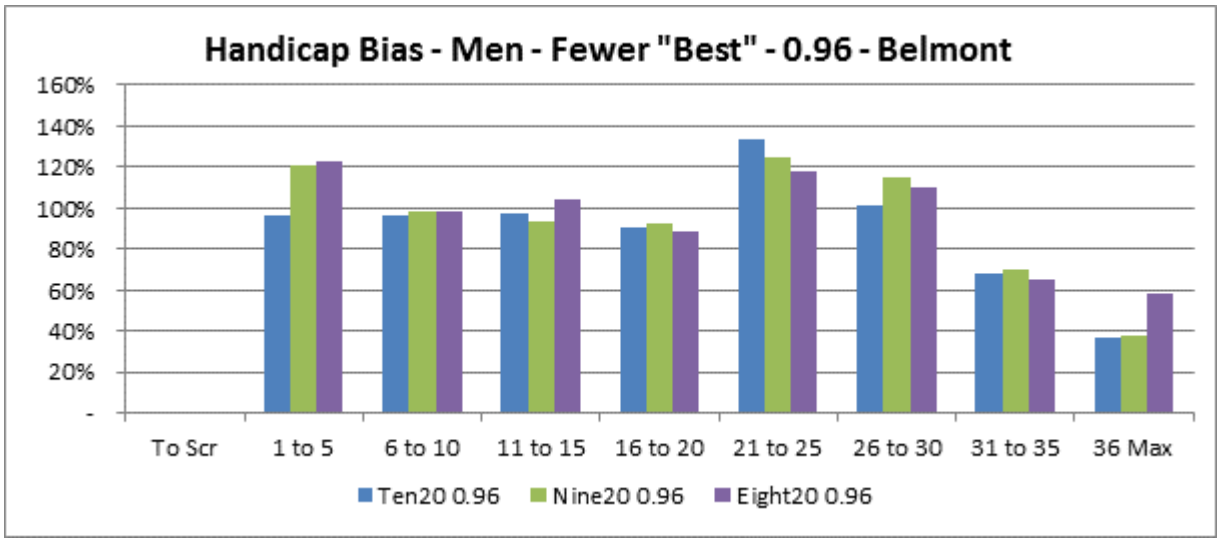


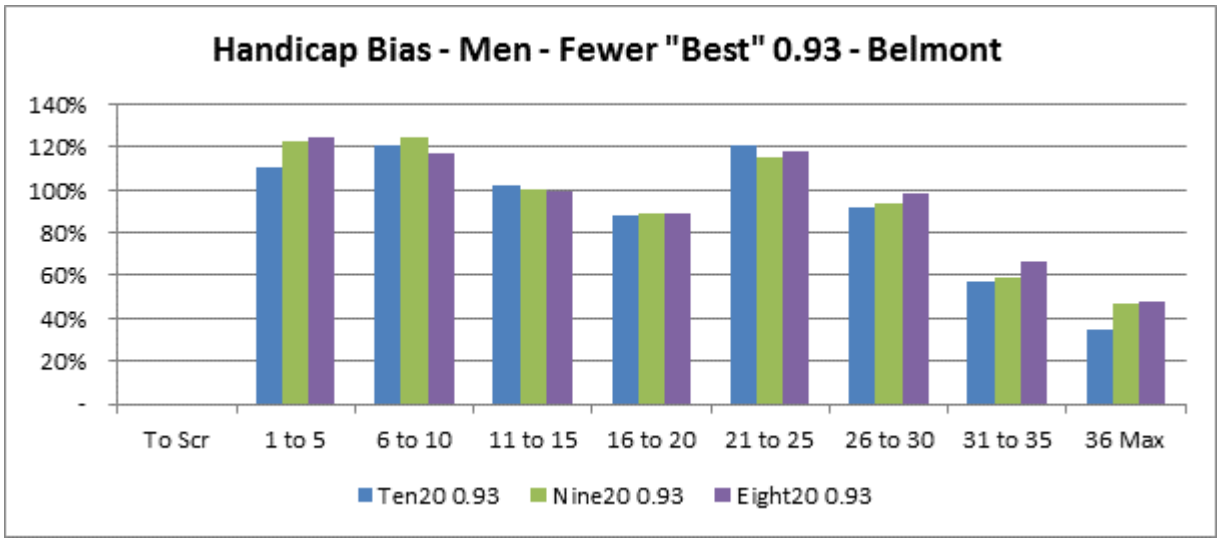


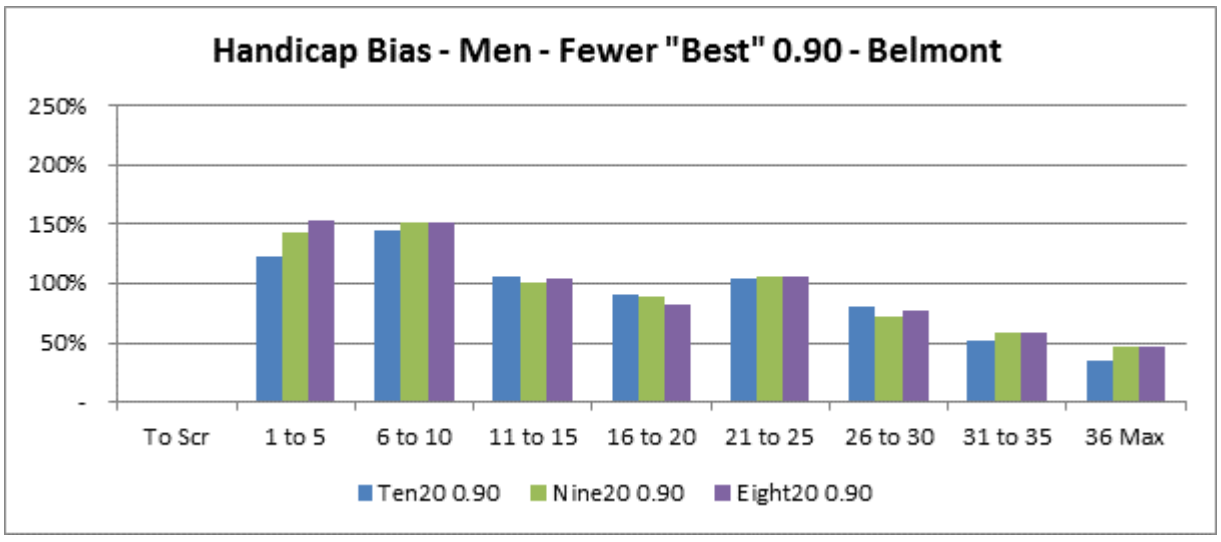
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

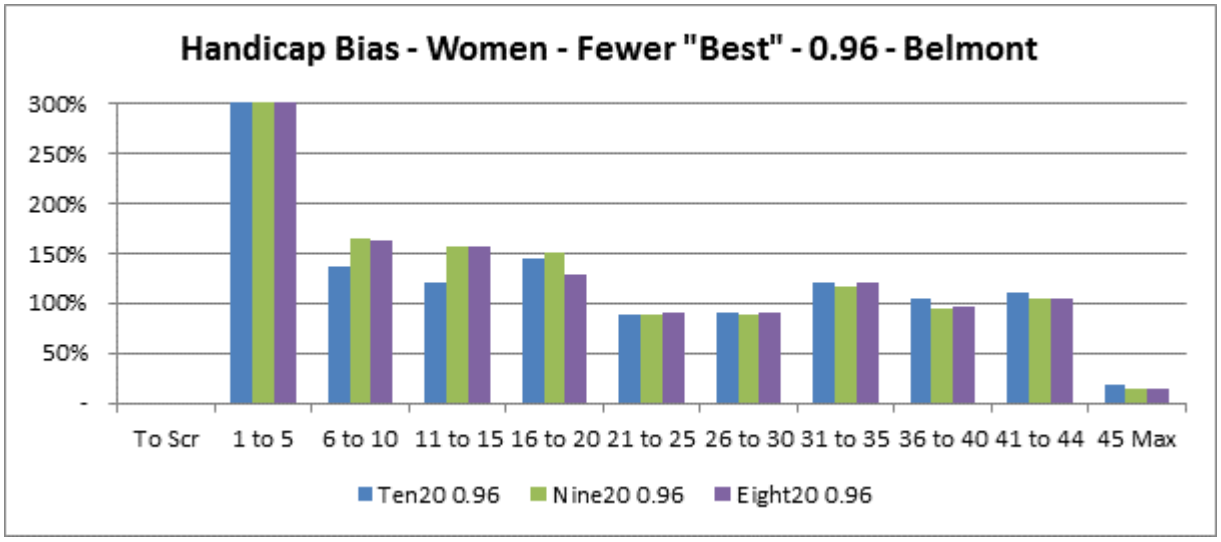
	Belmont			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	0.4	24.8	-23.1	25.1
Ten20 0.95	-3.9	20.4	-35.3	26.1
Ten20 0.94	-11.4	22.9	-41.8	29.4
Ten20 0.93	-21.9	21.4	-51.6	31.4
Ten20 0.92	-31.9	22.8	-56.6	31.2
Ten20 0.91	-34.5	21.8	-60.9	32.2
Ten20 0.9	-44.2	24.0	-72.7	37.8

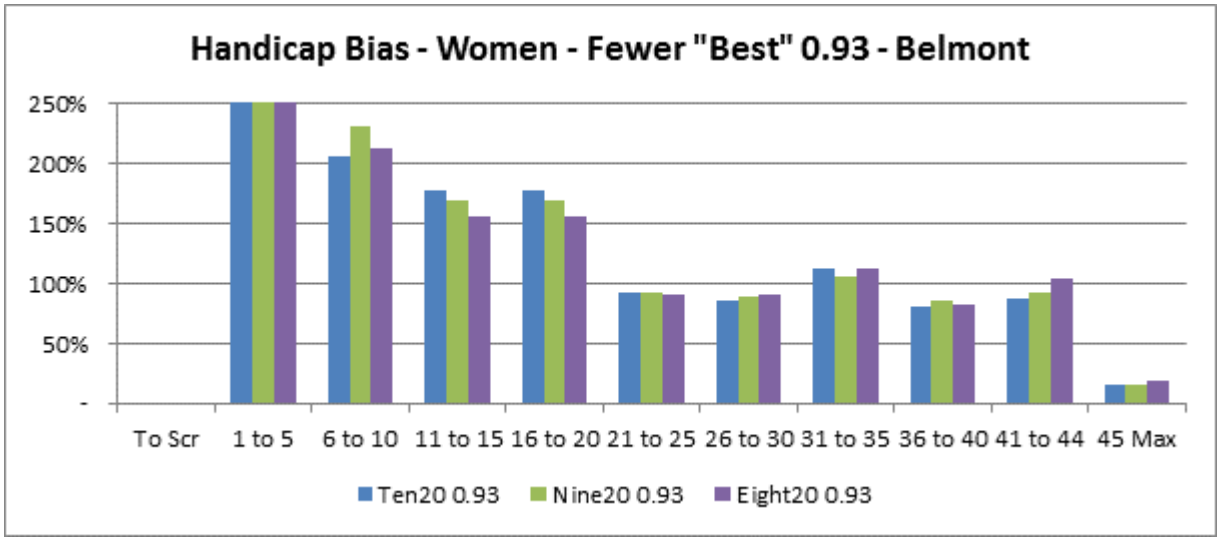
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

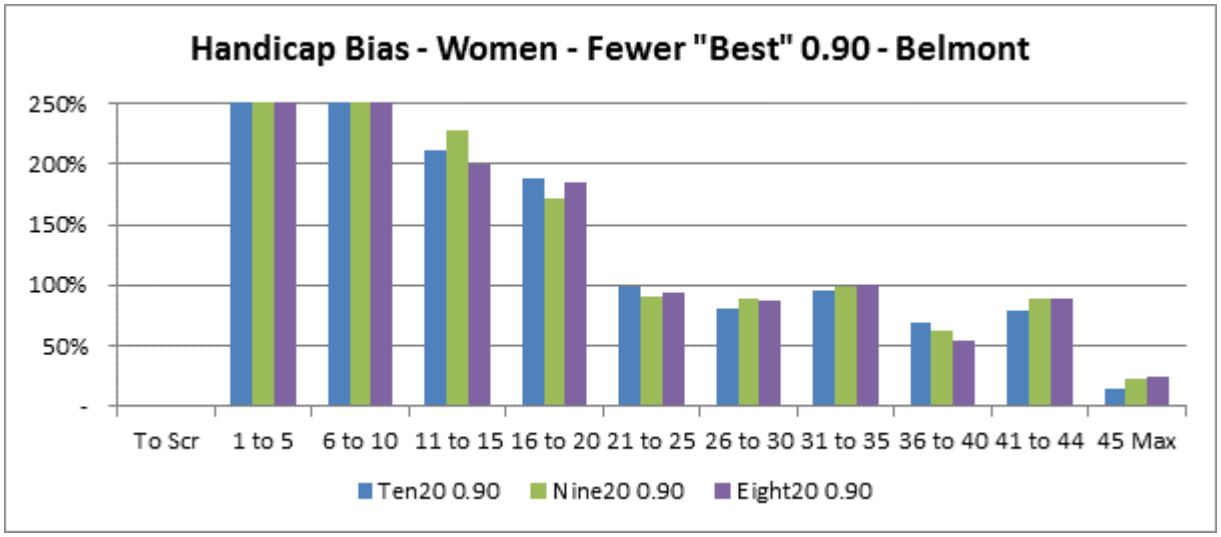







Handicap Bias - Women - Fewer "Best" - 0.96 - Belmont
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

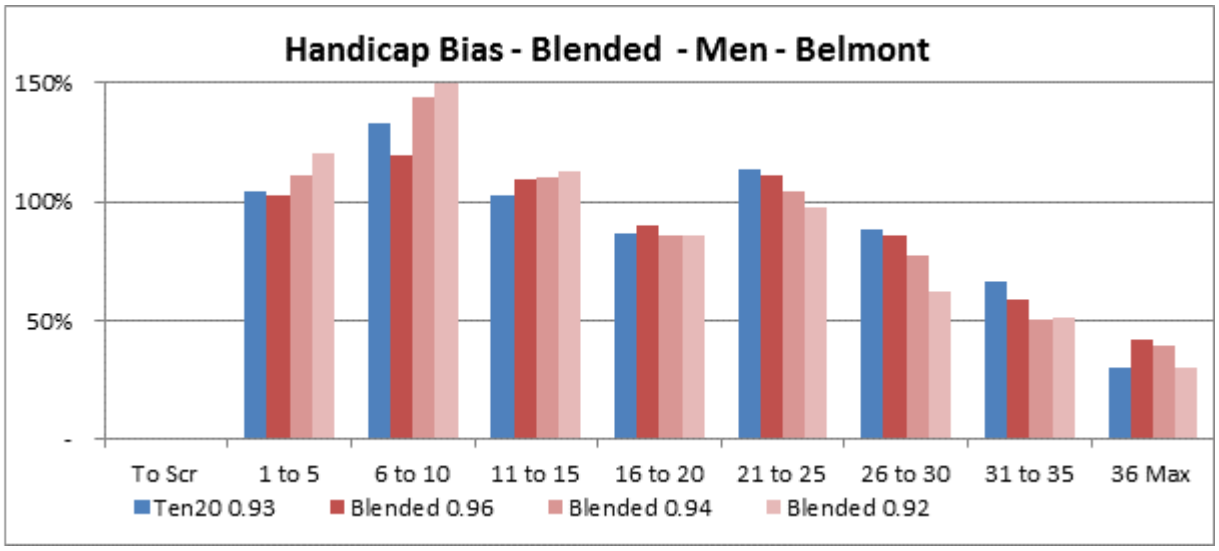

Handicap Bias - Women - Fewer "Best" 0.93 - Belmont
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

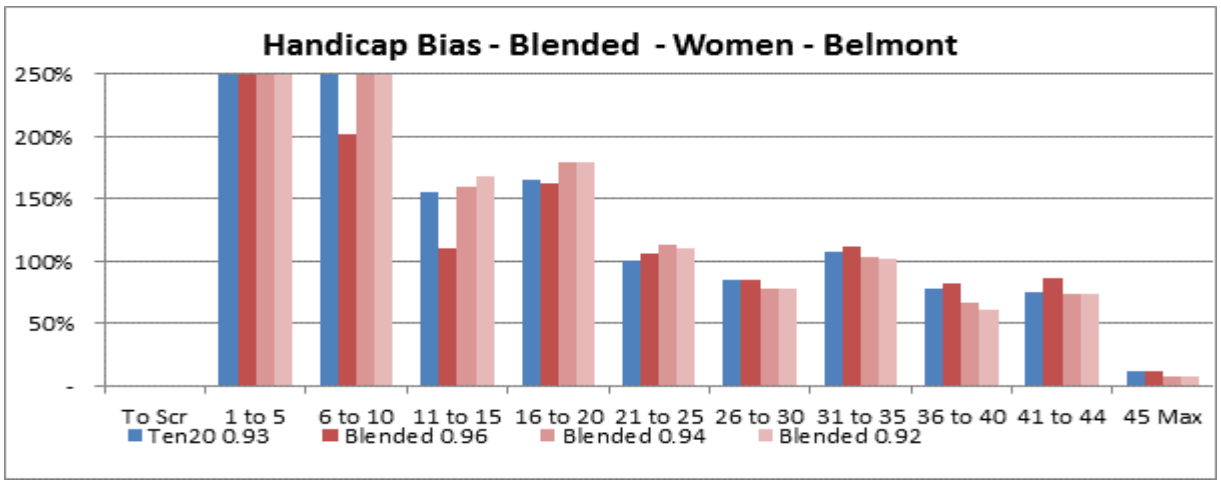

Handicap Bias - Women - Fewer "Best" 0.90 - Belmont
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

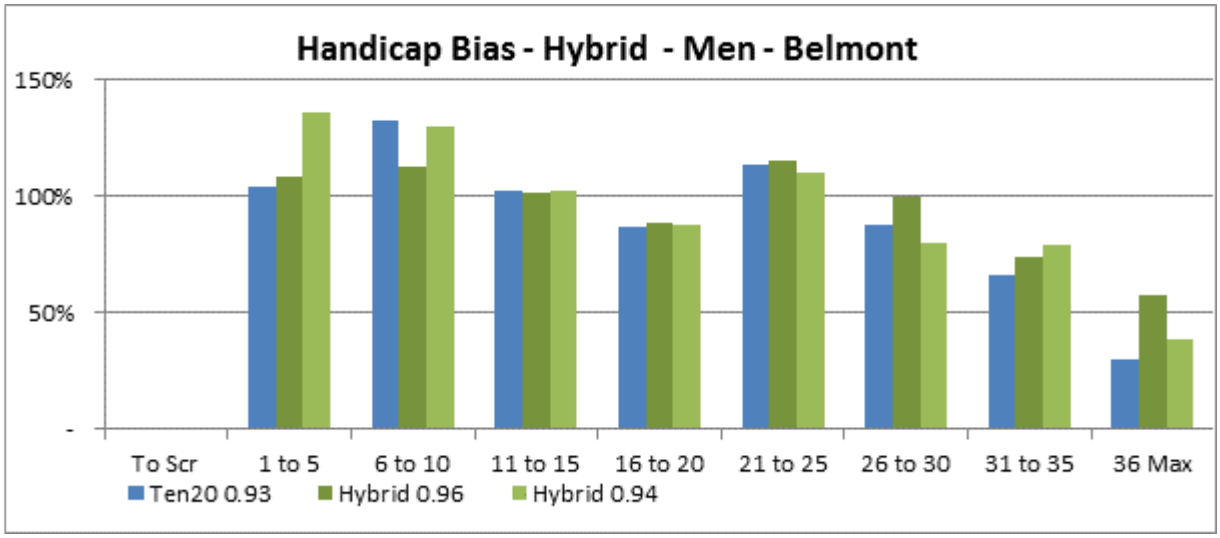
Belmont				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	0.4	24.8	-23.1	25.1
Nine20 0.96	0.0	20.3	-35.6	26.2
Eight20 0.96	-5.8	18.1	-31.9	25.1
Ten20 0.93	-21.9	21.4	-51.6	31.4
Nine20 0.93	-23.9	19.4	-51.0	28.7
Eight20 0.93	-16.4	18.9	-43.4	26.7
Ten20 0.90	-44.2	24.0	-72.7	37.8
Nine20 0.90	-46.6	27.4	-68.7	35.7
Eight20 0.90	-47.8	30.2	-71.9	38.5

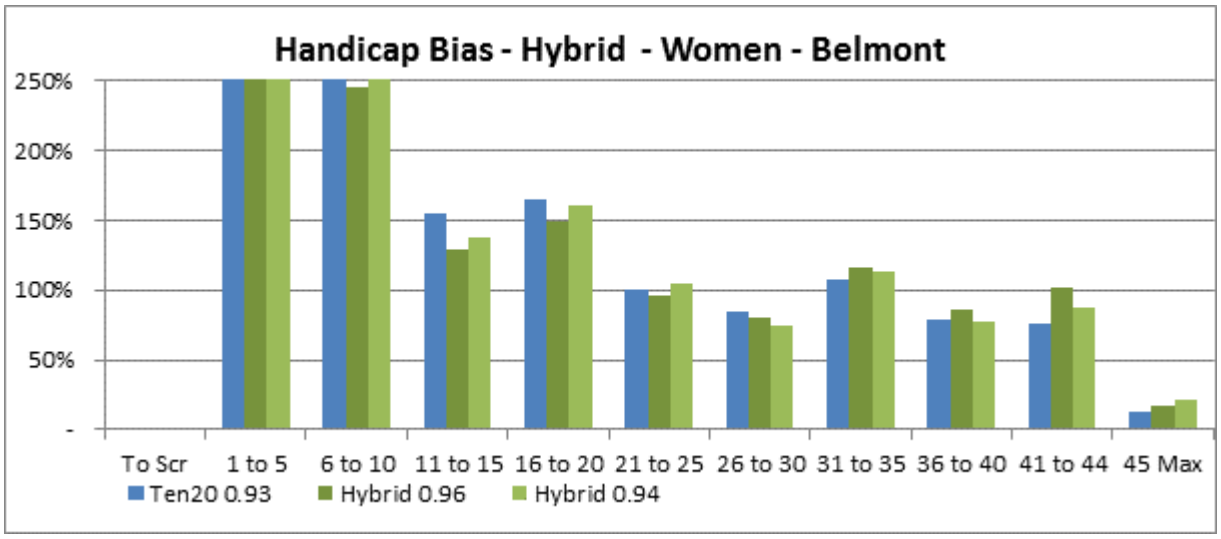
For the Blended:





For the Hybrid:

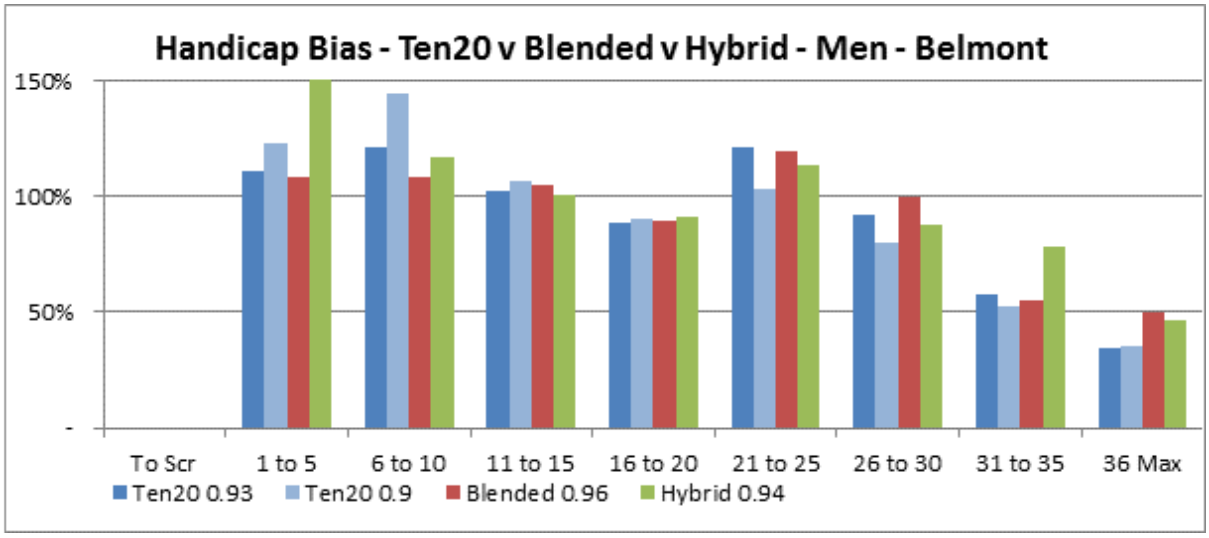


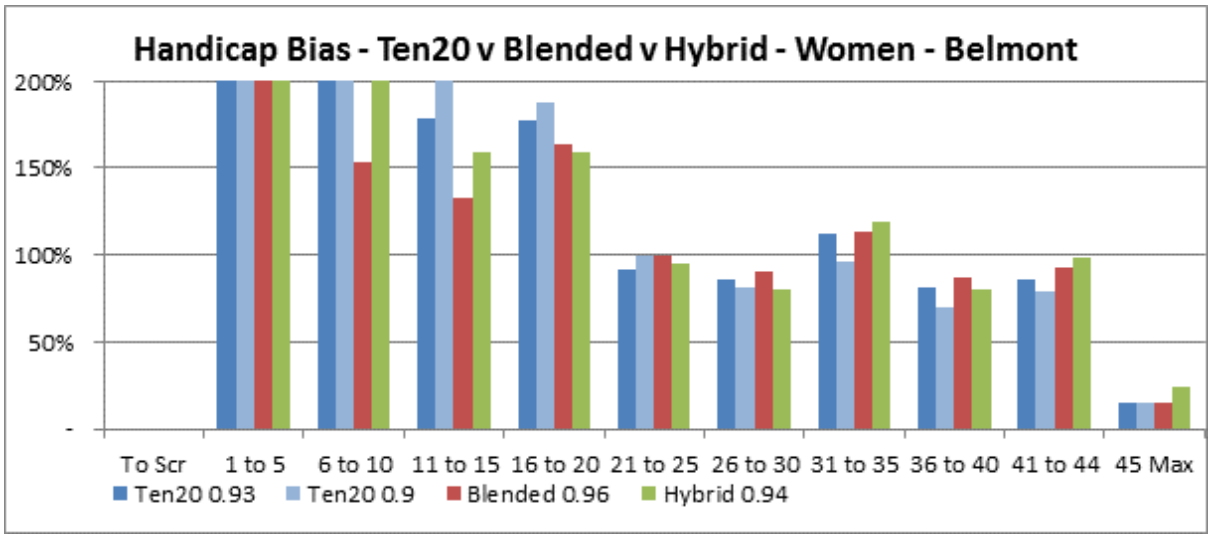


The Corresponding Tilt and Level Indices are:

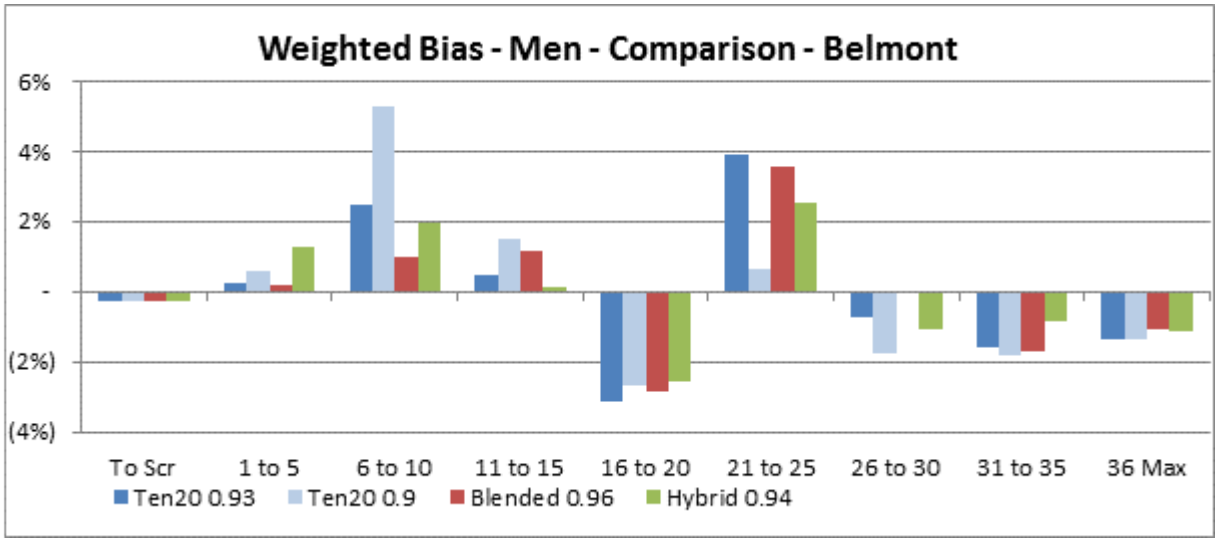
	Belmont			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-14.4	18.5	-39.0	25.8
Blended 0.94	-33.8	22.5	-58.2	34.6
Blended 0.92	-52.2	29.3	-68.1	36.8
Hybrid 0.96	2.4	18.3	-37.5	27.5
Hybrid 0.94	-22.6	16.4	-44.3	30.9

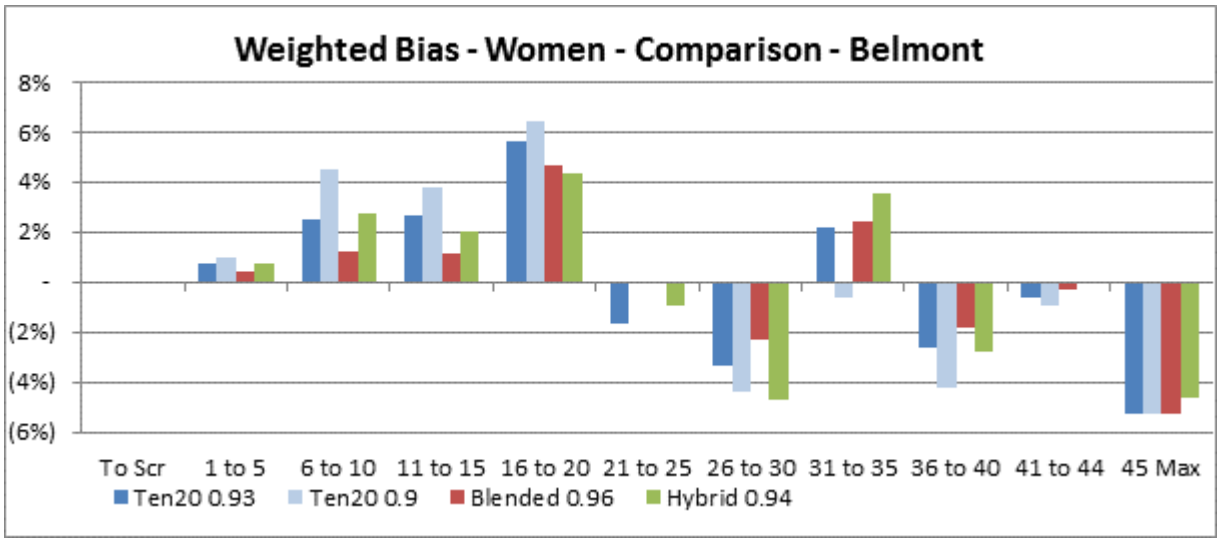
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

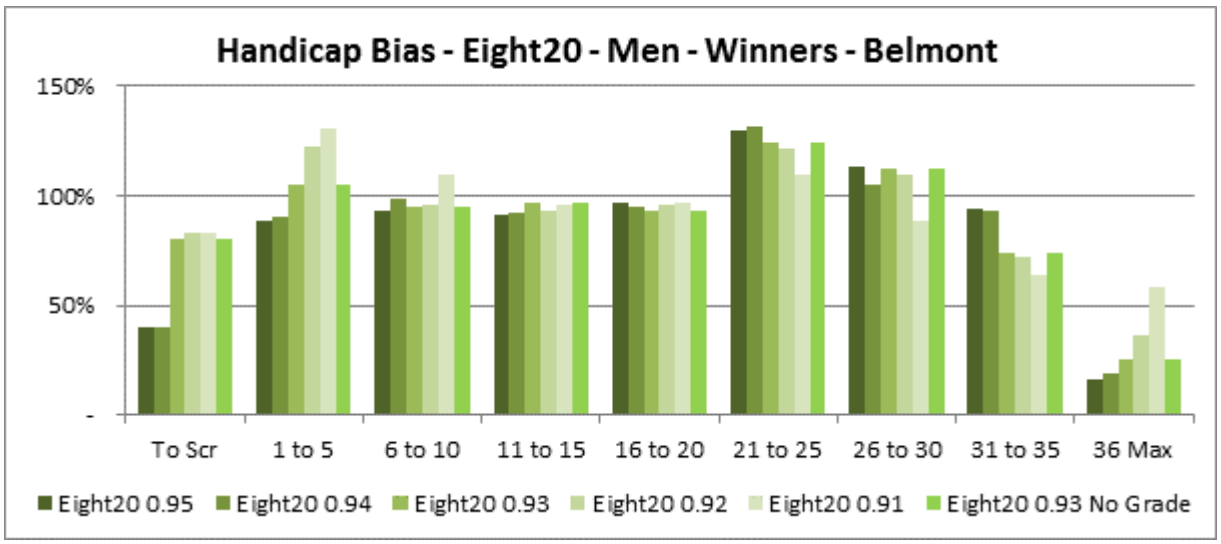
	Belmont			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-21.9	21.4	-51.6	31.4
Ten20 0.9	-44.2	24.0	-72.7	37.8
Blended 0.96	-14.4	18.5	-39.0	25.8
Hybrid 0.94	-22.6	16.4	-44.3	30.9

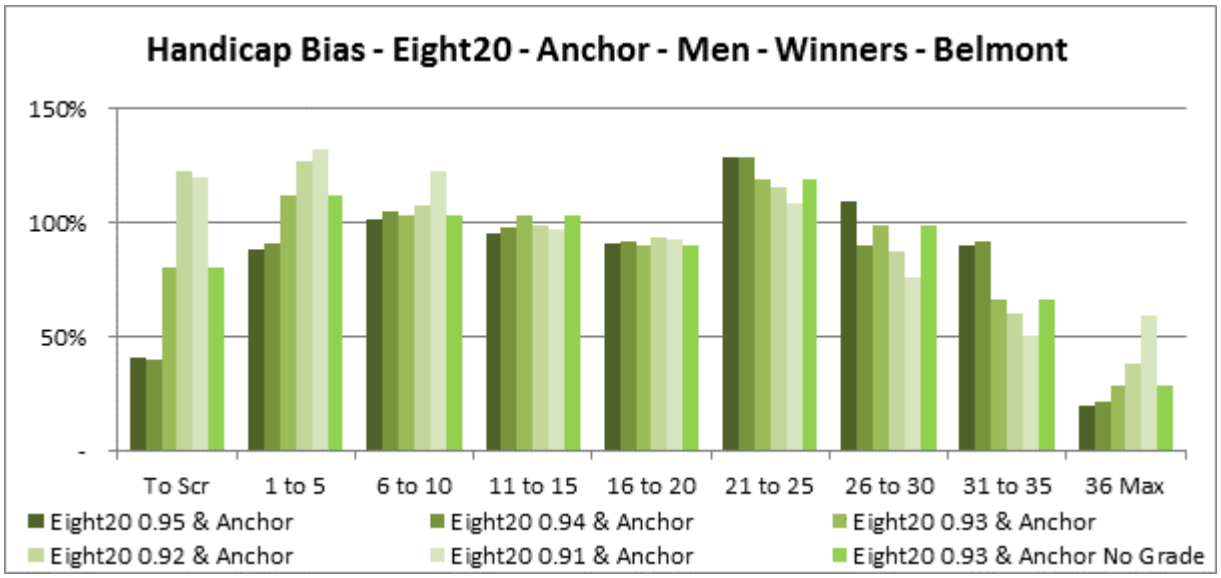
Putting it all together, with the Old System as a reference:

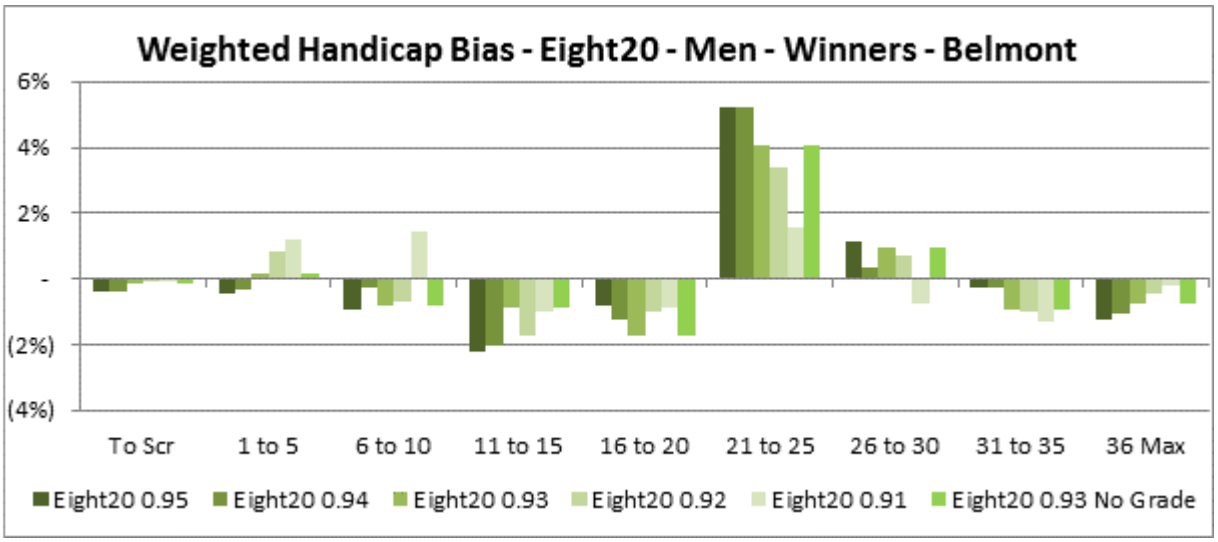
Belmont	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-48.4	20.8	-64.8	29.5
Current Period - Ten20 0.96	43.3	31.4	-9.6	33.6
Old Period - Ten20 0.96	-11.1	36.2	-30.8	27.8
Ten20 0.96	0.4	24.8	-23.1	25.1
Ten20 0.95	-3.9	20.4	-35.3	26.1
Ten20 0.94	-11.4	22.9	-41.8	29.4
Ten20 0.93	-21.9	21.4	-51.6	31.4
Ten20 0.92	-31.9	22.8	-56.6	31.2
Ten20 0.91	-34.5	21.8	-60.9	32.2
Ten20 0.9	-44.2	24.0	-72.7	37.8
Nine20 0.96	0.0	20.3	-35.6	26.2
Nine20 0.93	-23.9	19.4	-51.0	28.7
Nine20 0.90	-46.6	27.4	-68.7	35.7
Eight20 0.96	-5.8	18.1	-31.9	25.1
Eight20 0.93	-16.4	18.9	-43.4	26.7
Eight20 0.90	-47.8	30.2	-71.9	38.5
Blended 0.96	-14.4	18.5	-39.0	25.8
Blended 0.94	-33.8	22.5	-58.2	34.6
Blended 0.92	-52.2	29.3	-68.1	36.8
Hybrid 0.96	2.4	18.3	-37.5	27.5
Hybrid 0.94	-22.6	16.4	-44.3	30.9

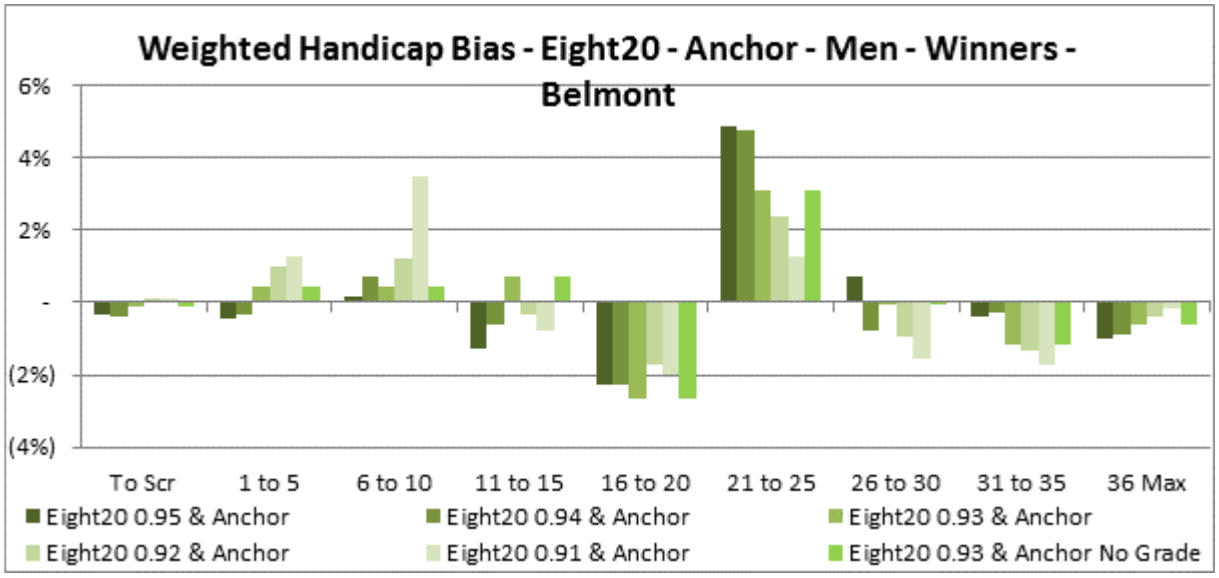
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

Phase 2


Handicap Bias - Eight20 - Men - Winners - Belmont
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Winners - Belmont
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Winners - Belmont
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Belmont
6%
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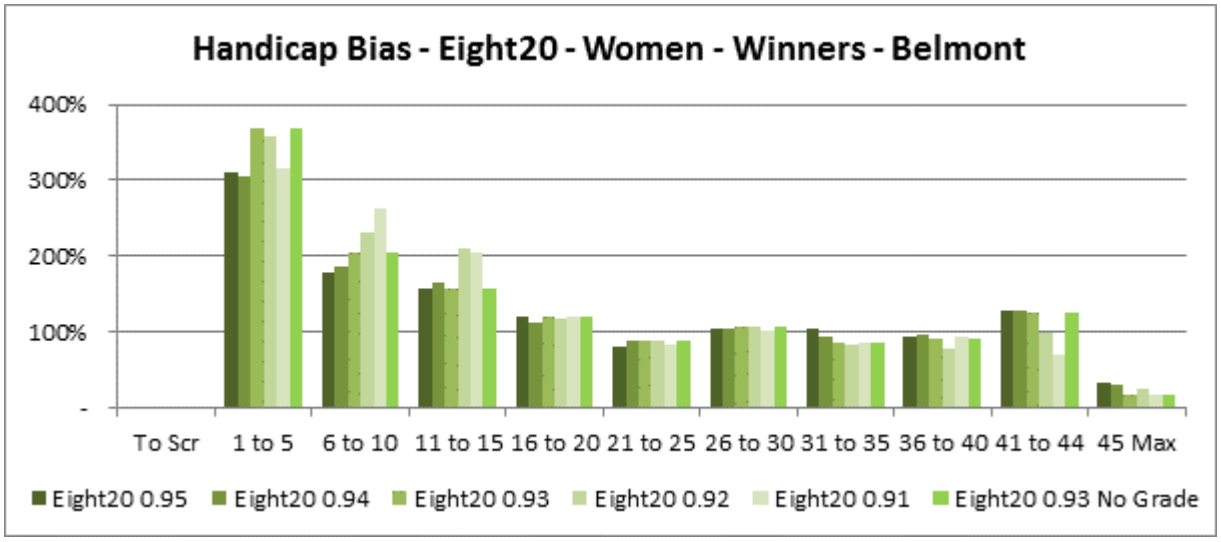
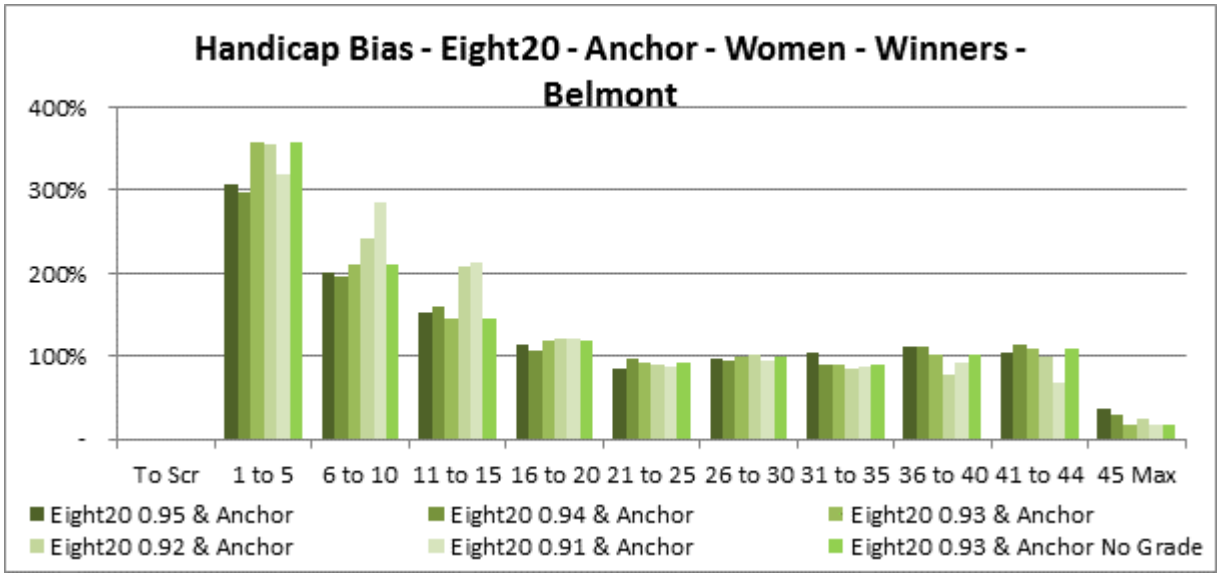
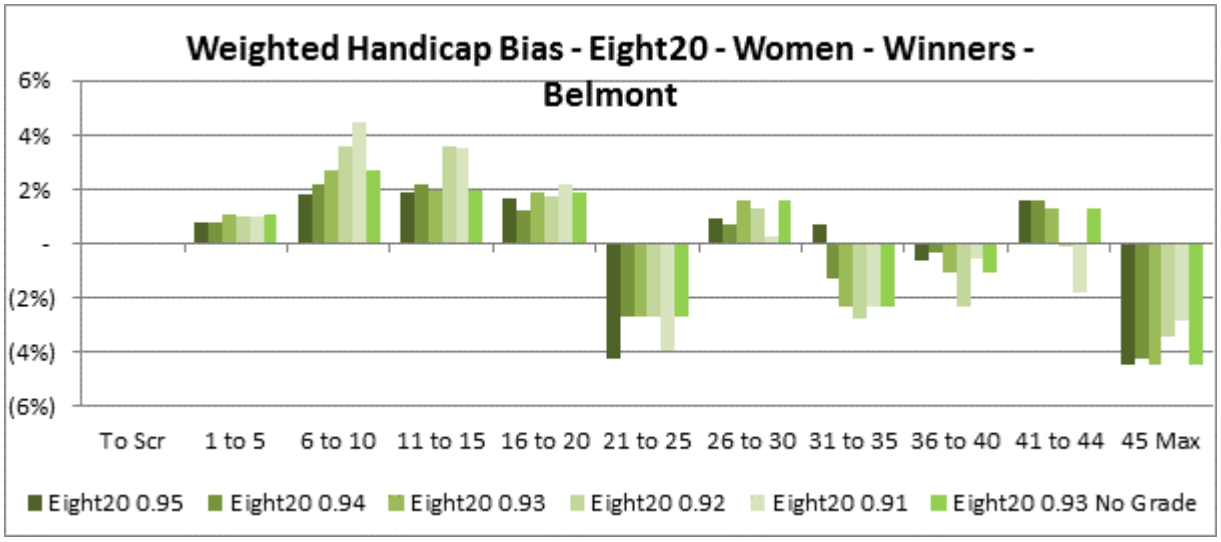
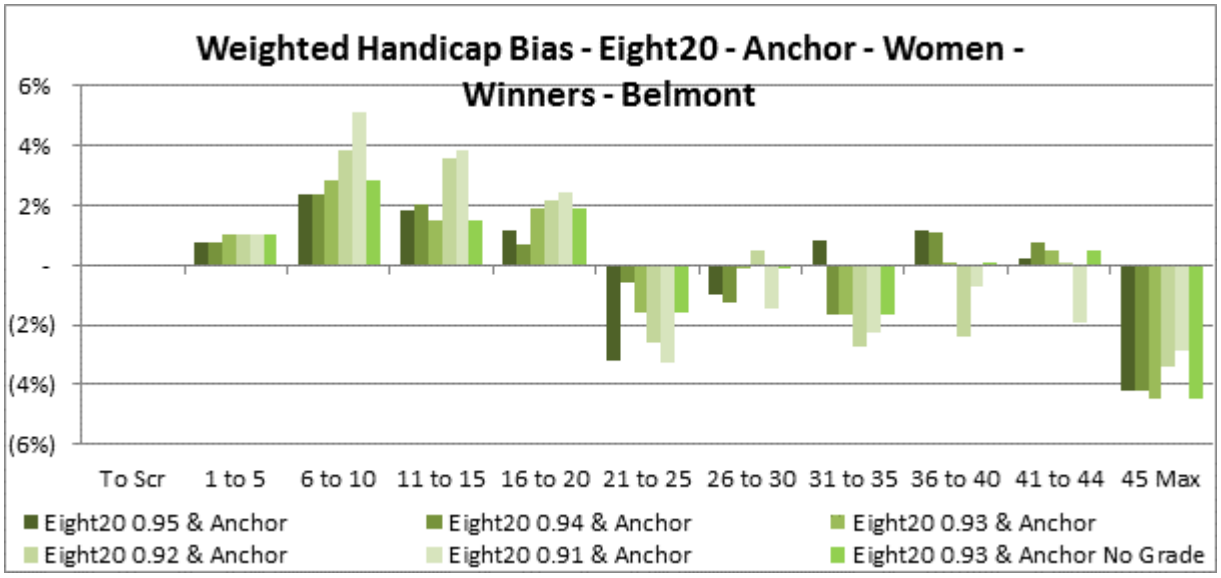
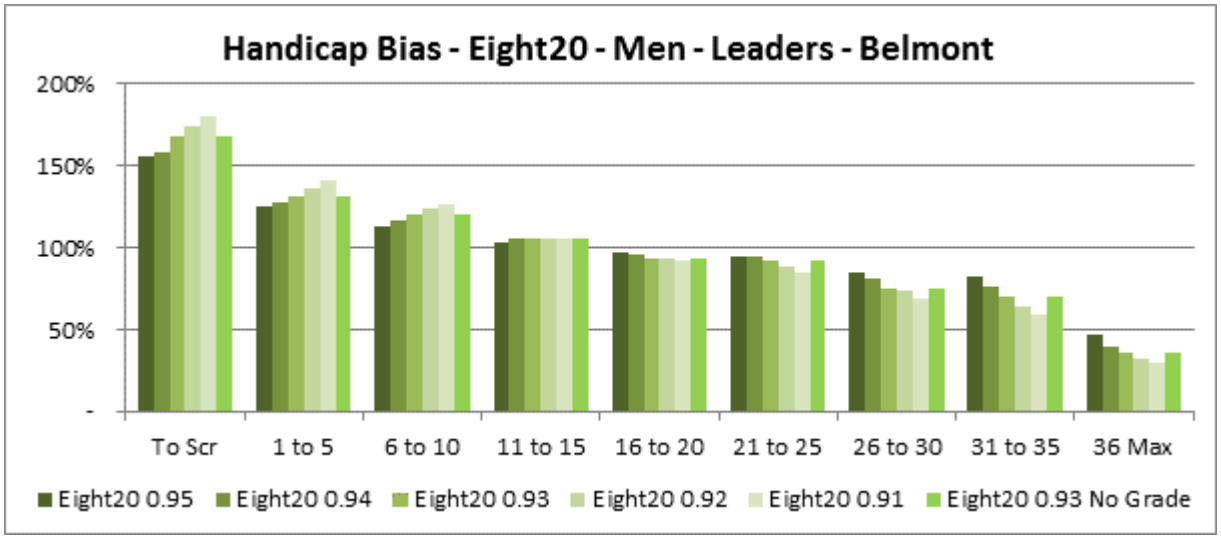
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

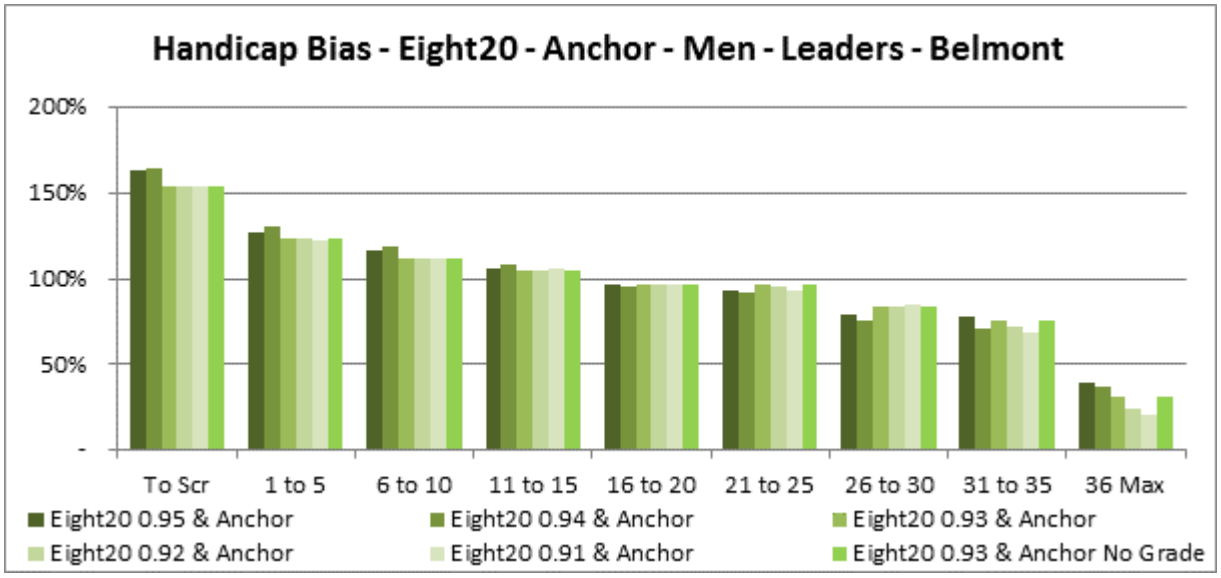

Handicap Bias - Eight20 - Women - Winners - Belmont
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

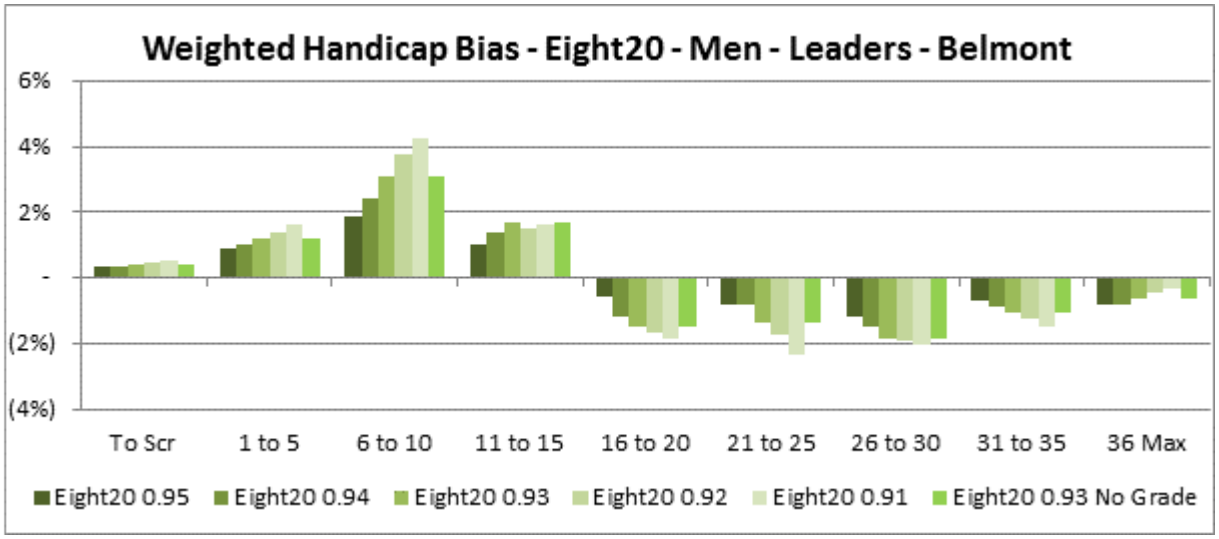

Handicap Bias - Eight20 - Anchor - Women - Winners - Belmont
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

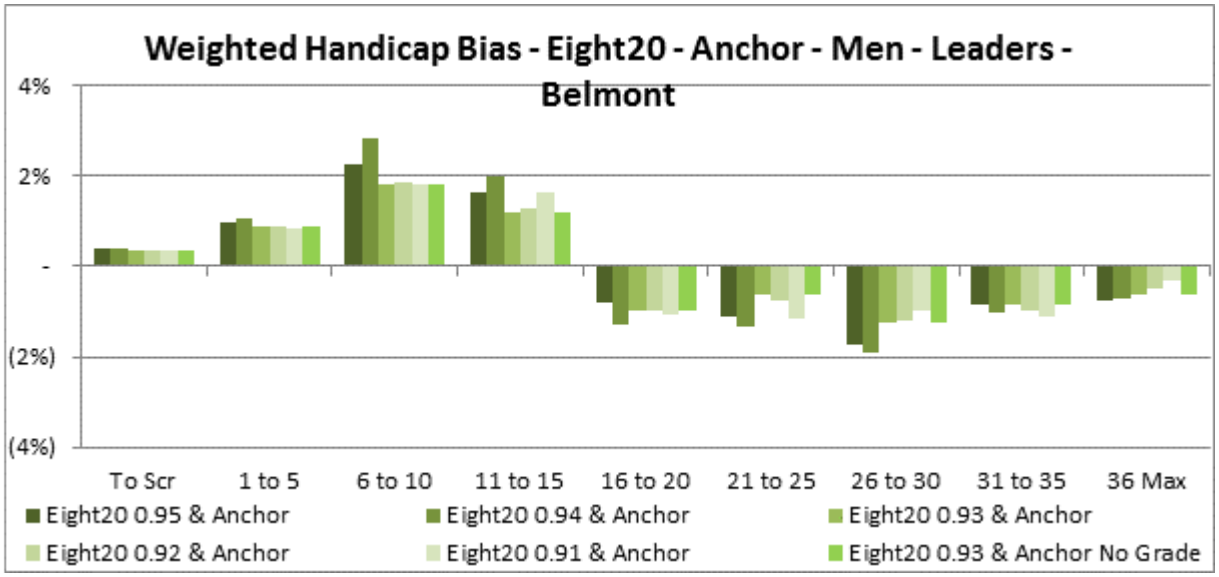

Weighted Handicap Bias - Eight20 - Women - Winners - Belmont
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

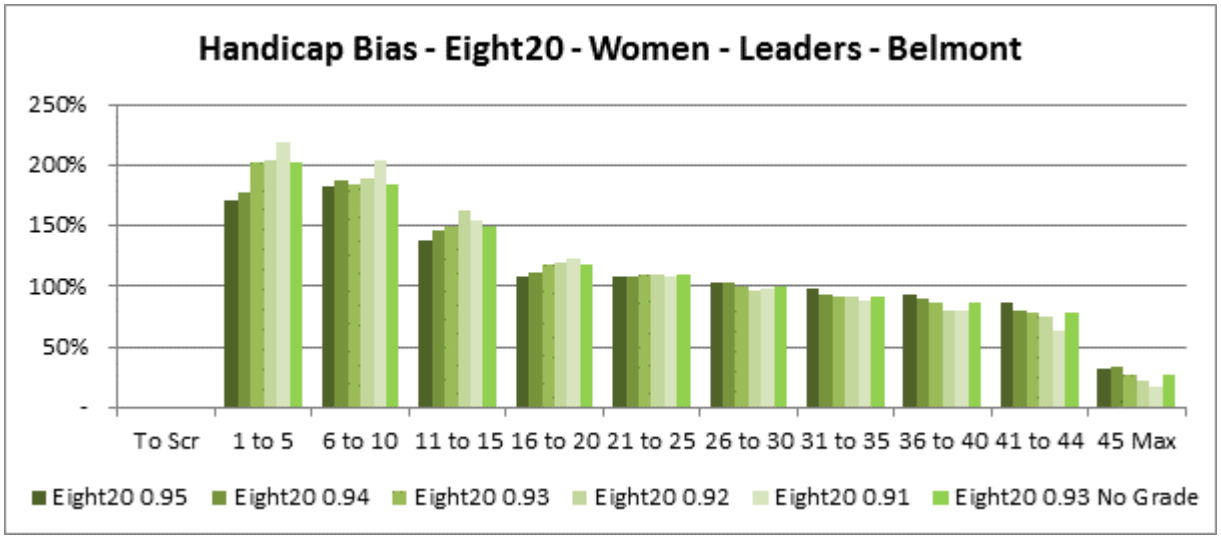

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Belmont
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

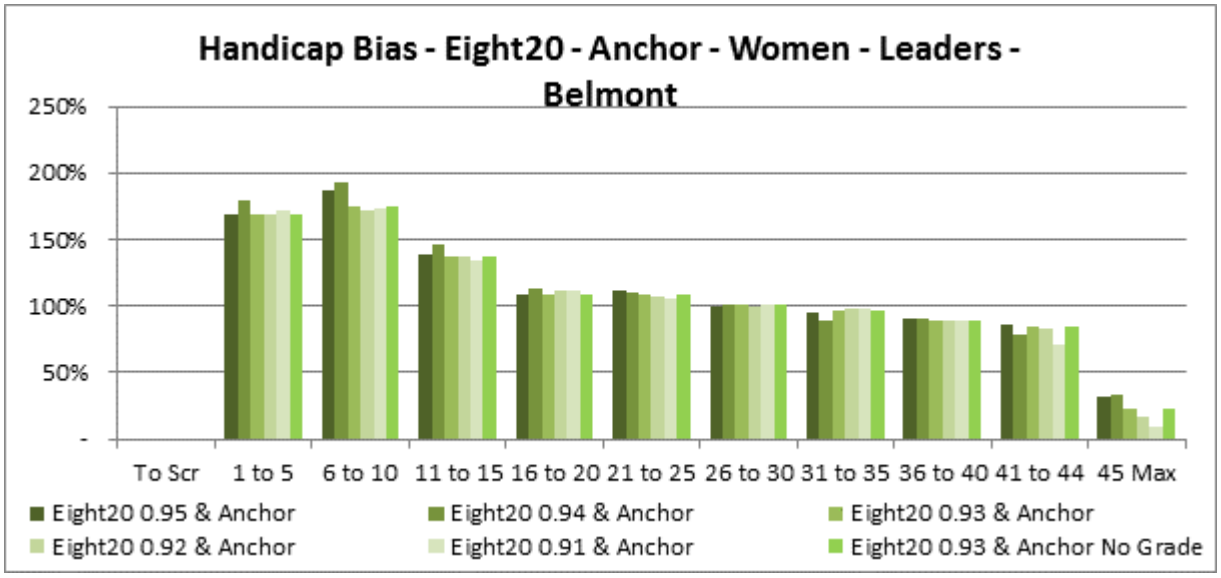

Handicap Bias - Eight20 - Men - Leaders - Belmont
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

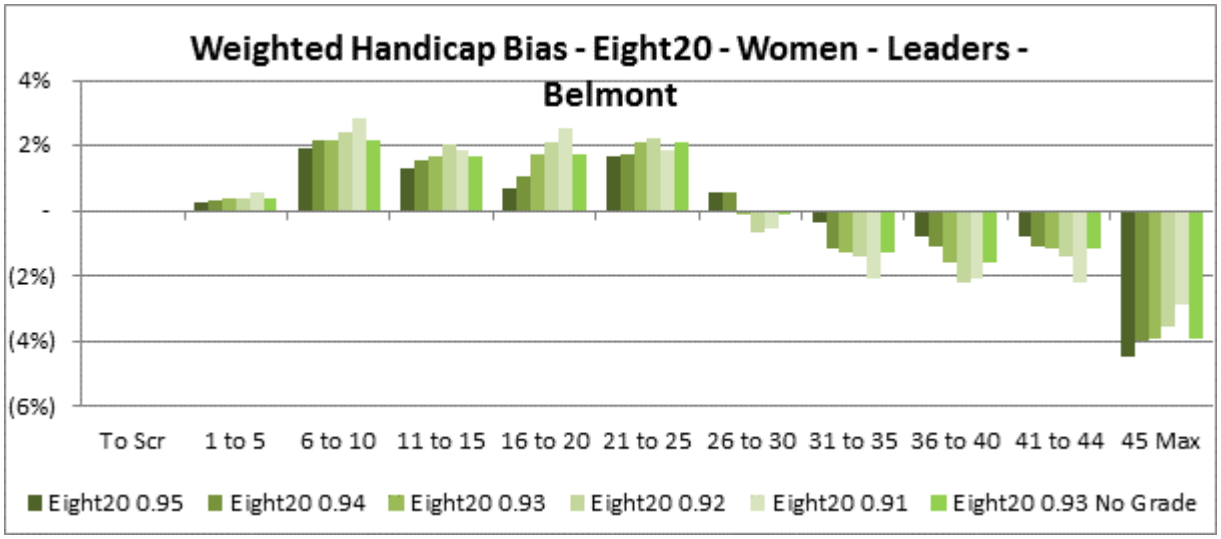

Handicap Bias - Eight20 - Anchor - Men - Leaders - Belmont
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

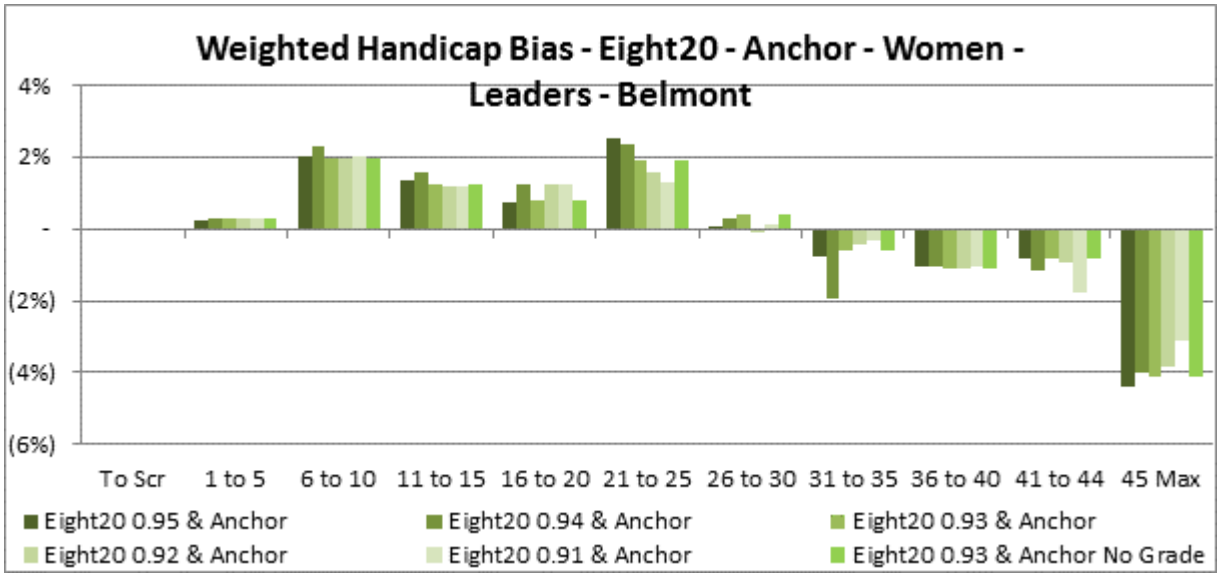

Weighted Handicap Bias - Eight20 - Men - Leaders - Belmont
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Belmont
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Belmont
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Belmont
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Belmont
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

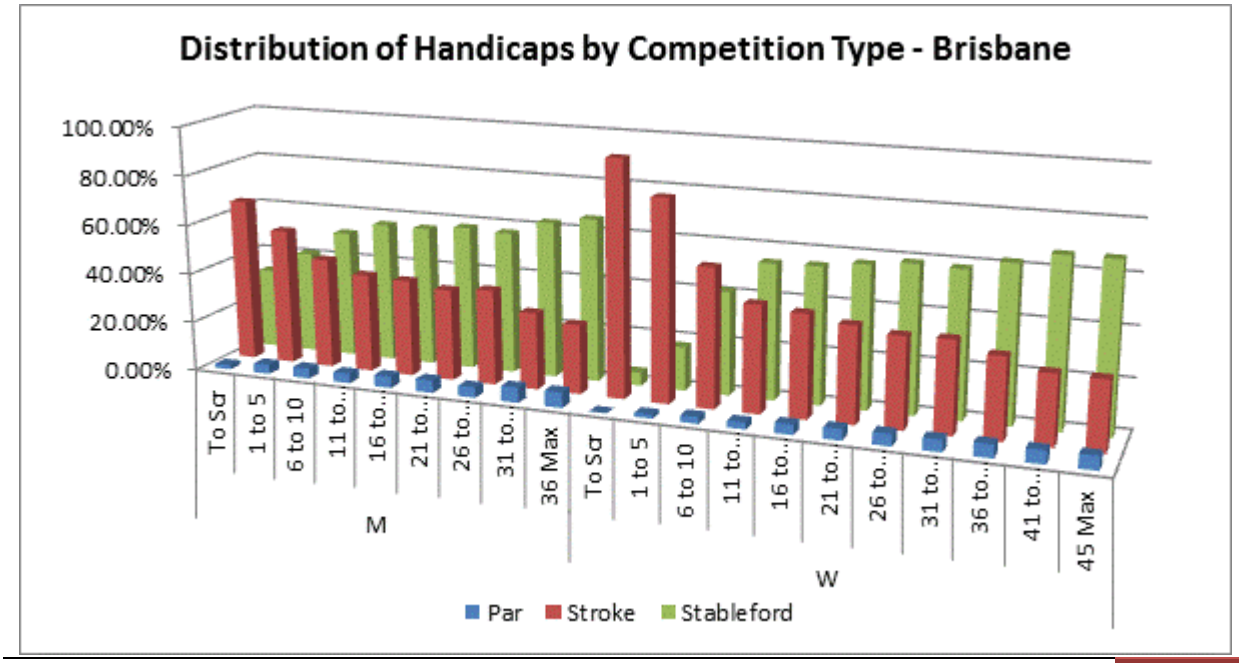


Phase 2 -Belmont					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	14.2	21.5	-27.0	23.0
	Eight20 0.94	10.0	20.9	-30.0	20.4
	Eight20 0.93	4.4	17.0	-37.9	23.2
	Eight20 0.92	1.6	15.2	-47.8	25.3
	Eight20 0.91	-16.2	11.2	-49.1	26.6
	Eight20 0.93 No Grade	4.4	17.0	-37.9	23.2
	Eight20 0.95 & Anchor	8.0	20.2	-28.1	20.3
	Eight20 0.94 & Anchor	0.6	19.6	-30.9	18.6
	Eight20 0.93 & Anchor	-9.0	15.5	-37.5	20.1
	Eight20 0.92 & Anchor	-17.9	13.3	-49.2	25.5
	Eight20 0.91 & Anchor	-30.1	17.8	-54.1	27.9
	Eight20 0.93 & Anchor No Grade	-9.0	15.5	-37.5	20.1
Leaders	Eight20 0.95	-28.8	10.6	-34.6	17.4
	Eight20 0.94	-33.8	13.5	-37.6	17.8
	Eight20 0.93	-39.8	16.9	-40.7	18.9
	Eight20 0.92	-43.7	19.3	-44.2	20.4
	Eight20 0.91	-48.4	22.1	-46.4	20.9
	Eight20 0.93 No Grade	-39.8	16.9	-40.7	18.9
	Eight20 0.95 & Anchor	-34.5	13.7	-36.7	18.6
	Eight20 0.94 & Anchor	-39.5	16.7	-39.9	19.3
	Eight20 0.93 & Anchor	-28.2	11.0	-34.9	17.2
	Eight20 0.92 & Anchor	-28.4	11.2	-34.4	16.3
	Eight20 0.91 & Anchor	-28.3	12.1	-33.8	15.1
	Eight20 0.93 & Anchor No Grade	-28.2	11.0	-34.9	17.2

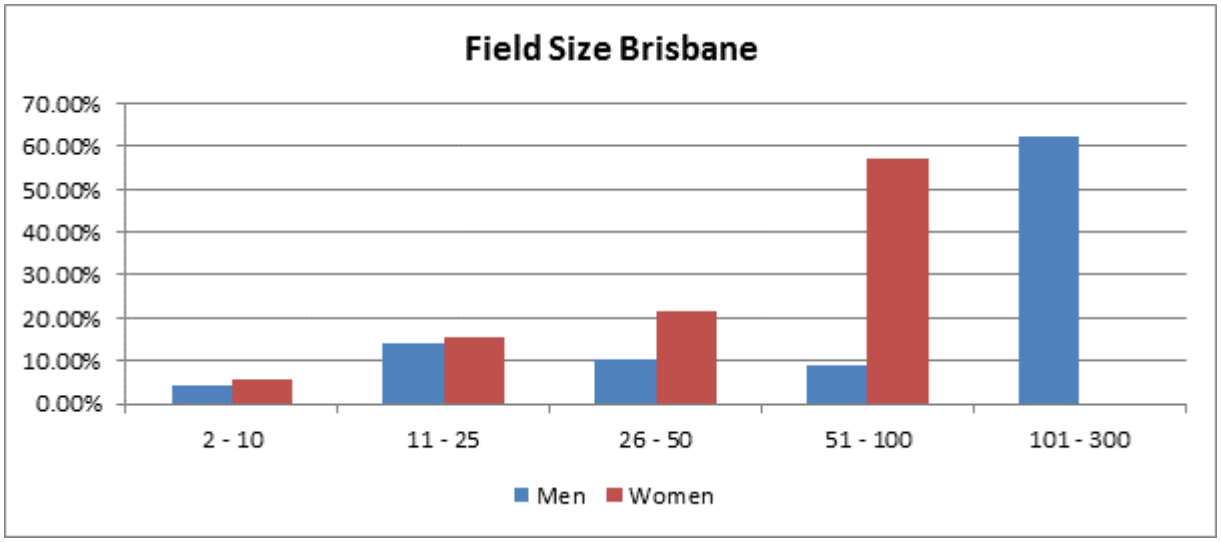
Appendix 2 – Brisbane

Phase 1

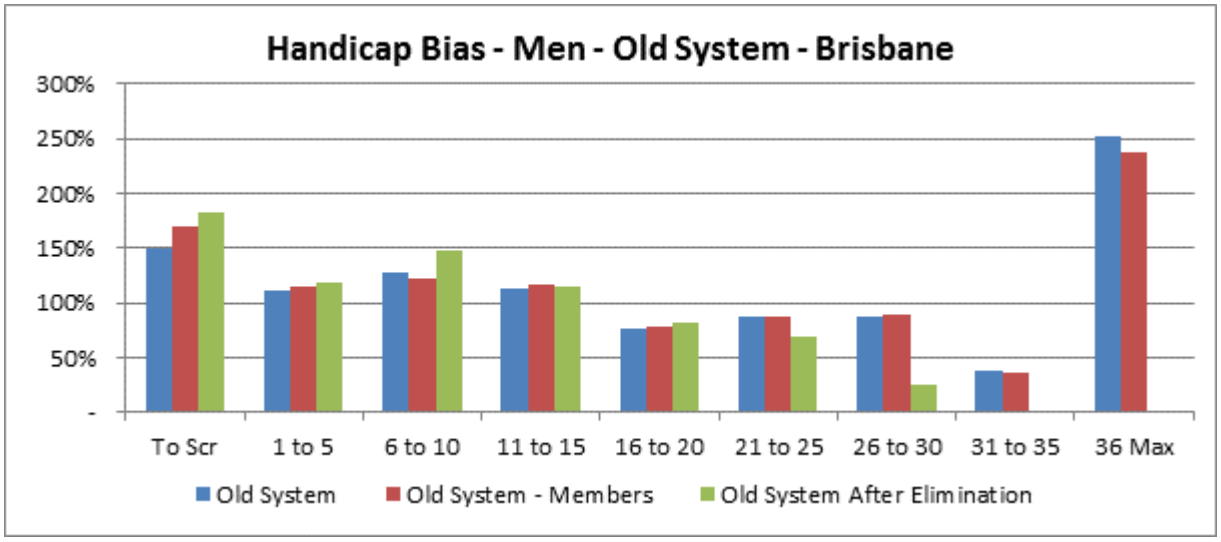
Brisbane	Men	Women	Total
Players in Database	1,624	396	2,020
Members	843	301	1,144
Visitors	781	95	876
Members who have Played 33 Rounds	788	281	1,069
Members with Last Round In Old System	183	58	241
Members with Last Round in Current System	660	243	903
Earliest Round	7/12/2007	30/12/2007	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			166
Number of Home Competitions	618	425	1,043
Number of Rounds of Golf	48,299	17,443	65,742
Number of Rounds at Home	42,102	14,651	56,753
Number of Rounds at Home Old	31,406	10,768	42,174
Number of Rounds at Home Current	10,696	3,883	14,579
Num Rnds Members at Home	39,704	14,432	54,136
Num Rnds Members at Home Old	29,458	10,589	40,047
Num Rnds Members at Home Cur	10,246	3,843	14,089
Num Rnds After Eliminations	21,898	7,725	29,623
Num Rnds After Eliminations Old	12,898	4,238	17,136
Num Rnds After Eliminations Cur	9,000	3,487	12,487

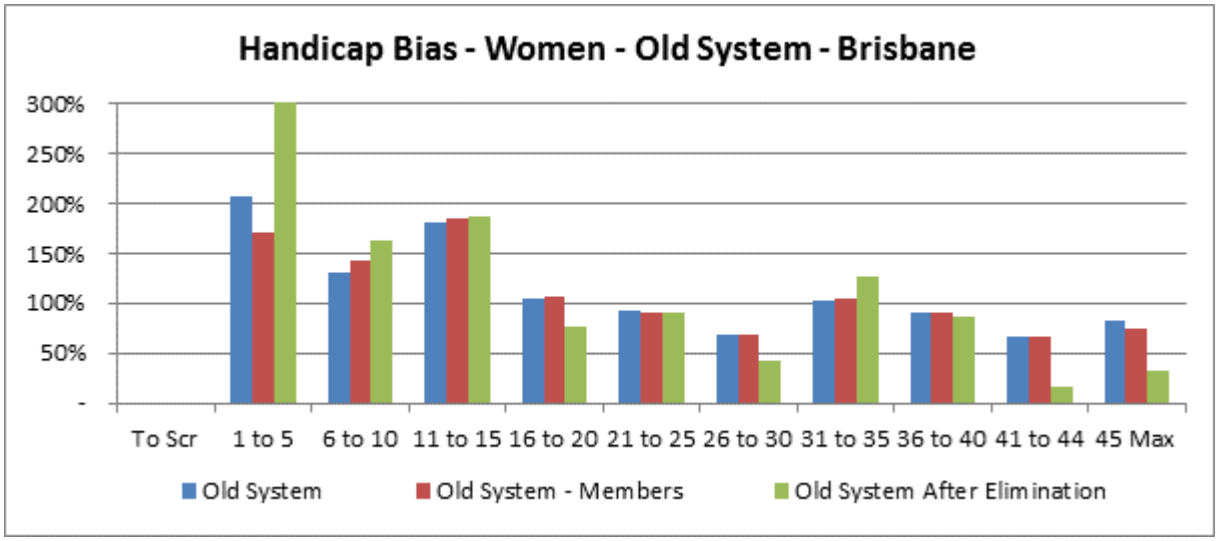


Most men's competitions are with a field of over 100, the women mainly field 51-100.

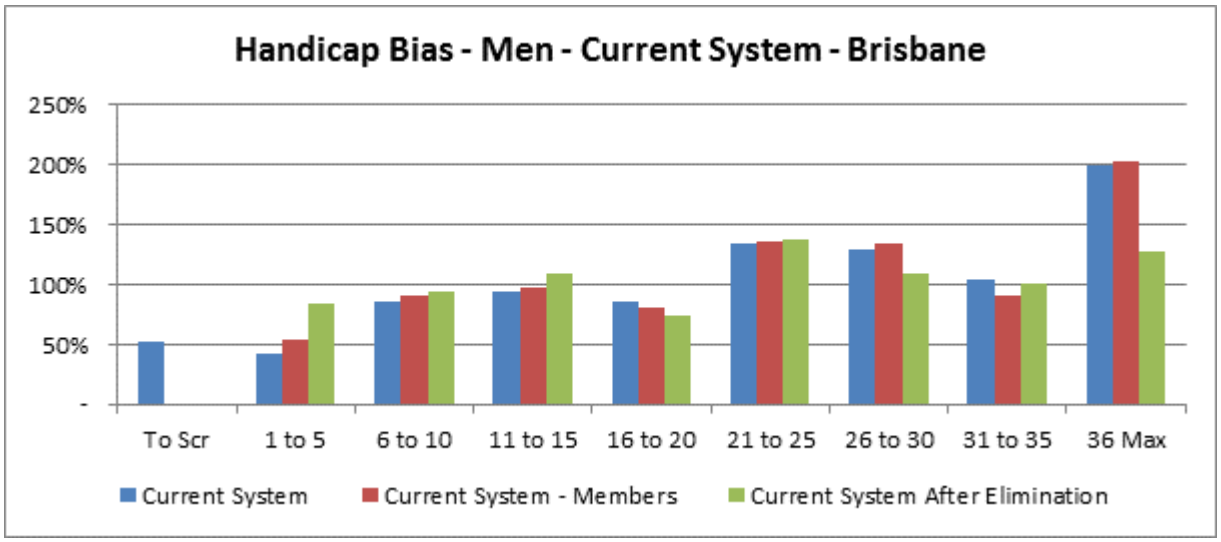


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

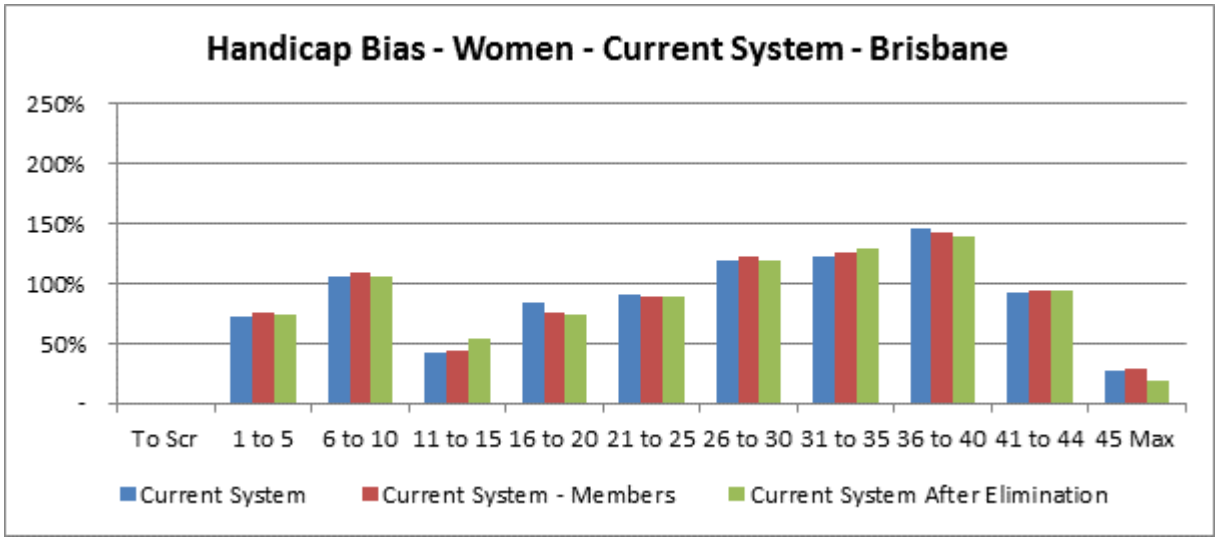




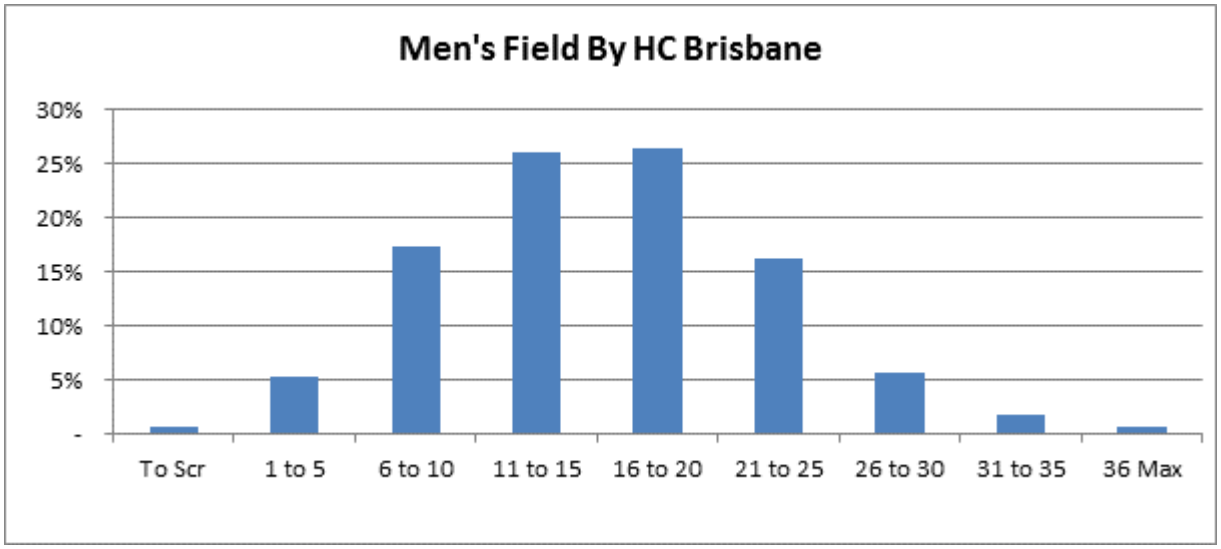
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

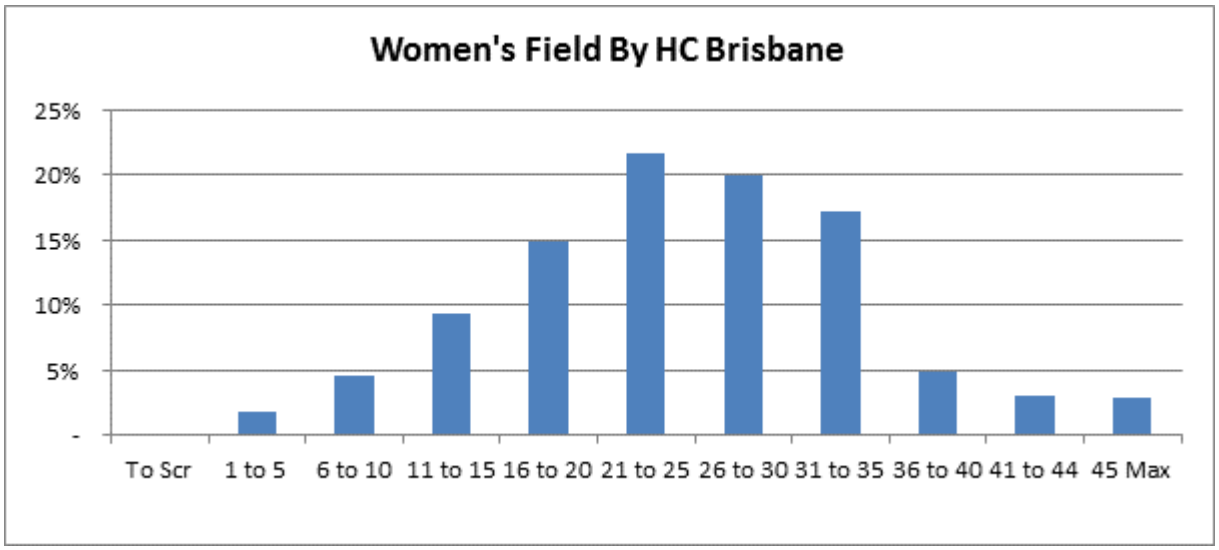


The picture is somewhat similar for the women.



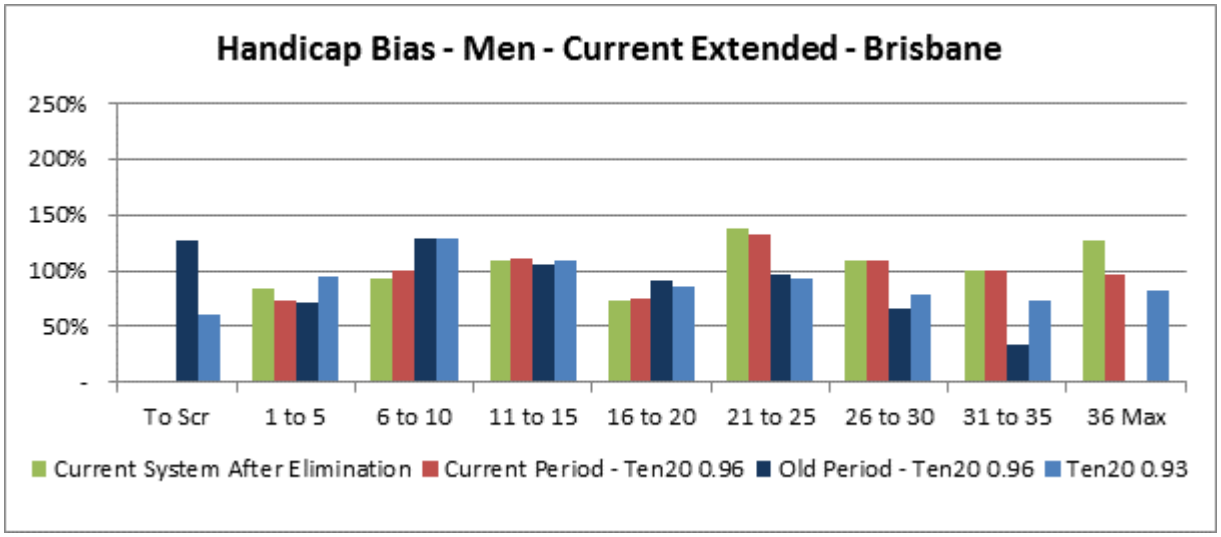
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





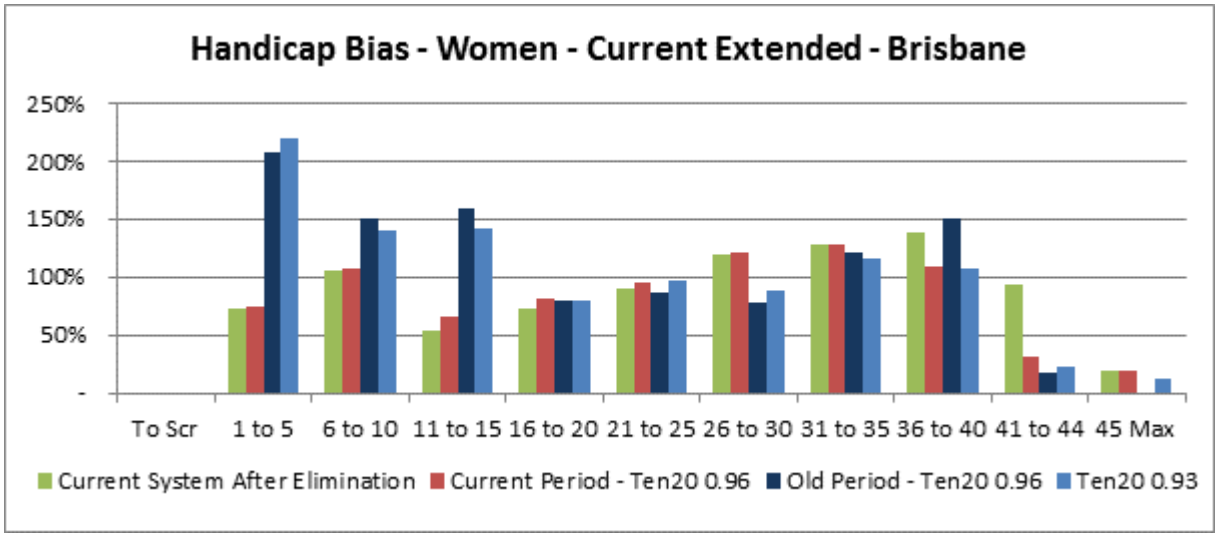
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

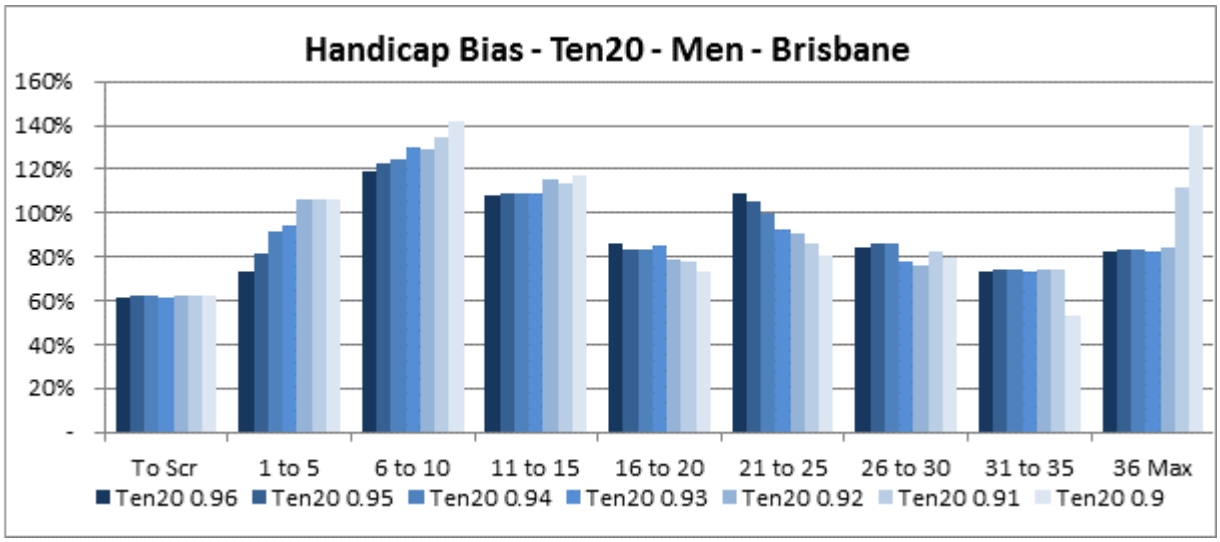


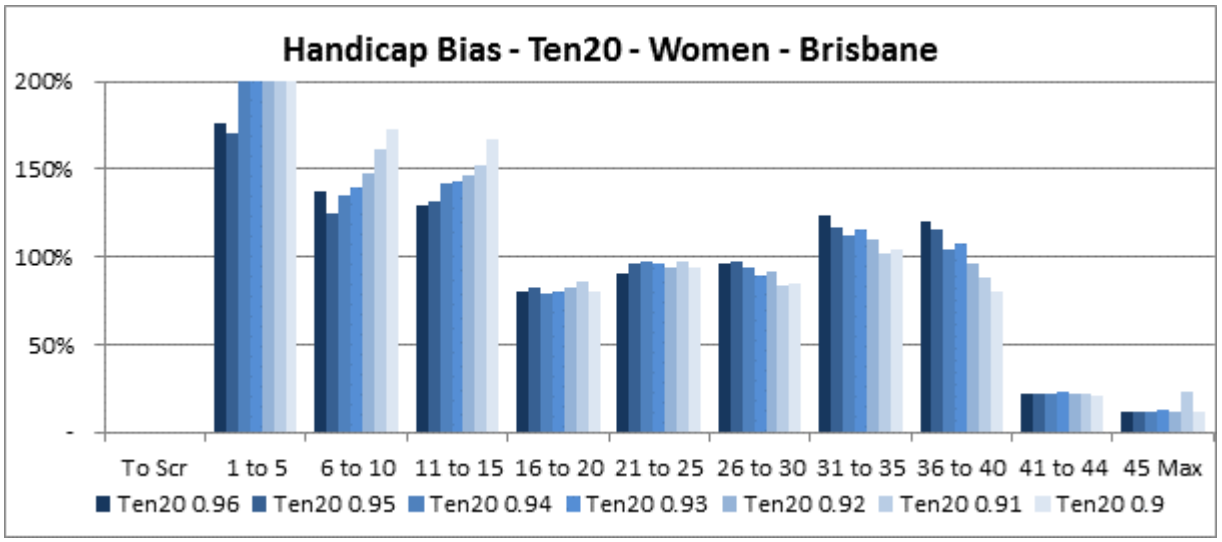
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low markers would have dominated over the two-years.

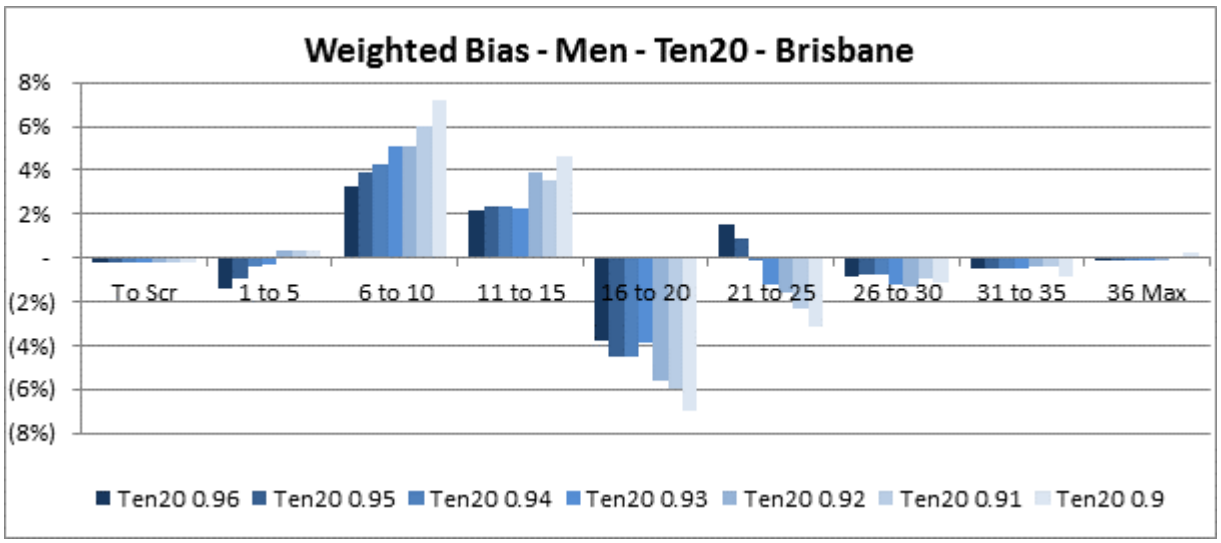


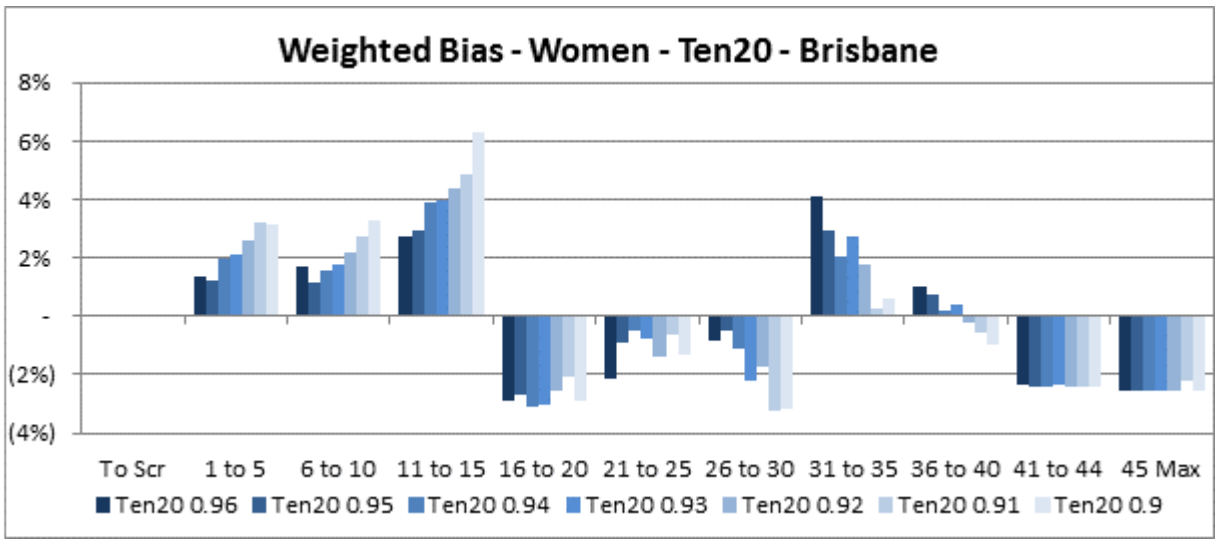
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

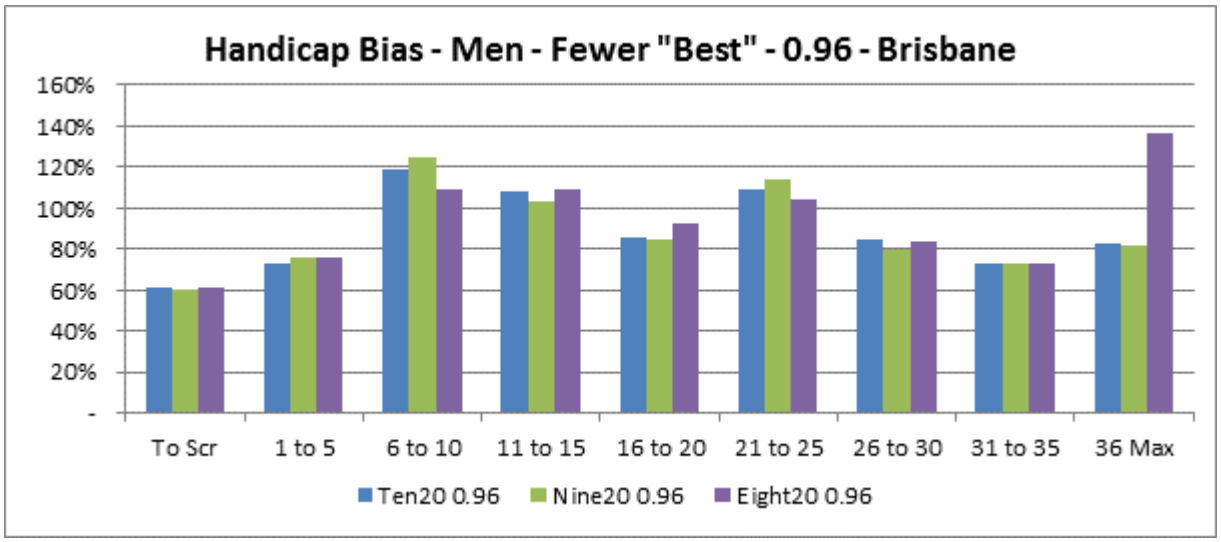


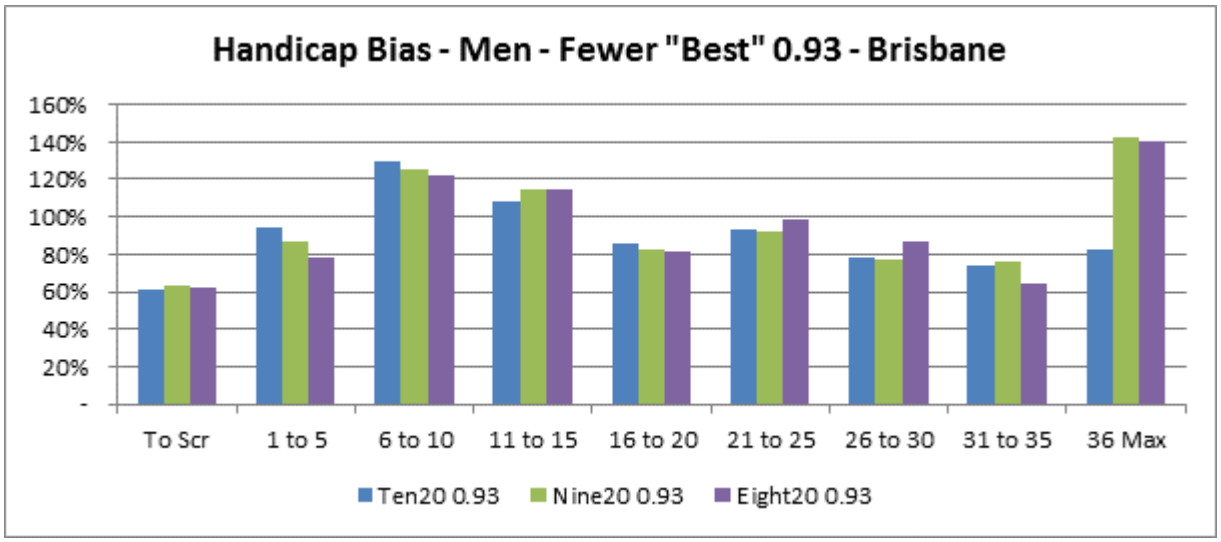


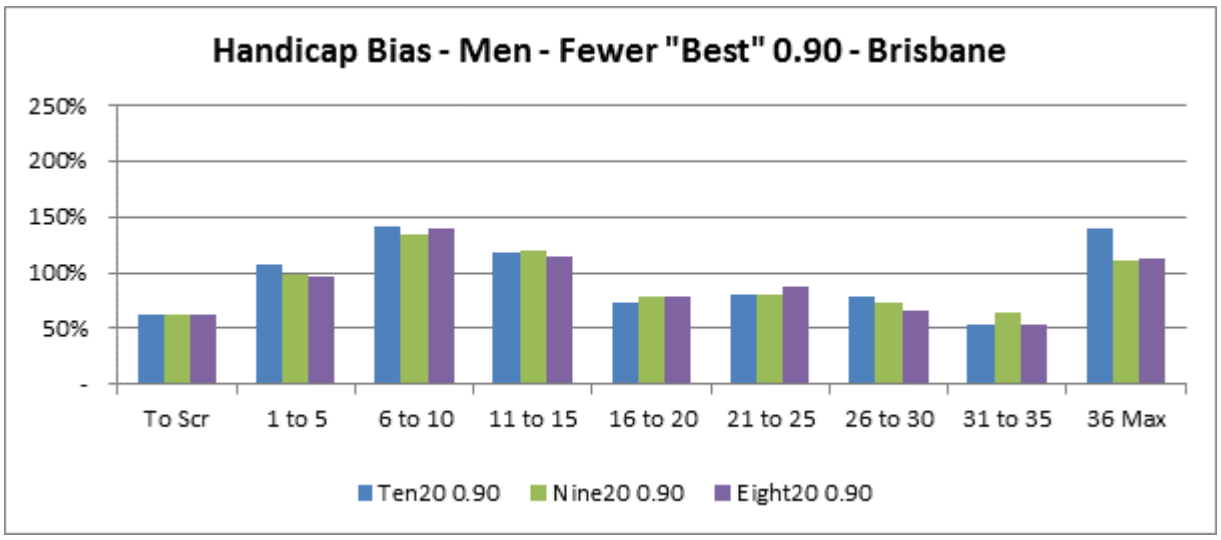
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

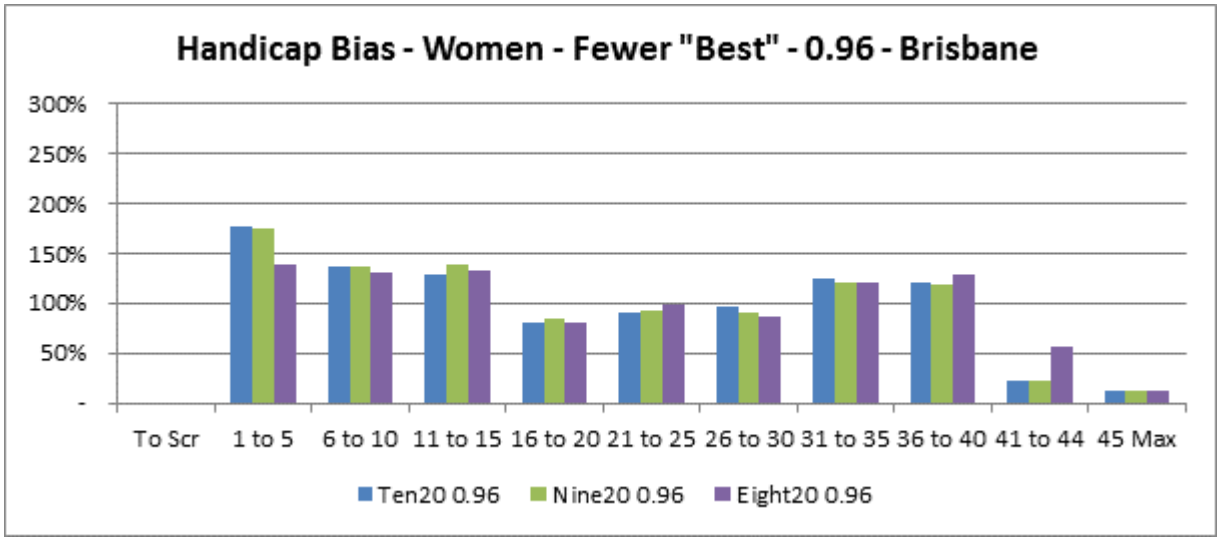
	Brisbane			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-9.2	20.7	-22.6	23.5
Ten20 0.95	-14.8	23.4	-23.7	20.3
Ten20 0.94	-20.4	23.8	-32.6	22.0
Ten20 0.93	-27.0	24.9	-33.1	24.0
Ten20 0.92	-33.6	31.0	-39.9	23.9
Ten20 0.91	-34.8	33.7	-48.9	26.0
Ten20 0.9	-43.3	41.0	-53.7	30.6

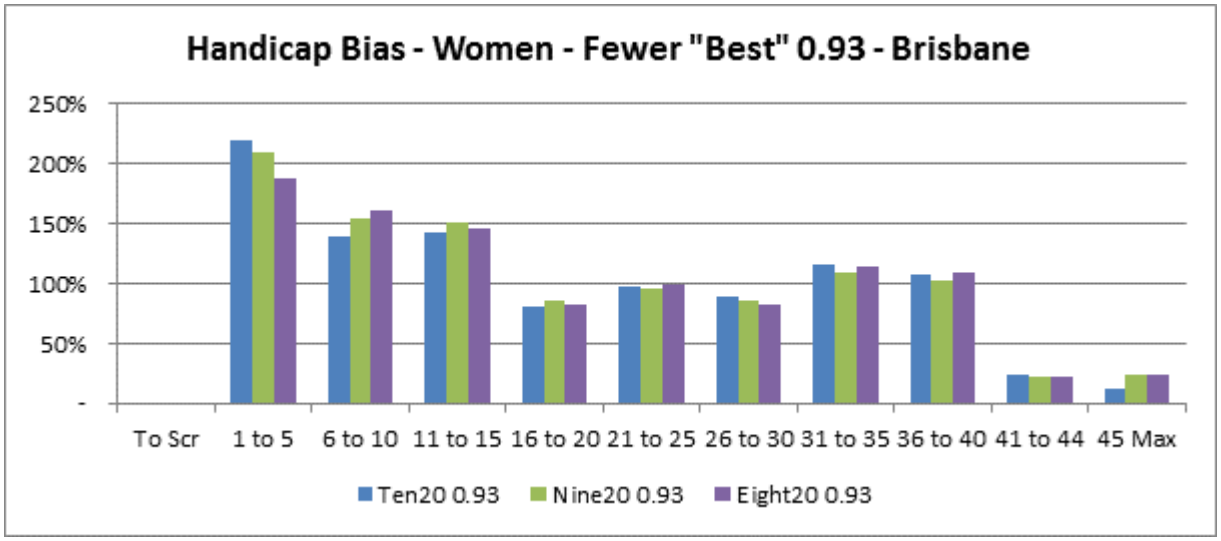
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

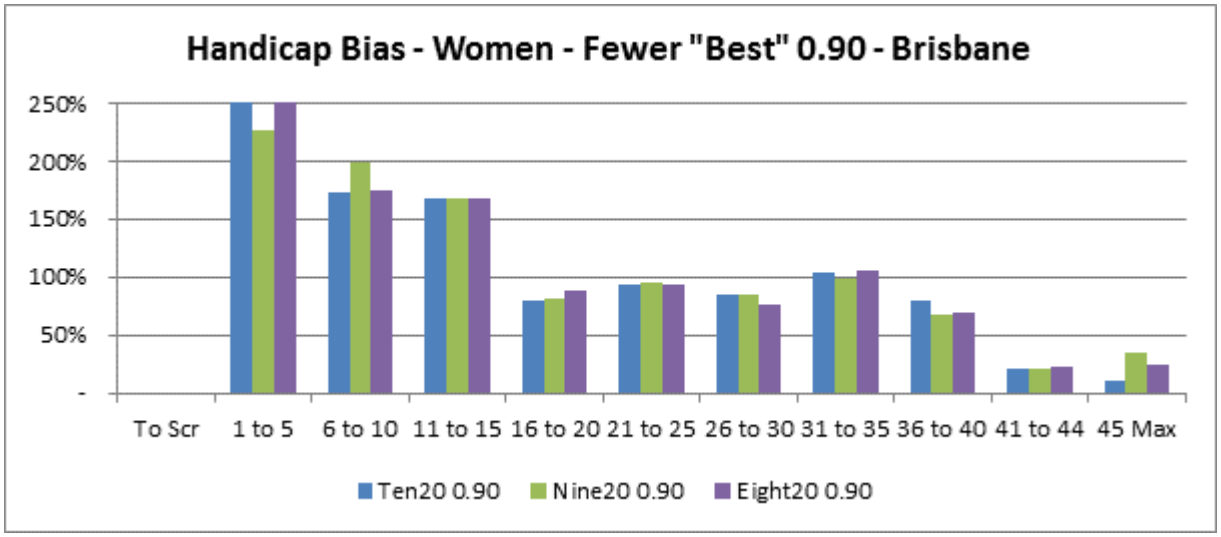







Handicap Bias - Women - Fewer "Best" - 0.96 - Brisbane
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

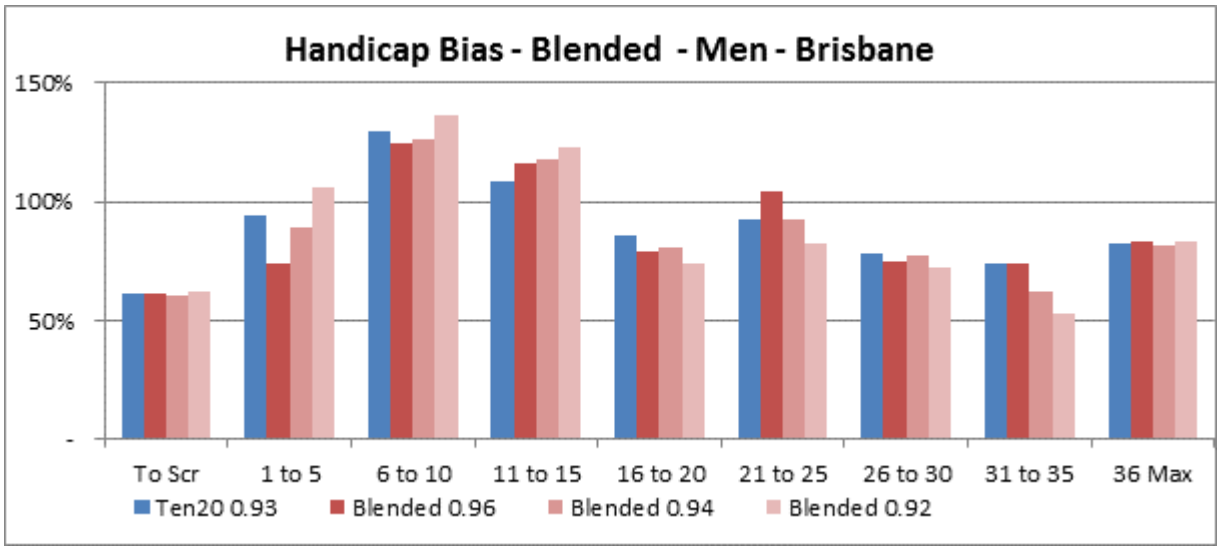

Handicap Bias - Women - Fewer "Best" 0.93 - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

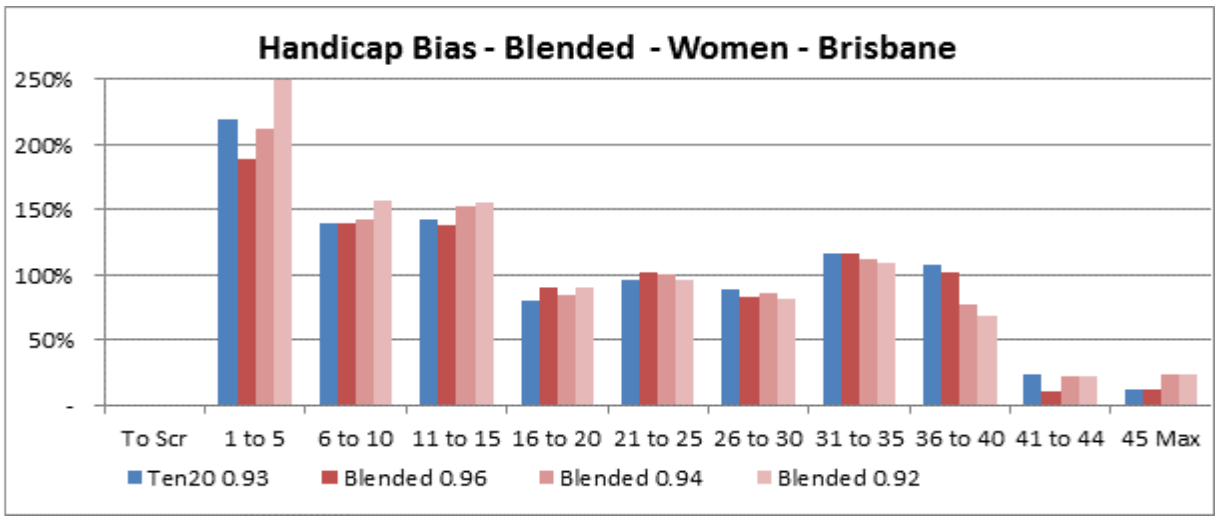

Handicap Bias - Women - Fewer "Best" 0.90 - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

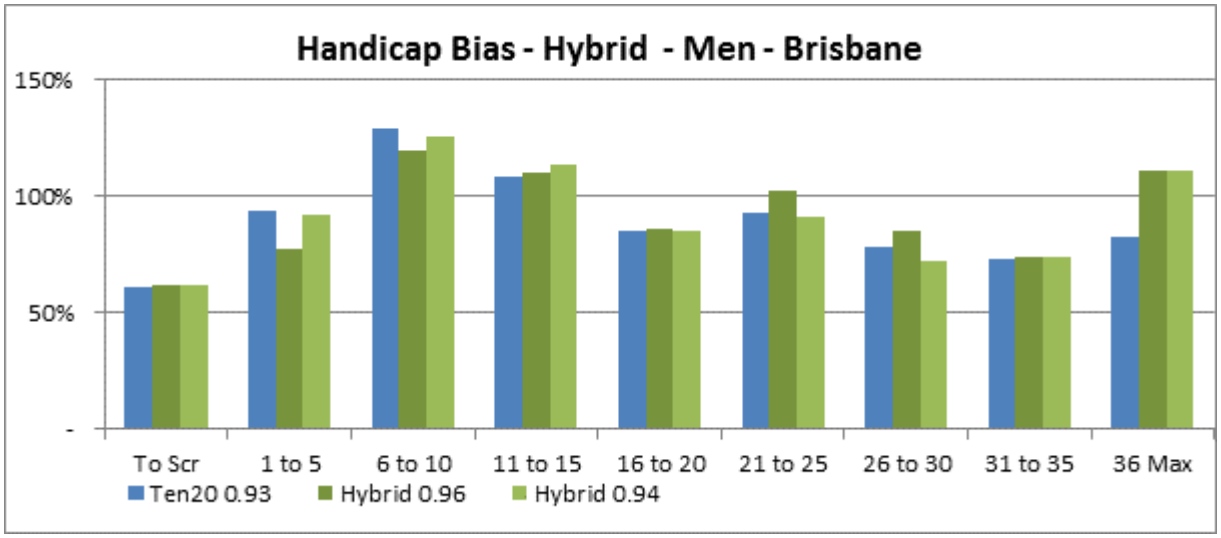
Brisbane	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-9.2	20.7	-22.6	23.5
Nine20 0.96	-10.8	23.1	-26.7	23.5
Eight20 0.96	-3.8	13.8	-18.1	22.3
Ten20 0.93	-27.0	24.9	-33.1	24.0
Nine20 0.93	-22.6	27.5	-38.4	23.9
Eight20 0.93	-16.1	26.3	-35.1	25.2
Ten20 0.90	-43.3	41.0	-53.7	30.6
Nine20 0.90	-39.9	36.3	-54.1	30.6
Eight20 0.90	-40.4	35.8	-55.4	31.7

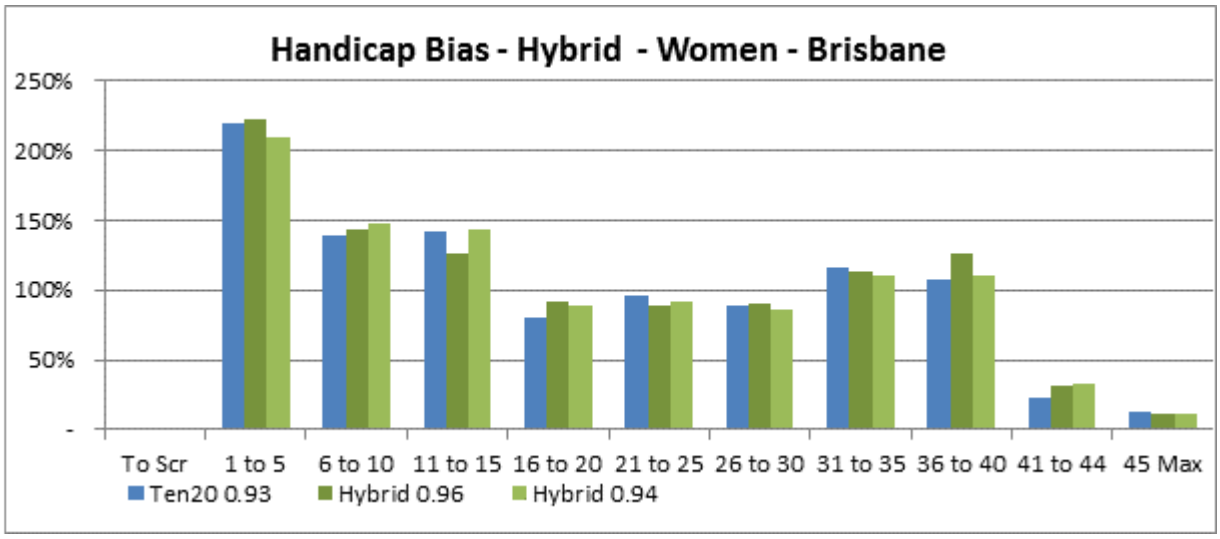
For the Blended:





For the Hybrid:

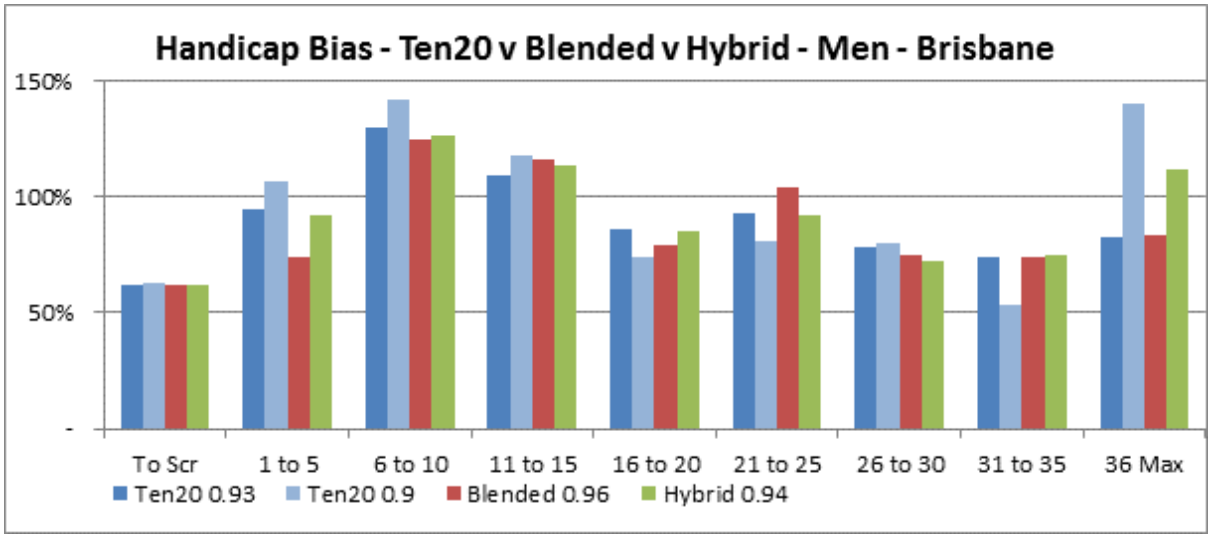


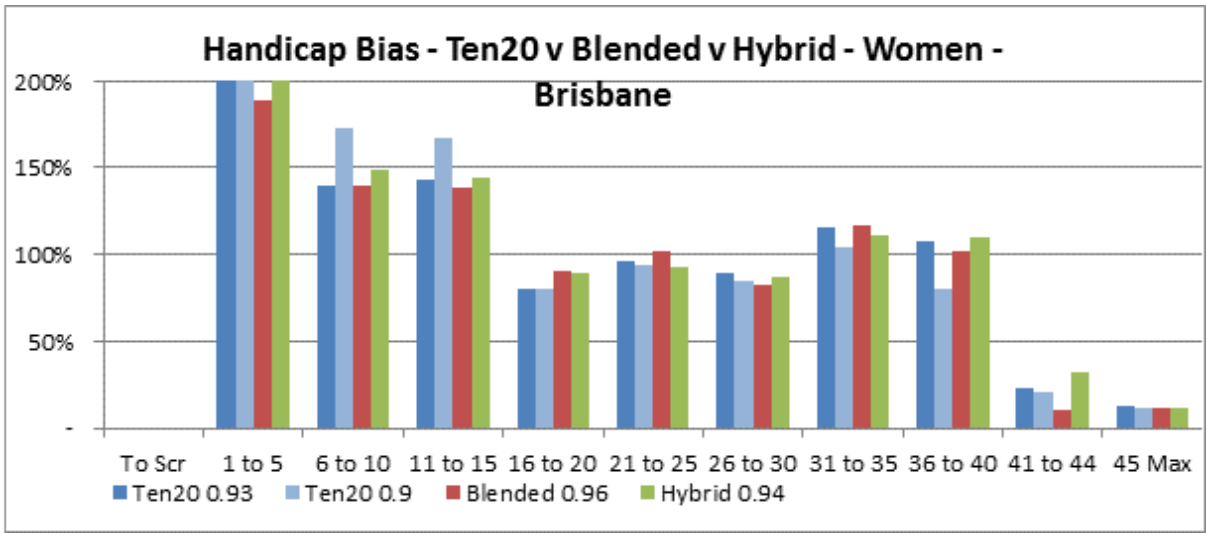


The Corresponding Tilt and Level Indices are:

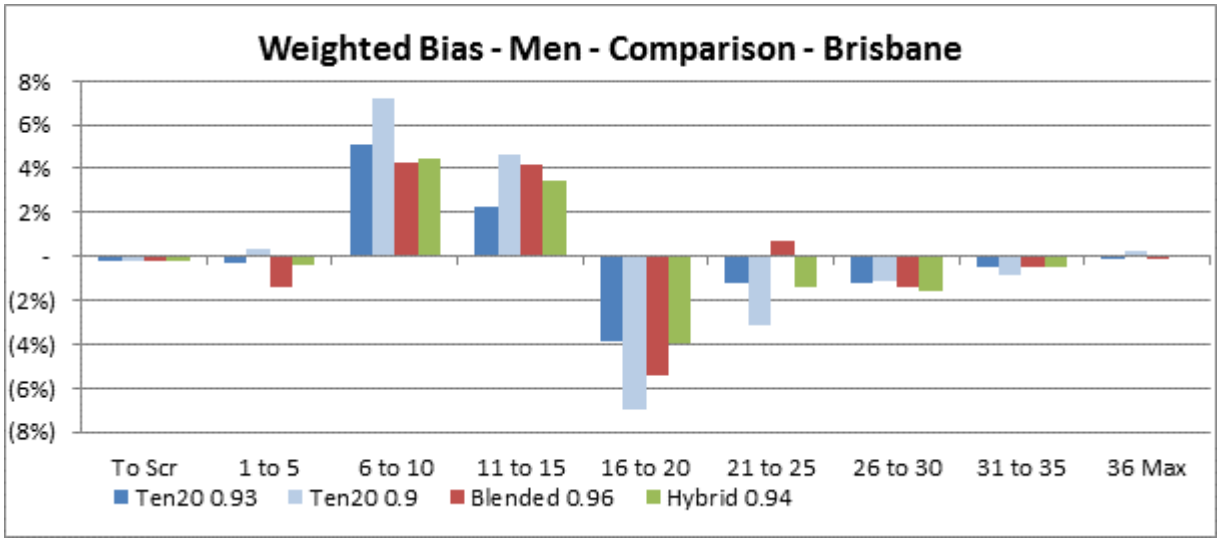
	Brisbane			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-19.2	29.5	-34.8	23.5
Blended 0.94	-29.3	30.3	-39.7	24.7
Blended 0.92	-45.6	40.8	-48.8	26.9
Hybrid 0.96	-12.1	20.8	-29.6	20.5
Hybrid 0.94	-26.2	25.6	-35.7	22.7

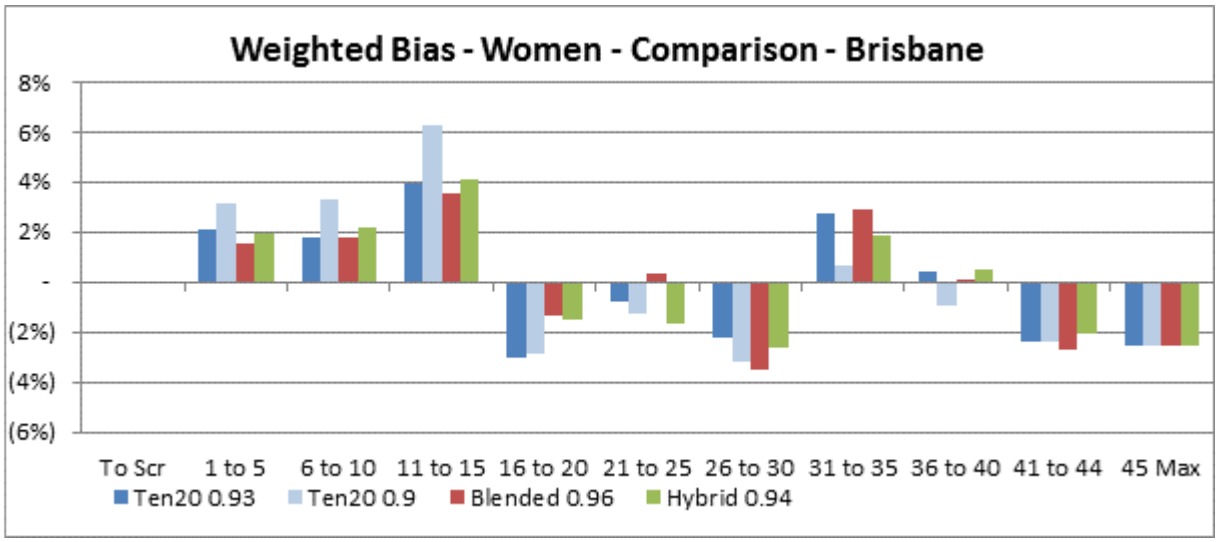
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

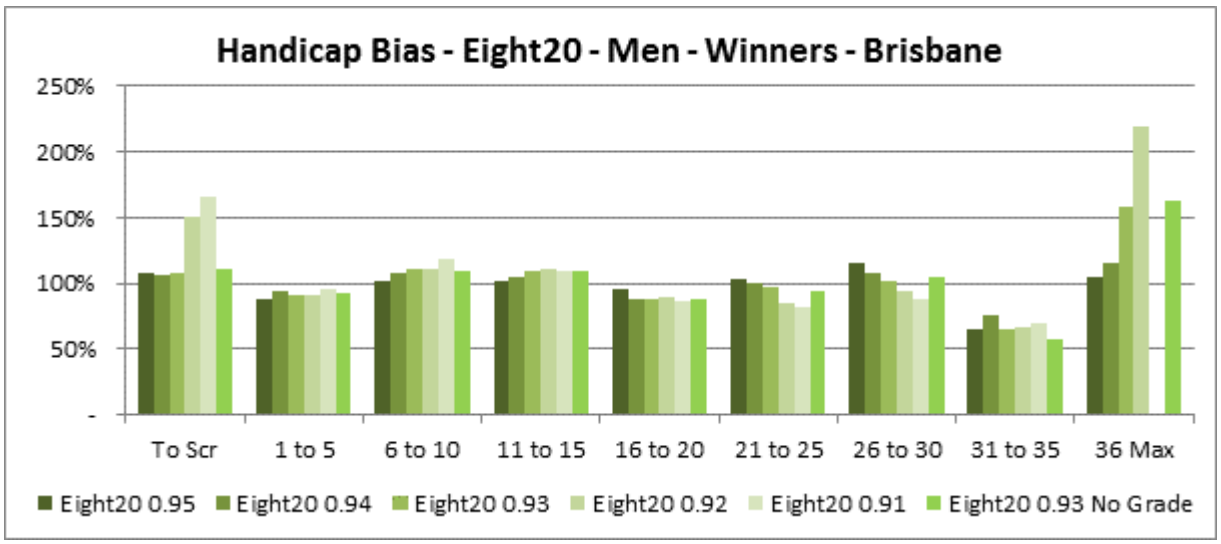
	Brisbane			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-27.0	24.9	-33.1	24.0
Ten20 0.9	-43.3	41.0	-53.7	30.6
Blended 0.96	-19.2	29.5	-34.8	23.5
Hybrid 0.94	-26.2	25.6	-35.7	22.7

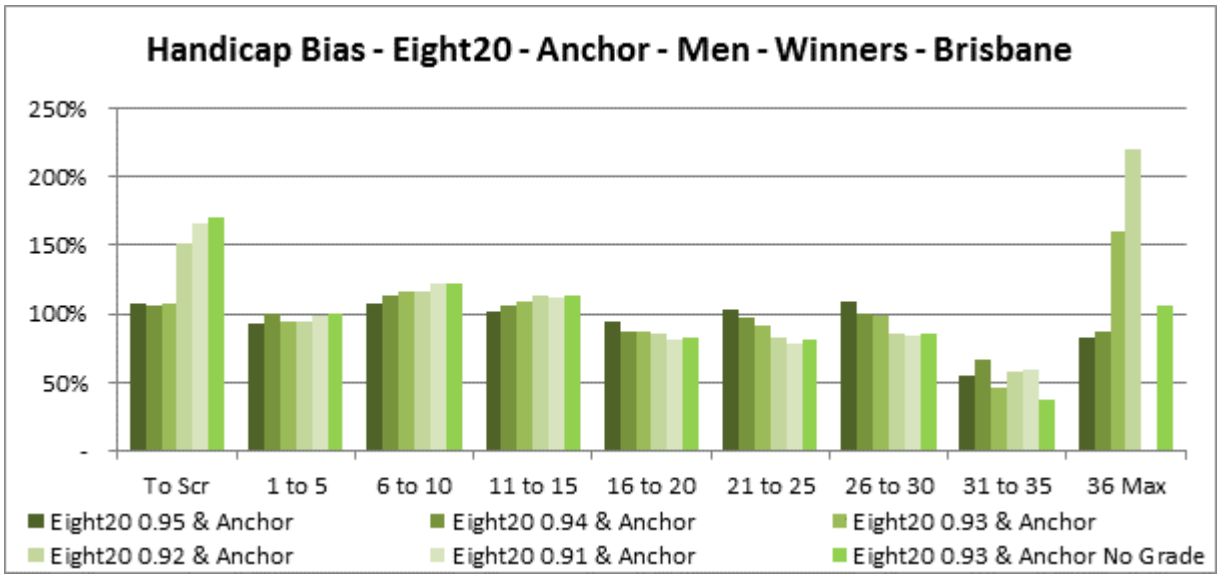
Putting it all together, with the Old System as a reference:

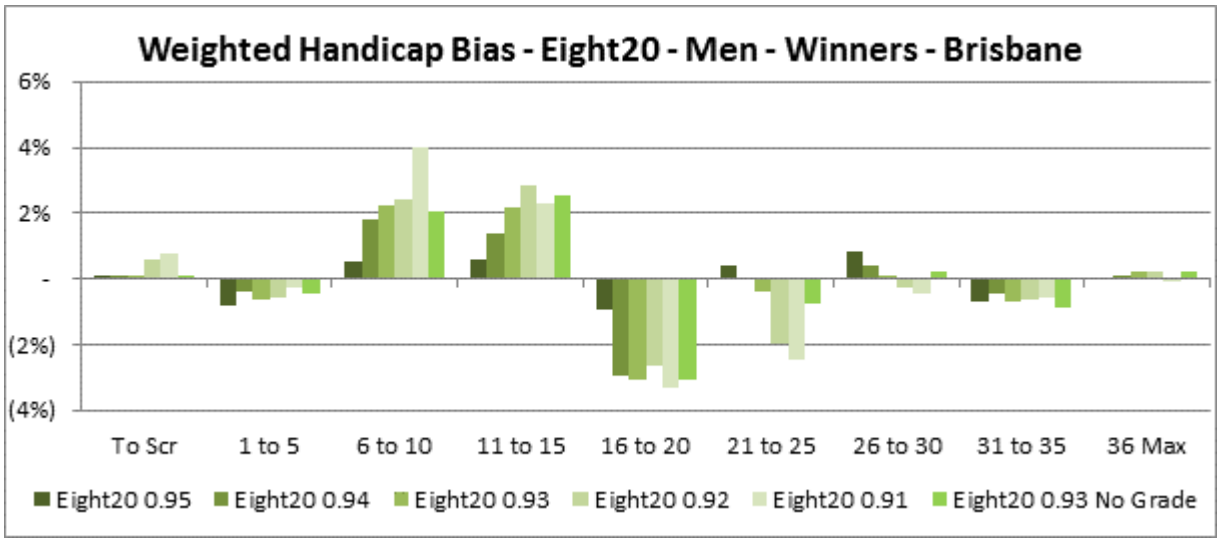
Brisbane	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-78.0	43.6	-58.0	52.0
Current Period - Ten20 0.96	16.6	32.1	4.7	26.7
Old Period - Ten20 0.96	-30.4	22.4	-33.4	33.6
Ten20 0.96	-9.2	20.7	-22.6	23.5
Ten20 0.95	-14.8	23.4	-23.7	20.3
Ten20 0.94	-20.4	23.8	-32.6	22.0
Ten20 0.93	-27.0	24.9	-33.1	24.0
Ten20 0.92	-33.6	31.0	-39.9	23.9
Ten20 0.91	-34.8	33.7	-48.9	26.0
Ten20 0.9	-43.3	41.0	-53.7	30.6
Nine20 0.96	-10.8	23.1	-26.7	23.5
Nine20 0.93	-22.6	27.5	-38.4	23.9
Nine20 0.90	-39.9	36.3	-54.1	30.6
Eight20 0.96	-3.8	13.8	-18.1	22.3
Eight20 0.93	-16.1	26.3	-35.1	25.2
Eight20 0.90	-40.4	35.8	-55.4	31.7
Blended 0.96	-19.2	29.5	-34.8	23.5
Blended 0.94	-29.3	30.3	-39.7	24.7
Blended 0.92	-45.6	40.8	-48.8	26.9
Hybrid 0.96	-12.1	20.8	-29.6	20.5
Hybrid 0.94	-26.2	25.6	-35.7	22.7

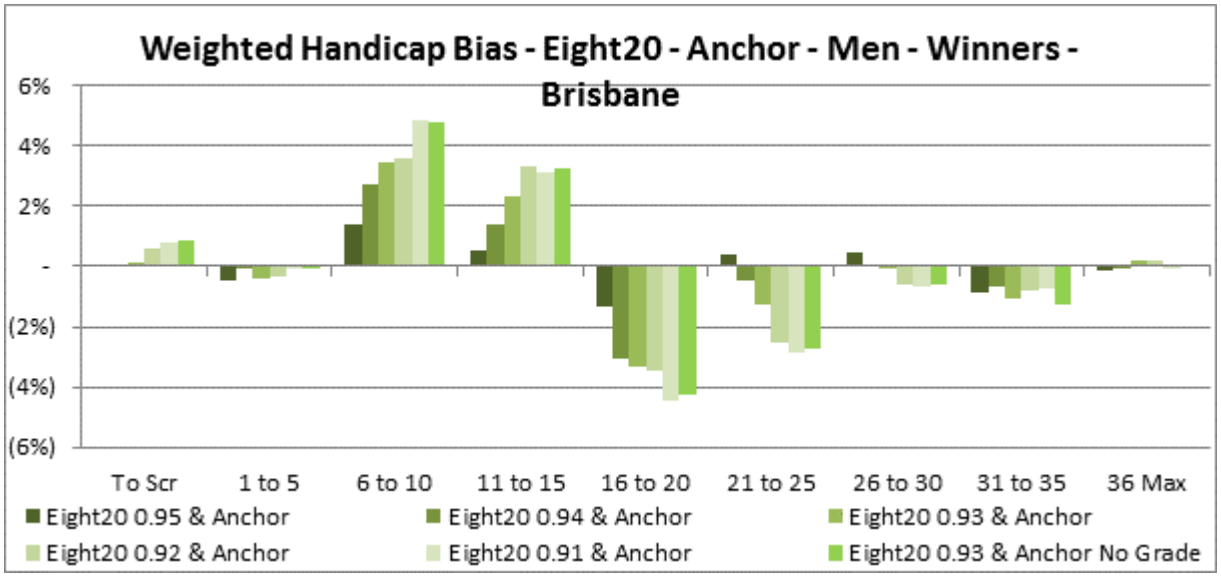
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

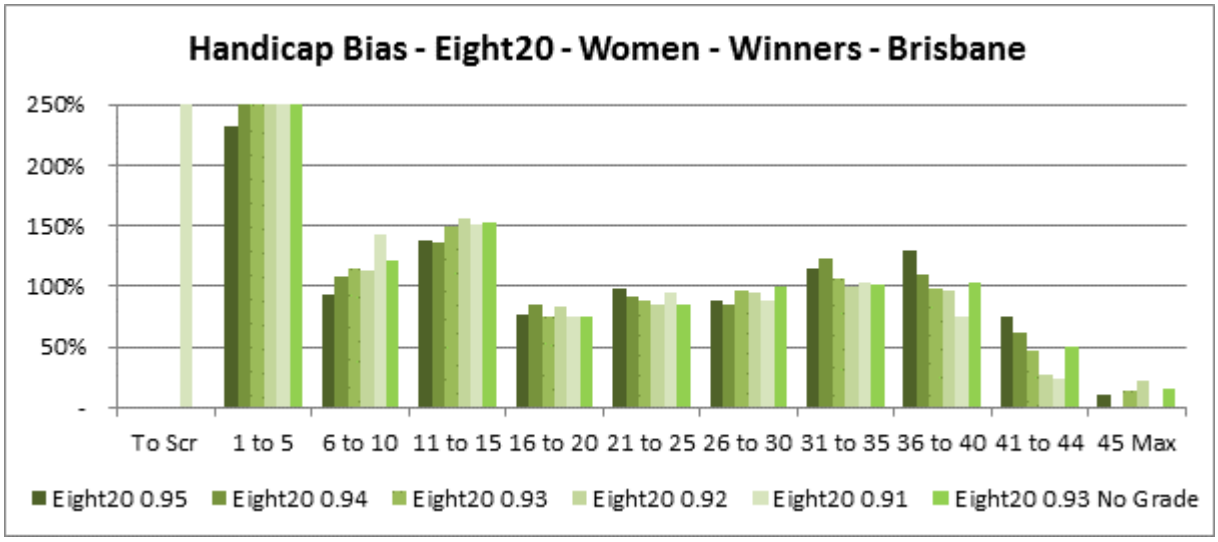
Phase 2

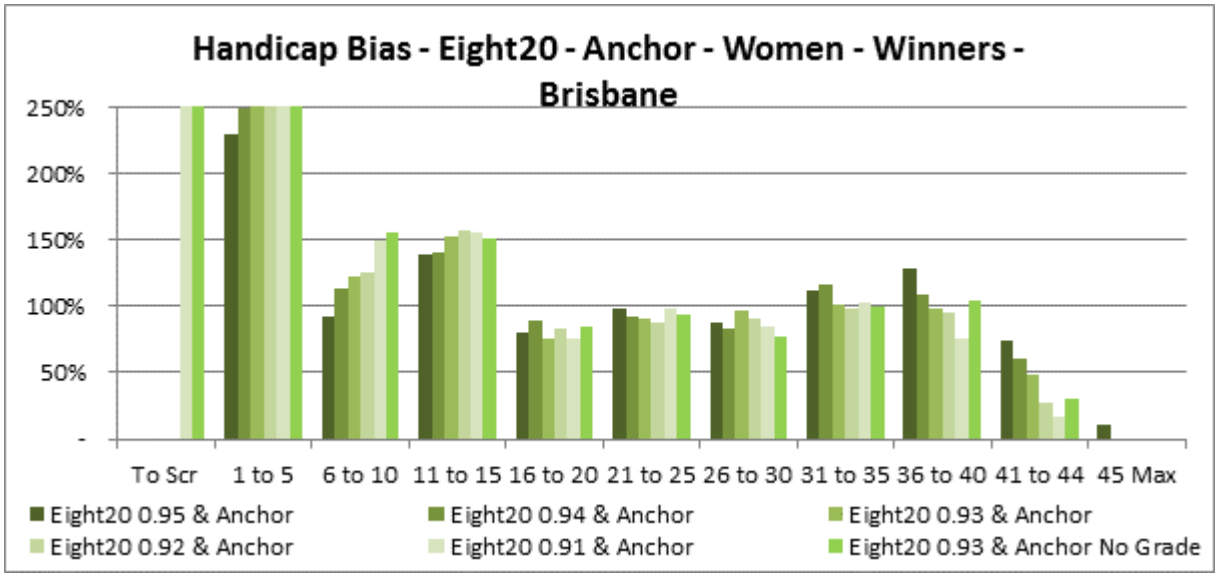

Handicap Bias - Eight20 - Men - Winners - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

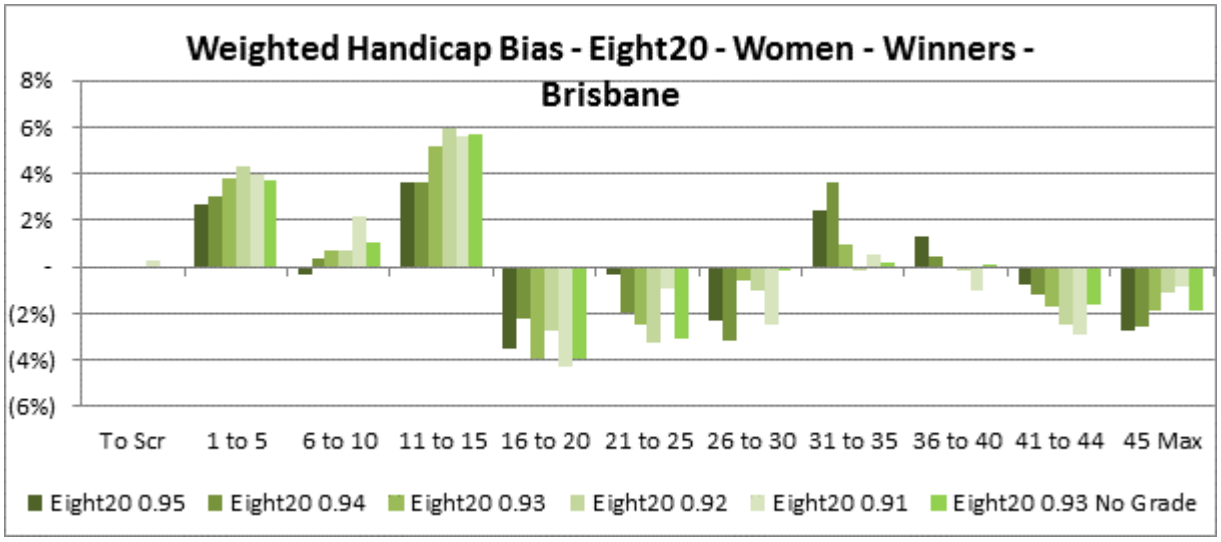

Handicap Bias - Eight20 - Anchor - Men - Winners - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

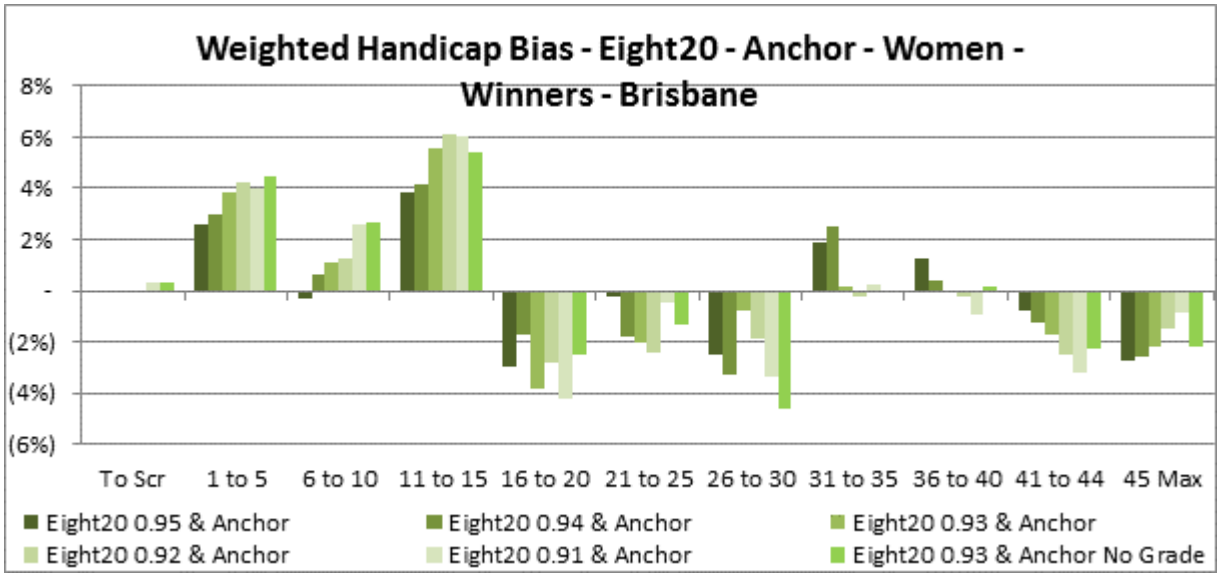

Weighted Handicap Bias - Eight20 - Men - Winners - Brisbane
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

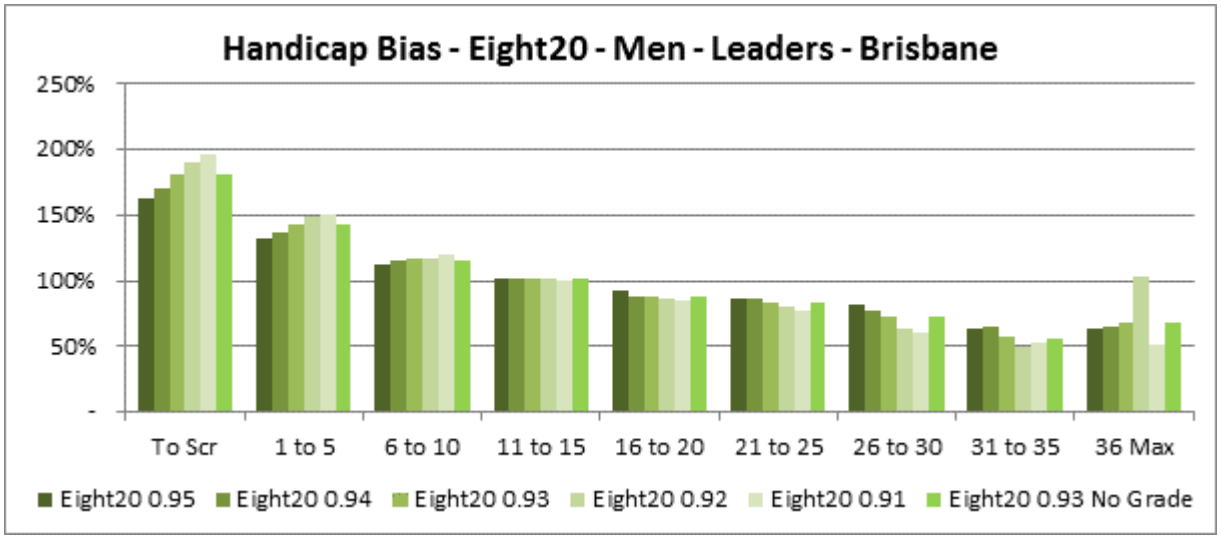

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Brisbane
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

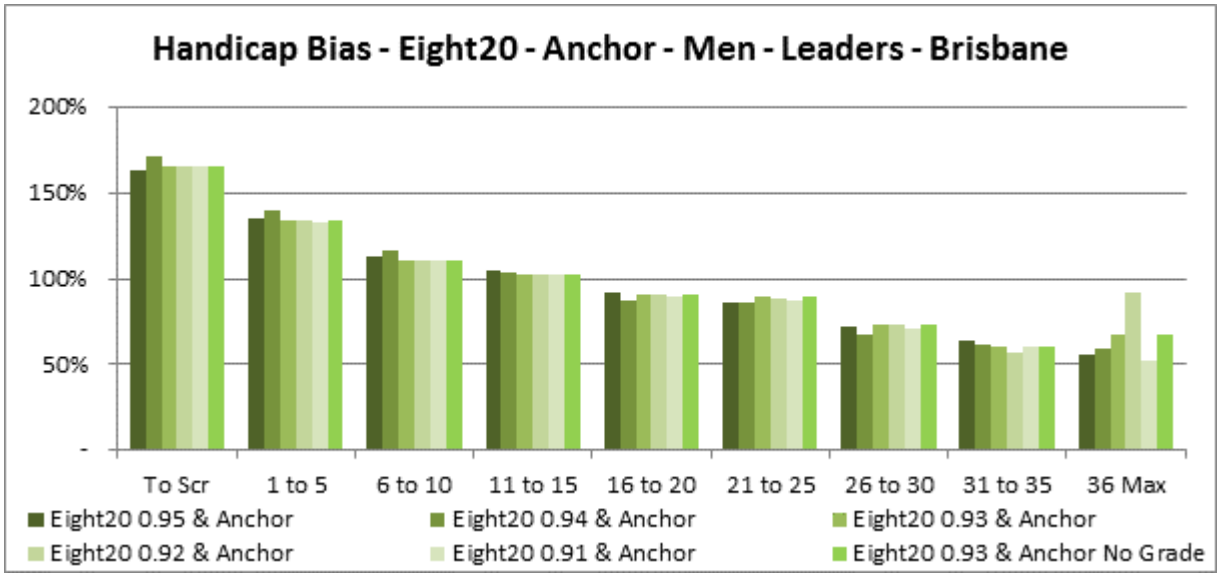

Handicap Bias - Eight20 - Women - Winners - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

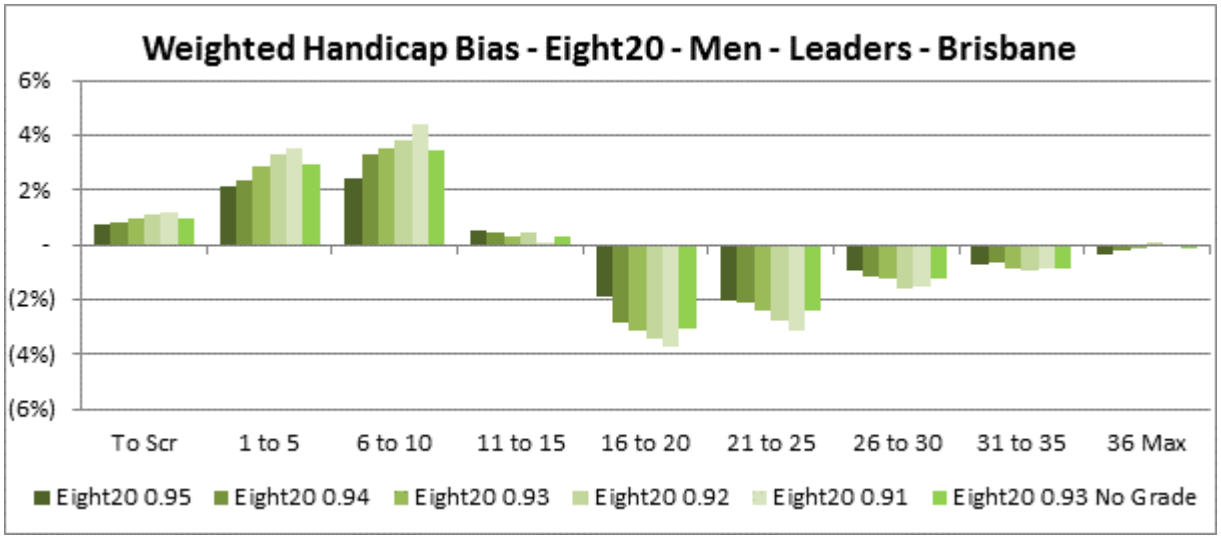

Handicap Bias - Eight20 - Anchor - Women - Winners - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

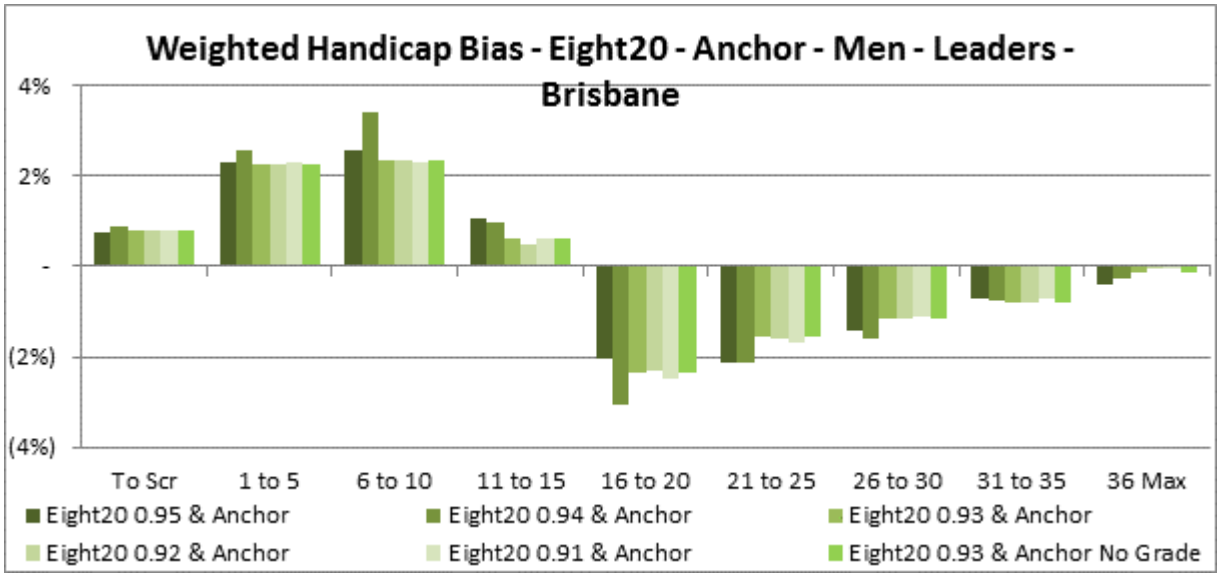

Weighted Handicap Bias - Eight20 - Women - Winners - Brisbane
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

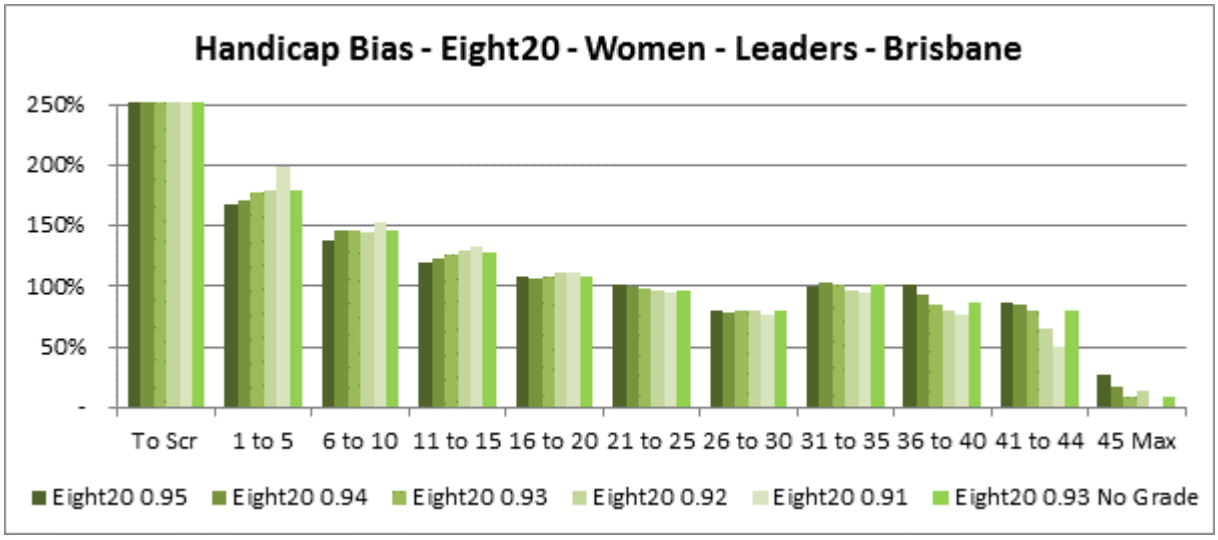

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Brisbane
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

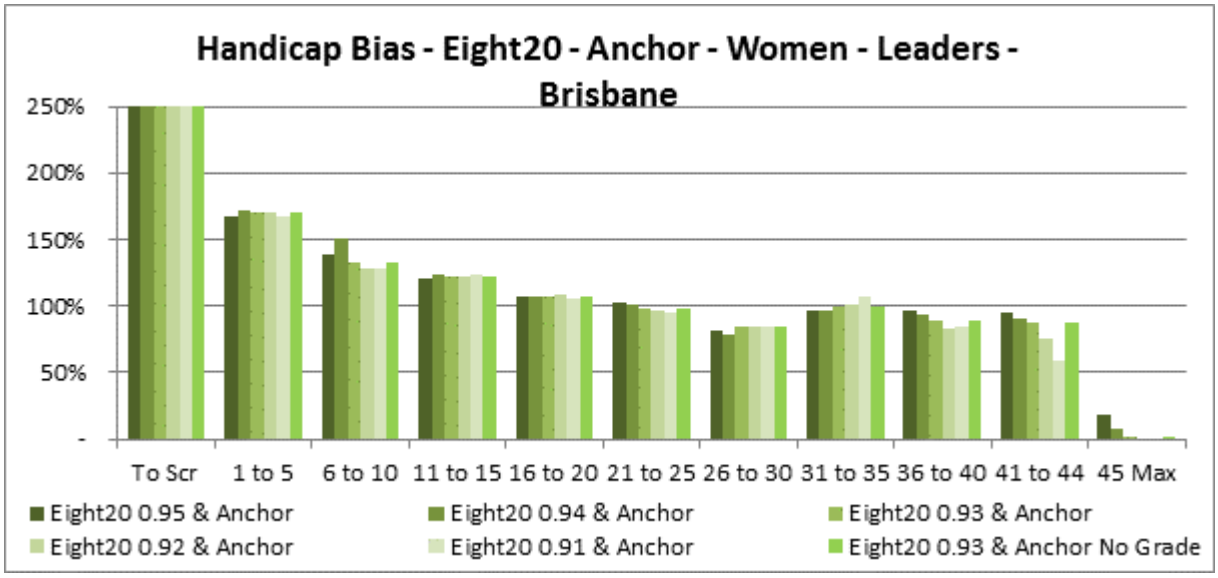

Handicap Bias - Eight20 - Men - Leaders - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

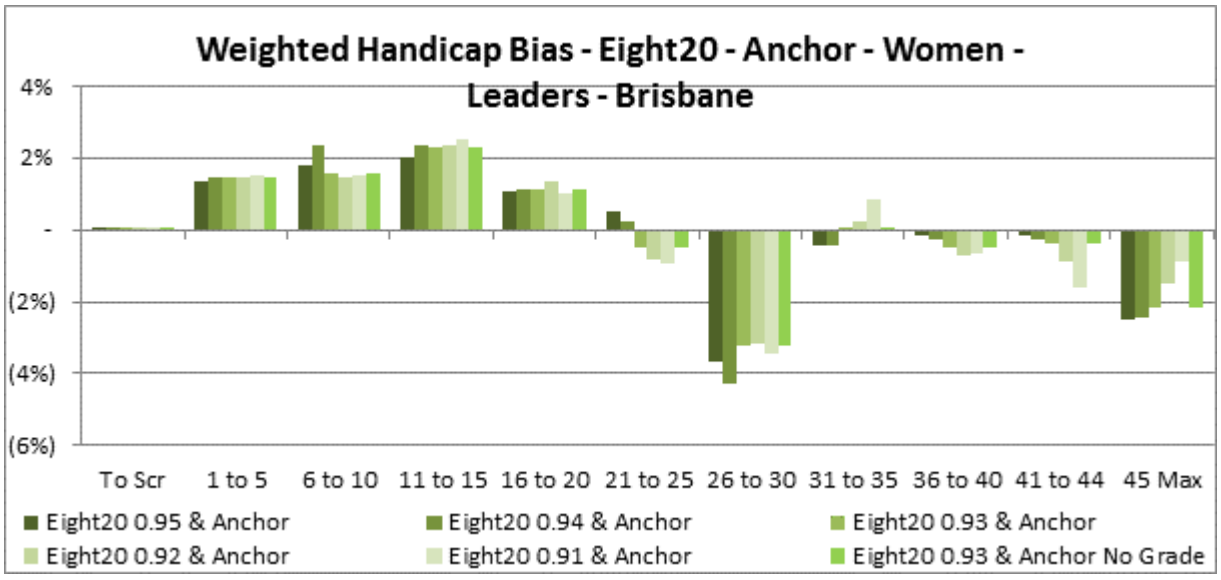

Handicap Bias - Eight20 - Anchor - Men - Leaders - Brisbane
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

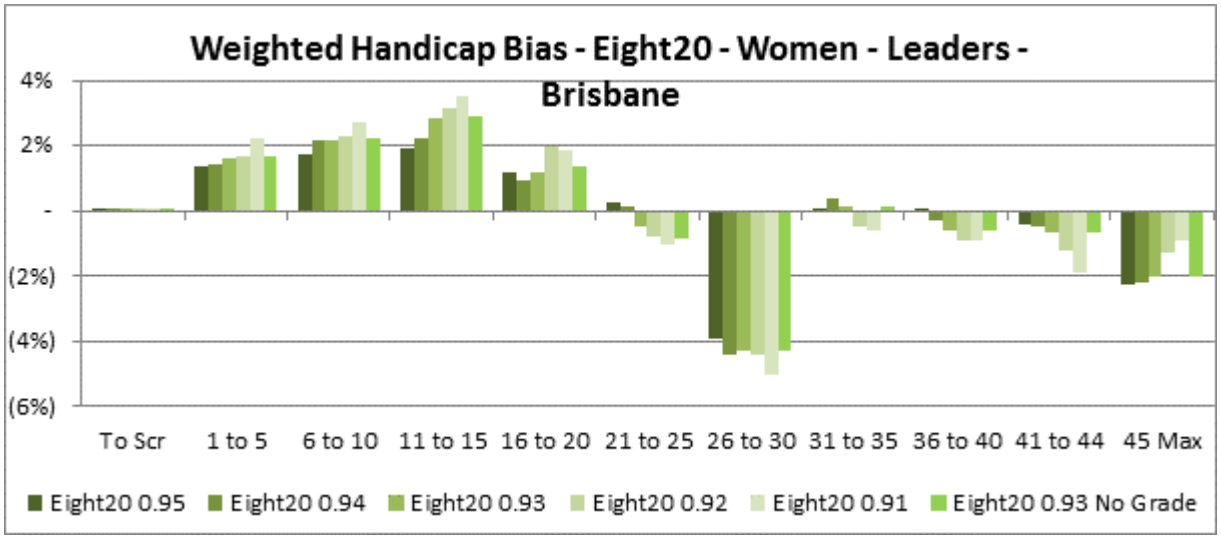

Weighted Handicap Bias - Eight20 - Men - Leaders - Brisbane
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Brisbane
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Brisbane
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Anchor - Women - Leaders - Brisbane
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

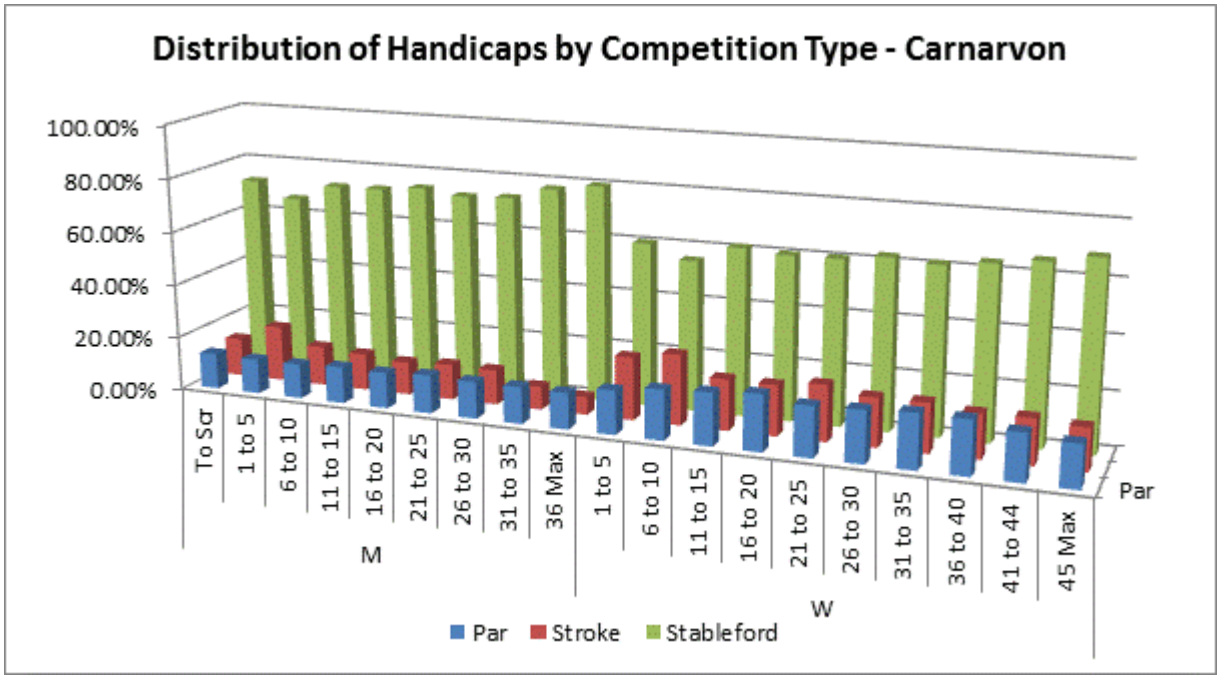


Phase 2 -Brisbane					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	1.0	6.5	-21.9	23.2
	Eight20 0.94	-7.0	13.3	-28.0	25.1
	Eight20 0.93	-11.0	15.9	-35.3	26.5
	Eight20 0.92	-20.1	18.1	-41.9	28.5
	Eight20 0.91	-29.8	22.2	-46.8	29.7
	Eight20 0.93 No Grade	-13.1	16.5	-37.1	28.0
	Eight20 0.95 & Anchor	-5.0	8.0	-22.8	22.6
	Eight20 0.94 & Anchor	-14.6	15.4	-31.3	24.9
	Eight20 0.93 & Anchor	-18.9	19.5	-39.3	27.5
	Eight20 0.92 & Anchor	-27.5	23.1	-45.4	29.2
	Eight20 0.91 & Anchor	-35.8	27.5	-50.5	31.8
	Eight20 0.93 & Anchor No Grade	-38.3	27.5	-53.9	31.5
Leaders	Eight20 0.95	-36.6	16.0	-29.7	17.6
	Eight20 0.94	-41.5	19.9	-31.9	19.3
	Eight20 0.93	-46.3	22.2	-35.2	20.1
	Eight20 0.92	-51.9	25.0	-37.7	21.5
	Eight20 0.91	-54.9	27.2	-42.9	24.5
	Eight20 0.93 No Grade	-46.5	22.1	-35.6	20.5
	Eight20 0.95 & Anchor	-39.1	17.2	-30.4	17.3
	Eight20 0.94 & Anchor	-44.1	21.2	-33.8	19.8
	Eight20 0.93 & Anchor	-35.1	16.0	-29.6	16.6
	Eight20 0.92 & Anchor	-34.7	16.0	-28.6	16.5
	Eight20 0.91 & Anchor	-34.6	16.3	-27.9	17.4
	Eight20 0.93 & Anchor No Grade	-35.1	16.0	-29.6	16.6

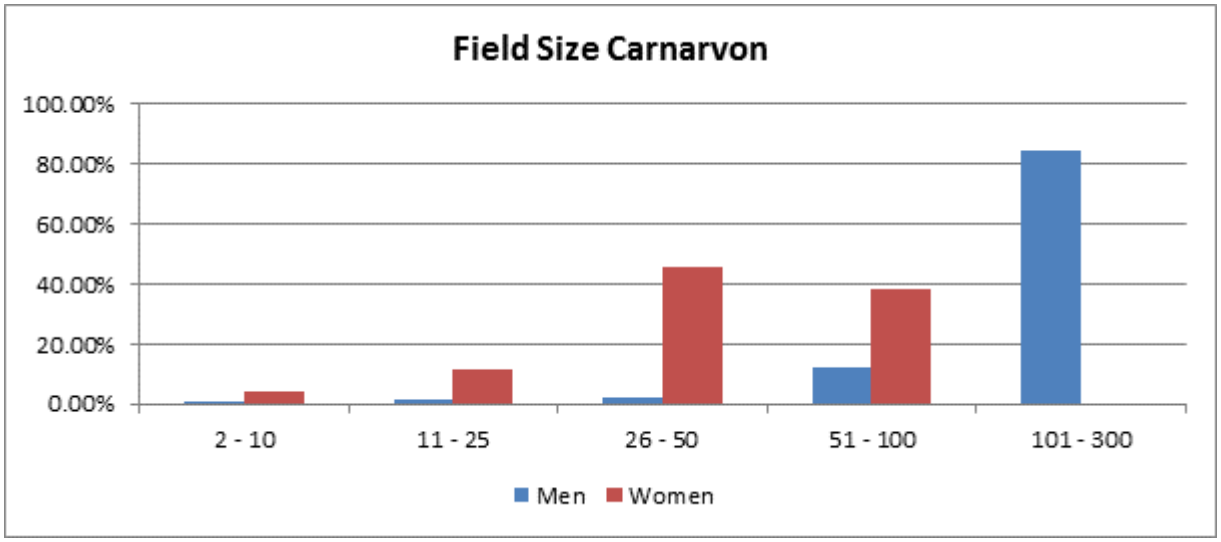
Appendix 3 – Carnarvon

Phase 1

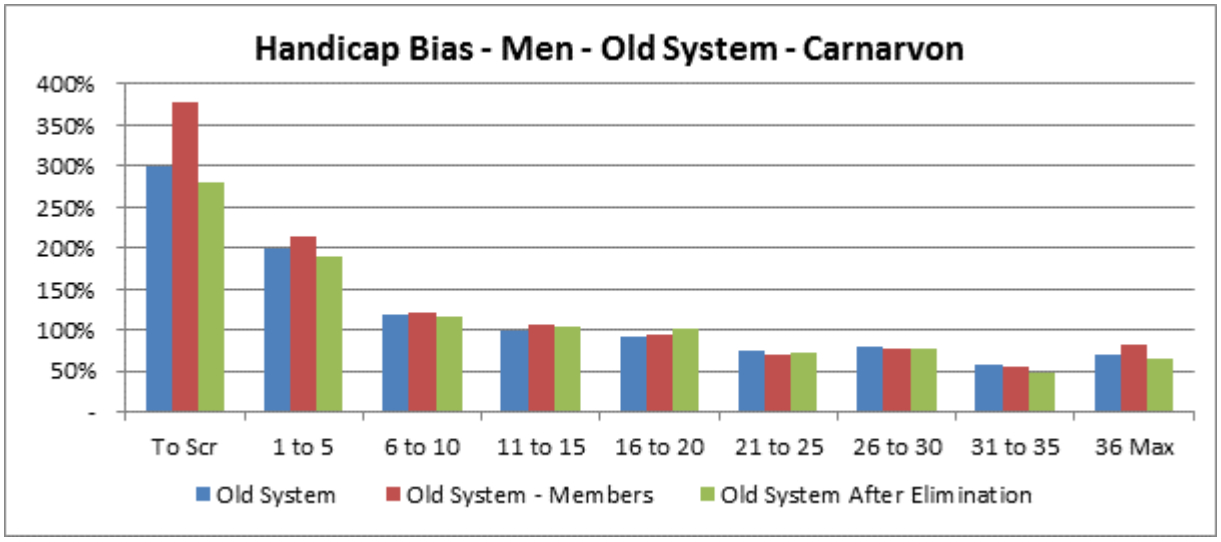
Carnarvon	Men	Women	Total
Players in Database	3,543	366	3,909
Members	782	208	990
Visitors	2,761	158	2,919
Members who have Played 33 Rounds	724	194	918
Members with Last Round In Old System	137	45	182
Members with Last Round in Current System	645	163	808
Earliest Round	4/12/2007	2/12/2007	
Latest Round	28/11/2010	28/11/2010	
Number of Visiting Clubs			226
Number of Home Competitions	526	330	856
Number of Rounds of Golf	94,157	16,542	110,699
Number of Rounds at Home	86,594	15,191	101,785
Number of Rounds at Home Old	67,500	11,778	79,278
Number of Rounds at Home Current	19,094	3,413	22,507
Num Rnds Members at Home	72,534	13,937	86,471
Num Rnds Members at Home Old	56,082	10,741	66,823
Num Rnds Members at Home Cur	16,452	3,196	19,648
Num Rnds After Eliminations	45,321	7,575	52,896
Num Rnds After Eliminations Old	29,868	4,715	34,583
Num Rnds After Eliminations Cur	15,453	2,860	18,313

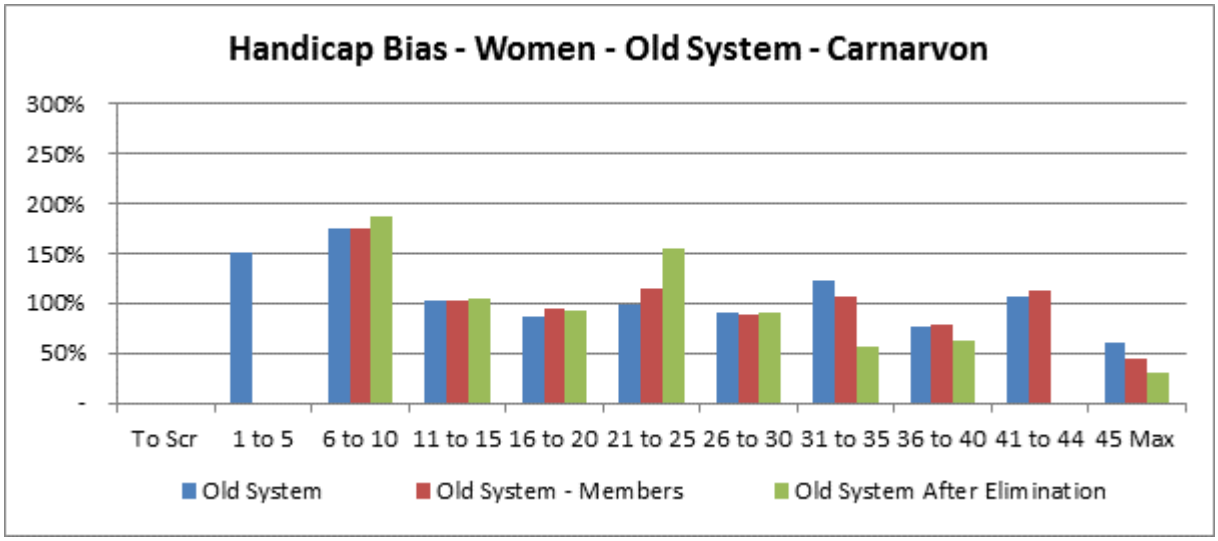


Most men's competitions are with a field of over 100, the women mainly field 26-50.

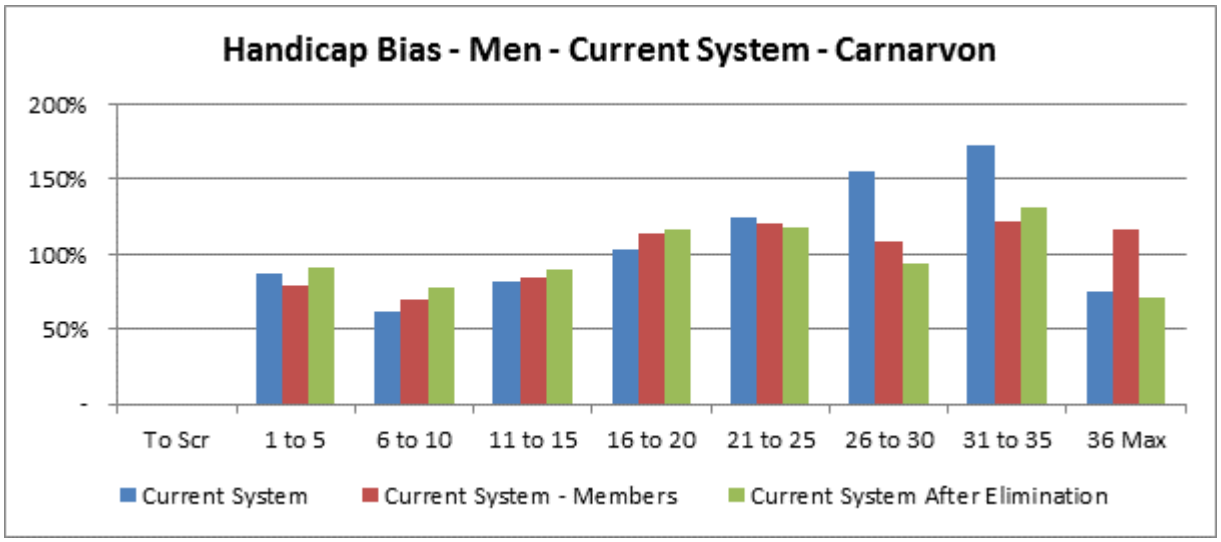


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

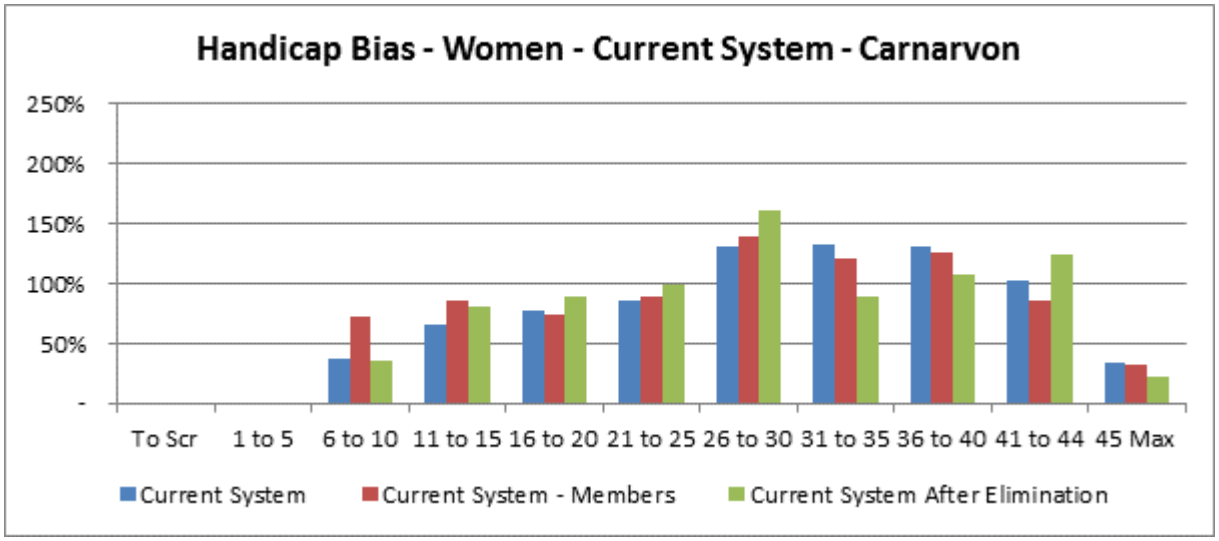




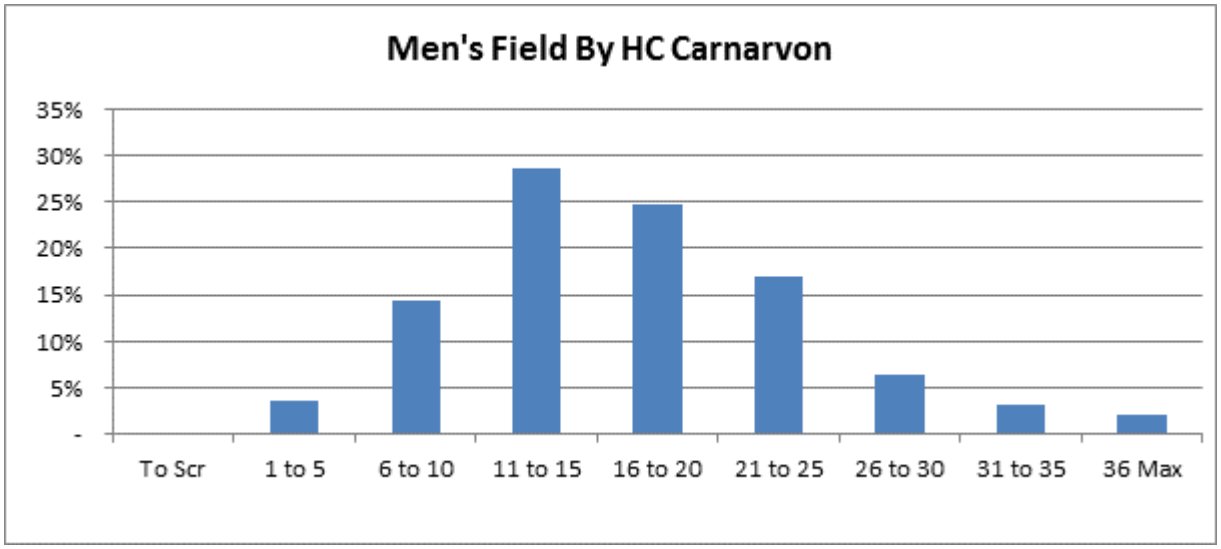
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

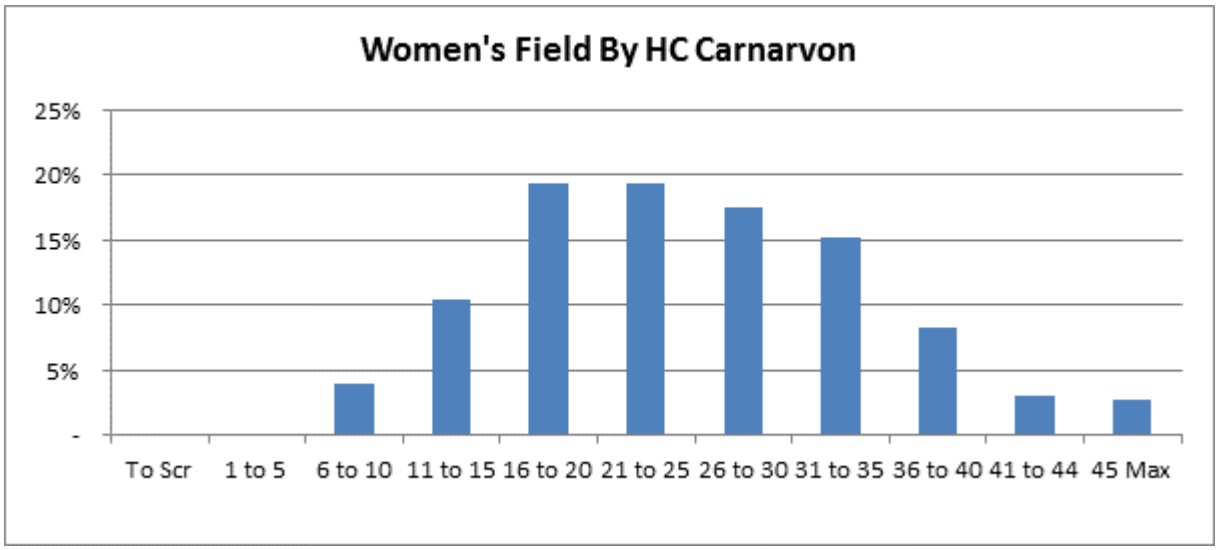


The picture is somewhat similar for the women.



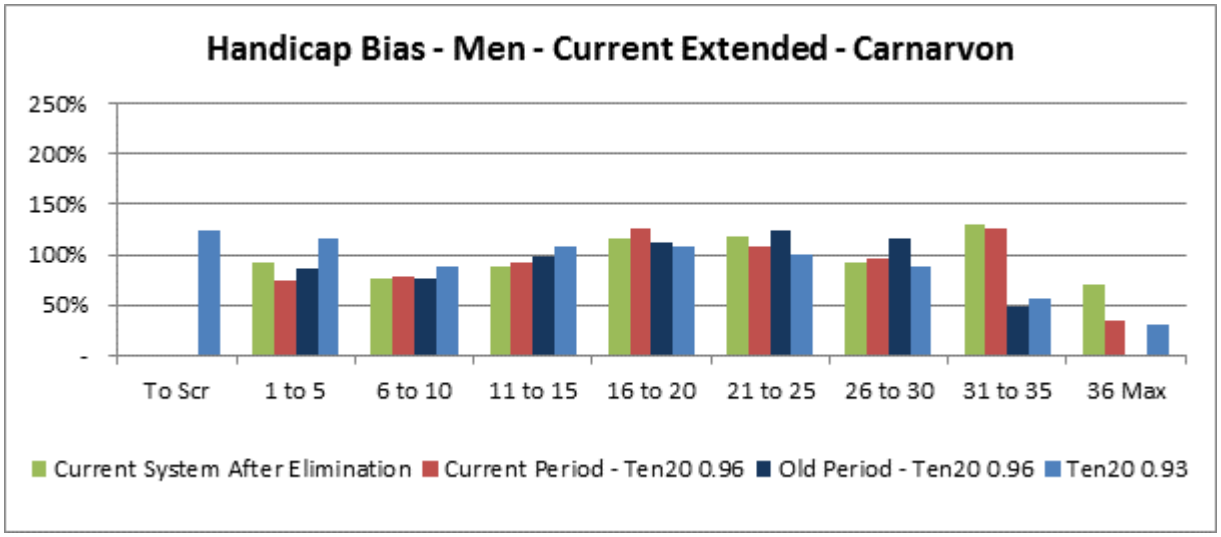
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





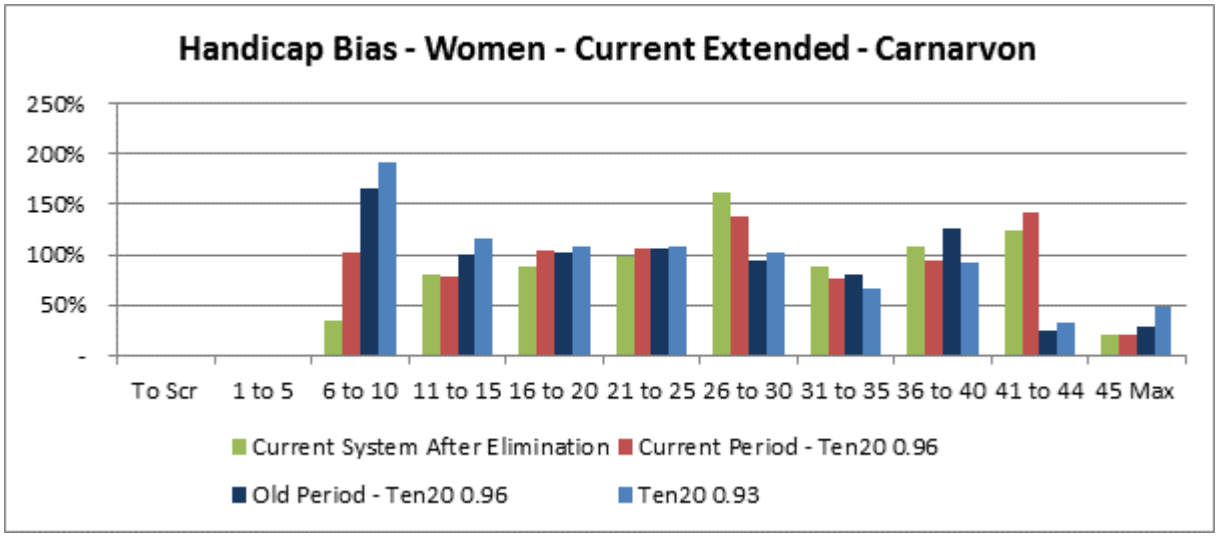
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

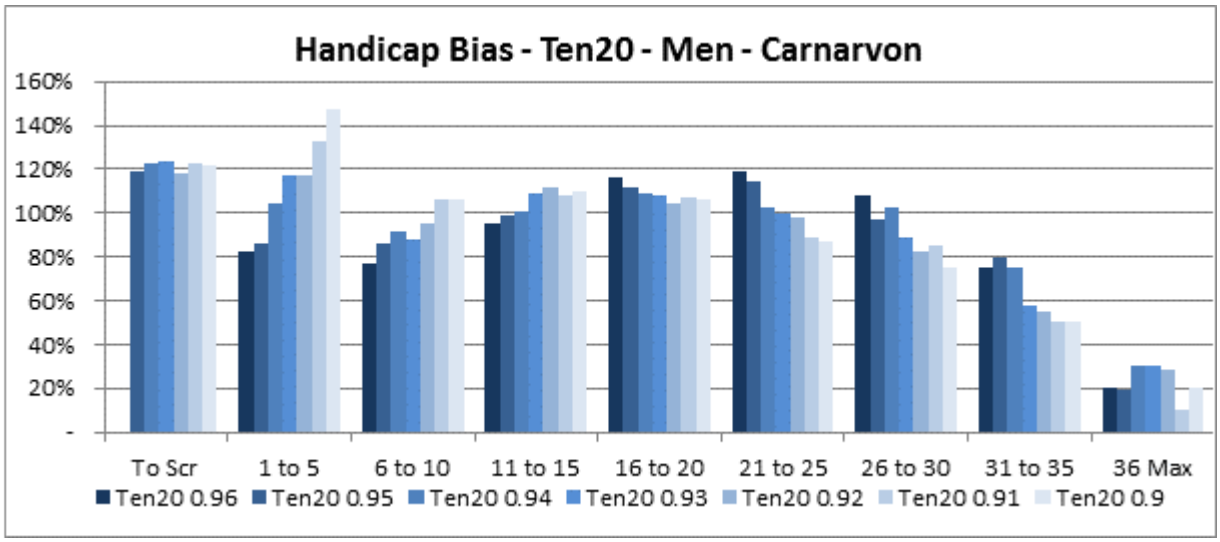


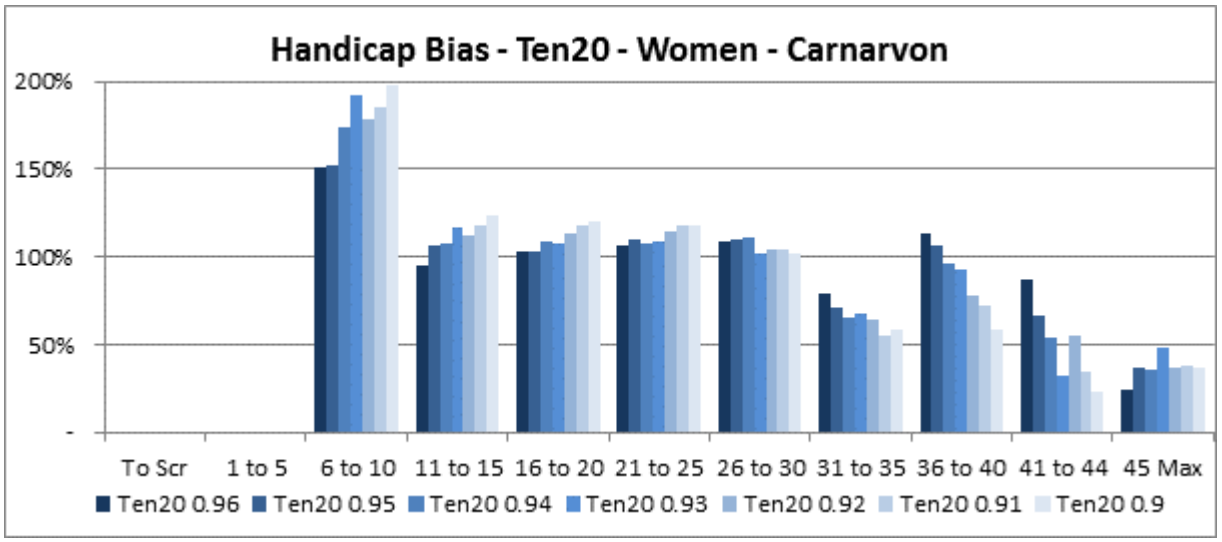
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the very high markers.

For women, the low markers would have dominated over the two-years.

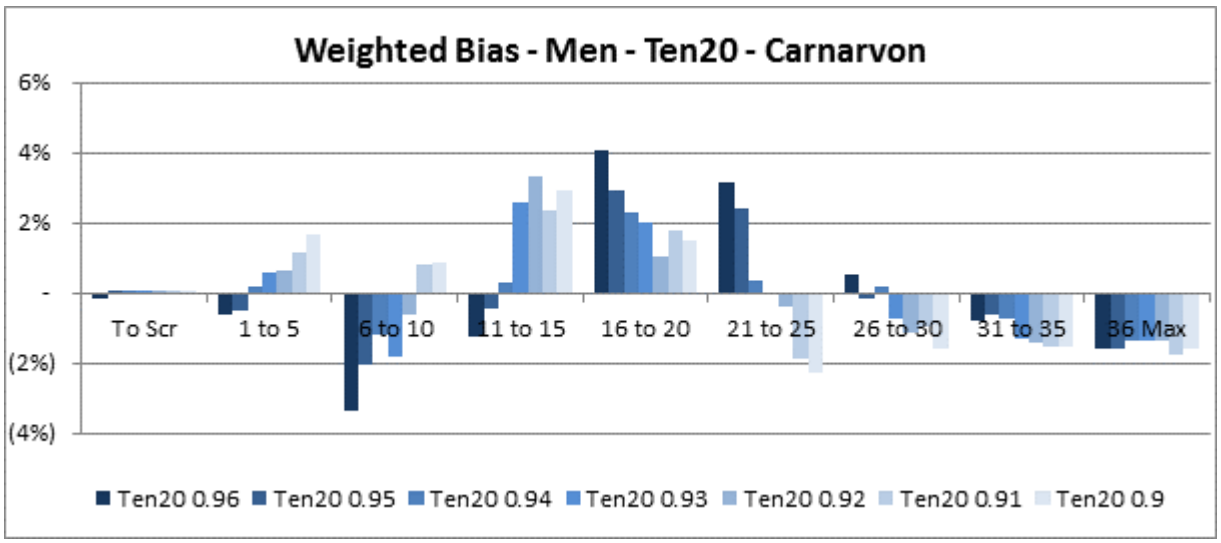


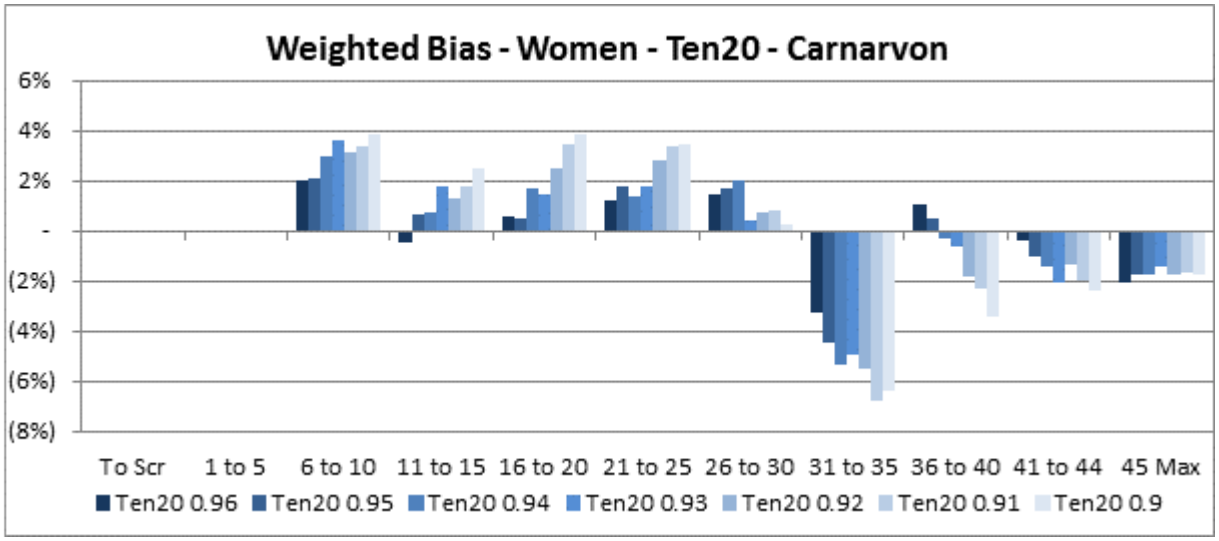
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

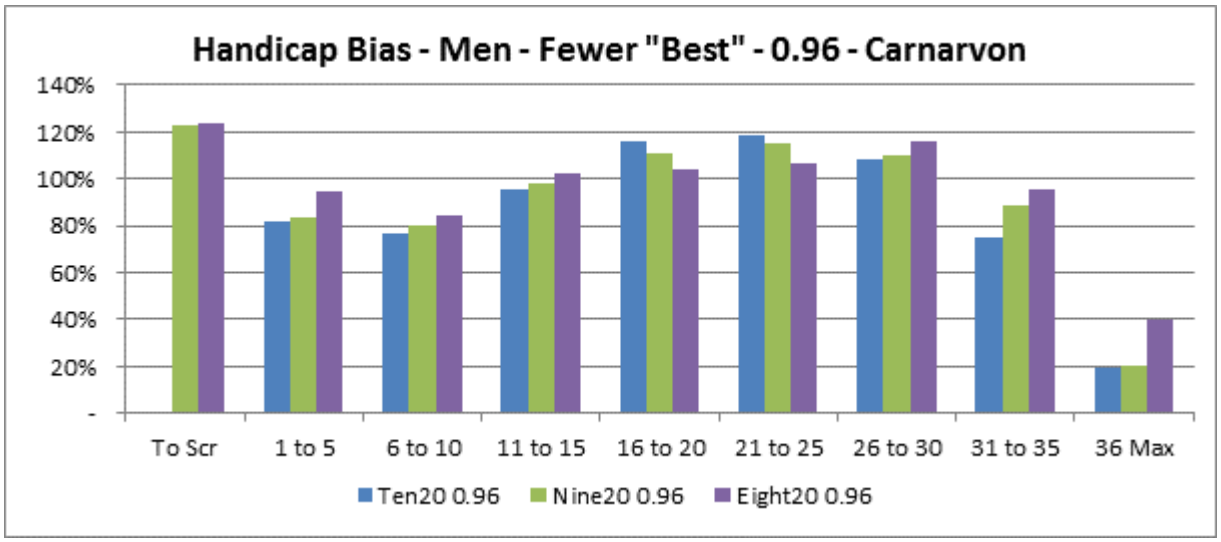


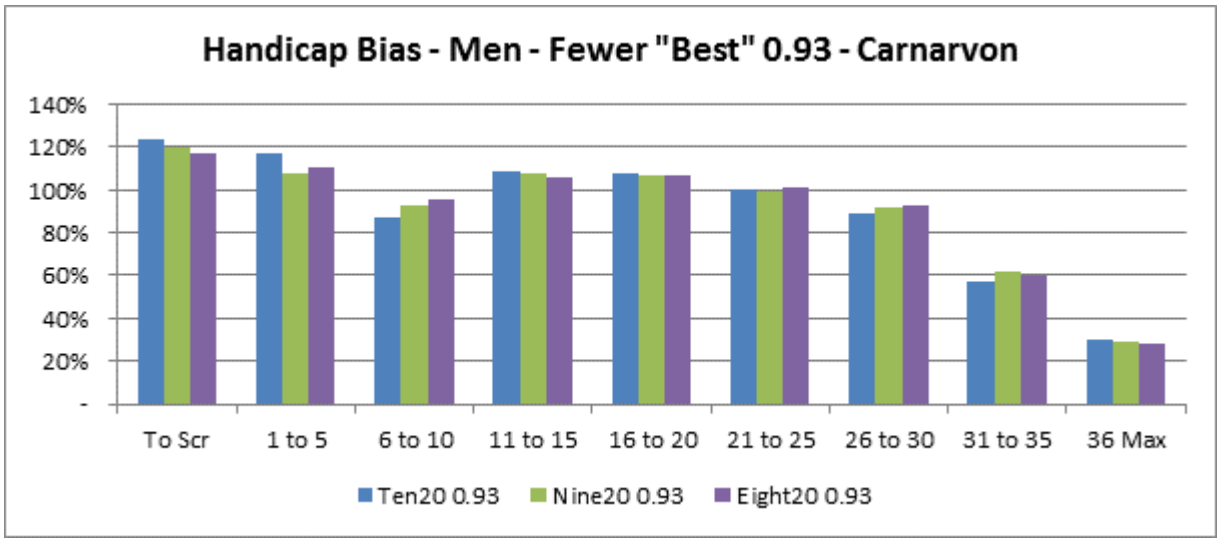


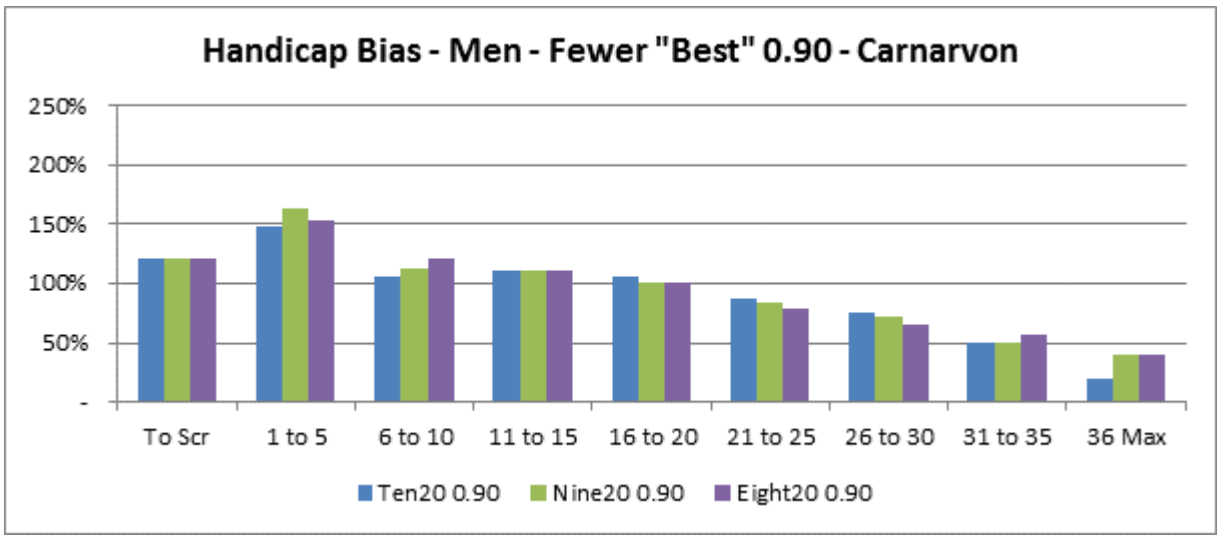
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

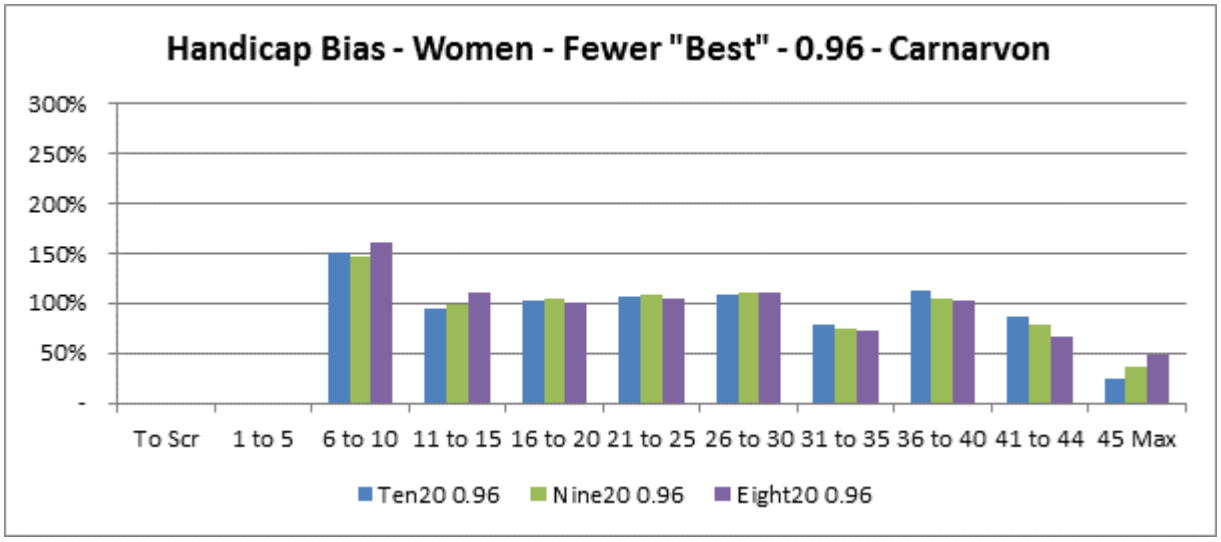
	Carnarvon			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	10.3	23.2	-17.7	15.7
Ten20 0.95	-0.3	16.6	-24.1	18.9
Ten20 0.94	-9.3	10.8	-32.9	22.8
Ten20 0.93	-19.7	15.2	-38.9	23.1
Ten20 0.92	-27.3	15.1	-40.4	25.4
Ten20 0.91	-38.5	16.1	-48.6	31.2
Ten20 0.9	-43.7	18.4	-55.8	33.0

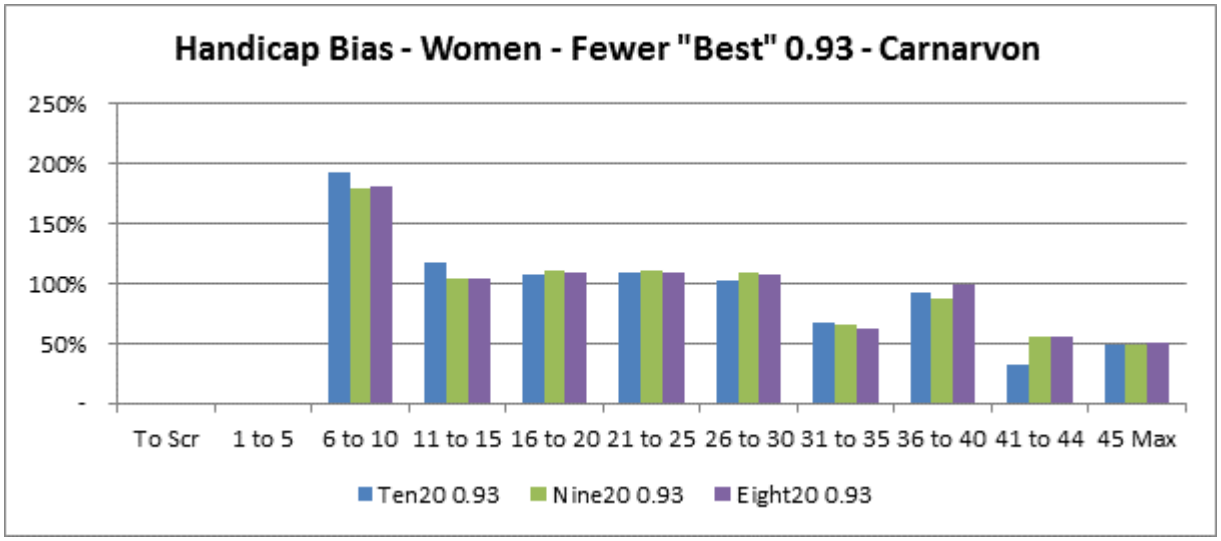
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

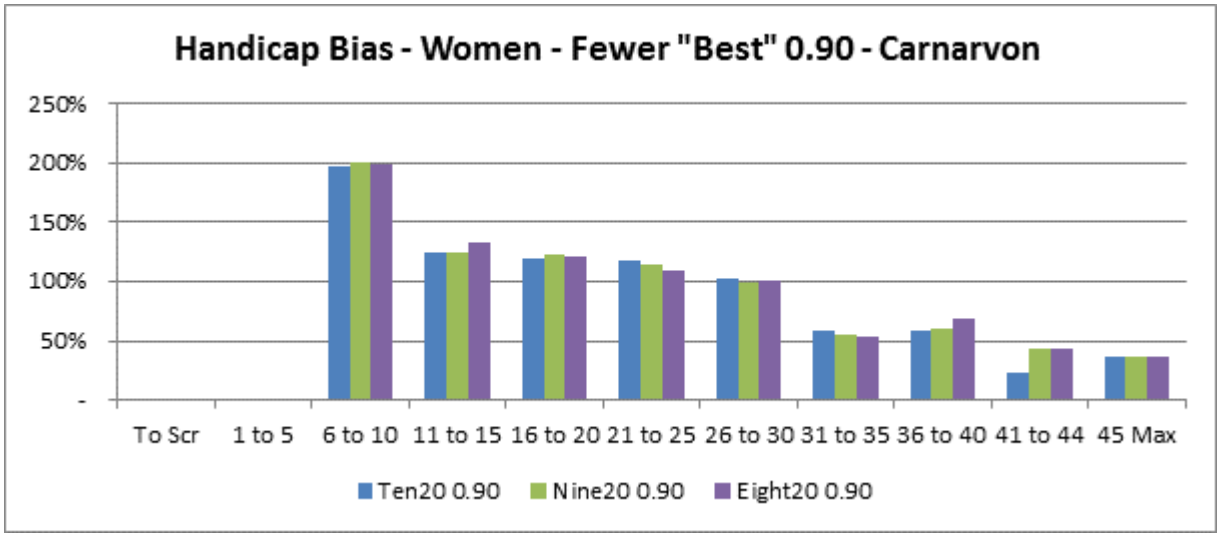







Handicap Bias - Women - Fewer "Best" - 0.96 - Carnarvon
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

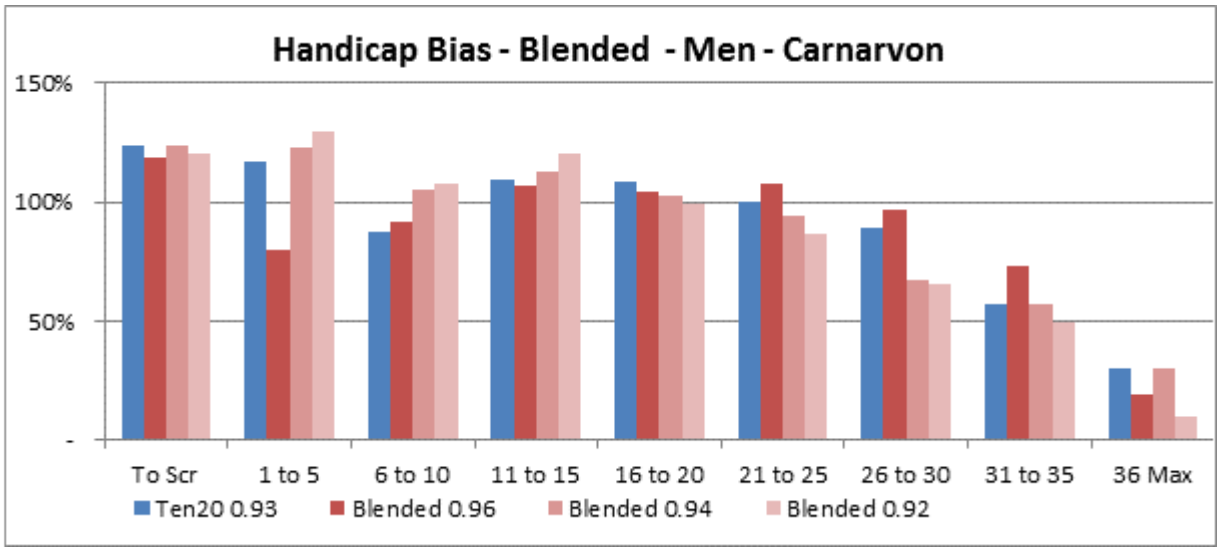

Handicap Bias - Women - Fewer "Best" 0.93 - Carnarvon
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

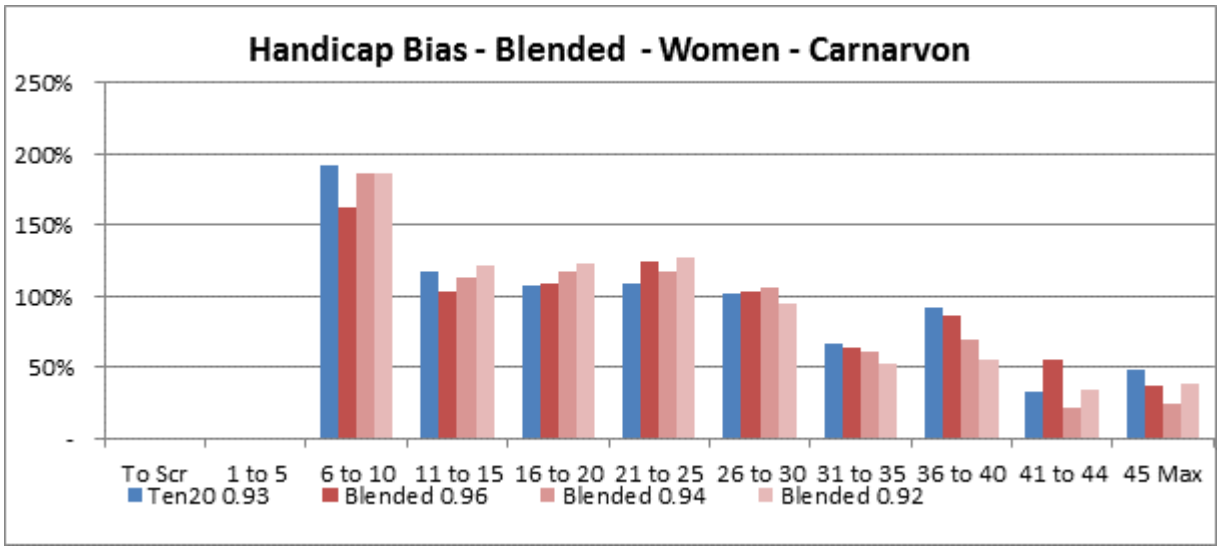

Handicap Bias - Women - Fewer "Best" 0.90 - Carnarvon
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

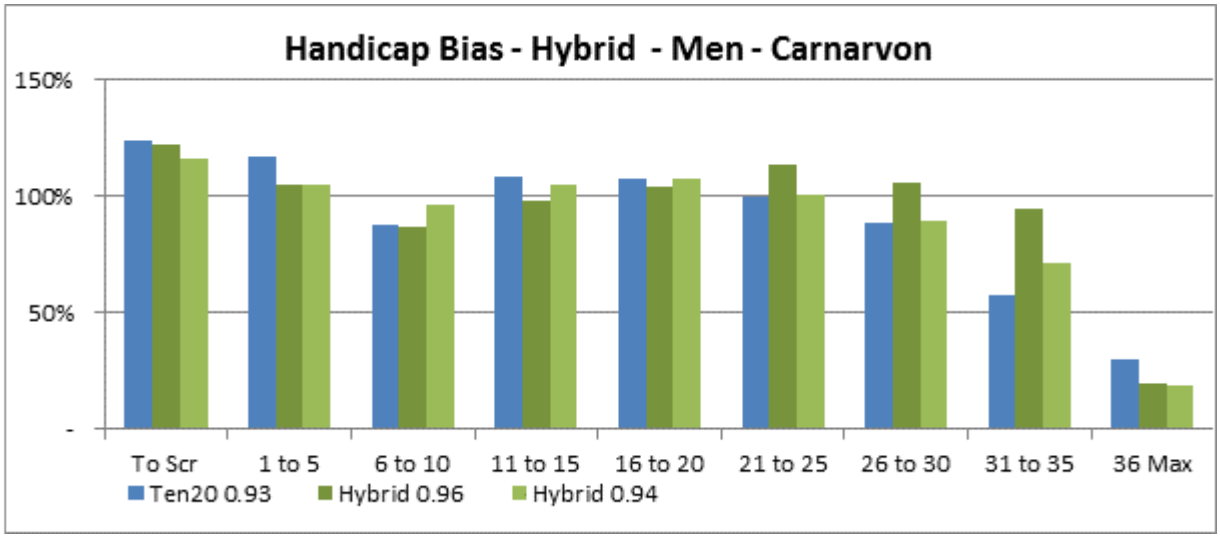
Carnarvon				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	10.3	23.2	-17.7	15.7
Nine20 0.96	7.4	17.9	-20.4	17.2
Eight20 0.96	3.7	11.2	-24.1	17.6
Ten20 0.93	-19.7	15.2	-38.9	23.1
Nine20 0.93	-19.2	12.9	-33.8	23.4
Eight20 0.93	-19.4	10.9	-31.6	23.3
Ten20 0.90	-43.7	18.4	-55.8	33.0
Nine20 0.90	-49.3	20.4	-55.5	34.0
Eight20 0.90	-52.9	23.5	-54.8	32.9

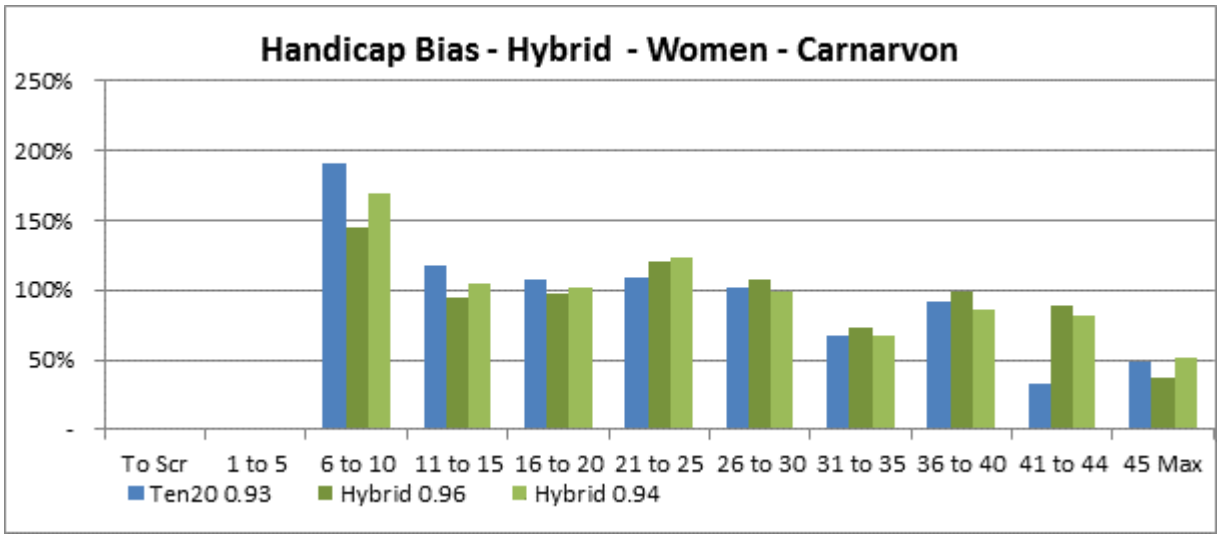
For the Blended:





For the Hybrid:

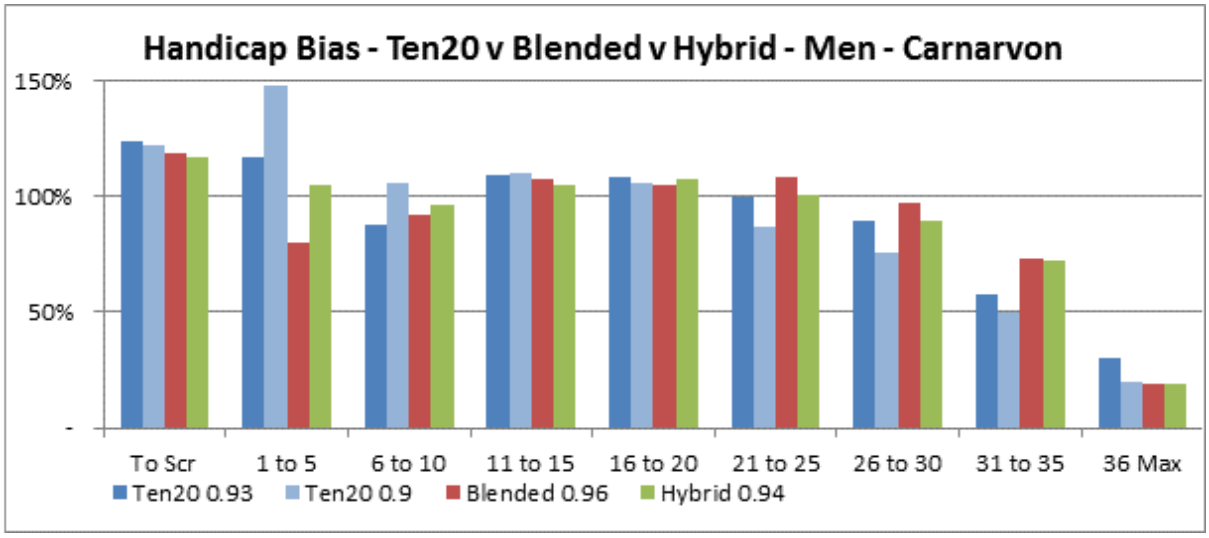


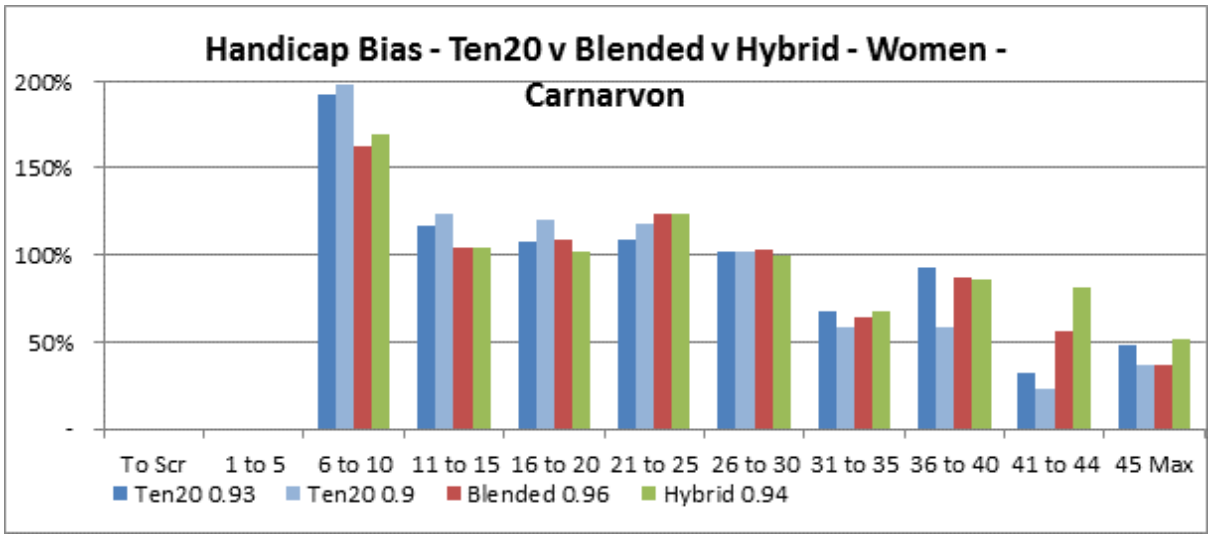


The Corresponding Tilt and Level Indices are:

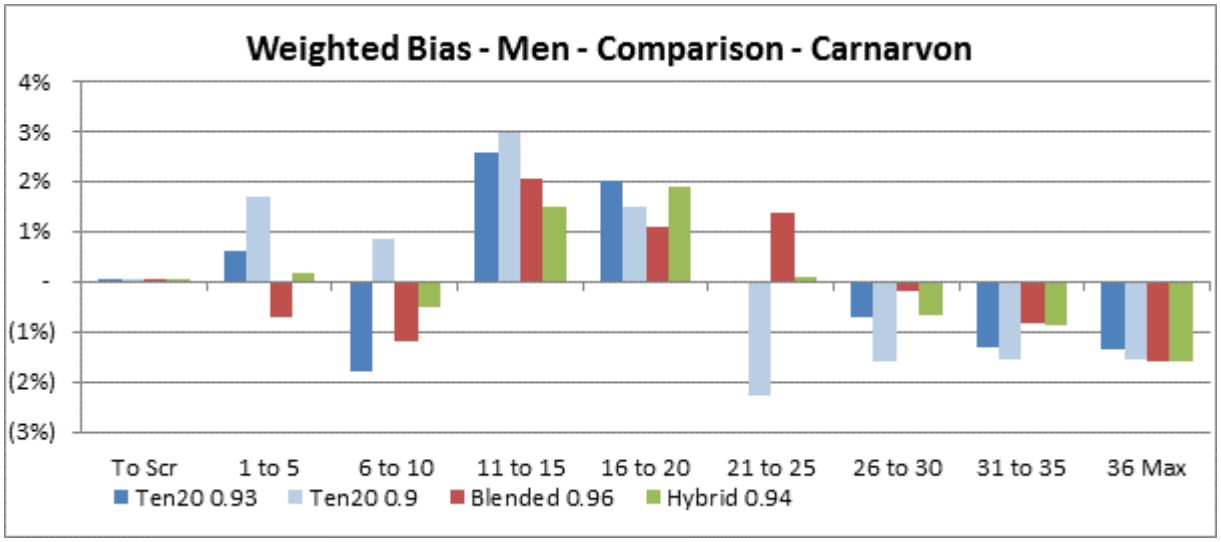
	Carnarvon			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-9.2	12.4	-34.2	25.8
Blended 0.94	-37.1	17.1	-49.5	29.9
Blended 0.92	-49.7	25.6	-56.3	37.0
Hybrid 0.96	0.0	13.0	-19.0	20.3
Hybrid 0.94	-18.9	11.1	-29.3	24.0

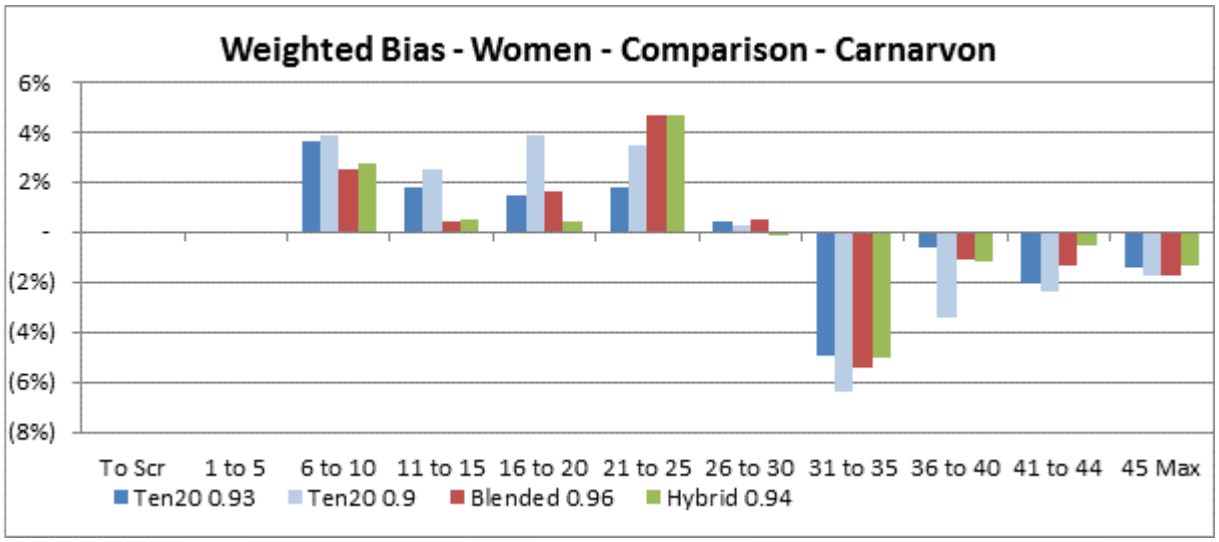
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

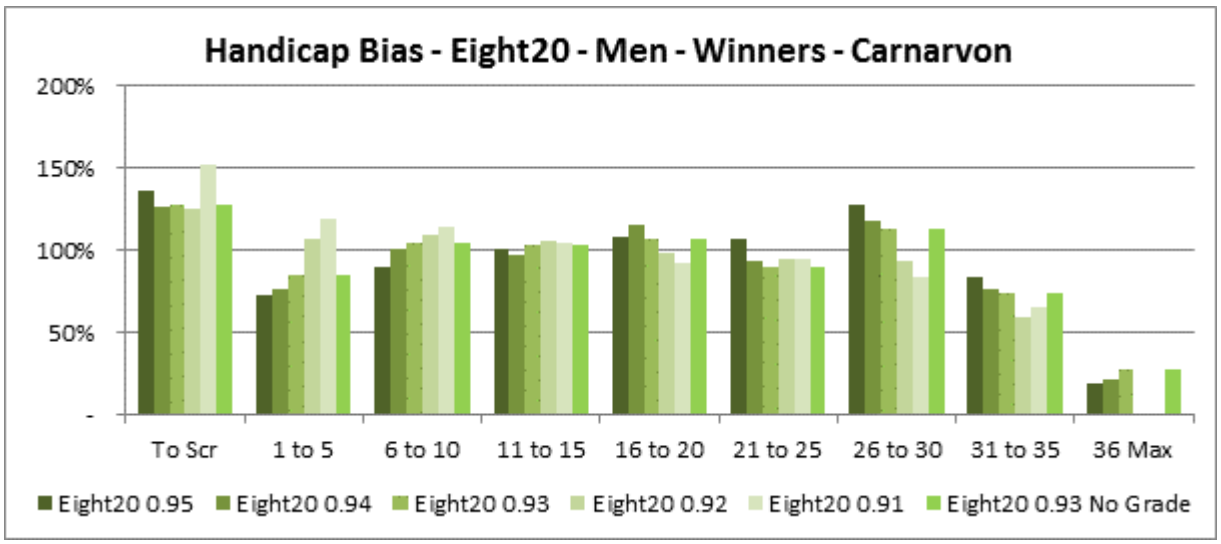
	Carnarvon			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-19.7	15.2	-38.9	23.1
Ten20 0.9	-43.7	18.4	-55.8	33.0
Blended 0.96	-9.2	12.4	-34.2	25.8
Hybrid 0.94	-18.9	11.1	-29.3	24.0

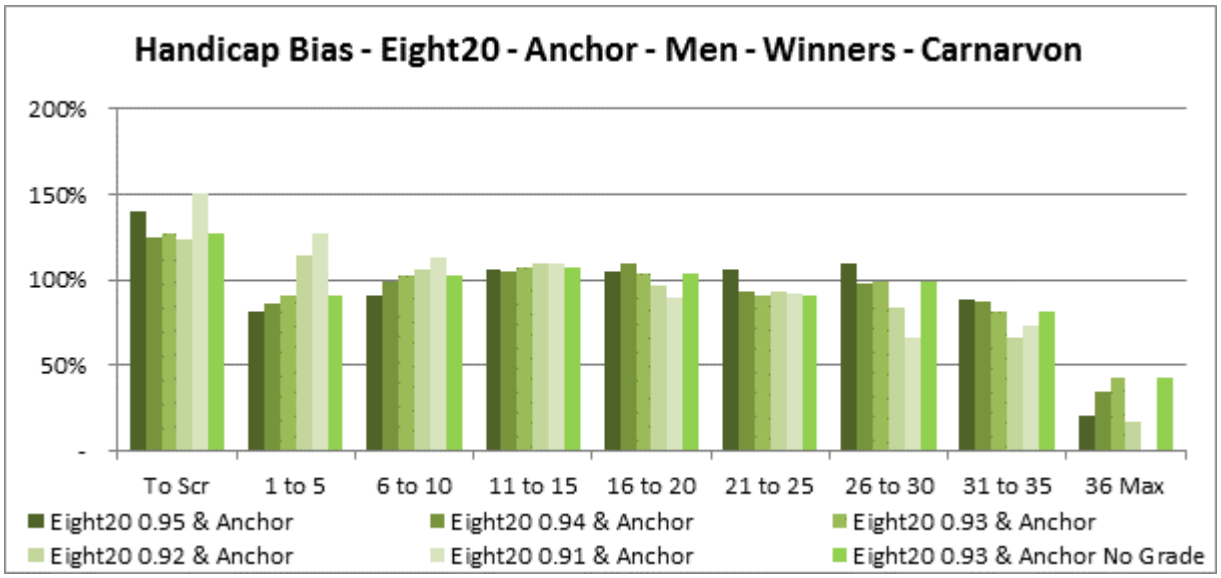
Putting it all together, with the Old System as a reference:

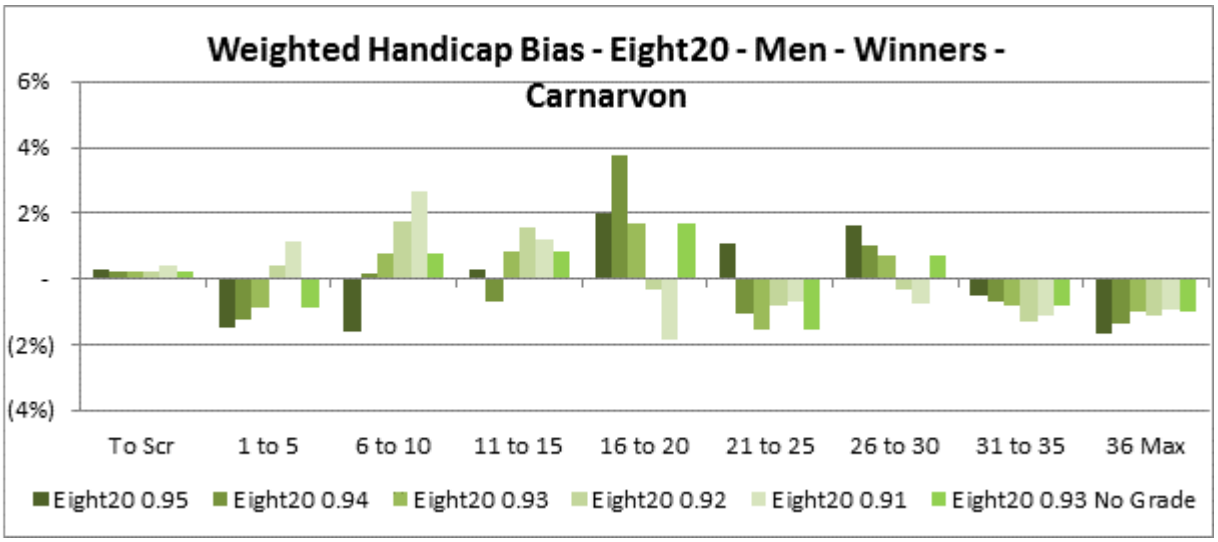
Carnarvon	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-53.2	24.0	-50.5	44.2
Current Period - Ten20 0.96	17.0	28.1	-3.5	26.9
Old Period - Ten20 0.96	5.5	24.2	-25.1	18.0
Ten20 0.96	10.3	23.2	-17.7	15.7
Ten20 0.95	-0.3	16.6	-24.1	18.9
Ten20 0.94	-9.3	10.8	-32.9	22.8
Ten20 0.93	-19.7	15.2	-38.9	23.1
Ten20 0.92	-27.3	15.1	-40.4	25.4
Ten20 0.91	-38.5	16.1	-48.6	31.2
Ten20 0.9	-43.7	18.4	-55.8	33.0
Nine20 0.96	7.4	17.9	-20.4	17.2
Nine20 0.93	-19.2	12.9	-33.8	23.4
Nine20 0.90	-49.3	20.4	-55.5	34.0
Eight20 0.96	3.7	11.2	-24.1	17.6
Eight20 0.93	-19.4	10.9	-31.6	23.3
Eight20 0.90	-52.9	23.5	-54.8	32.9
Blended 0.96	-9.2	12.4	-34.2	25.8
Blended 0.94	-37.1	17.1	-49.5	29.9
Blended 0.92	-49.7	25.6	-56.3	37.0
Hybrid 0.96	0.0	13.0	-19.0	20.3
Hybrid 0.94	-18.9	11.1	-29.3	24.0

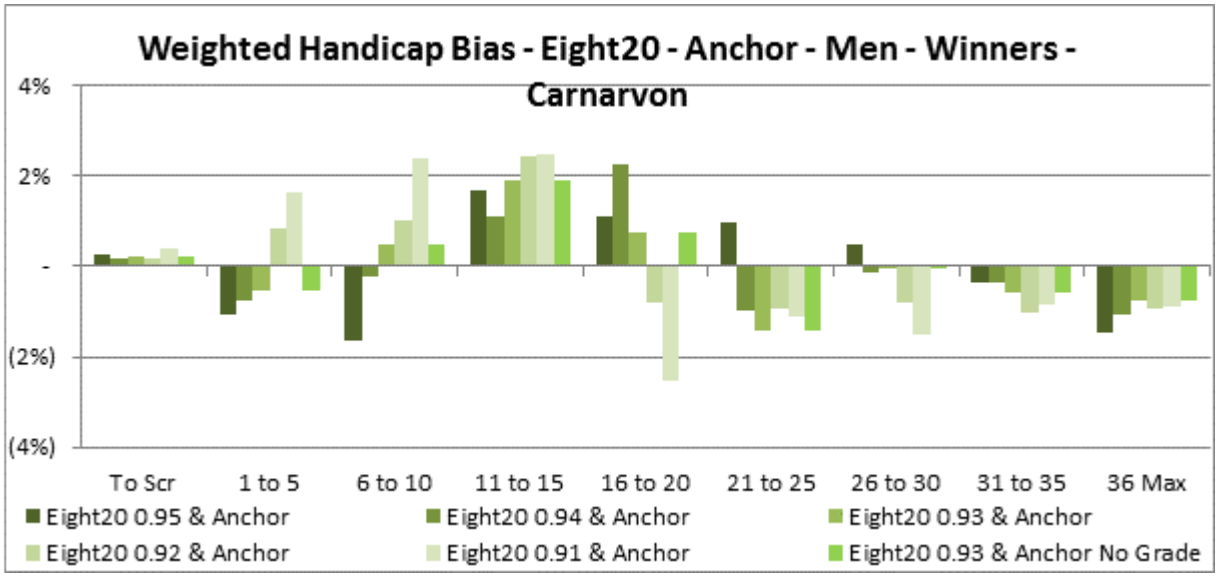
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

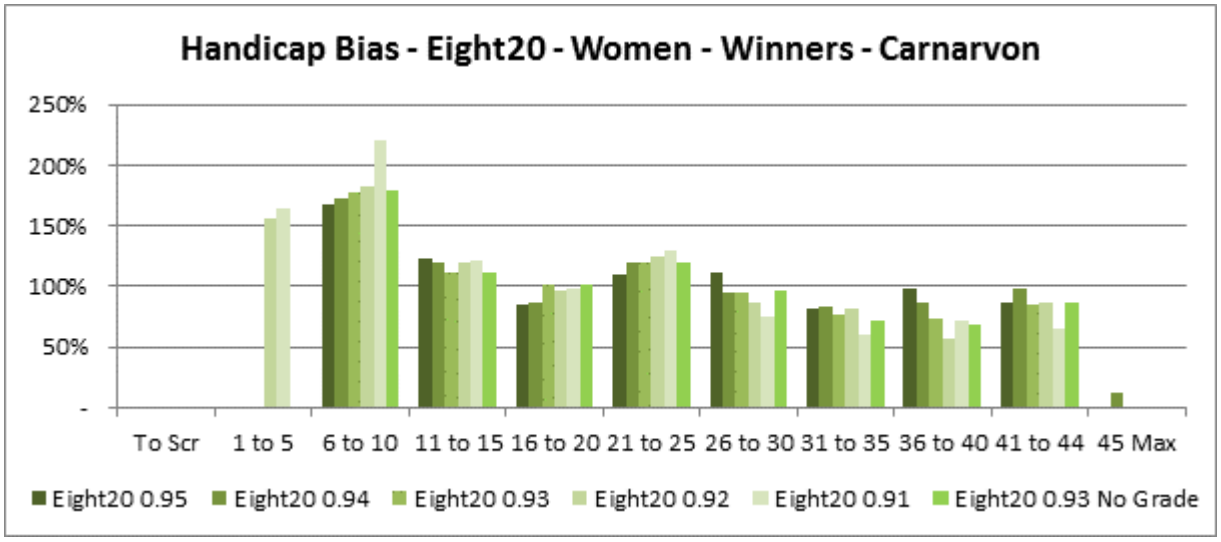
Phase 2

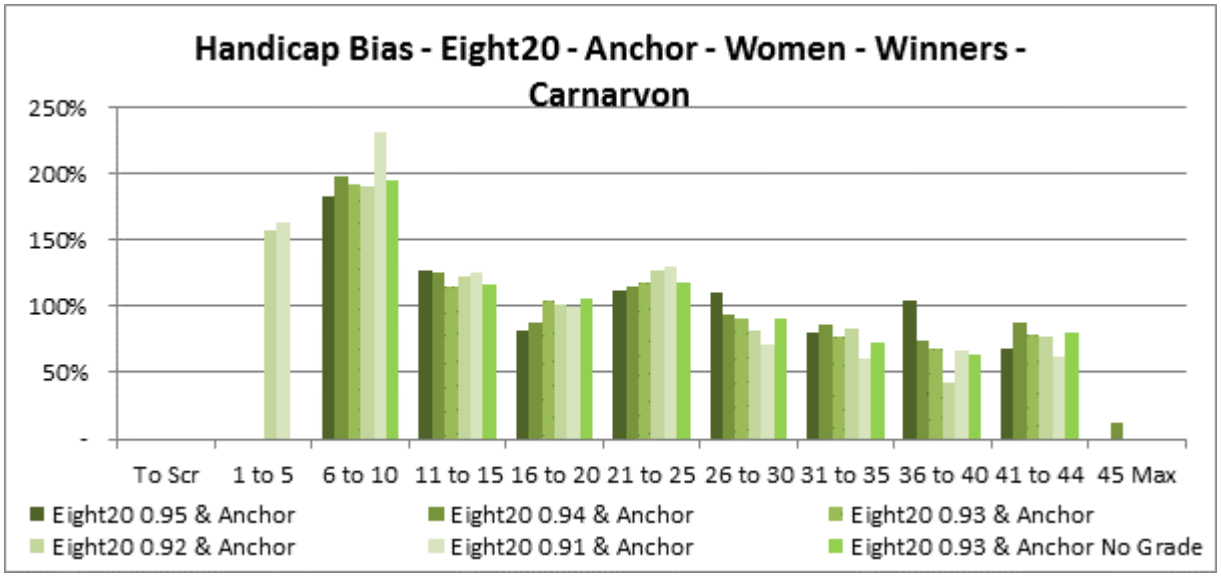

Handicap Bias - Eight20 - Men - Winners - Carnarvon
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Winners - Carnarvon
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Winners - Carnarvon
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Carnarvon
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Winners - Carnarvon
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Winners - Carnarvon
250%
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To Scr
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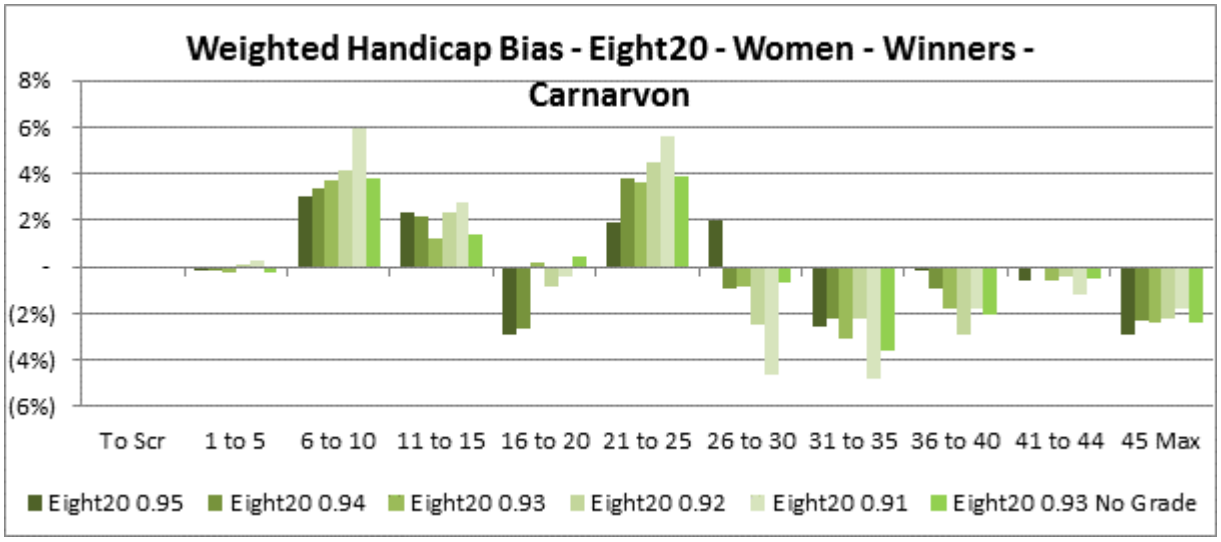
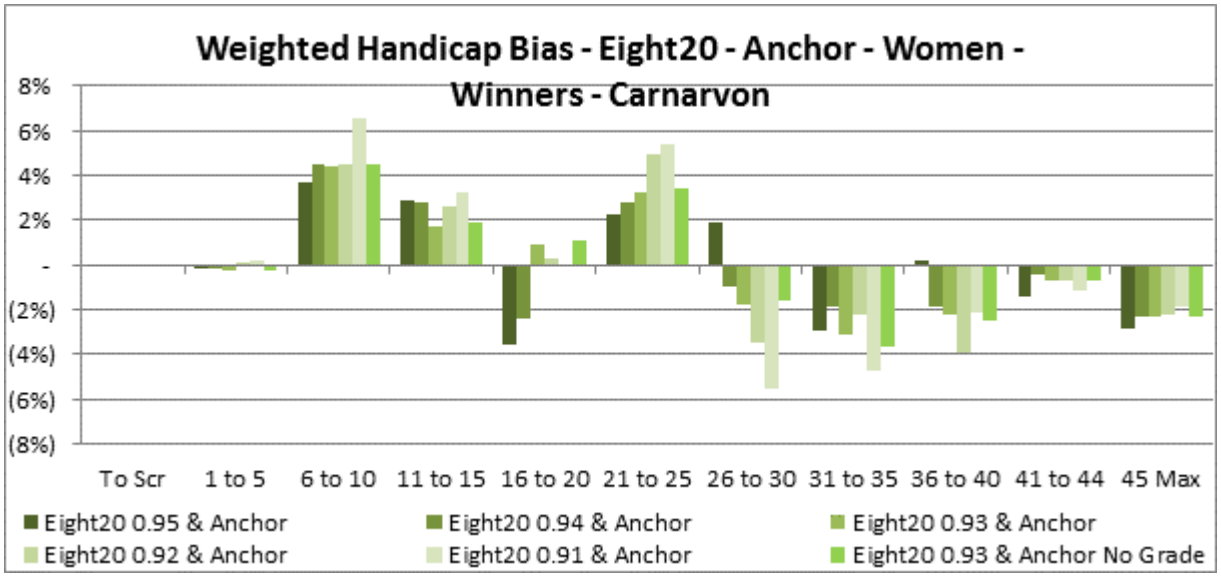
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Winners - Carnarvon
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Carnarvon
8%
6%
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2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
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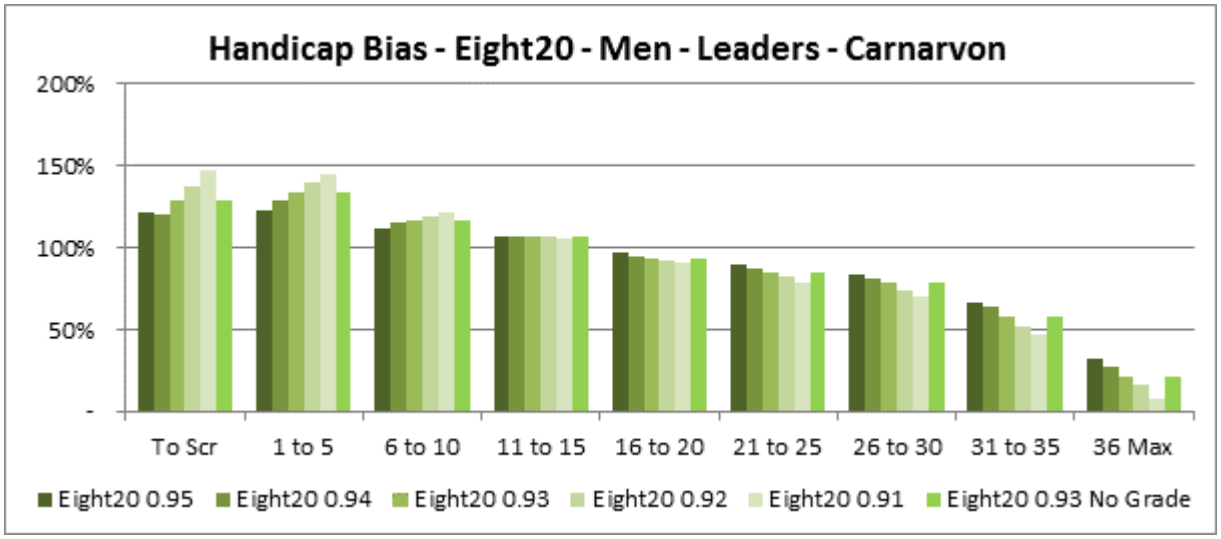
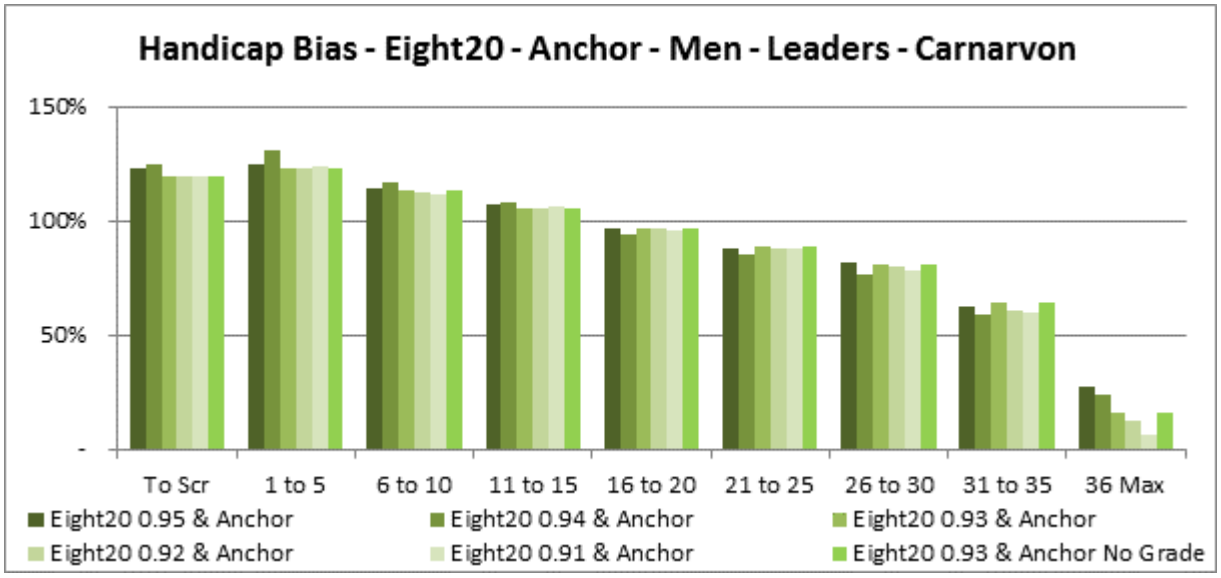
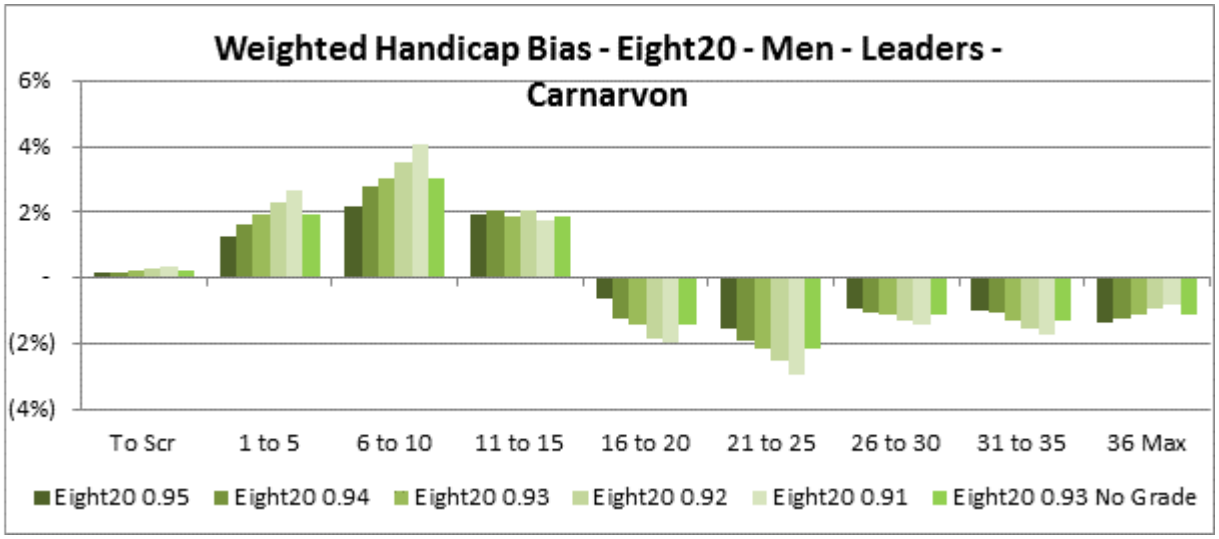
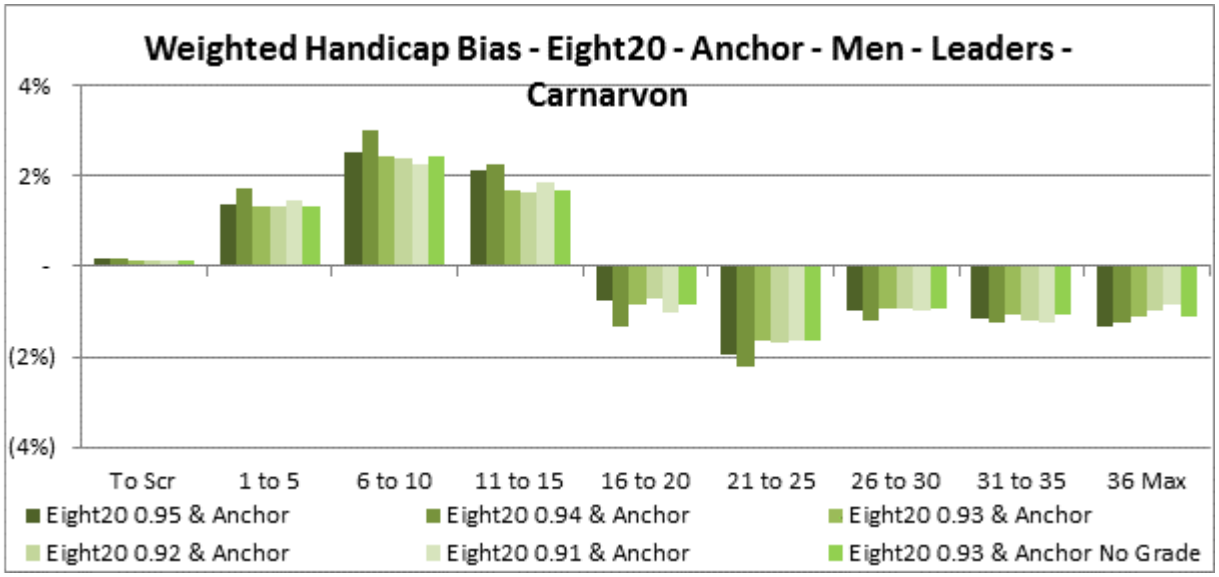
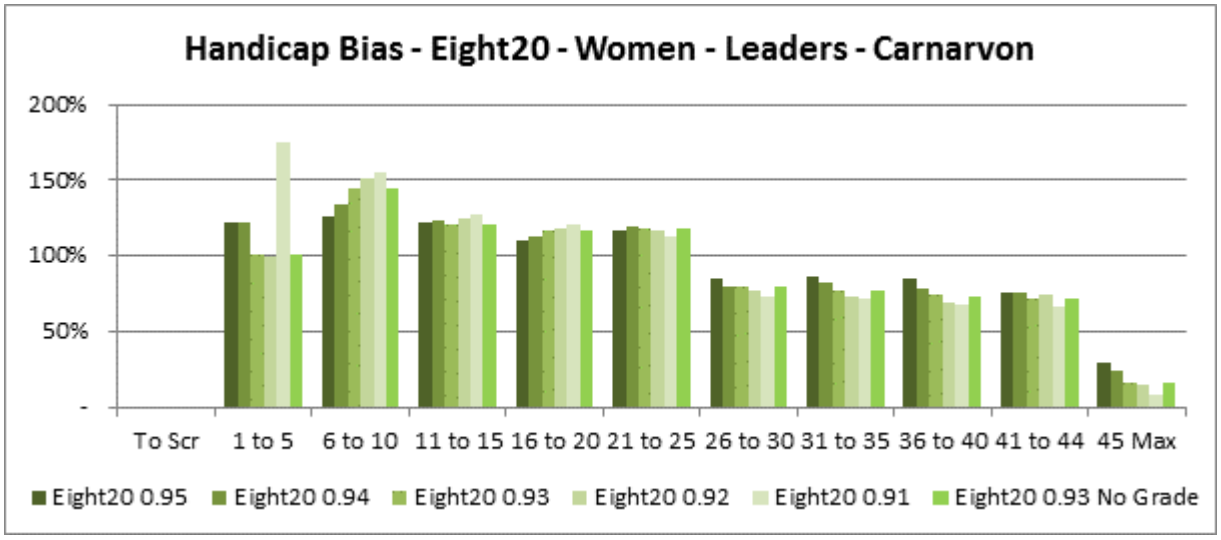
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Men - Leaders - Carnarvon
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Leaders - Carnarvon
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Leaders - Carnarvon
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Carnarvon
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Carnarvon
200%
150%
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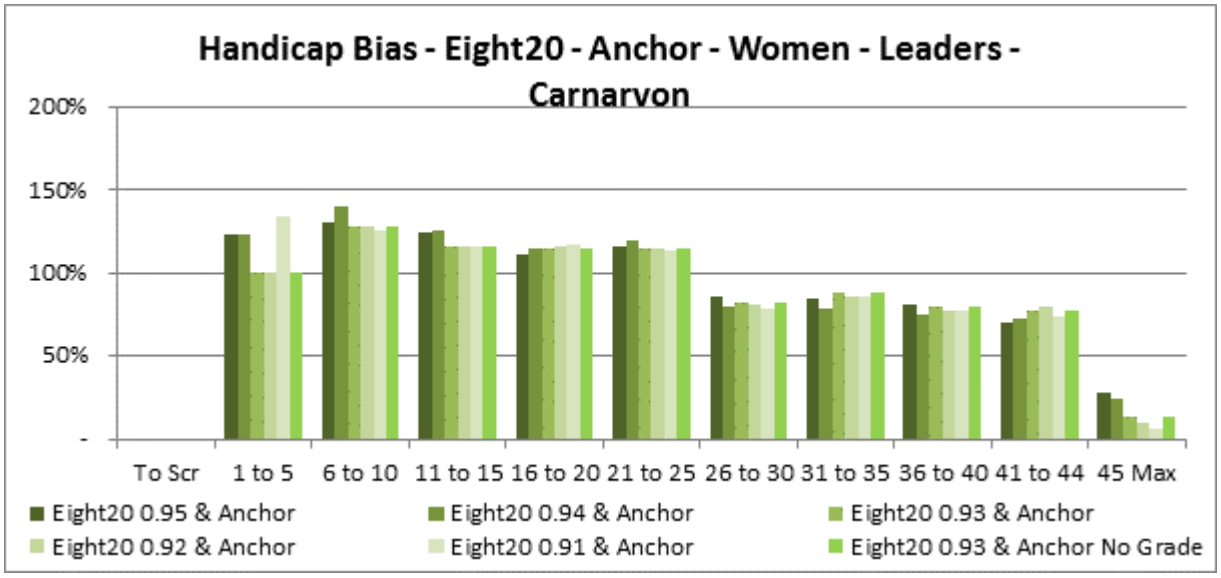
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Carnarvon
200%
150%
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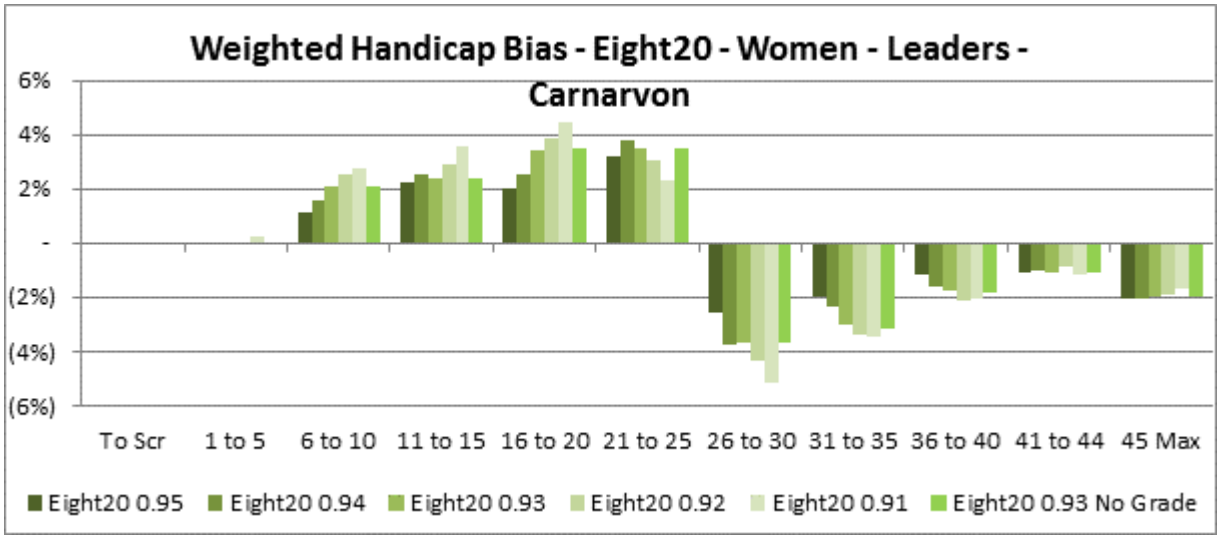
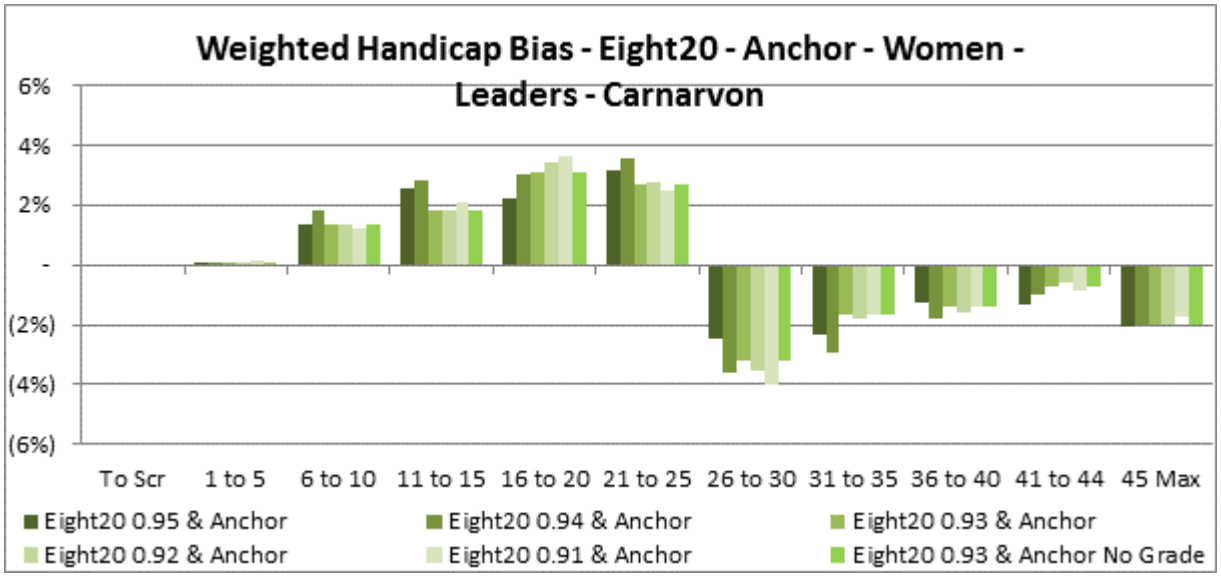
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Carnarvon
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

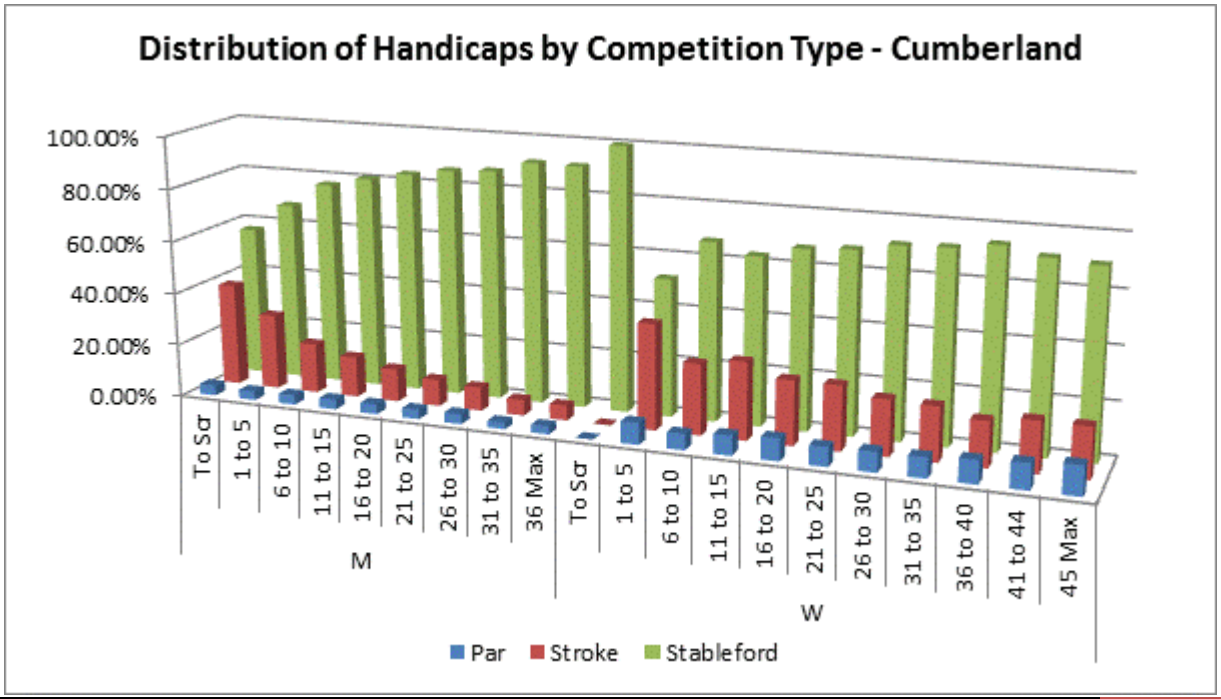


Phase 2 -Carnarvon					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	4.6	14.0	-27.6	21.5
	Eight20 0.94	-5.4	16.0	-28.4	22.2
	Eight20 0.93	-12.0	11.0	-35.8	21.9
	Eight20 0.92	-28.1	10.9	-40.9	26.2
	Eight20 0.91	-34.3	14.3	-52.5	35.9
	Eight20 0.93 No Grade	-12.0	11.0	-38.0	23.5
	Eight20 0.95 & Anchor	-2.4	12.0	-32.6	24.9
	Eight20 0.94 & Anchor	-9.8	10.8	-36.1	23.4
	Eight20 0.93 & Anchor	-14.0	9.9	-41.7	23.9
	Eight20 0.92 & Anchor	-28.5	12.2	-48.1	29.9
	Eight20 0.91 & Anchor	-40.0	18.1	-56.5	38.0
	Eight20 0.93 & Anchor No Grade	-14.0	9.9	-43.9	25.5
Leaders	Eight20 0.95	-37.5	14.4	-31.4	19.5
	Eight20 0.94	-42.2	17.1	-36.0	23.8
	Eight20 0.93	-45.5	18.4	-39.7	25.4
	Eight20 0.92	-51.2	21.4	-43.1	27.9
	Eight20 0.91	-56.0	23.8	-47.3	30.3
	Eight20 0.93 No Grade	-45.5	18.4	-40.0	25.7
	Eight20 0.95 & Anchor	-41.3	16.3	-34.5	20.7
	Eight20 0.94 & Anchor	-45.9	18.9	-39.3	25.2
	Eight20 0.93 & Anchor	-37.2	14.6	-31.4	20.5
	Eight20 0.92 & Anchor	-36.8	14.4	-32.1	21.8
	Eight20 0.91 & Anchor	-36.7	14.8	-32.3	22.4
	Eight20 0.93 & Anchor No Grade	-37.2	14.6	-31.4	20.5

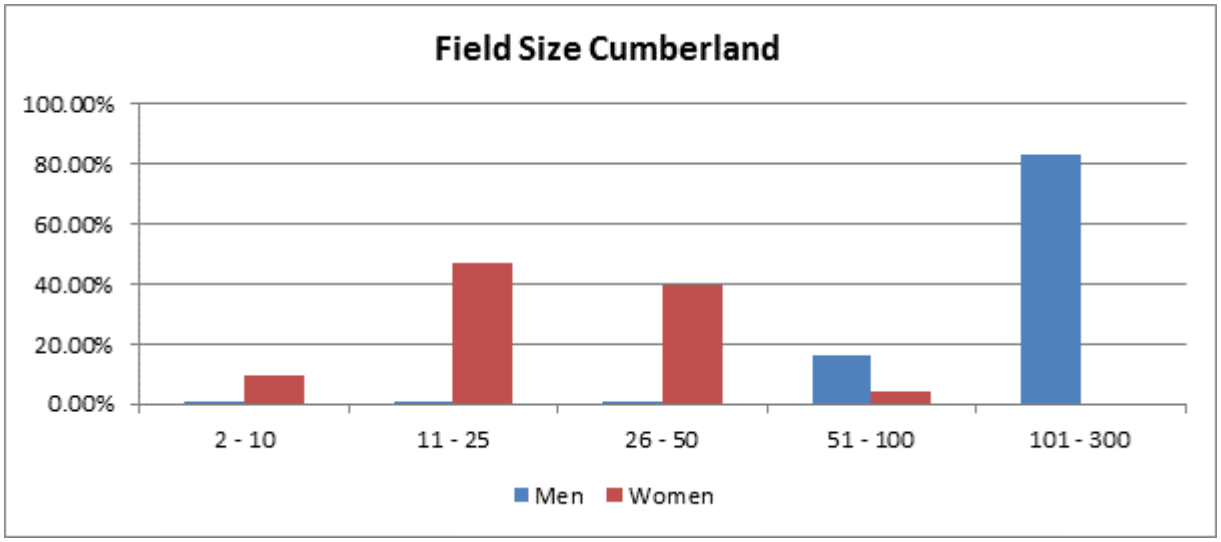
Appendix 4 – Cumberland

Phase 1

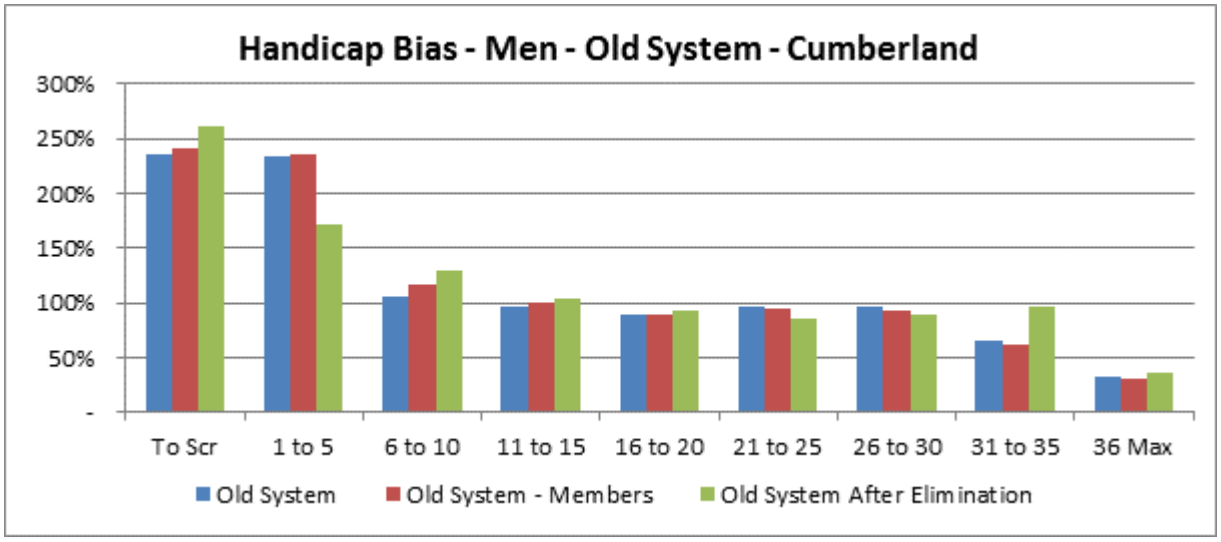
Cumberland	Men	Women	Total
Players in Database	3,058	336	3,394
Members	1,044	174	1,218
Visitors	2,014	162	2,176
Members who have Played 33 Rounds	967	154	1,121
Members with Last Round In Old System	172	43	215
Members with Last Round in Current System	872	131	1,003
Earliest Round	10/12/2007	25/1/2008	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			239
Number of Home Competitions	619	375	994
Number of Rounds of Golf	110,216	10,730	120,946
Number of Rounds at Home	100,751	9,598	110,349
Number of Rounds at Home Old	79,926	7,117	87,043
Number of Rounds at Home Current	20,825	2,481	23,306
Num Rnds Members at Home	92,399	8,940	101,339
Num Rnds Members at Home Old	72,699	6,552	79,251
Num Rnds Members at Home Cur	19,700	2,388	22,088
Num Rnds After Eliminations	56,209	4,848	61,057
Num Rnds After Eliminations Old	37,577	2,775	40,352
Num Rnds After Eliminations Cur	18,632	2,073	20,705

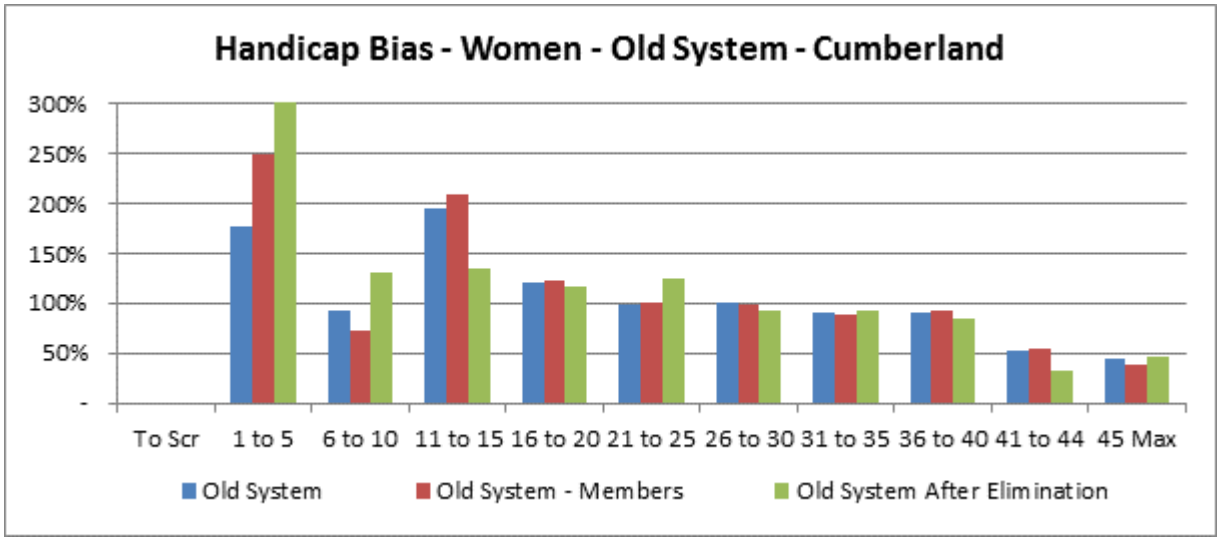


Most men's competitions are with a field of over 100, the women mainly field 11 - 50.

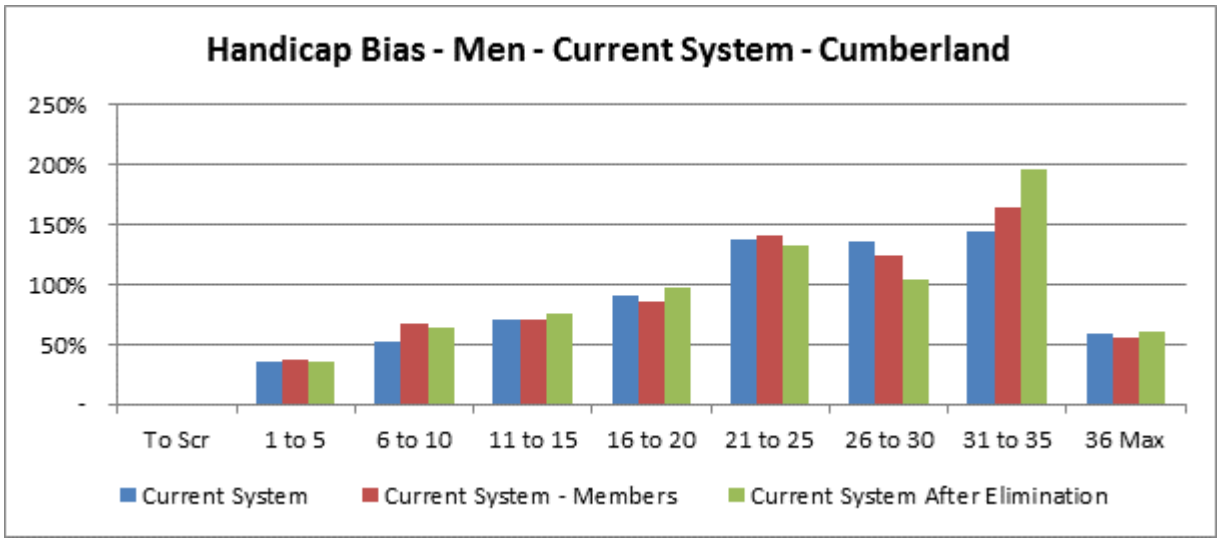


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

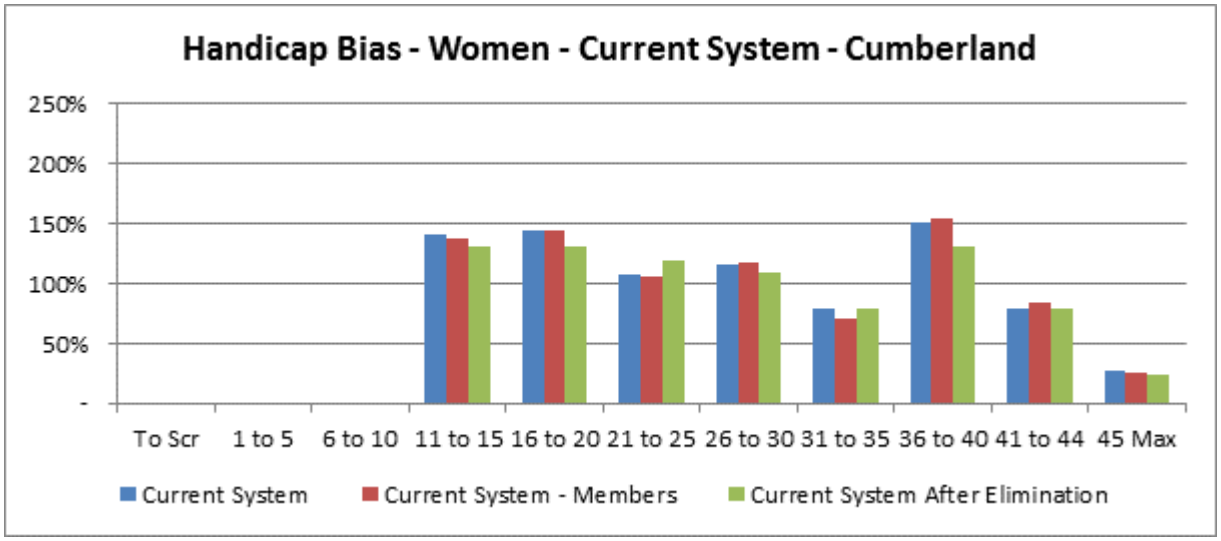




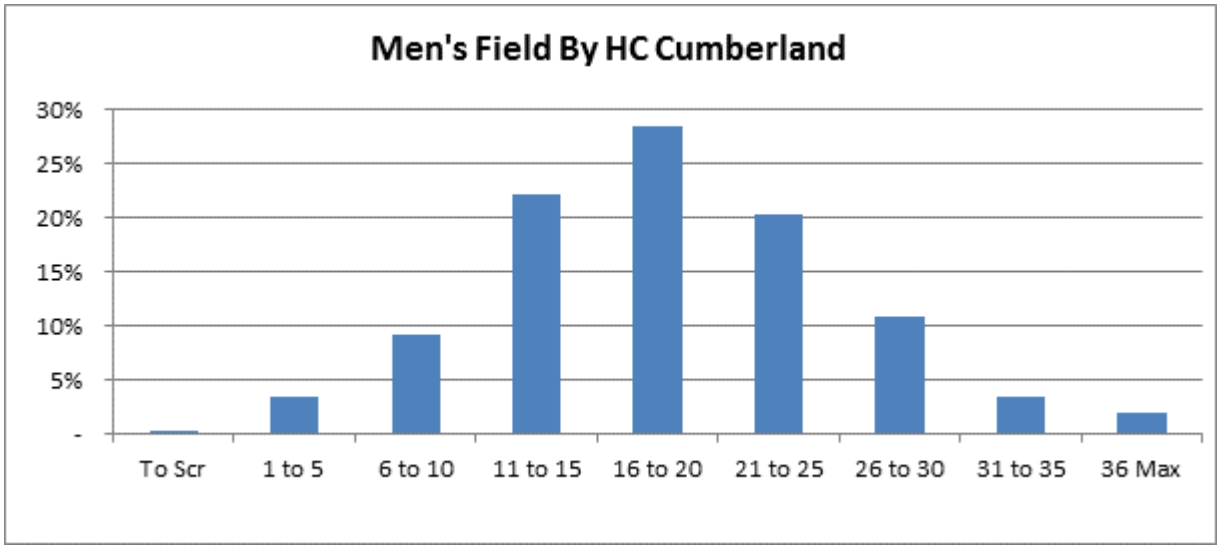
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

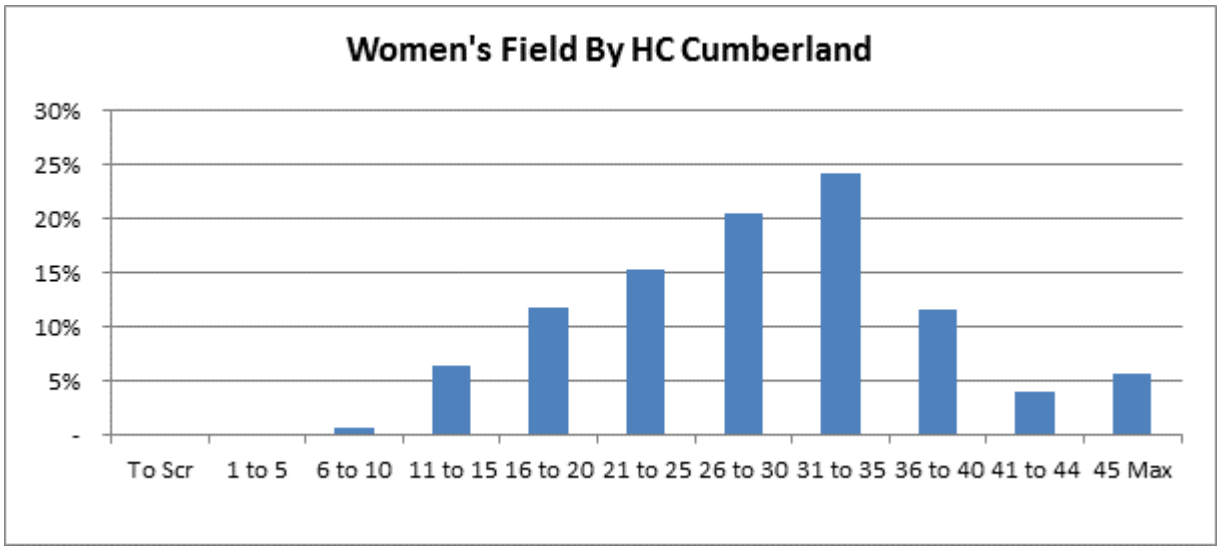


The picture is somewhat similar for the women.



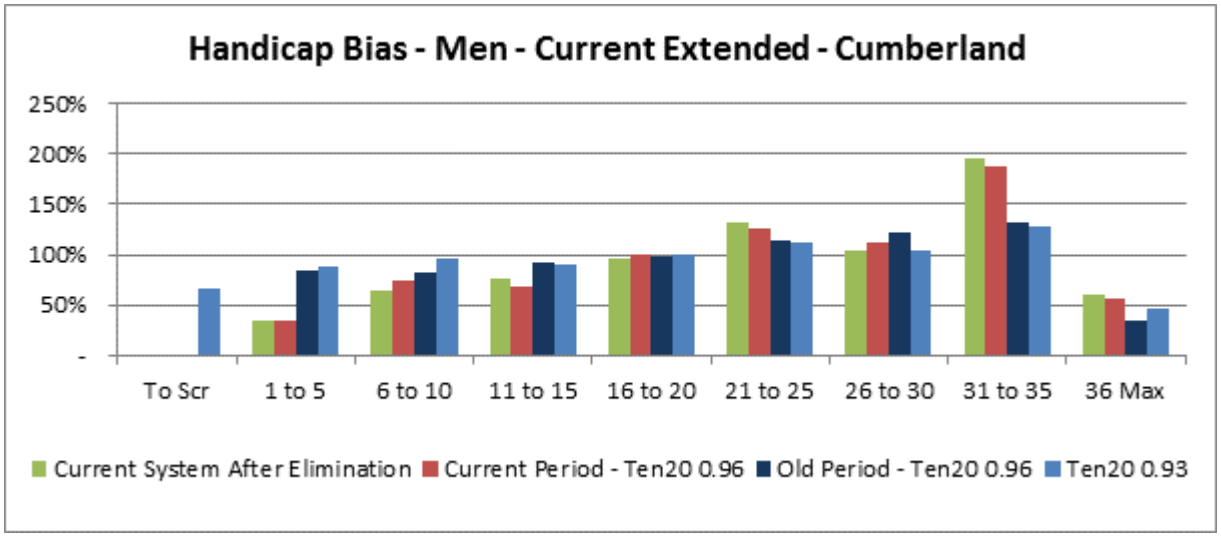
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





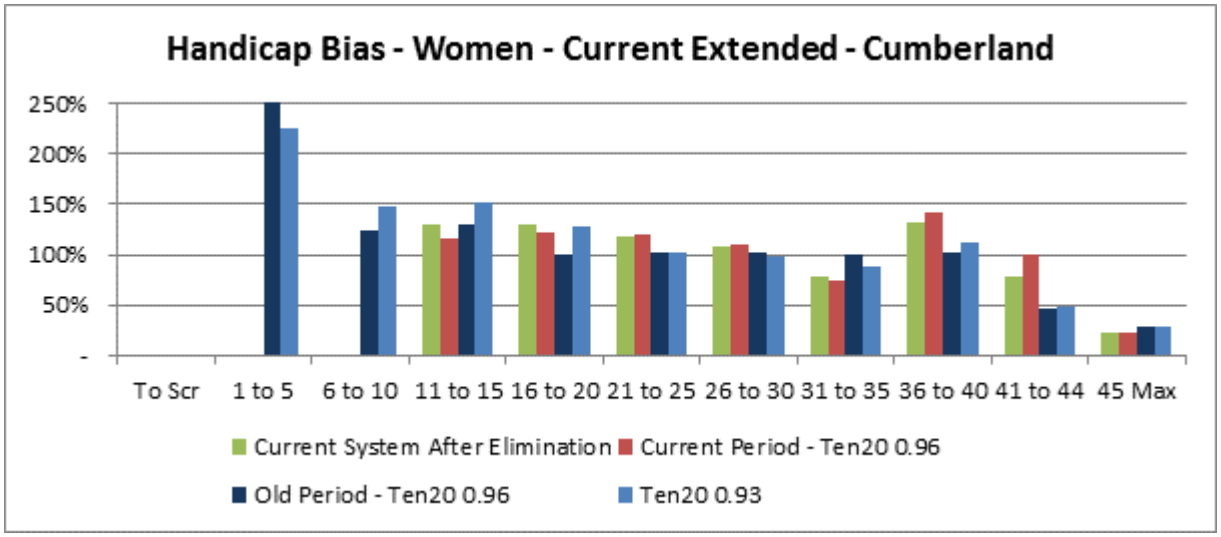
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

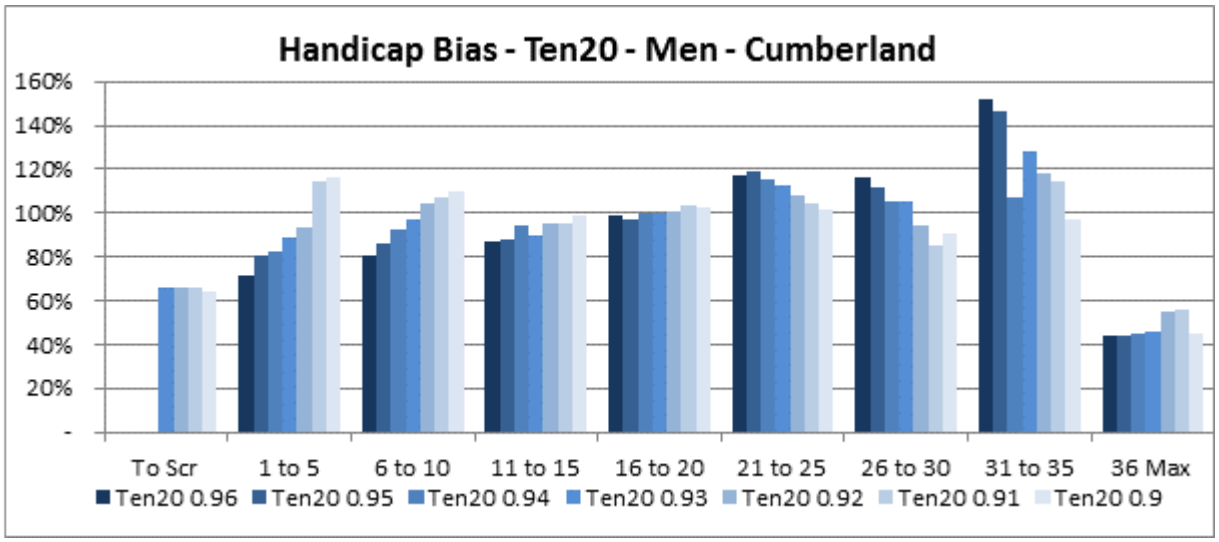


Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

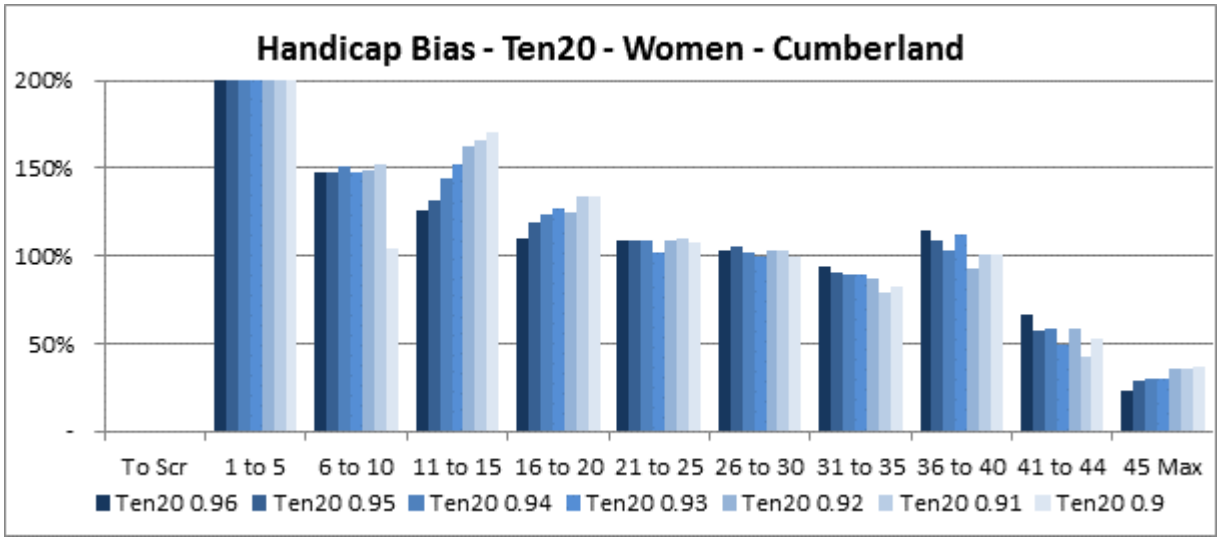
For women, the low markers would have dominated over the two-years.



The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.

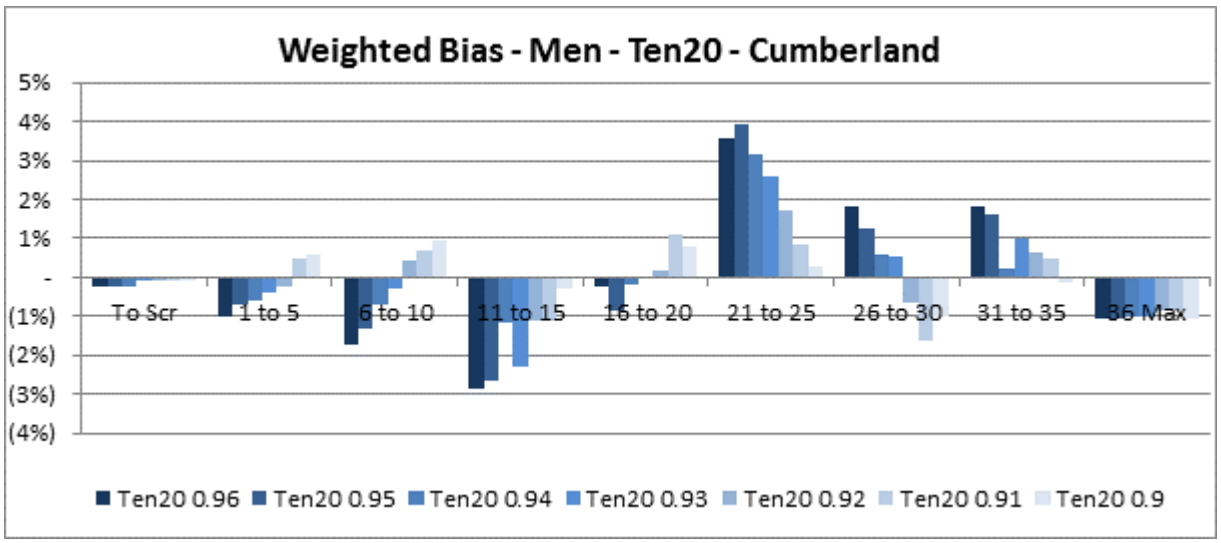


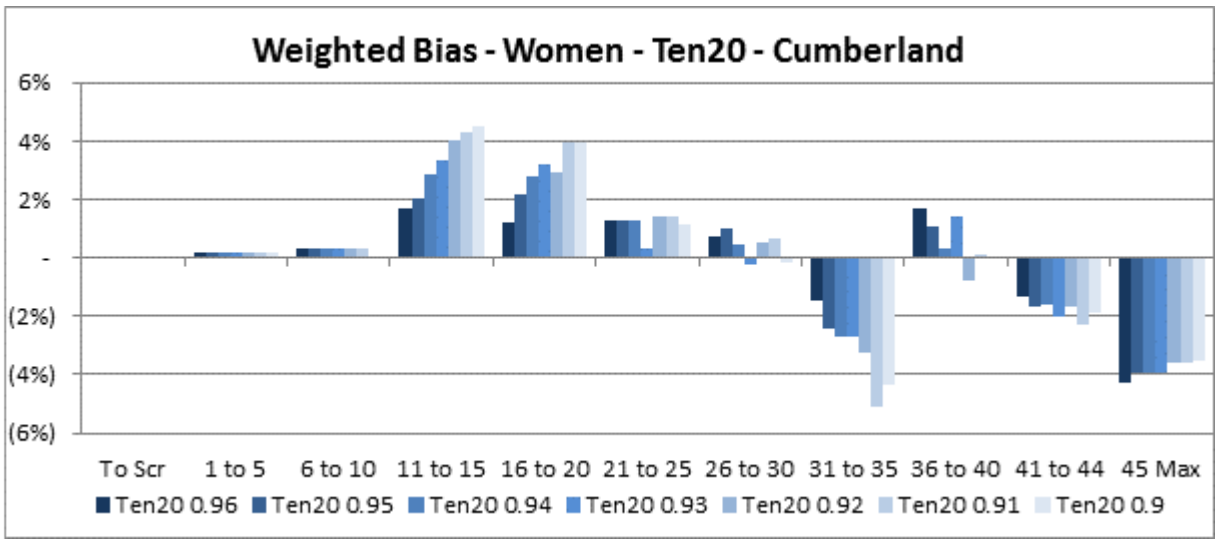
If one is seeking to bring the 1 through 10 markers up to 100%, 0.93 seems to strike a reasonable balance.



The women are essentially well served by the 0.96 BFE, however aligning it at 0.93 to the men should not be too problematic.

In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

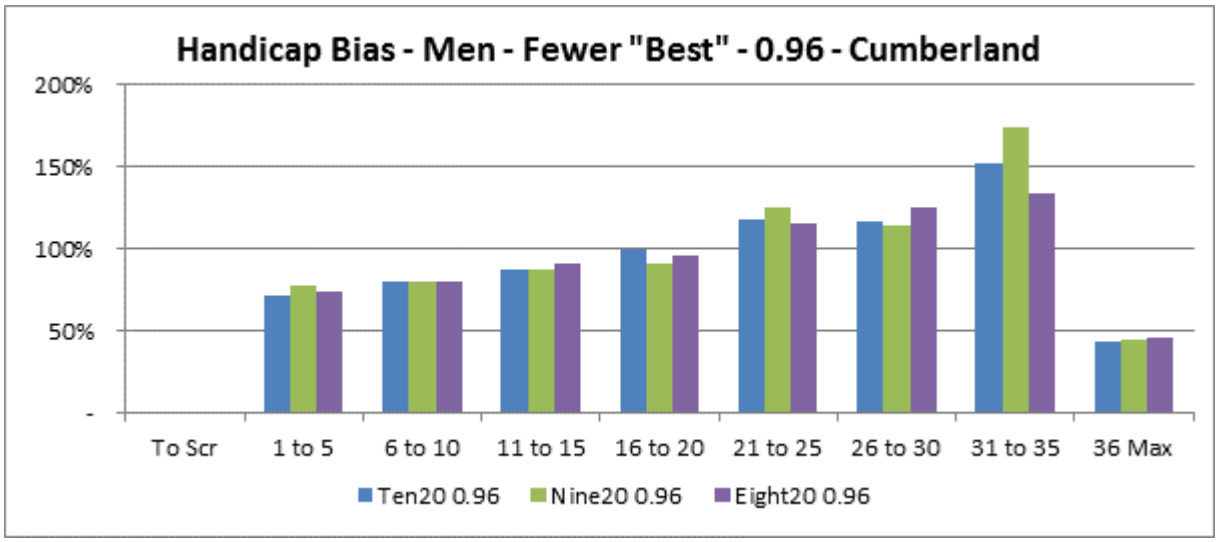


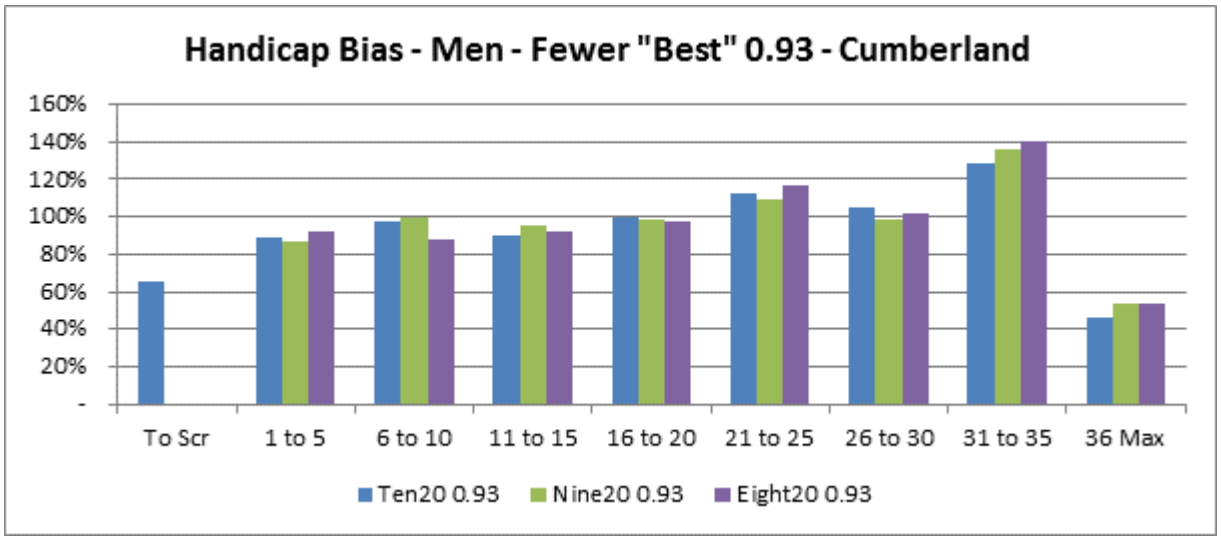


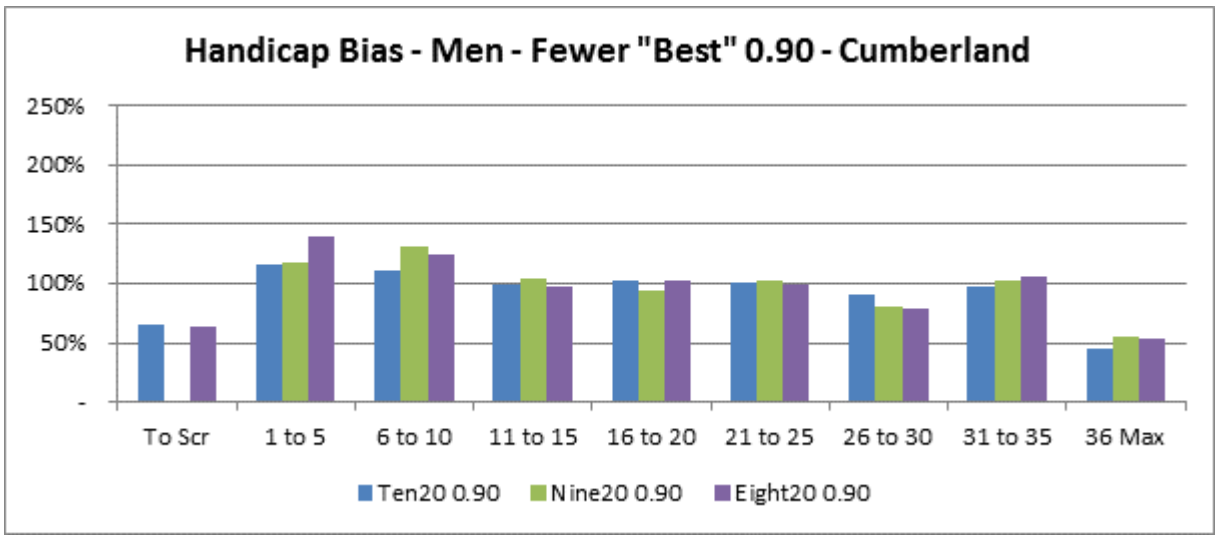
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

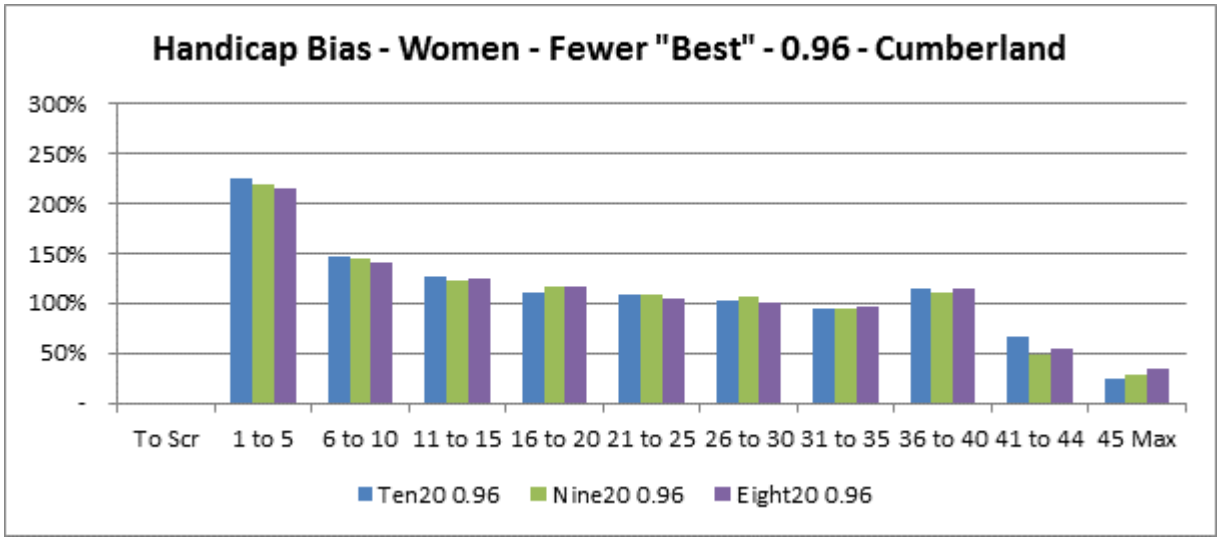
	Cumberland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	31.5	20.3	-27.3	17.8
Ten20 0.95	25.7	19.6	-31.7	19.3
Ten20 0.94	10.7	13.1	-36.5	20.7
Ten20 0.93	11.6	13.5	-36.8	22.5
Ten20 0.92	0.3	8.6	-41.6	23.3
Ten20 0.91	-9.5	9.6	-45.8	28.4
Ten20 0.9	-15.2	7.2	-43.4	26.9

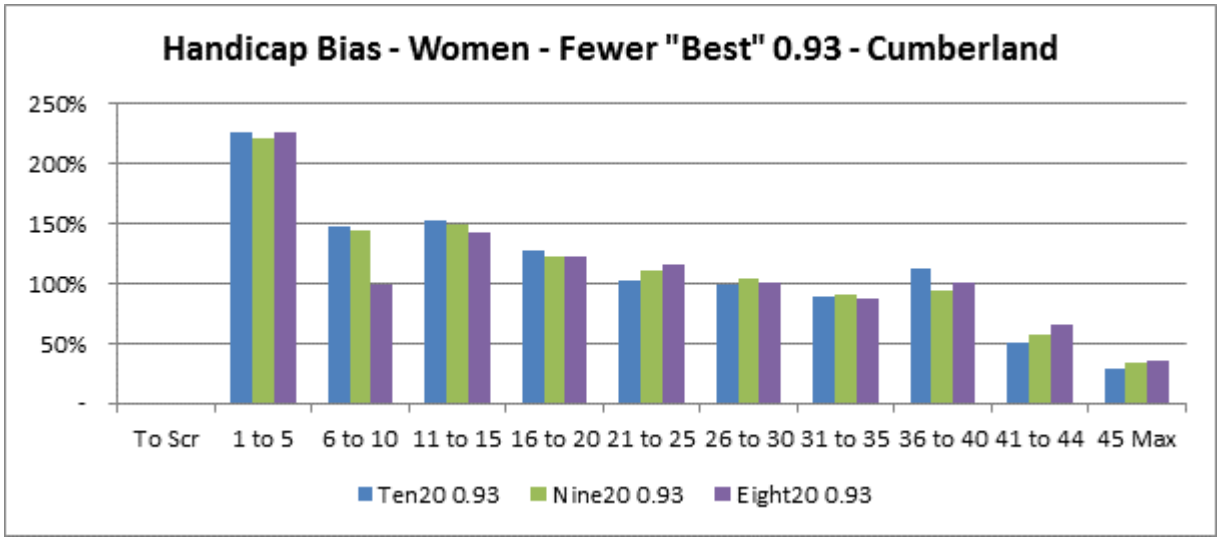
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

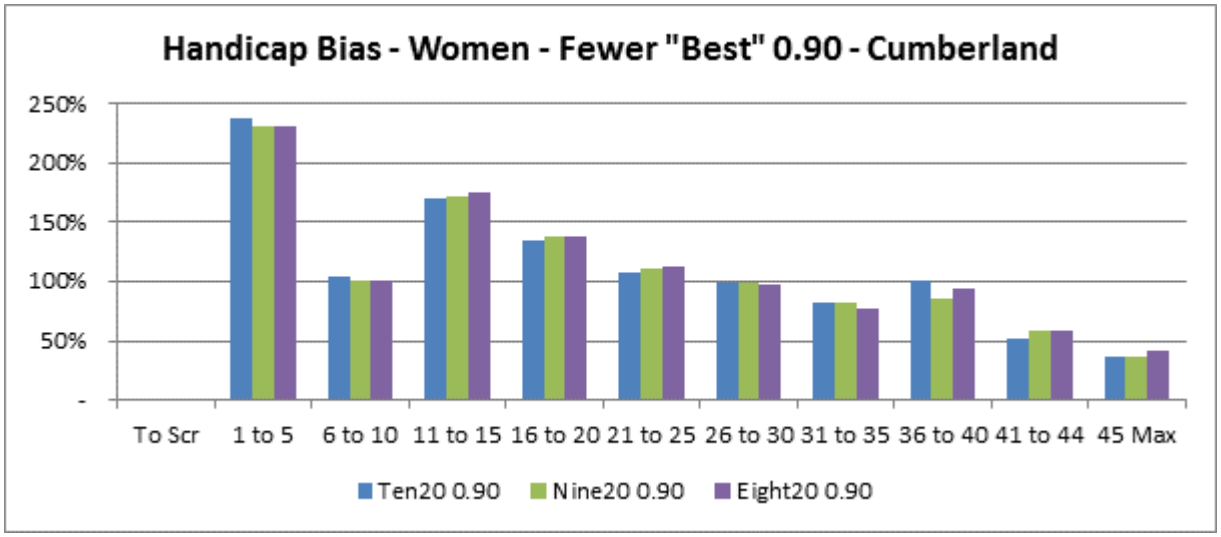







Handicap Bias - Women - Fewer "Best" - 0.96 - Cumberland
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

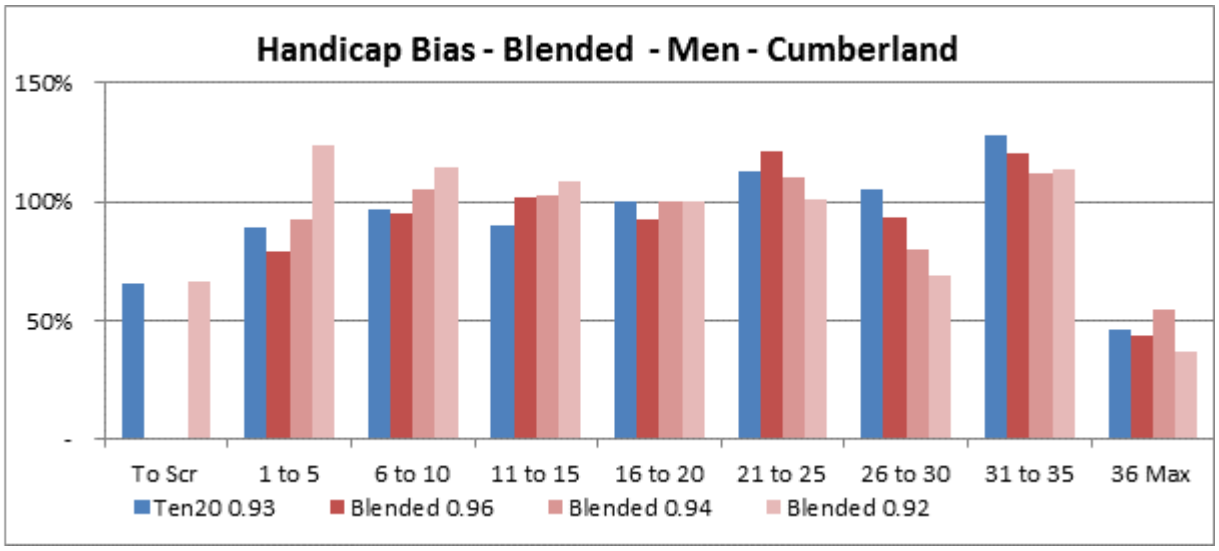

Handicap Bias - Women - Fewer "Best" 0.93 - Cumberland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

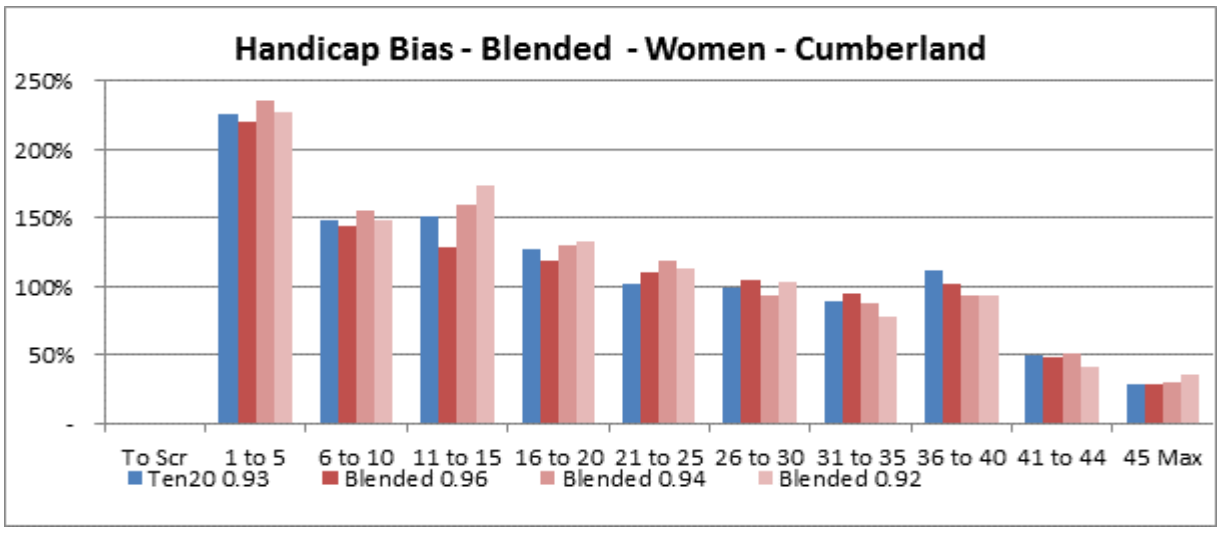

Handicap Bias - Women - Fewer "Best" 0.90 - Cumberland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

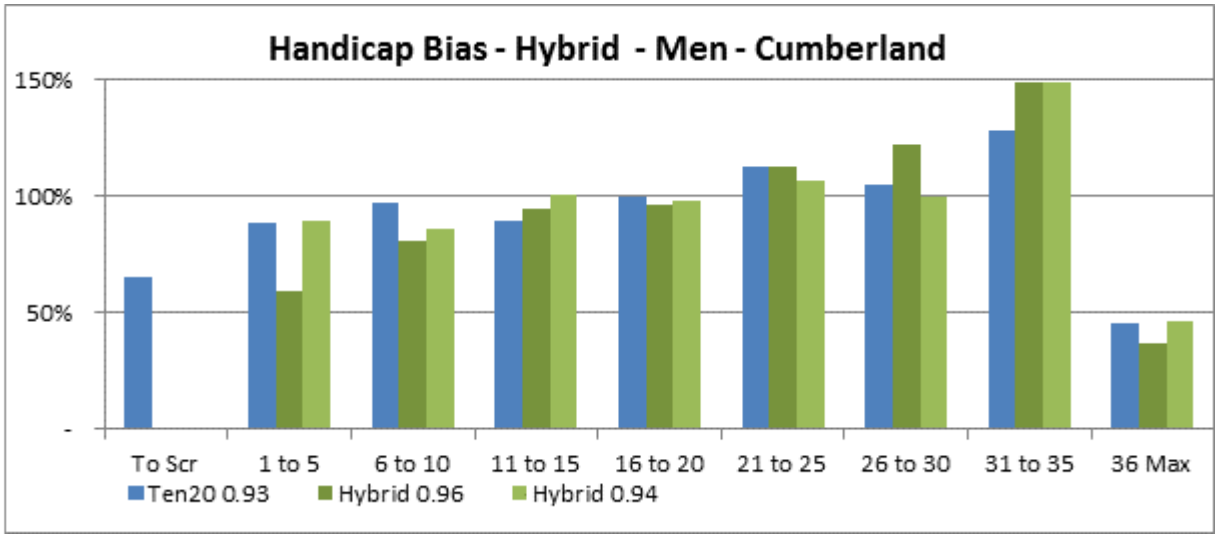
	Cumberland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	31.5	20.3	-27.3	17.8
Nine20 0.96	36.0	25.8	-29.7	17.8
Eight20 0.96	29.1	19.2	-26.1	16.6
Ten20 0.93	11.6	13.5	-36.8	22.5
Nine20 0.93	8.9	9.4	-37.8	20.3
Eight20 0.93	17.0	15.1	-34.1	20.8
Ten20 0.90	-15.2	7.2	-43.4	26.9
Nine20 0.90	-23.8	15.0	-47.2	28.3
Eight20 0.90	-25.6	13.0	-46.5	30.5

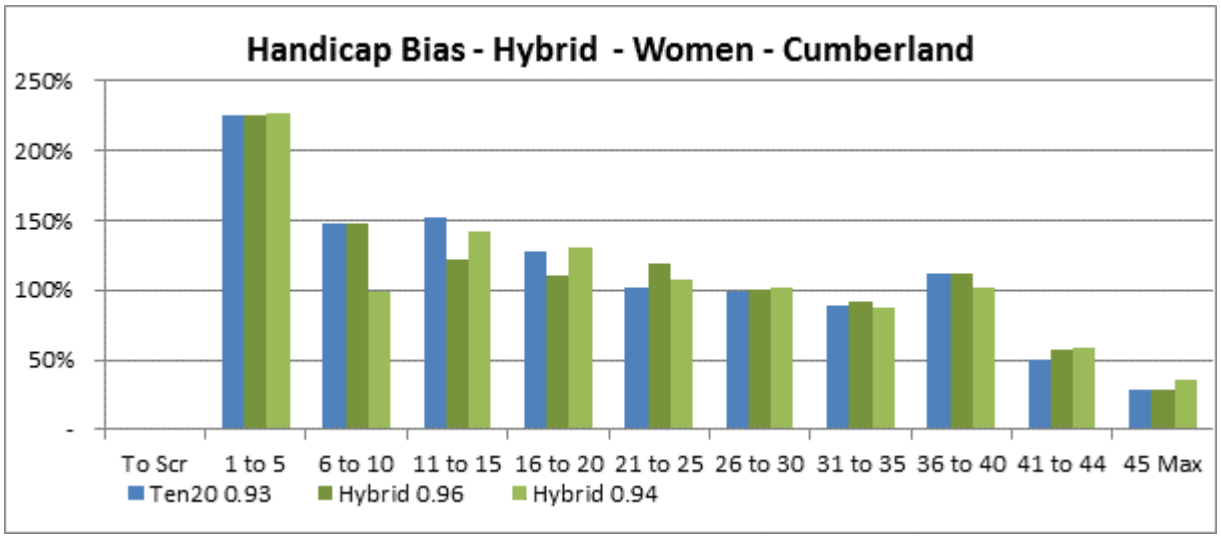
For the Blended:





For the Hybrid:

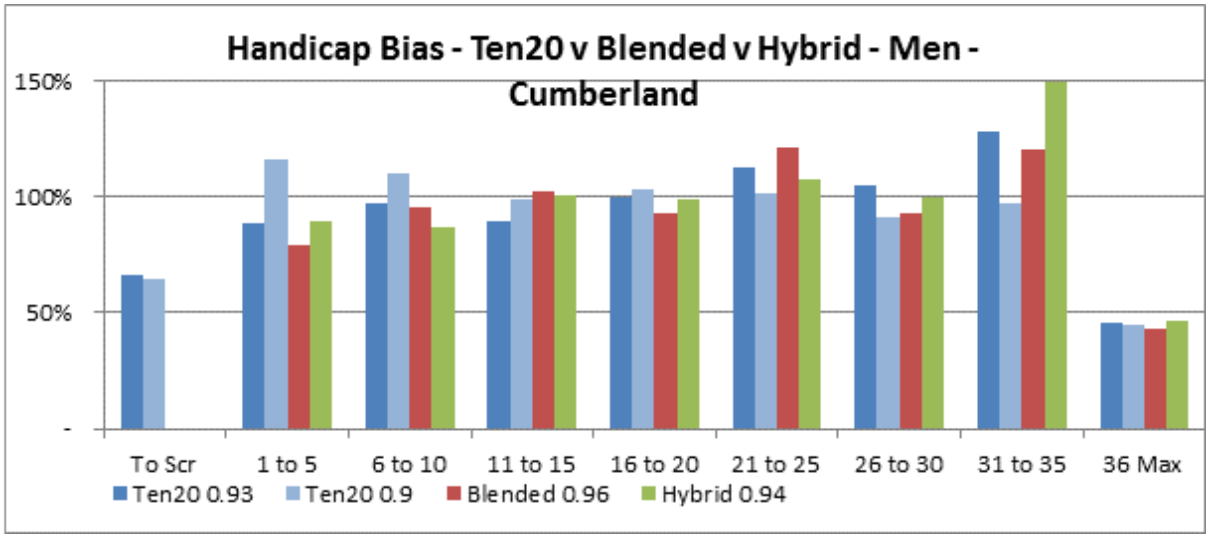




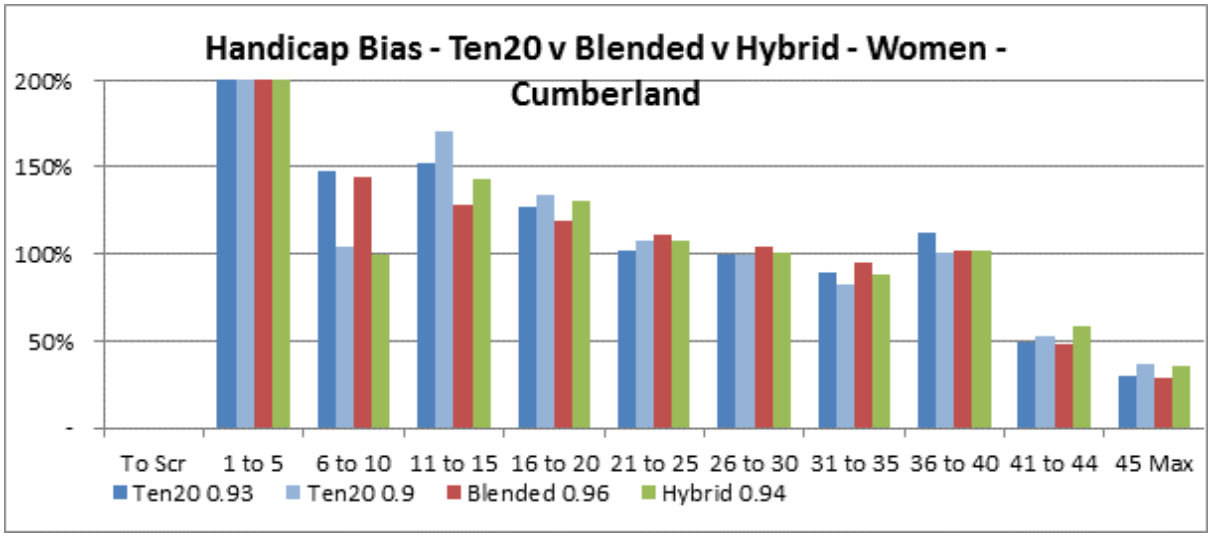
The Corresponding Tilt and Level Indices are:

	Cumberland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	7.4	18.3	-33.2	18.3
Blended 0.94	-7.0	11.6	-44.8	25.5
Blended 0.92	-27.4	15.4	-49.4	29.7
Hybrid 0.96	29.5	17.4	-28.8	19.2
Hybrid 0.94	11.5	9.9	-35.7	21.5

Comparing representatives of each of the three methods:

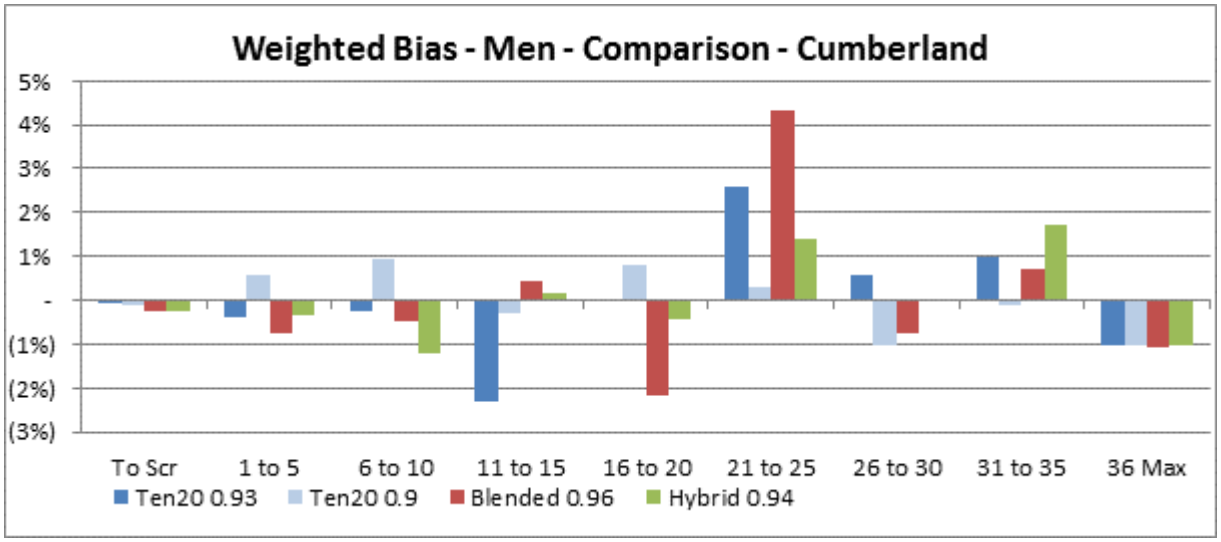


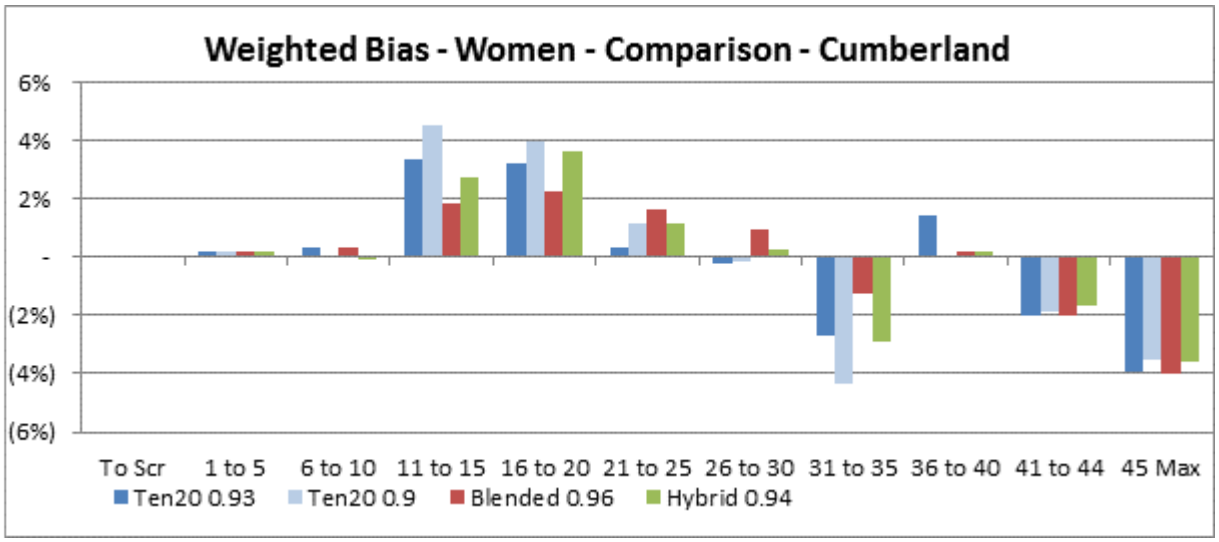
For women:



The Corresponding Tilt and Level Indices are:

The Weighted Bias is:





With the corresponding Tilt and Level Indices:

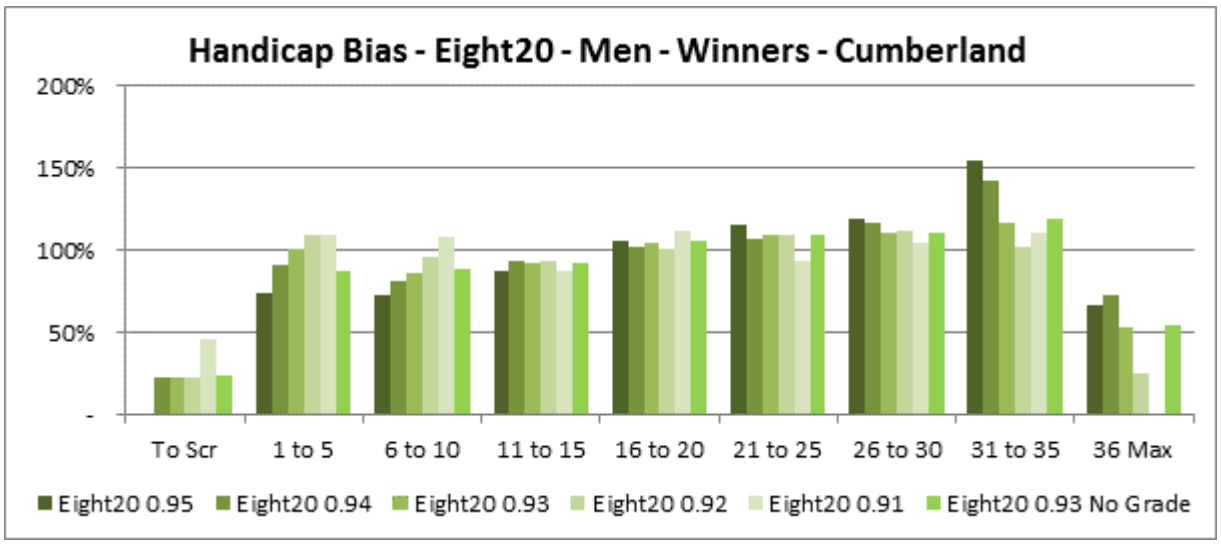
	Cumberland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	11.6	13.5	-36.8	22.5
Ten20 0.9	-15.2	7.2	-43.4	26.9
Blended 0.96	7.4	18.3	-33.2	18.3
Hybrid 0.94	11.5	9.9	-35.7	21.5

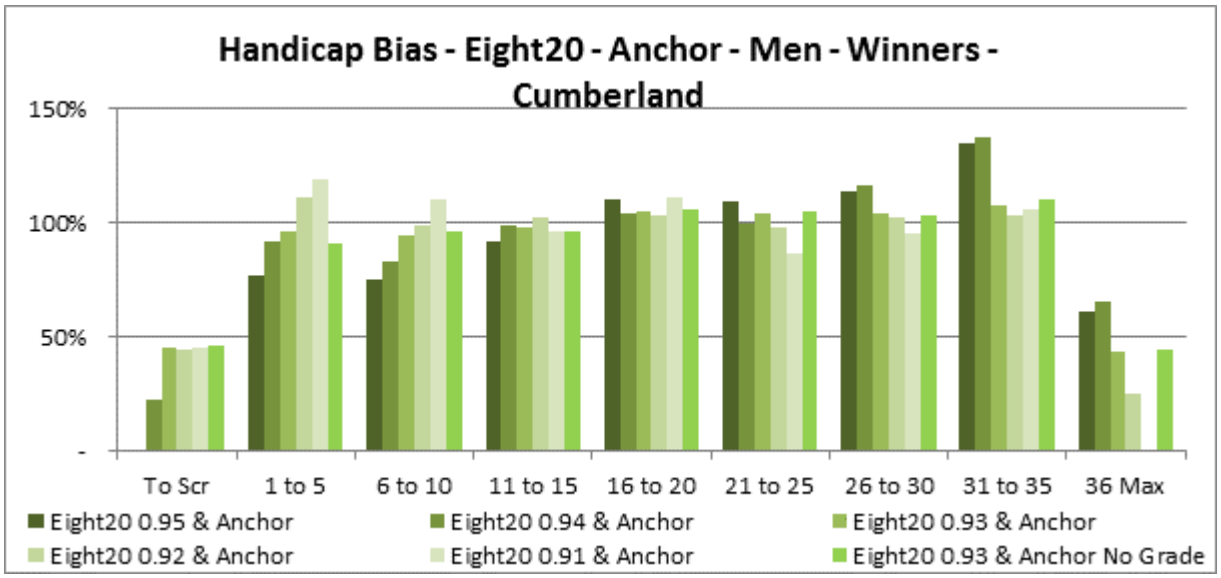
Putting it all together, with the Old System as a reference:

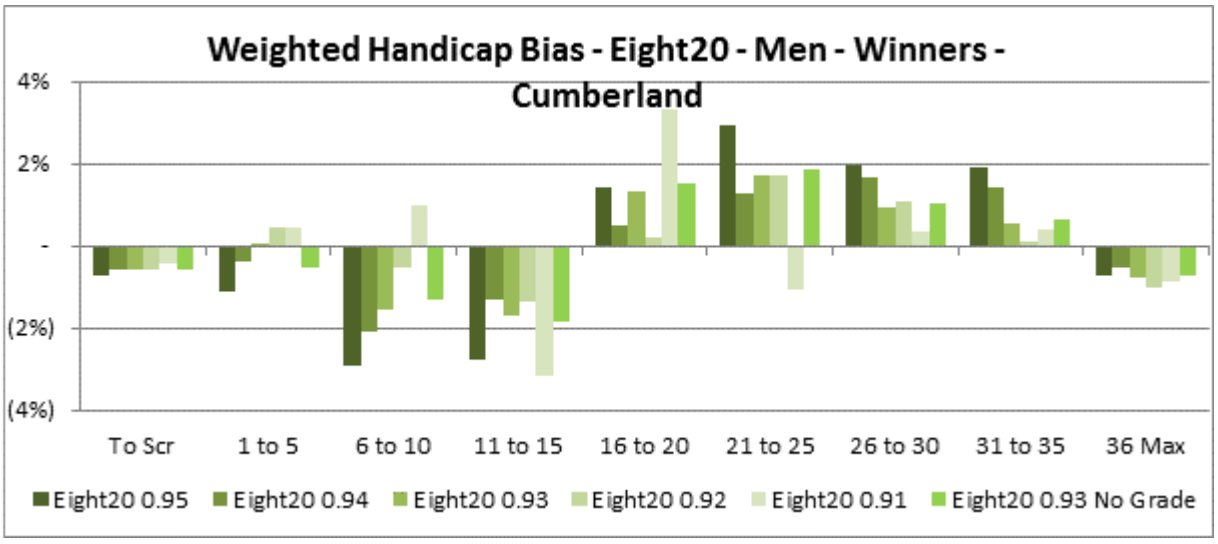
Cumberland	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-42.5	18.8	-41.3	21.7
Current Period - Ten20 0.96	55.4	34.8	-17.5	31.5
Old Period - Ten20 0.96	22.4	16.6	-30.0	15.4
Ten20 0.96	31.5	20.3	-27.3	17.8
Ten20 0.95	25.7	19.6	-31.7	19.3
Ten20 0.94	10.7	13.1	-36.5	20.7
Ten20 0.93	11.6	13.5	-36.8	22.5
Ten20 0.92	0.3	8.6	-41.6	23.3
Ten20 0.91	-9.5	9.6	-45.8	28.4
Ten20 0.9	-15.2	7.2	-43.4	26.9
Nine20 0.96	36.0	25.8	-29.7	17.8
Nine20 0.93	8.9	9.4	-37.8	20.3
Nine20 0.90	-23.8	15.0	-47.2	28.3
Eight20 0.96	29.1	19.2	-26.1	16.6
Eight20 0.93	17.0	15.1	-34.1	20.8
Eight20 0.90	-25.6	13.0	-46.5	30.5
Blended 0.96	7.4	18.3	-33.2	18.3
Blended 0.94	-7.0	11.6	-44.8	25.5
Blended 0.92	-27.4	15.4	-49.4	29.7
Hybrid 0.96	29.5	17.4	-28.8	19.2
Hybrid 0.94	11.5	9.9	-35.7	21.5

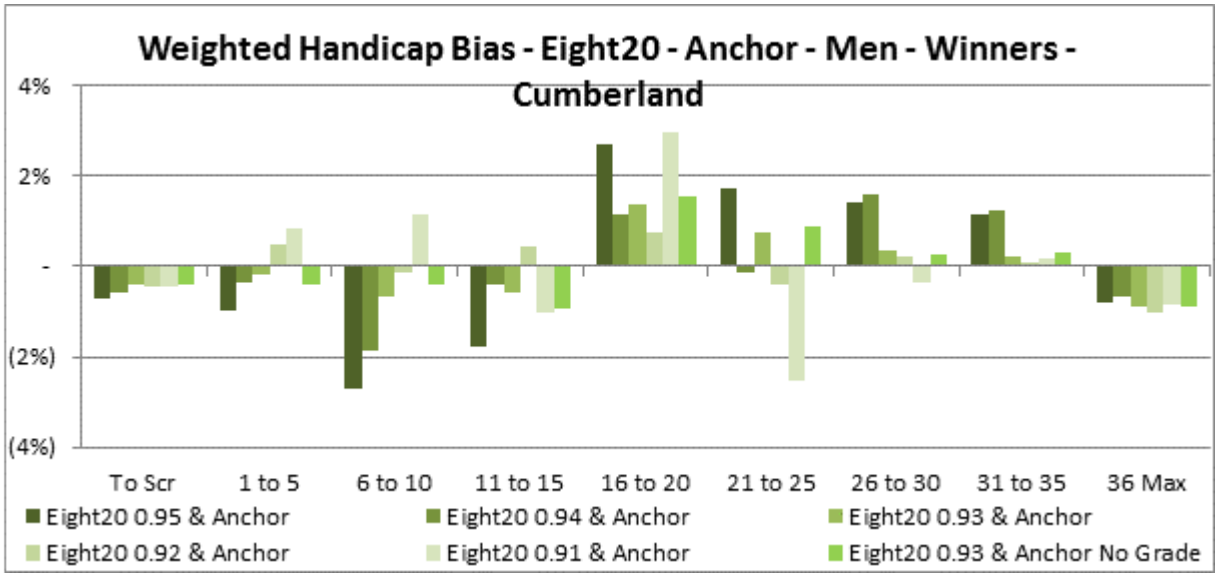
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

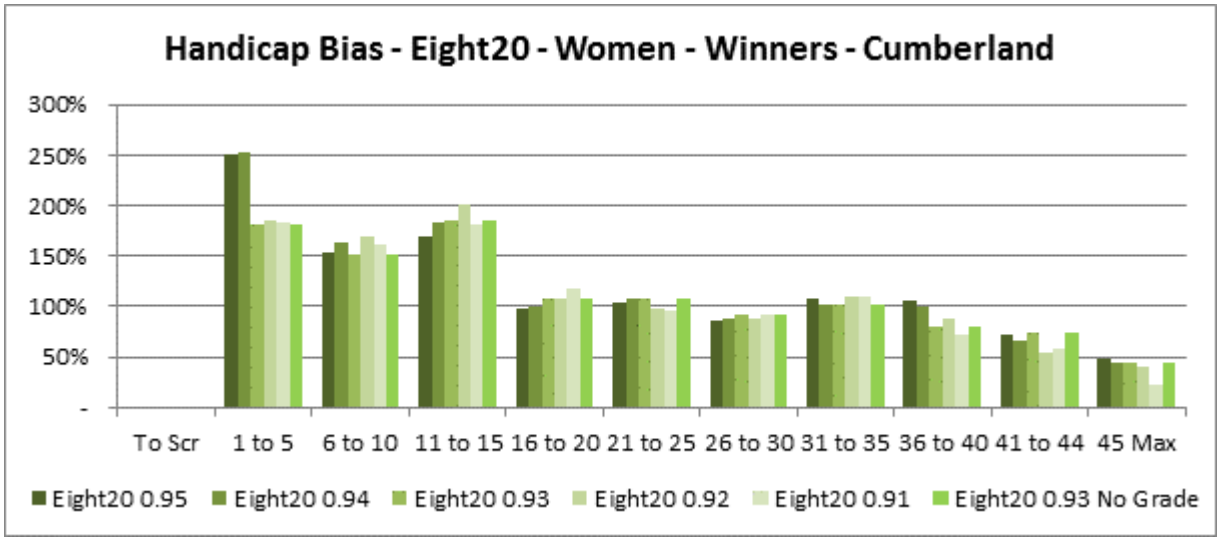
Phase 2

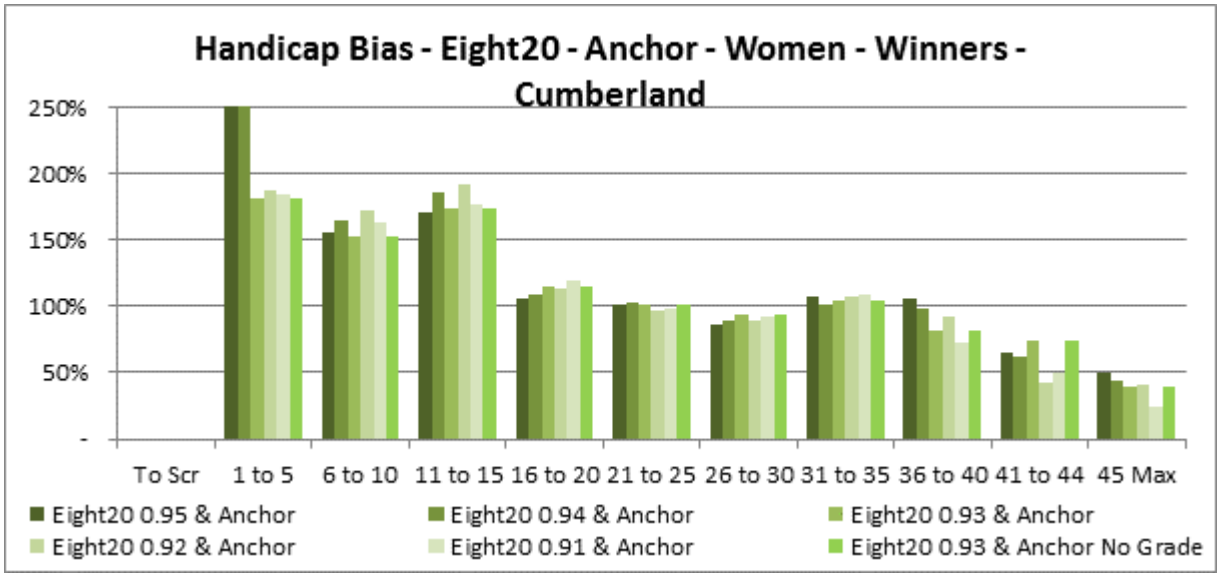

Handicap Bias - Eight20 - Men - Winners - Cumberland
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

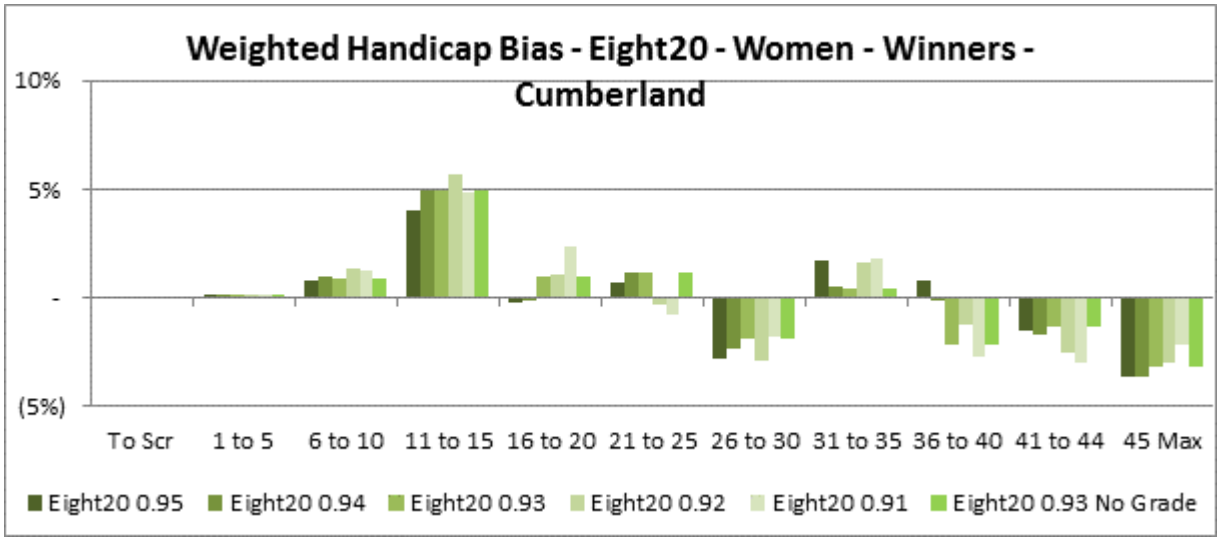

Handicap Bias - Eight20 - Anchor - Men - Winners - Cumberland
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

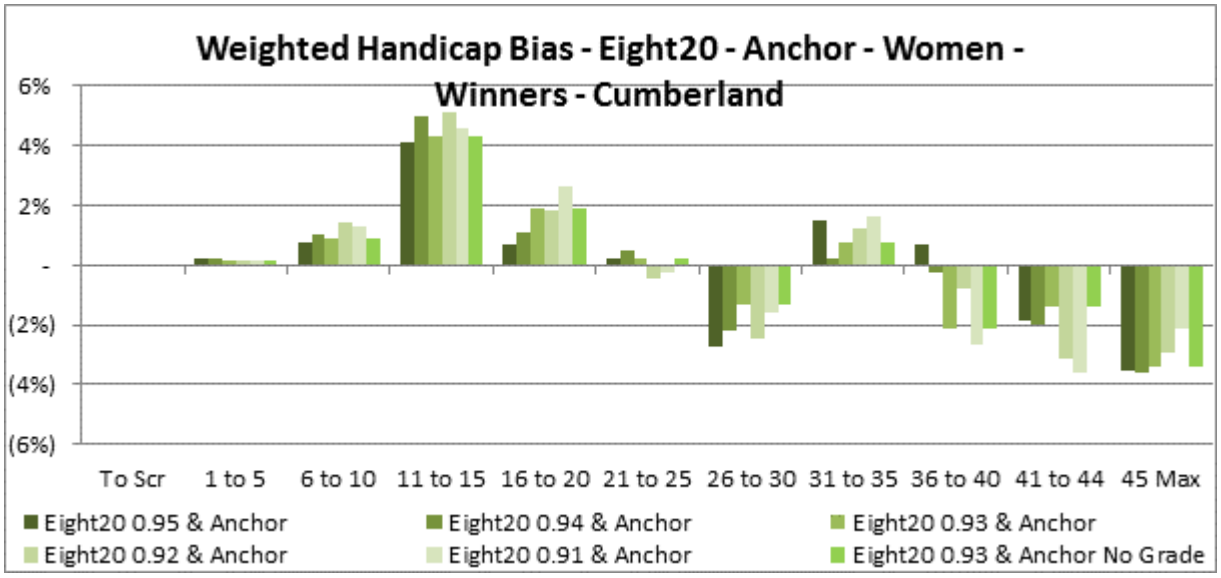

Weighted Handicap Bias - Eight20 - Men - Winners - Cumberland
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

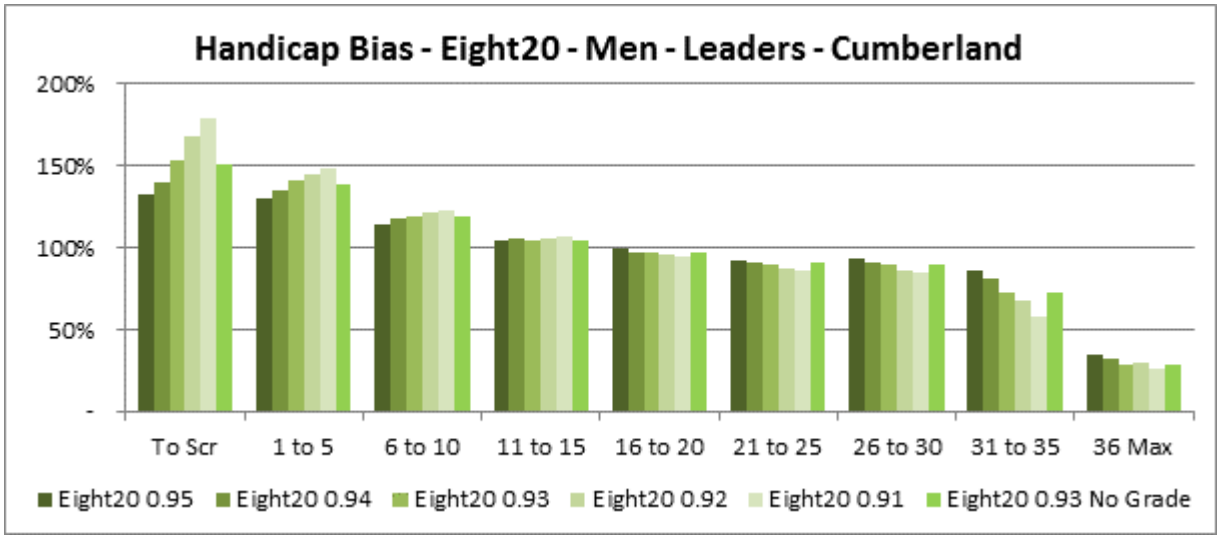

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Cumberland
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

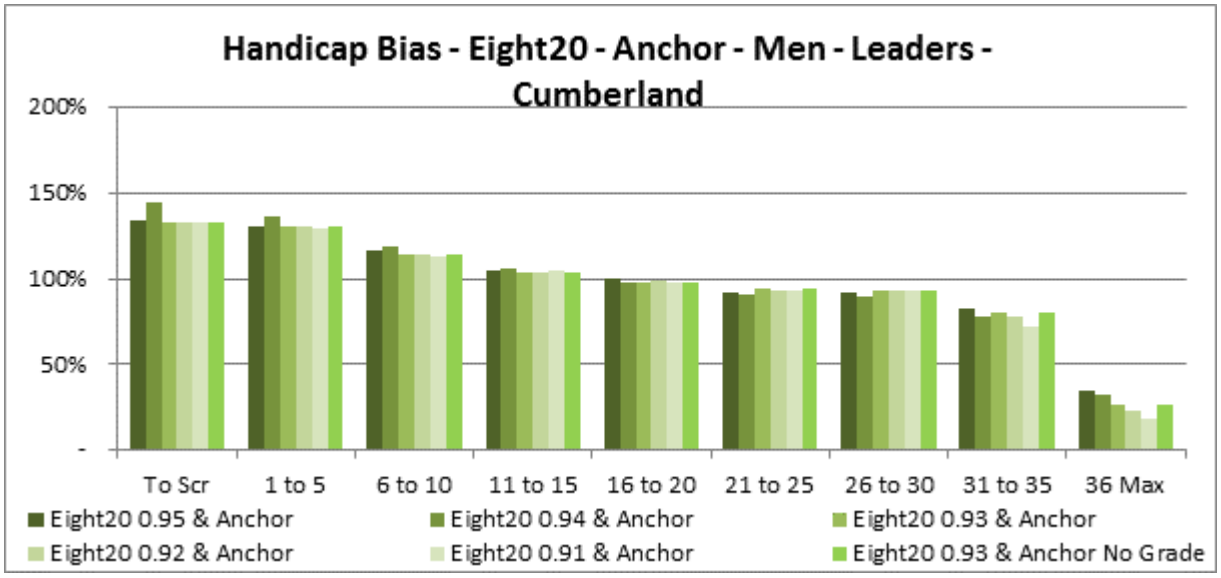

Handicap Bias - Eight20 - Women - Winners - Cumberland
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

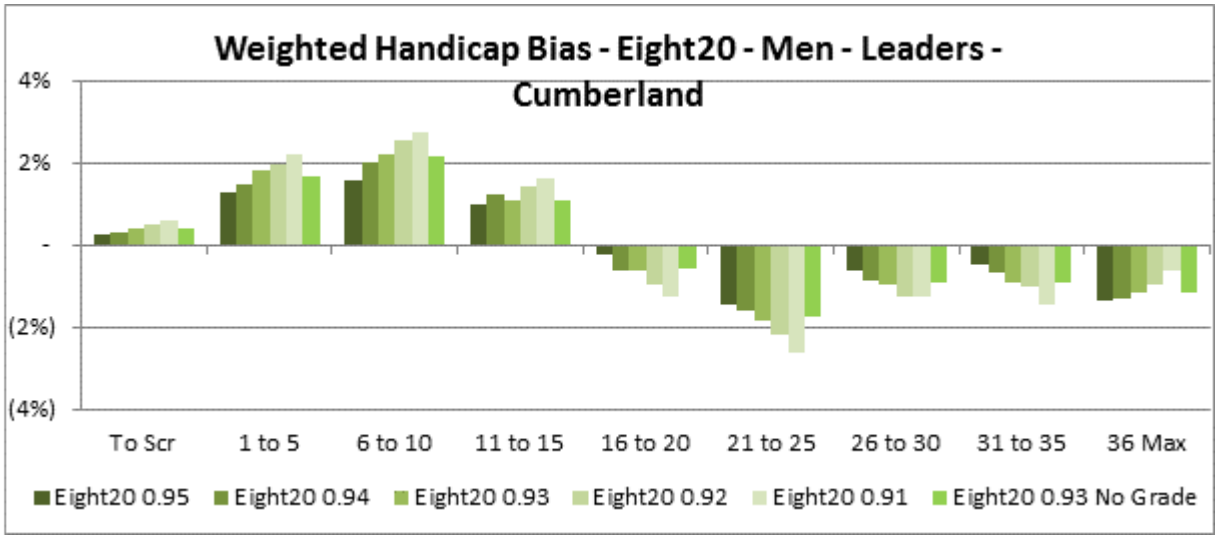

Handicap Bias - Eight20 - Anchor - Women - Winners - Cumberland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

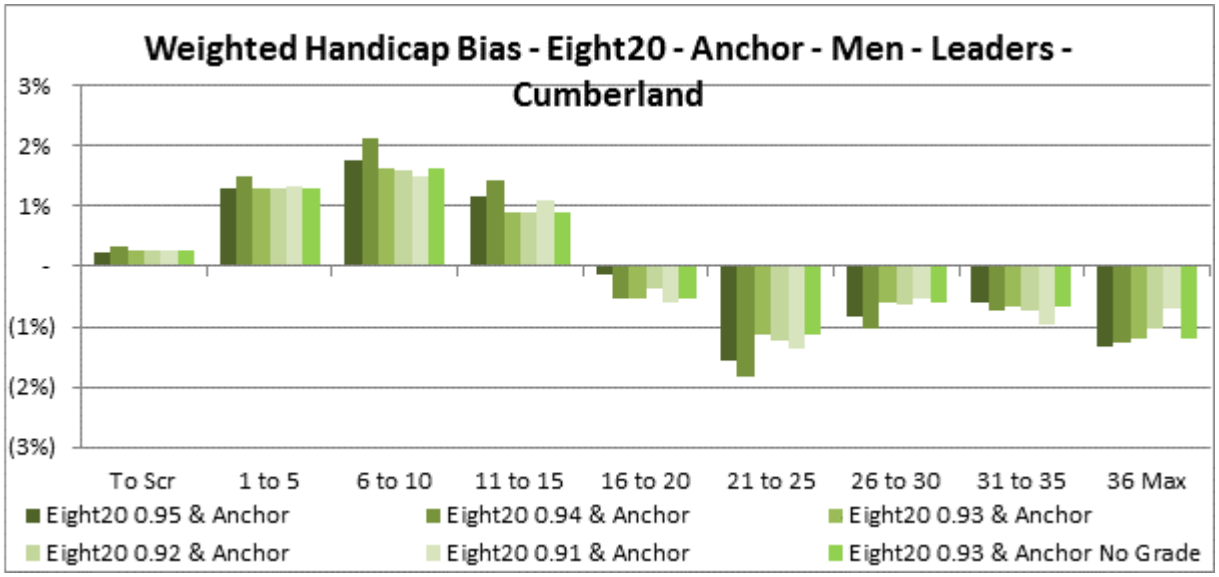

Weighted Handicap Bias - Eight20 - Women - Winners - Cumberland
10%
5%
-
(5%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

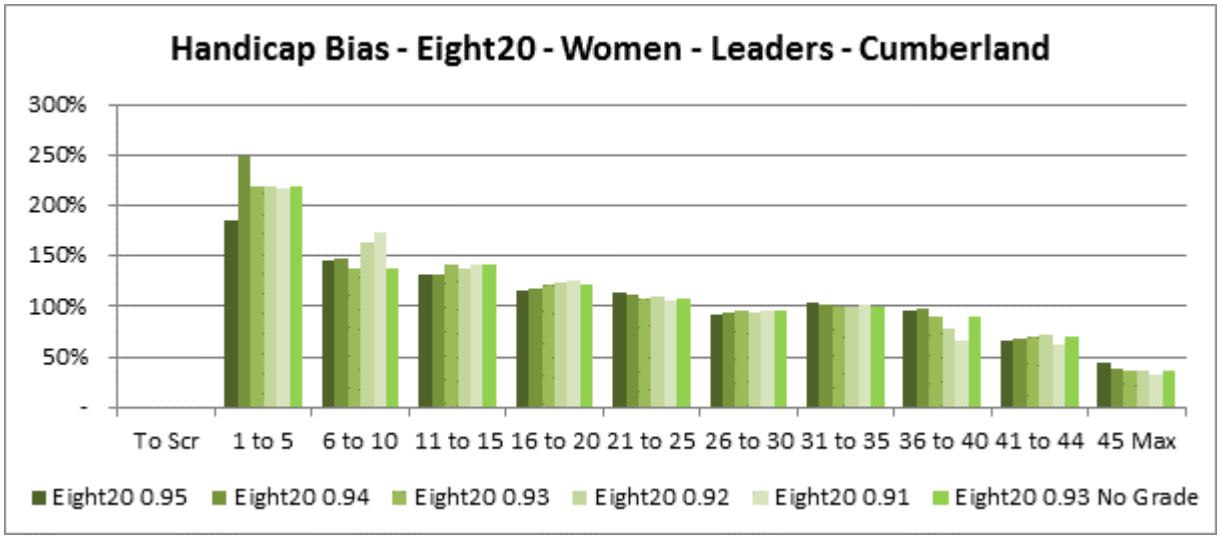

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Cumberland
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

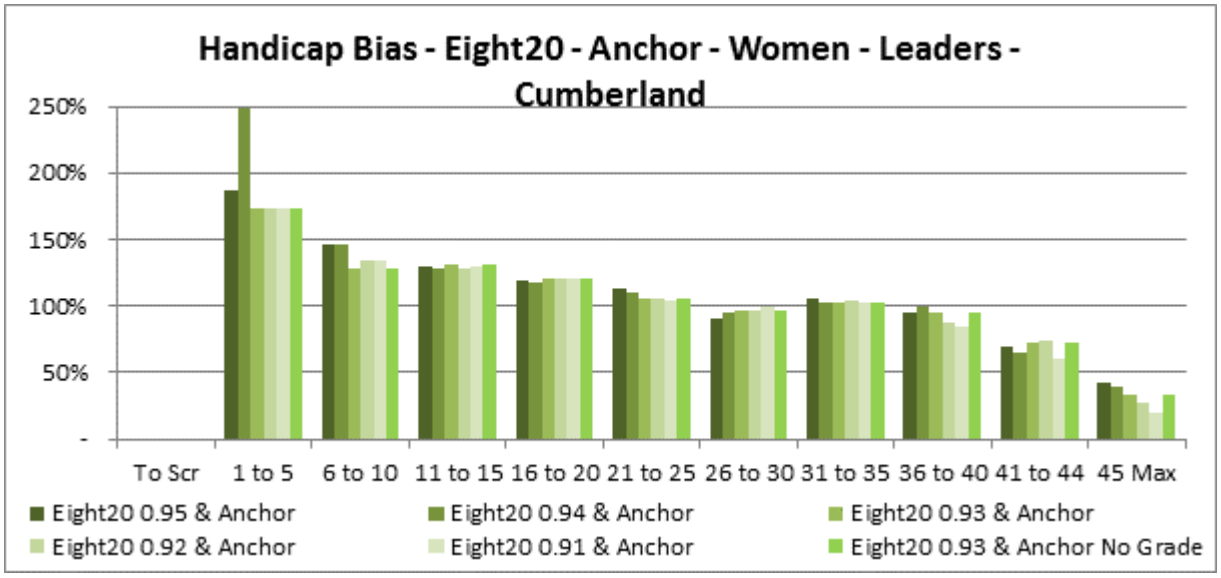

Handicap Bias - Eight20 - Men - Leaders - Cumberland
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

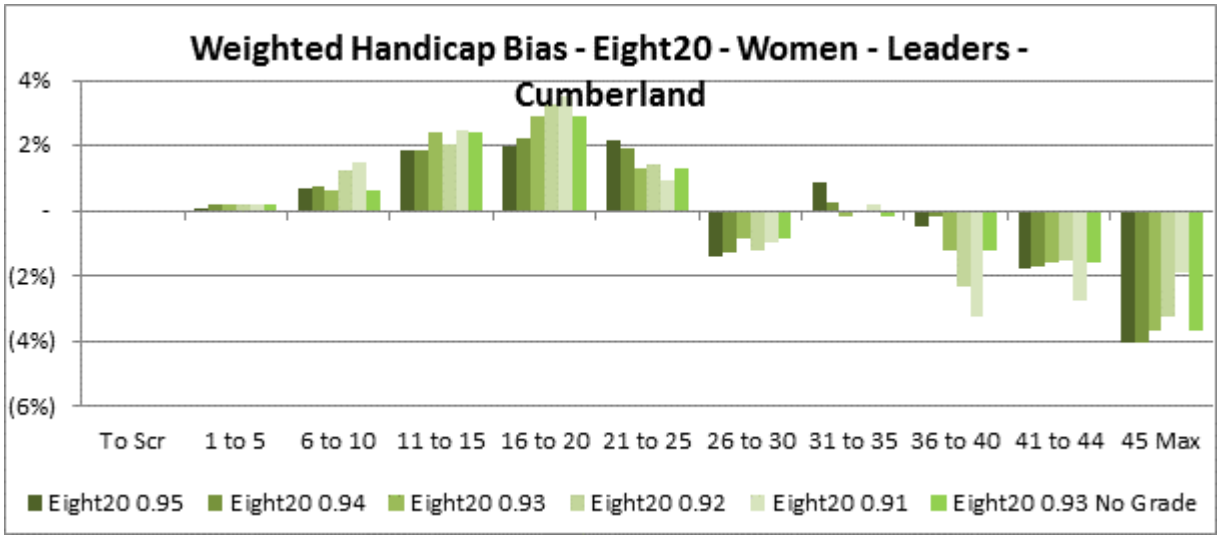

Handicap Bias - Eight20 - Anchor - Men - Leaders - Cumberland
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

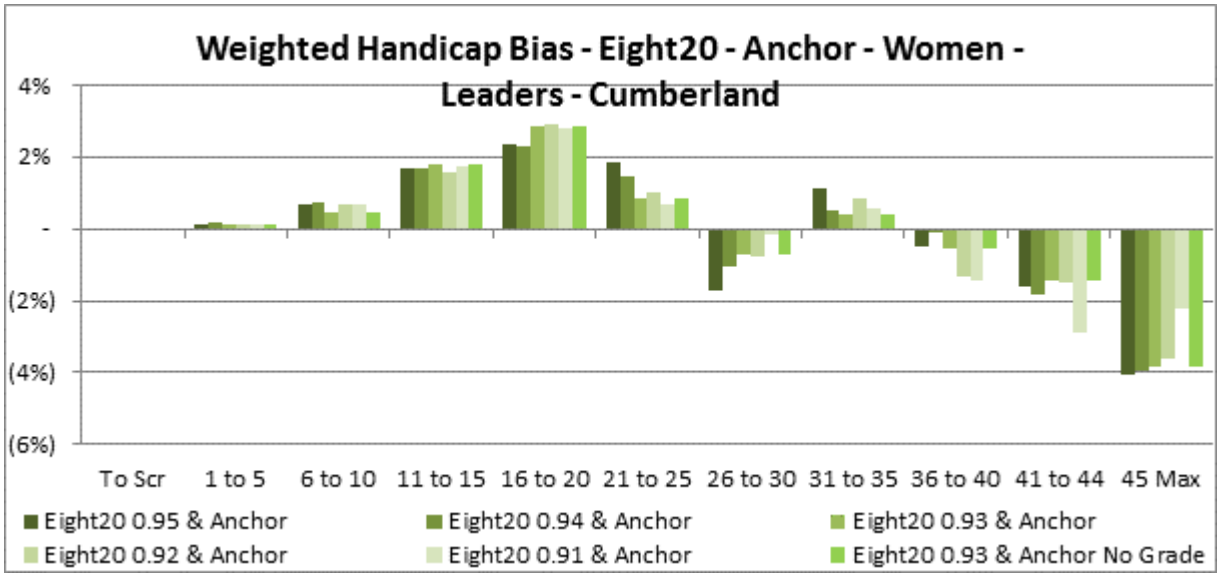

Weighted Handicap Bias - Eight20 - Men - Leaders - Cumberland
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Cumberland
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Cumberland
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Cumberland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Cumberland
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

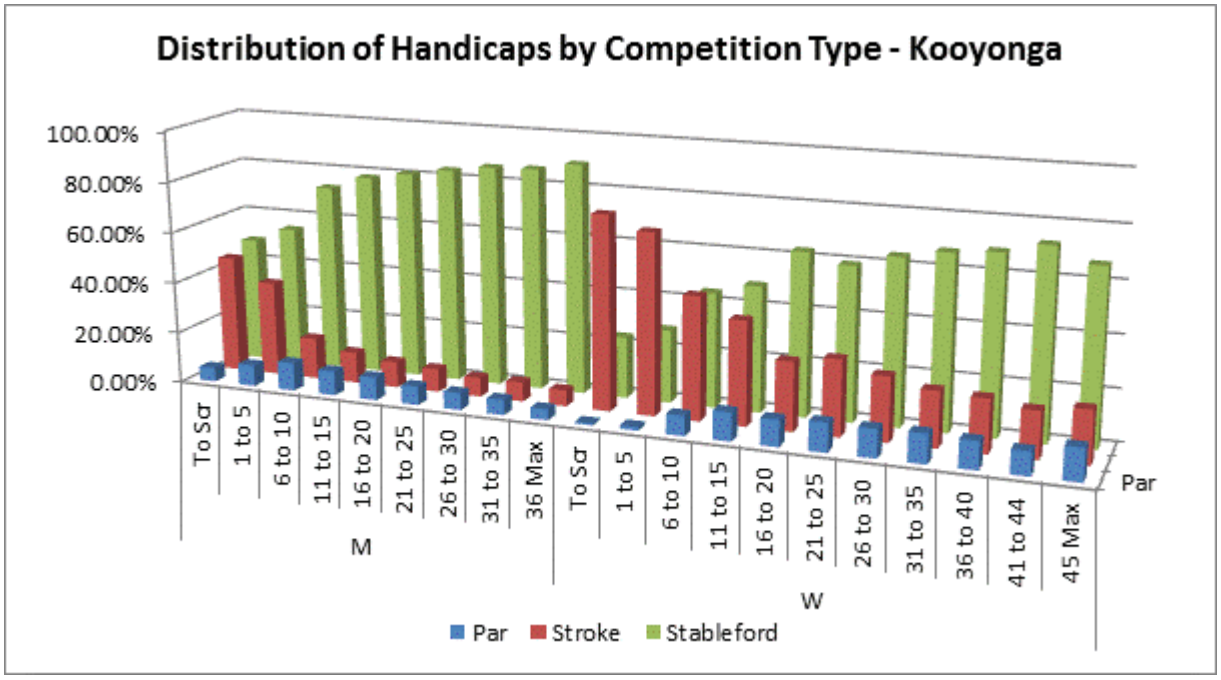


Phase 2 -Cumberland					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	40.9	21.4	-29.3	21.1
	Eight20 0.94	26.3	13.0	-36.3	22.0
	Eight20 0.93	15.3	12.3	-39.0	21.8
	Eight20 0.92	5.7	9.9	-41.3	25.1
	Eight20 0.91	-2.0	17.6	-41.2	24.2
	Eight20 0.93 No Grade	19.0	13.0	-39.0	21.8
	Eight20 0.95 & Anchor	29.7	18.0	-31.9	21.0
	Eight20 0.94 & Anchor	19.5	11.1	-39.4	22.2
	Eight20 0.93 & Anchor	4.5	7.5	-38.7	20.8
	Eight20 0.92 & Anchor	-6.2	5.5	-42.4	24.3
	Eight20 0.91 & Anchor	-13.7	15.6	-43.3	24.5
	Eight20 0.93 & Anchor No Grade	5.7	8.3	-38.7	20.8
Leaders	Eight20 0.95	-30.8	11.0	-33.1	18.6
	Eight20 0.94	-35.5	13.0	-33.6	18.2
	Eight20 0.93	-39.6	14.3	-36.2	18.5
	Eight20 0.92	-43.7	16.6	-38.6	19.6
	Eight20 0.91	-47.1	18.7	-40.4	21.0
	Eight20 0.93 No Grade	-38.3	13.8	-36.2	18.5
	Eight20 0.95 & Anchor	-33.3	12.0	-32.7	19.0
	Eight20 0.94 & Anchor	-38.0	14.1	-32.9	17.7
	Eight20 0.93 & Anchor	-30.3	10.6	-31.9	17.4
	Eight20 0.92 & Anchor	-29.9	10.5	-32.7	17.7
	Eight20 0.91 & Anchor	-28.6	10.7	-31.7	16.7
	Eight20 0.93 & Anchor No Grade	-30.3	10.6	-31.9	17.4

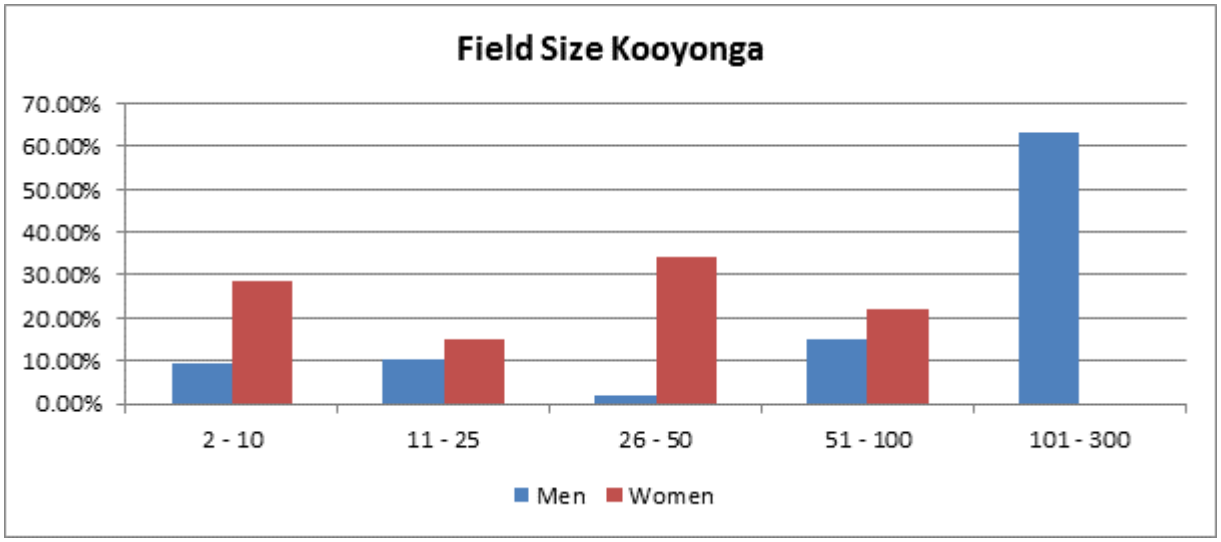
Appendix 5 – Kooyonga

Phase 1

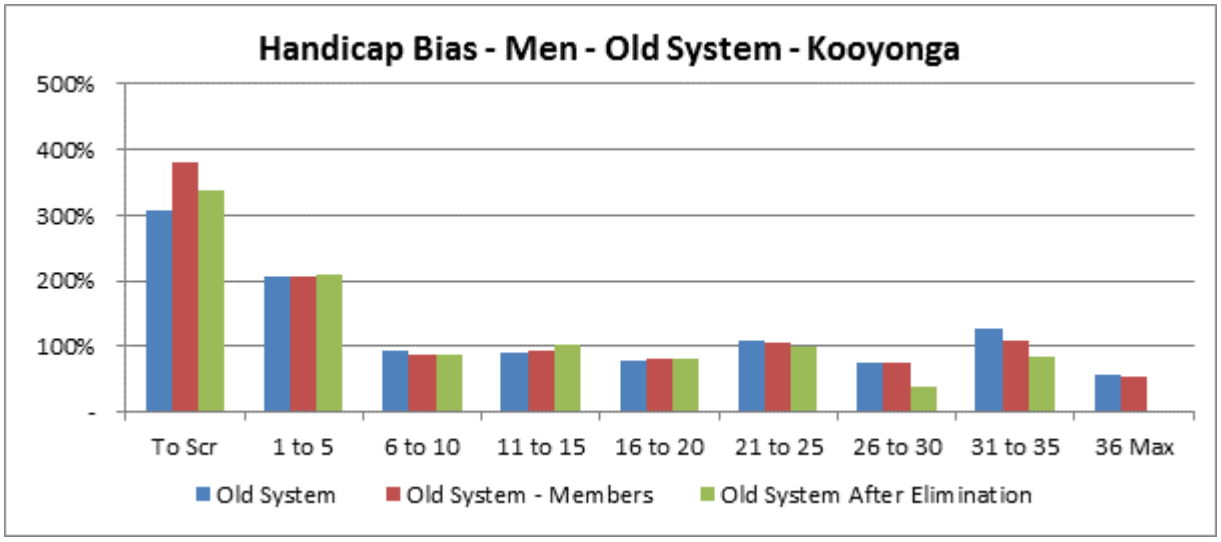
Kooyonga	Men	Women	Total
Players in Database	2,055	454	2,509
Members	705	282	987
Visitors	1,350	172	1,522
Members who have Played 33 Rounds	669	270	939
Members with Last Round In Old System	143	55	198
Members with Last Round in Current System	562	227	789
Earliest Round	19/12/2007	12/2/2008	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			161
Number of Home Competitions	978	718	1,696
Number of Rounds of Golf	55,086	13,154	68,240
Number of Rounds at Home	47,252	10,001	57,253
Number of Rounds at Home Old	36,749	7,484	44,233
Number of Rounds at Home Current	10,503	2,517	13,020
Num Rnds Members at Home	44,016	9,584	53,600
Num Rnds Members at Home Old	34,441	7,172	41,613
Num Rnds Members at Home Cur	9,575	2,412	11,987
Num Rnds After Eliminations	26,036	4,423	30,459
Num Rnds After Eliminations Old	17,282	2,517	19,799
Num Rnds After Eliminations Cur	8,754	1,906	10,660

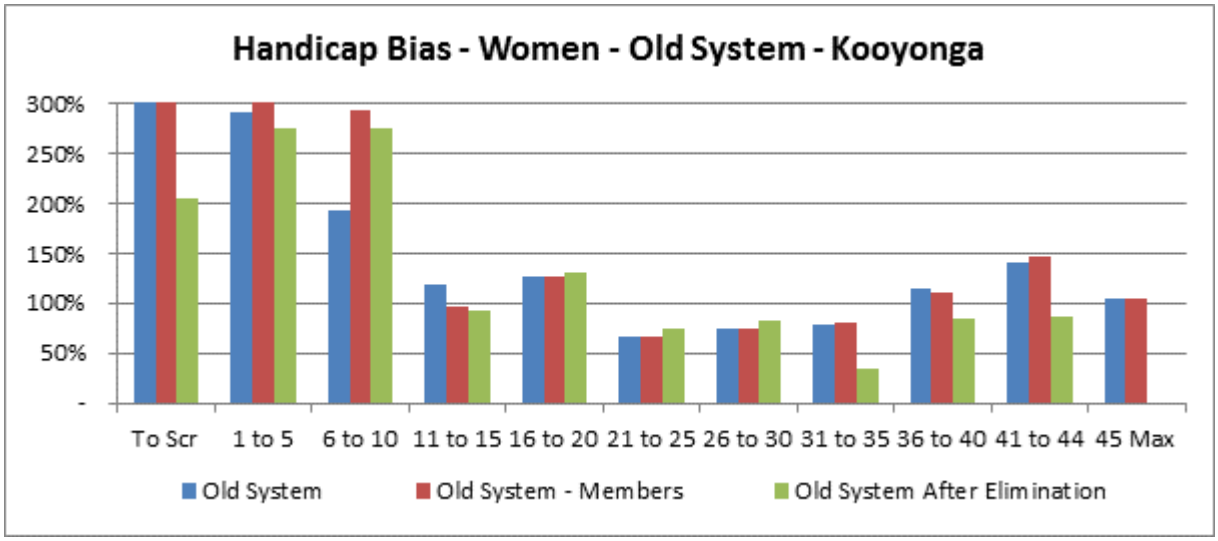


Most men's competitions are with a field of over 100, the women mainly field 26 - 50.

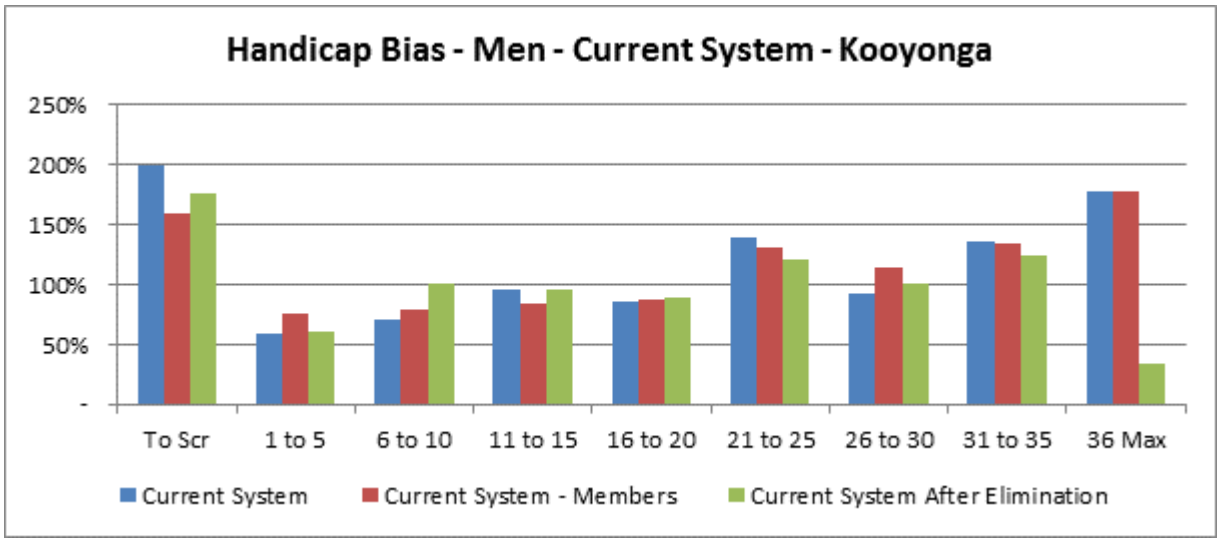


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

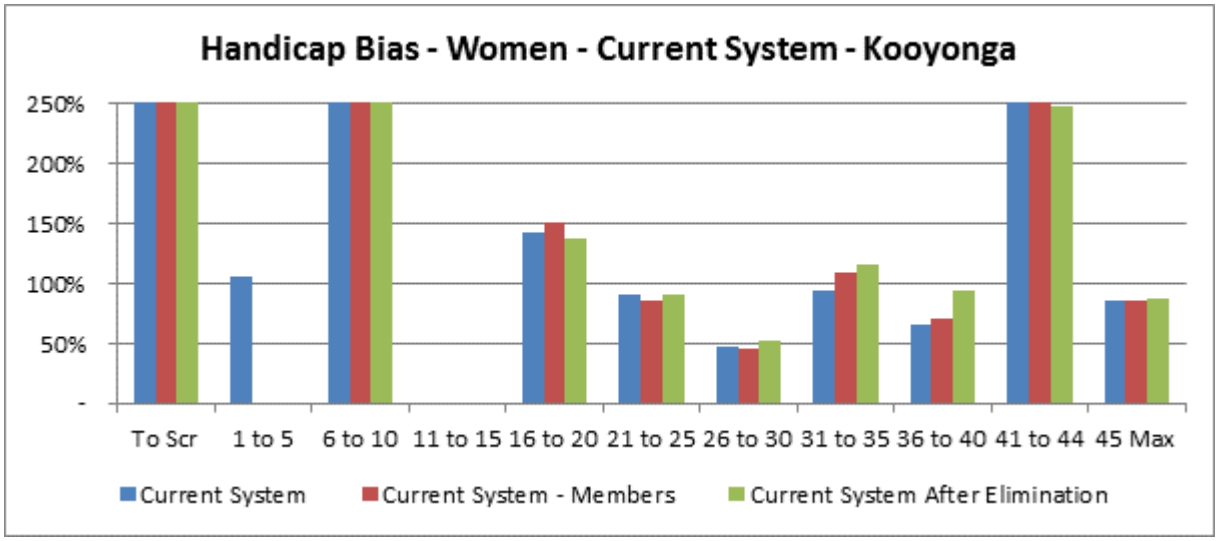




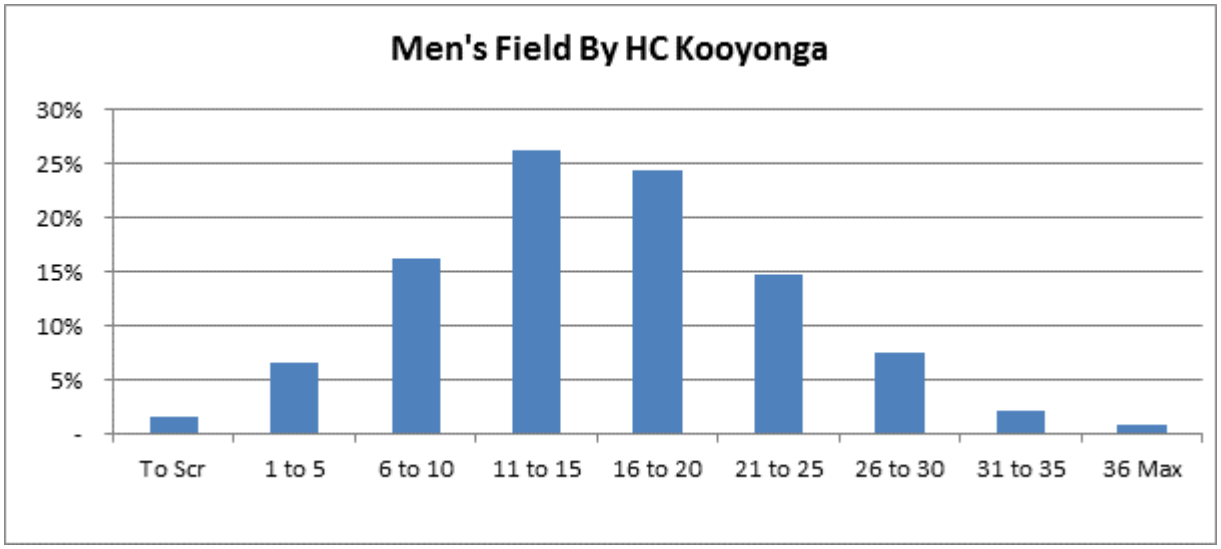
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

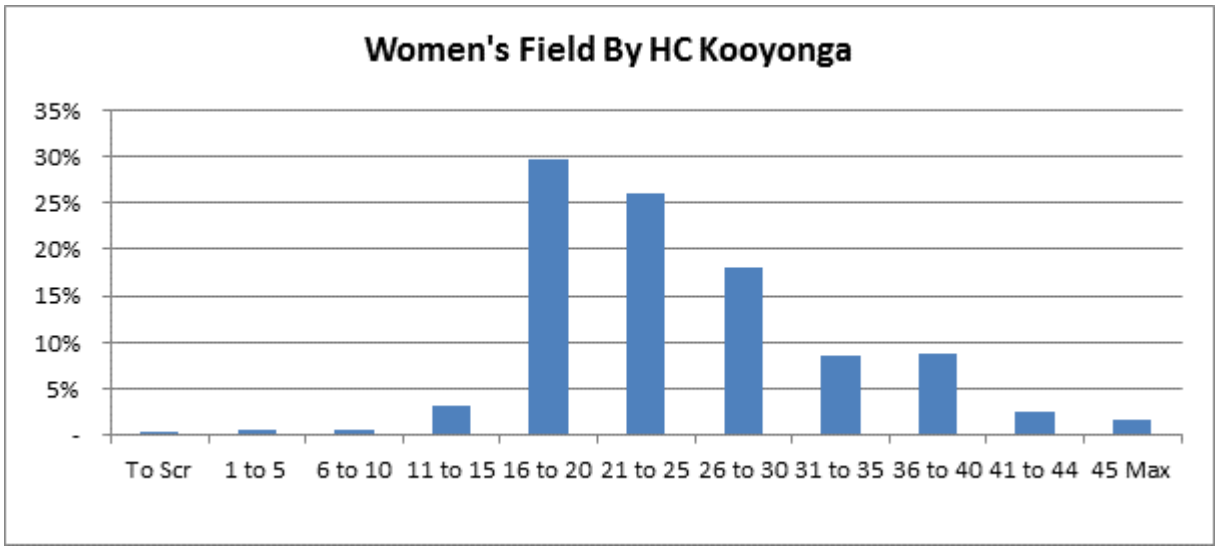


The picture is somewhat similar for the women.



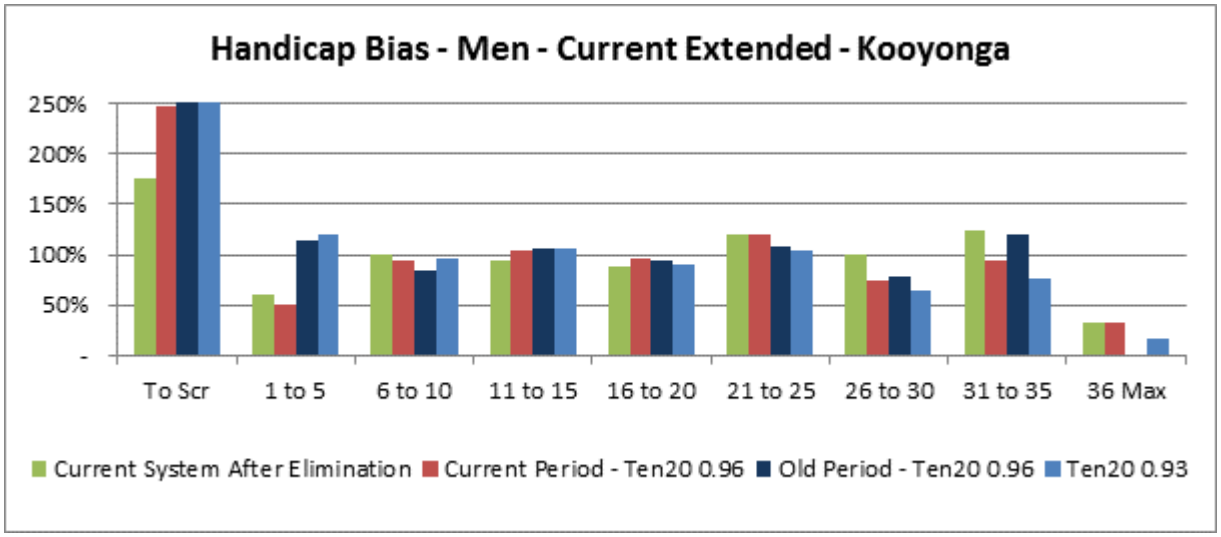
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





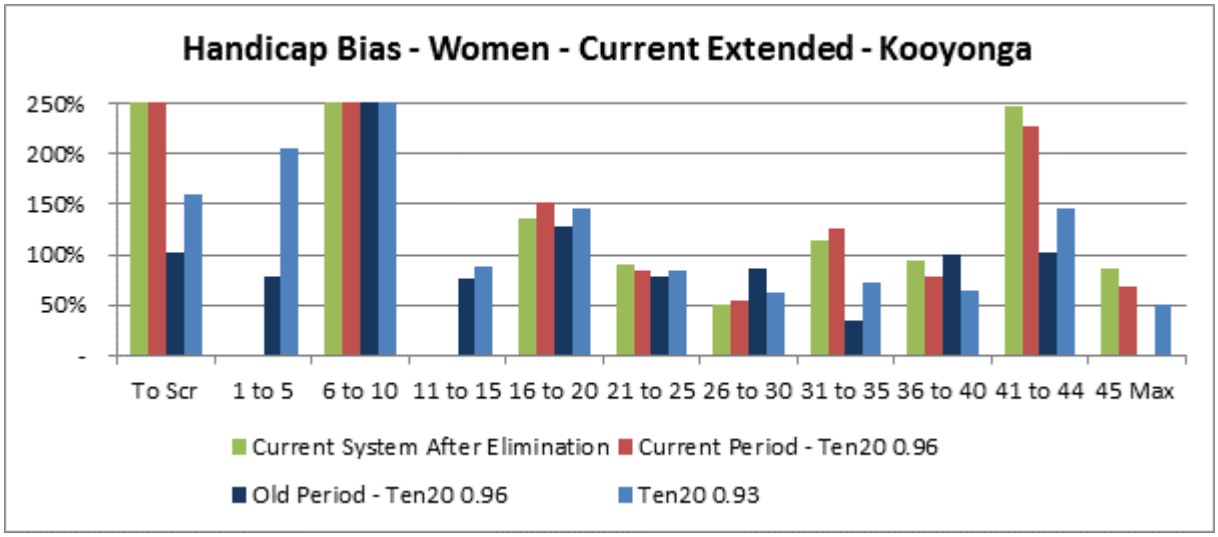
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

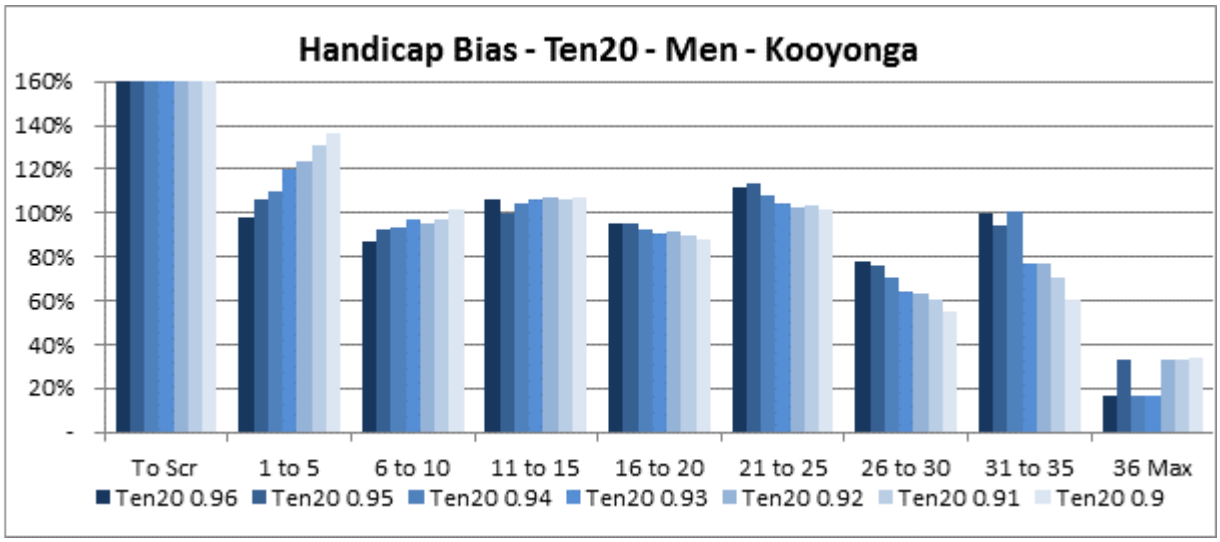


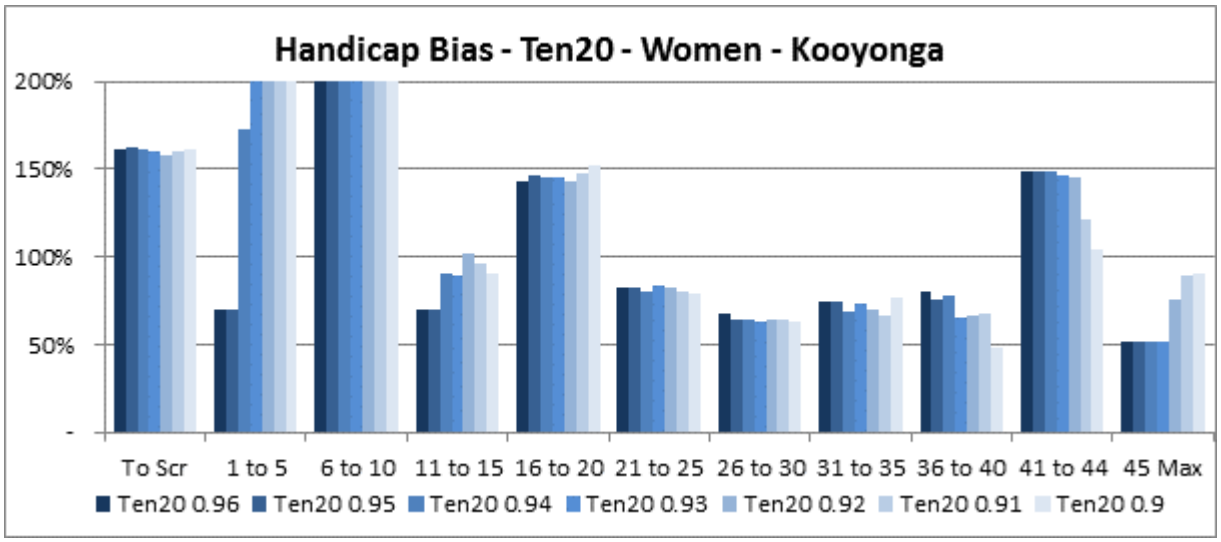
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low markers would have dominated over the two-years.

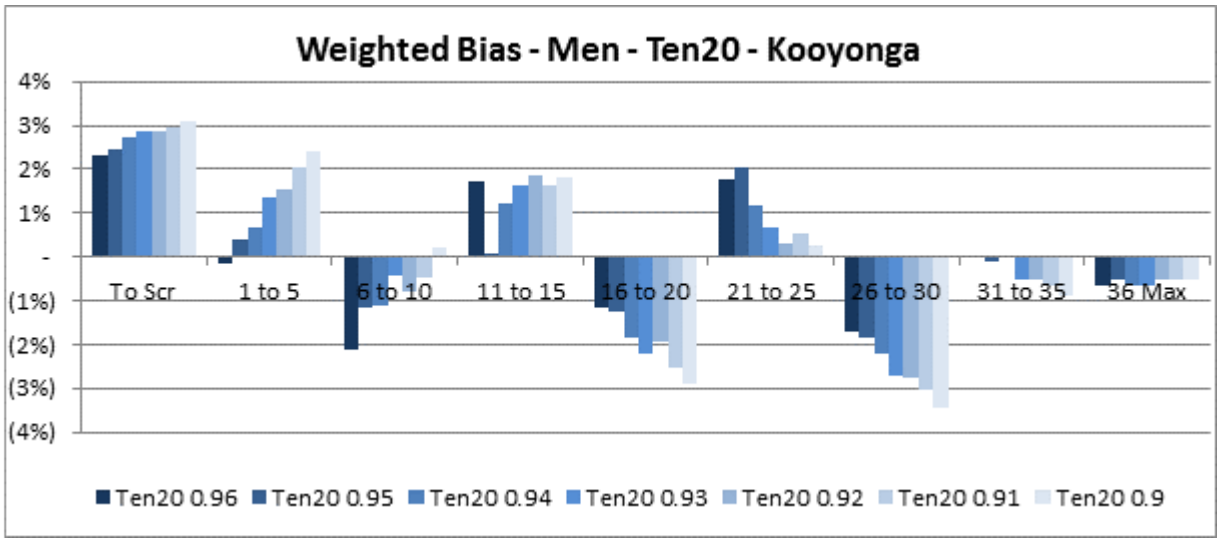


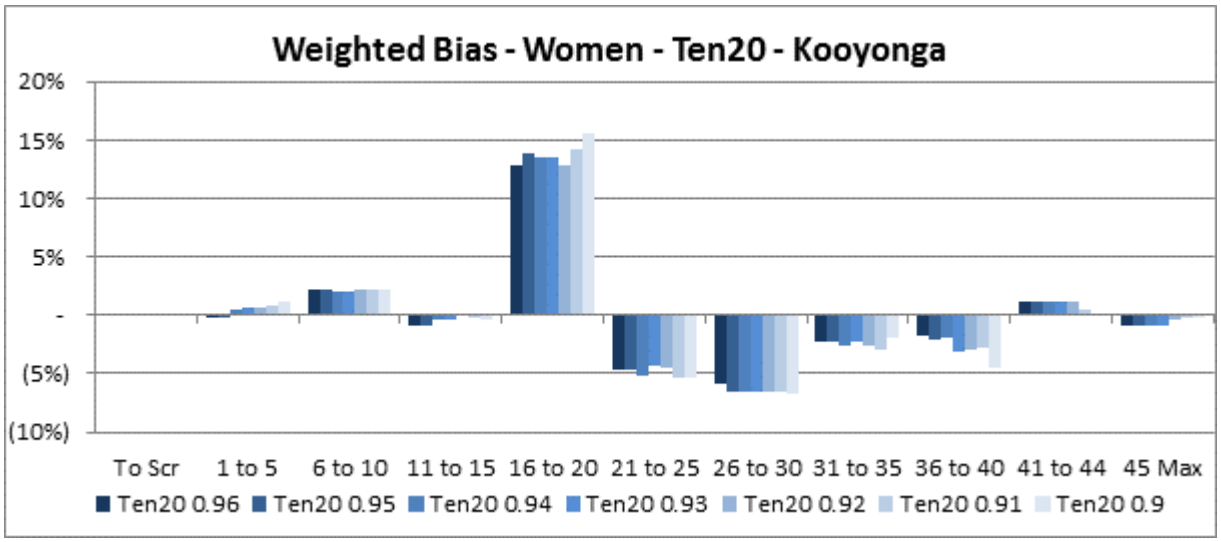
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.

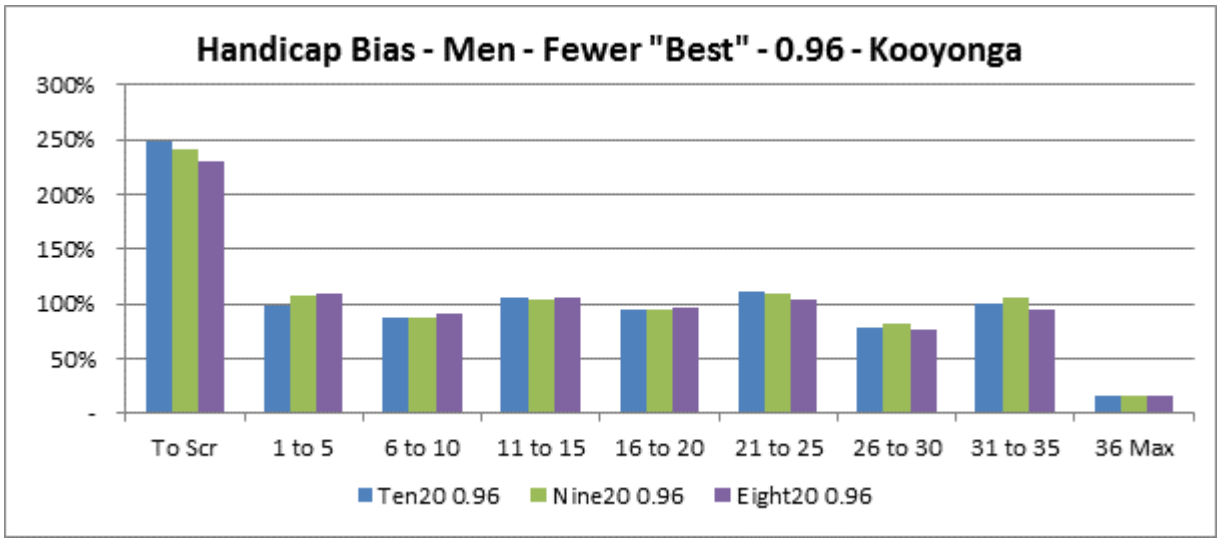


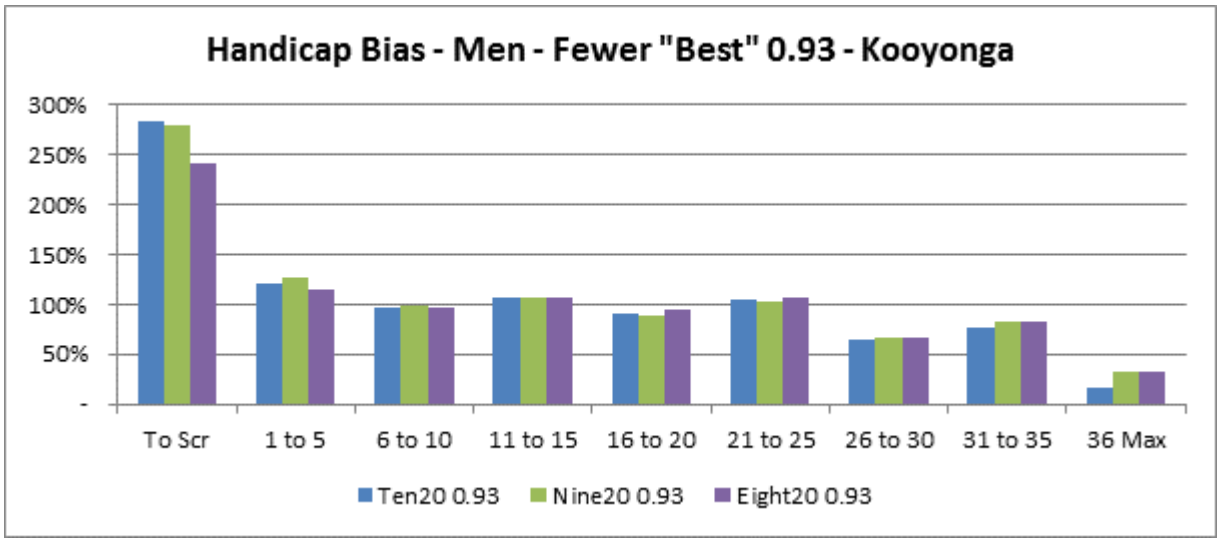


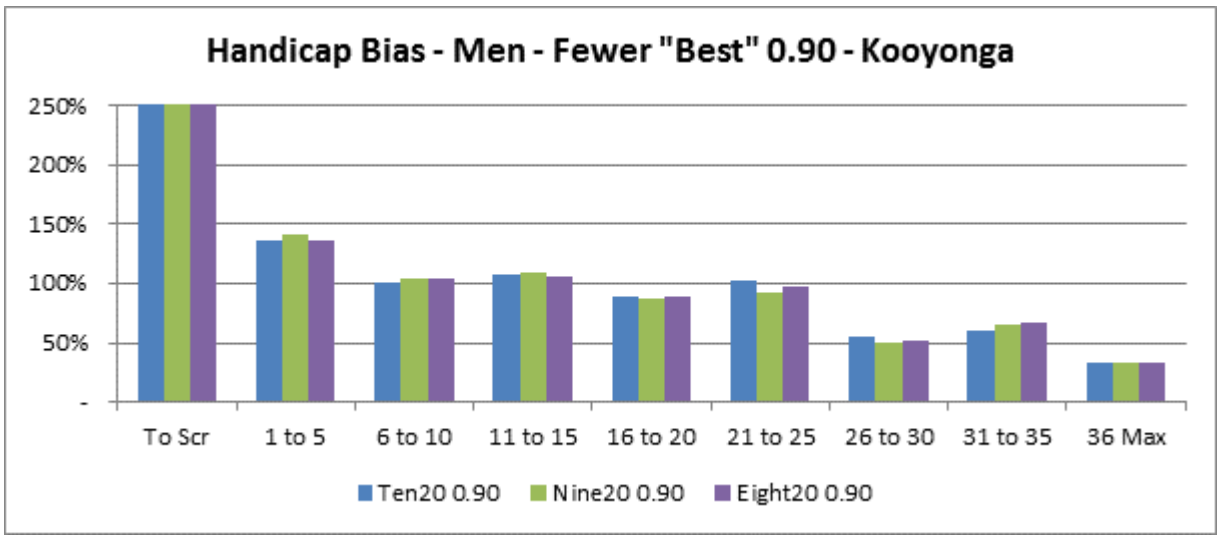
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

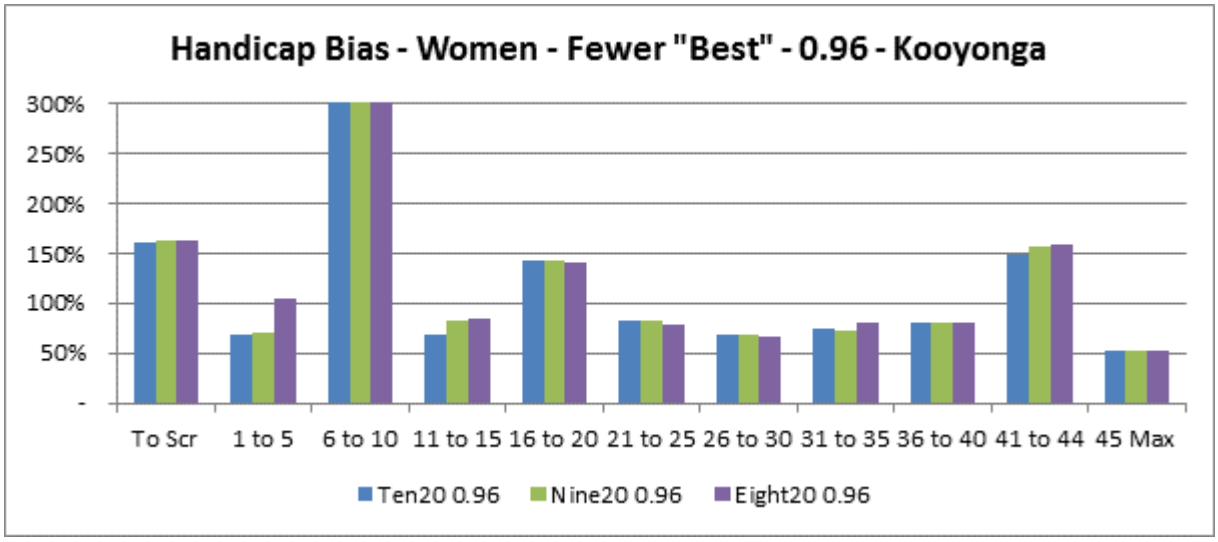
	Kooyonga			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-17.8	16.0	-29.2	48.6
Ten20 0.95	-21.4	14.6	-31.8	52.1
Ten20 0.94	-29.6	16.1	-34.8	51.7
Ten20 0.93	-42.0	18.1	-38.1	51.4
Ten20 0.92	-41.9	18.2	-36.9	49.8
Ten20 0.91	-47.2	20.1	-40.5	54.4
Ten20 0.9	-55.1	22.3	-46.9	59.0

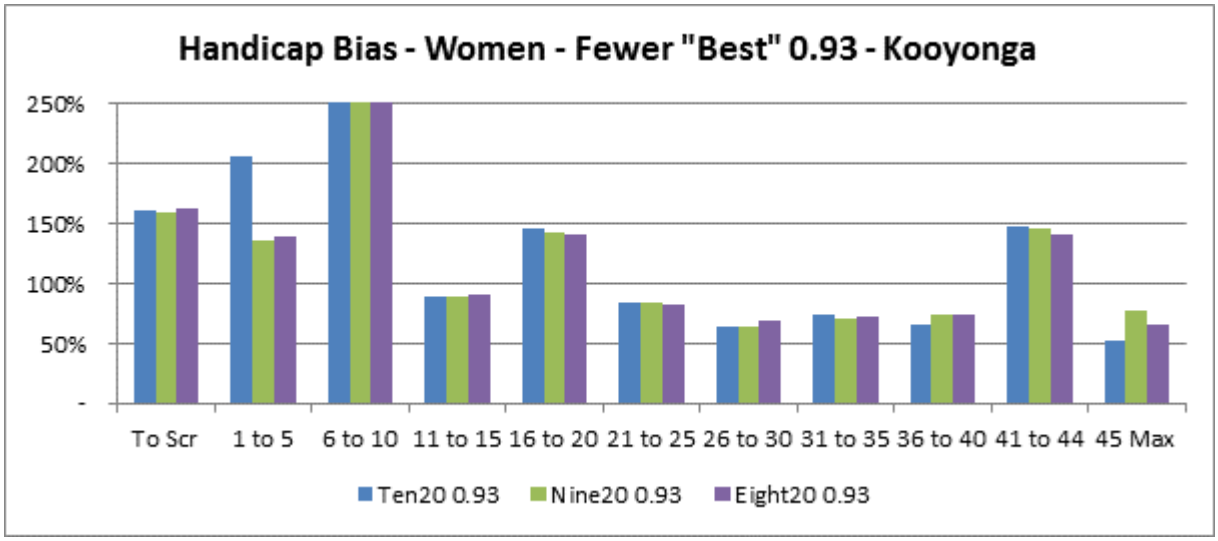
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

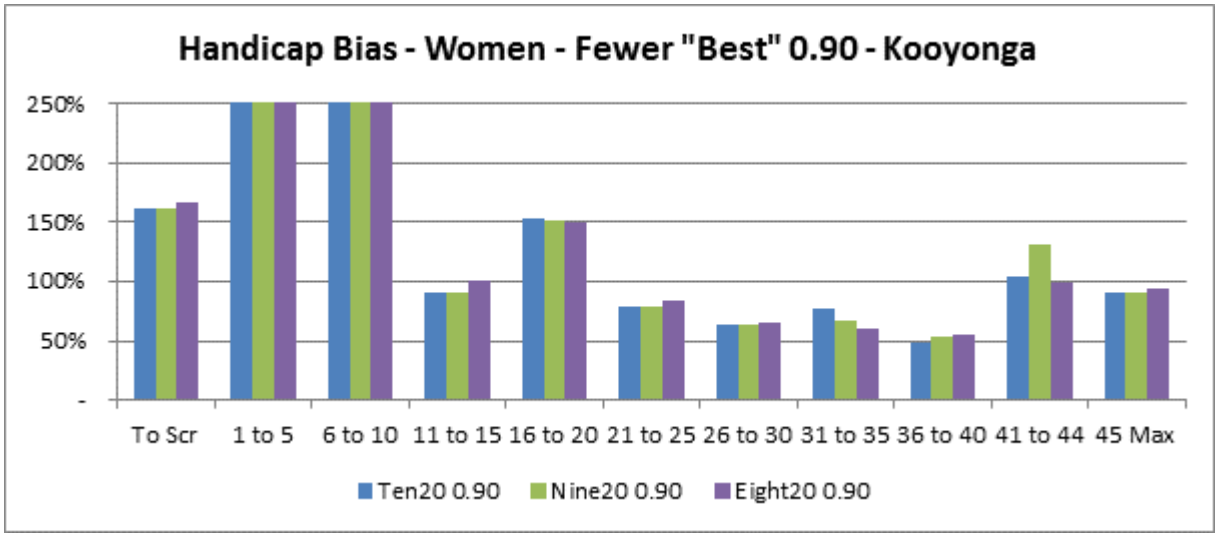







Handicap Bias - Women - Fewer "Best" - 0.96 - Kooyonga
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

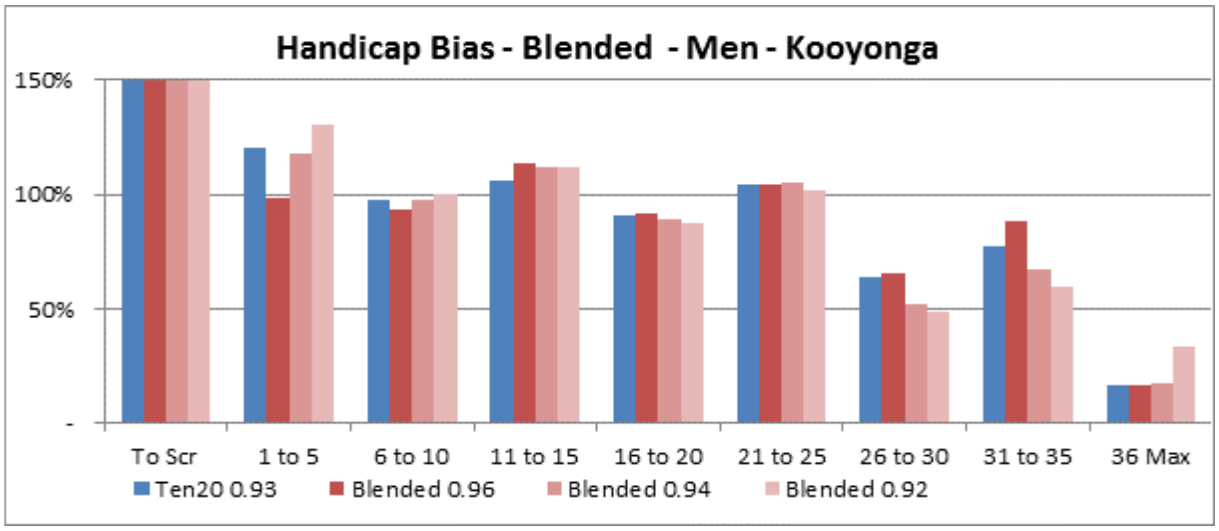

Handicap Bias - Women - Fewer "Best" 0.93 - Kooyonga
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

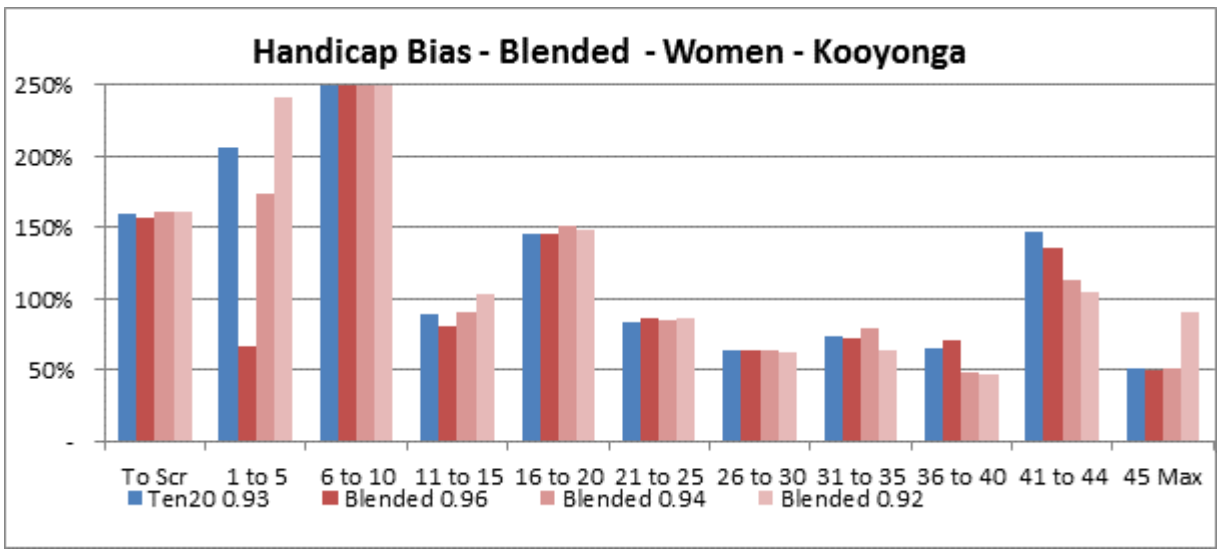

Handicap Bias - Women - Fewer "Best" 0.90 - Kooyonga
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

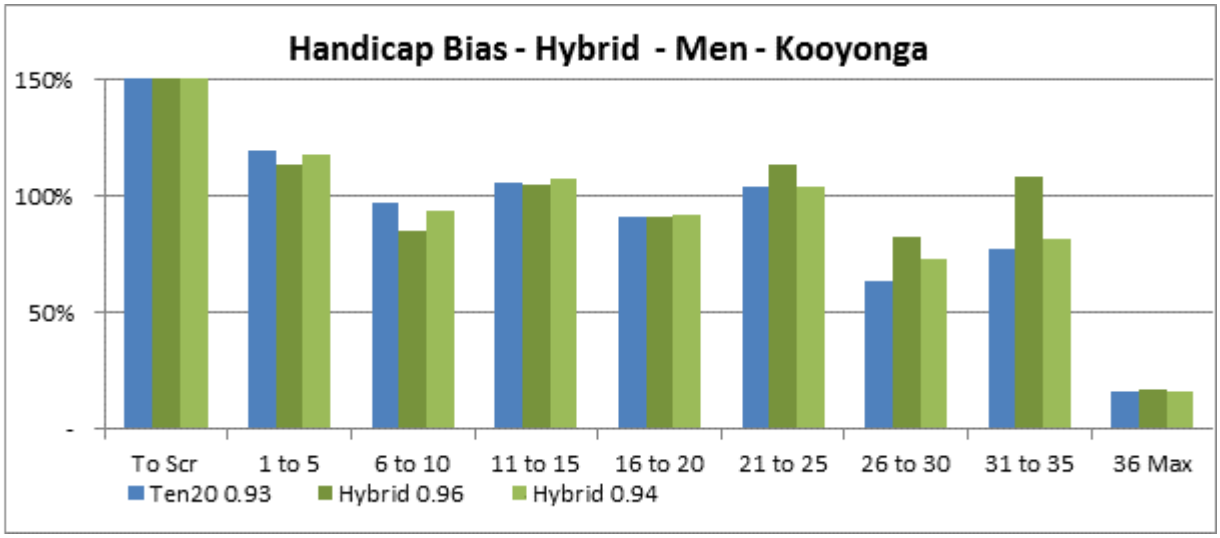
Method	Kooyonga Men		Women	
	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-17.8	16.0	-29.2	48.6
Nine20 0.96	-18.5	14.4	-28.6	47.7
Eight20 0.96	-23.7	12.7	-28.5	47.8
Ten20 0.93	-42.0	18.1	-38.1	51.4
Nine20 0.93	-41.8	18.5	-32.4	48.4
Eight20 0.93	-31.8	15.3	-33.2	46.7
Ten20 0.90	-55.1	22.3	-46.9	59.0
Nine20 0.90	-65.4	25.8	-45.3	58.0
Eight20 0.90	-61.0	23.5	-47.1	55.3

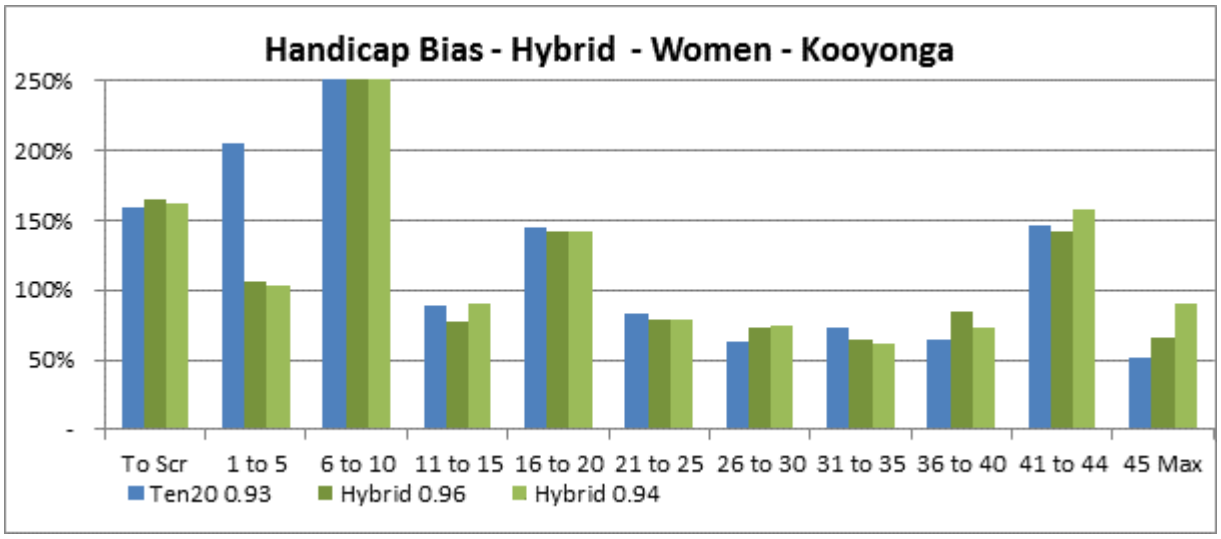
For the Blended:





For the Hybrid:

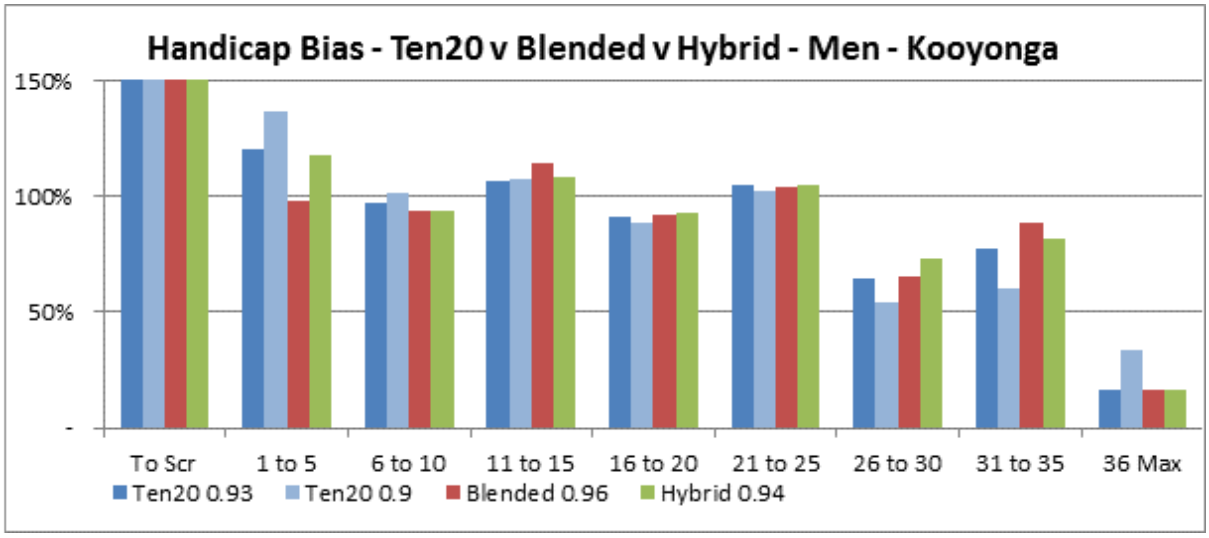


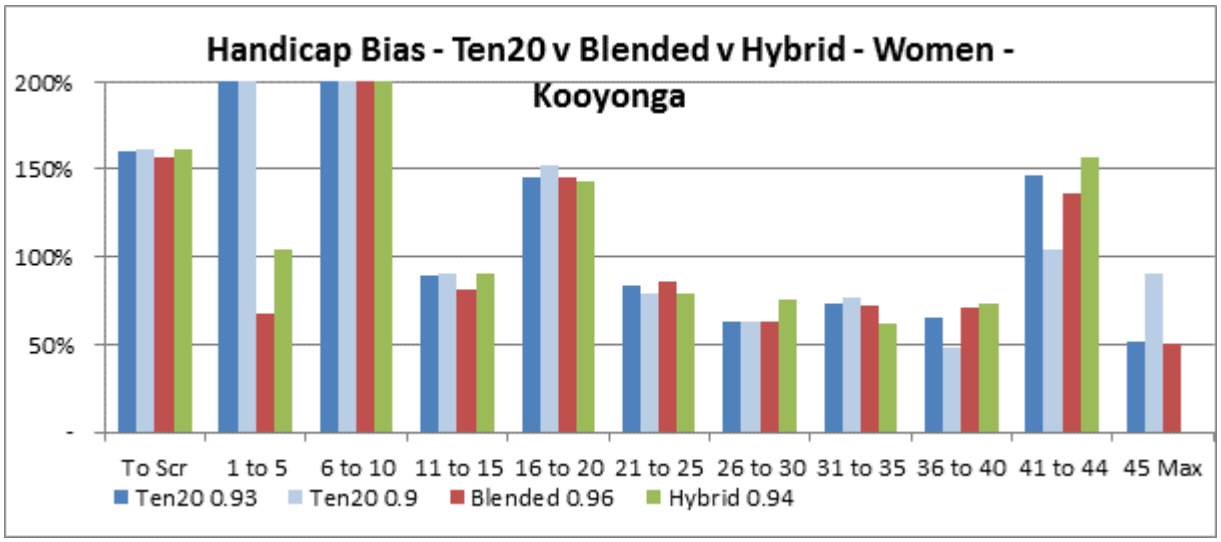


The Corresponding Tilt and Level Indices are:

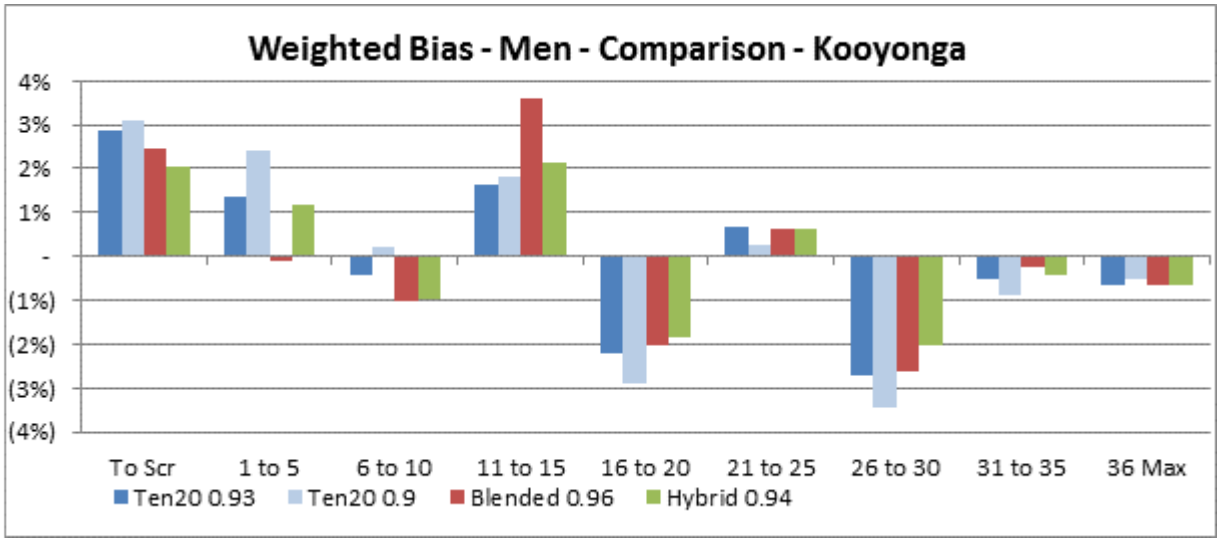
	Kooyonga			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-31.7	20.0	-34.7	50.9
Blended 0.94	-48.0	22.5	-44.9	56.0
Blended 0.92	-55.5	24.6	-47.9	55.1
Hybrid 0.96	-17.1	16.9	-29.1	48.2
Hybrid 0.94	-31.8	15.7	-29.2	48.3

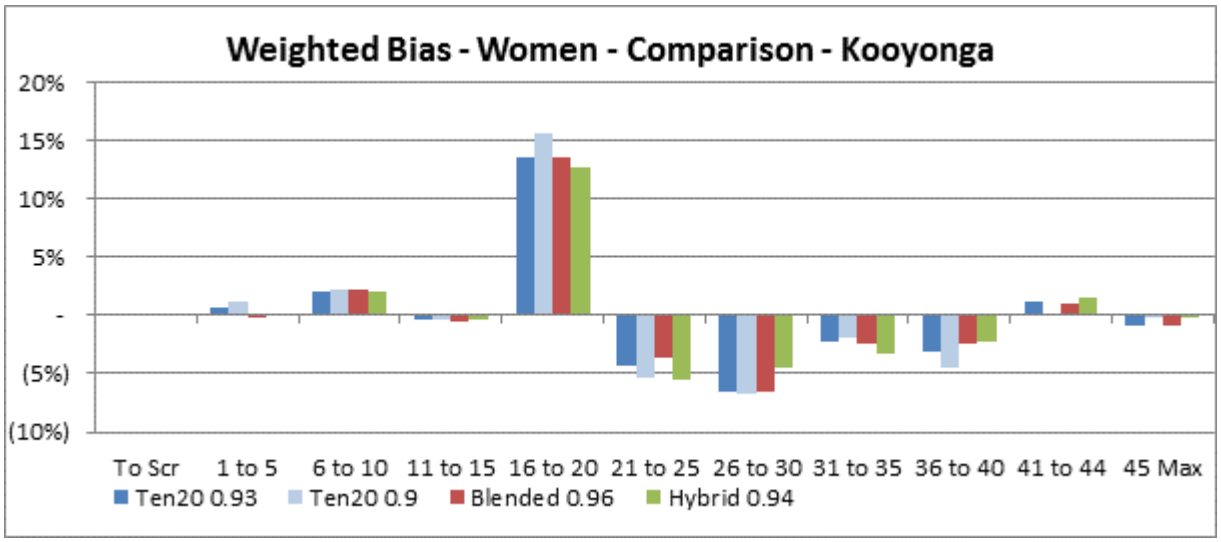
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

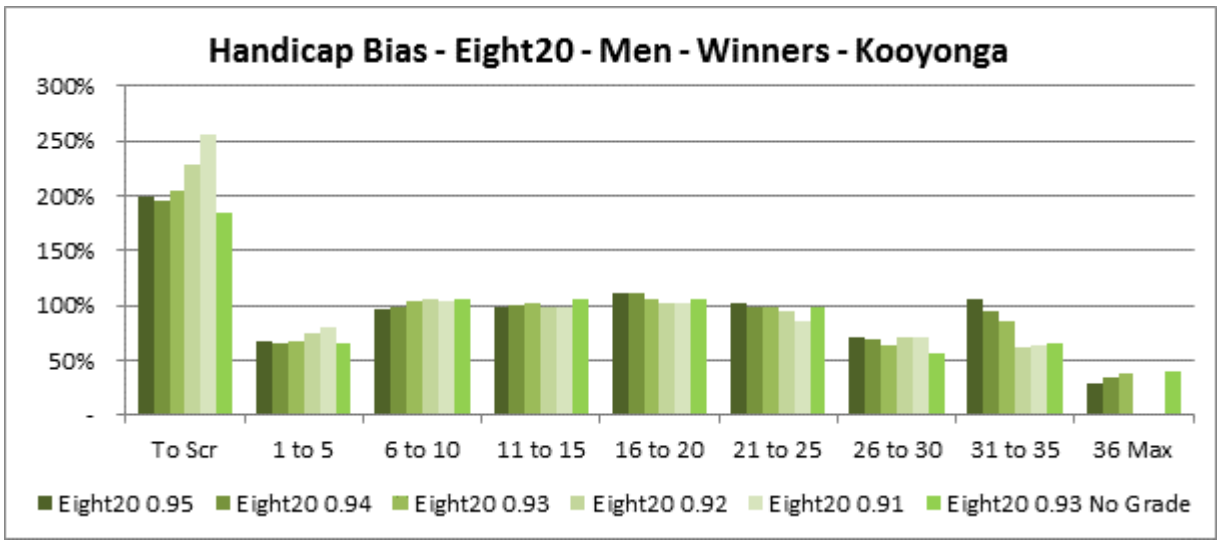
	Kooyonga			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-42.0	18.1	-38.1	51.4
Ten20 0.9	-55.1	22.3	-46.9	59.0
Blended 0.96	-31.7	20.0	-34.7	50.9
Hybrid 0.94	-31.8	15.7	-29.2	48.3

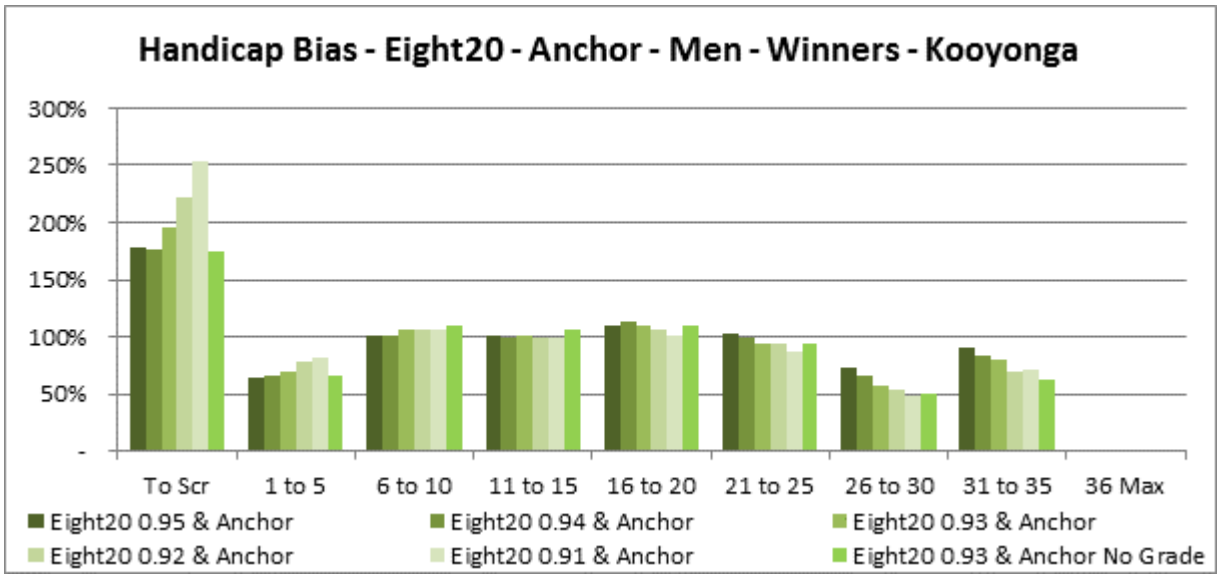
Putting it all together, with the Old System as a reference:

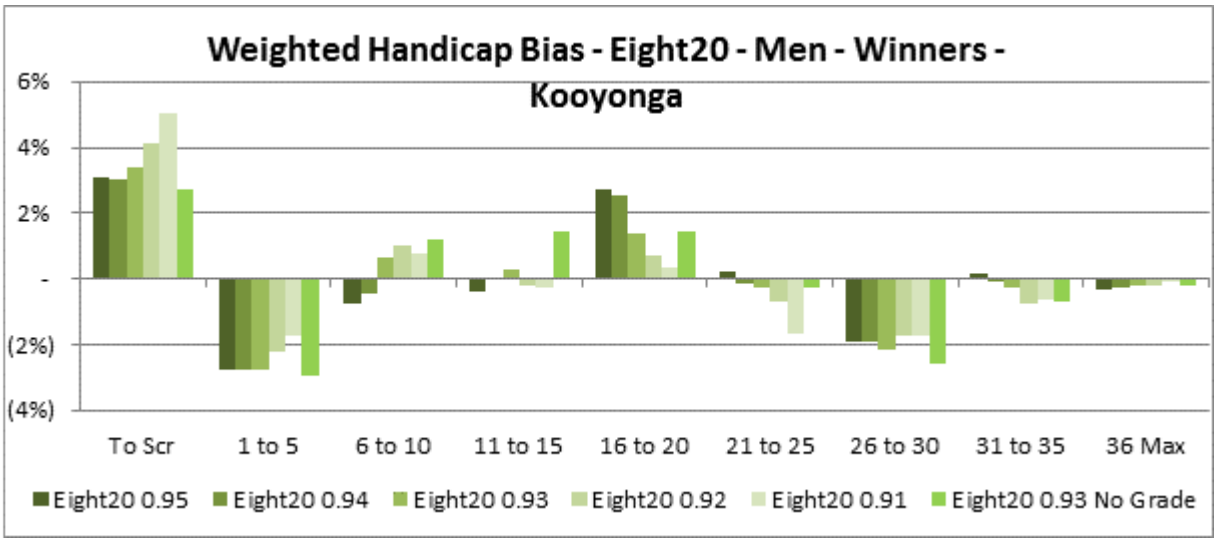
Kooyonga	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-77.6	37.2	-42.1	41.2
Current Period - Ten20 0.96	-3.7	19.7	-18.1	60.7
Old Period - Ten20 0.96	-21.4	17.1	-29.7	37.4
Ten20 0.96	-17.8	16.0	-29.2	48.6
Ten20 0.95	-21.4	14.6	-31.8	52.1
Ten20 0.94	-29.6	16.1	-34.8	51.7
Ten20 0.93	-42.0	18.1	-38.1	51.4
Ten20 0.92	-41.9	18.2	-36.9	49.8
Ten20 0.91	-47.2	20.1	-40.5	54.4
Ten20 0.9	-55.1	22.3	-46.9	59.0
Nine20 0.96	-18.5	14.4	-28.6	47.7
Nine20 0.93	-41.8	18.5	-32.4	48.4
Nine20 0.90	-65.4	25.8	-45.3	58.0
Eight20 0.96	-23.7	12.7	-28.5	47.8
Eight20 0.93	-31.8	15.3	-33.2	46.7
Eight20 0.90	-61.0	23.5	-47.1	55.3
Blended 0.96	-31.7	20.0	-34.7	50.9
Blended 0.94	-48.0	22.5	-44.9	56.0
Blended 0.92	-55.5	24.6	-47.9	55.1
Hybrid 0.96	-17.1	16.9	-29.1	48.2
Hybrid 0.94	-31.8	15.7	-29.2	48.3

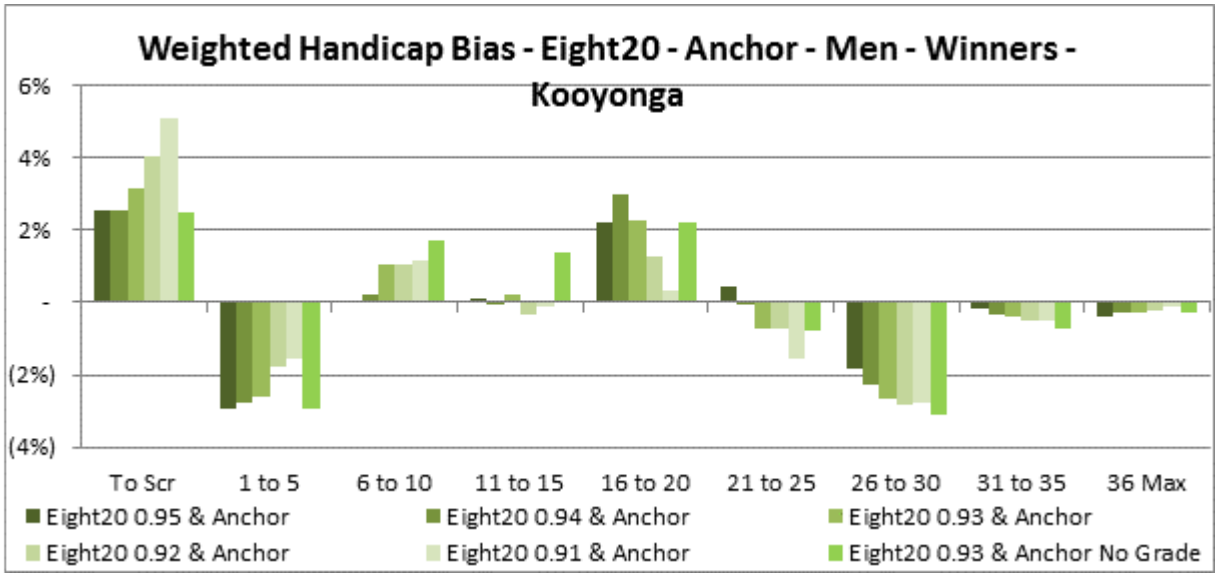
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

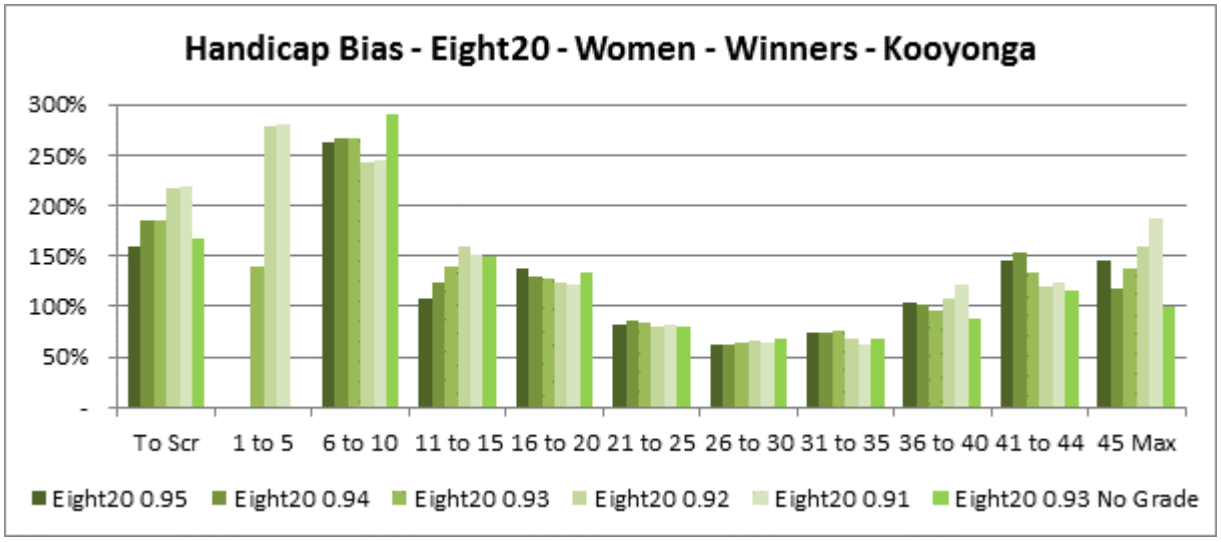
Phase 2

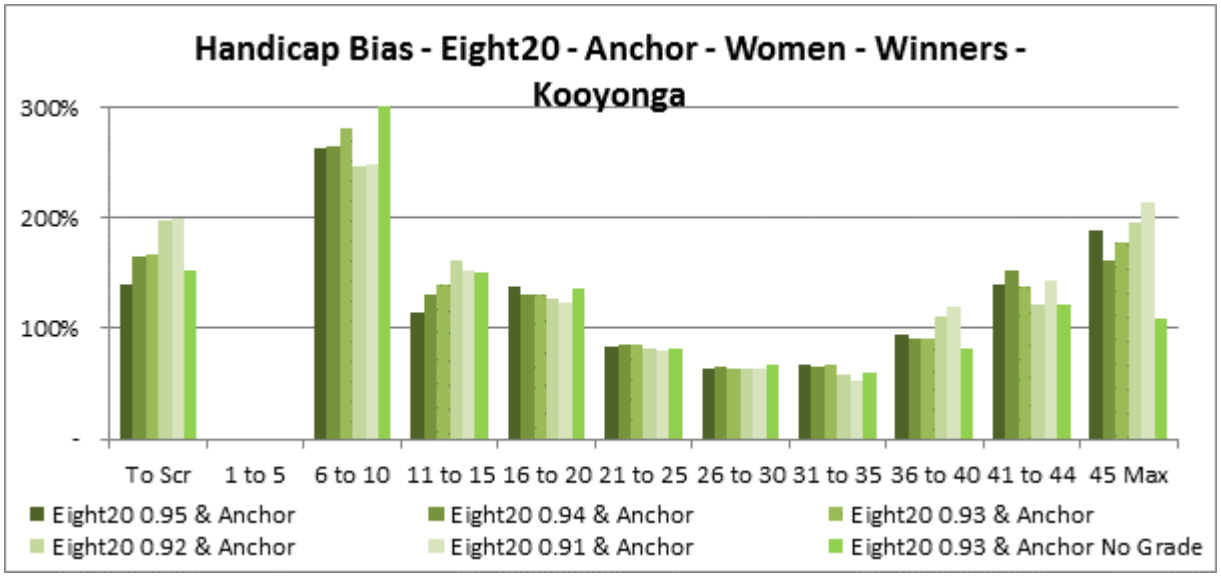

Handicap Bias - Eight20 - Men - Winners - Kooyonga
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

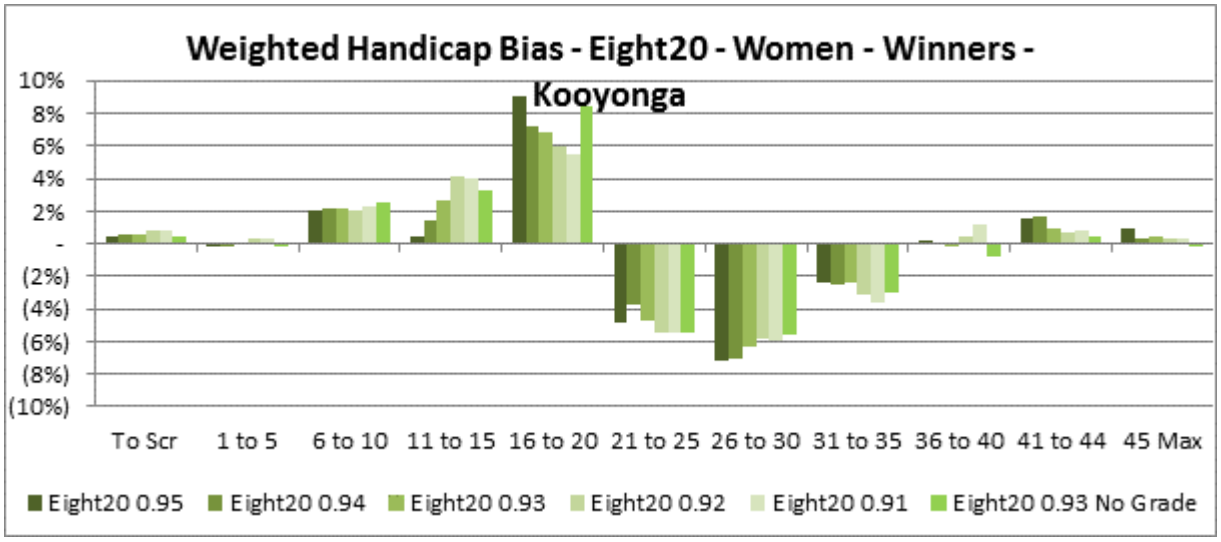

Handicap Bias - Eight20 - Anchor - Men - Winners - Kooyonga
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

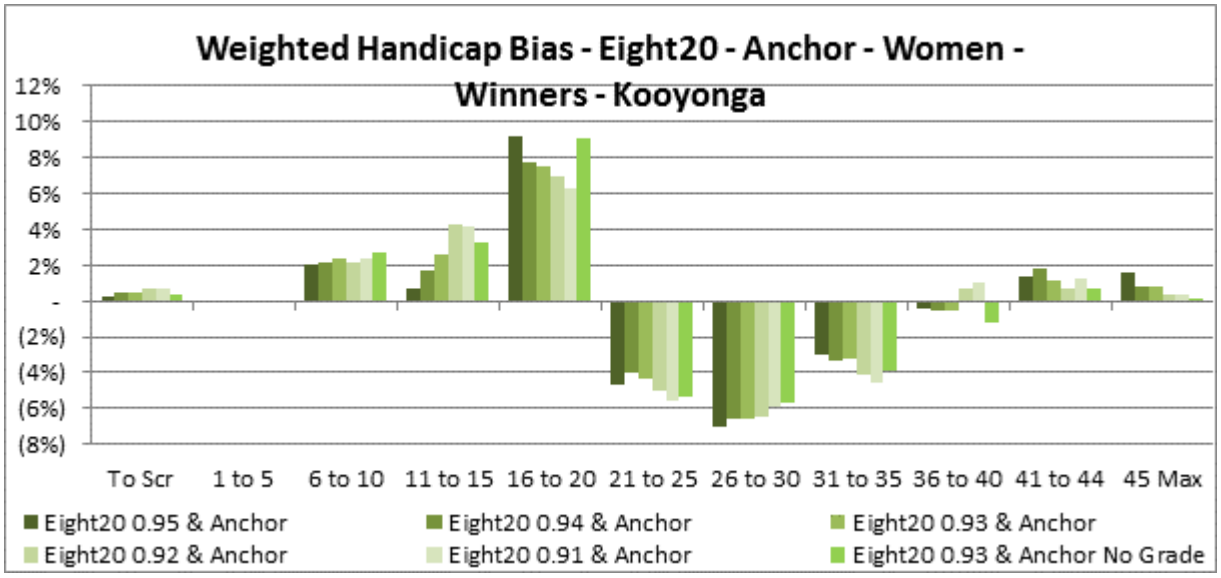

Weighted Handicap Bias - Eight20 - Men - Winners - Kooyonga
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

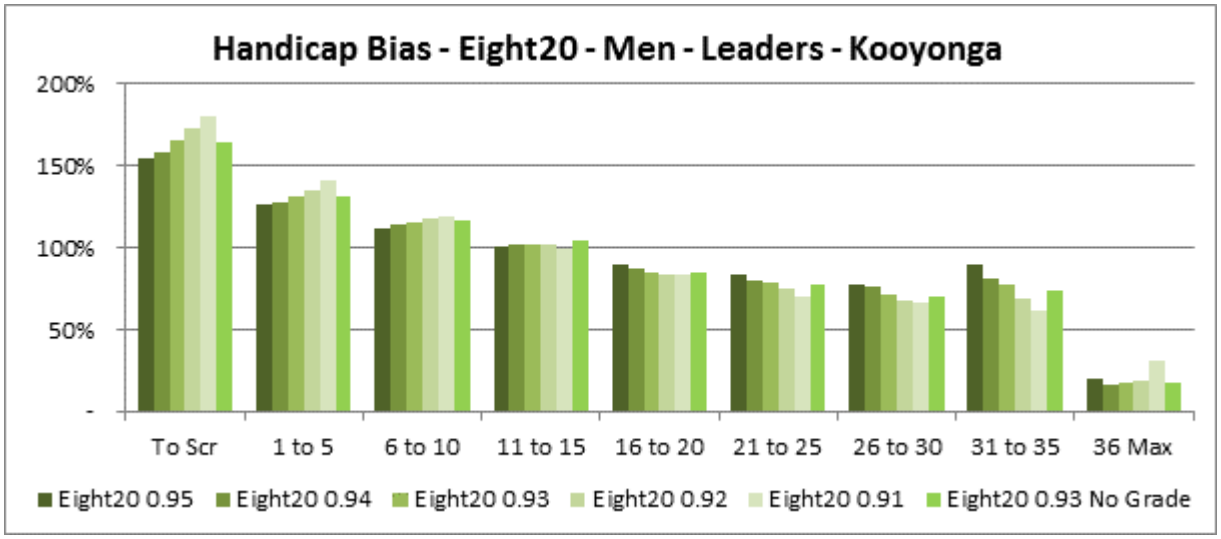

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Kooyonga
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

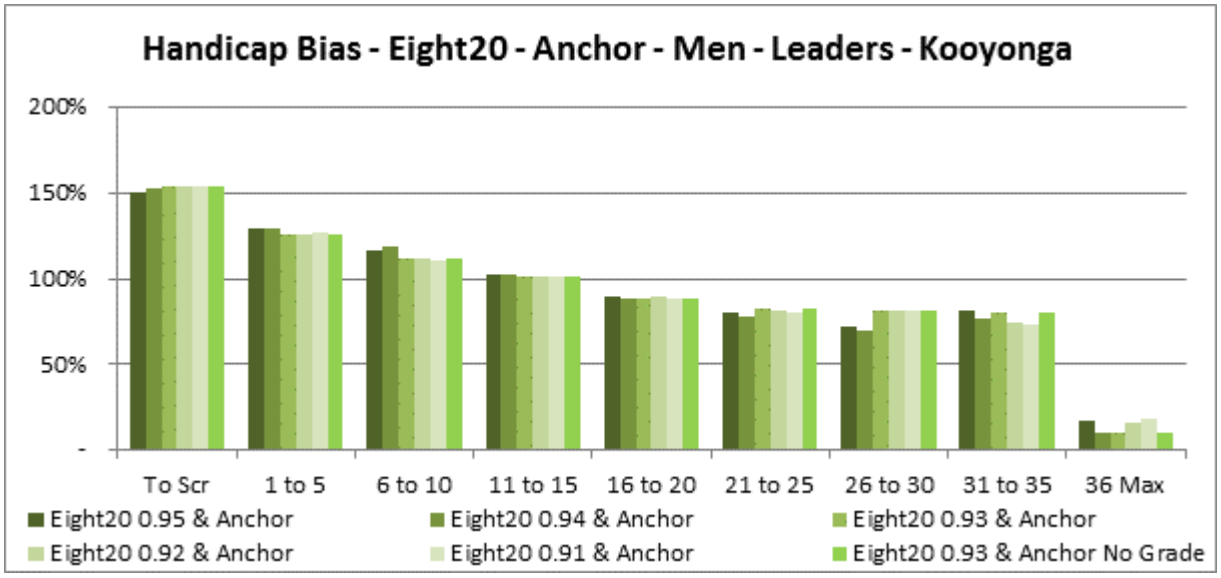

Handicap Bias - Eight20 - Women - Winners - Kooyonga
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

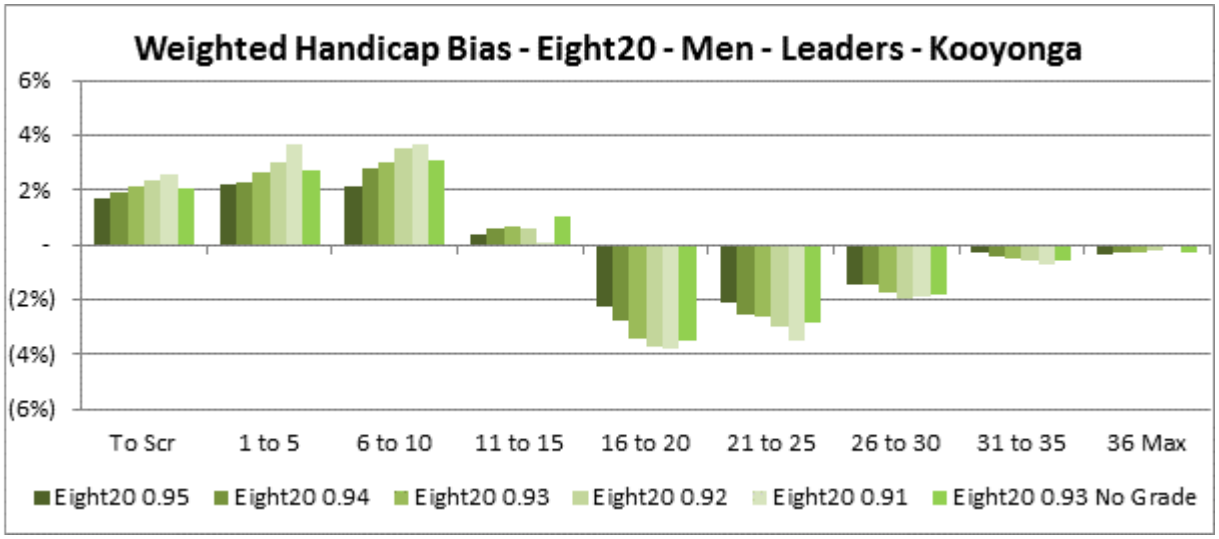

Handicap Bias - Eight20 - Anchor - Women - Winners - Kooyonga
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

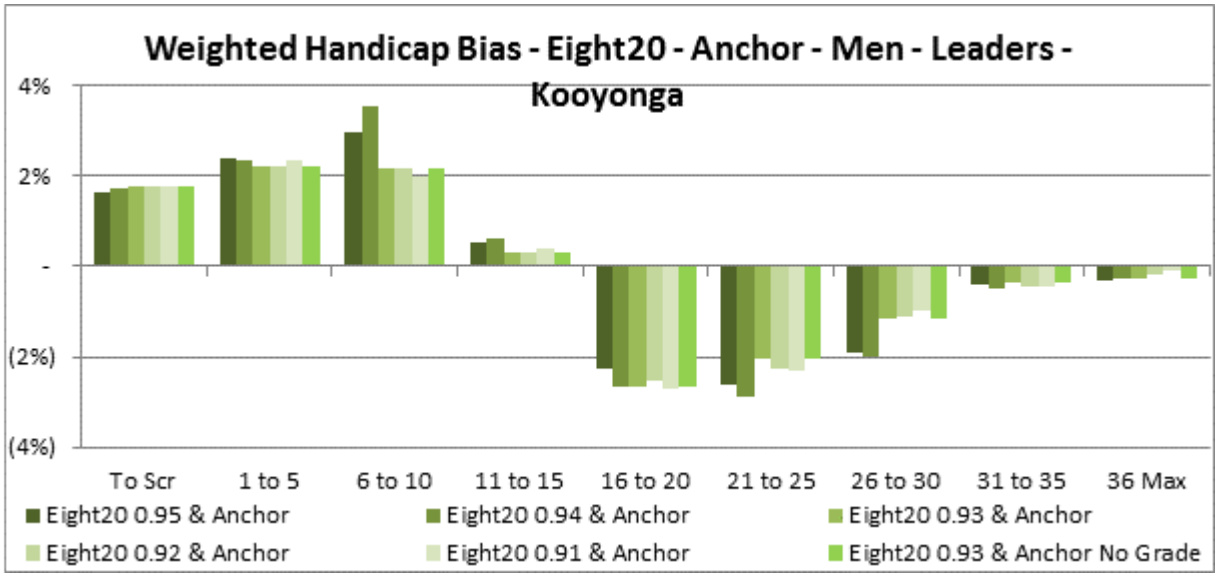

Weighted Handicap Bias - Eight20 - Women - Winners - Kooyonga
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

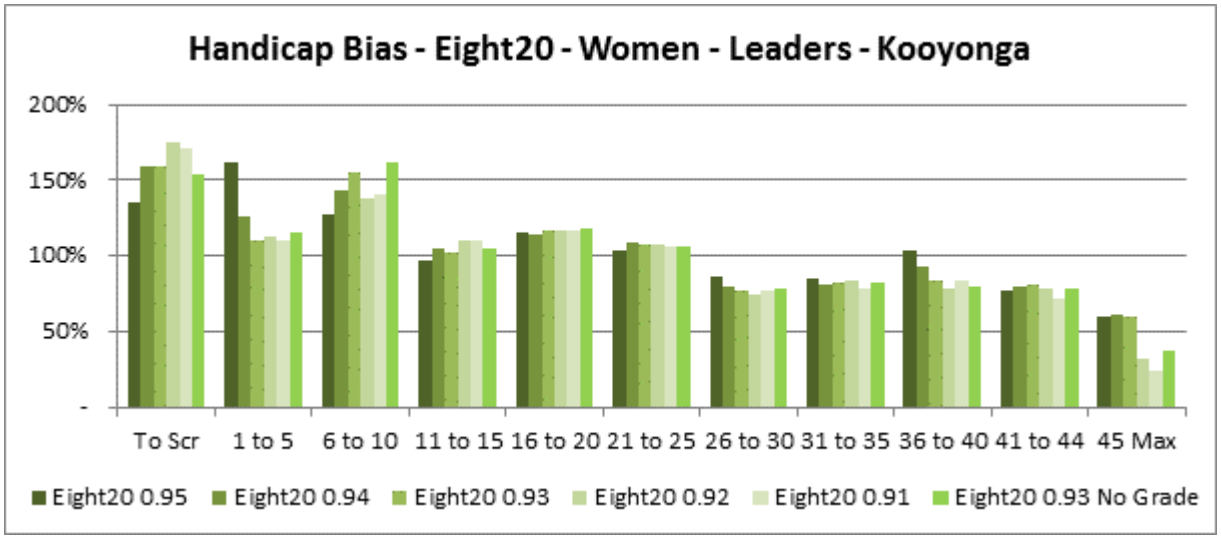

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Kooyonga
12%
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

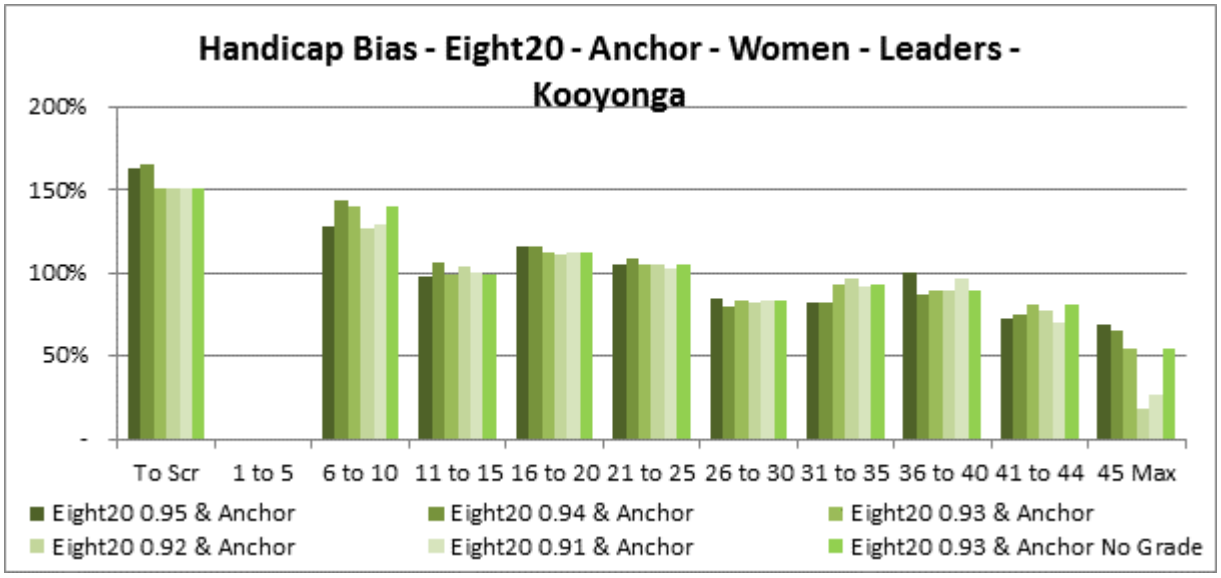

Handicap Bias - Eight20 - Men - Leaders - Kooyonga
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

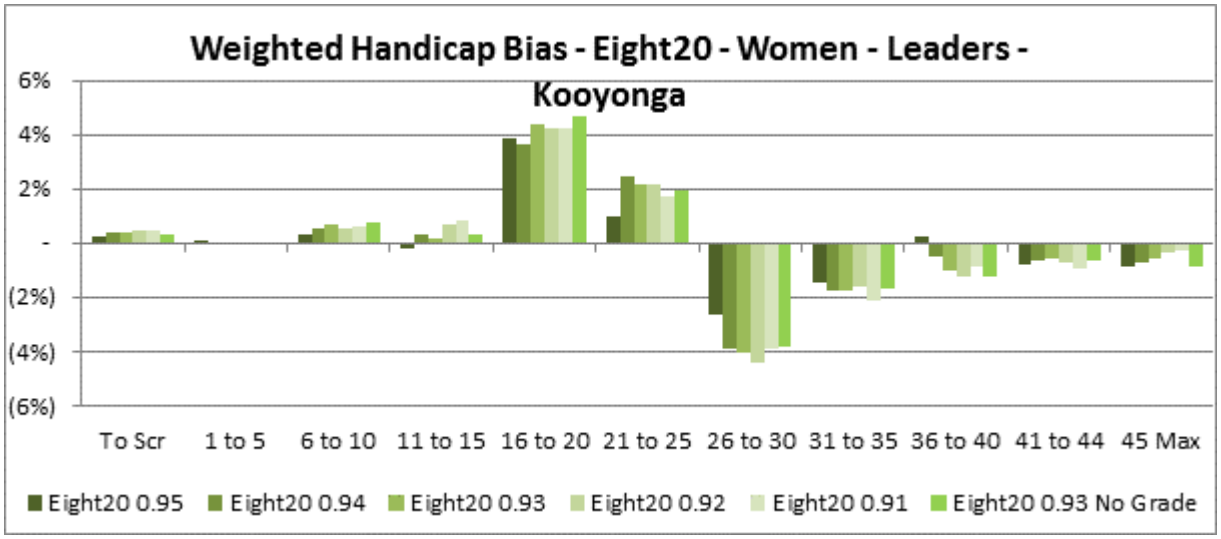

Handicap Bias - Eight20 - Anchor - Men - Leaders - Kooyonga
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

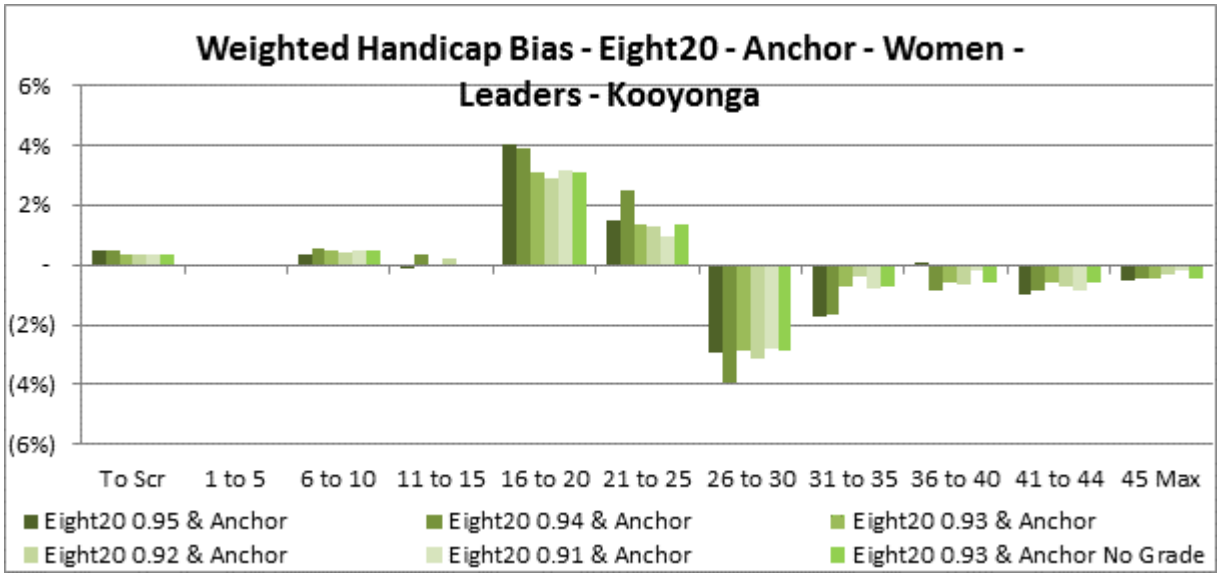

Weighted Handicap Bias - Eight20 - Men - Leaders - Kooyonga
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Kooyonga
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Kooyonga
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Kooyonga
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Kooyonga
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

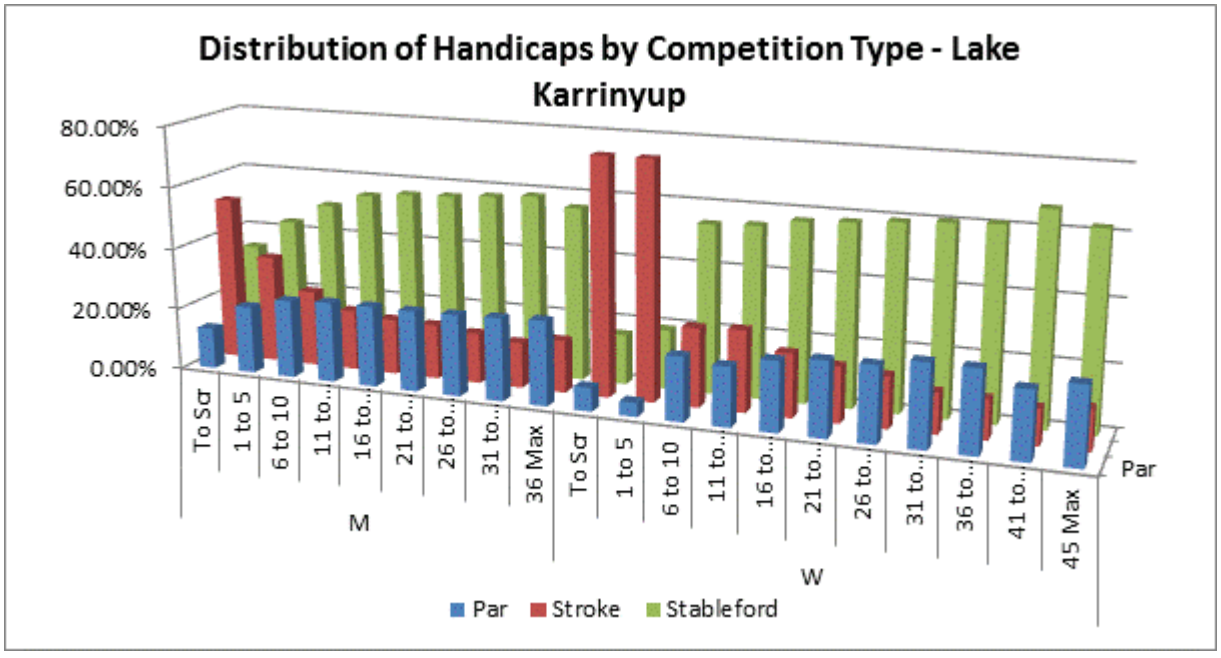


Phase 2 -Kooyonga					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	-11.0	19.2	-16.1	41.4
	Eight20 0.94	-13.7	18.5	-20.0	36.3
	Eight20 0.93	-21.8	18.1	-24.5	35.8
	Eight20 0.92	-31.6	18.5	-29.1	36.4
	Eight20 0.91	-39.4	21.0	-27.9	36.2
	Eight20 0.93 No Grade	-23.7	19.0	-32.9	39.8
	Eight20 0.95 & Anchor	-11.3	17.2	-17.1	41.7
	Eight20 0.94 & Anchor	-15.2	18.9	-21.6	37.8
	Eight20 0.93 & Anchor	-25.8	19.7	-25.8	38.1
	Eight20 0.92 & Anchor	-35.4	19.7	-30.1	39.6
	Eight20 0.91 & Anchor	-44.7	22.5	-27.6	39.0
	Eight20 0.93 & Anchor No Grade	-27.3	21.1	-35.9	42.4
Leaders	Eight20 0.95	-42.2	17.4	-16.3	16.3
	Eight20 0.94	-47.7	20.4	-20.7	19.8
	Eight20 0.93	-53.1	23.2	-22.1	21.4
	Eight20 0.92	-58.9	26.1	-23.3	21.8
	Eight20 0.91	-63.9	28.3	-23.4	20.9
	Eight20 0.93 No Grade	-54.8	24.0	-24.6	21.6
	Eight20 0.95 & Anchor	-48.6	20.5	-18.0	17.9
	Eight20 0.94 & Anchor	-52.0	22.7	-21.8	20.6
	Eight20 0.93 & Anchor	-41.7	17.9	-15.4	14.8
	Eight20 0.92 & Anchor	-41.4	18.0	-14.9	14.7
	Eight20 0.91 & Anchor	-40.8	18.2	-14.2	14.4
	Eight20 0.93 & Anchor No Grade	-41.7	17.9	-15.4	14.8

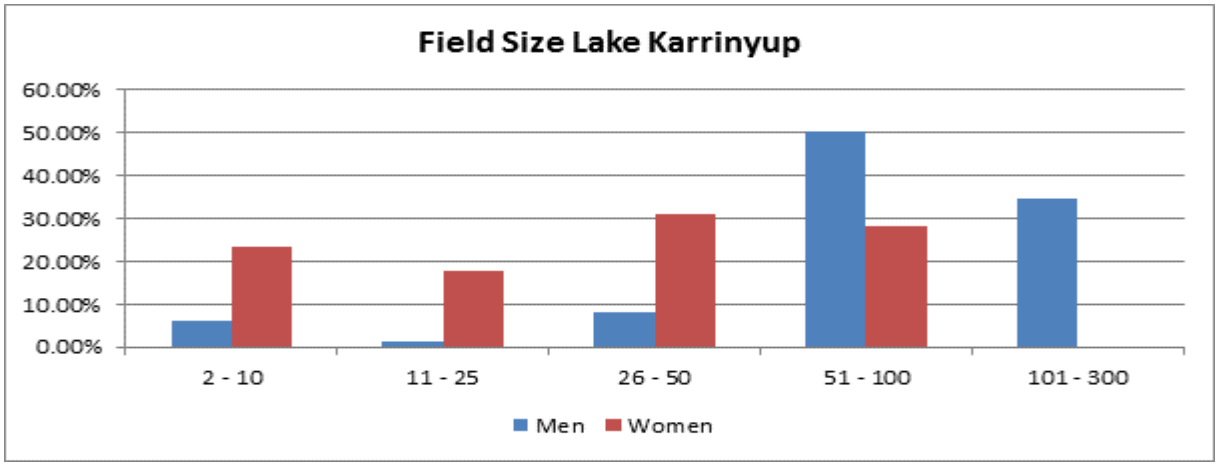
Appendix 6 – Lake Karrinyup

Phase 1

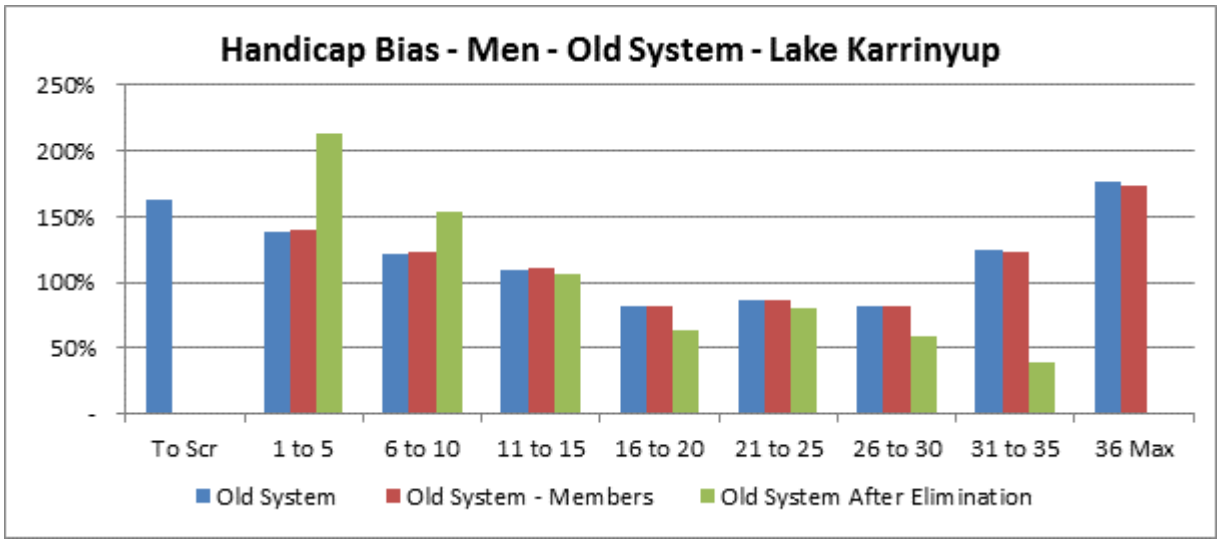
Lake Karrinyup	Men	Women	Total
Players in Database	1,308	513	1,821
Members	821	386	1,207
Visitors	487	127	614
Members who have Played 33 Rounds	783	367	1,150
Members with Last Round In Old System	156	51	207
Members with Last Round in Current System	665	335	1,000
Earliest Round	1/12/2007	2/12/2007	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			95
Number of Home Competitions	789	789	1,578
Number of Rounds of Golf	53,409	18,719	72,128
Number of Rounds at Home	48,024	16,614	64,638
Number of Rounds at Home Old	36,304	11,278	47,582
Number of Rounds at Home Current	11,720	5,336	17,056
Num Rnds Members at Home	46,673	16,368	63,041
Num Rnds Members at Home Old	35,345	11,098	46,443
Num Rnds Members at Home Cur	11,328	5,270	16,598
Num Rnds After Eliminations	26,661	7,607	34,268
Num Rnds After Eliminations Old	16,613	3,291	19,904
Num Rnds After Eliminations Cur	10,048	4,316	14,364

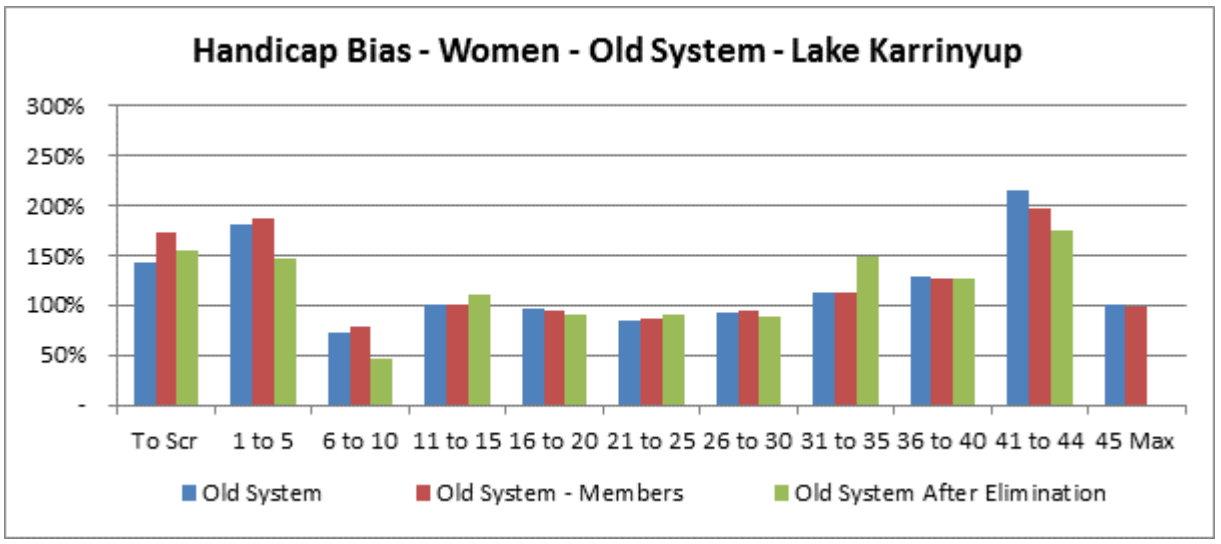


Most men's competitions are with a field of over 50, the women's field is spread.

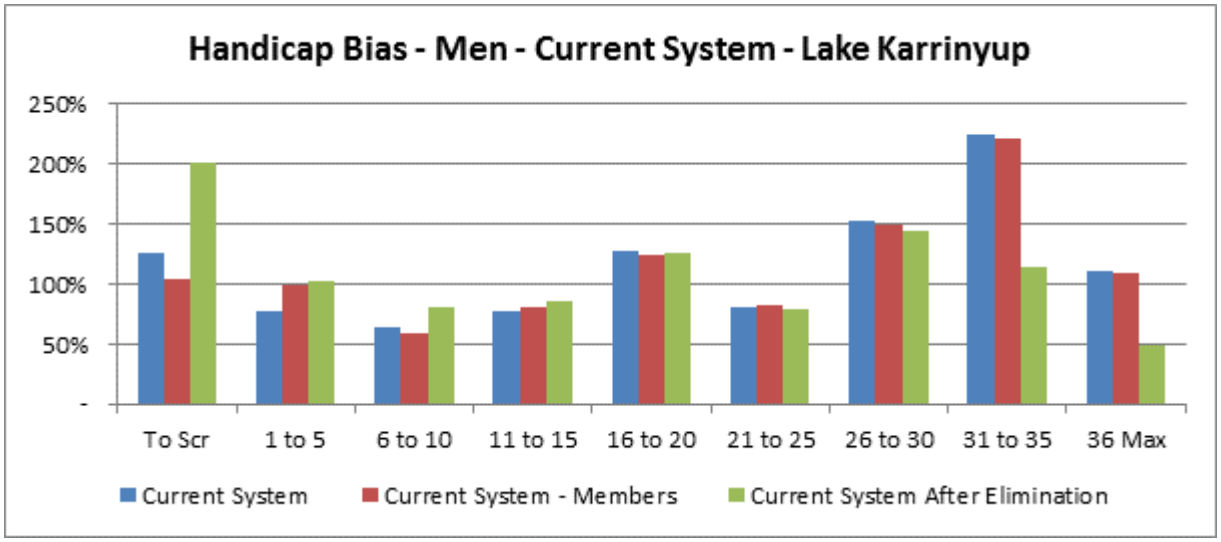


Under the Old System, the bias pattern was rather mixed. (One should ignoring the Men's 31 and over ranges, as they represent a tiny proportion of the field). What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

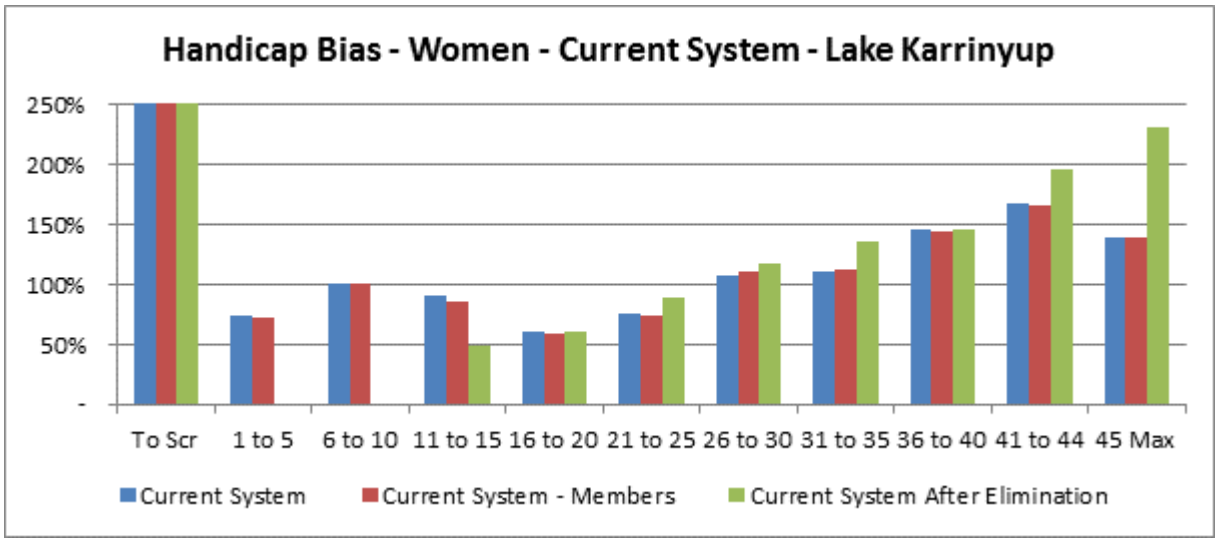




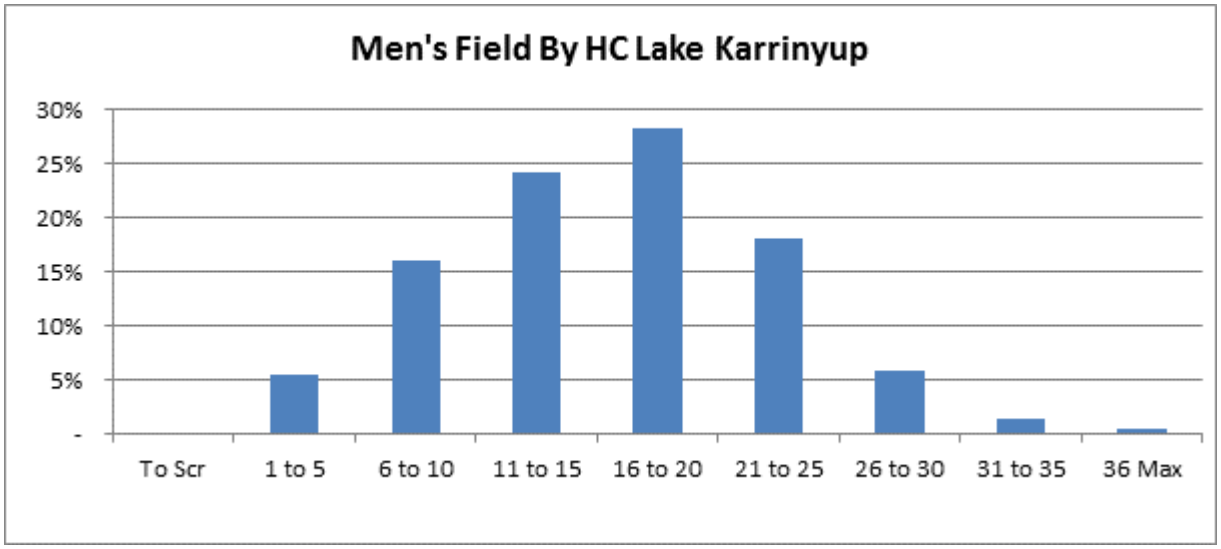
Under the Current System, the bias favours the higher markers for men.

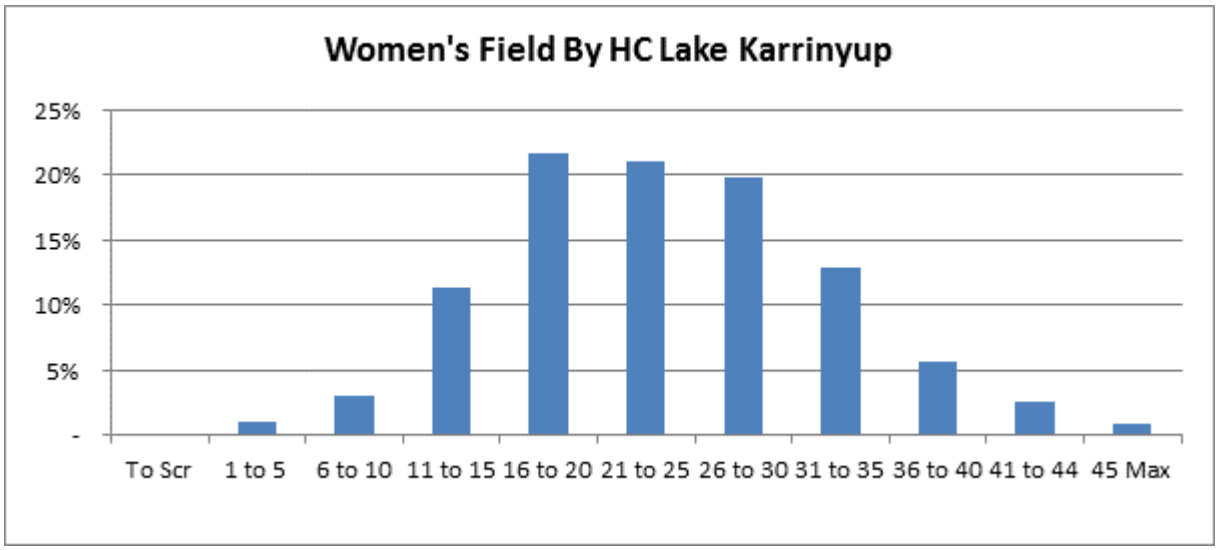


The picture is similar for the women.



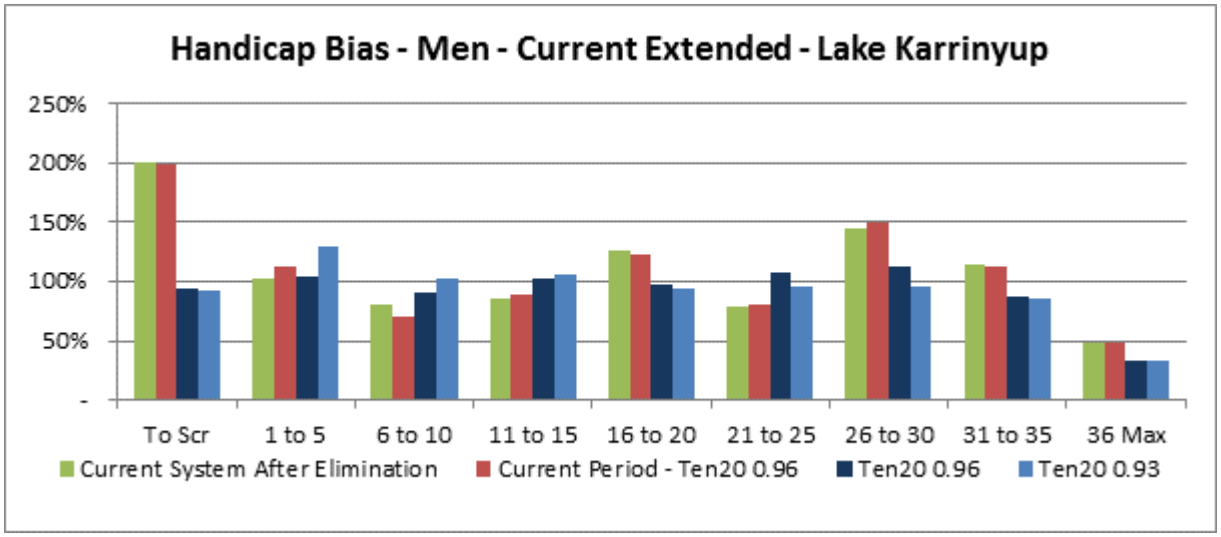
A point to reiterate regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





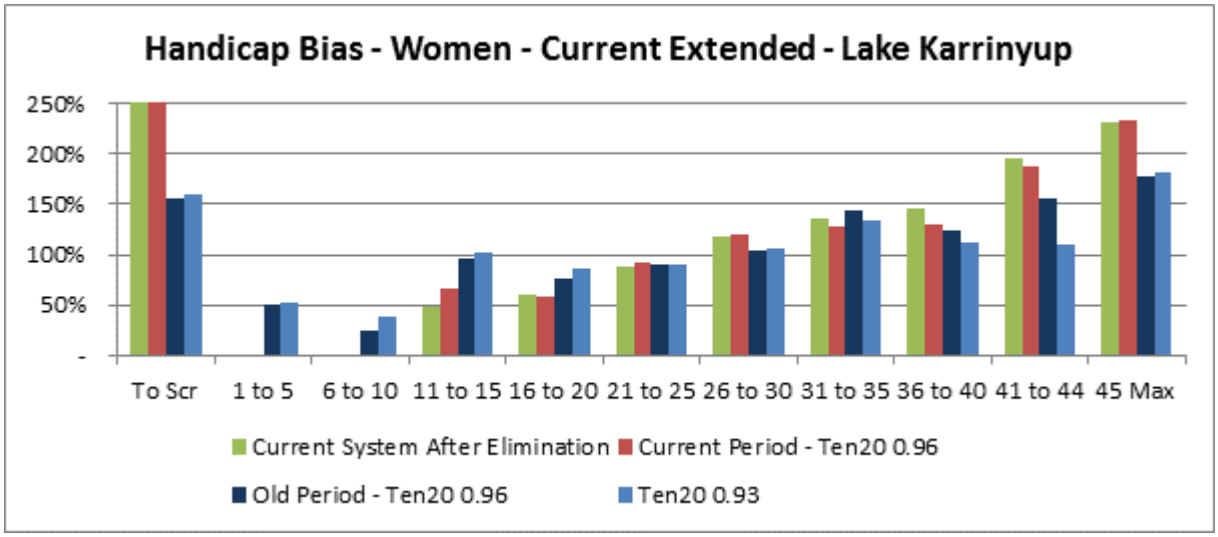
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

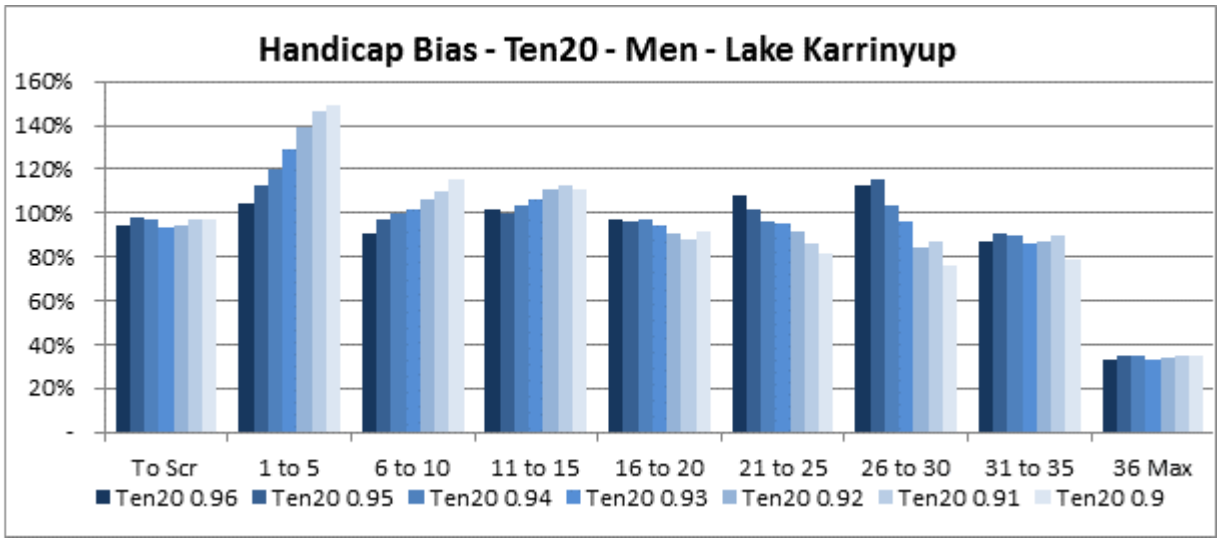


Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the high markers would have dominated over the two-years, but at 0.93 some balance is restored.



The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.



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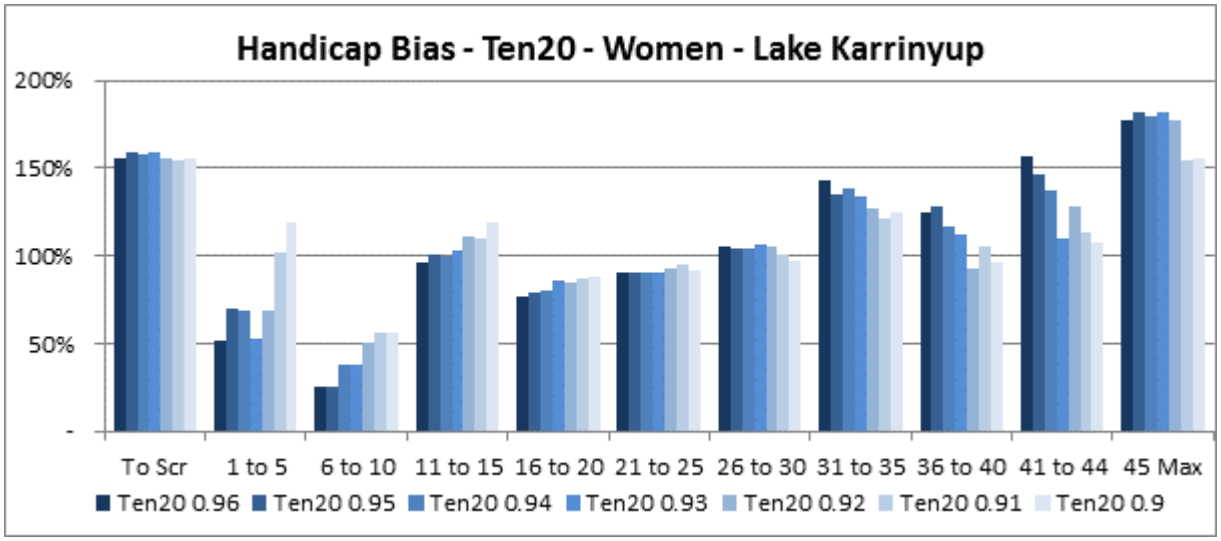
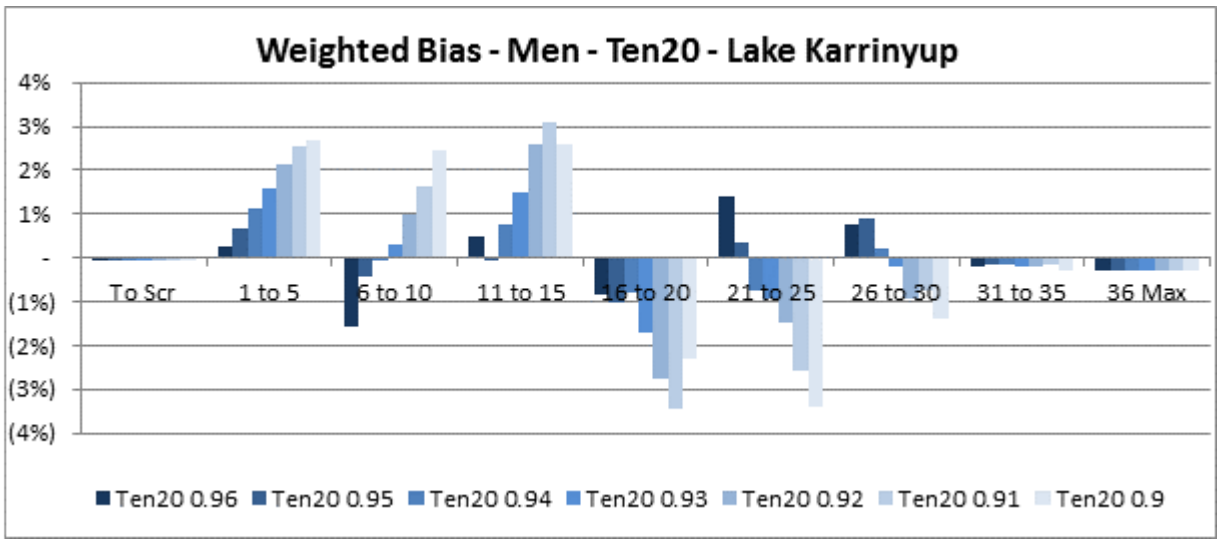
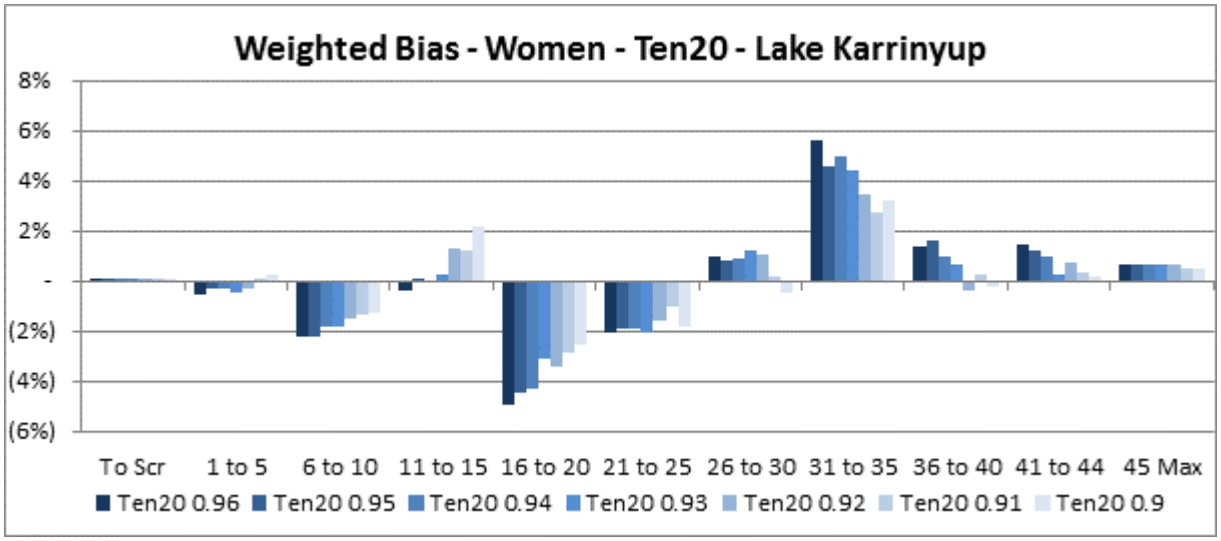


In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

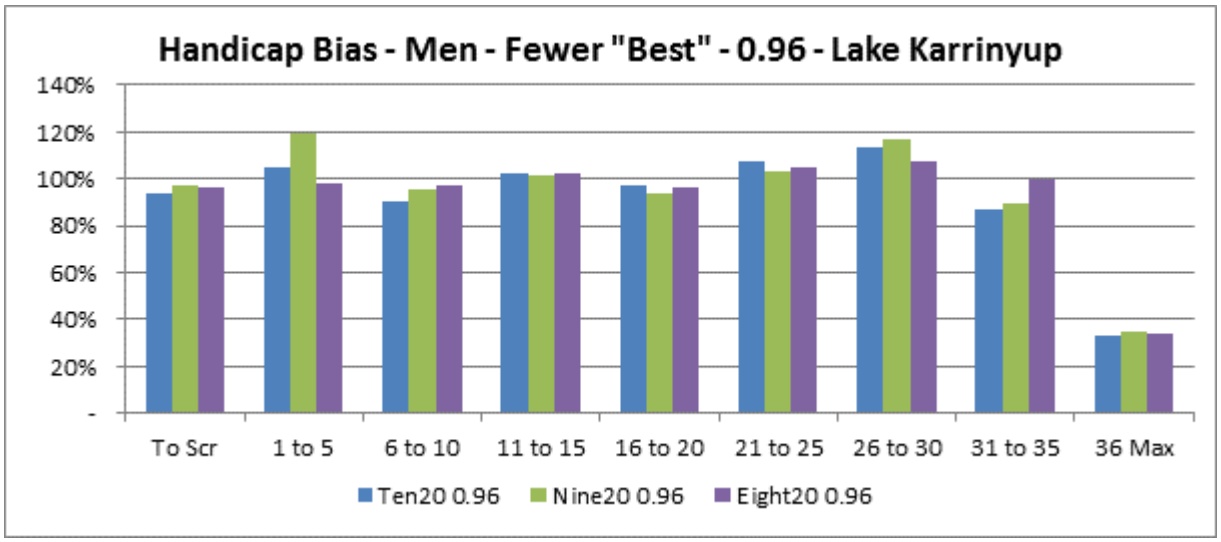


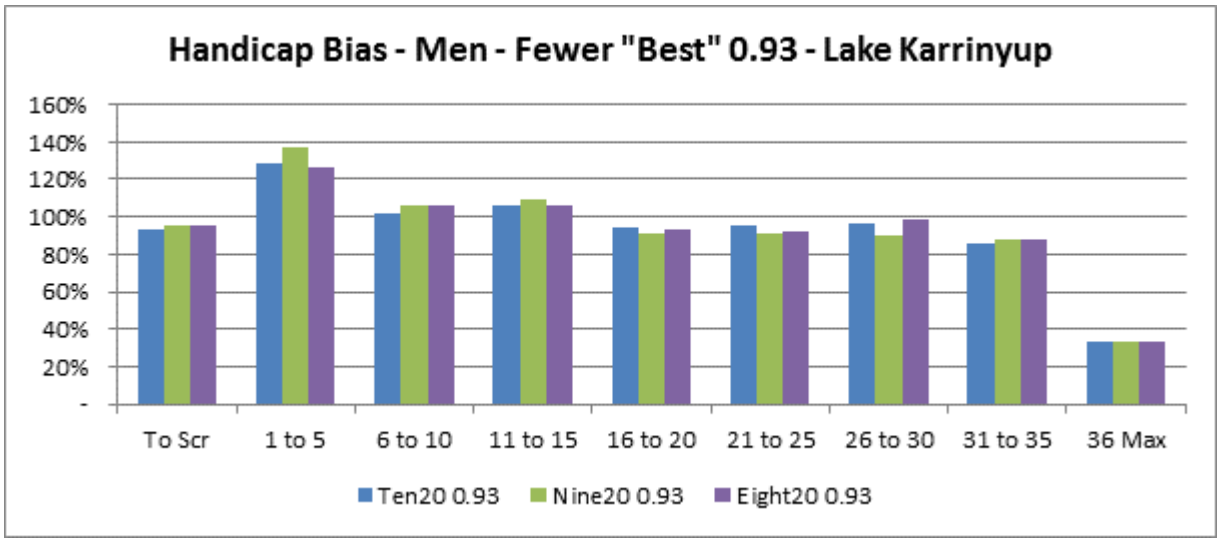


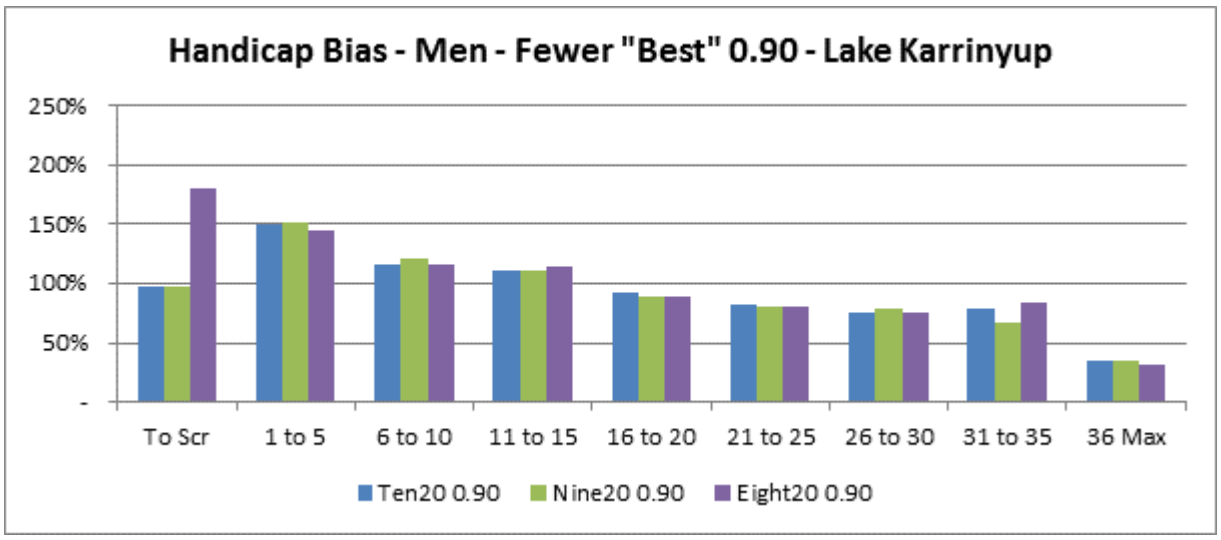
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

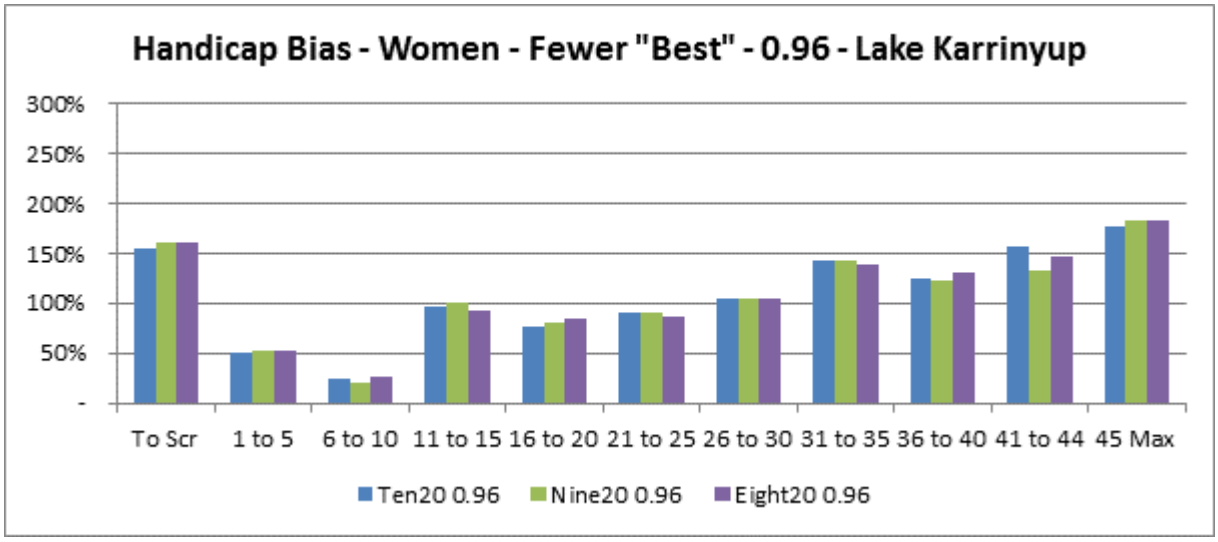
	Lake Karrinyup			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	5.1	8.7	36.0	26.6
Ten20 0.95	-1.0	5.9	31.6	23.4
Ten20 0.94	-9.9	6.3	28.8	23.1
Ten20 0.93	-16.7	10.4	23.8	19.9
Ten20 0.92	-26.7	17.0	17.4	18.0
Ten20 0.91	-32.9	21.7	12.8	14.3
Ten20 0.9	-39.9	22.1	8.4	16.5

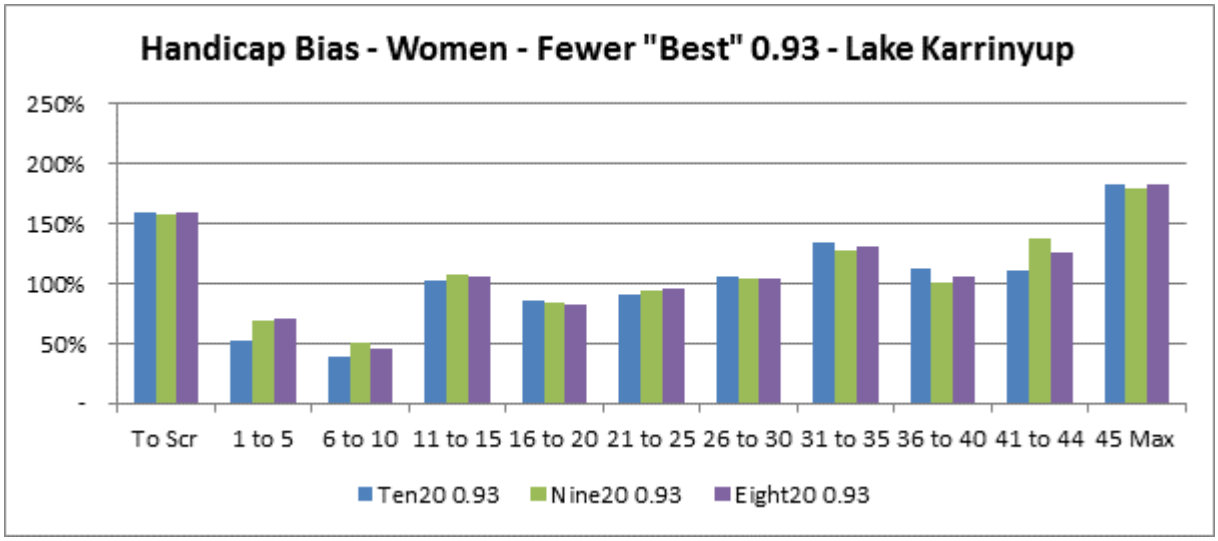
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

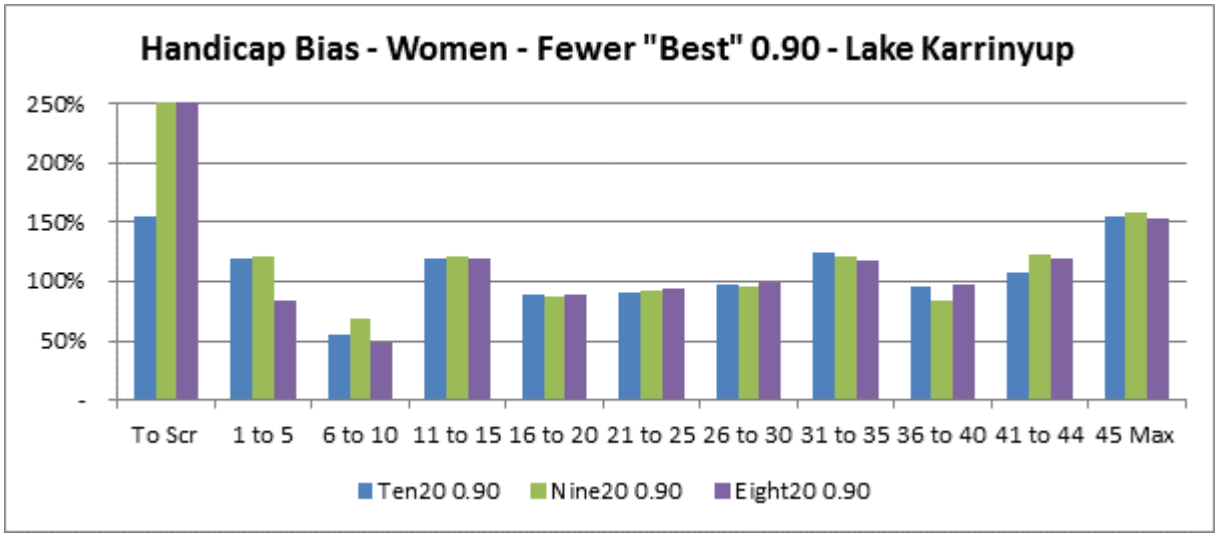







Handicap Bias - Women - Fewer "Best" - 0.96 - Lake Karrinyup
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

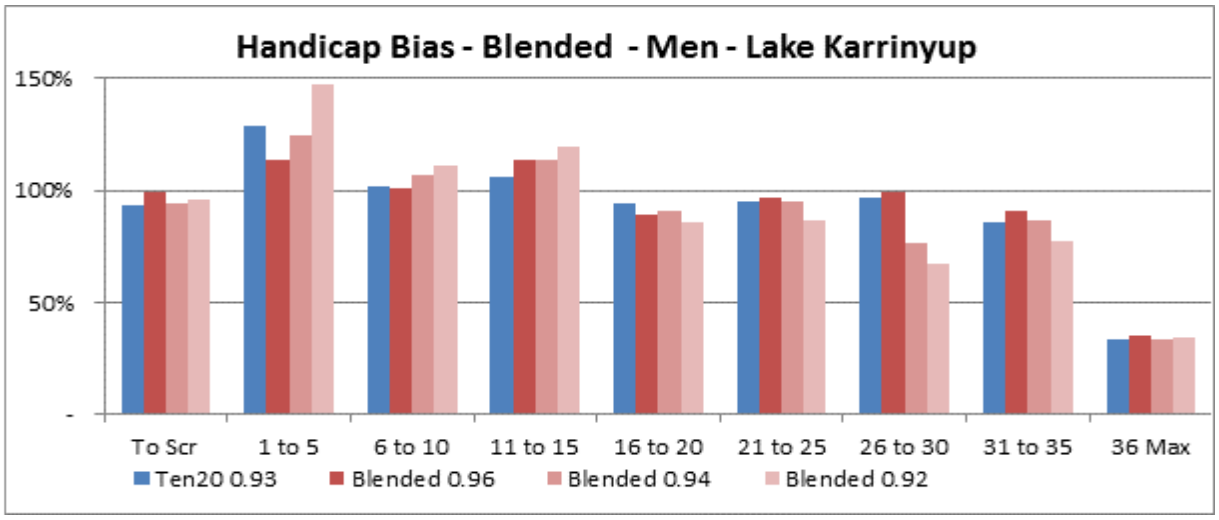

Handicap Bias - Women - Fewer "Best" 0.93 - Lake Karrinyup
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

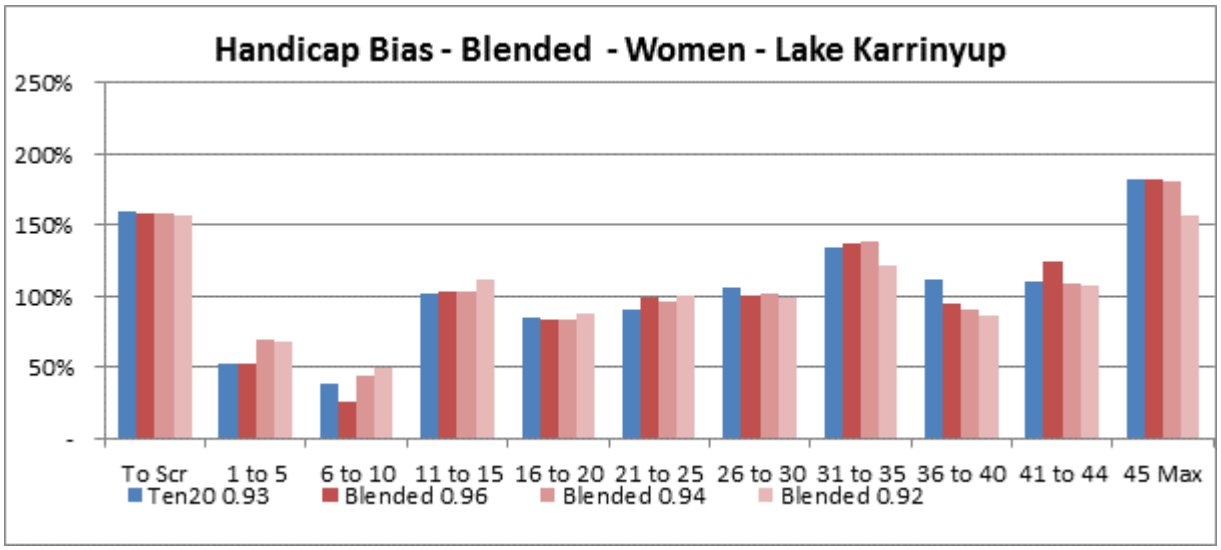

Handicap Bias - Women - Fewer "Best" 0.90 - Lake Karrinyup
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

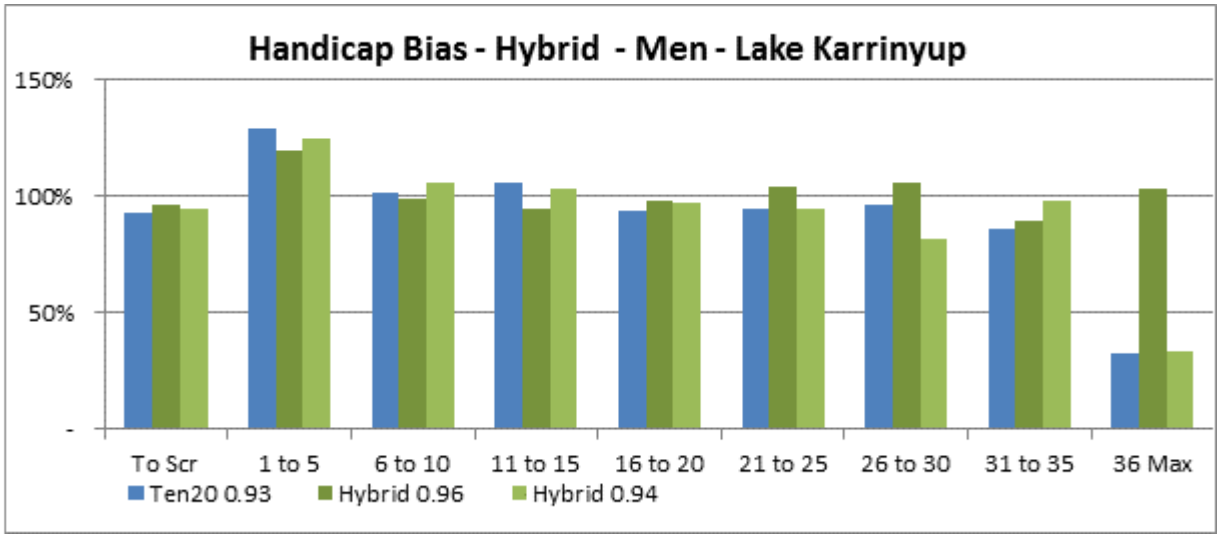
Lake Karrinyup	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	5.1	8.7	36.0	26.6
Nine20 0.96	-1.8	8.8	32.4	24.9
Eight20 0.96	1.9	5.7	34.1	23.1
Ten20 0.93	-16.7	10.4	23.8	19.9
Nine20 0.93	-25.0	16.2	20.3	18.1
Eight20 0.93	-18.3	11.7	21.4	19.0
Ten20 0.90	-39.9	22.1	8.4	16.5
Nine20 0.90	-44.3	25.3	4.7	15.9
Eight20 0.90	-41.6	25.0	9.5	14.5

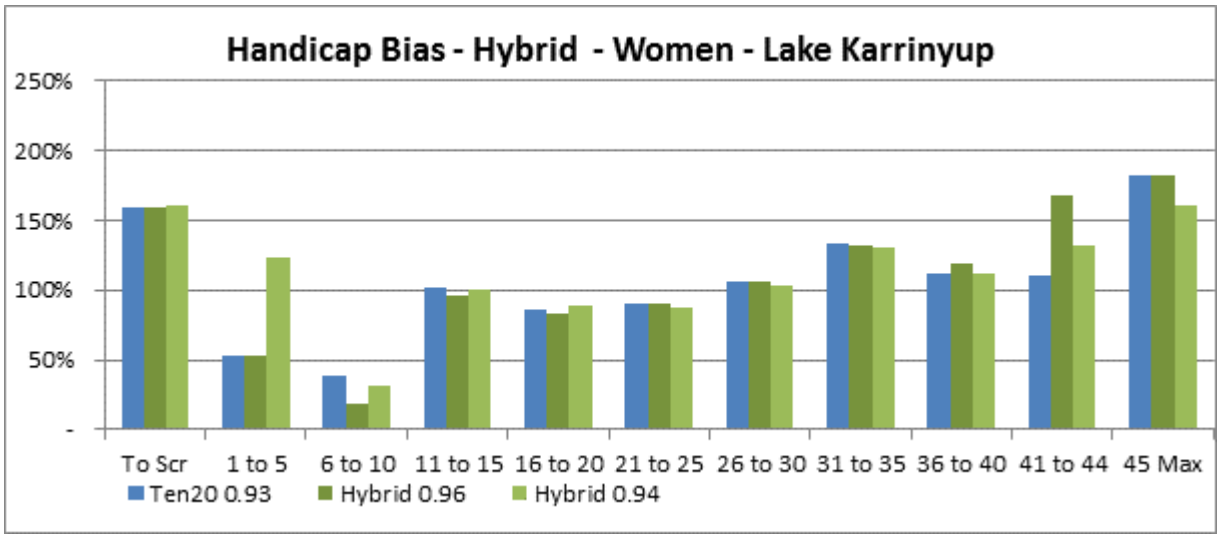
For the Blended:





For the Hybrid:

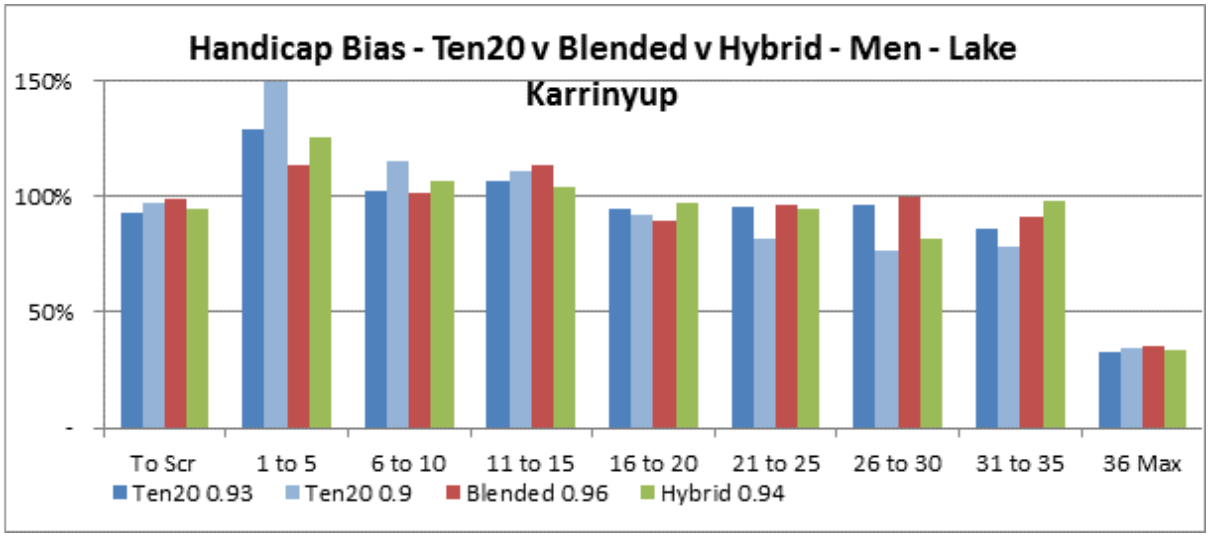


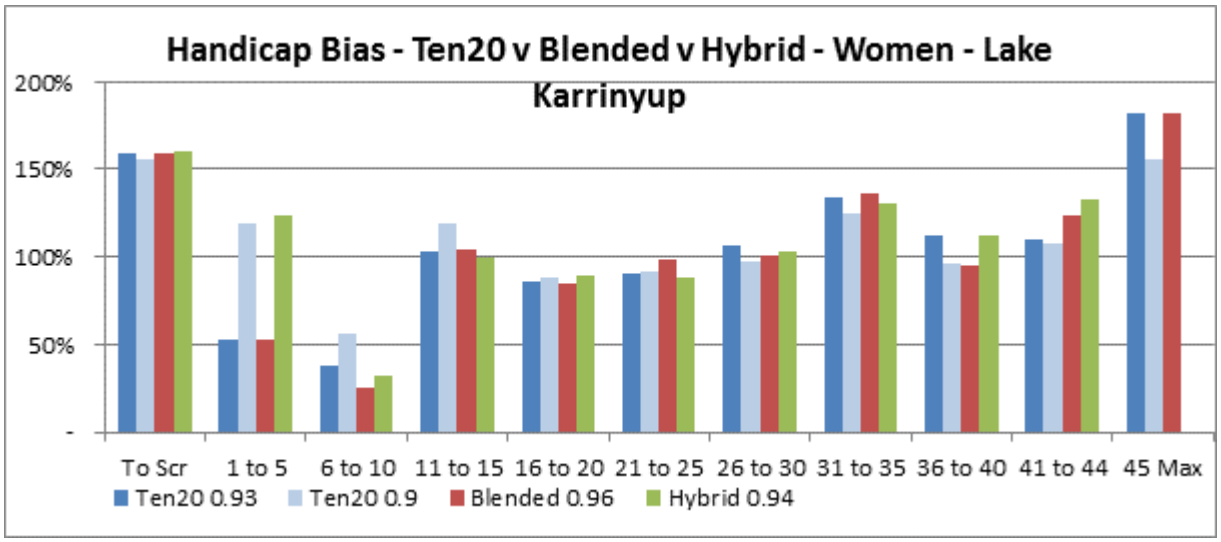


The Corresponding Tilt and Level Indices are:

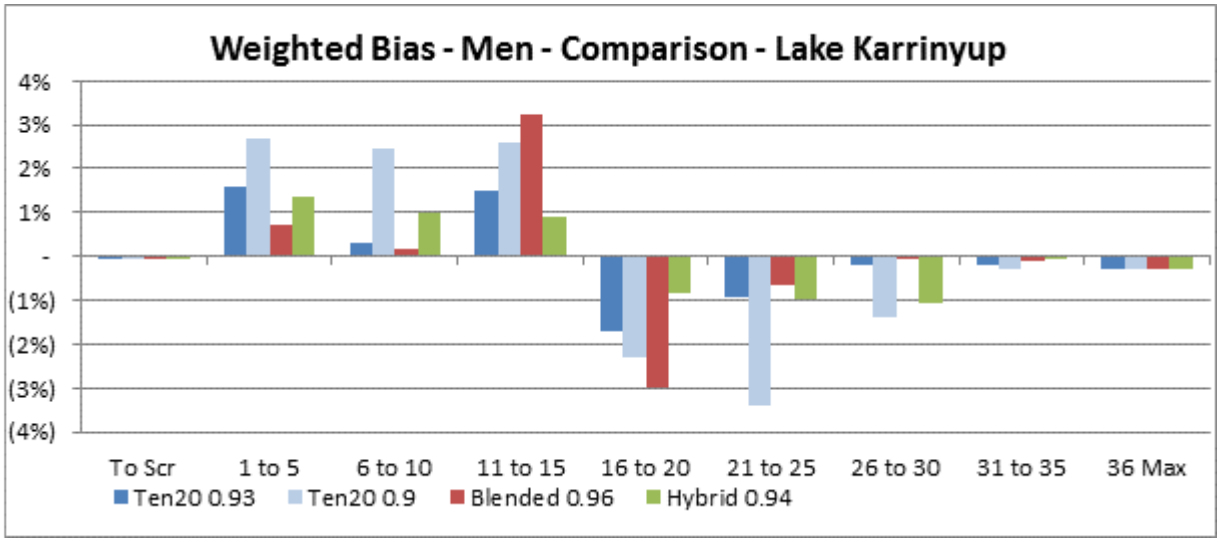
	Lake Karrinyup			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-13.4	16.0	23.1	20.1
Blended 0.94	-24.8	17.2	20.1	20.9
Blended 0.92	-40.8	26.9	10.6	14.0
Hybrid 0.96	-0.9	6.9	33.0	21.3
Hybrid 0.94	-19.1	9.1	21.2	18.2

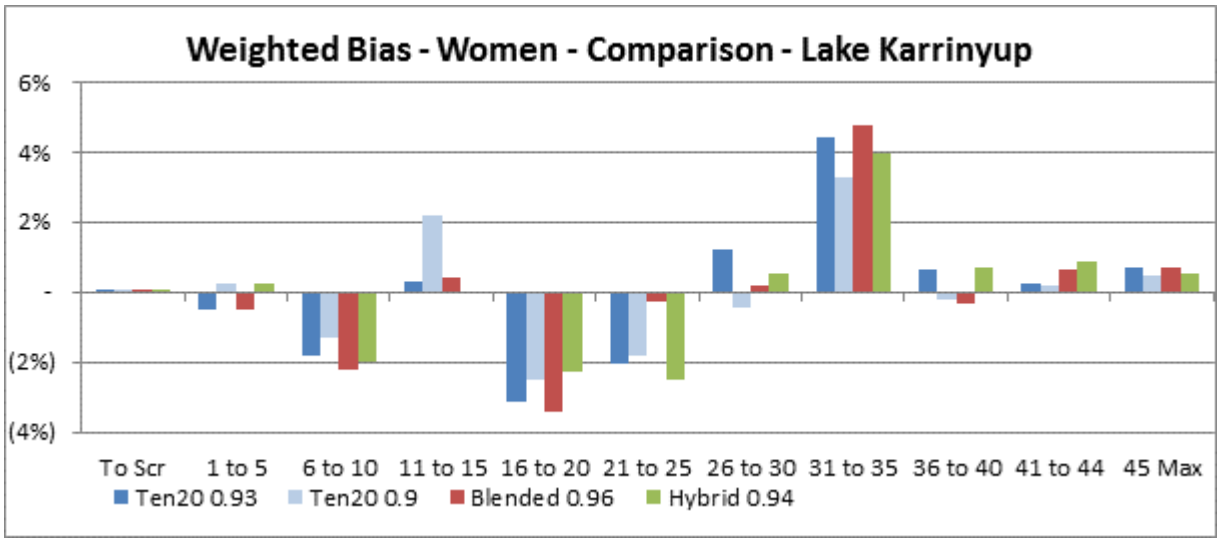
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

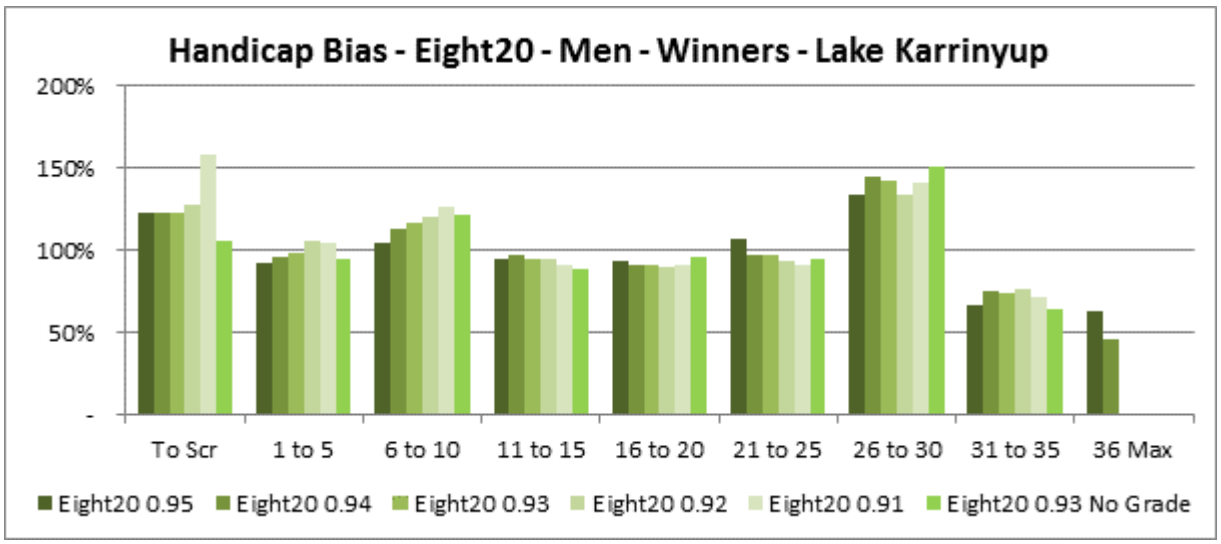
	Lake Karrinyup			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-16.7	10.4	23.8	19.9
Ten20 0.9	-39.9	22.1	8.4	16.5
Blended 0.96	-13.4	16.0	23.1	20.1
Hybrid 0.94	-19.1	9.1	21.2	18.2

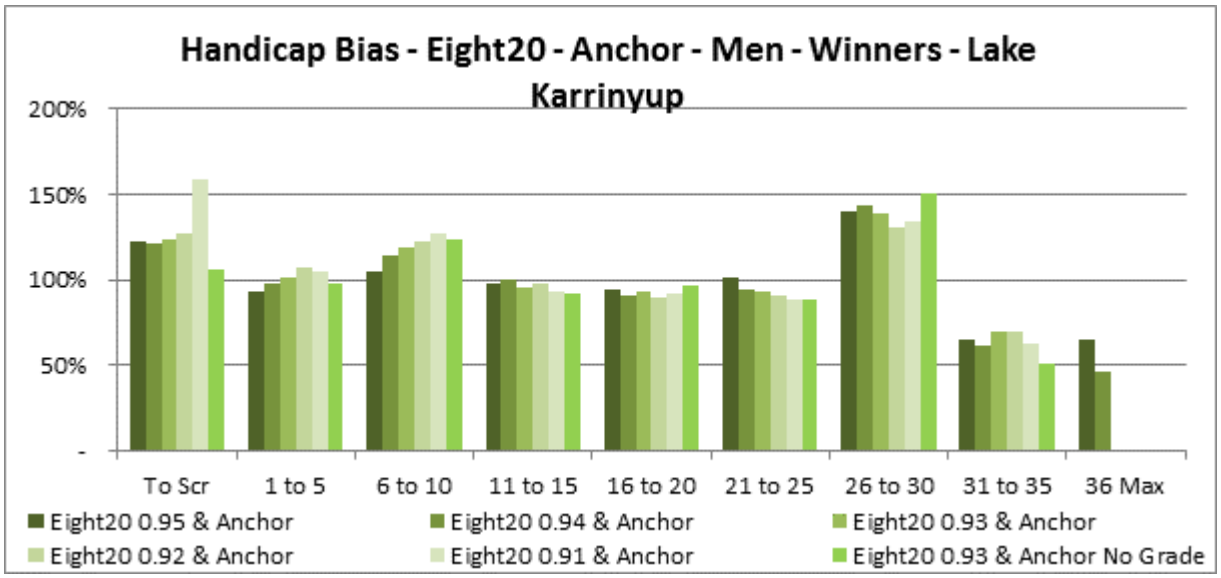
Putting it all together, with the Old System as a reference:

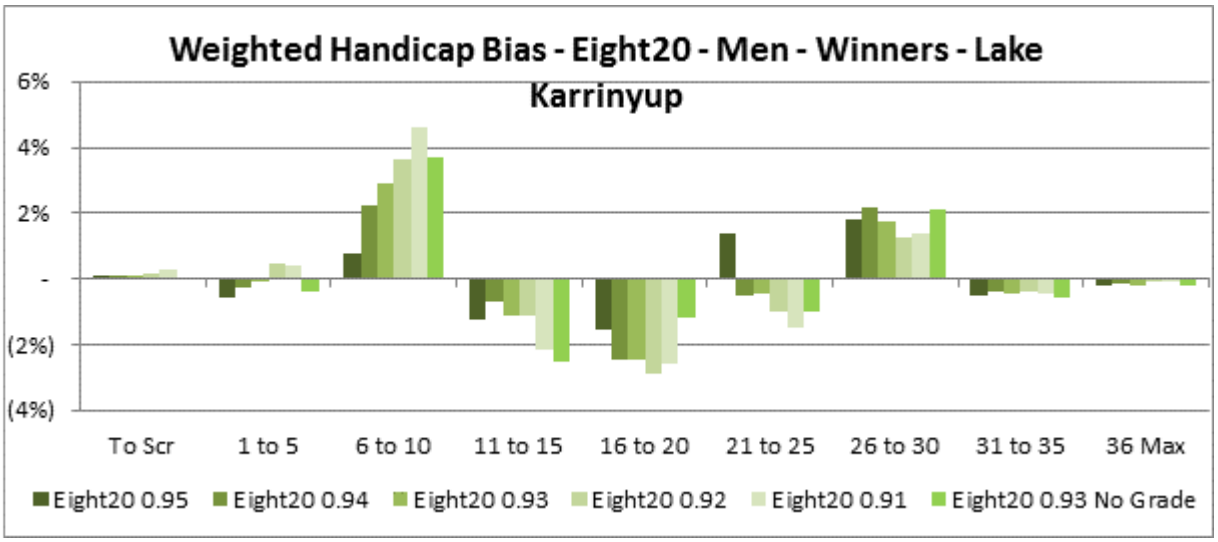
Lake Karrinyup	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-82.8	54.9	18.6	25.2
Current Period - Ten20 0.96	18.5	33.7	51.1	38.0
Old Period - Ten20 0.96	2.8	19.8	29.8	34.5
Ten20 0.96	5.1	8.7	36.0	26.6
Ten20 0.95	-1.0	5.9	31.6	23.4
Ten20 0.94	-9.9	6.3	28.8	23.1
Ten20 0.93	-16.7	10.4	23.8	19.9
Ten20 0.92	-26.7	17.0	17.4	18.0
Ten20 0.91	-32.9	21.7	12.8	14.3
Ten20 0.9	-39.9	22.1	8.4	16.5
Nine20 0.96	-1.8	8.8	32.4	24.9
Nine20 0.93	-25.0	16.2	20.3	18.1
Nine20 0.90	-44.3	25.3	4.7	15.9
Eight20 0.96	1.9	5.7	34.1	23.1
Eight20 0.93	-18.3	11.7	21.4	19.0
Eight20 0.90	-41.6	25.0	9.5	14.5
Blended 0.96	-13.4	16.0	23.1	20.1
Blended 0.94	-24.8	17.2	20.1	20.9
Blended 0.92	-40.8	26.9	10.6	14.0
Hybrid 0.96	-0.9	6.9	33.0	21.3
Hybrid 0.94	-19.1	9.1	21.2	18.2

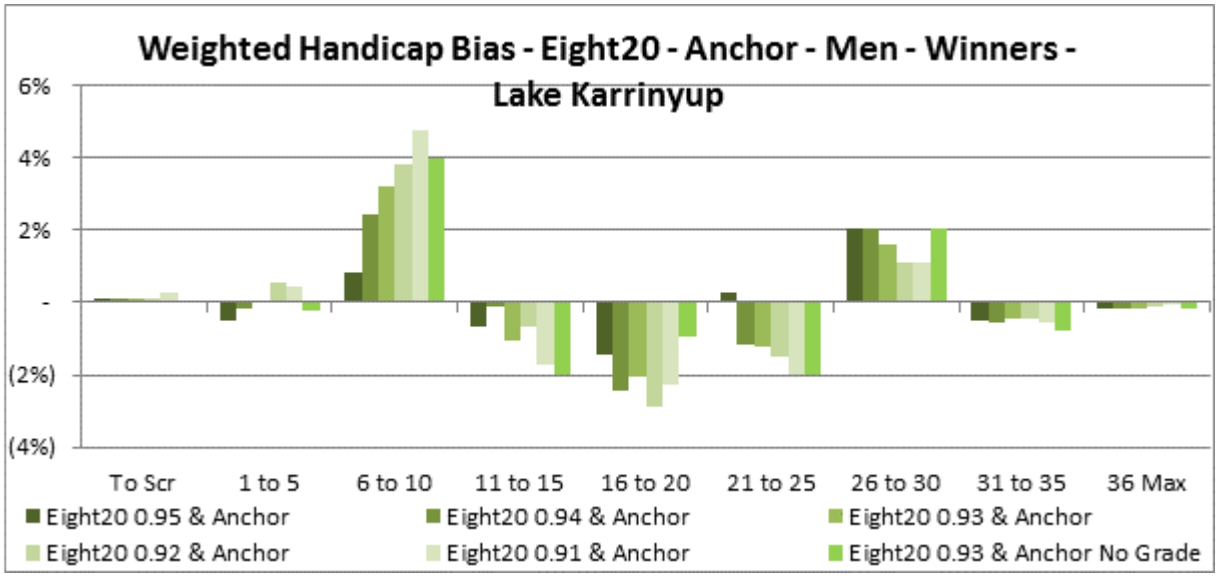
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

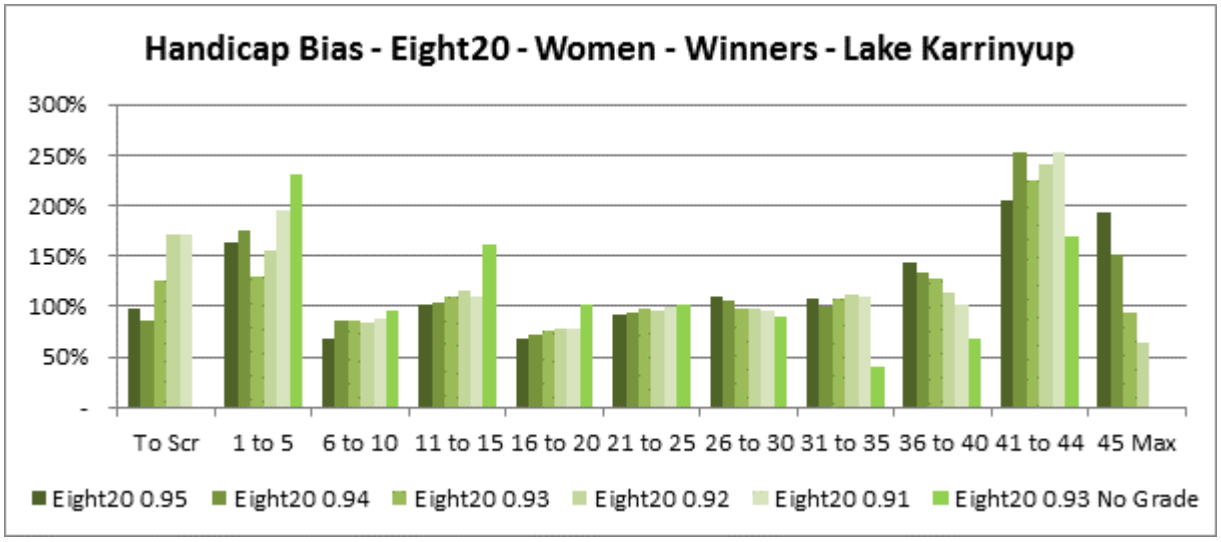
Phase 2

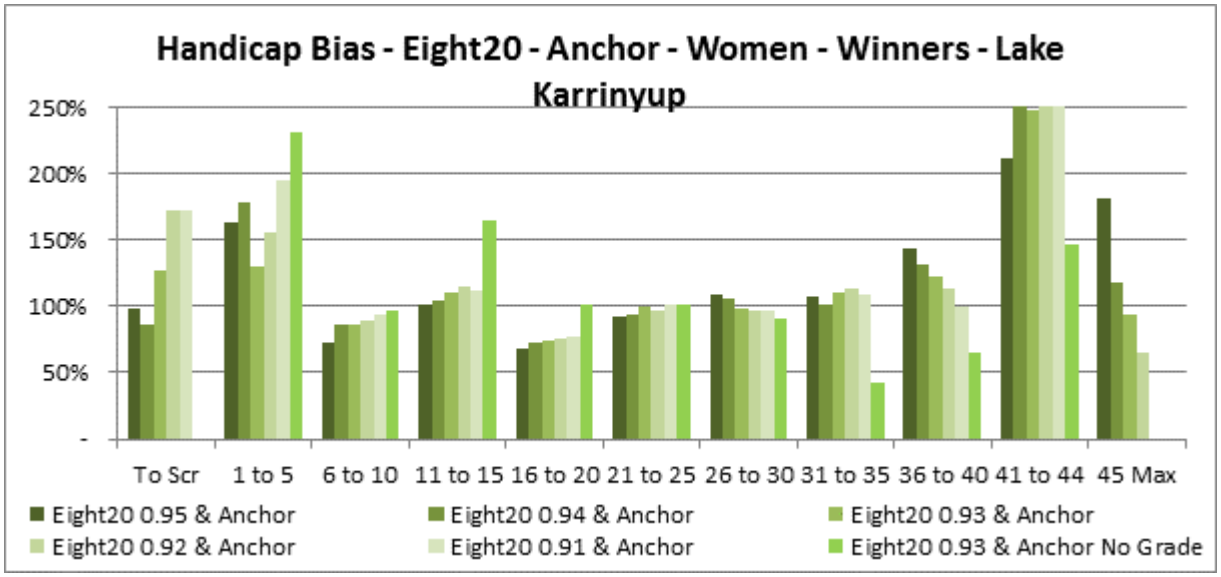

Handicap Bias - Eight20 - Men - Winners - Lake Karrinyup
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

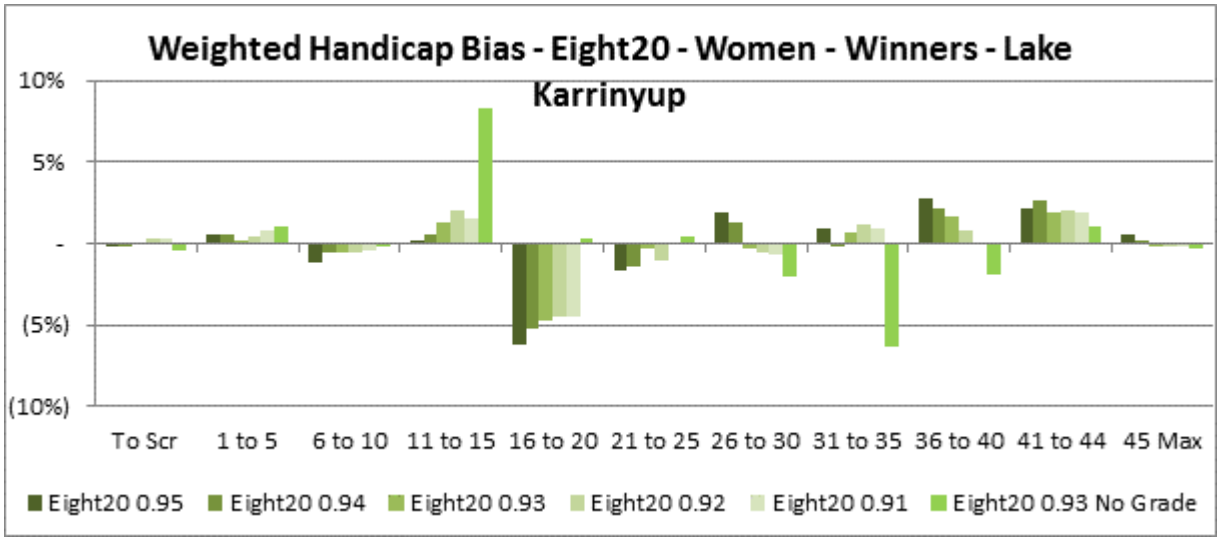

Handicap Bias - Eight20 - Anchor - Men - Winners - Lake Karrinyup
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

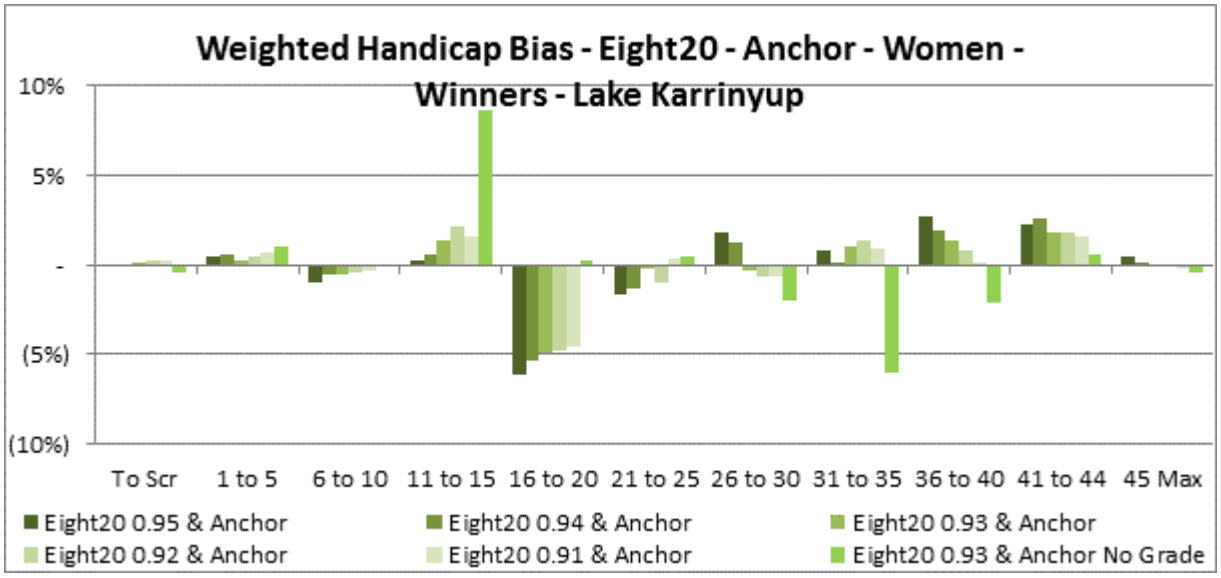

Weighted Handicap Bias - Eight20 - Men - Winners - Lake Karrinyup
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

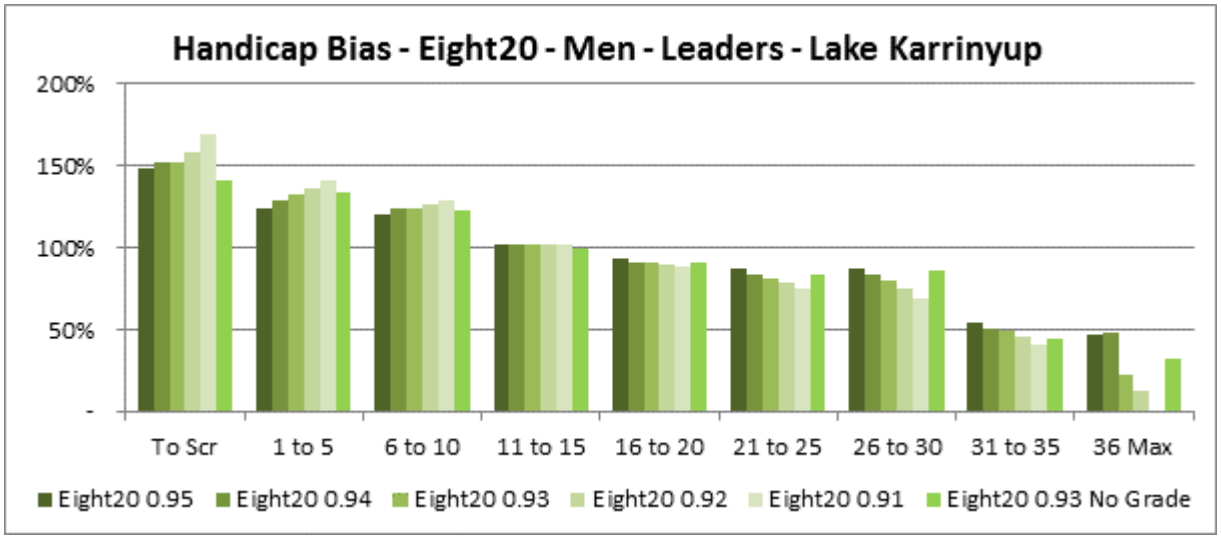

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Lake Karrinyup
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

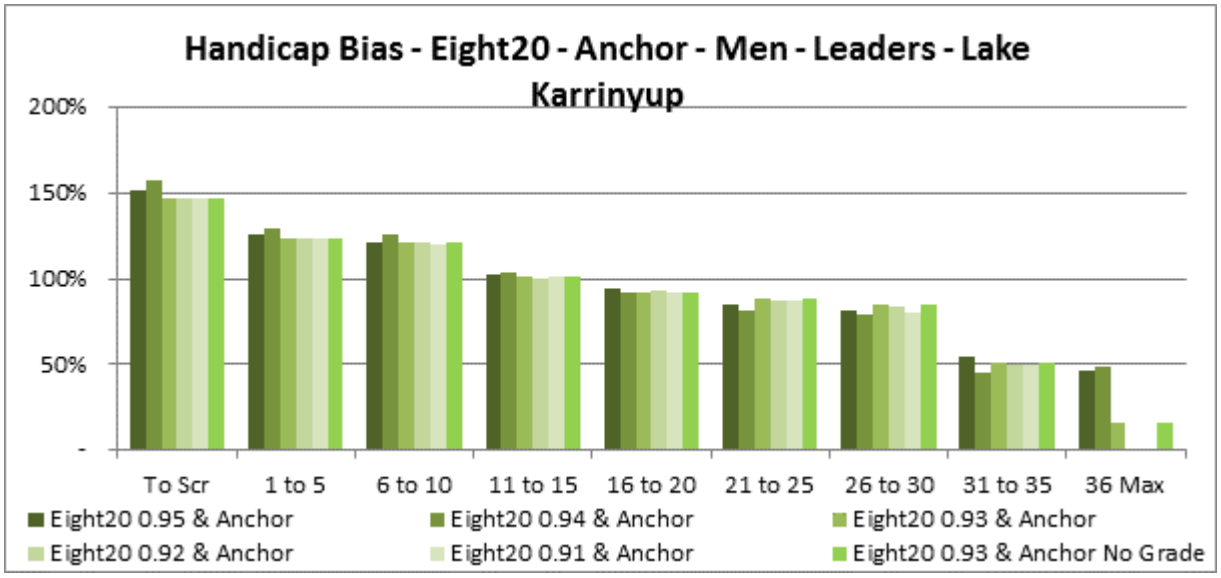

Handicap Bias - Eight20 - Women - Winners - Lake Karrinyup
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

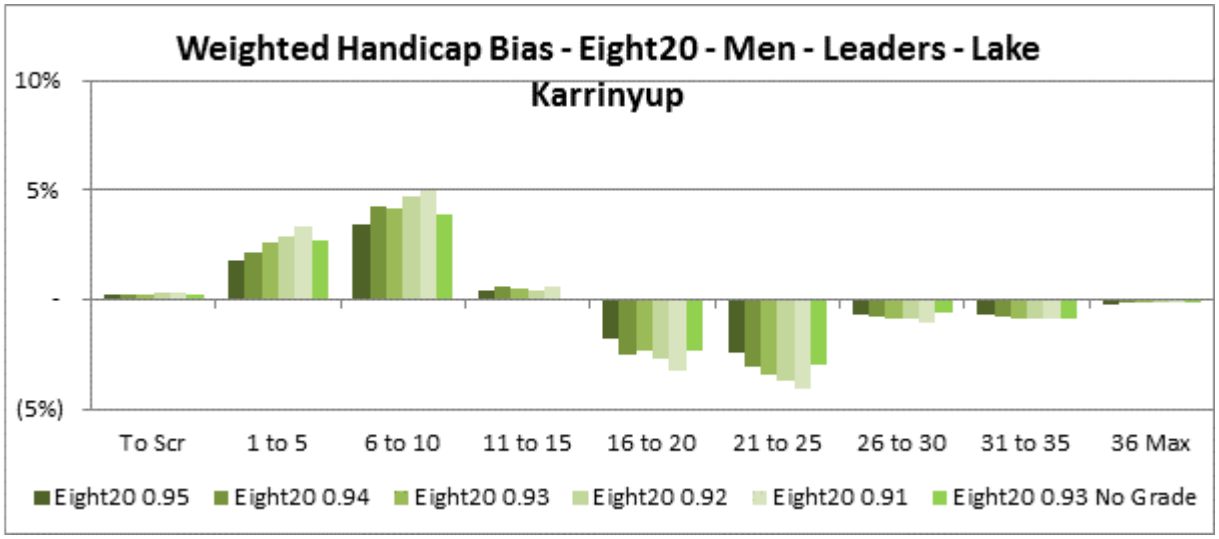

Handicap Bias - Eight20 - Anchor - Women - Winners - Lake Karrinyup
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

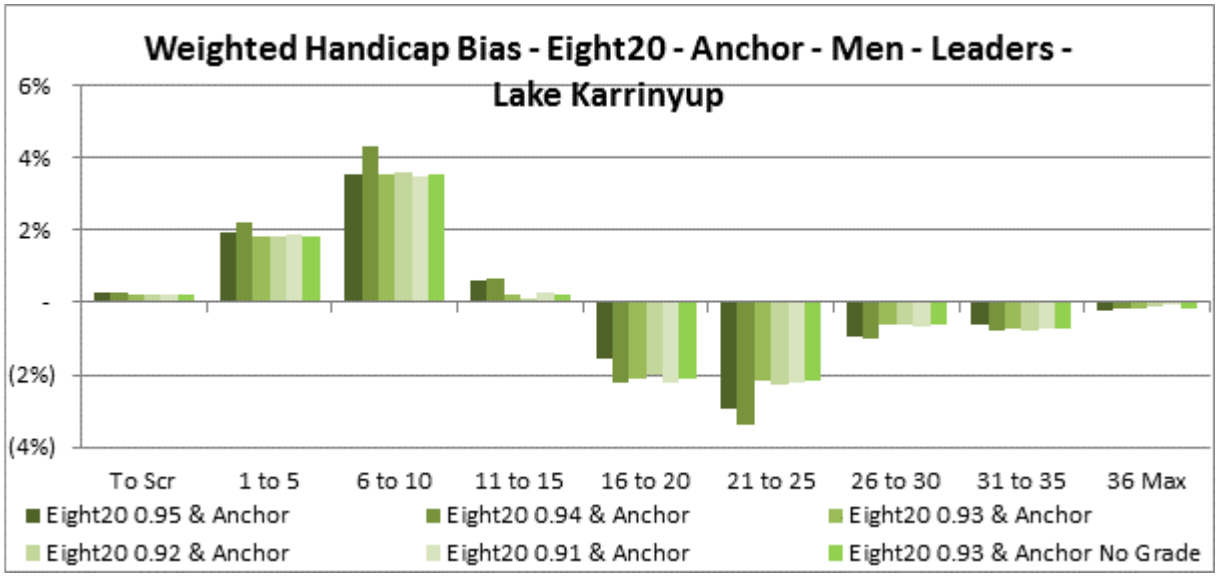

Weighted Handicap Bias - Eight20 - Women - Winners - Lake Karrinyup
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

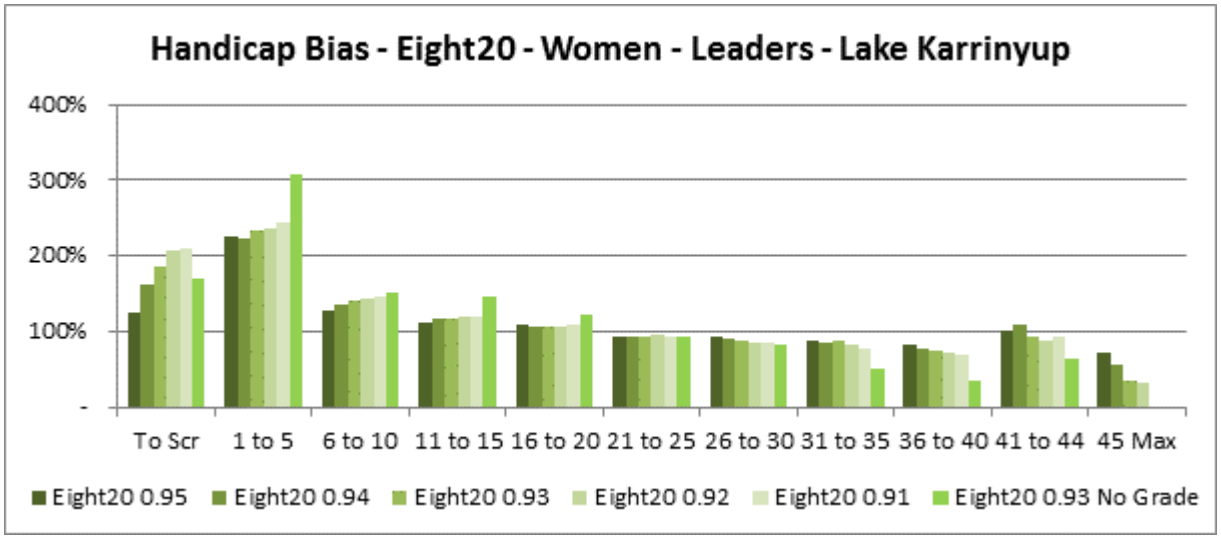

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Lake Karrinyup
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

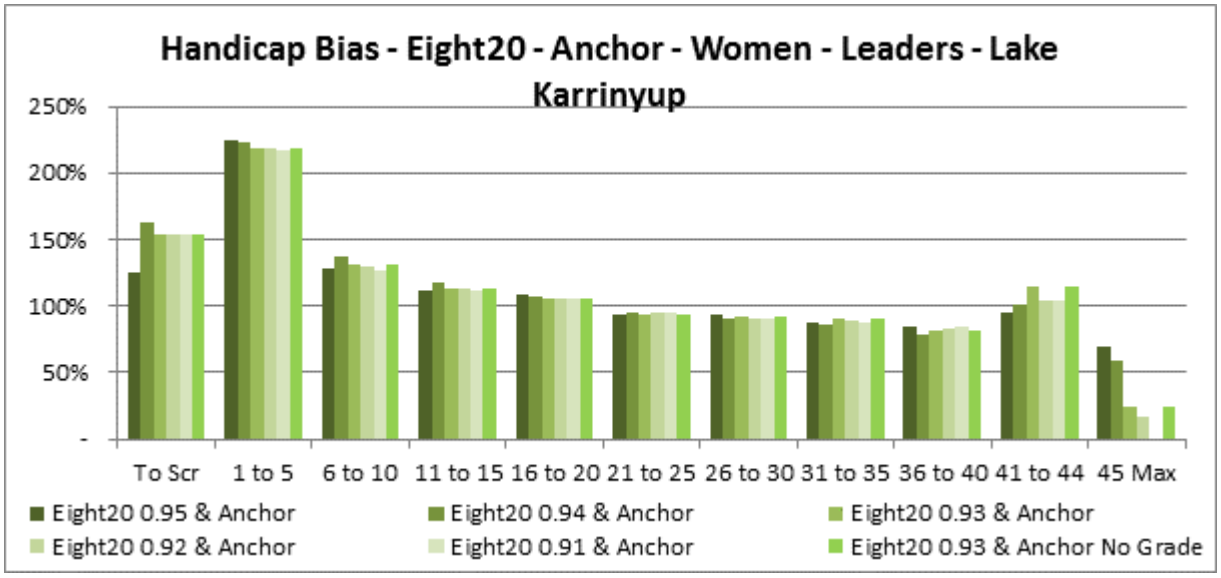

Handicap Bias - Eight20 - Men - Leaders - Lake Karrinyup
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

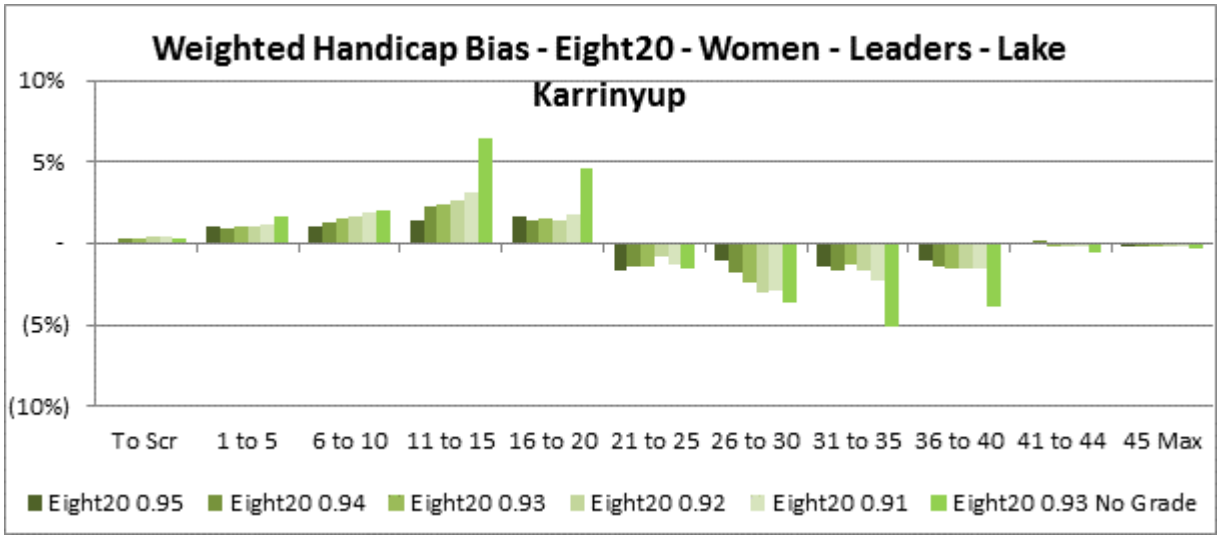

Handicap Bias - Eight20 - Anchor - Men - Leaders - Lake Karrinyup
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

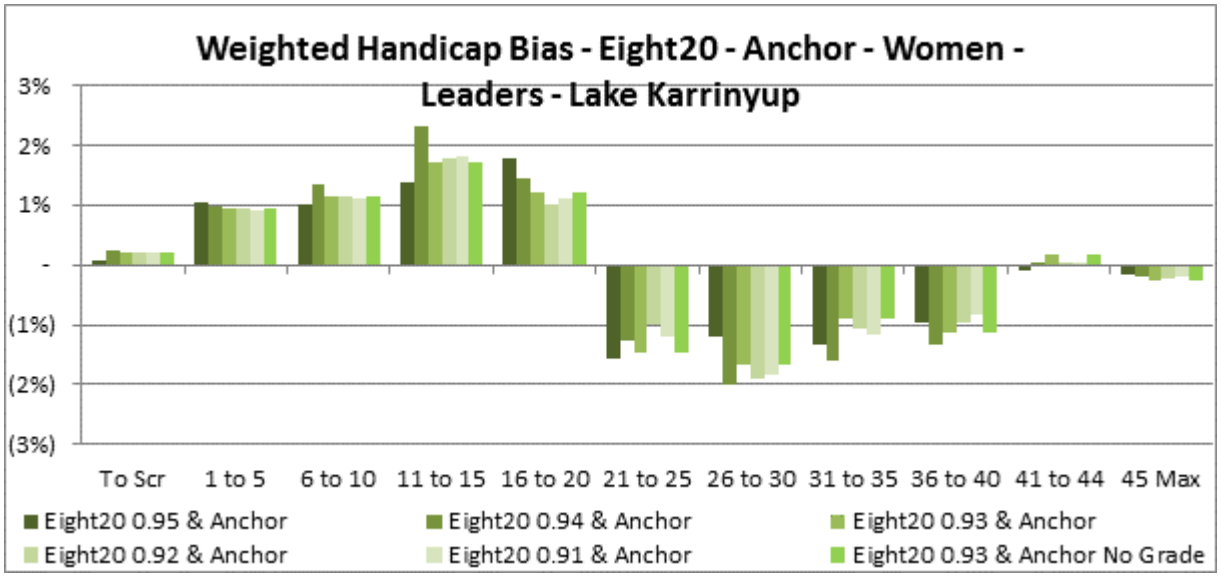

Weighted Handicap Bias - Eight20 - Men - Leaders - Lake Karrinyup
10%
5%
-
(5%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Lake Karrinyup
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Lake Karrinyup
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Lake Karrinyup
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Lake Karrinyup
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

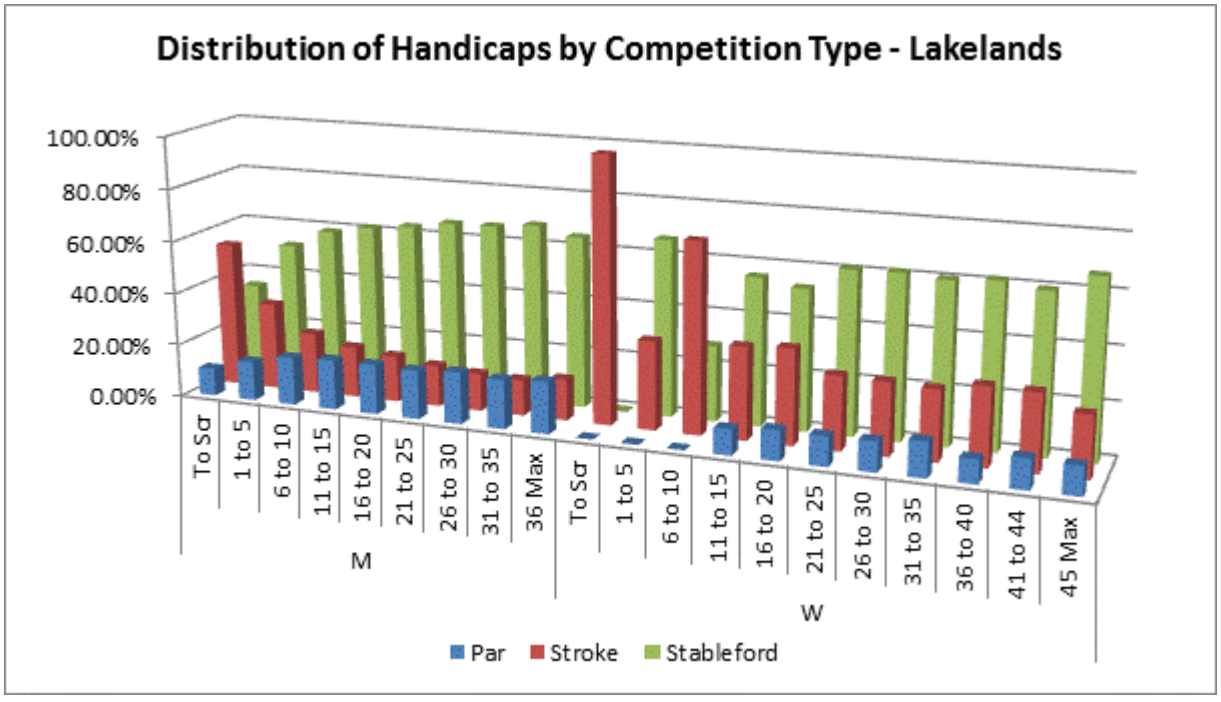


Phase 2 -Lake Karrinyup					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	6.3	11.4	27.7	24.4
	Eight20 0.94	-2.5	14.5	20.7	20.9
	Eight20 0.93	-6.5	15.6	14.3	17.8
	Eight20 0.92	-13.7	18.0	9.8	18.0
	Eight20 0.91	-16.1	21.5	6.2	16.8
	Eight20 0.93 No Grade	-5.3	18.5	-33.3	34.6
	Eight20 0.95 & Anchor	4.0	10.0	26.7	24.2
	Eight20 0.94 & Anchor	-6.8	15.1	19.7	20.9
	Eight20 0.93 & Anchor	-10.3	15.8	13.9	18.0
	Eight20 0.92 & Anchor	-17.1	18.5	9.2	18.8
	Eight20 0.91 & Anchor	-19.9	21.4	3.9	16.7
	Eight20 0.93 & Anchor No Grade	-10.5	19.3	-35.8	35.0
Leaders	Eight20 0.95	-34.3	17.8	-18.1	11.8
	Eight20 0.94	-40.3	22.2	-22.3	14.1
	Eight20 0.93	-42.9	23.2	-25.4	15.3
	Eight20 0.92	-46.7	25.7	-27.8	16.6
	Eight20 0.91	-51.8	28.8	-30.8	18.8
	Eight20 0.93 No Grade	-40.2	21.7	-55.1	35.4
	Eight20 0.95 & Anchor	-36.9	19.0	-18.4	11.8
	Eight20 0.94 & Anchor	-42.7	23.0	-23.0	14.3
	Eight20 0.93 & Anchor	-33.2	18.0	-18.6	11.7
	Eight20 0.92 & Anchor	-33.3	18.2	-18.8	11.5
	Eight20 0.91 & Anchor	-32.9	18.3	-18.5	11.6
	Eight20 0.93 & Anchor No Grade	-33.2	18.0	-18.6	11.7

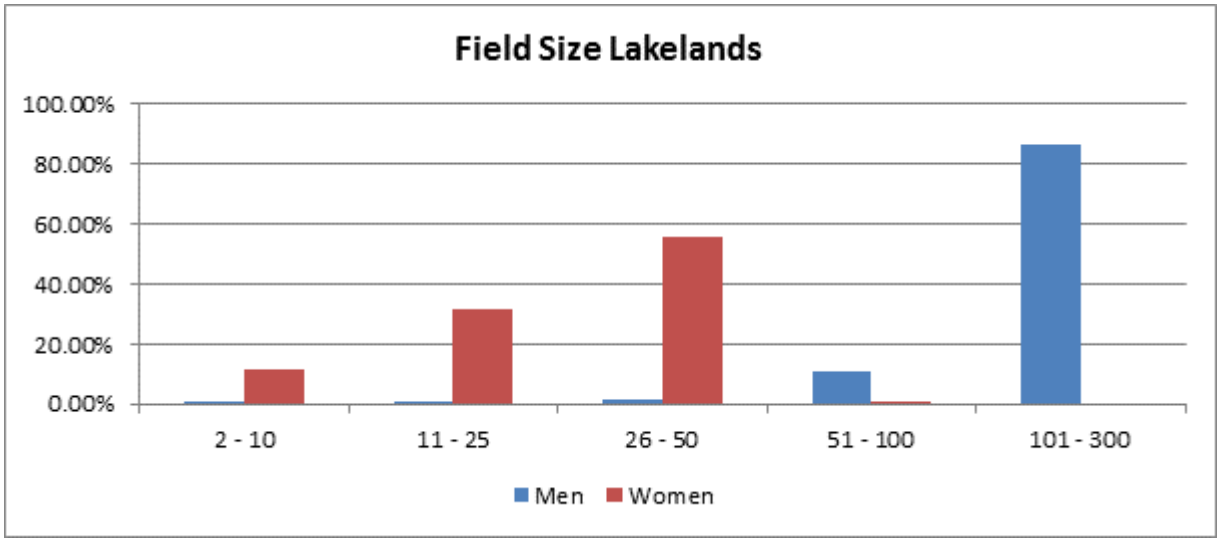
Appendix 7 – Lakelands

Phase 1

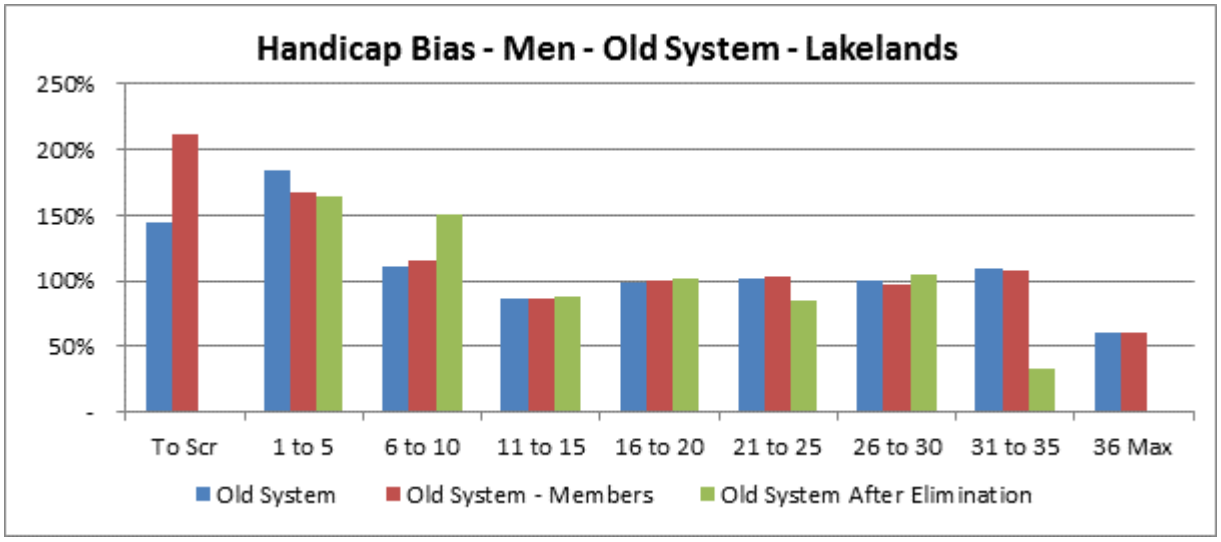
Lakelands	Men	Women	Total
Players in Database	1,802	393	2,195
Members	1,004	98	1,102
Visitors	798	295	1,093
Members who have Played 33 Rounds	920	95	1,015
Members with Last Round In Old System	199	14	213
Members with Last Round in Current System	805	84	889
Earliest Round	1/12/2007	3/3/2008	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			140
Number of Home Competitions	559	313	872
Number of Rounds of Golf	91,218	8,670	99,888
Number of Rounds at Home	85,210	7,727	92,937
Number of Rounds at Home Old	65,781	5,913	71,694
Number of Rounds at Home Current	19,429	1,814	21,243
Num Rnds Members at Home	82,556	7,051	89,607
Num Rnds Members at Home Old	63,423	5,347	68,770
Num Rnds Members at Home Cur	19,133	1,704	20,837
Num Rnds After Eliminations	50,788	4,316	55,104
Num Rnds After Eliminations Old	33,072	2,688	35,760
Num Rnds After Eliminations Cur	17,716	1,628	19,344

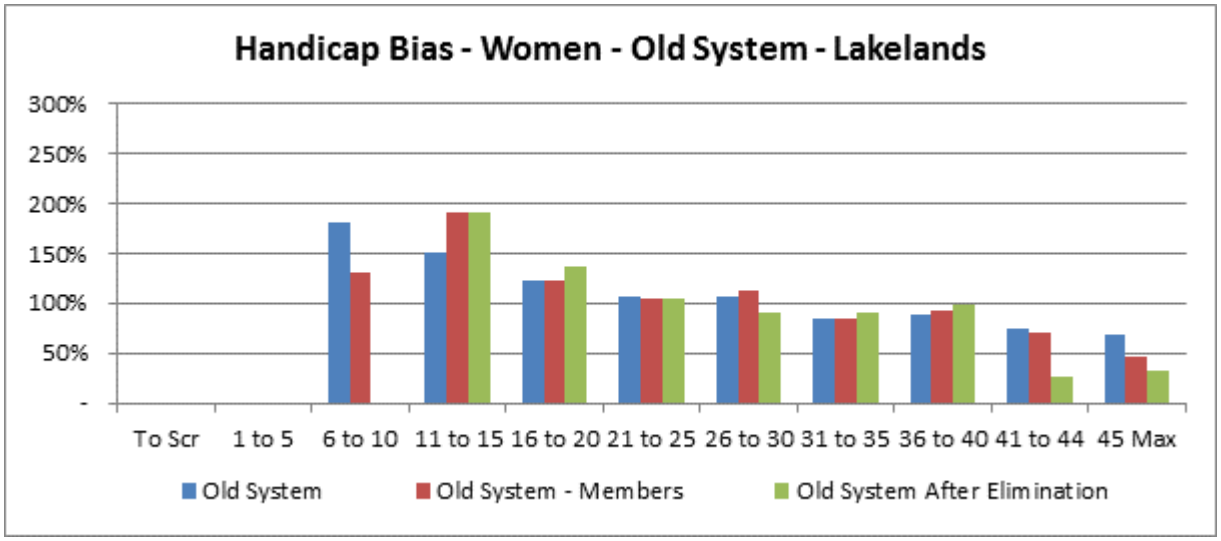


Most men's competitions are with a field of over 100, the women mainly field 26 - 50.

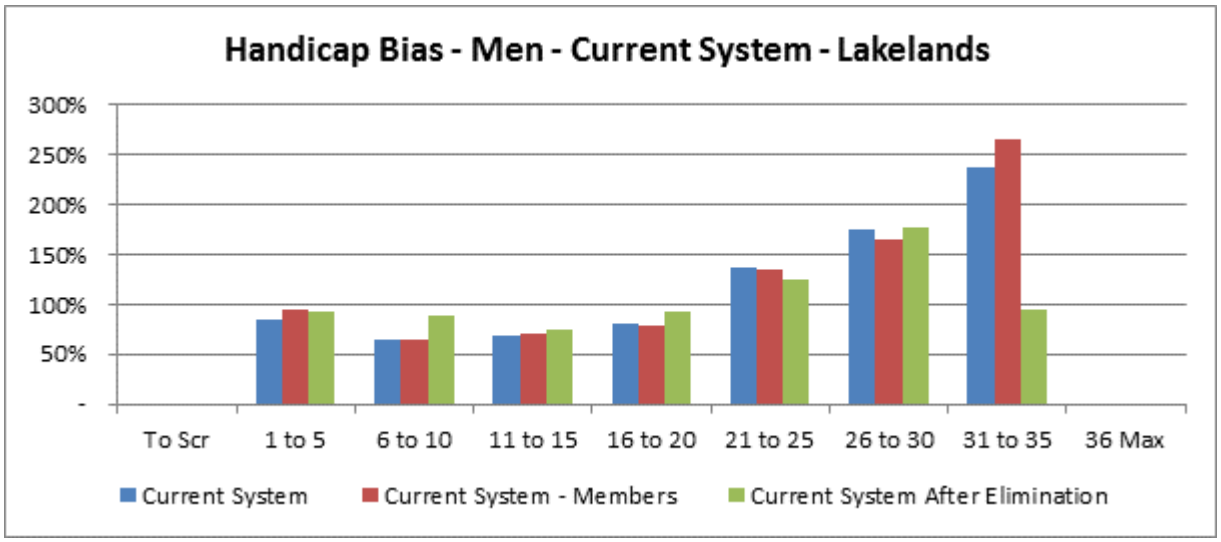


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

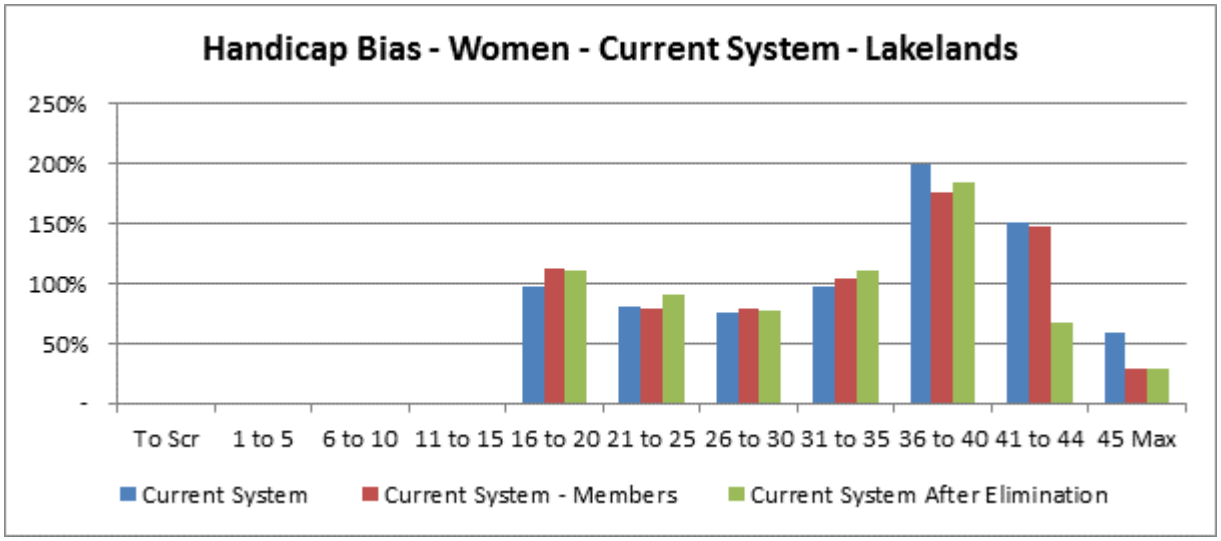




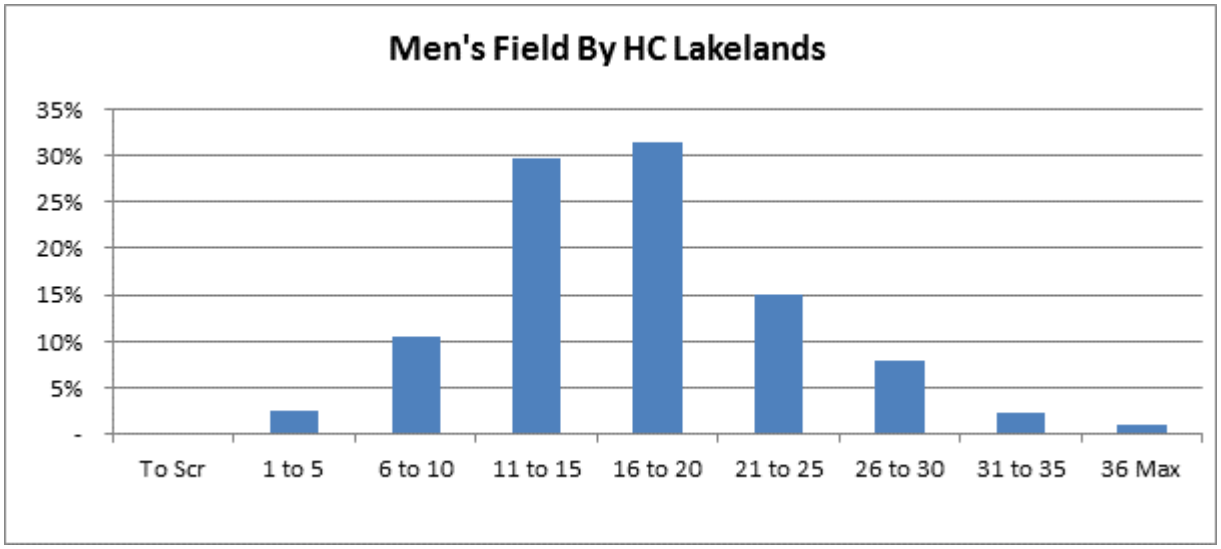
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

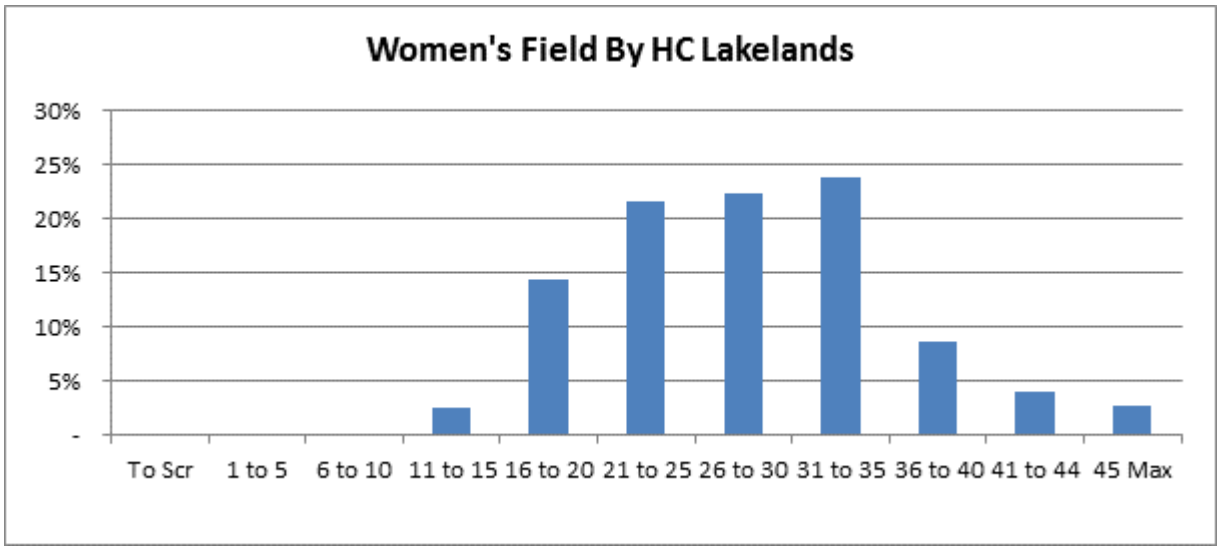


The picture is somewhat similar for the women.



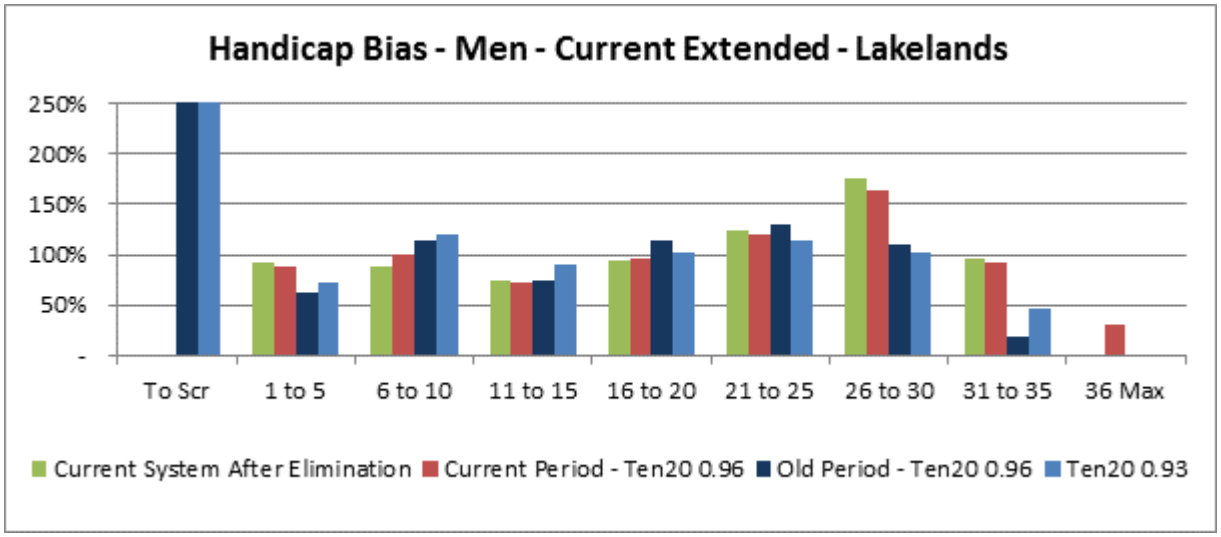
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





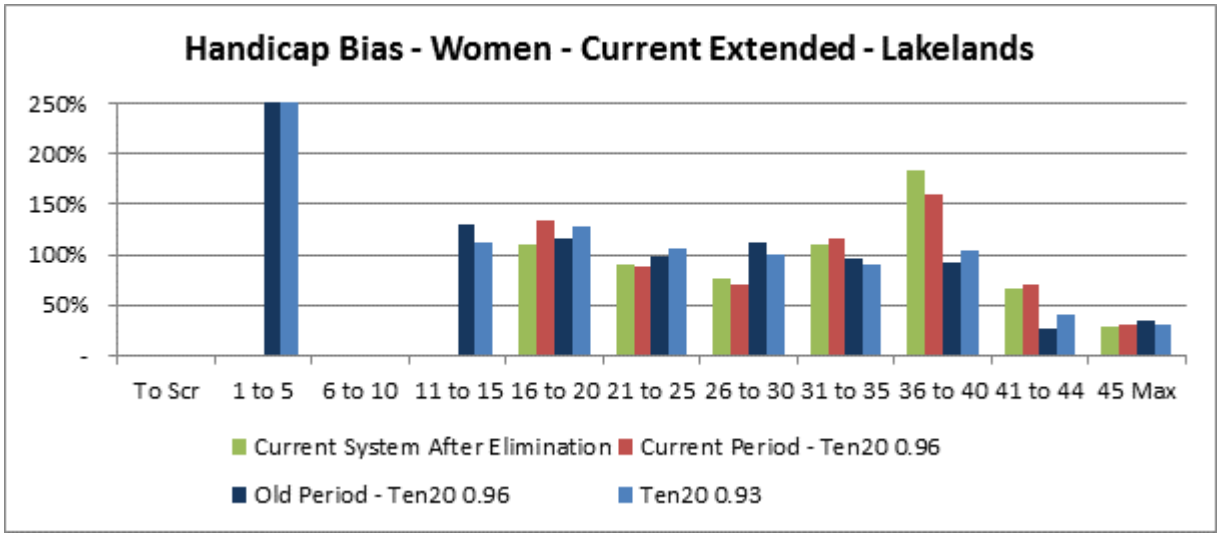
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

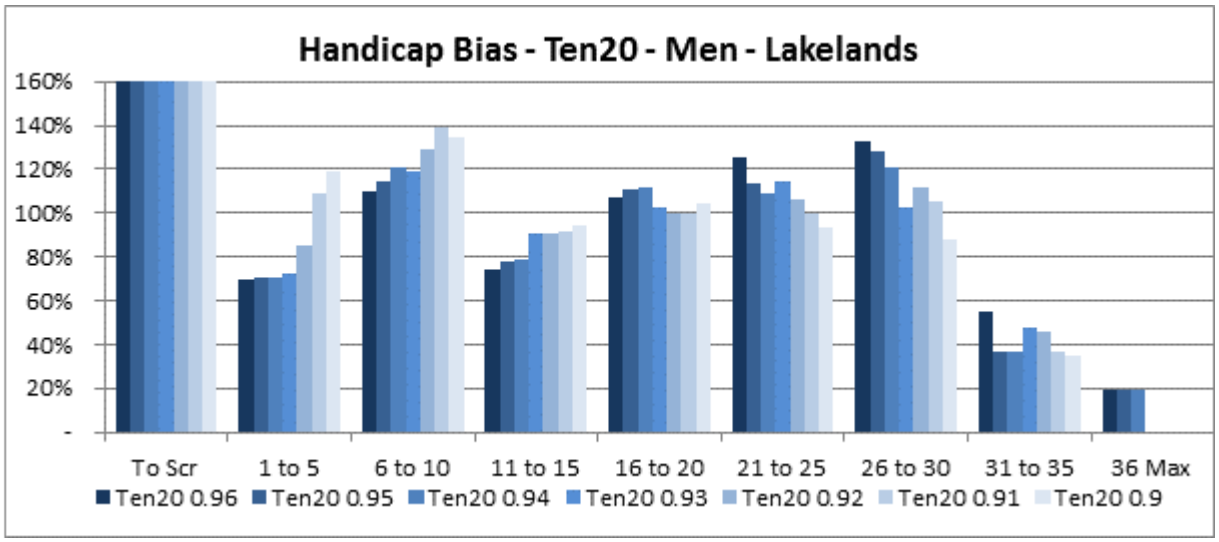


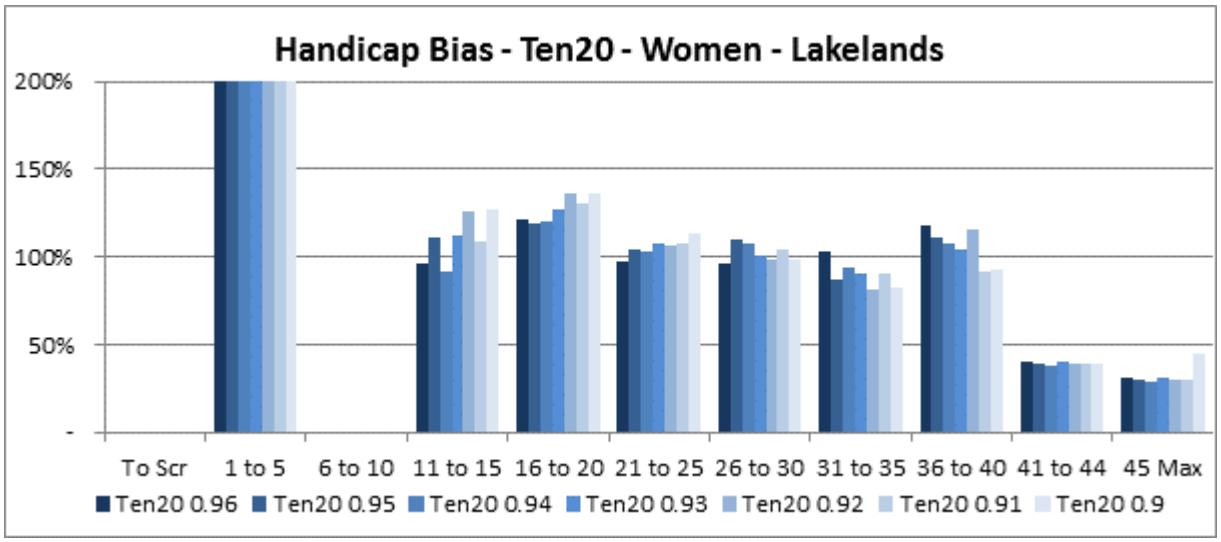
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the bias over the two-years is reasonably flat.

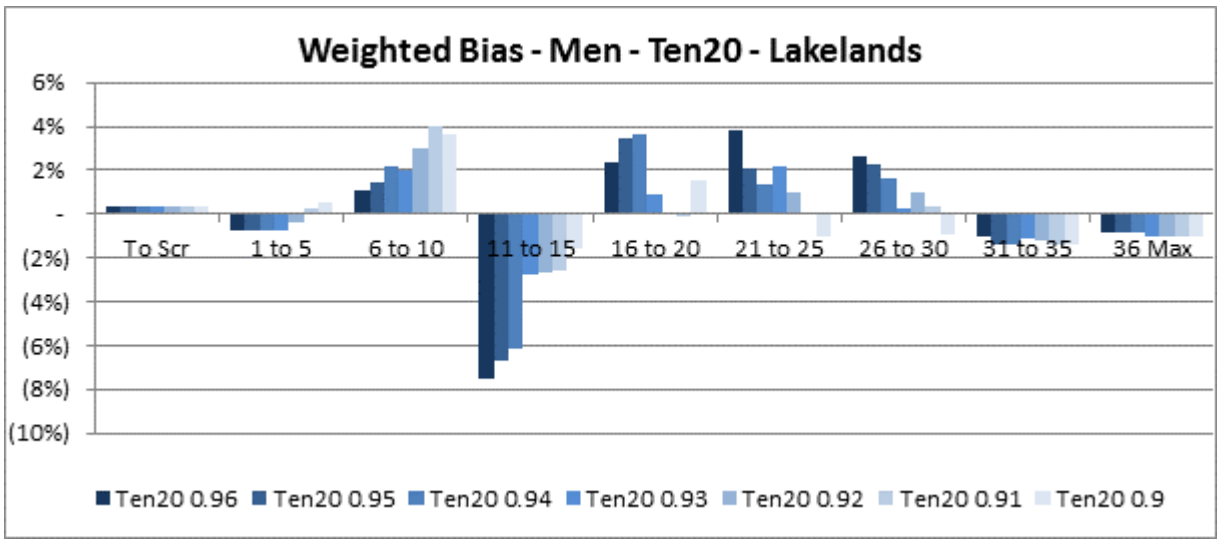


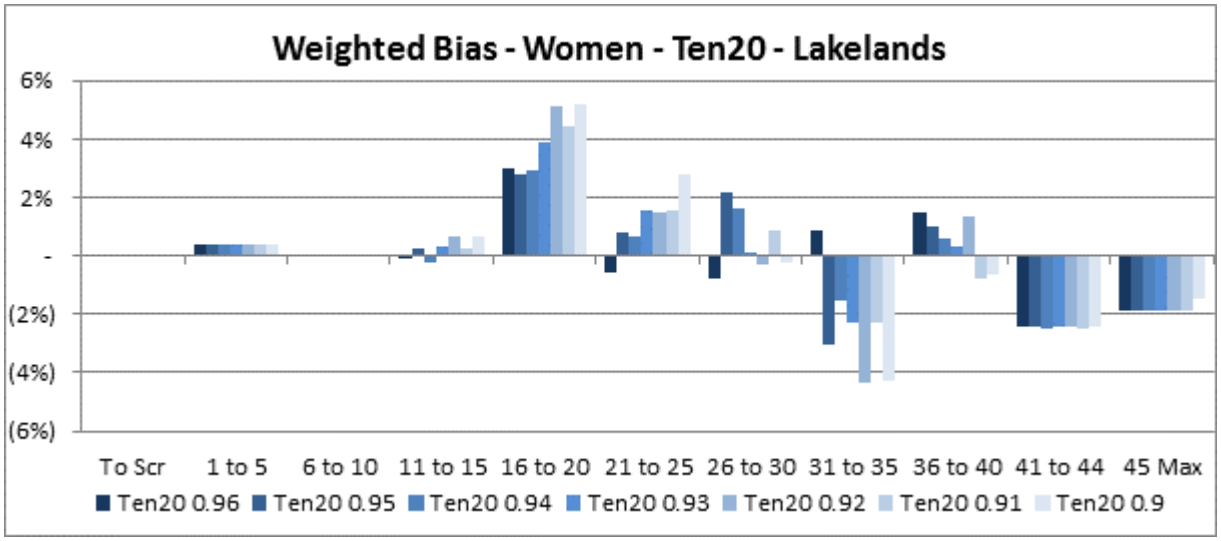
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

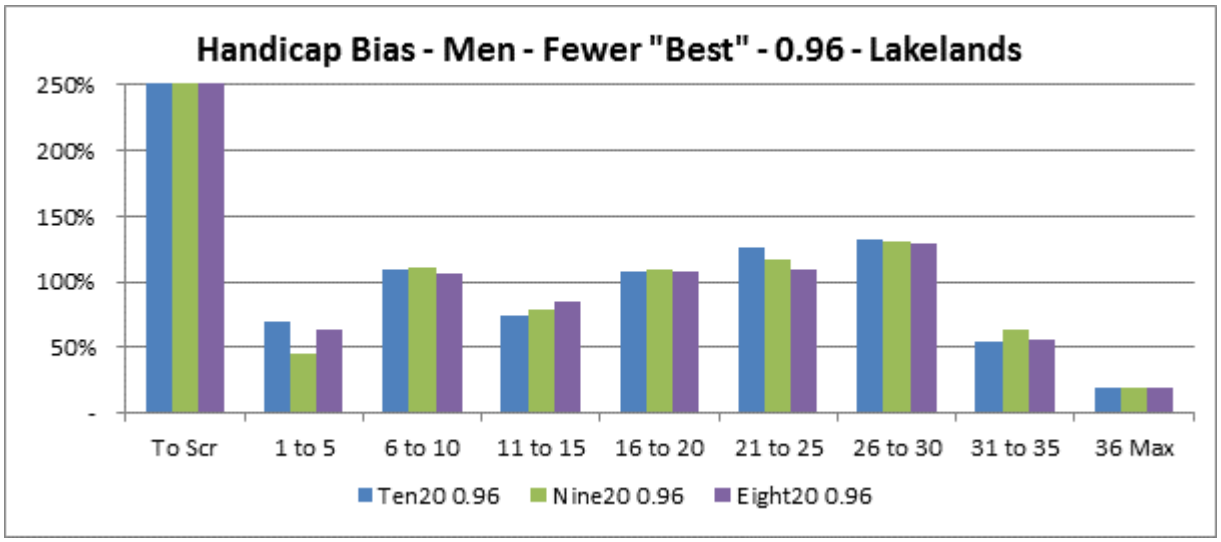


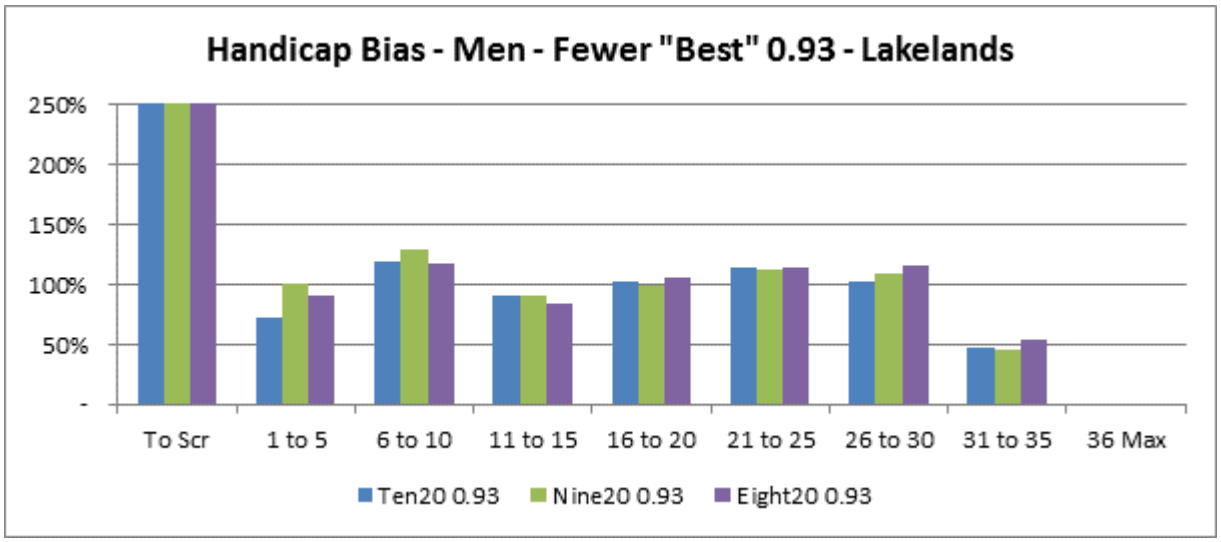


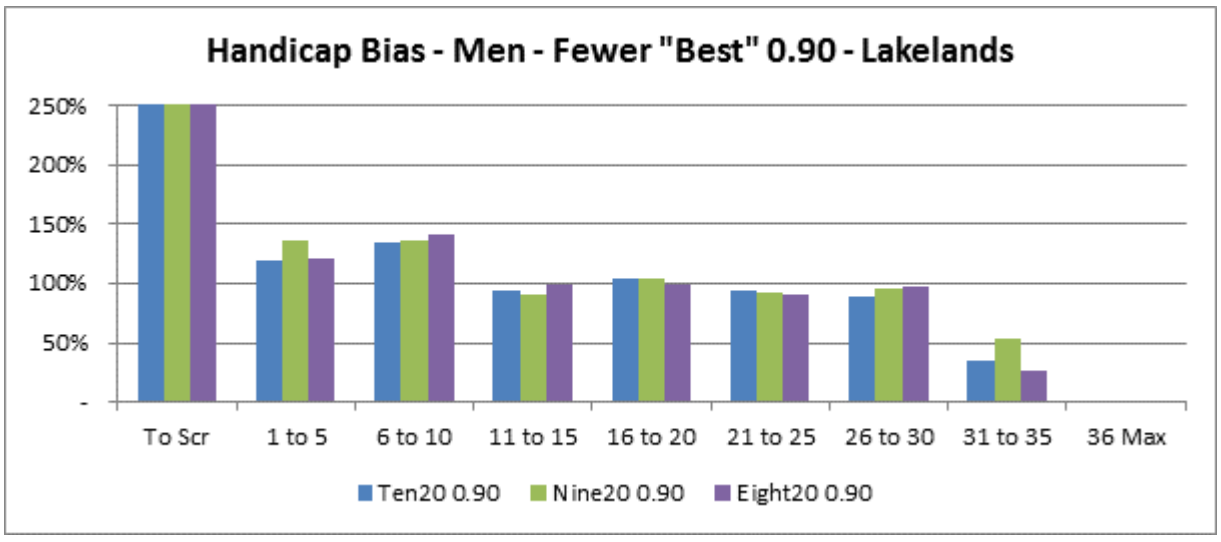
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

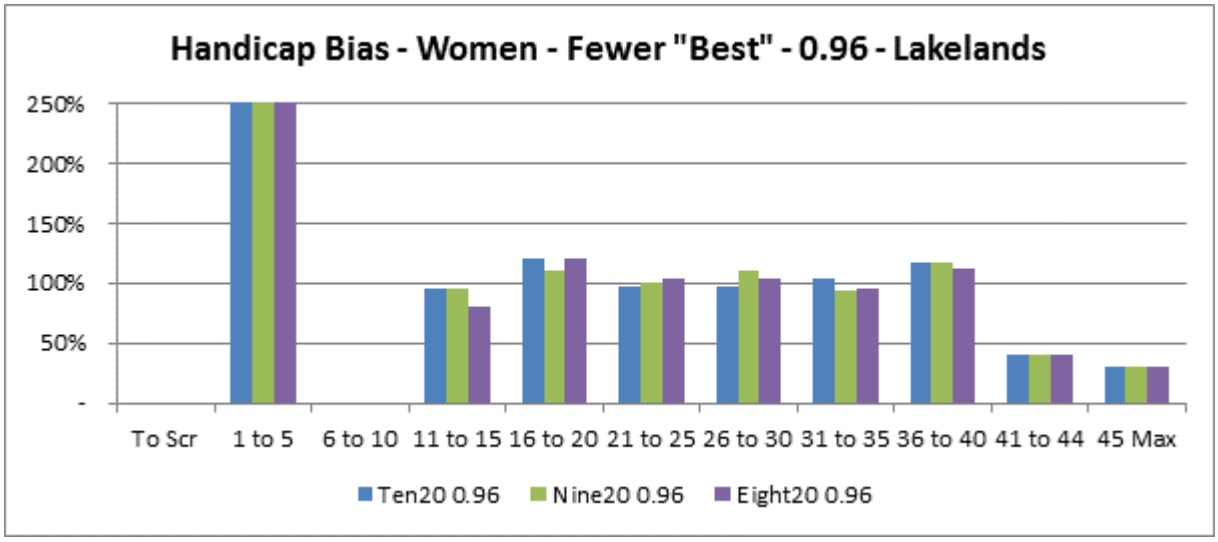
	Lakelands			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	15.0	33.1	-16.3	15.0
Ten20 0.95	5.9	29.9	-22.8	18.2
Ten20 0.94	-0.3	28.3	-21.0	15.6
Ten20 0.93	-9.5	15.9	-26.0	18.1
Ten20 0.92	-14.2	16.1	-29.2	24.4
Ten20 0.91	-25.4	18.1	-28.8	19.6
Ten20 0.9	-33.1	17.0	-32.6	25.0

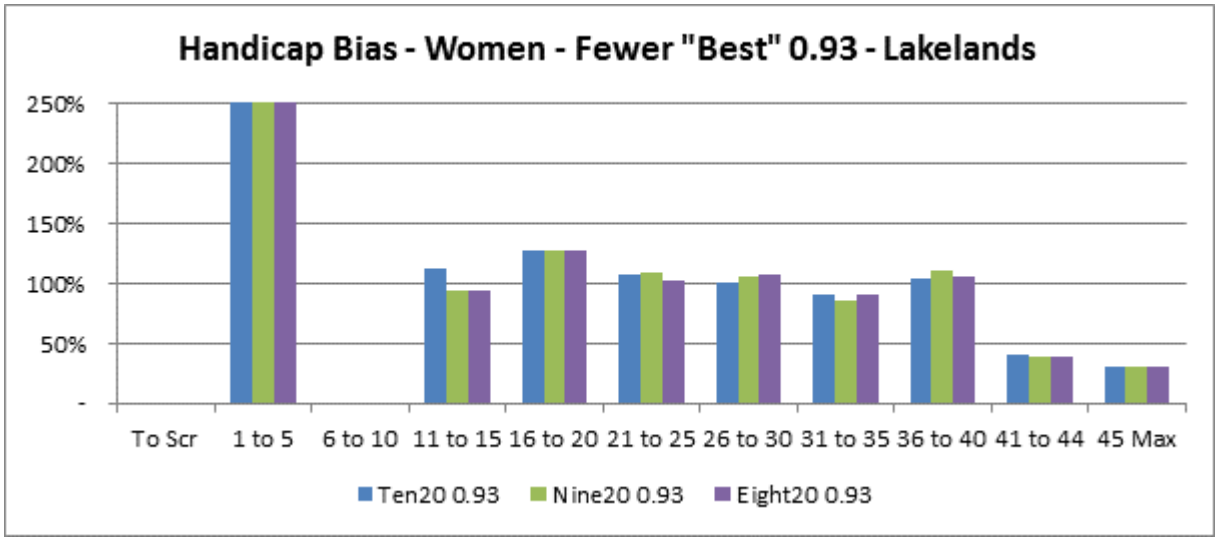
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

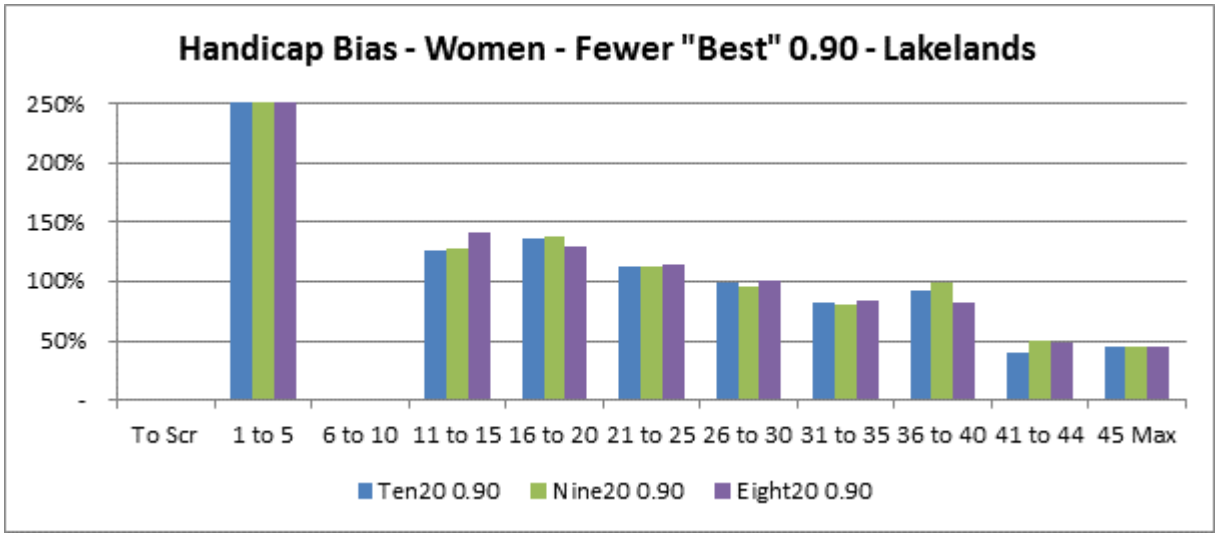







Handicap Bias - Women - Fewer "Best" - 0.96 - Lakelands
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

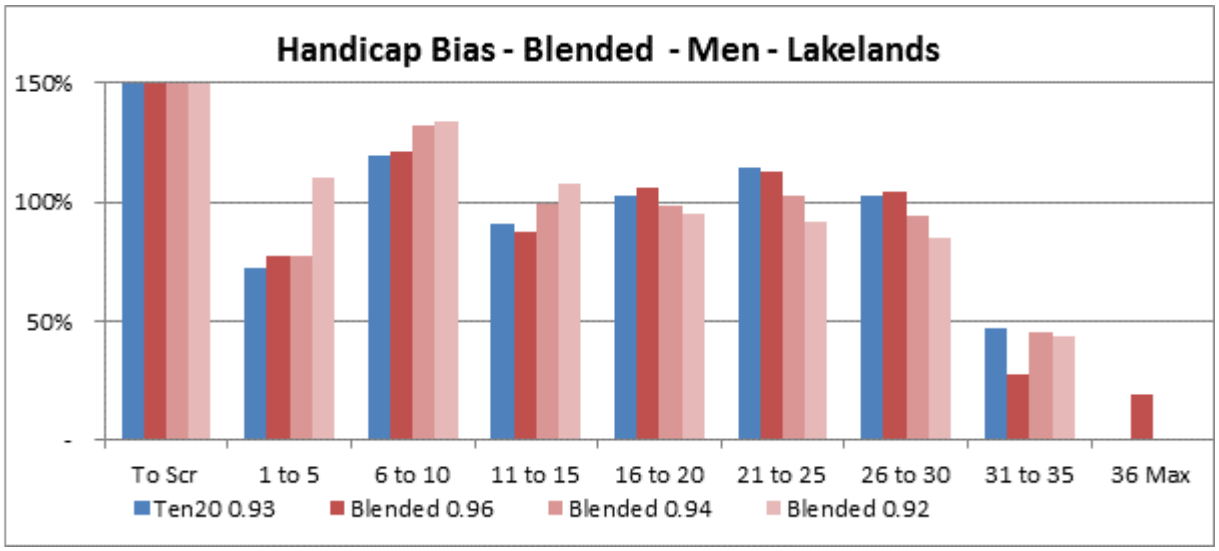

Handicap Bias - Women - Fewer "Best" 0.93 - Lakelands
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

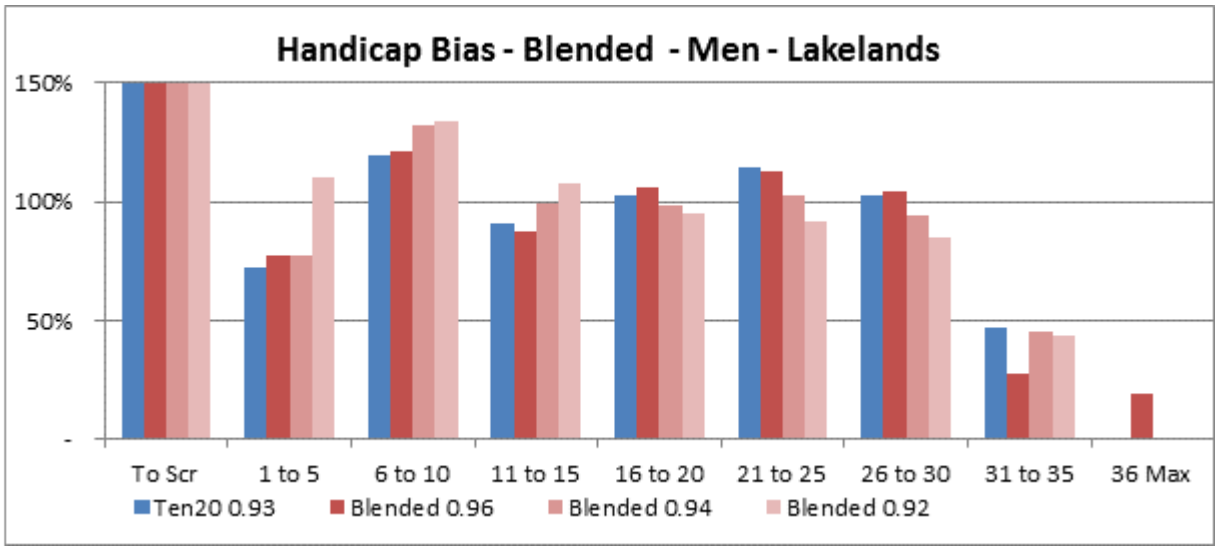

Handicap Bias - Women - Fewer "Best" 0.90 - Lakelands
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

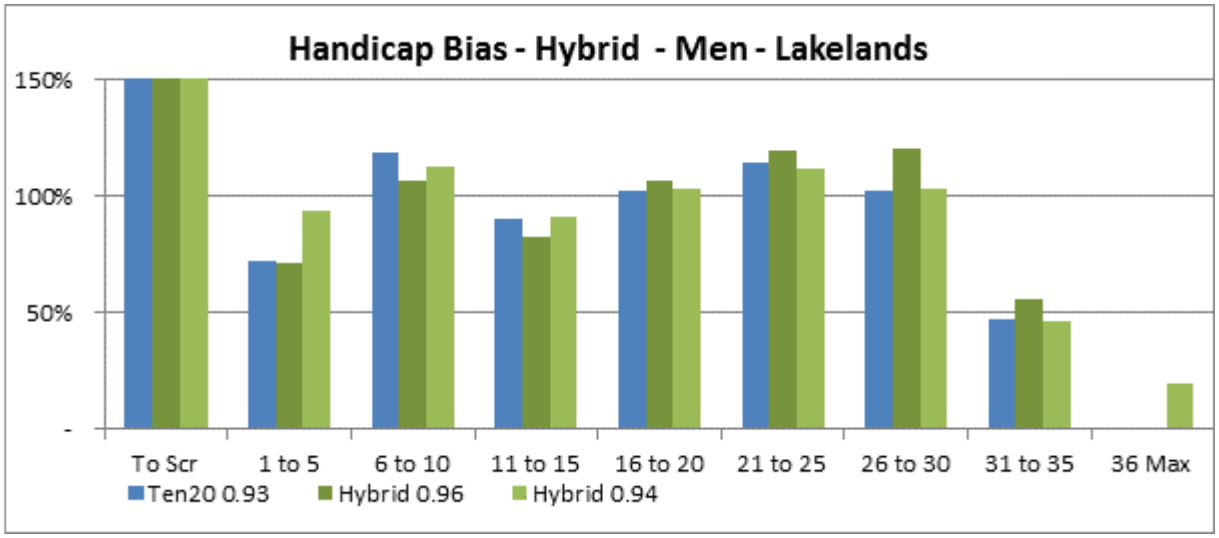
Method	Lakelands Men		Women	
	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	15.0	33.1	-16.3	15.0
Nine20 0.96	14.2	28.5	-16.3	15.0
Eight20 0.96	6.7	21.4	-18.9	15.0
Ten20 0.93	-9.5	15.9	-26.0	18.1
Nine20 0.93	-14.9	17.7	-25.1	20.8
Eight20 0.93	-4.0	21.4	-23.7	18.4
Ten20 0.90	-33.1	17.0	-32.6	25.0
Nine20 0.90	-30.5	18.9	-31.0	25.2
Eight20 0.90	-36.9	17.7	-31.9	22.3

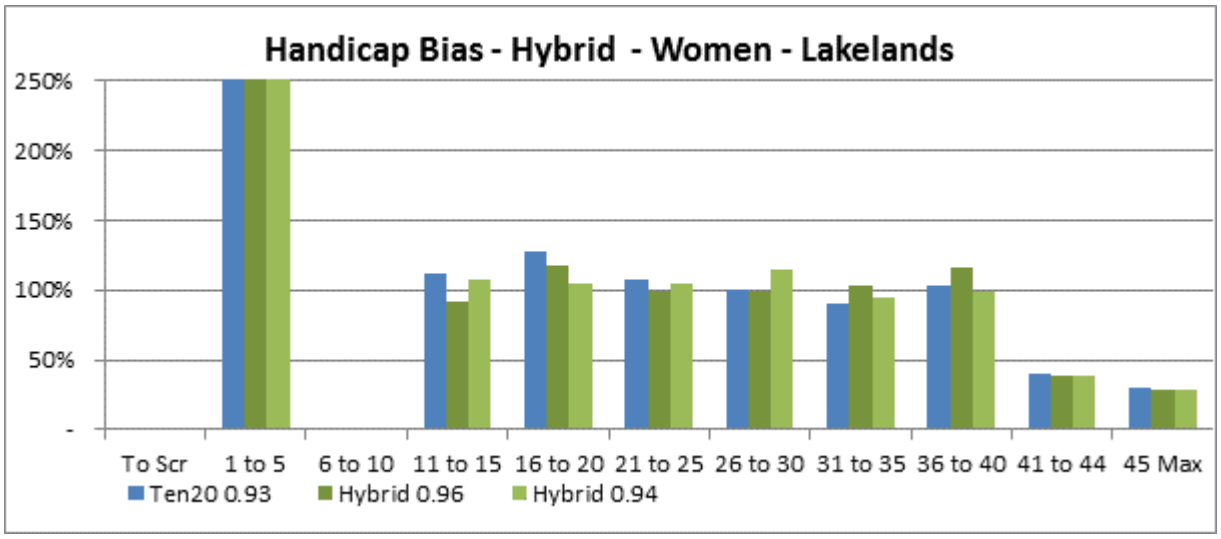
For the Blended:





For the Hybrid:

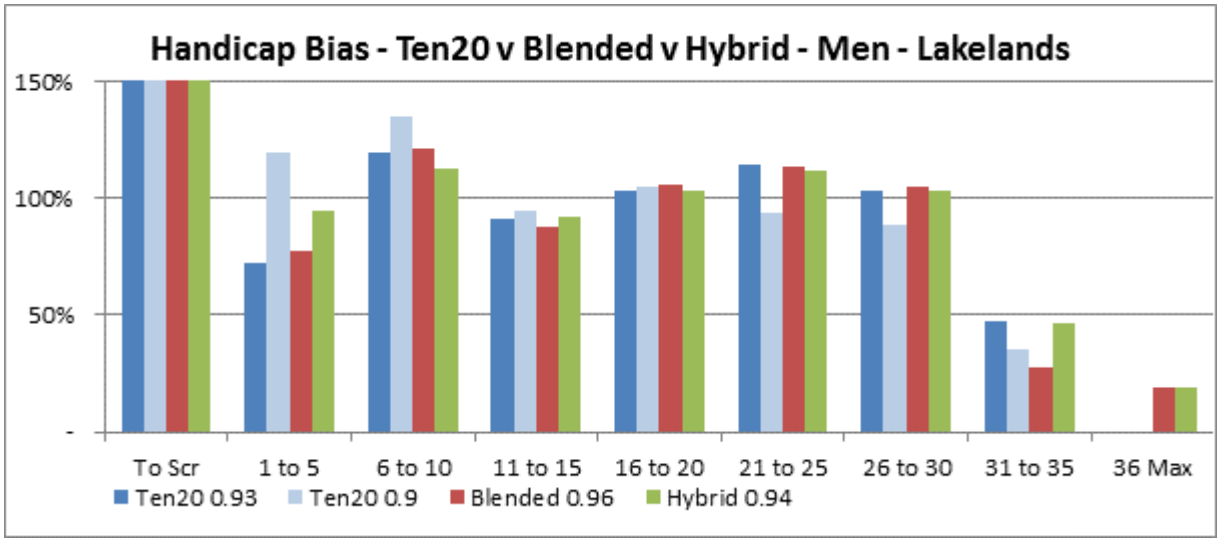


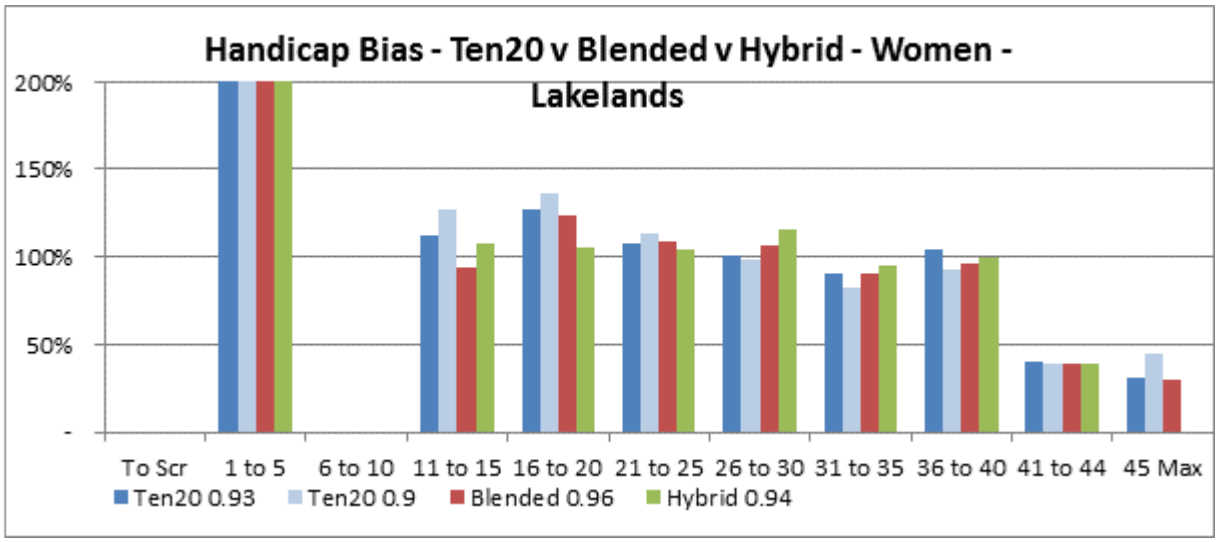


The Corresponding Tilt and Level Indices are:

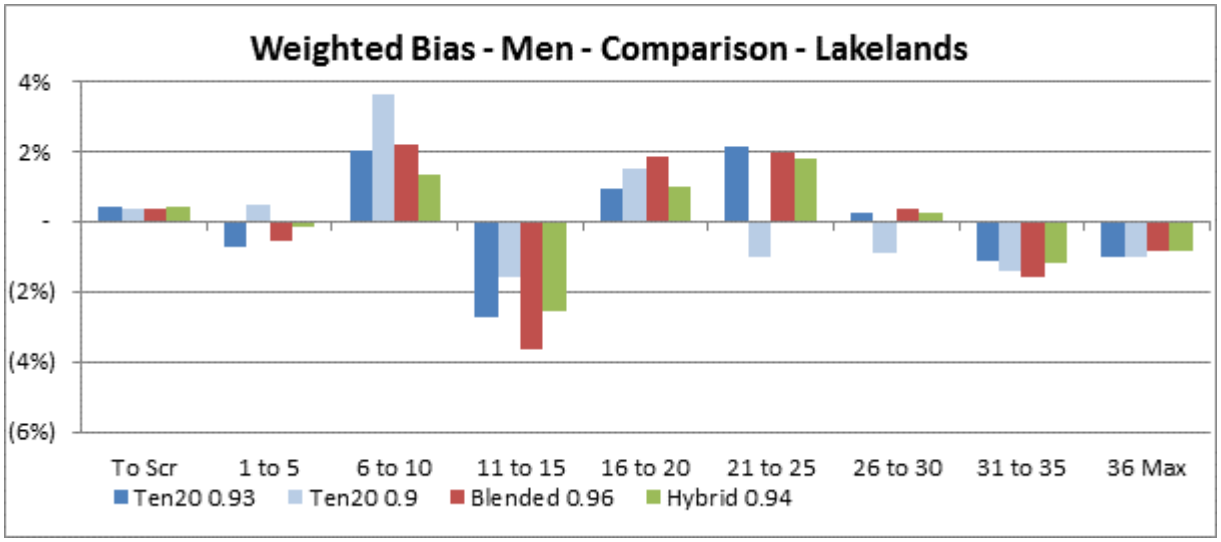
	Lakelands			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-9.9	19.1	-25.4	17.8
Blended 0.94	-24.5	13.7	-31.1	24.7
Blended 0.92	-38.2	17.6	-38.9	27.1
Hybrid 0.96	5.8	23.6	-16.1	13.8
Hybrid 0.94	-9.7	13.5	-19.5	15.8

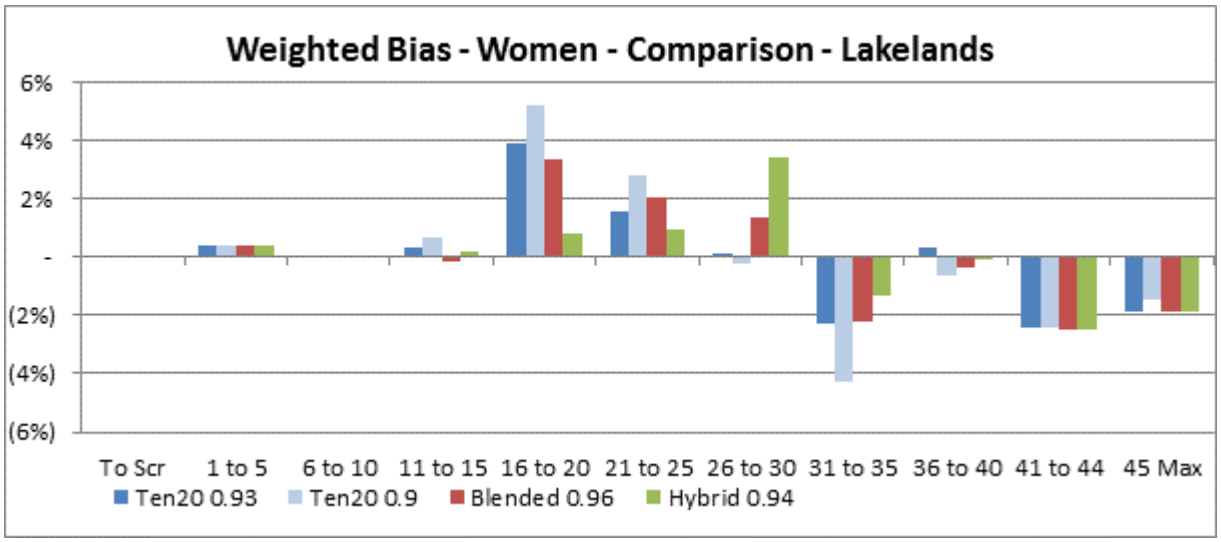
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

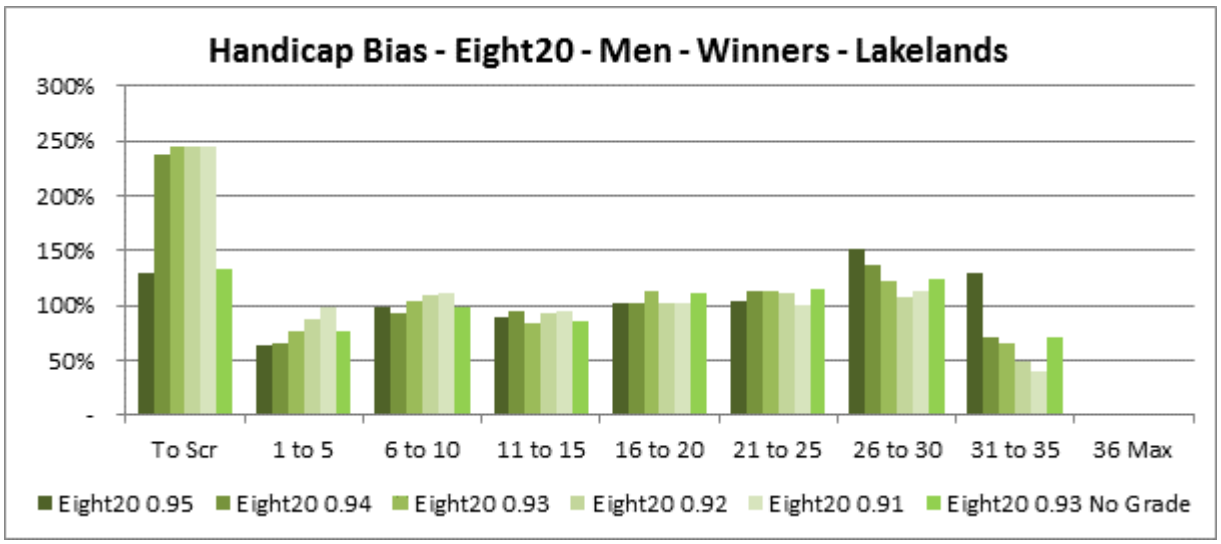
	Lakelands			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-9.5	15.9	-26.0	18.1
Ten20 0.9	-33.1	17.0	-32.6	25.0
Blended 0.96	-9.9	19.1	-25.4	17.8
Hybrid 0.94	-9.7	13.5	-19.5	15.8

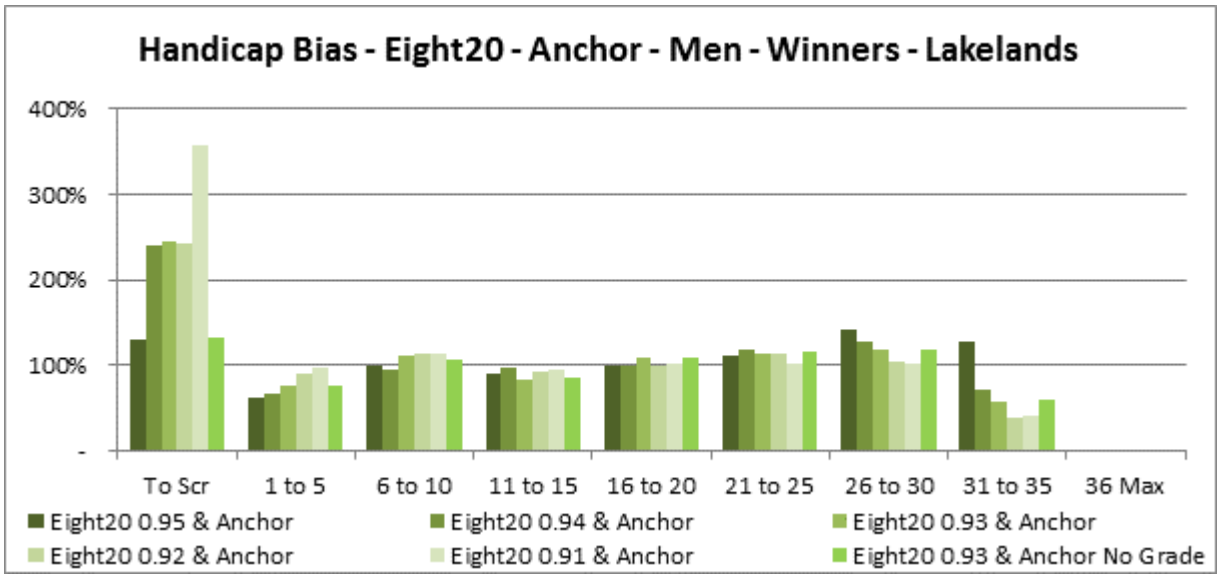
Putting it all together, with the Old System as a reference:

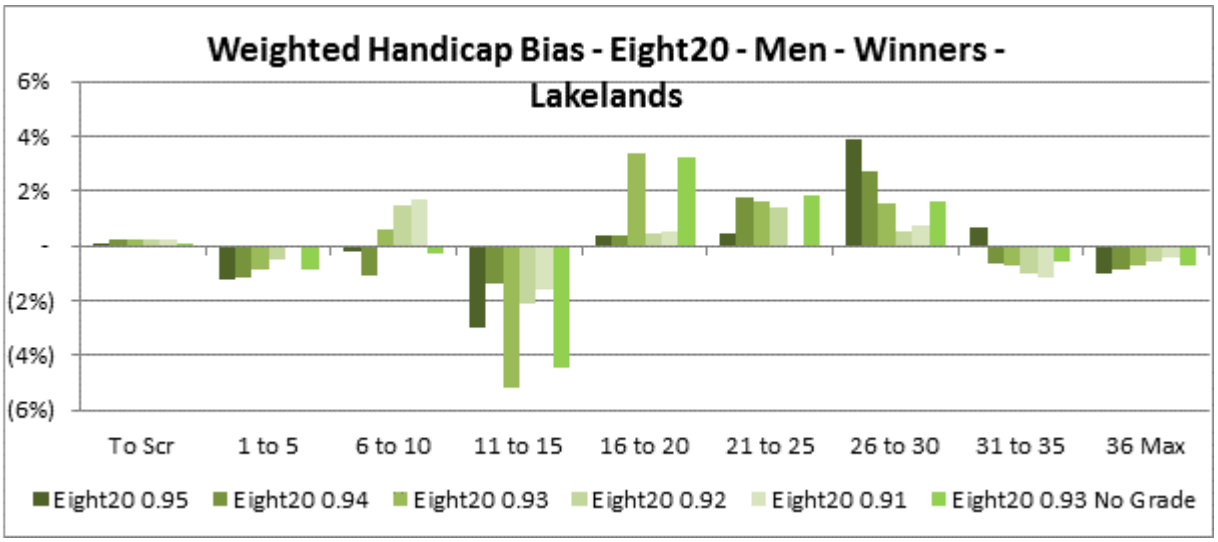
Lakelands	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-36.0	25.5	-34.5	24.0
Current Period - Ten20 0.96	31.0	36.0	2.7	35.7
Old Period - Ten20 0.96	-1.8	35.2	-24.1	15.7
Ten20 0.96	15.0	33.1	-16.3	15.0
Ten20 0.95	5.9	29.9	-22.8	18.2
Ten20 0.94	-0.3	28.3	-21.0	15.6
Ten20 0.93	-9.5	15.9	-26.0	18.1
Ten20 0.92	-14.2	16.1	-29.2	24.4
Ten20 0.91	-25.4	18.1	-28.8	19.6
Ten20 0.9	-33.1	17.0	-32.6	25.0
Nine20 0.96	14.2	28.5	-16.3	15.0
Nine20 0.93	-14.9	17.7	-25.1	20.8
Nine20 0.90	-30.5	18.9	-31.0	25.2
Eight20 0.96	6.7	21.4	-18.9	15.0
Eight20 0.93	-4.0	21.4	-23.7	18.4
Eight20 0.90	-36.9	17.7	-31.9	22.3
Blended 0.96	-9.9	19.1	-25.4	17.8
Blended 0.94	-24.5	13.7	-31.1	24.7
Blended 0.92	-38.2	17.6	-38.9	27.1
Hybrid 0.96	5.8	23.6	-16.1	13.8
Hybrid 0.94	-9.7	13.5	-19.5	15.8

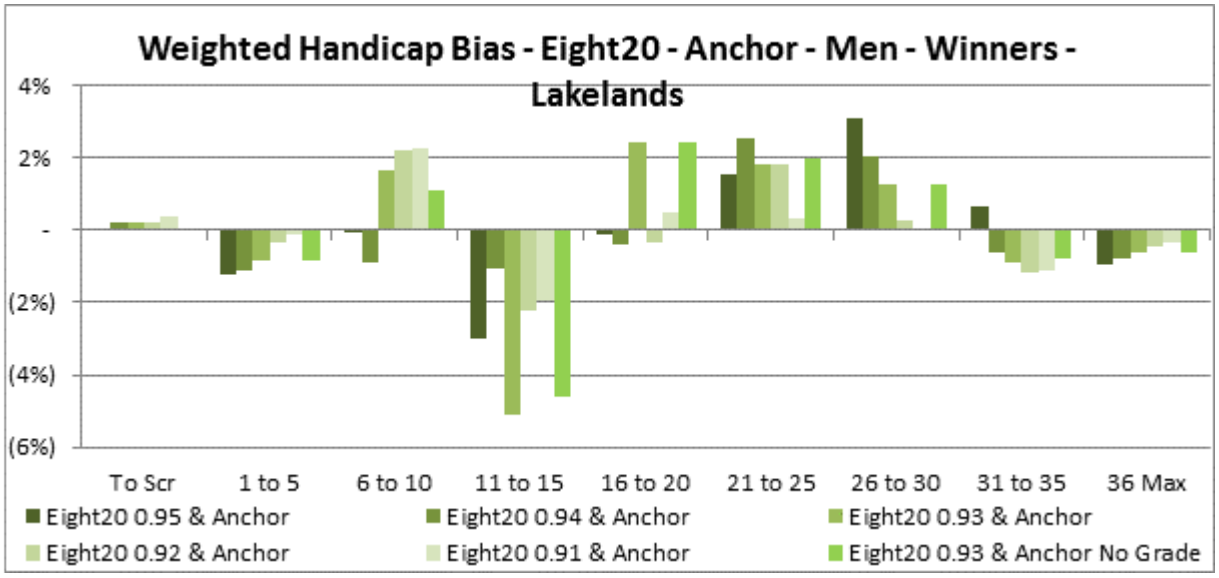
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

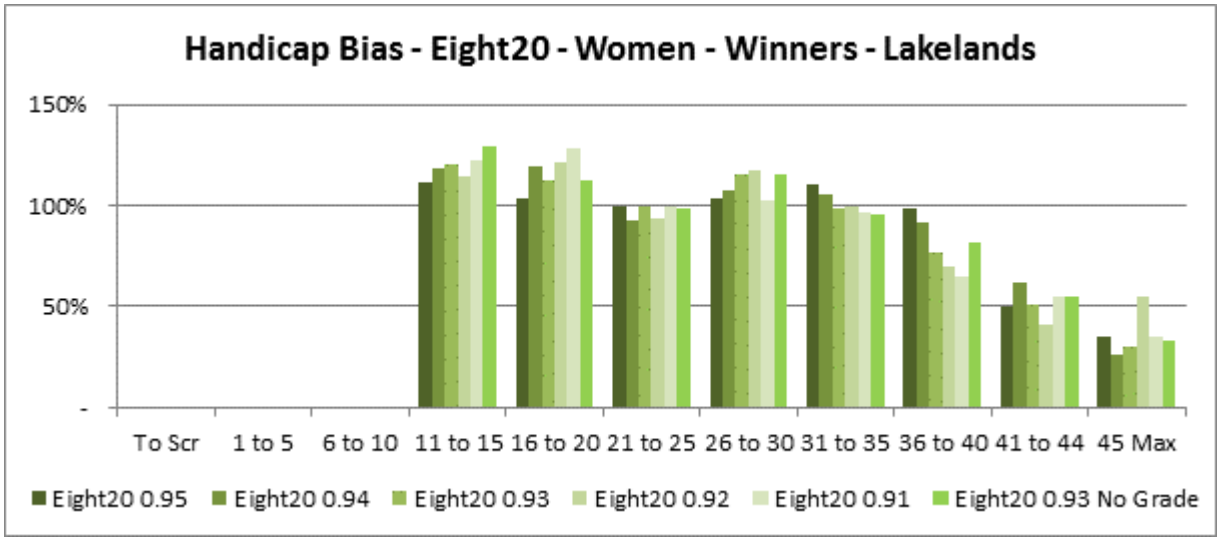
Phase 2

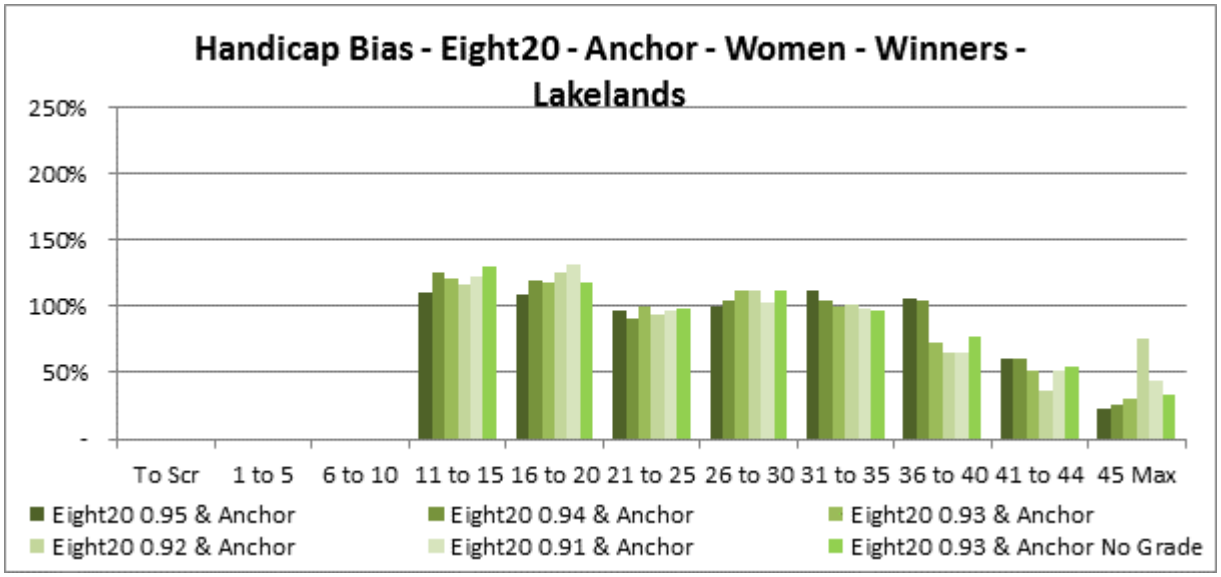

Handicap Bias - Eight20 - Men - Winners - Lakelands
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

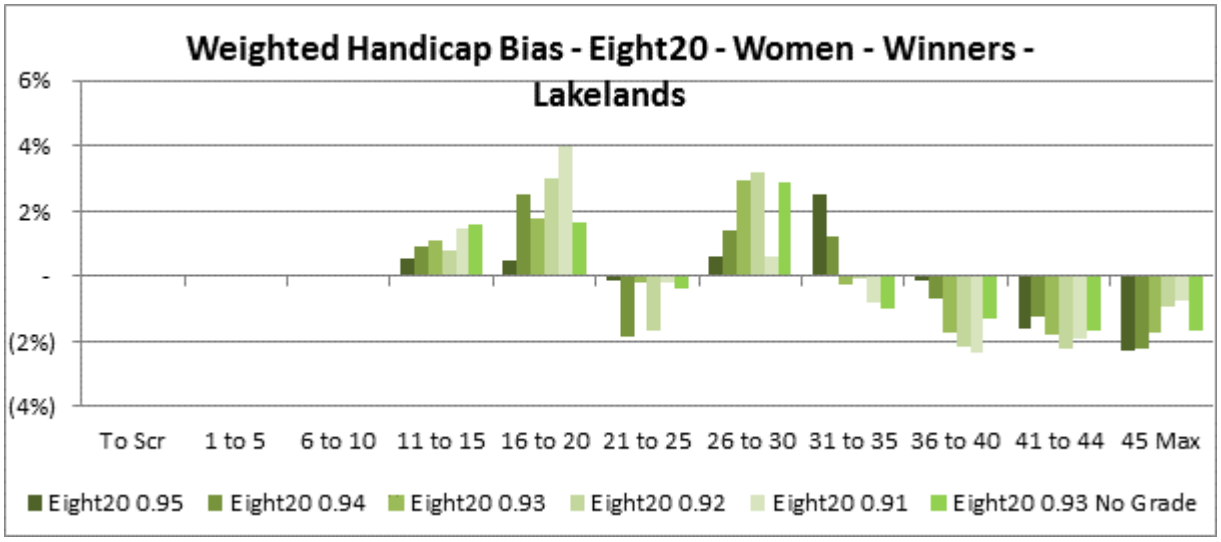

Handicap Bias - Eight20 - Anchor - Men - Winners - Lakelands
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

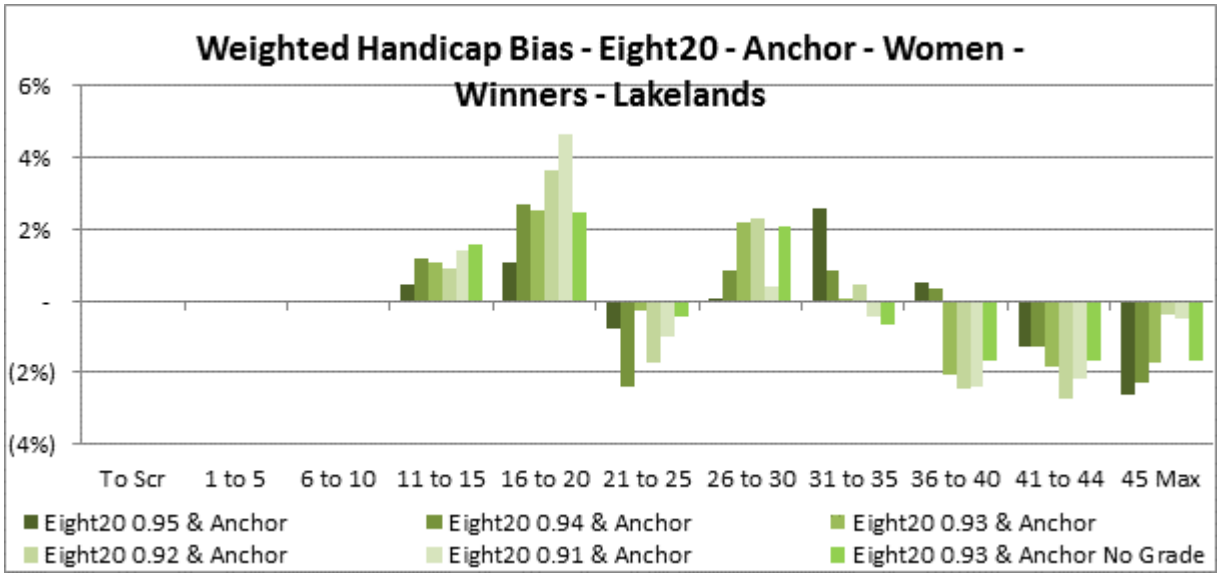

Weighted Handicap Bias - Eight20 - Men - Winners - Lakelands
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

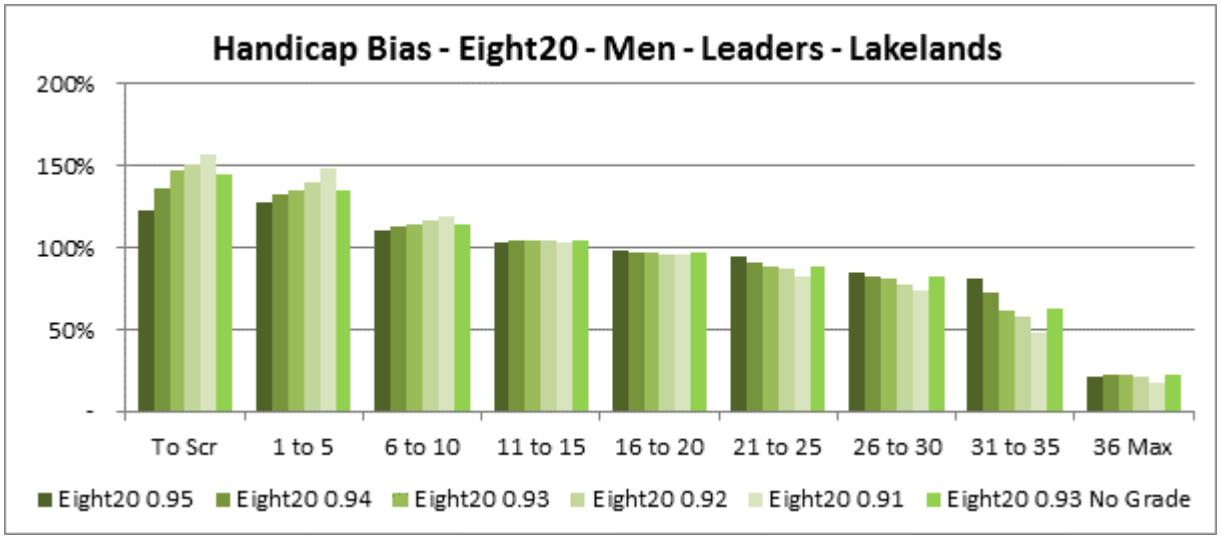

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Lakelands
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

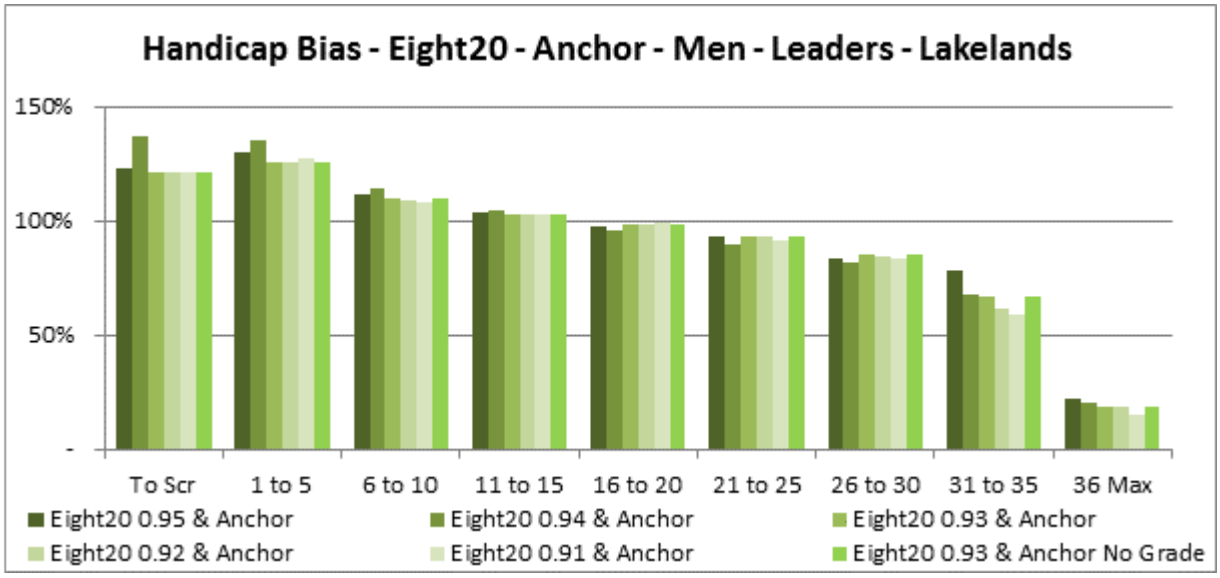

Handicap Bias - Eight20 - Women - Winners - Lakelands
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

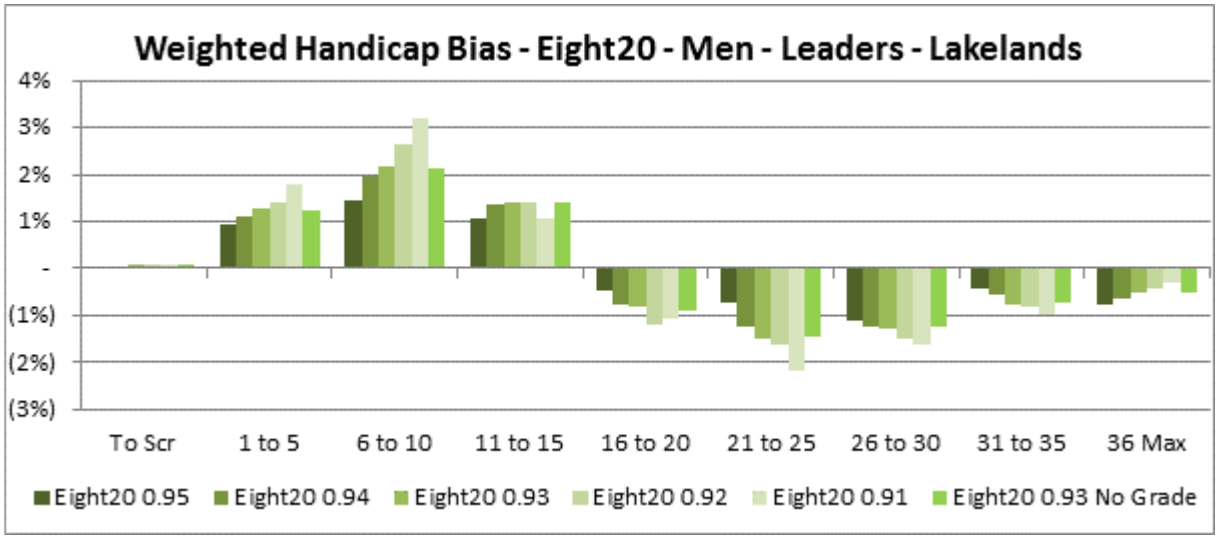

Handicap Bias - Eight20 - Anchor - Women - Winners - Lakelands
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

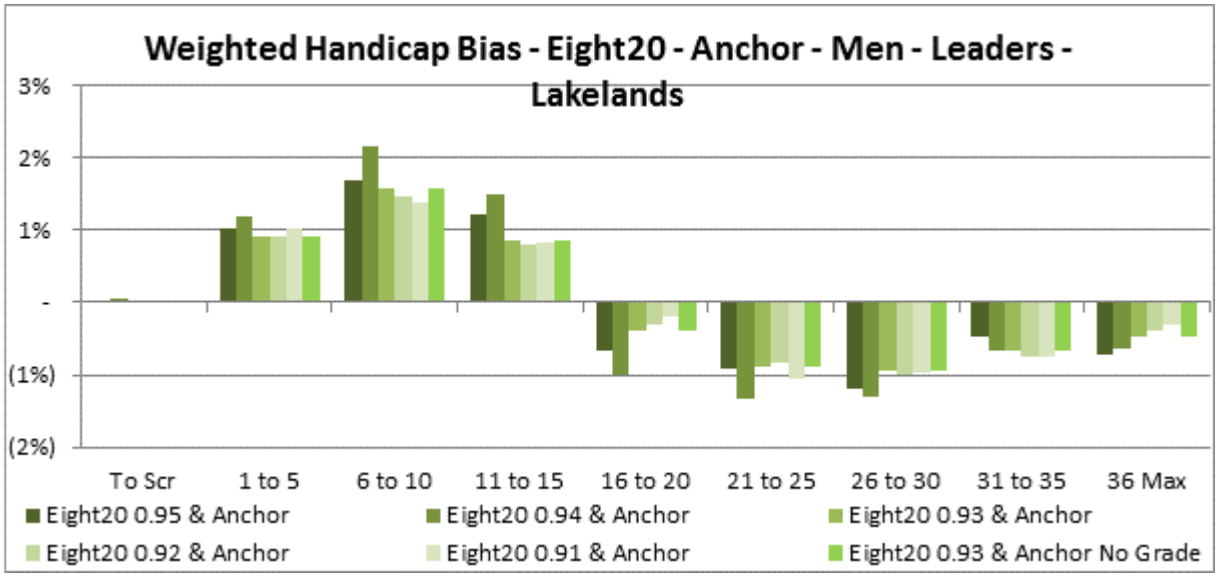

Weighted Handicap Bias - Eight20 - Women - Winners - Lakelands
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

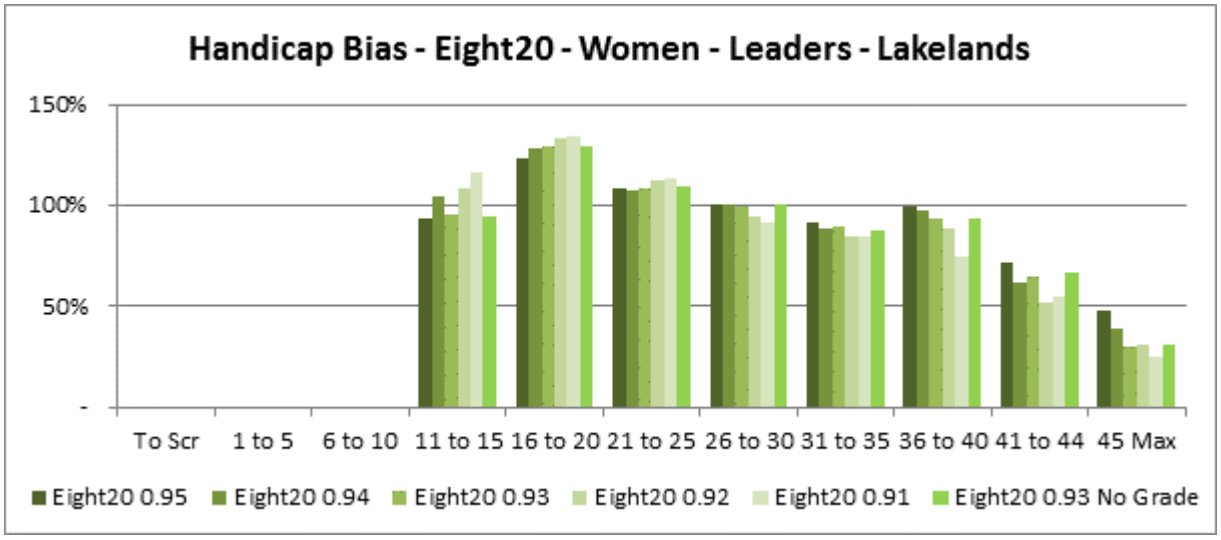

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Lakelands
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

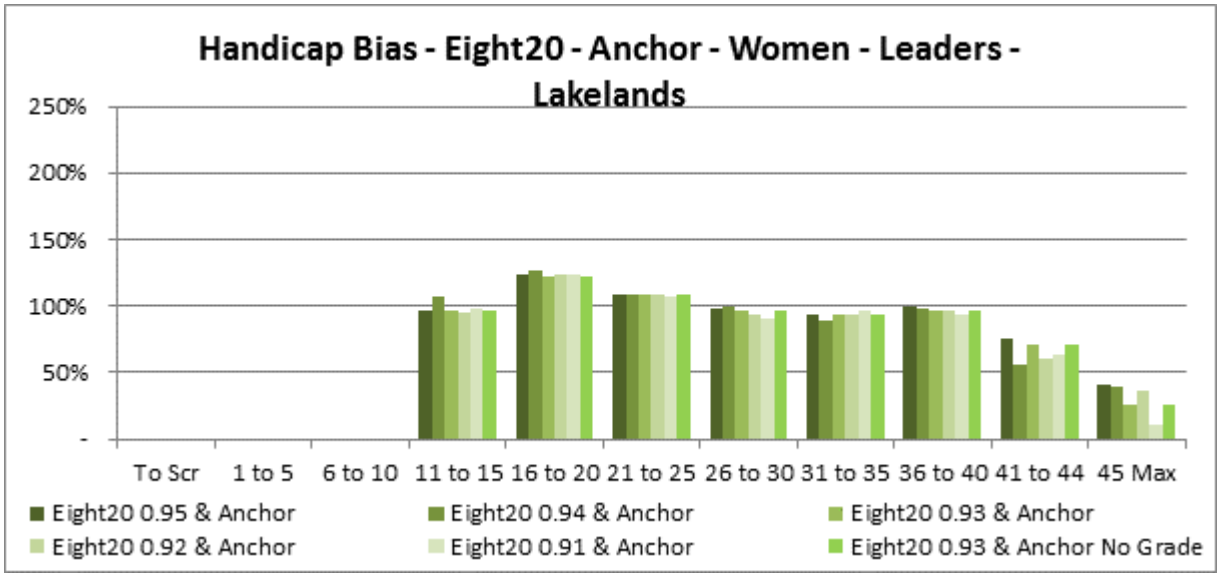

Handicap Bias - Eight20 - Men - Leaders - Lakelands
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

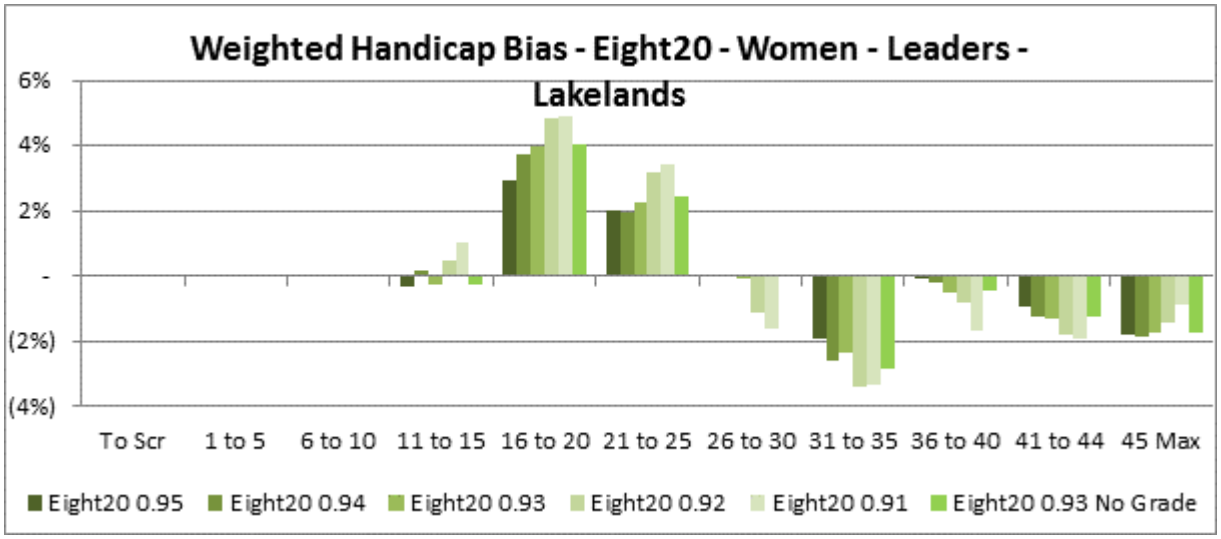

Handicap Bias - Eight20 - Anchor - Men - Leaders - Lakelands
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

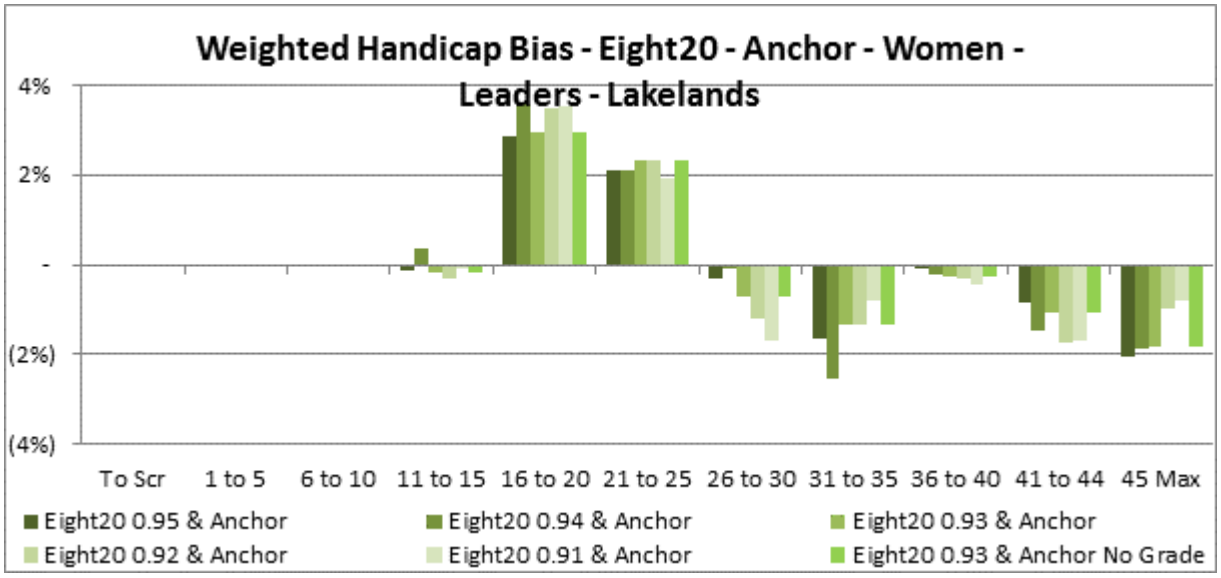

Weighted Handicap Bias - Eight20 - Men - Leaders - Lakelands
4%
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Lakelands
3%
2%
1%
-
(1%)
(2%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Lakelands
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Lakelands
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Lakelands
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

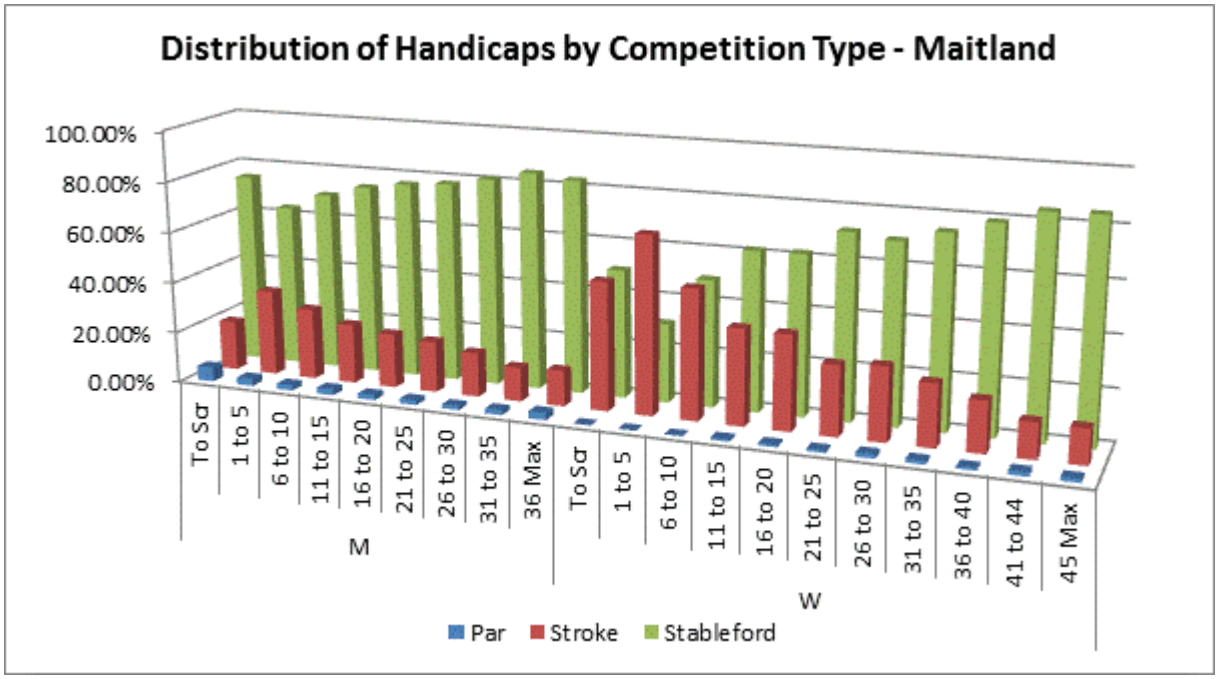


		Phase 2 -Lakelands			
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	21.9	18.5	-12.8	12.2
	Eight20 0.94	13.1	14.1	-17.2	14.6
	Eight20 0.93	9.1	23.9	-20.6	14.9
	Eight20 0.92	-5.1	11.7	-19.5	18.3
	Eight20 0.91	-10.2	9.9	-24.0	17.0
	Eight20 0.93 No Grade	13.3	21.8	-20.9	14.8
	Eight20 0.95 & Anchor	20.7	17.2	-12.3	13.2
	Eight20 0.94 & Anchor	11.5	13.7	-16.3	15.1
	Eight20 0.93 & Anchor	4.8	22.9	-22.2	15.1
	Eight20 0.92 & Anchor	-8.6	13.7	-20.5	19.1
	Eight20 0.91 & Anchor	-13.6	11.6	-23.9	18.9
	Eight20 0.93 & Anchor No Grade	7.6	21.1	-22.6	14.8
Leaders	Eight20 0.95	-23.7	9.3	-17.3	14.3
	Eight20 0.94	-28.2	11.9	-22.0	17.3
	Eight20 0.93	-30.4	13.0	-21.5	17.7
	Eight20 0.92	-33.3	15.1	-27.6	22.9
	Eight20 0.91	-37.9	17.4	-29.2	24.0
	Eight20 0.93 No Grade	-30.0	13.0	-21.8	18.8
	Eight20 0.95 & Anchor	-25.7	10.5	-18.1	14.3
	Eight20 0.94 & Anchor	-30.1	13.1	-22.9	17.2
	Eight20 0.93 & Anchor	-22.7	9.1	-18.3	14.6
	Eight20 0.92 & Anchor	-22.0	8.8	-17.6	15.8
	Eight20 0.91 & Anchor	-22.1	8.9	-16.9	15.2
	Eight20 0.93 & Anchor No Grade	-22.7	9.1	-18.3	14.6

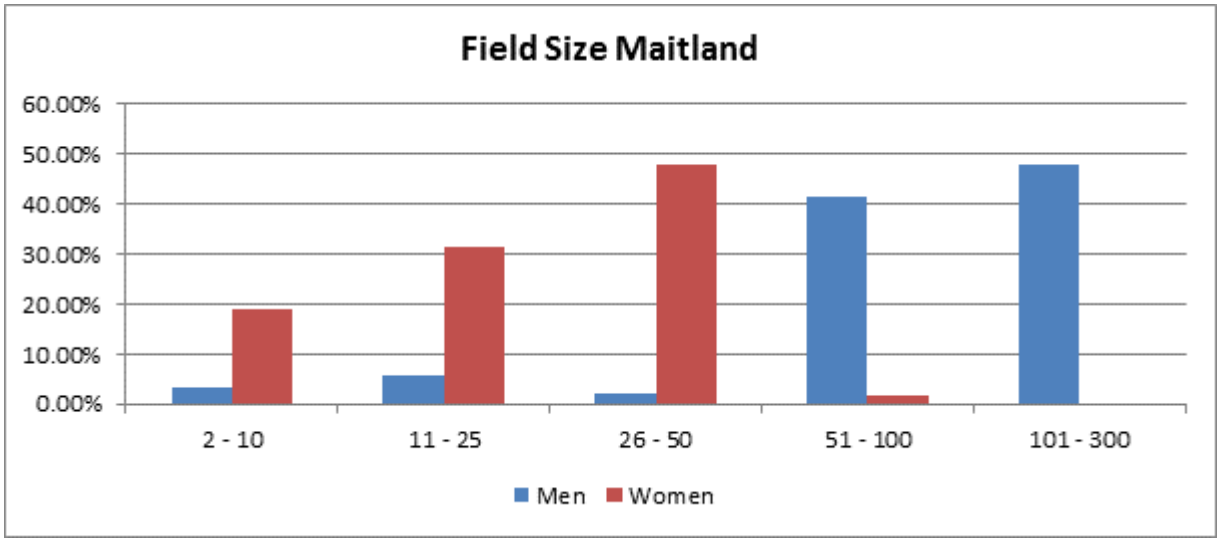
Appendix 8 – Maitland

Phase 1

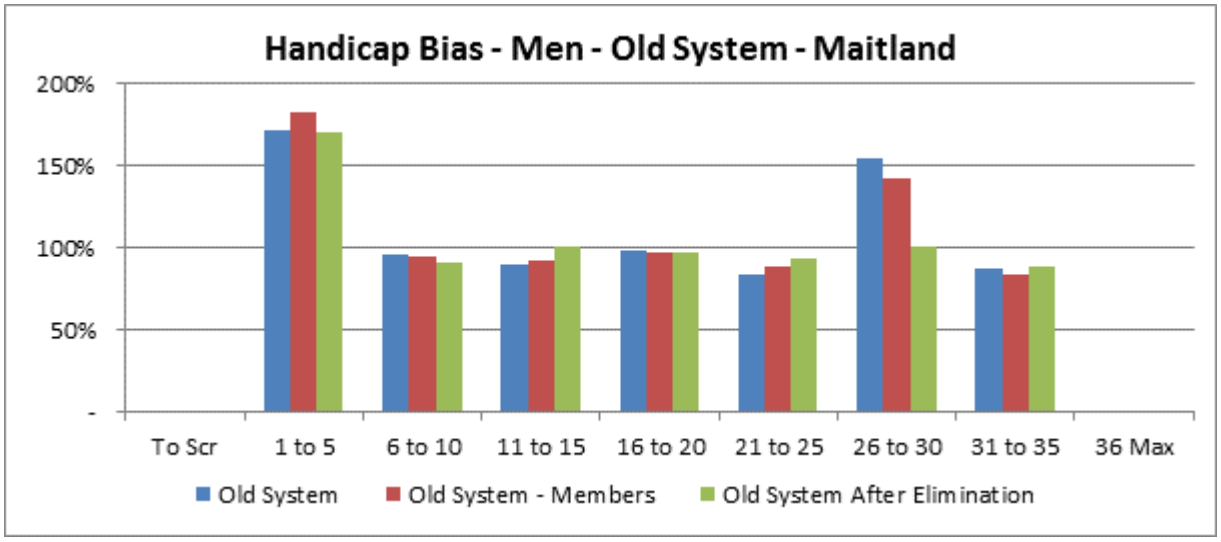
Maitland	Men	Women	Total
Players in Database	2,308	399	2,707
Members	795	116	911
Visitors	1,513	283	1,796
Members who have Played 33 Rounds	732	107	839
Members with Last Round In Old System	188	26	214
Members with Last Round in Current System	607	90	697
Earliest Round	1/12/2007	12/3/2008	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			202
Number of Home Competitions	435	297	732
Number of Rounds of Golf	49,410	6,777	56,187
Number of Rounds at Home	42,311	5,446	47,757
Number of Rounds at Home Old	33,388	4,219	37,607
Number of Rounds at Home Current	8,923	1,227	10,150
Num Rnds Members at Home	36,787	4,894	41,681
Num Rnds Members at Home Old	28,981	3,771	32,752
Num Rnds Members at Home Cur	7,806	1,123	8,929
Num Rnds After Eliminations	20,130	2,391	22,521
Num Rnds After Eliminations Old	13,300	1,407	14,707
Num Rnds After Eliminations Cur	6,830	984	7,814

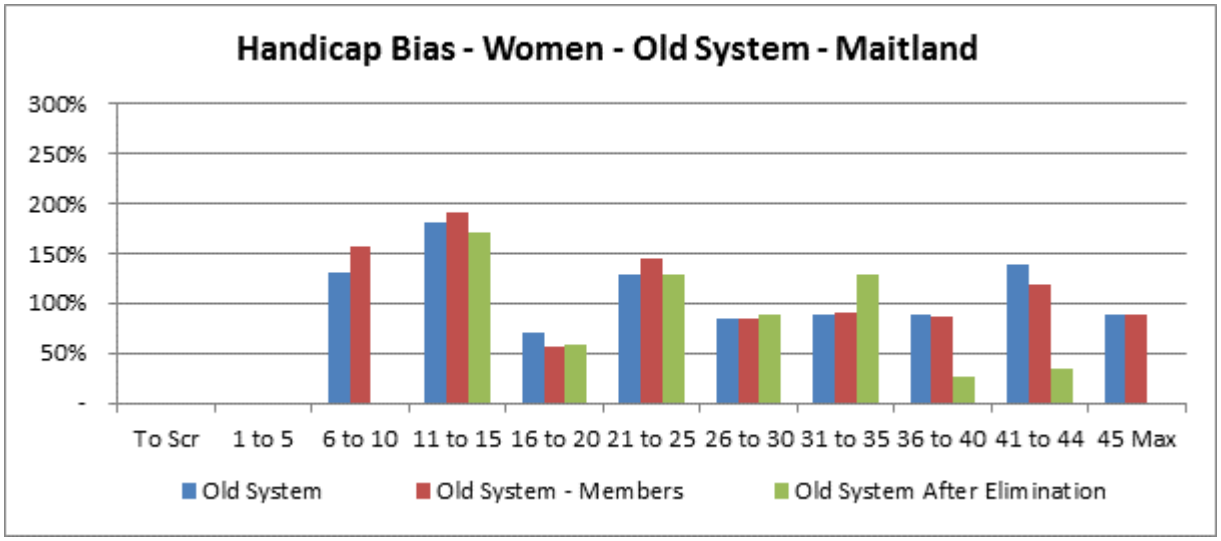


Most men's competitions are with a field of over 50, the women mainly field 21 - 50.

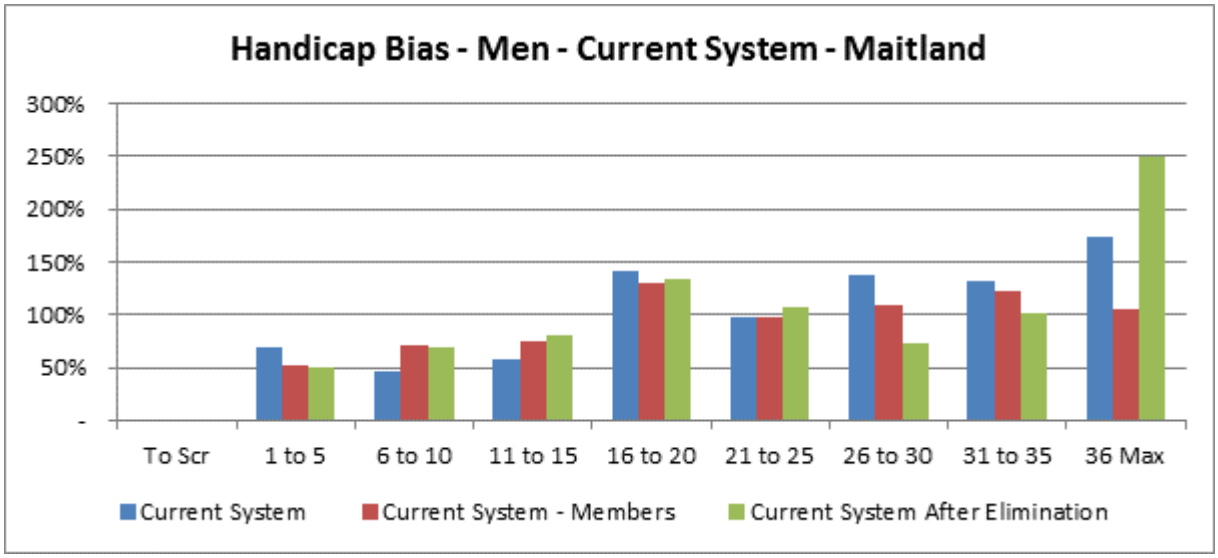


Under the Old System, the bias was mixed. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

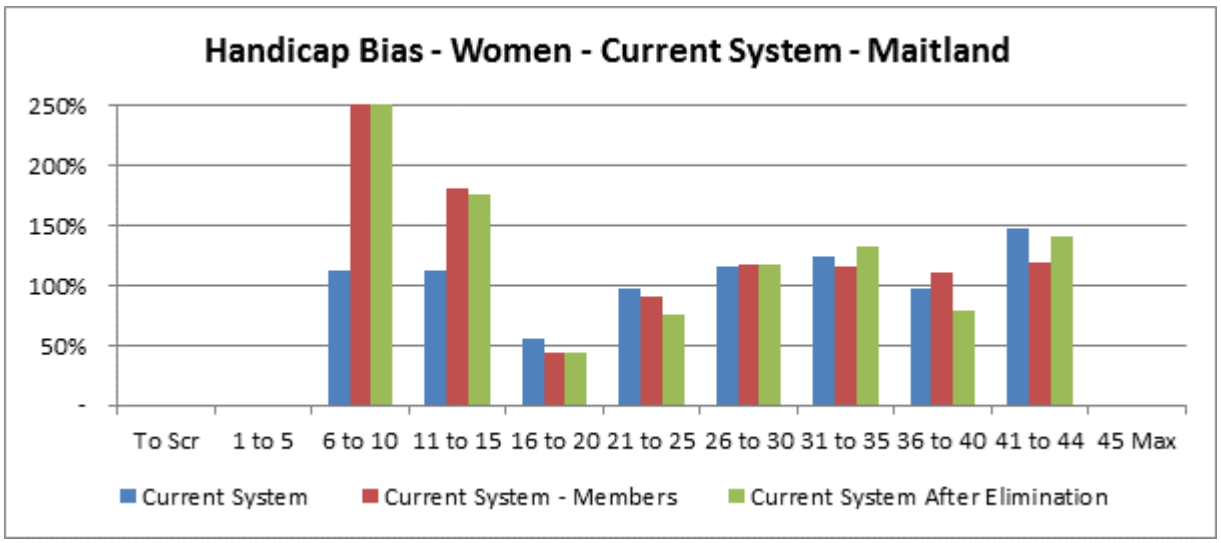




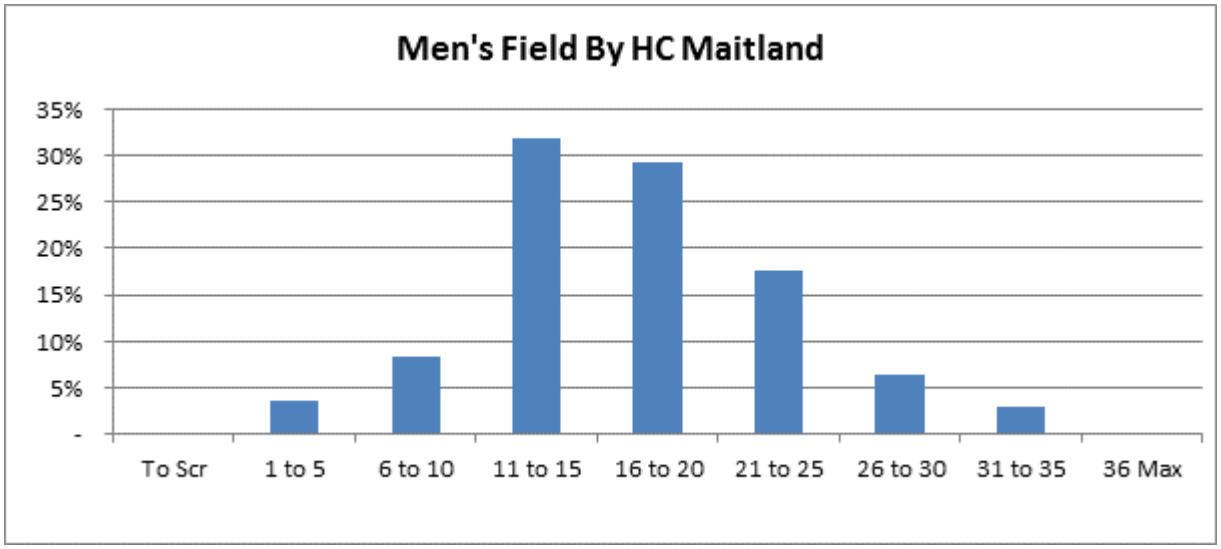
Under the Current System, there is now a bias in favour of the men high markers.

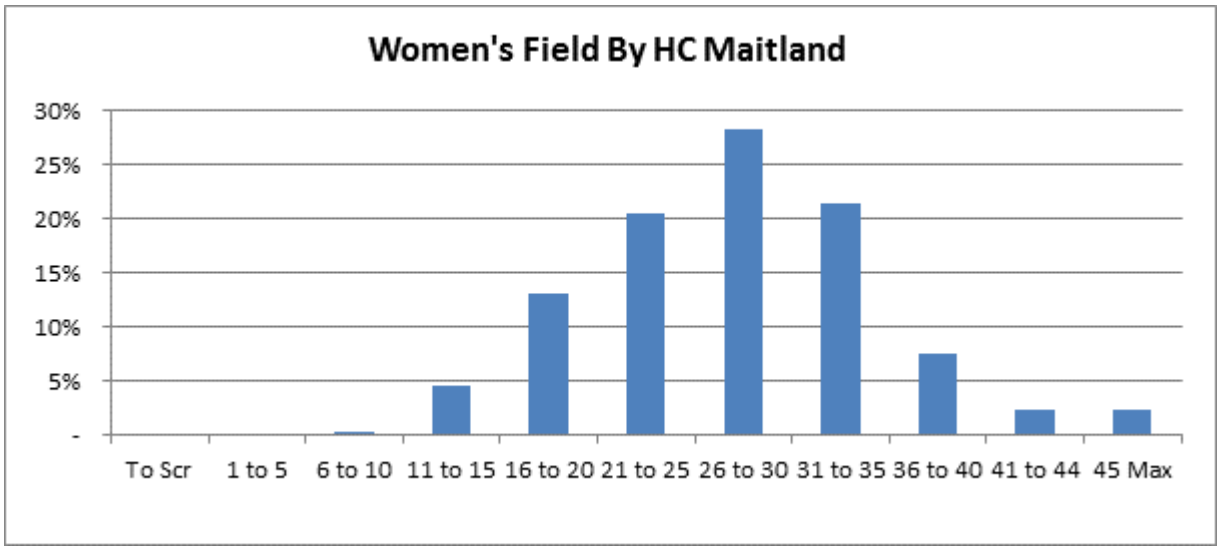


The picture is somewhat similar for the women.



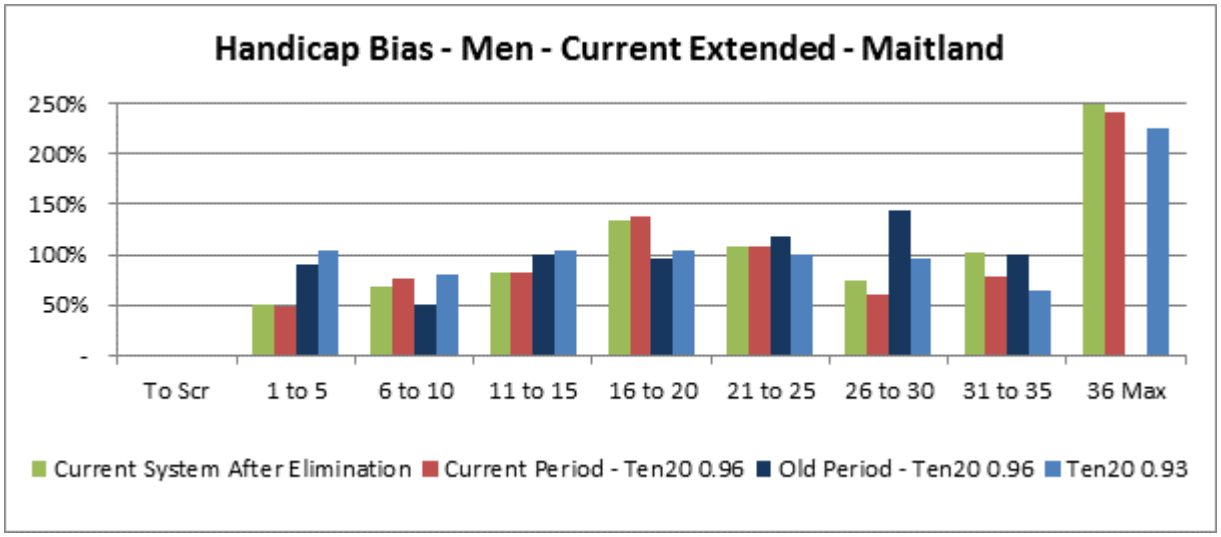
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.



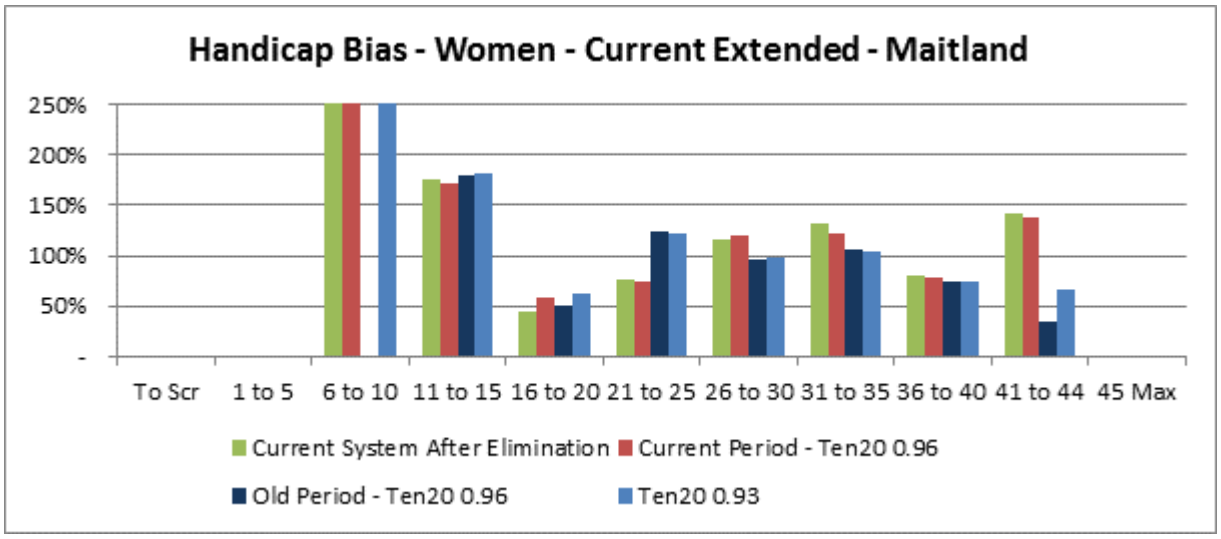


In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

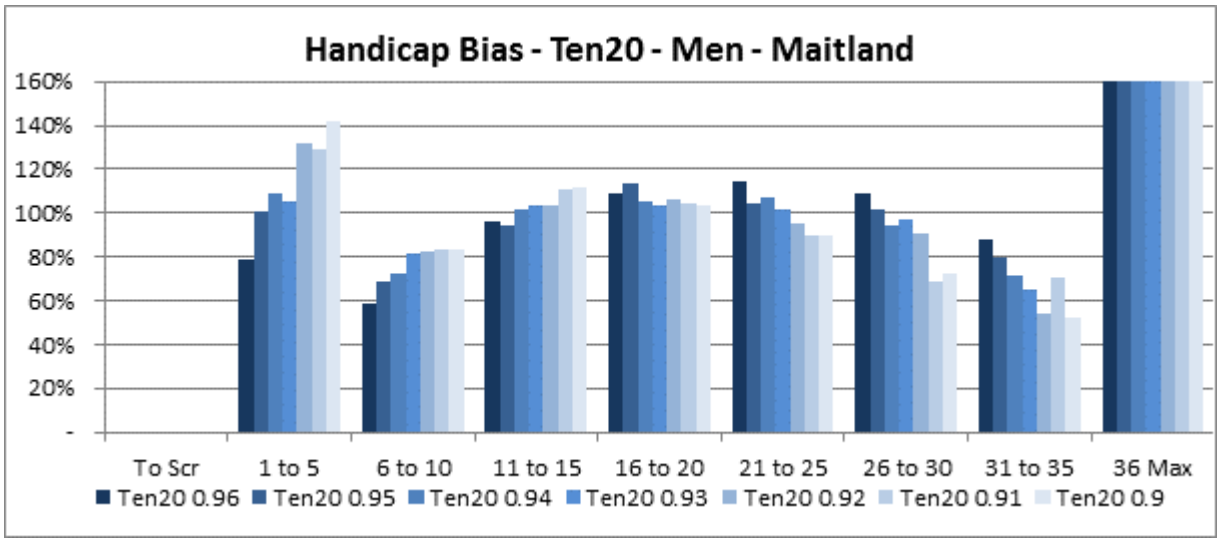
In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

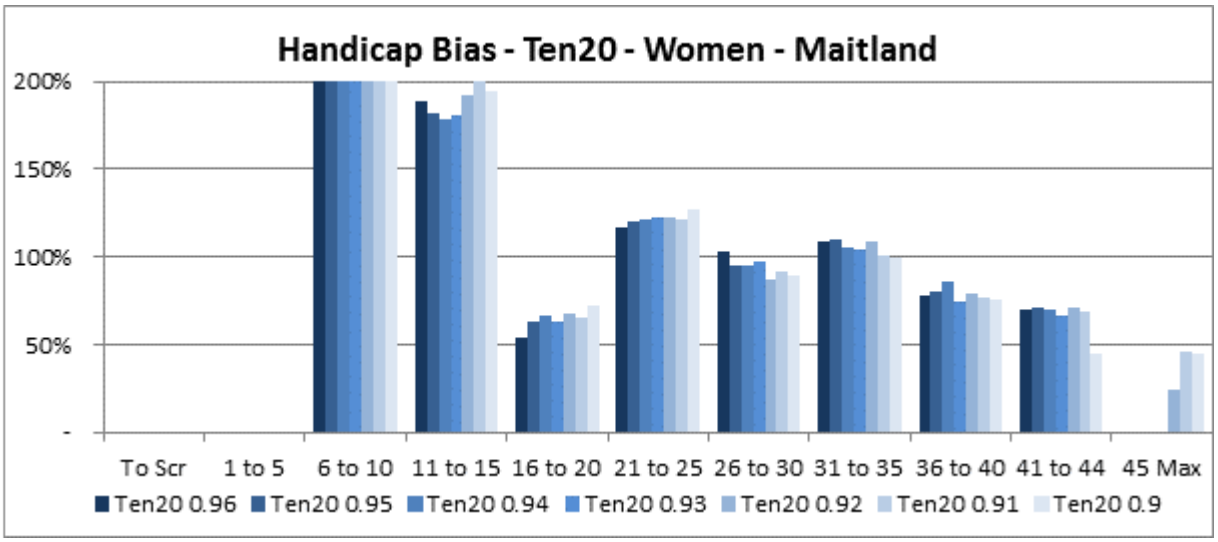


For women, the low markers would have dominated over the two-years.

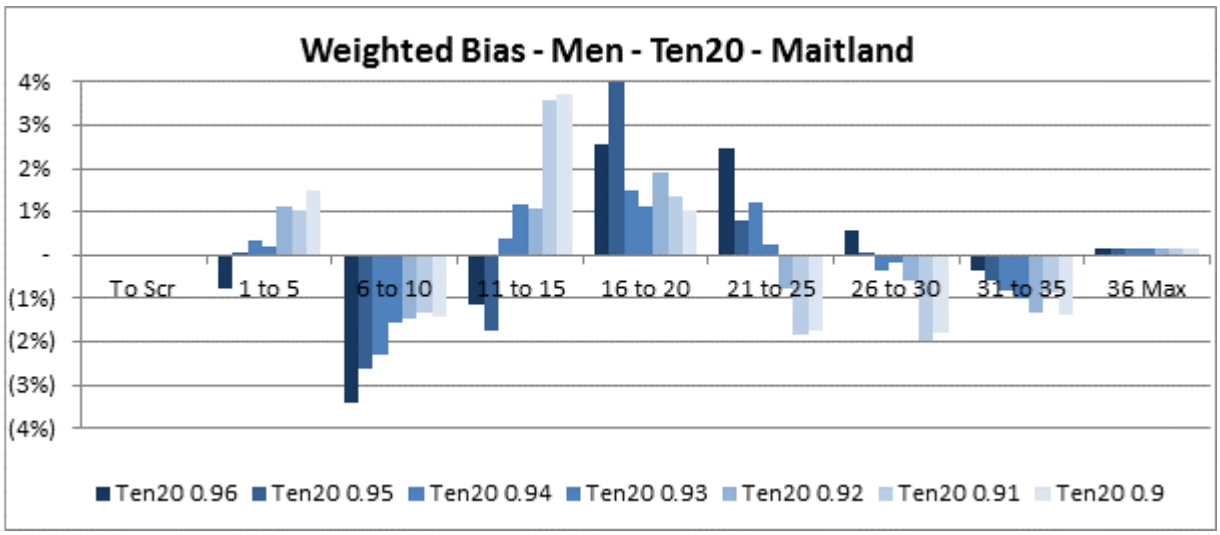


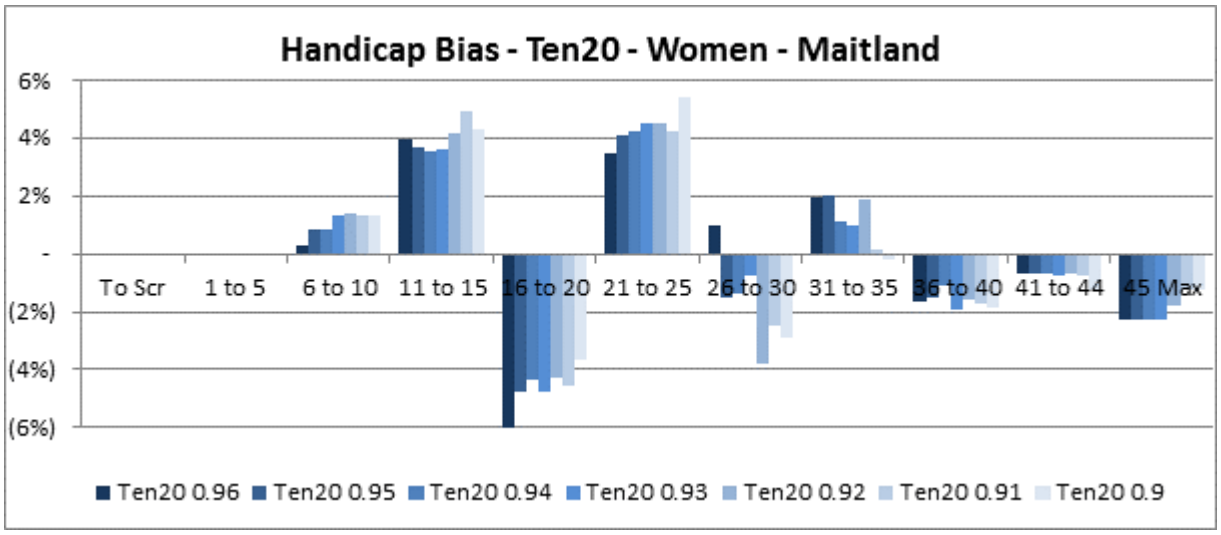
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

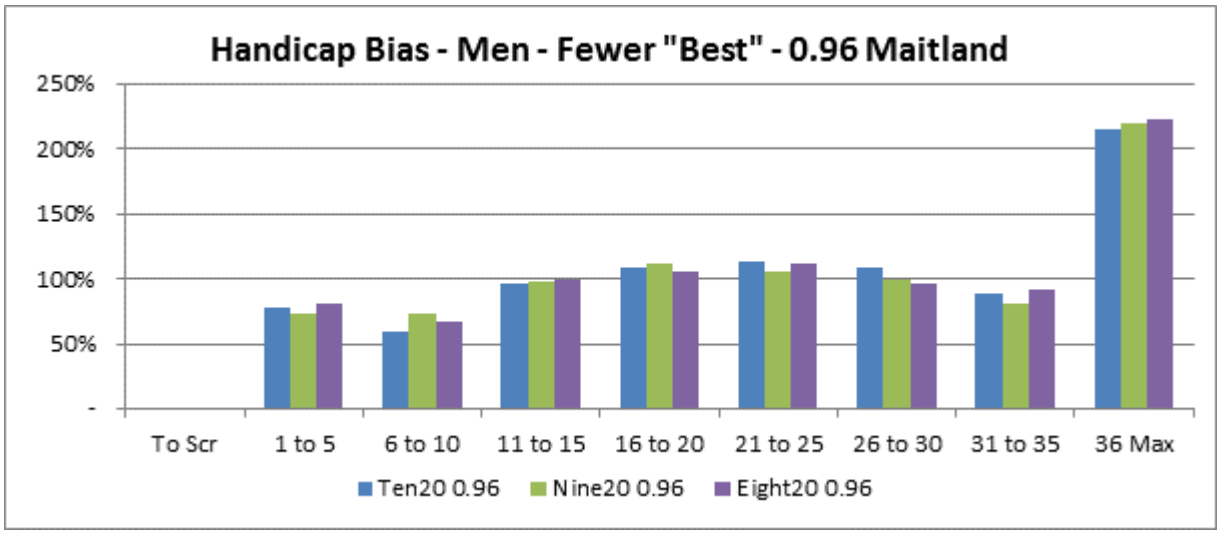


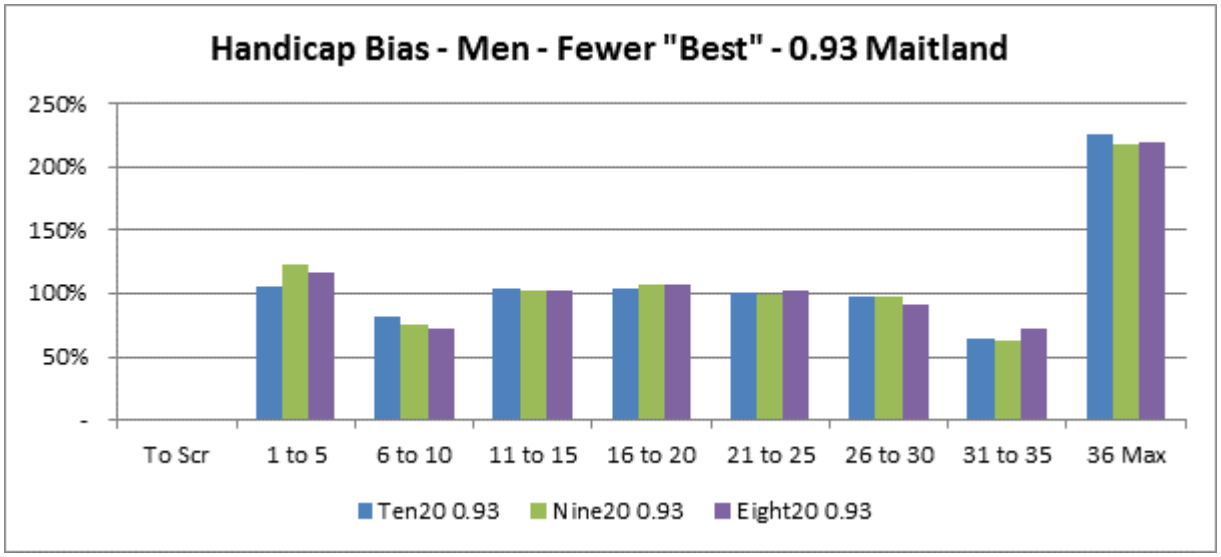


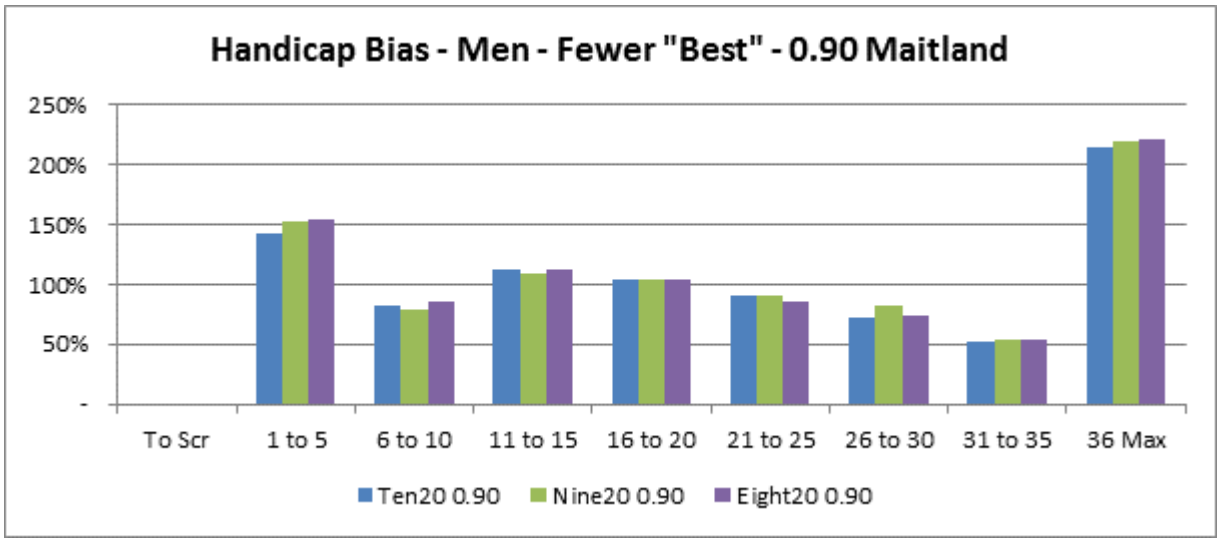
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

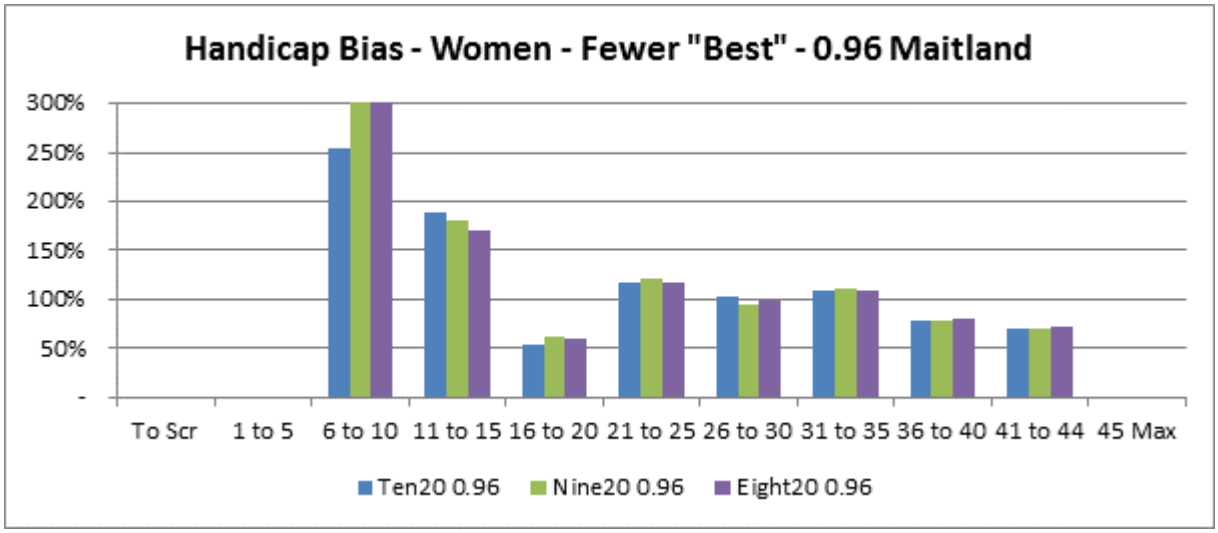
	Maitland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	22.6	18.2	-15.8	28.0
Ten20 0.95	11.4	18.3	-19.4	26.2
Ten20 0.94	3.3	11.2	-20.0	24.7
Ten20 0.93	-1.7	8.8	-23.2	26.4
Ten20 0.92	-11.2	11.7	-22.2	28.7
Ten20 0.91	-19.4	17.9	-23.7	27.7
Ten20 0.9	-23.5	18.5	-26.5	28.0

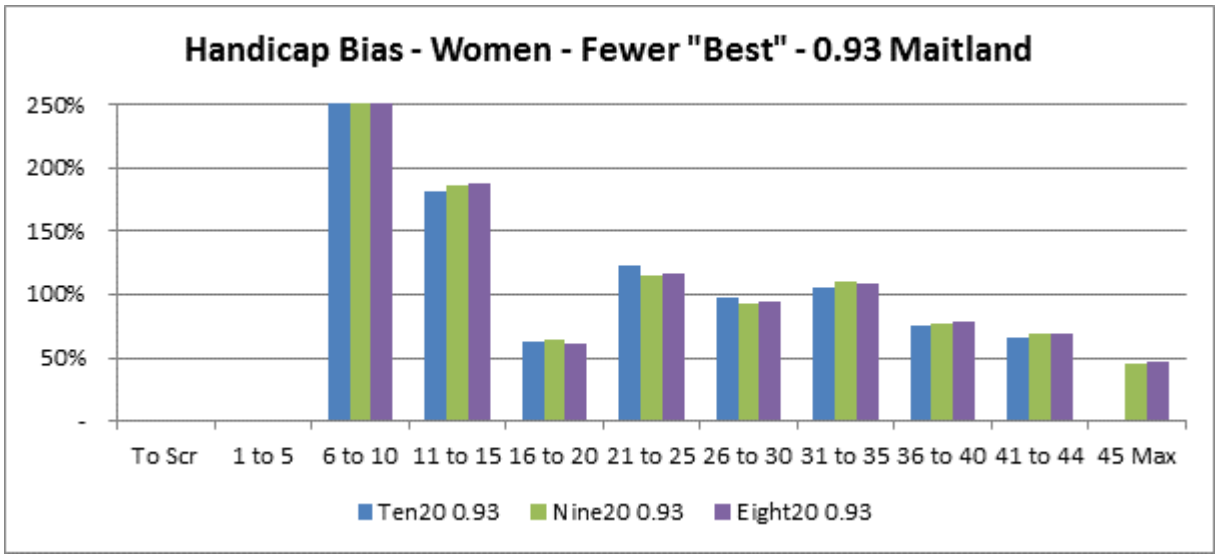
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

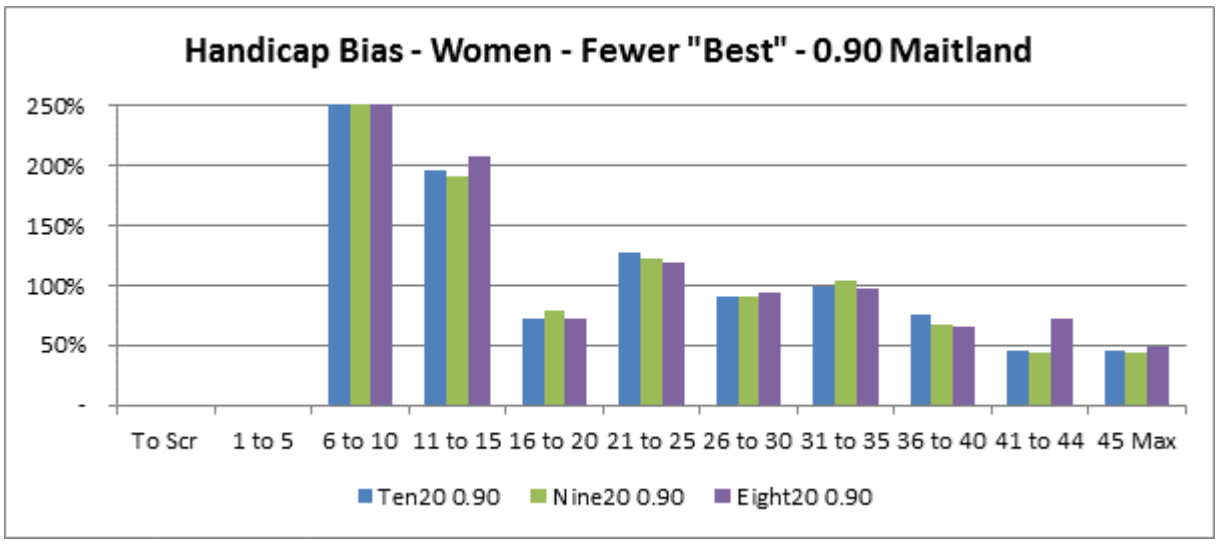







Handicap Bias - Women - Fewer "Best" - 0.96 Maitland
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

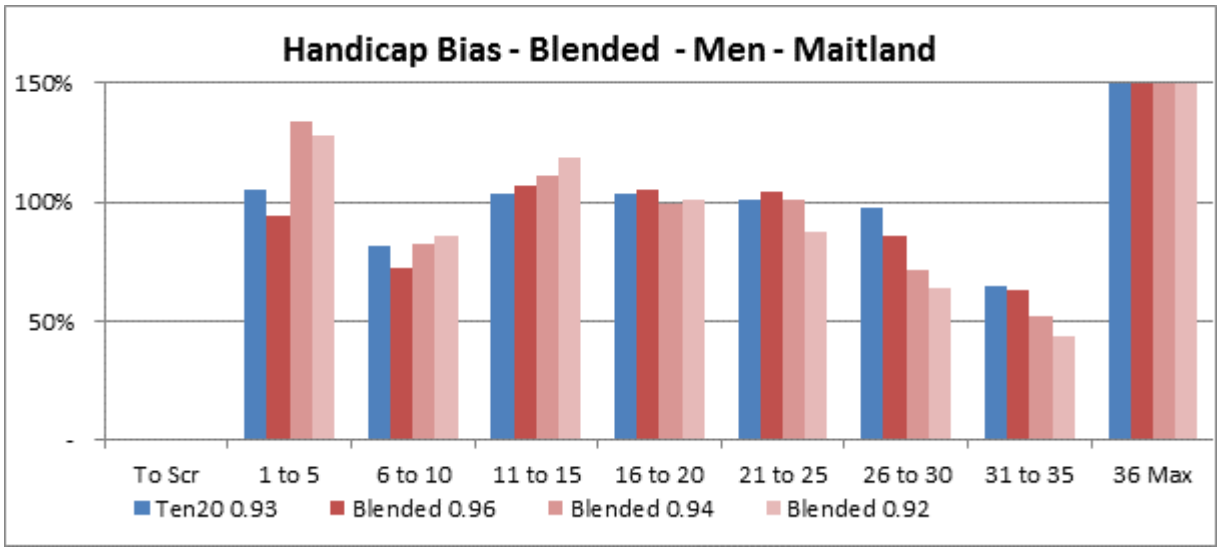

Handicap Bias - Women - Fewer "Best" - 0.93 Maitland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

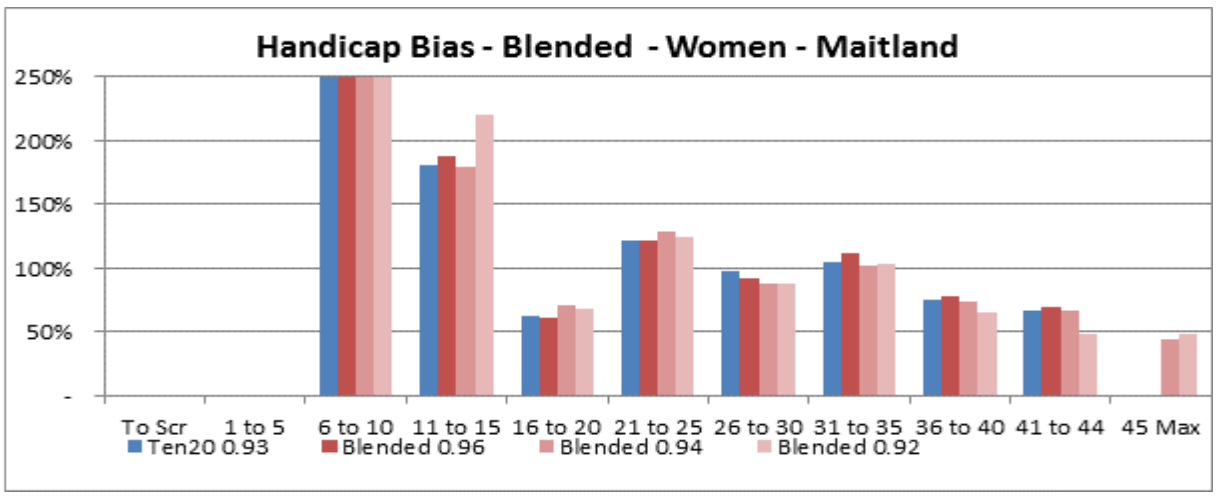

Handicap Bias - Women - Fewer "Best" - 0.90 Maitland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

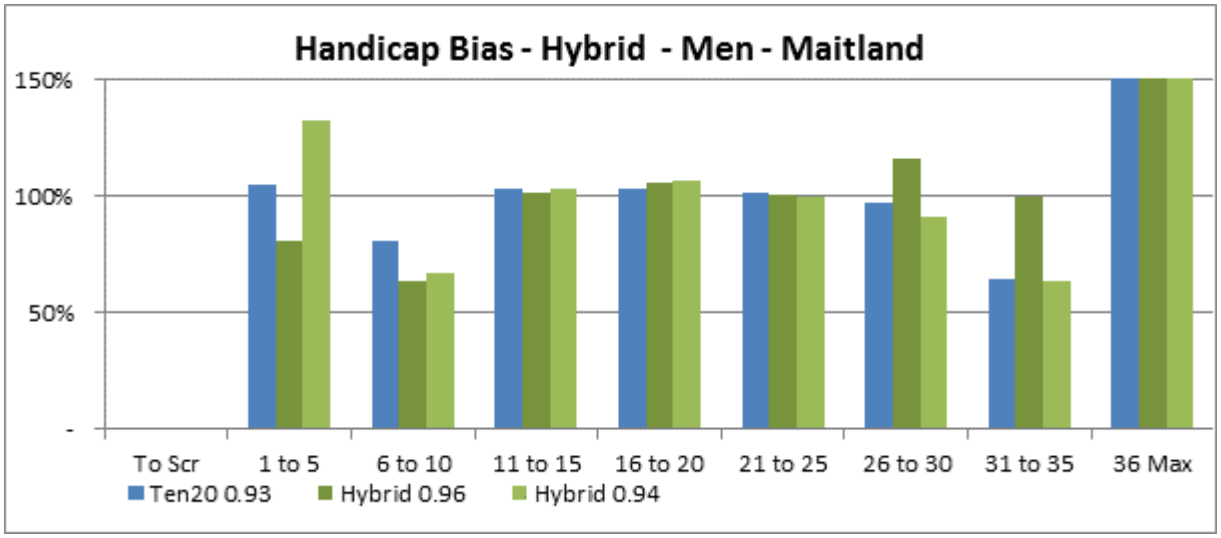
Maitland				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	22.6	18.2	-15.8	28.0
Nine20 0.96	13.6	15.4	-19.1	27.1
Eight20 0.96	15.2	14.0	-18.4	25.6
Ten20 0.93	-1.7	8.8	-23.2	26.4
Nine20 0.93	-3.4	11.3	-17.8	24.8
Eight20 0.93	-1.2	11.7	-15.8	25.5
Ten20 0.90	-23.5	18.5	-26.5	28.0
Nine20 0.90	-20.5	16.7	-26.7	25.4
Eight20 0.90	-27.1	19.8	-26.7	25.5

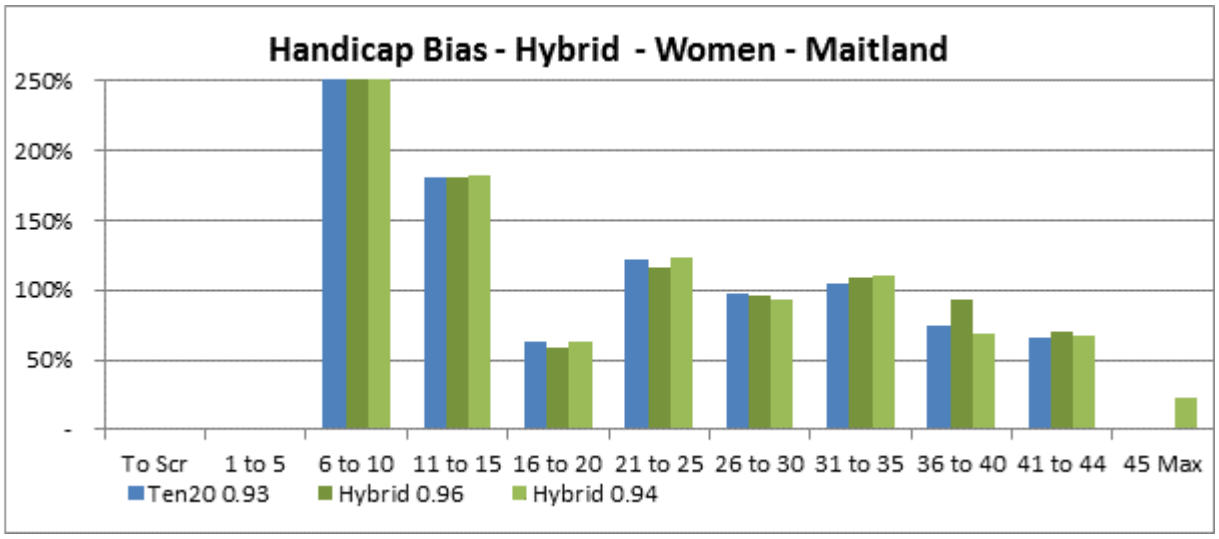
For the Blended:





For the Hybrid:

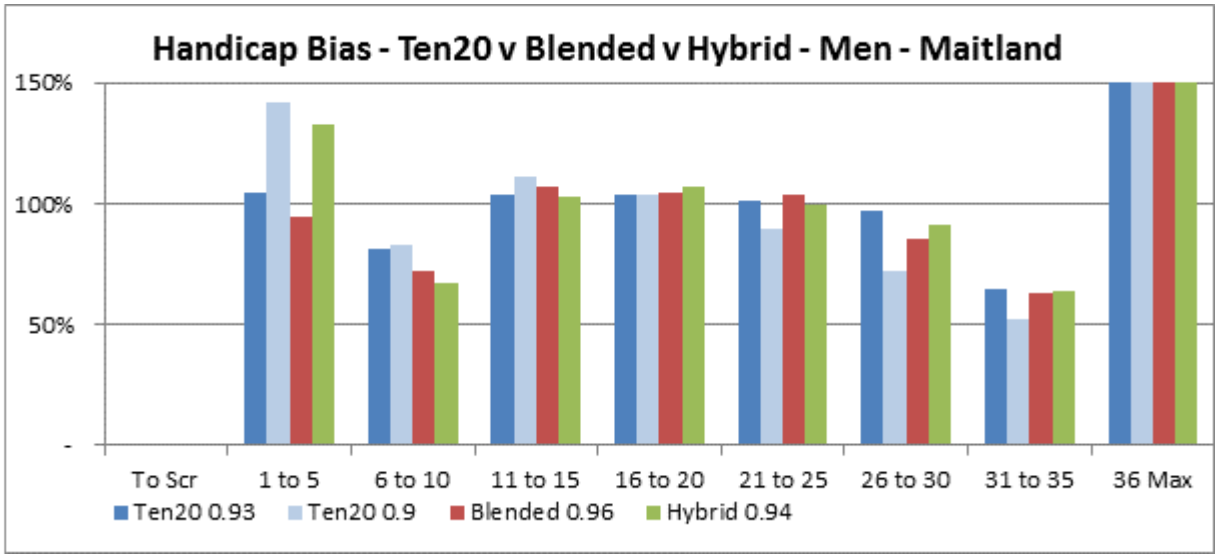


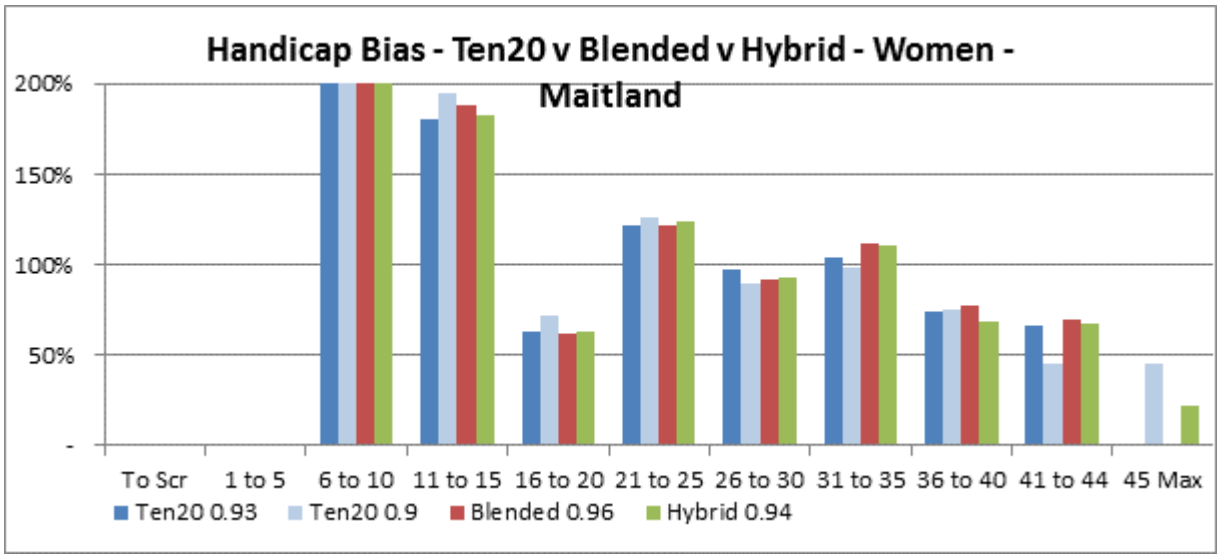


The Corresponding Tilt and Level Indices are:

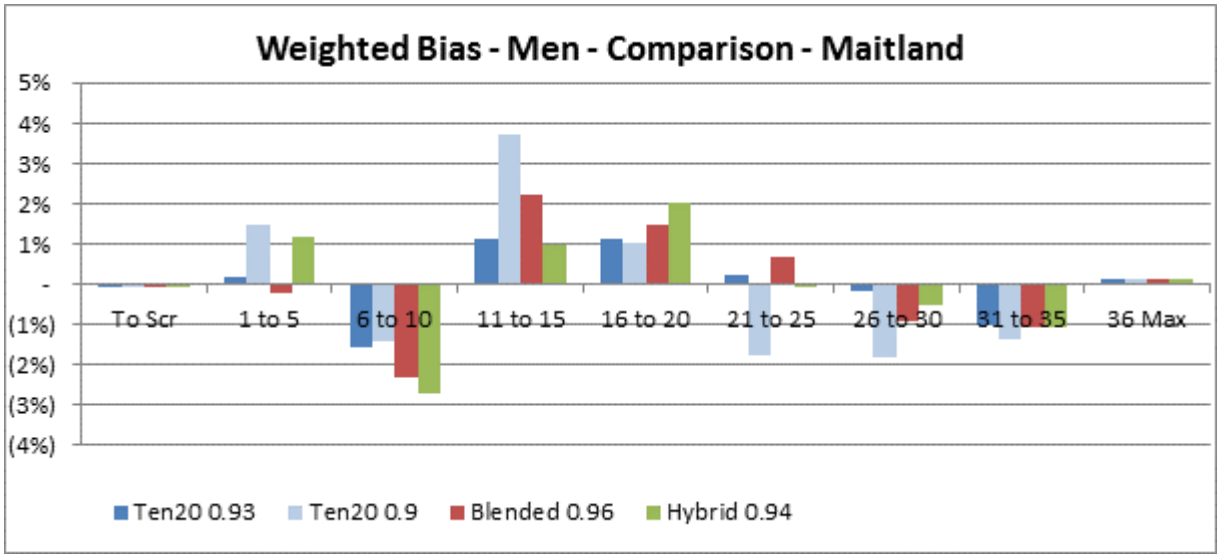
	Maitland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-1.0	13.6	-20.1	28.6
Blended 0.94	-18.5	16.1	-23.0	28.7
Blended 0.92	-29.5	25.4	-28.7	30.8
Hybrid 0.96	17.4	13.2	-15.8	25.6
Hybrid 0.94	-4.3	13.9	-19.8	28.0

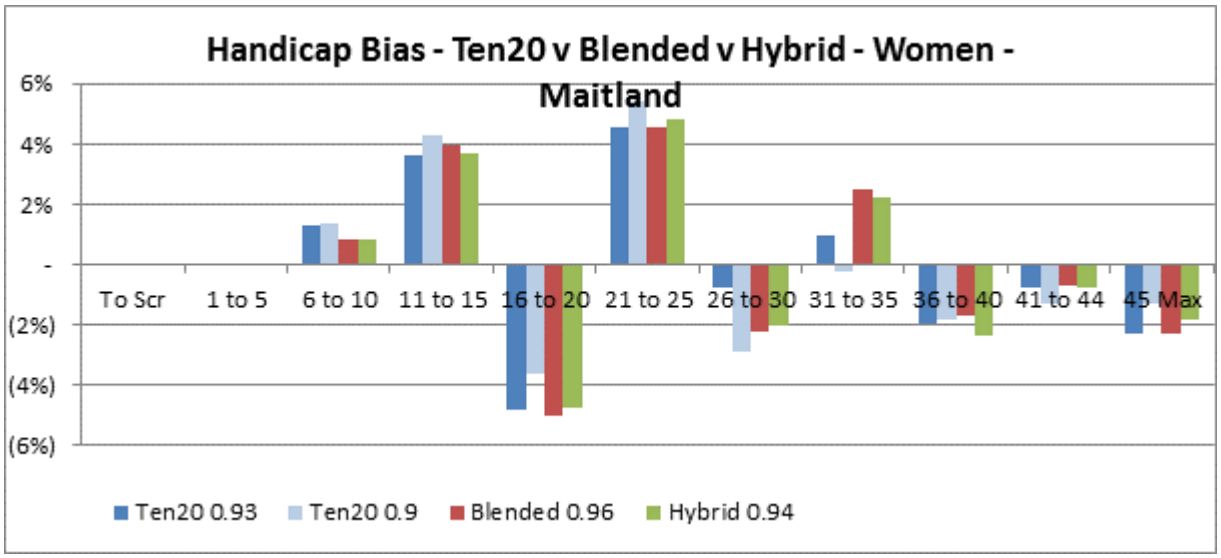
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

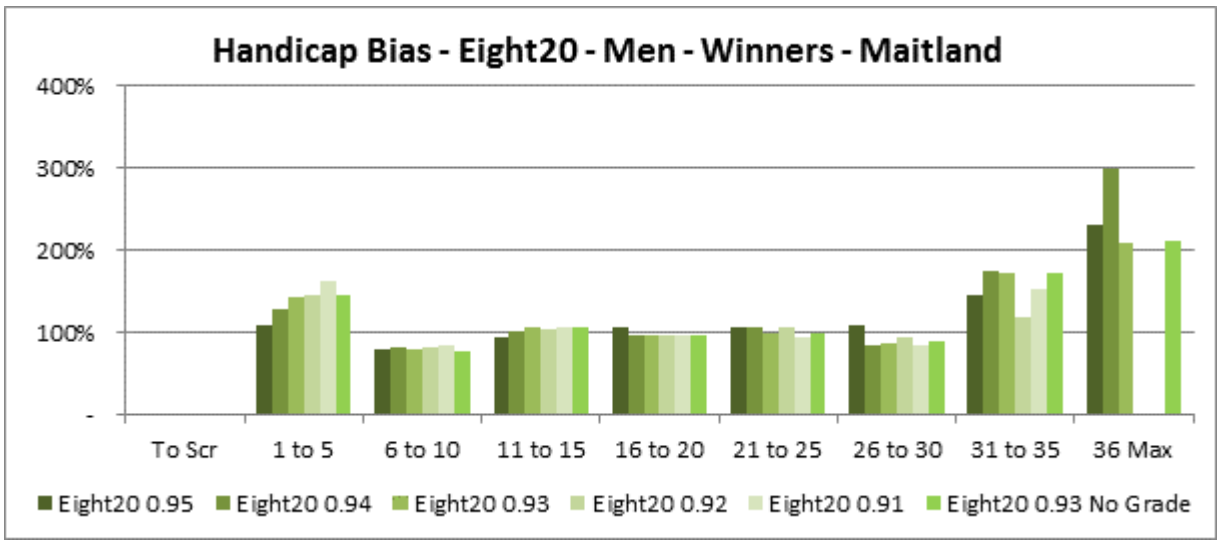
	Maitland			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-1.7	8.8	-23.2	26.4
Ten20 0.9	-23.5	18.5	-26.5	28.0
Blended 0.96	-1.0	13.6	-20.1	28.6
Hybrid 0.94	-4.3	13.9	-19.8	28.0

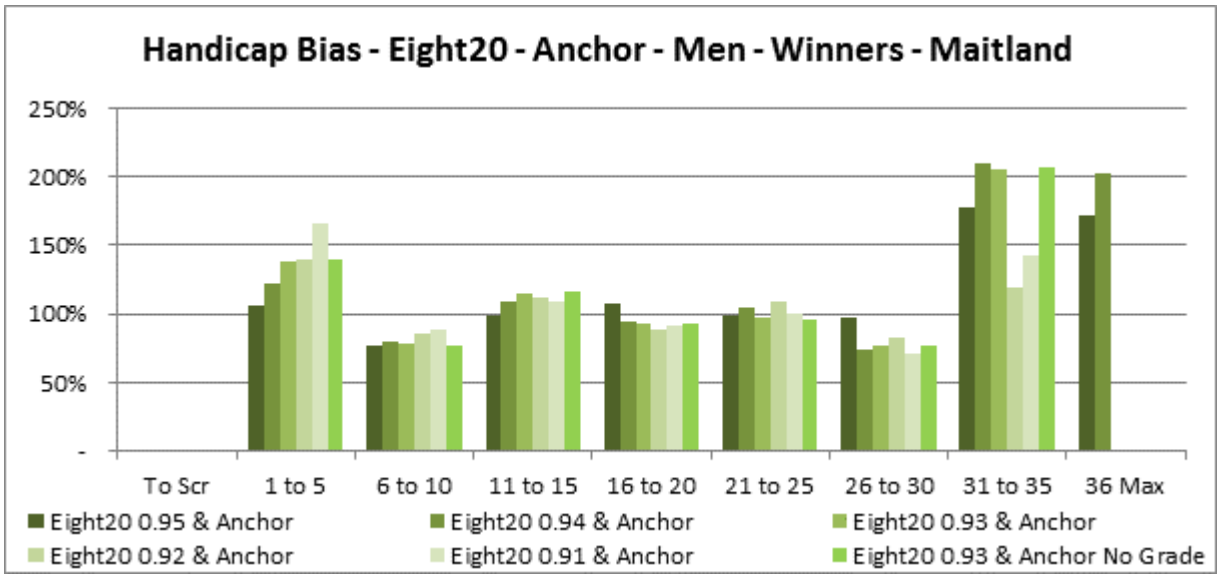
Putting it all together, with the Old System as a reference:

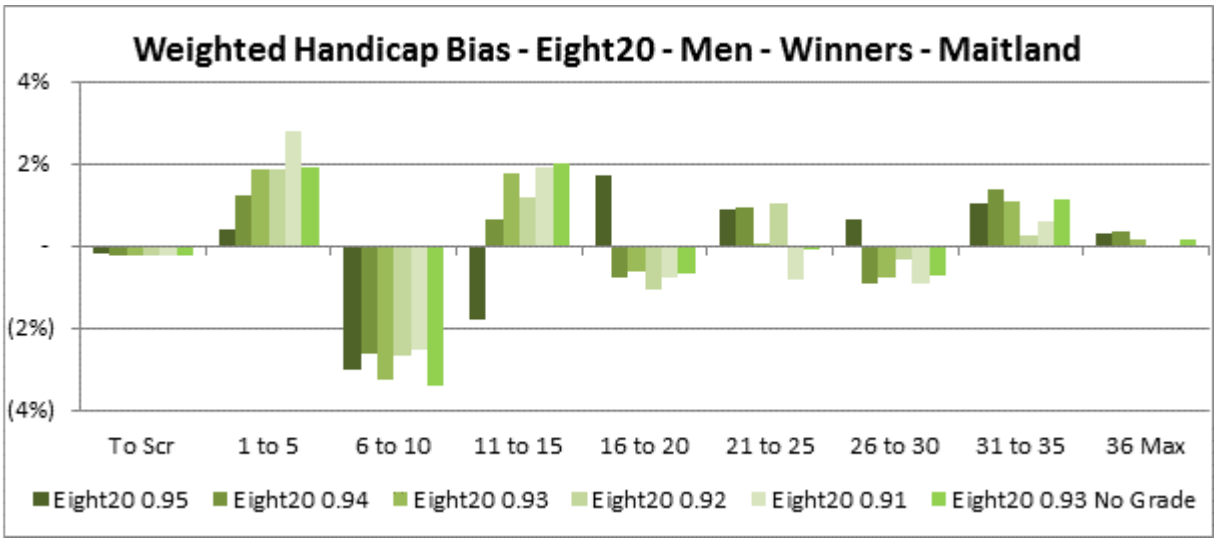
Maitland	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-14.7	10.6	-23.1	39.5
Current Period - Ten20 0.96	18.0	46.7	0.0	36.4
Old Period - Ten20 0.96	29.3	21.1	-19.7	30.3
Ten20 0.96	22.6	18.2	-15.8	28.0
Ten20 0.95	11.4	18.3	-19.4	26.2
Ten20 0.94	3.3	11.2	-20.0	24.7
Ten20 0.93	-1.7	8.8	-23.2	26.4
Ten20 0.92	-11.2	11.7	-22.2	28.7
Ten20 0.91	-19.4	17.9	-23.7	27.7
Ten20 0.9	-23.5	18.5	-26.5	28.0
Nine20 0.96	13.6	15.4	-19.1	27.1
Nine20 0.93	-3.4	11.3	-17.8	24.8
Nine20 0.90	-20.5	16.7	-26.7	25.4
Eight20 0.96	15.2	14.0	-18.4	25.6
Eight20 0.93	-1.2	11.7	-15.8	25.5
Eight20 0.90	-27.1	19.8	-26.7	25.5
Blended 0.96	-1.0	13.6	-20.1	28.6
Blended 0.94	-18.5	16.1	-23.0	28.7
Blended 0.92	-29.5	25.4	-28.7	30.8
Hybrid 0.96	17.4	13.2	-15.8	25.6
Hybrid 0.94	-4.3	13.9	-19.8	28.0

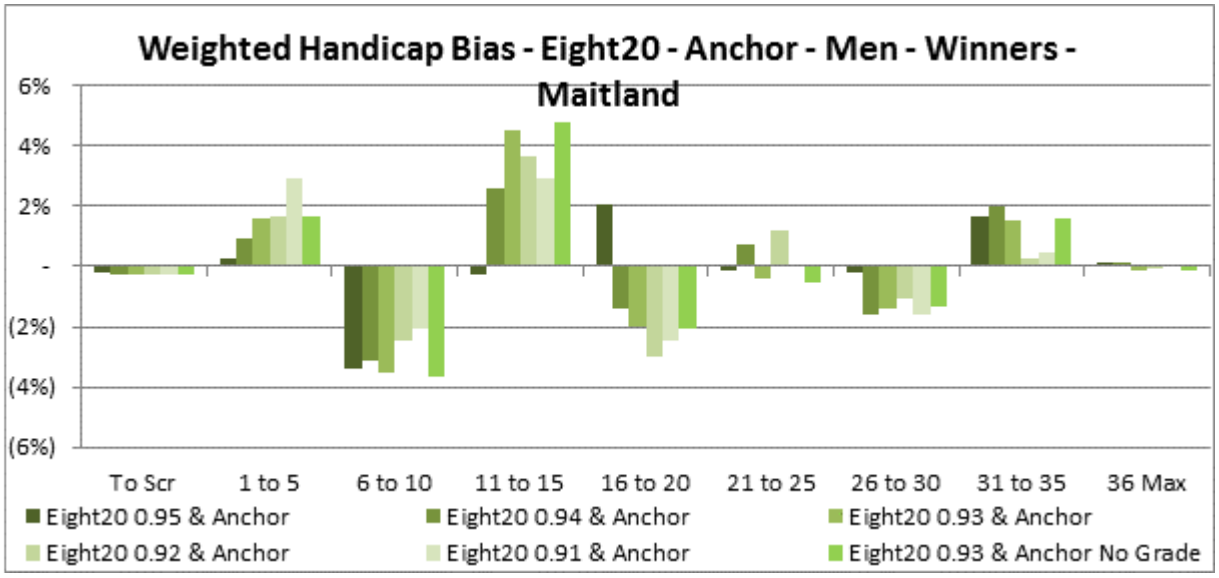
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

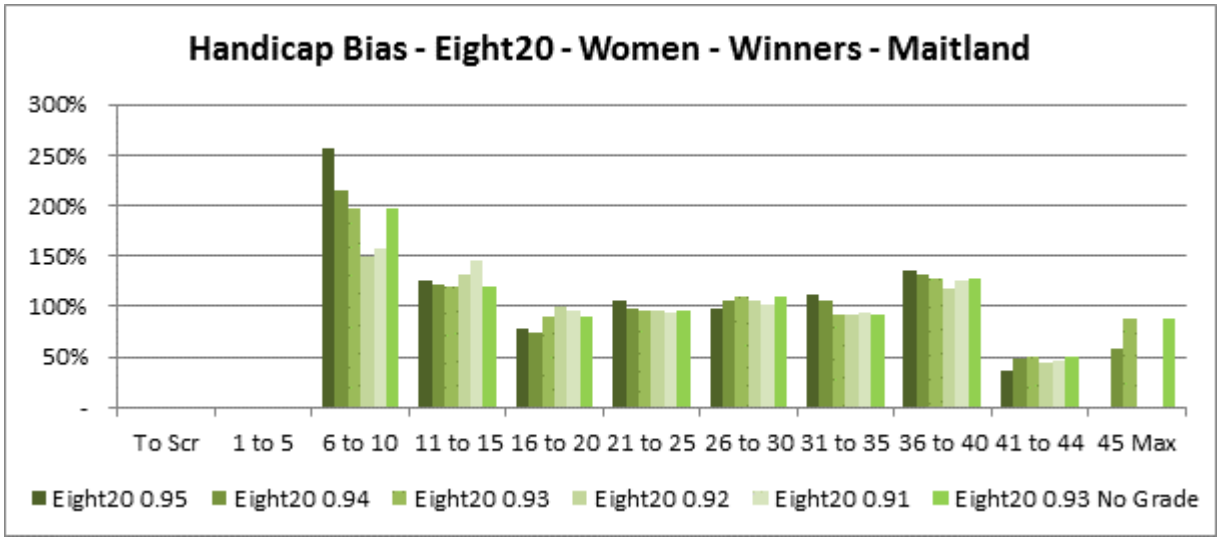
Phase 2

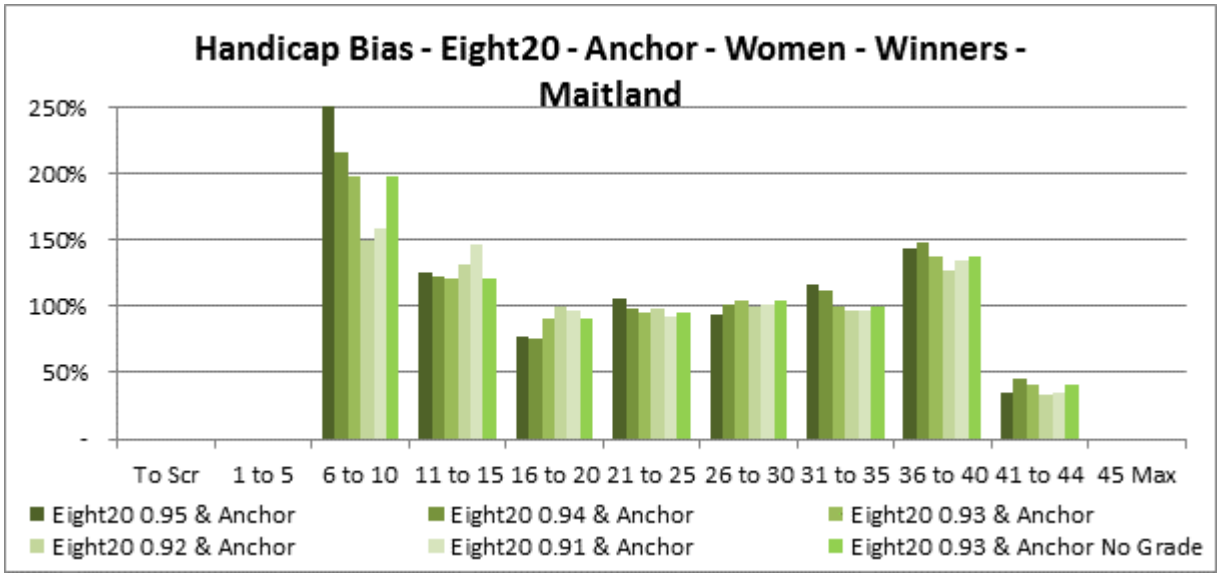

Handicap Bias - Eight20 - Men - Winners - Maitland
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

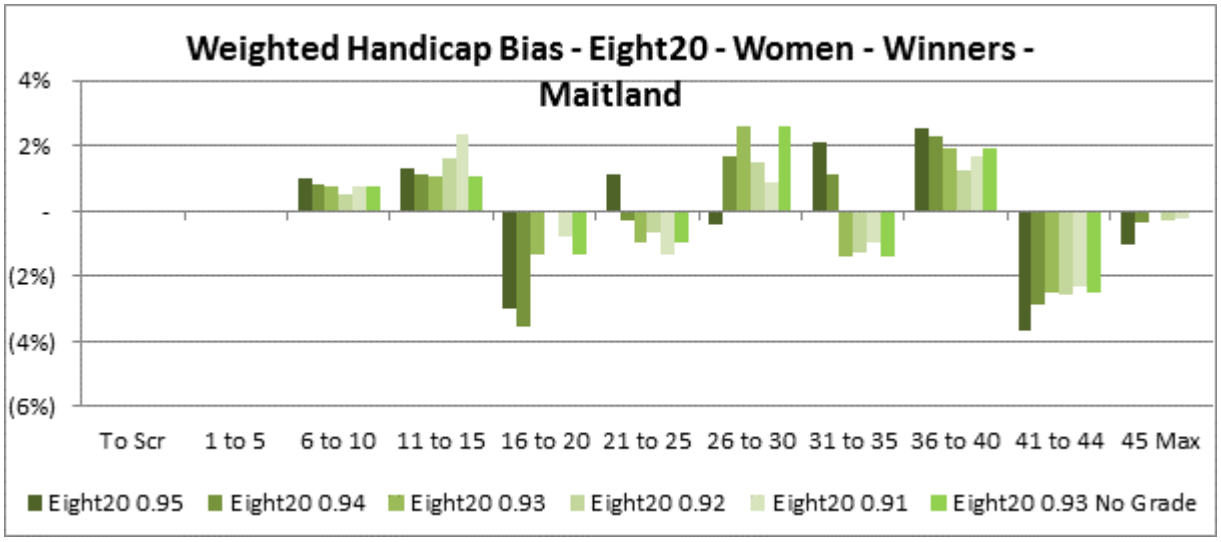

Handicap Bias - Eight20 - Anchor - Men - Winners - Maitland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

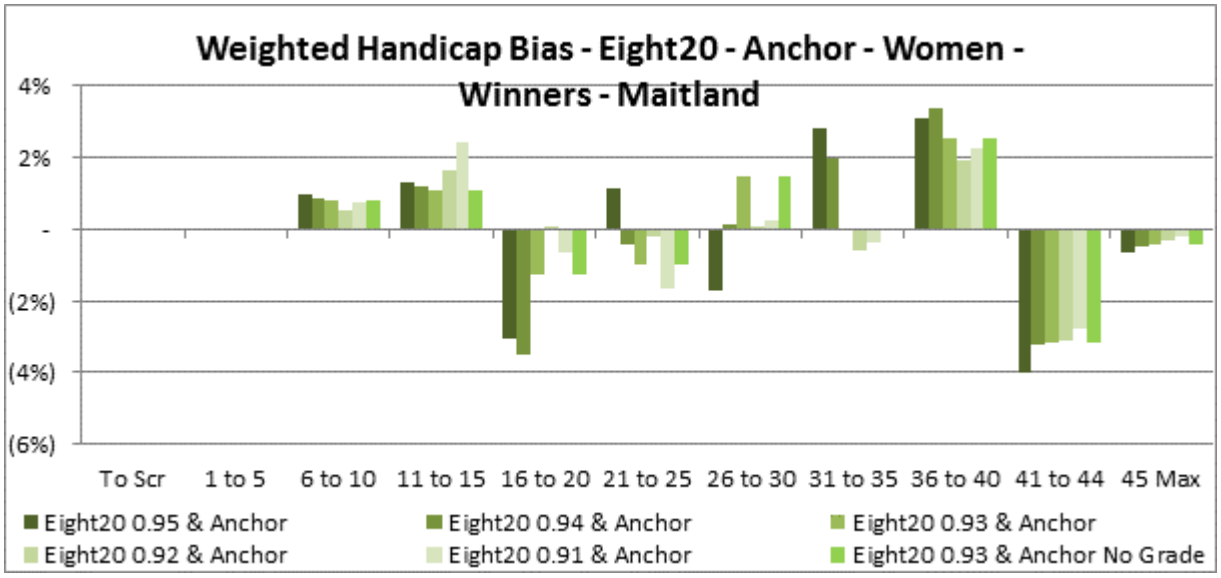

Weighted Handicap Bias - Eight20 - Men - Winners - Maitland
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

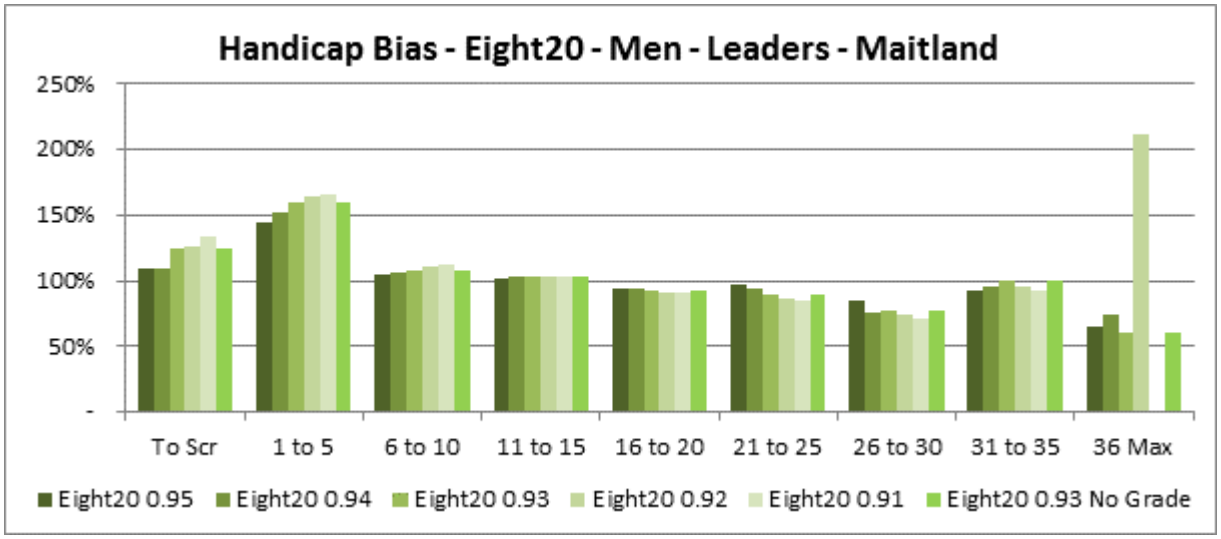

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Maitland
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

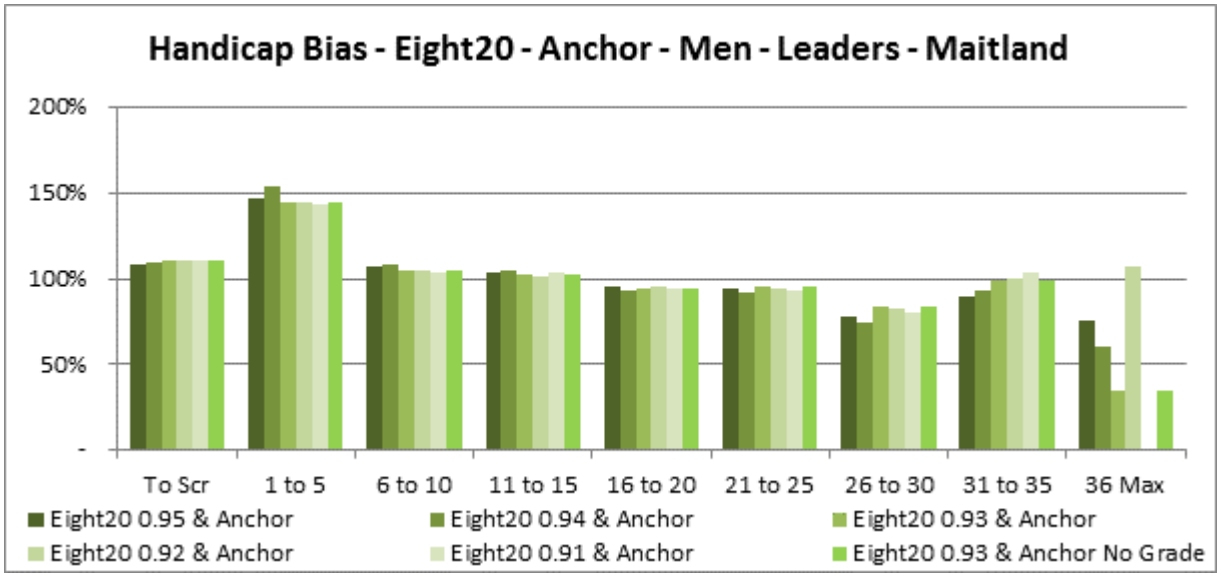

Handicap Bias - Eight20 - Women - Winners - Maitland
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

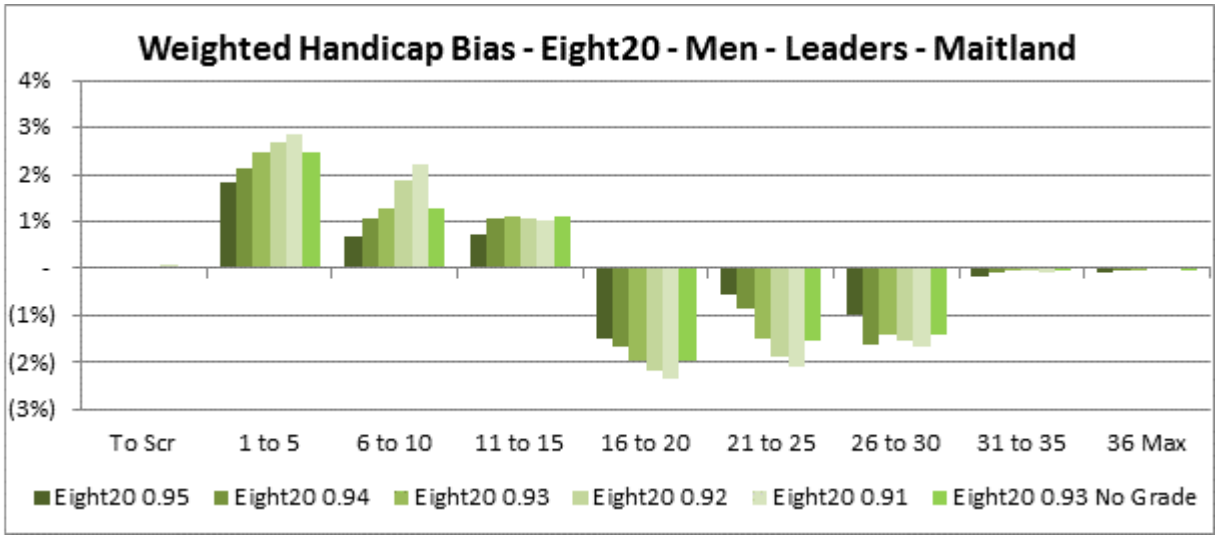

Handicap Bias - Eight20 - Anchor - Women - Winners - Maitland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

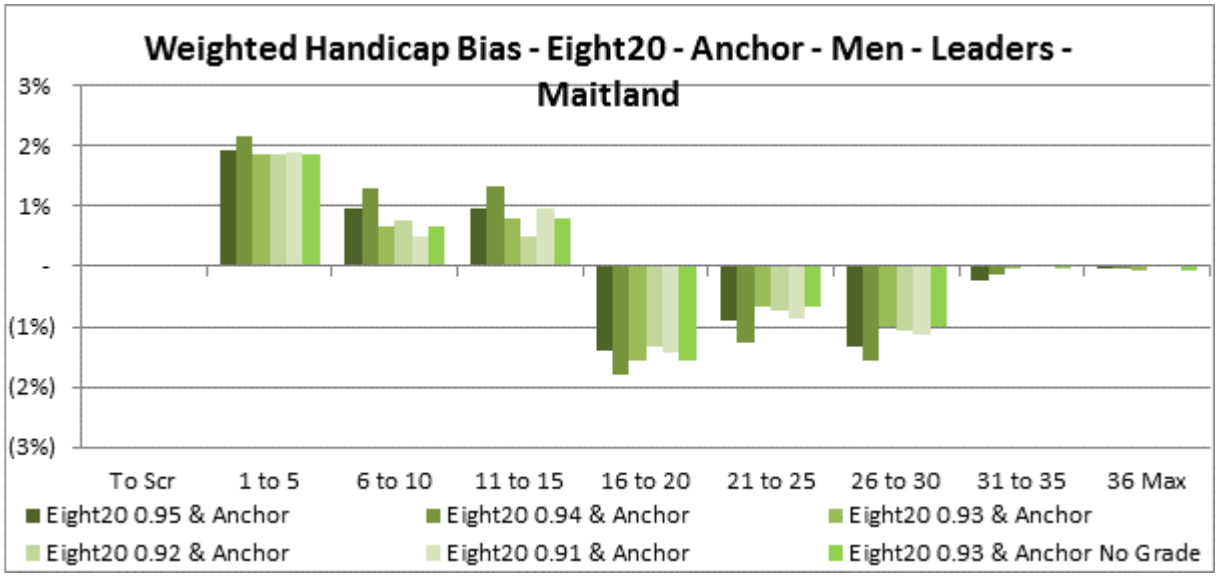

Weighted Handicap Bias - Eight20 - Women - Winners - Maitland
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

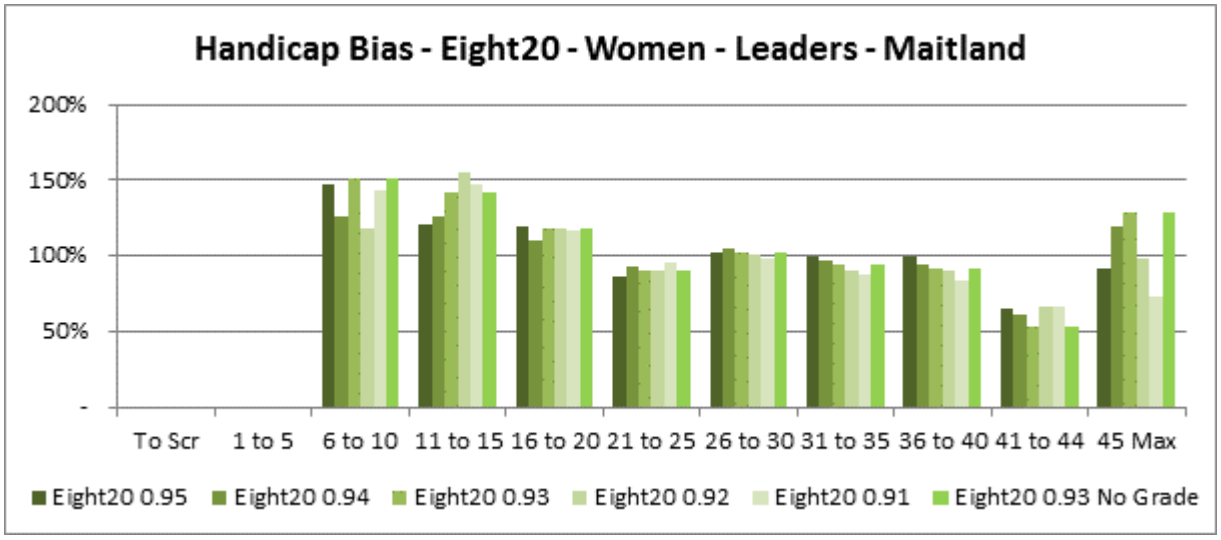

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Maitland
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

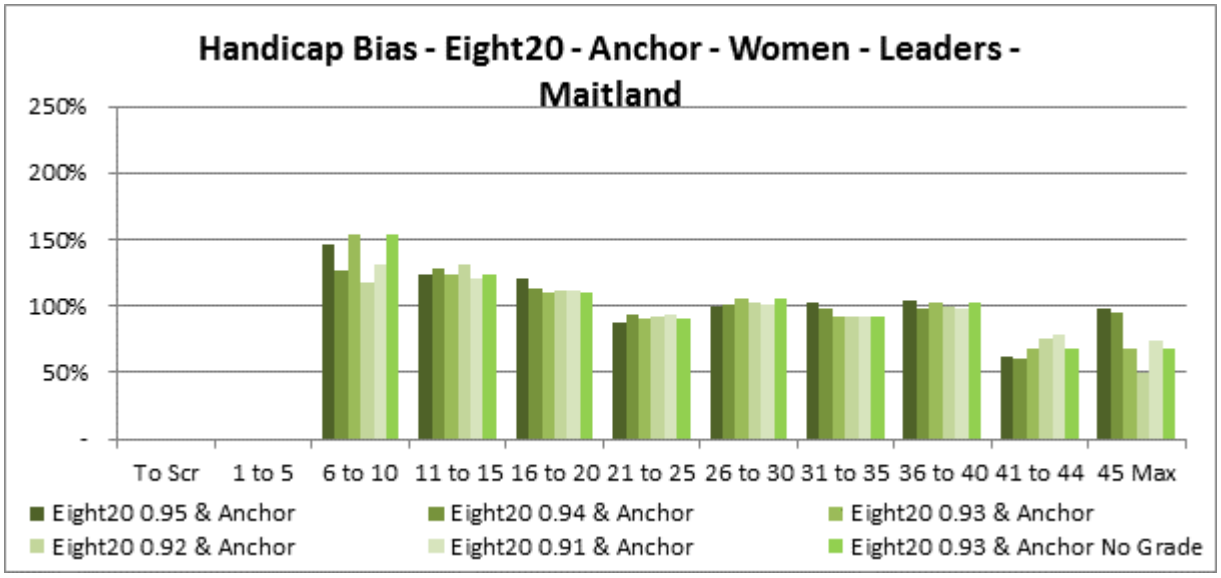

Handicap Bias - Eight20 - Men - Leaders - Maitland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

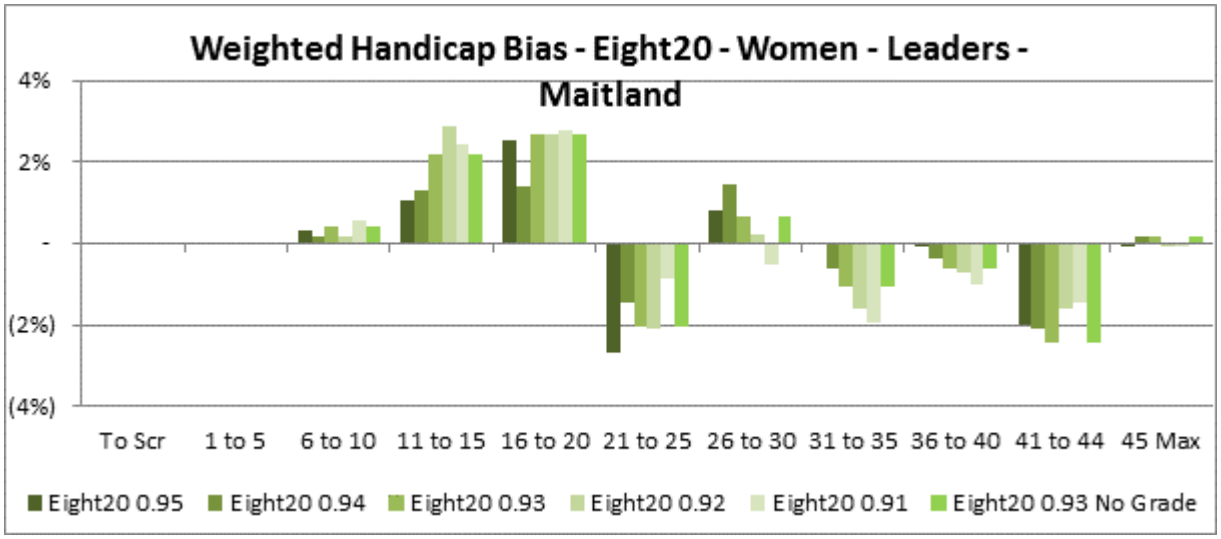

Handicap Bias - Eight20 - Anchor - Men - Leaders - Maitland
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

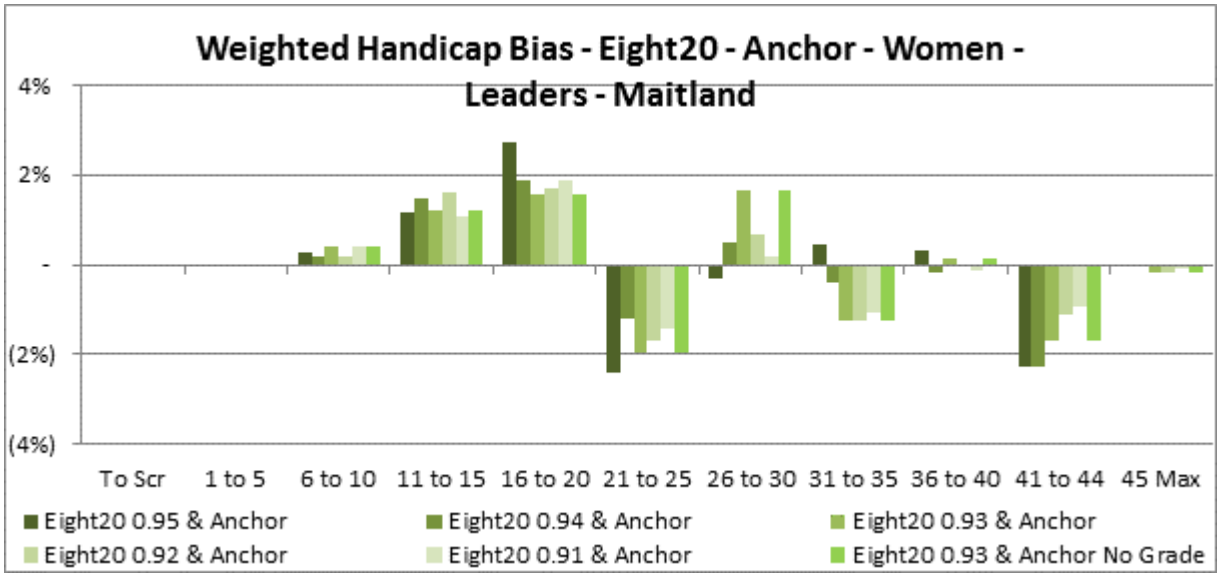

Weighted Handicap Bias - Eight20 - Men - Leaders - Maitland
4%
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Maitland
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Maitland
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Maitland
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Maitland
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

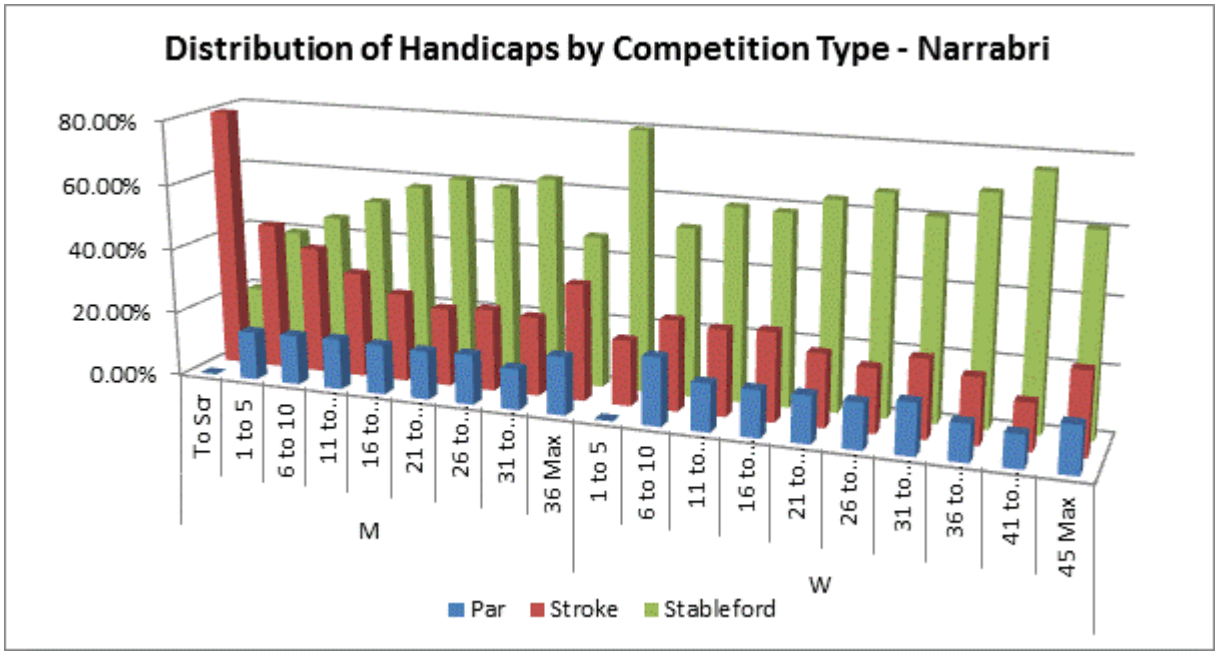


		Phase 2 -Maitland			
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	23.2	14.9	-9.9	19.6
	Eight20 0.94	10.8	12.8	-3.6	17.9
	Eight20 0.93	4.3	15.5	-7.3	15.3
	Eight20 0.92	0.9	13.5	-12.6	12.4
	Eight20 0.91	-8.3	15.9	-11.4	13.6
	Eight20 0.93 No Grade	4.2	16.4	-7.3	15.3
	Eight20 0.95 & Anchor	20.2	15.4	-7.5	22.4
	Eight20 0.94 & Anchor	9.6	18.2	-2.1	20.1
	Eight20 0.93 & Anchor	-0.5	23.4	-8.2	15.2
	Eight20 0.92 & Anchor	-5.2	20.6	-12.9	12.9
	Eight20 0.91 & Anchor	-14.0	19.4	-11.3	15.1
	Eight20 0.93 & Anchor No Grade	-0.6	24.5	-8.2	15.2
Leaders	Eight20 0.95	-18.4	9.9	-11.9	13.9
	Eight20 0.94	-23.5	12.7	-11.9	11.4
	Eight20 0.93	-26.5	14.6	-18.6	15.5
	Eight20 0.92	-30.4	16.9	-18.5	15.9
	Eight20 0.91	-33.6	18.4	-20.7	14.7
	Eight20 0.93 No Grade	-26.6	14.7	-18.6	15.5
	Eight20 0.95 & Anchor	-21.9	11.3	-12.4	14.3
	Eight20 0.94 & Anchor	-26.0	14.0	-14.1	11.4
	Eight20 0.93 & Anchor	-18.0	10.3	-12.0	12.4
	Eight20 0.92 & Anchor	-17.5	9.8	-11.5	10.8
	Eight20 0.91 & Anchor	-17.9	10.5	-10.5	9.5
	Eight20 0.93 & Anchor No Grade	-18.0	10.3	-12.0	12.4

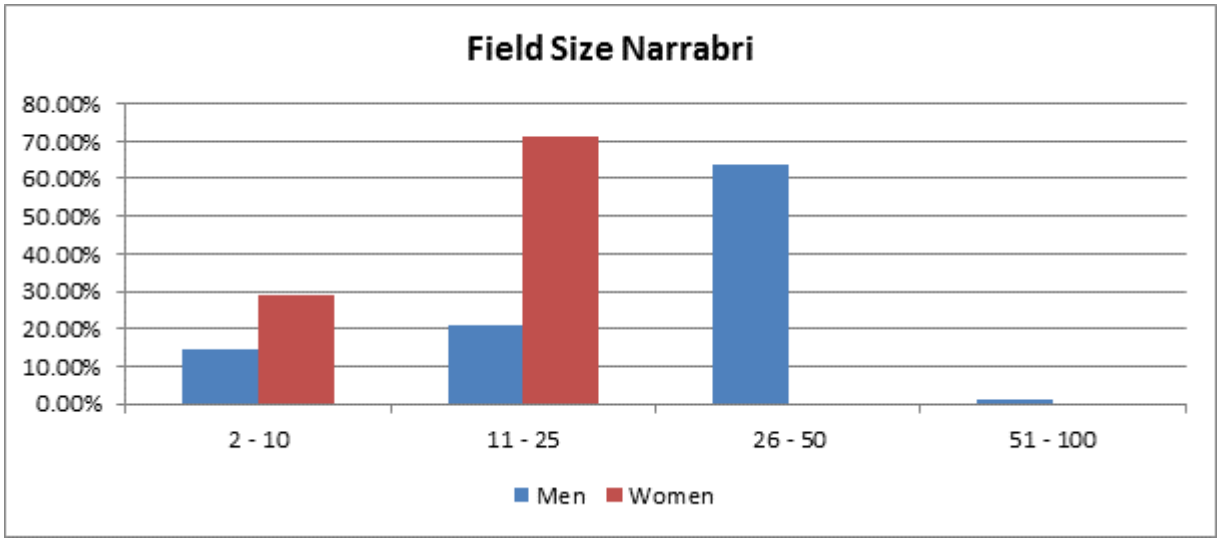
Appendix 9 – Narrabri

Phase 1

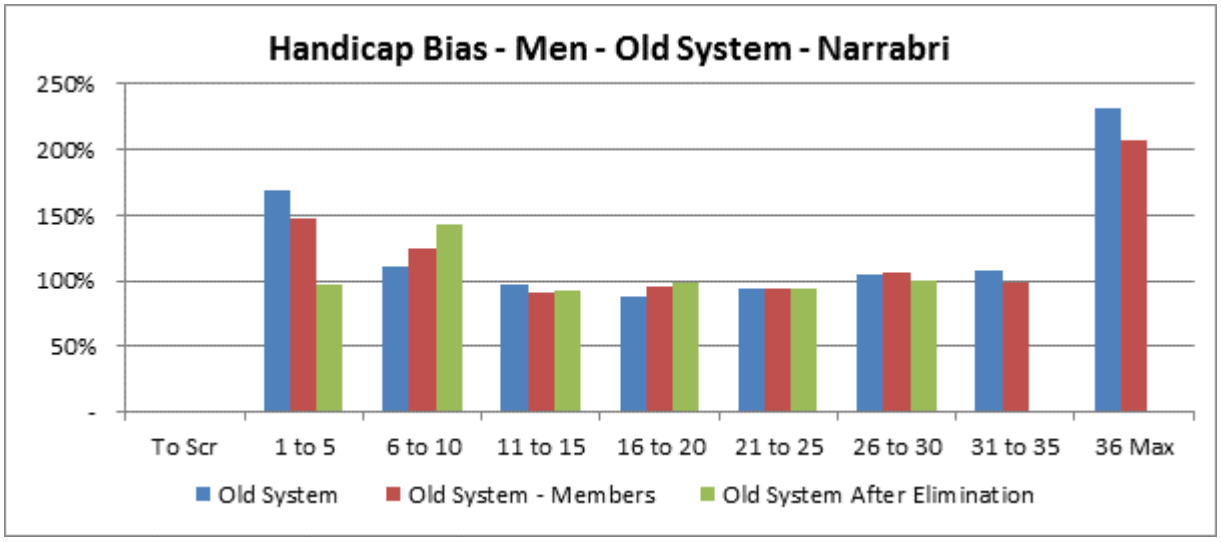
Narrabri	Men	Women	Total
Players in Database	623	331	954
Members	268	81	349
Visitors	355	250	605
Members who have Played 33 Rounds	247	72	319
Members with Last Round In Old System	87	22	109
Members with Last Round in Current System	181	59	240
Earliest Round	29/12/2007	10/2/2008	
Latest Round	28/11/2010	29/11/2010	
Number of Visiting Clubs			145
Number of Home Competitions	322	309	631
Number of Rounds of Golf	11,349	5,097	16,446
Number of Rounds at Home	10,103	4,883	14,986
Number of Rounds at Home Old	7,918	3,565	11,483
Number of Rounds at Home Current	2,185	1,318	3,503
Num Rnds Members at Home	9,030	4,065	13,095
Num Rnds Members at Home Old	7,024	3,078	10,102
Num Rnds Members at Home Cur	2,006	987	2,993
Num Rnds After Eliminations	4,506	2,226	6,732
Num Rnds After Eliminations Old	2,922	1,338	4,260
Num Rnds After Eliminations Cur	1,584	888	2,472

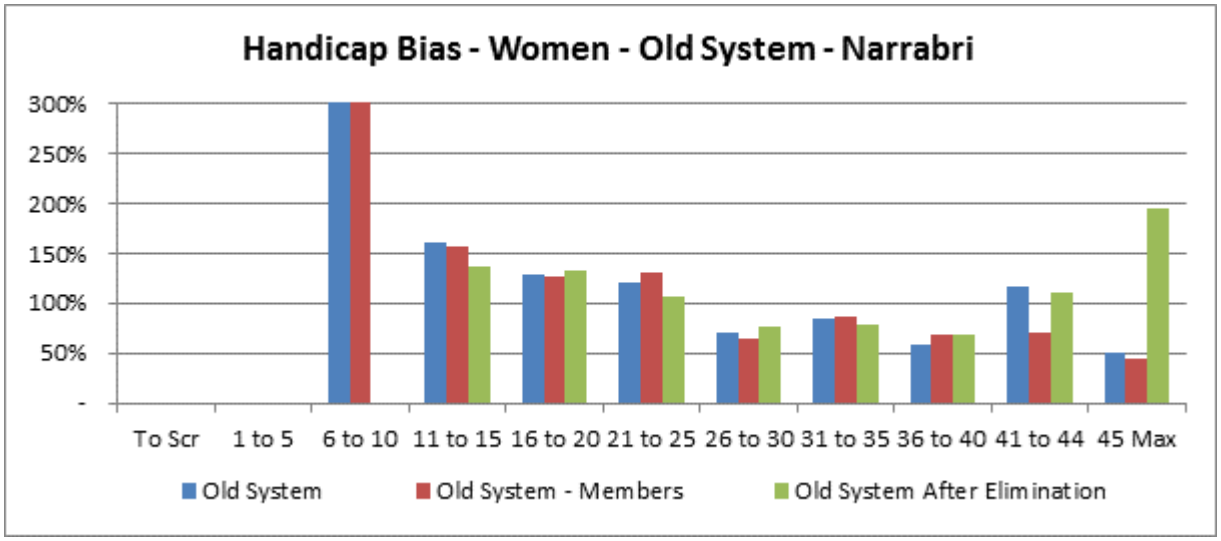


Most men's competitions are with a field 26 - 50, the women mainly field 11 - 25.

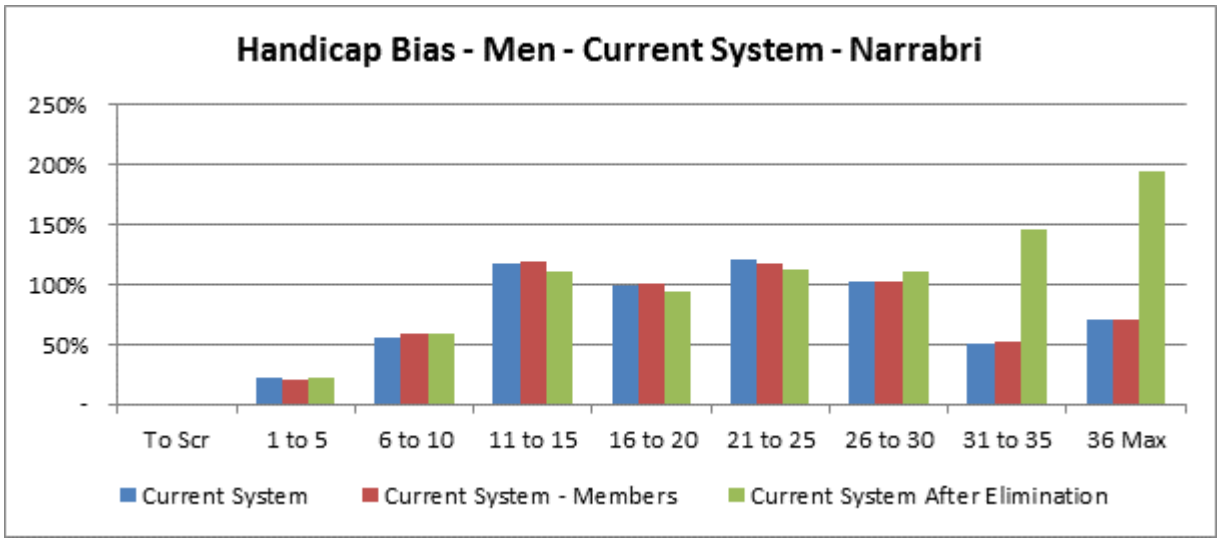


Under the Old System, there was a bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

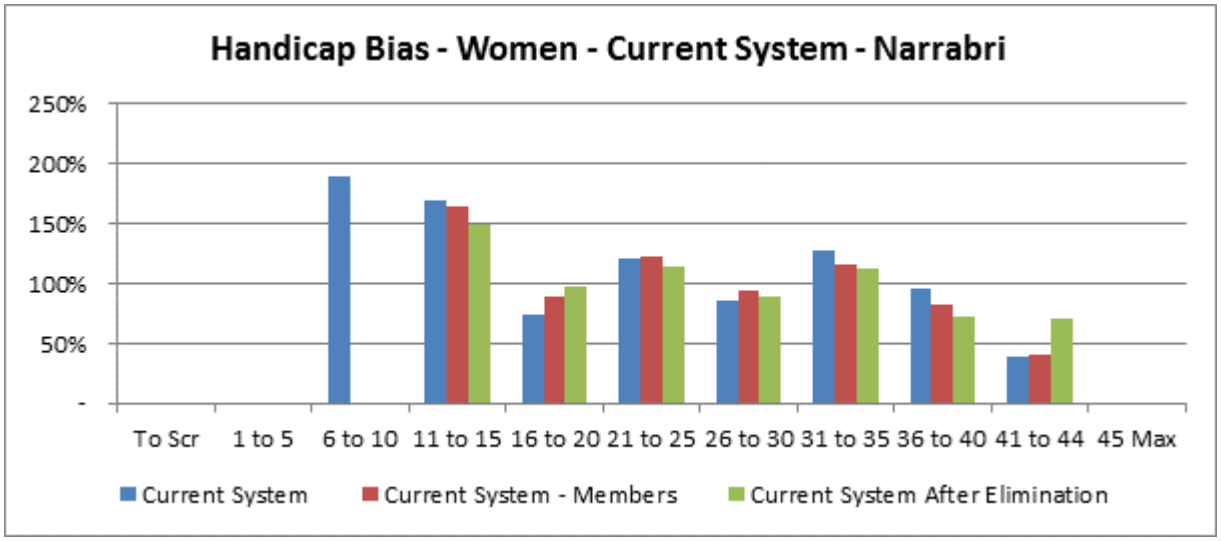




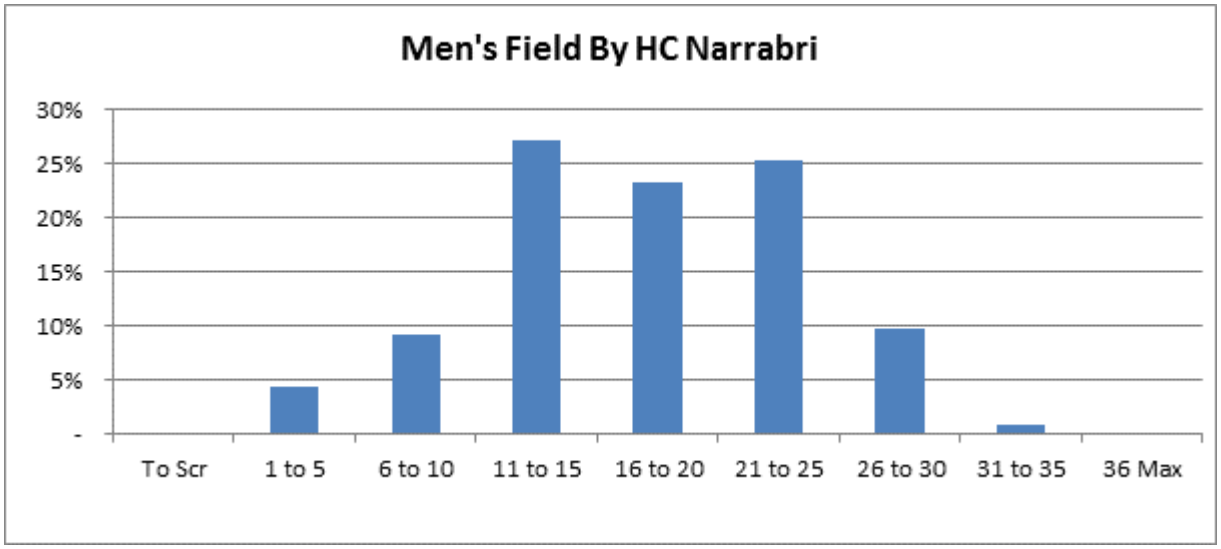
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

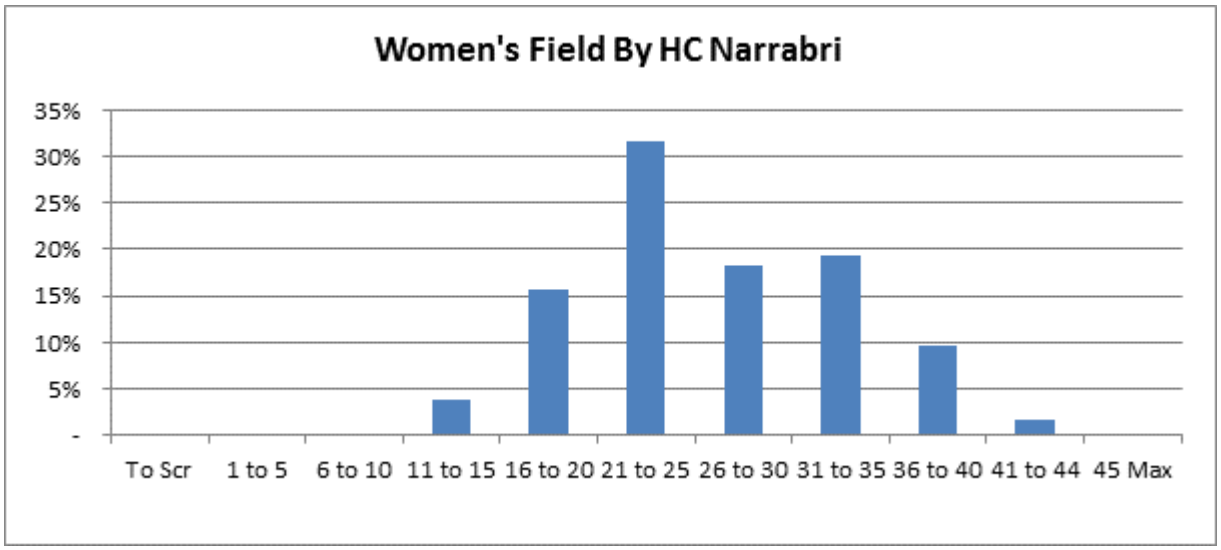


The picture is somewhat similar for the women.



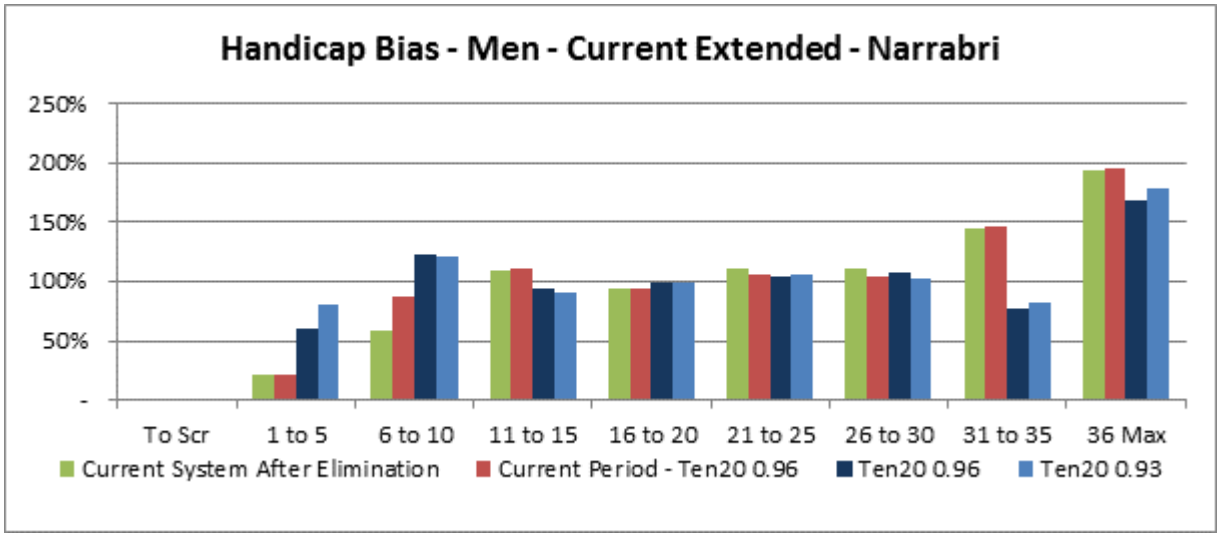
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





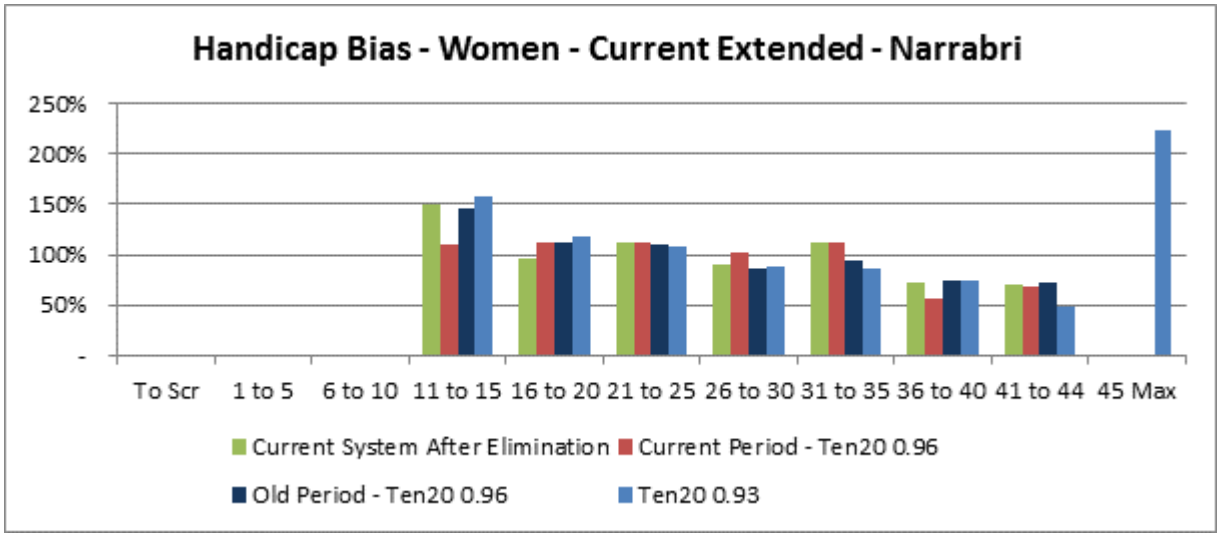
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

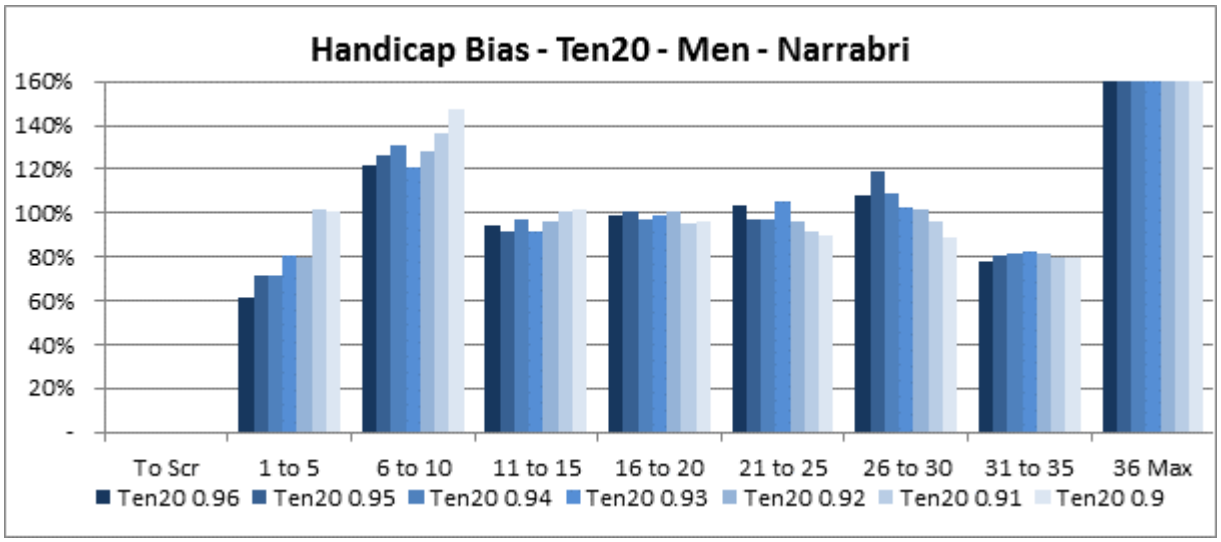


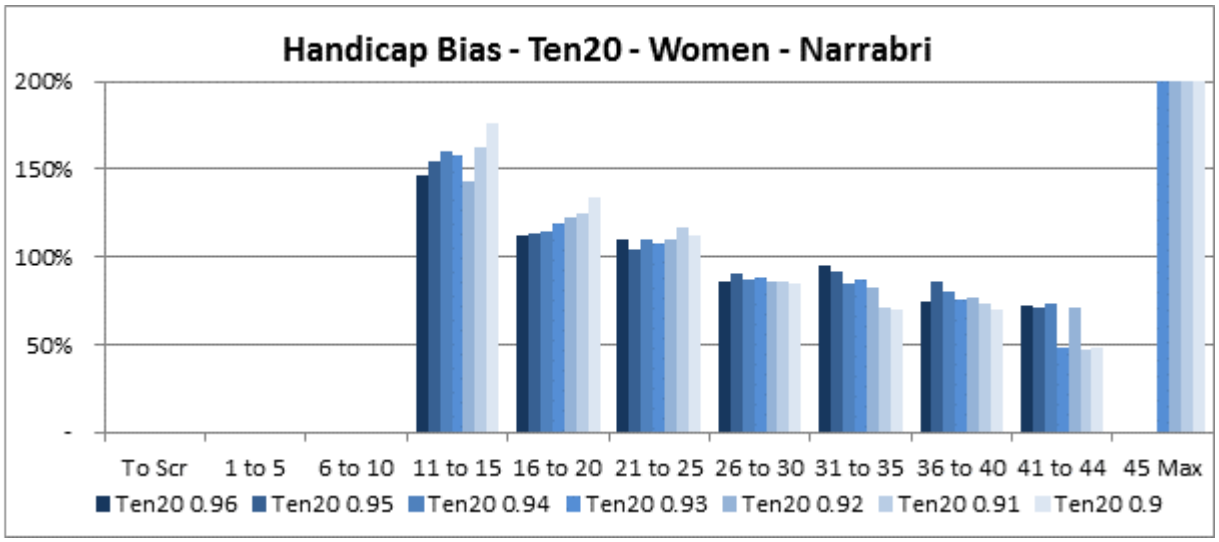
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low markers would have dominated over the two-years.

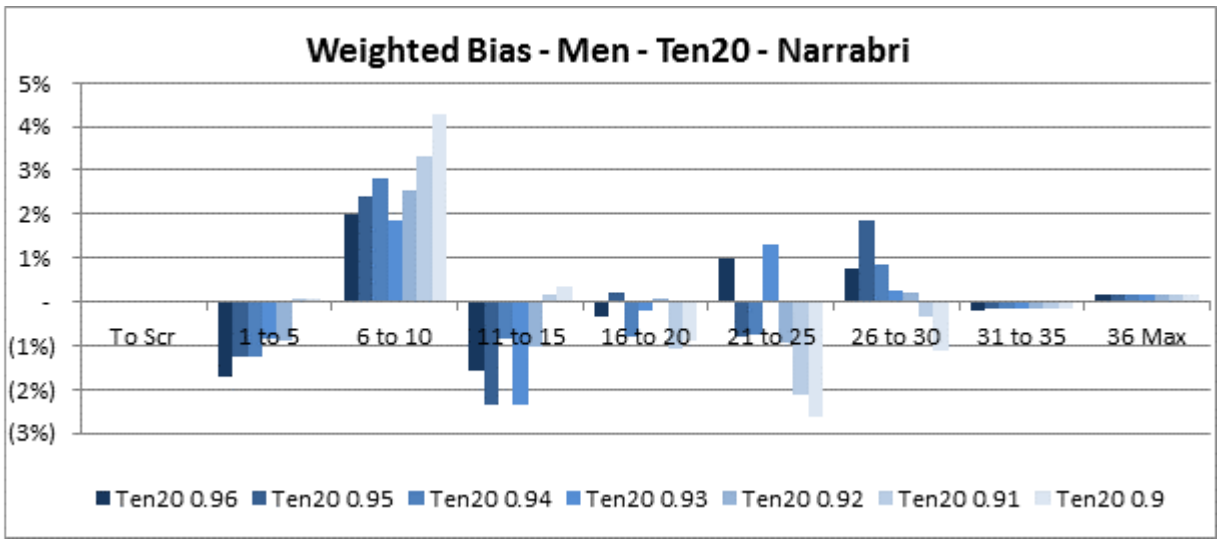


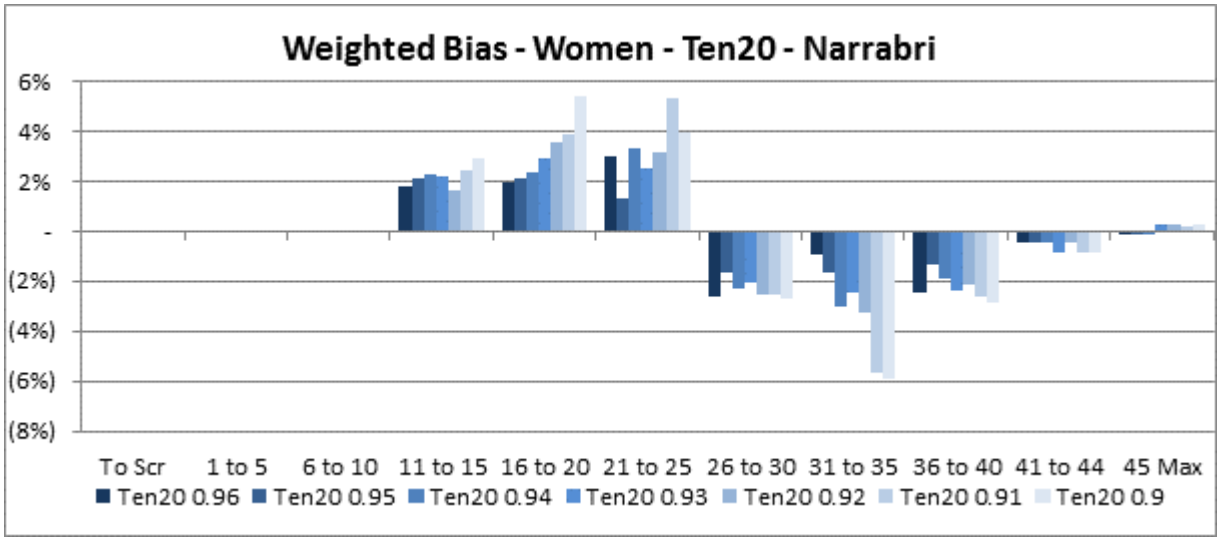
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

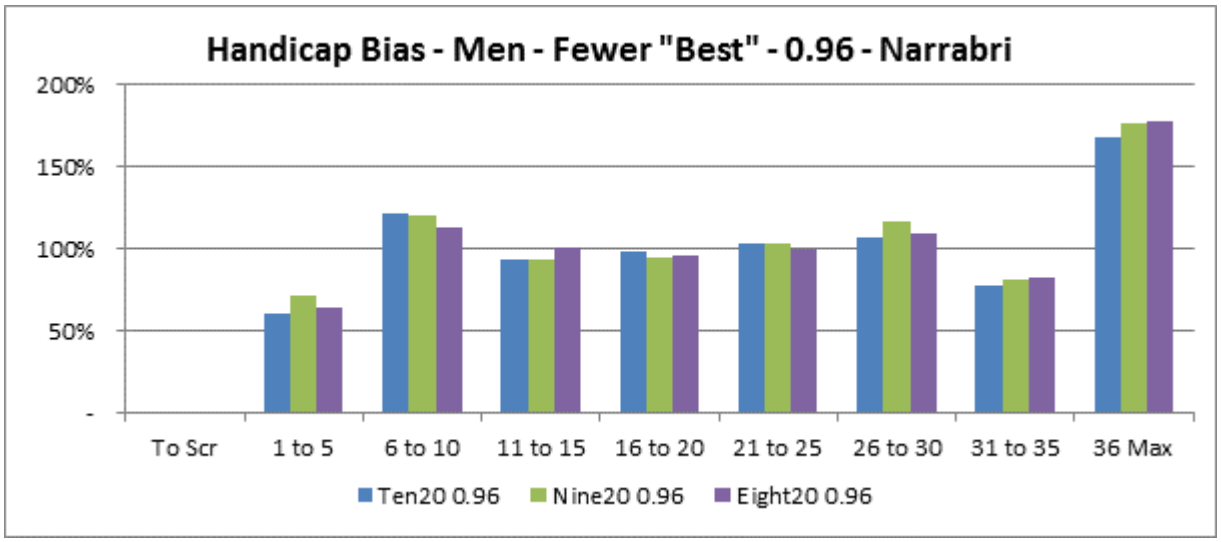


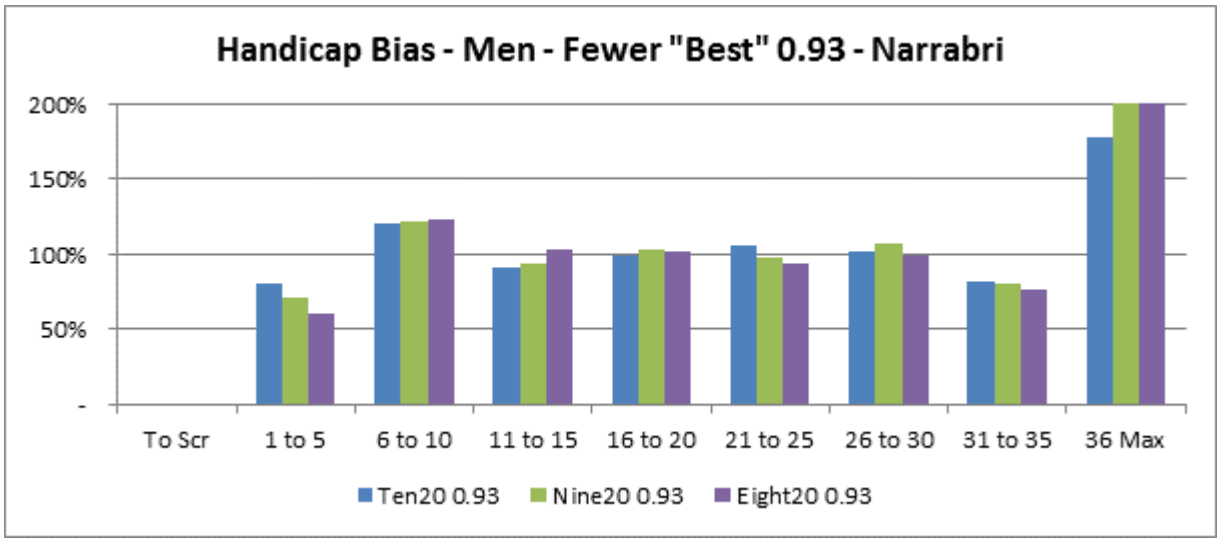


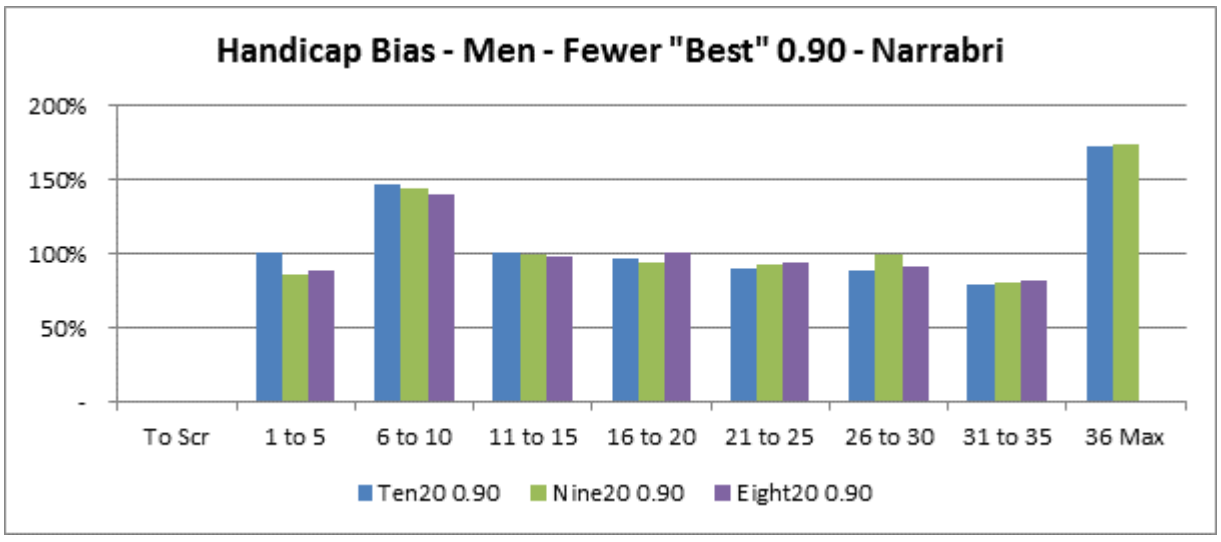
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

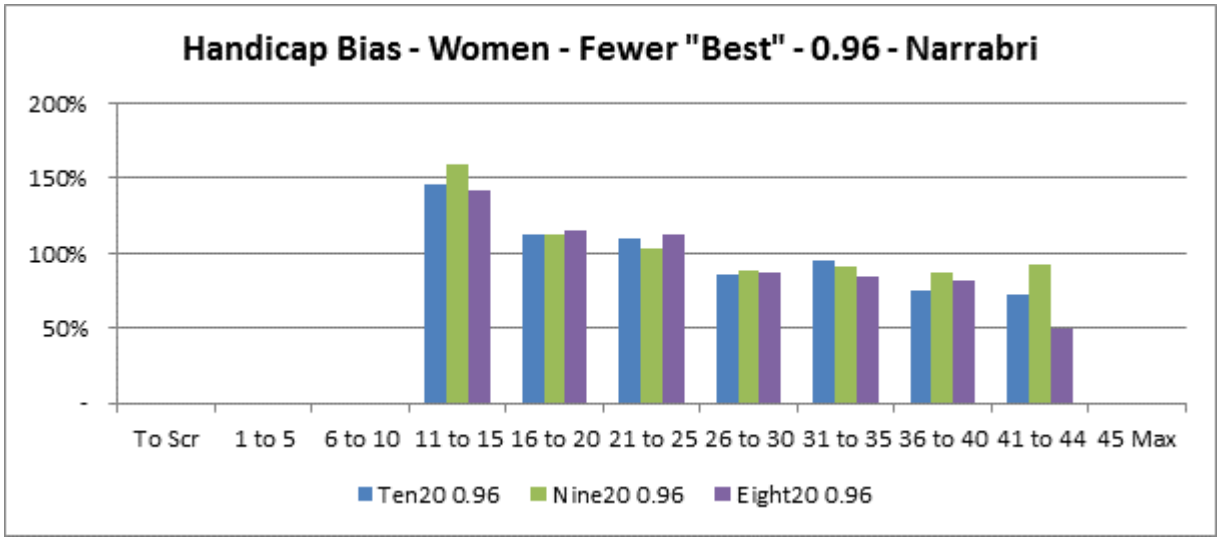
	Narrabri			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	8.6	11.8	-18.3	17.3
Ten20 0.95	7.1	14.6	-16.5	13.4
Ten20 0.94	0.1	12.3	-21.5	19.9
Ten20 0.93	5.2	12.0	-21.6	19.0
Ten20 0.92	-3.0	10.7	-21.3	21.7
Ten20 0.91	-16.4	14.6	-30.0	30.9
Ten20 0.9	-23.1	18.5	-33.4	32.2

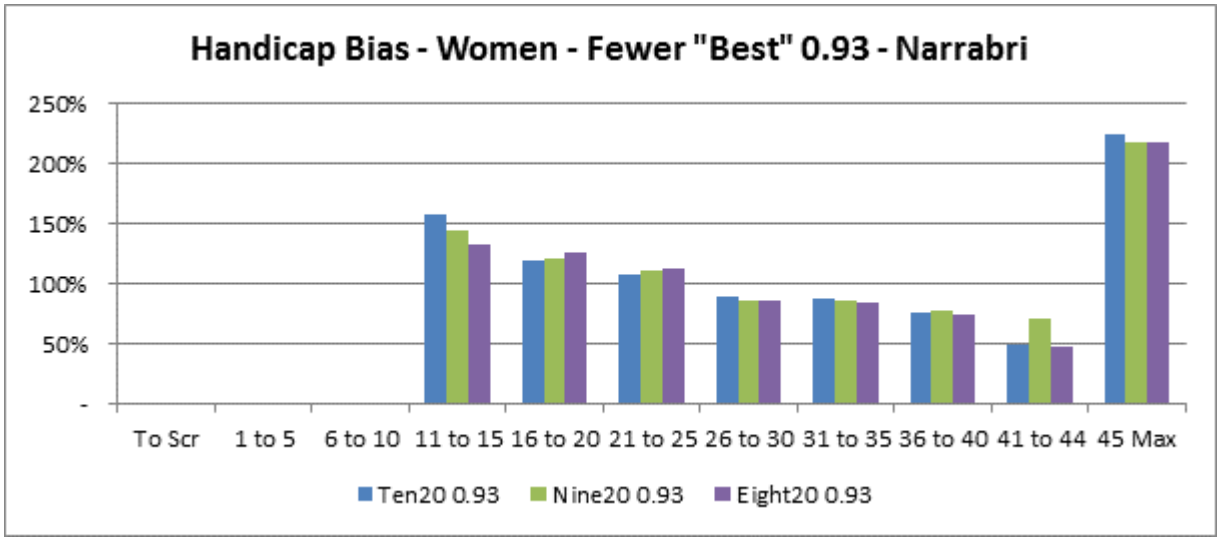
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

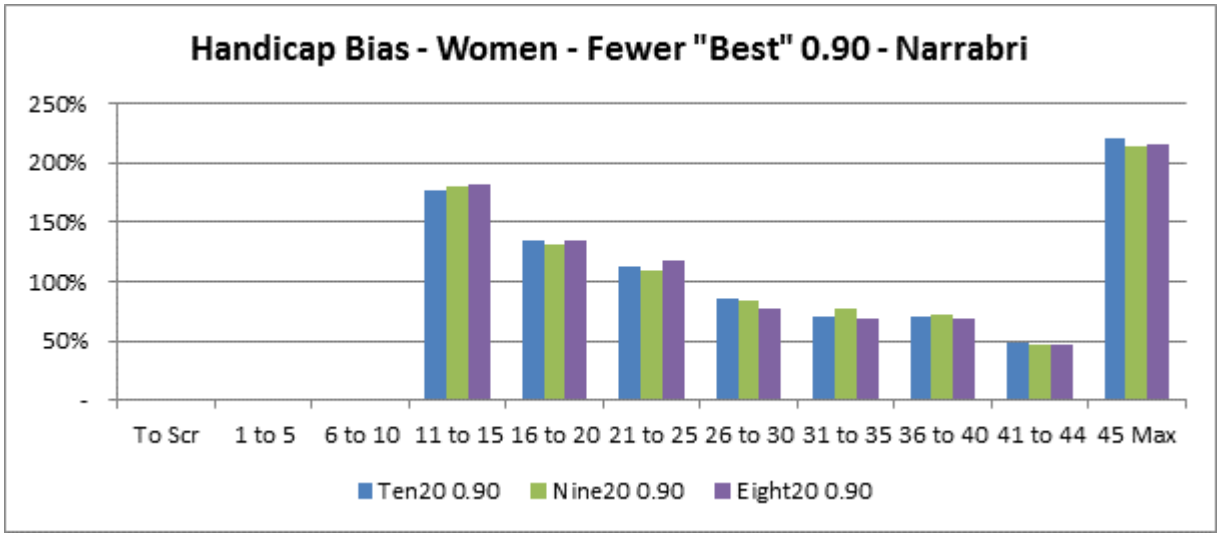







Handicap Bias - Women - Fewer "Best" - 0.96 - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

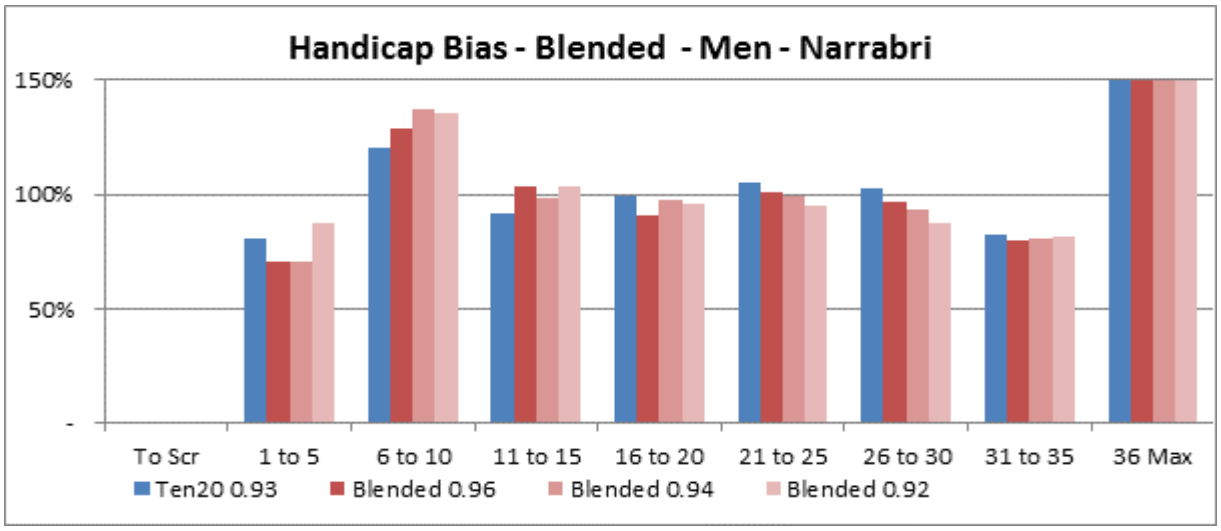

Handicap Bias - Women - Fewer "Best" 0.93 - Narrabri
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

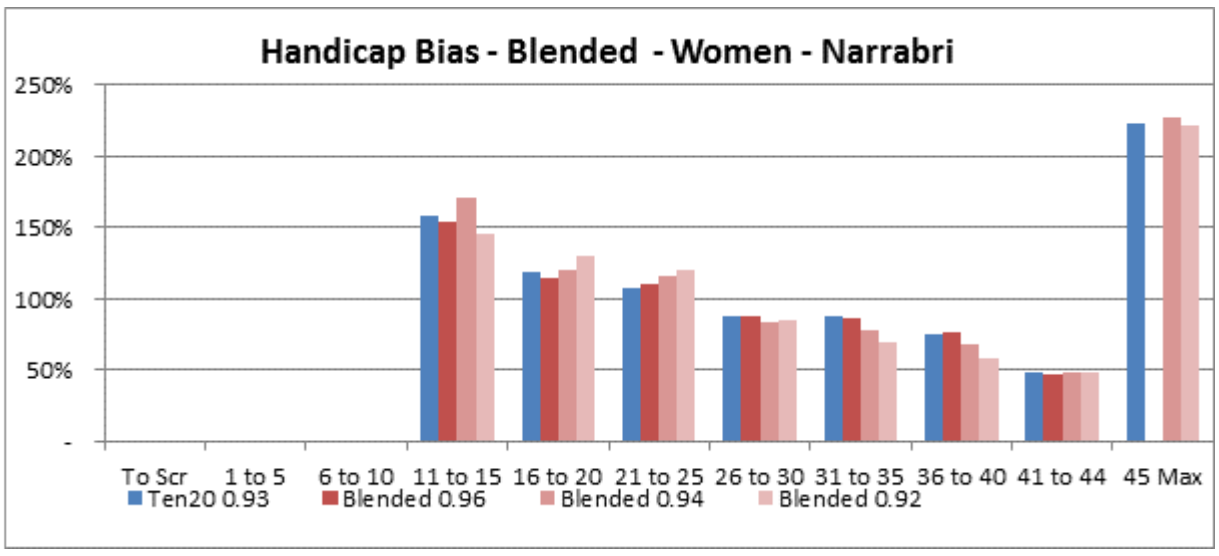

Handicap Bias - Women - Fewer "Best" 0.90 - Narrabri
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

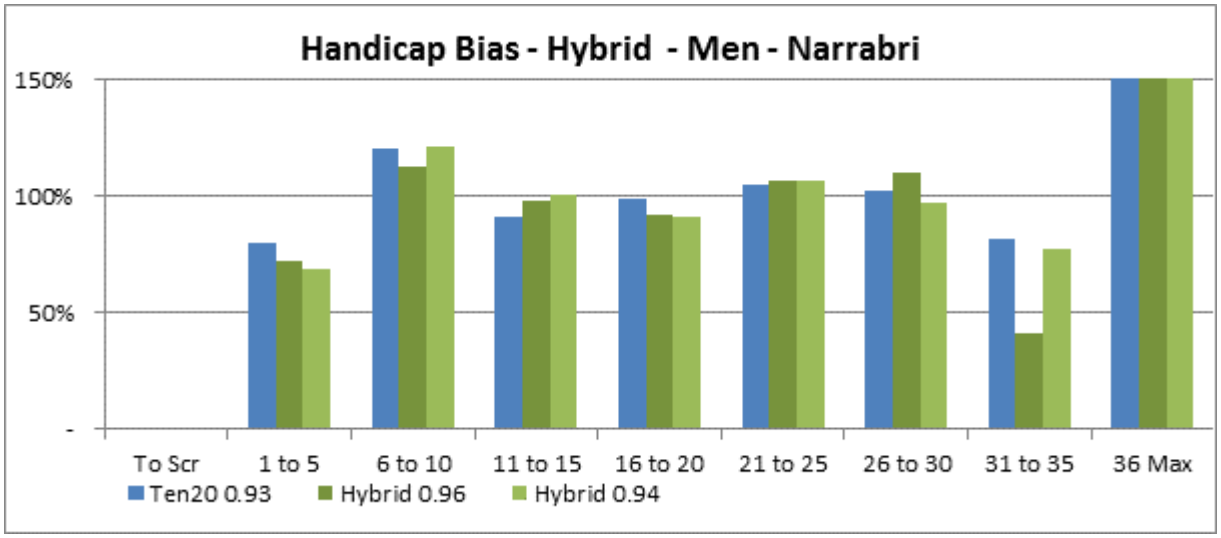
Narrabri				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	8.6	11.8	-18.3	17.3
Nine20 0.96	10.0	12.7	-15.7	14.0
Eight20 0.96	6.9	8.4	-21.2	20.9
Ten20 0.93	5.2	12.0	-21.6	19.0
Nine20 0.93	6.1	11.0	-20.3	20.5
Eight20 0.93	-0.7	12.1	-23.5	23.9
Ten20 0.90	-23.1	18.5	-33.4	32.2
Nine20 0.90	-13.0	16.5	-30.1	27.4
Eight20 0.90	-16.1	14.6	-36.2	37.1

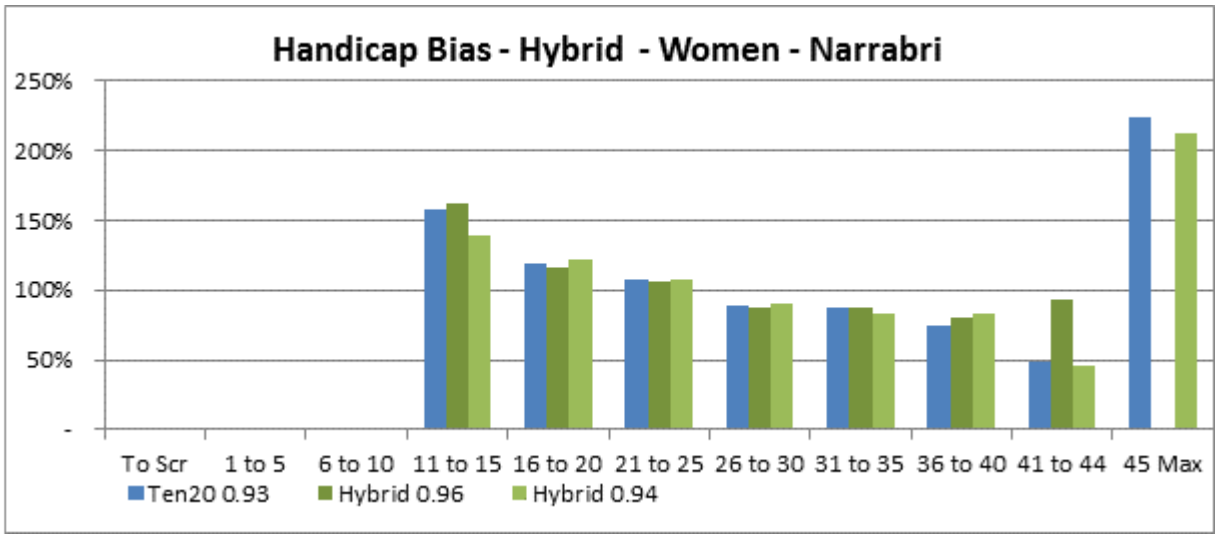
For the Blended:





For the Hybrid:

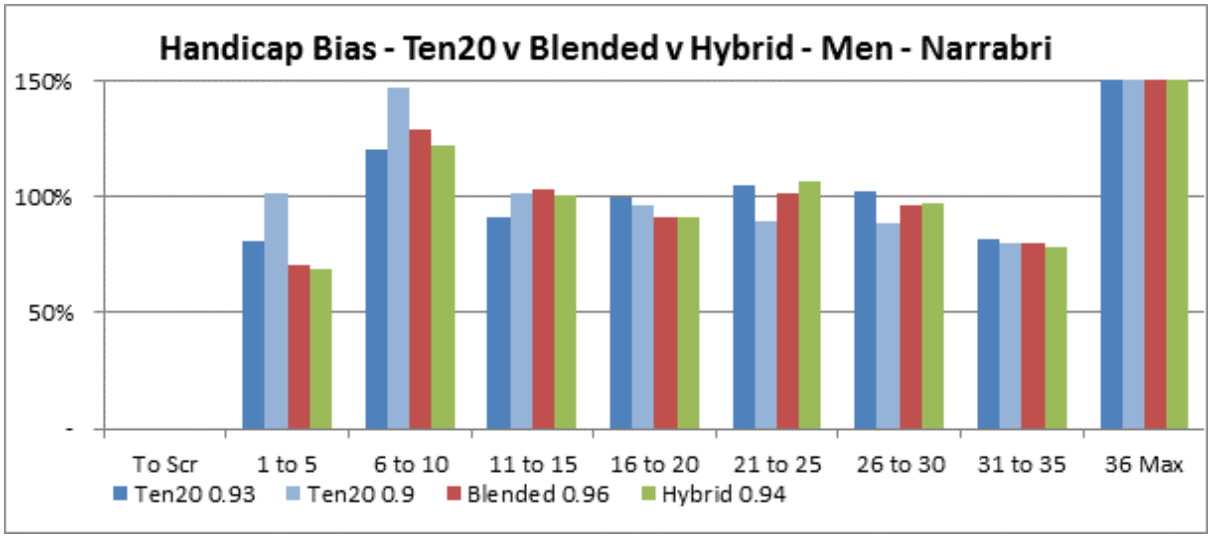


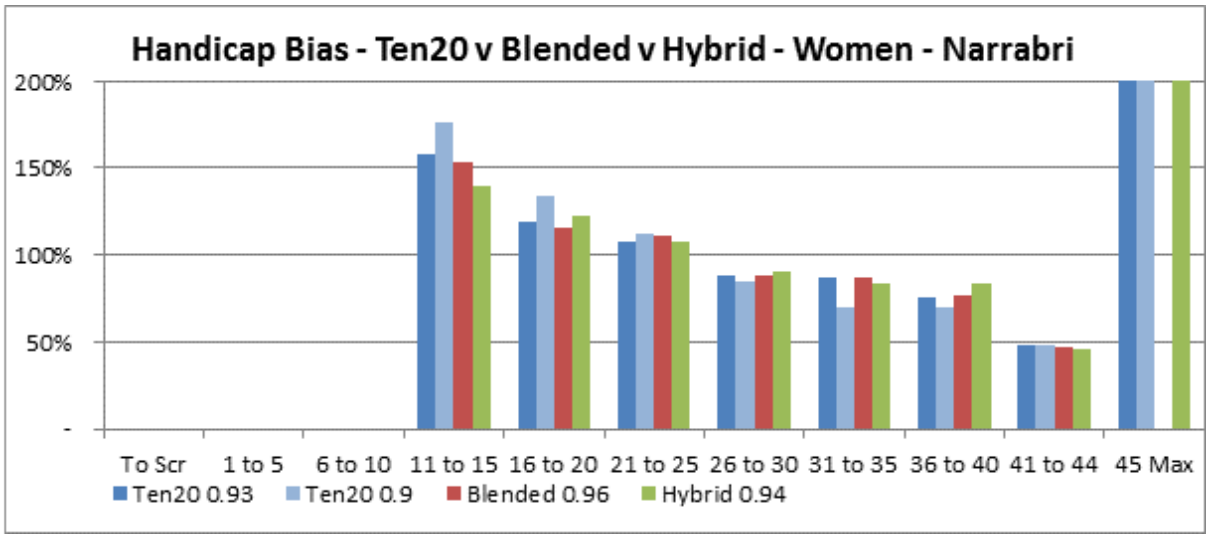


The Corresponding Tilt and Level Indices are:

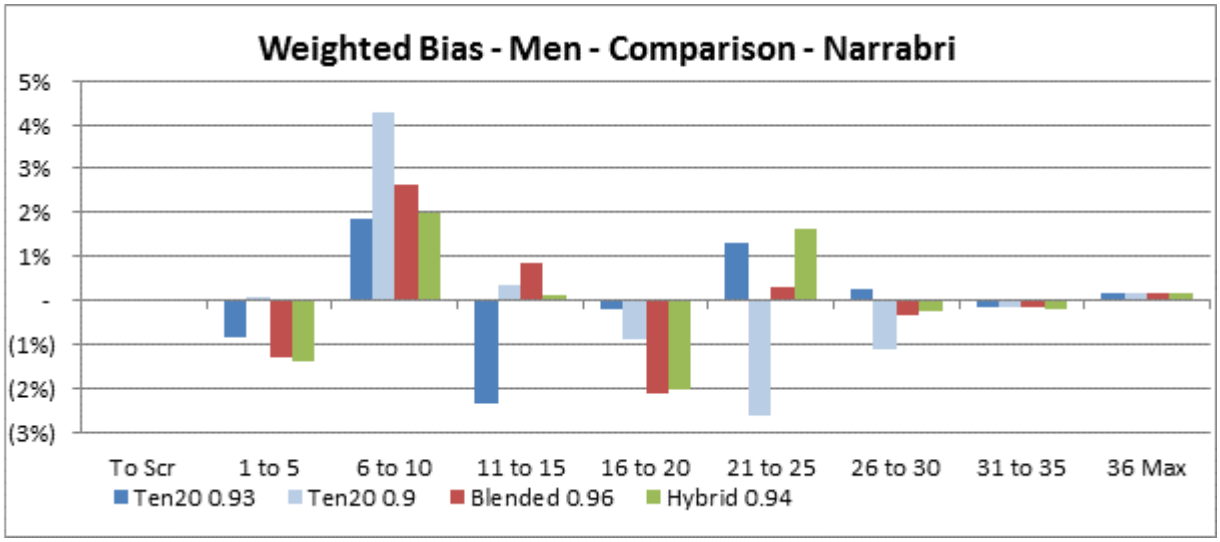
	Narrabri			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-4.3	13.3	-22.4	19.6
Blended 0.94	-6.7	13.4	-28.7	28.4
Blended 0.92	-15.8	14.2	-33.5	35.5
Hybrid 0.96	7.5	11.7	-19.4	17.4
Hybrid 0.94	1.9	12.6	-20.2	19.2

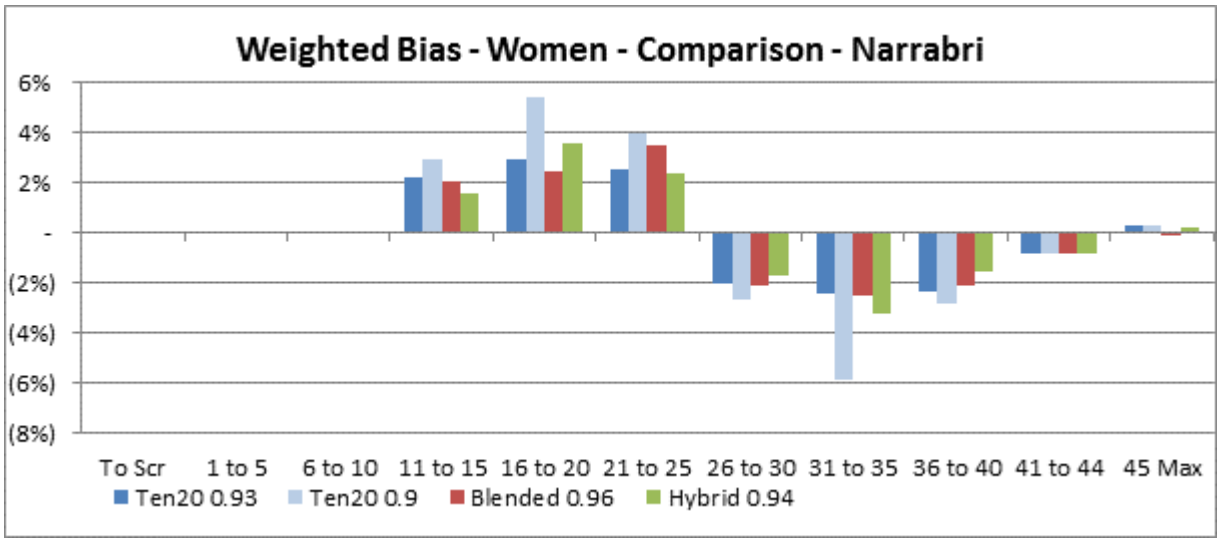
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

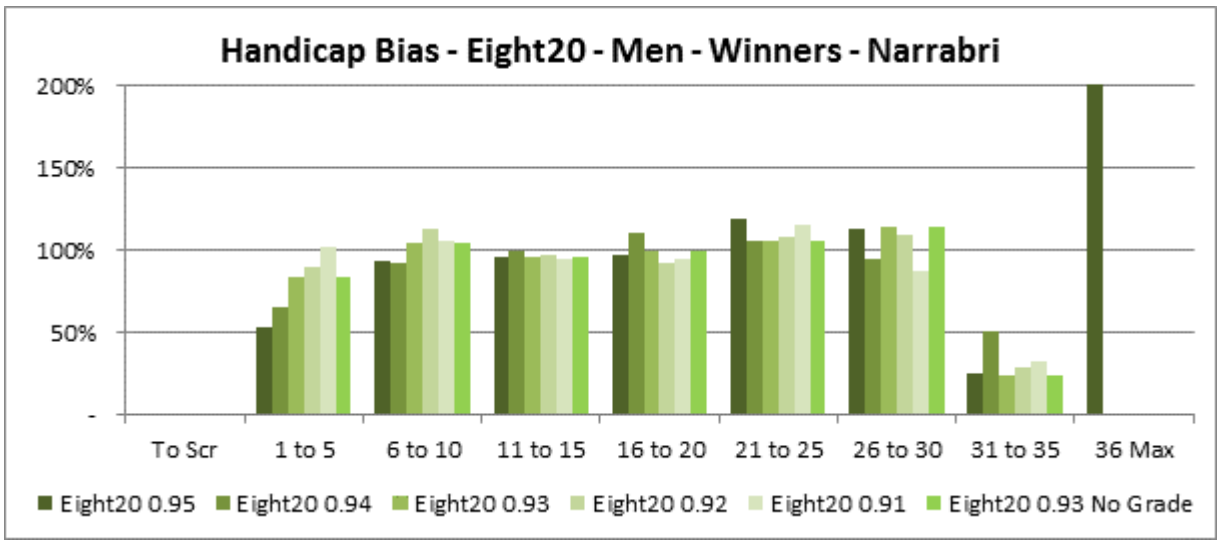
	Narrabri			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	5.2	12.0	-21.6	19.0
Ten20 0.9	-23.1	18.5	-33.4	32.2
Blended 0.96	-4.3	13.3	-22.4	19.6
Hybrid 0.94	1.9	12.6	-20.2	19.2

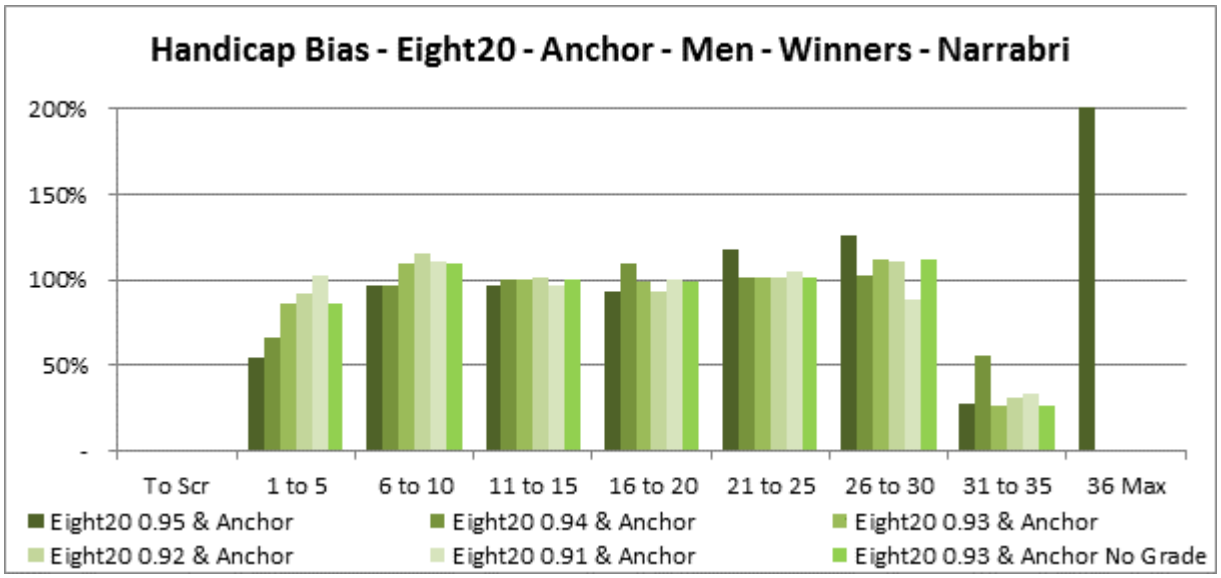
Putting it all together, with the Old System as a reference:

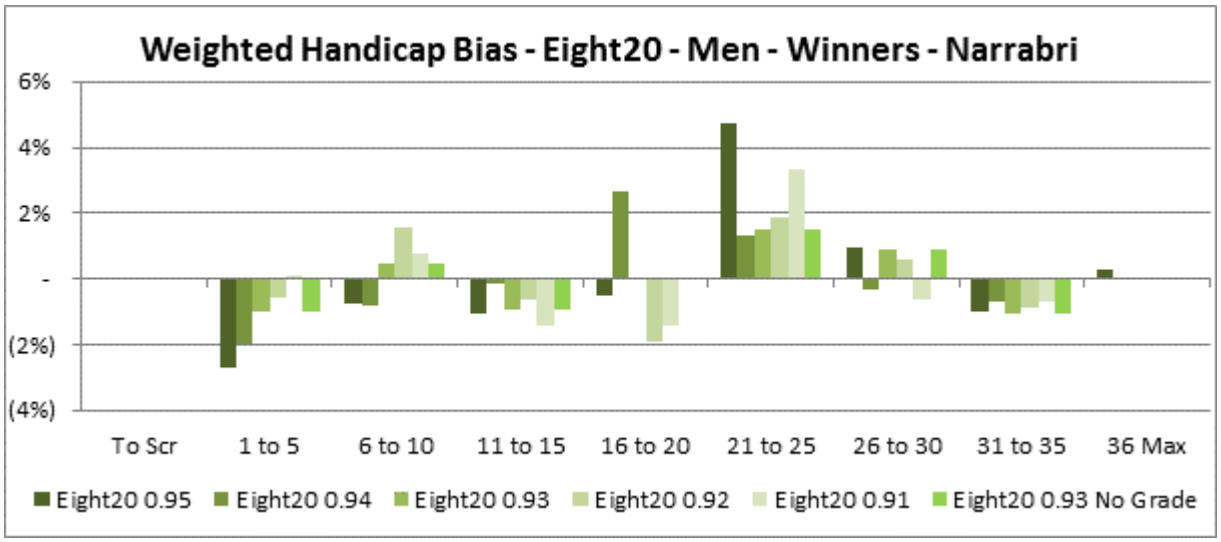
Narrabri	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-17.5	16.5	-25.1	27.6
Current Period - Ten20 0.96	23.1	18.3	-12.0	20.0
Old Period - Ten20 0.96	3.4	18.8	-8.9	19.9
Ten20 0.96	8.6	11.8	-18.3	17.3
Ten20 0.95	7.1	14.6	-16.5	13.4
Ten20 0.94	0.1	12.3	-21.5	19.9
Ten20 0.93	5.2	12.0	-21.6	19.0
Ten20 0.92	-3.0	10.7	-21.3	21.7
Ten20 0.91	-16.4	14.6	-30.0	30.9
Ten20 0.9	-23.1	18.5	-33.4	32.2
Nine20 0.96	10.0	12.7	-15.7	14.0
Nine20 0.93	6.1	11.0	-20.3	20.5
Nine20 0.90	-13.0	16.5	-30.1	27.4
Eight20 0.96	6.9	8.4	-21.2	20.9
Eight20 0.93	-0.7	12.1	-23.5	23.9
Eight20 0.90	-16.1	14.6	-36.2	37.1
Blended 0.96	-4.3	13.3	-22.4	19.6
Blended 0.94	-6.7	13.4	-28.7	28.4
Blended 0.92	-15.8	14.2	-33.5	35.5
Hybrid 0.96	7.5	11.7	-19.4	17.4
Hybrid 0.94	1.9	12.6	-20.2	19.2

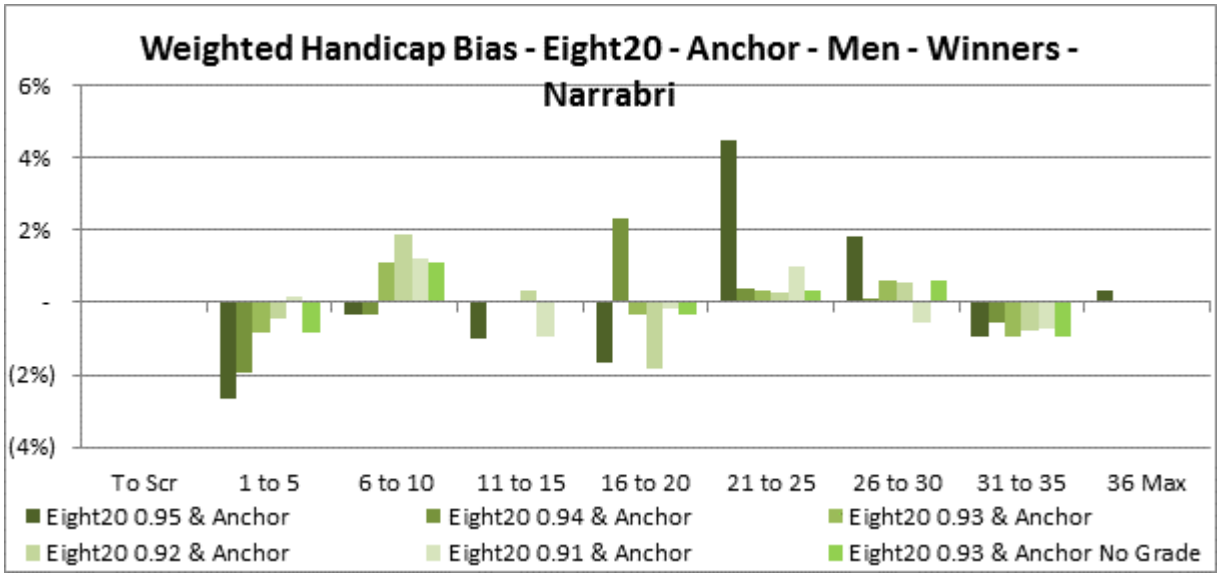
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

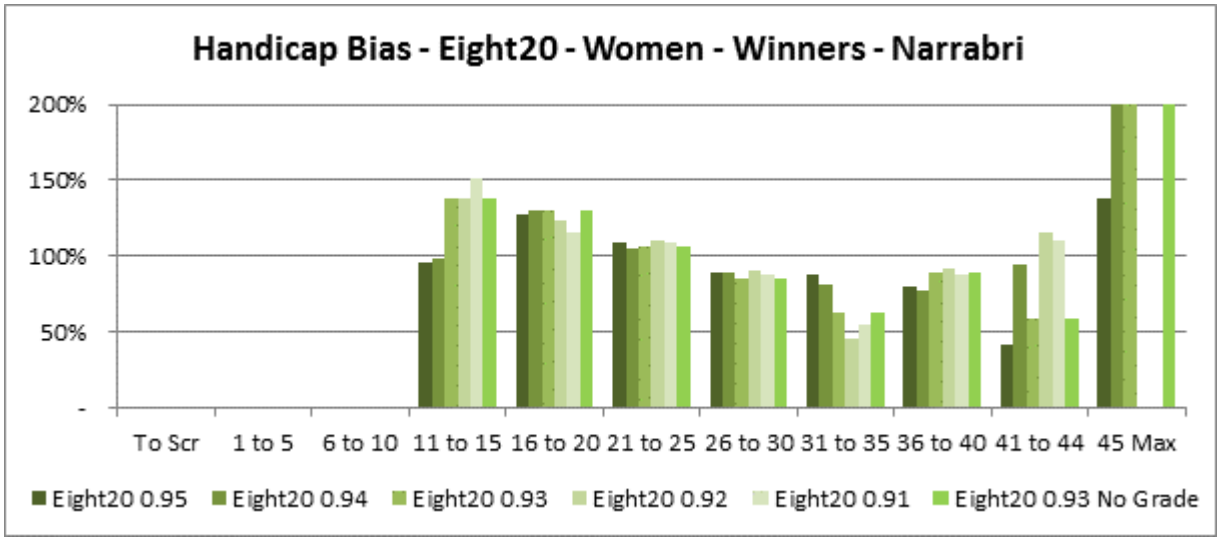
Phase 2

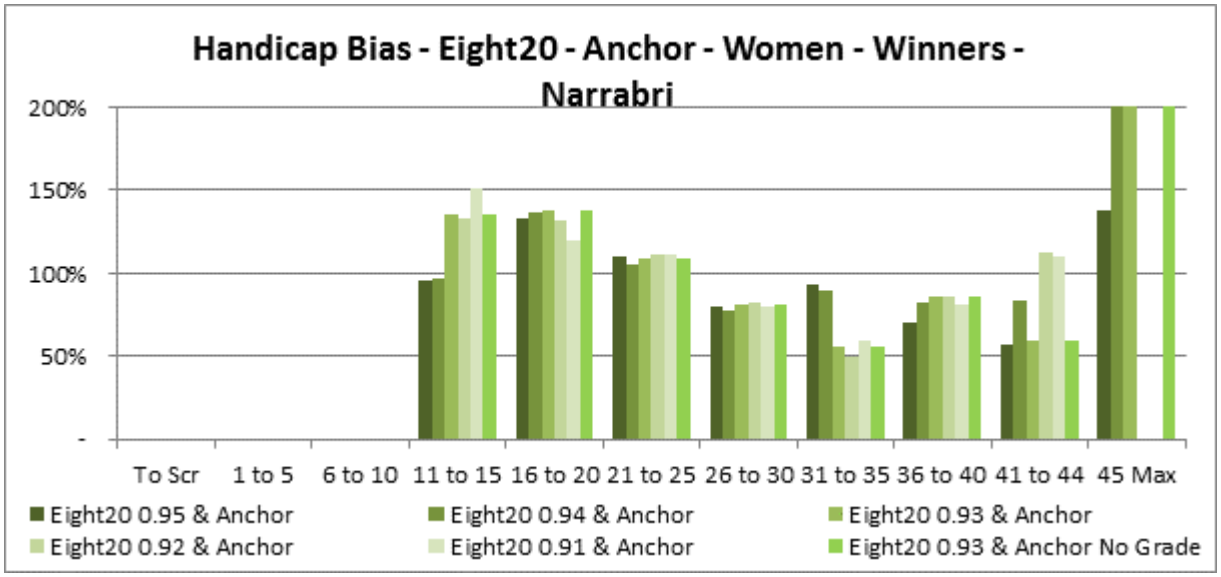

Handicap Bias - Eight20 - Men - Winners - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

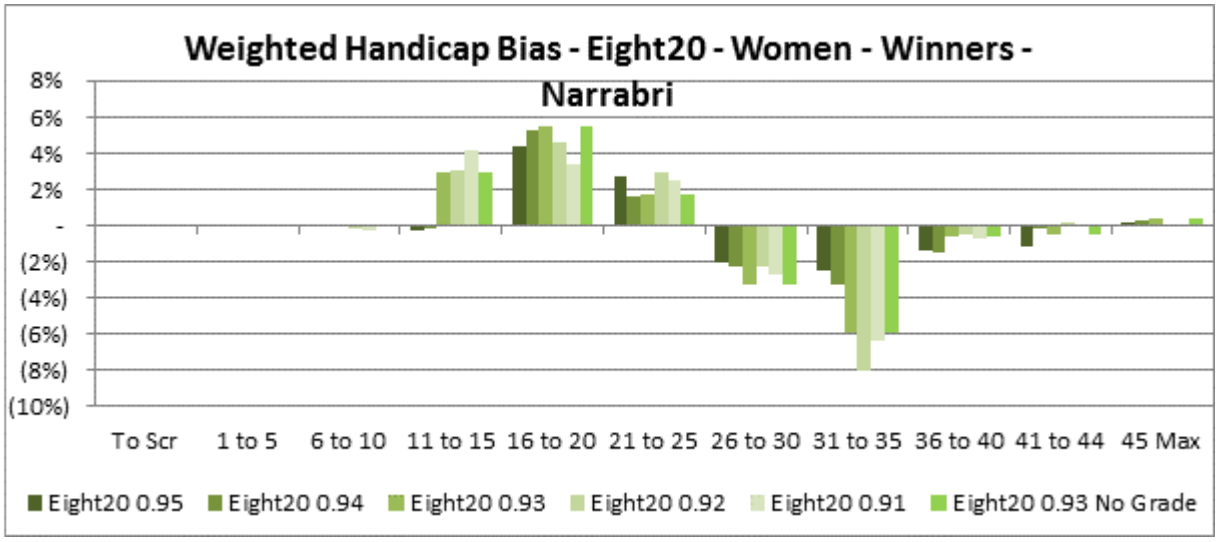

Handicap Bias - Eight20 - Anchor - Men - Winners - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

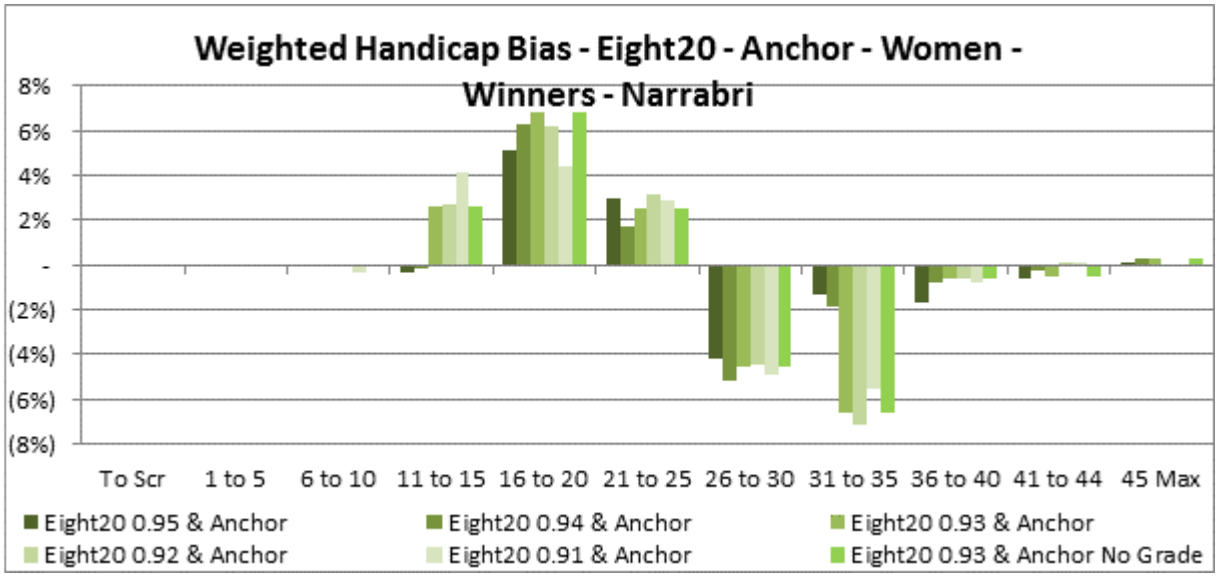

Weighted Handicap Bias - Eight20 - Men - Winners - Narrabri
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

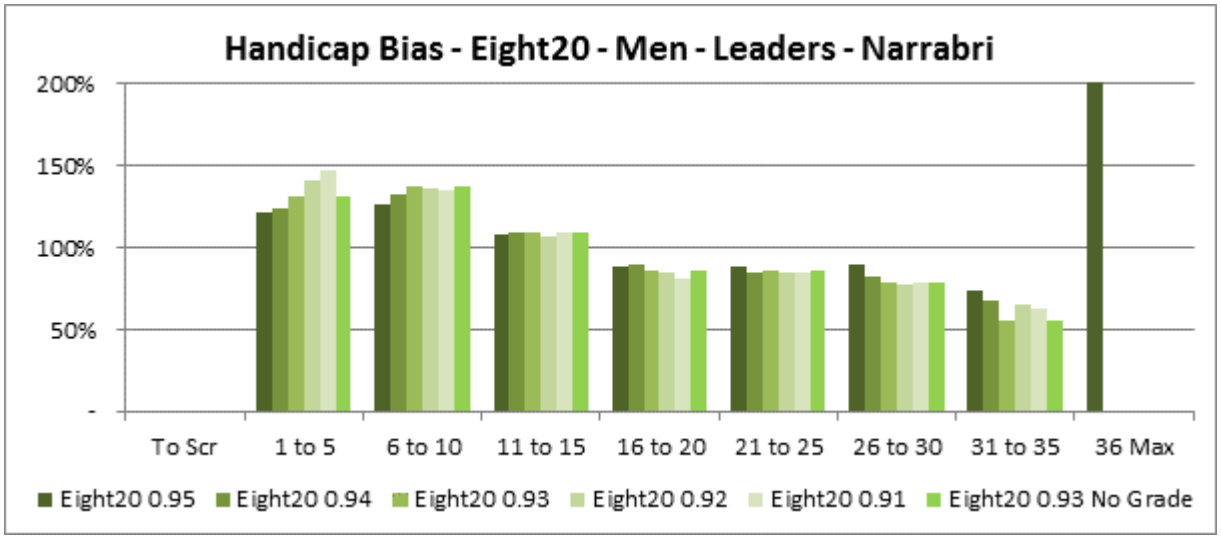

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Narrabri
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

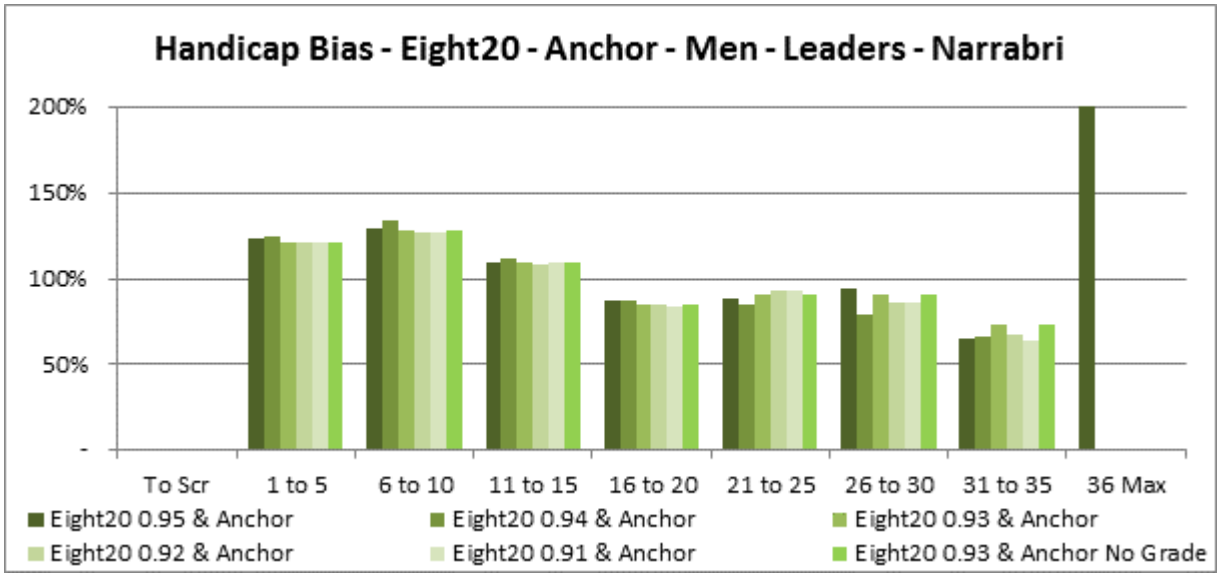

Handicap Bias - Eight20 - Women - Winners - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

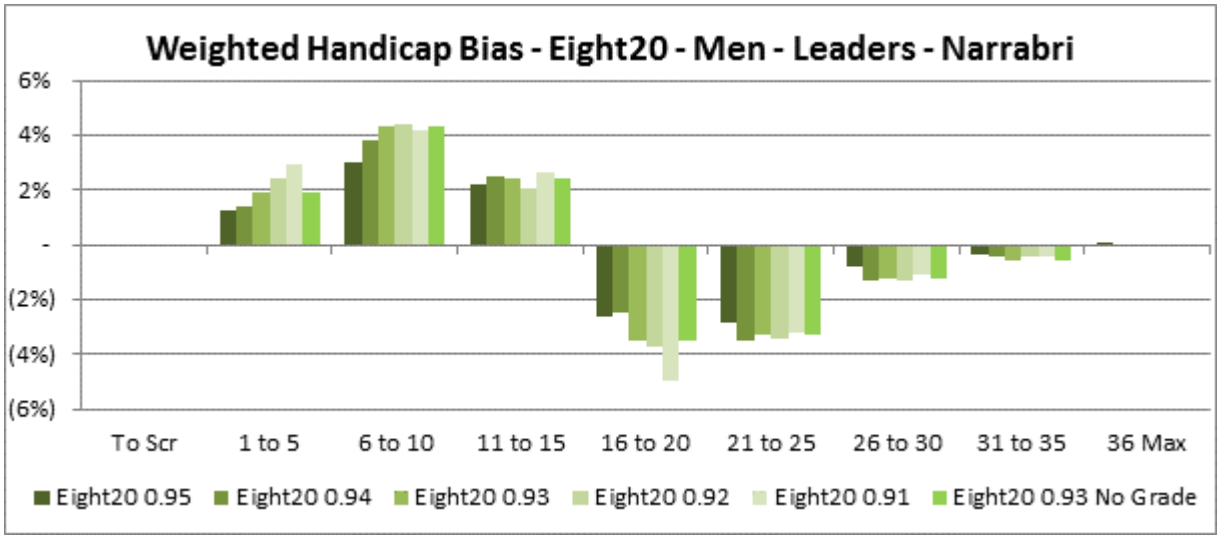

Handicap Bias - Eight20 - Anchor - Women - Winners - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

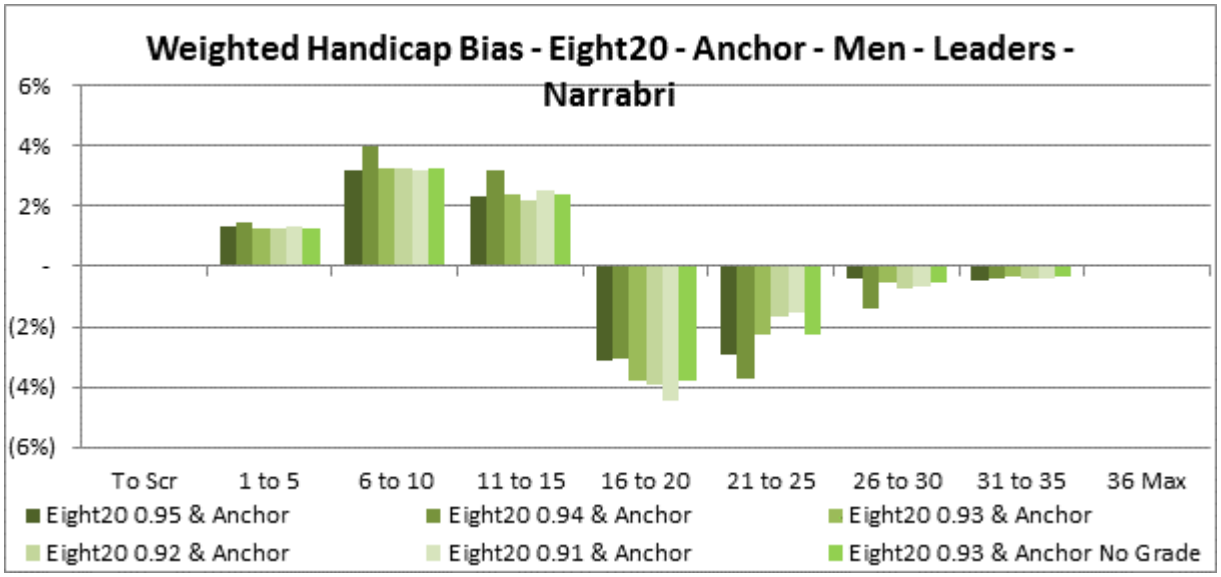

Weighted Handicap Bias - Eight20 - Women - Winners - Narrabri
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

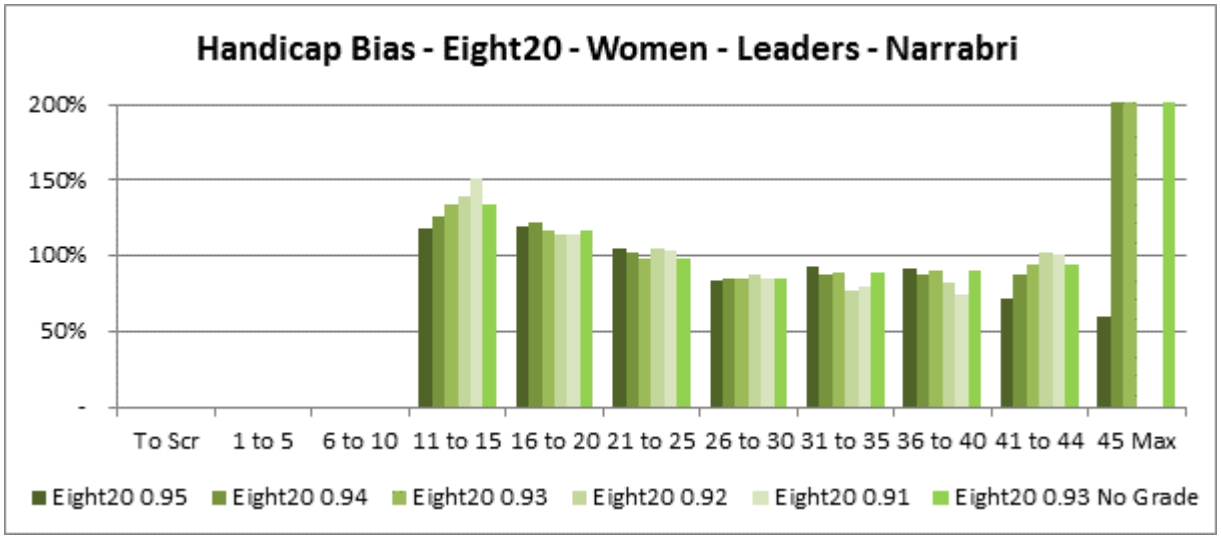

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Narrabri
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

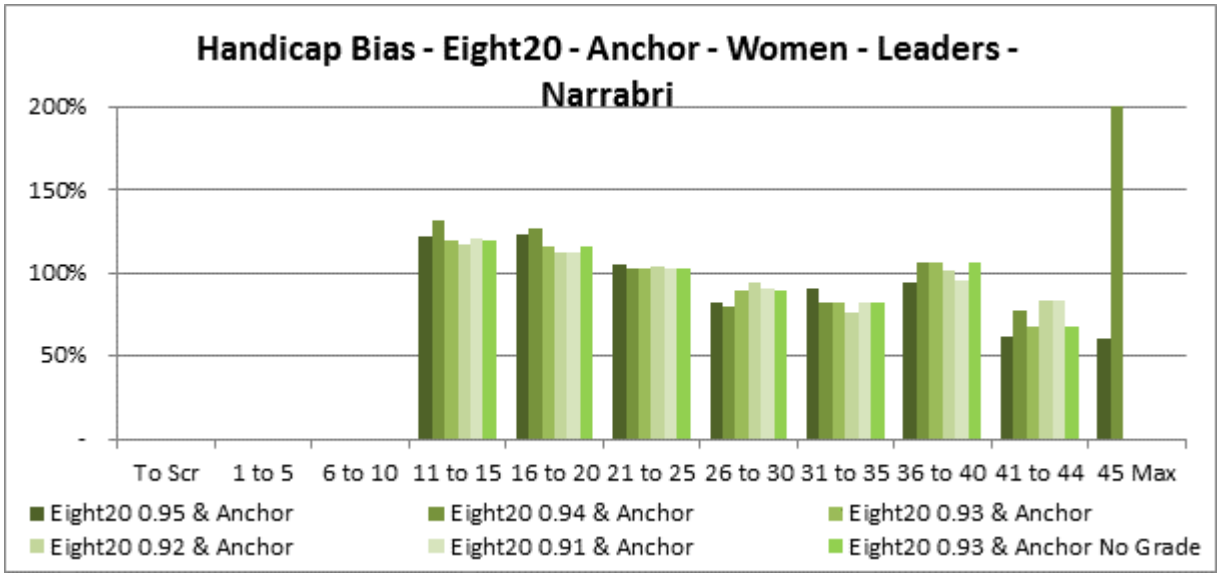

Handicap Bias - Eight20 - Men - Leaders - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

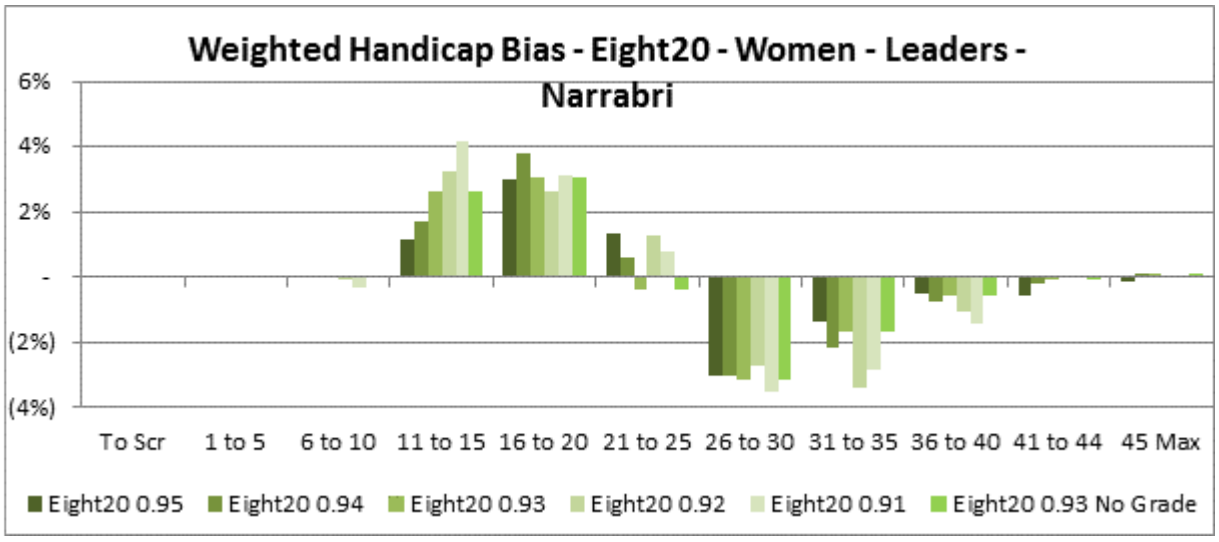

Handicap Bias - Eight20 - Anchor - Men - Leaders - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

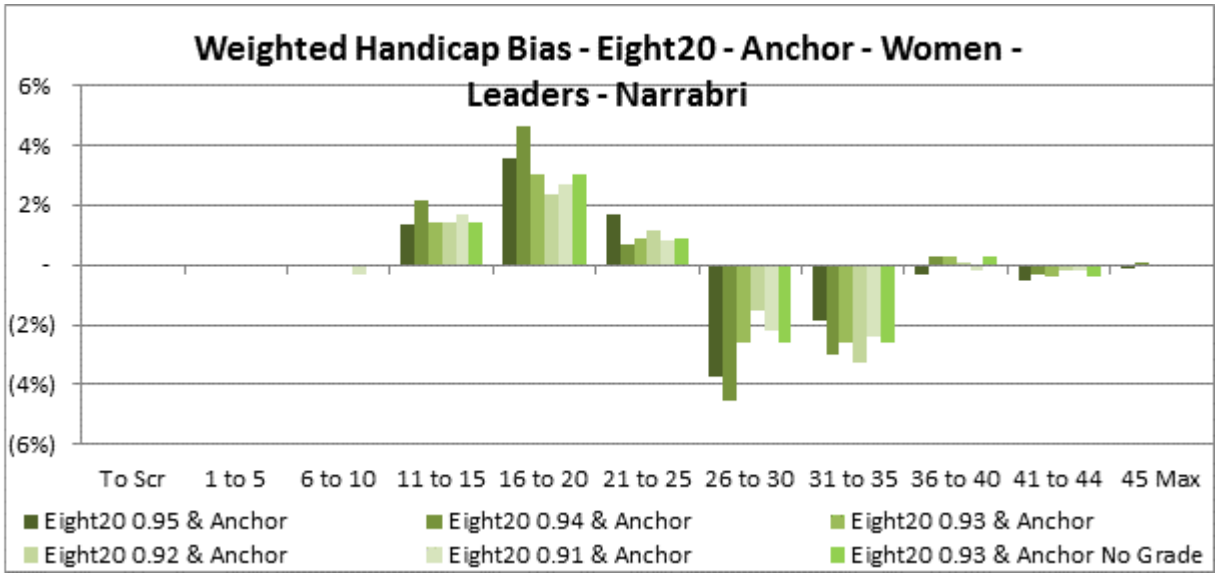

Weighted Handicap Bias - Eight20 - Men - Leaders - Narrabri
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Narrabri
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Narrabri
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Narrabri
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

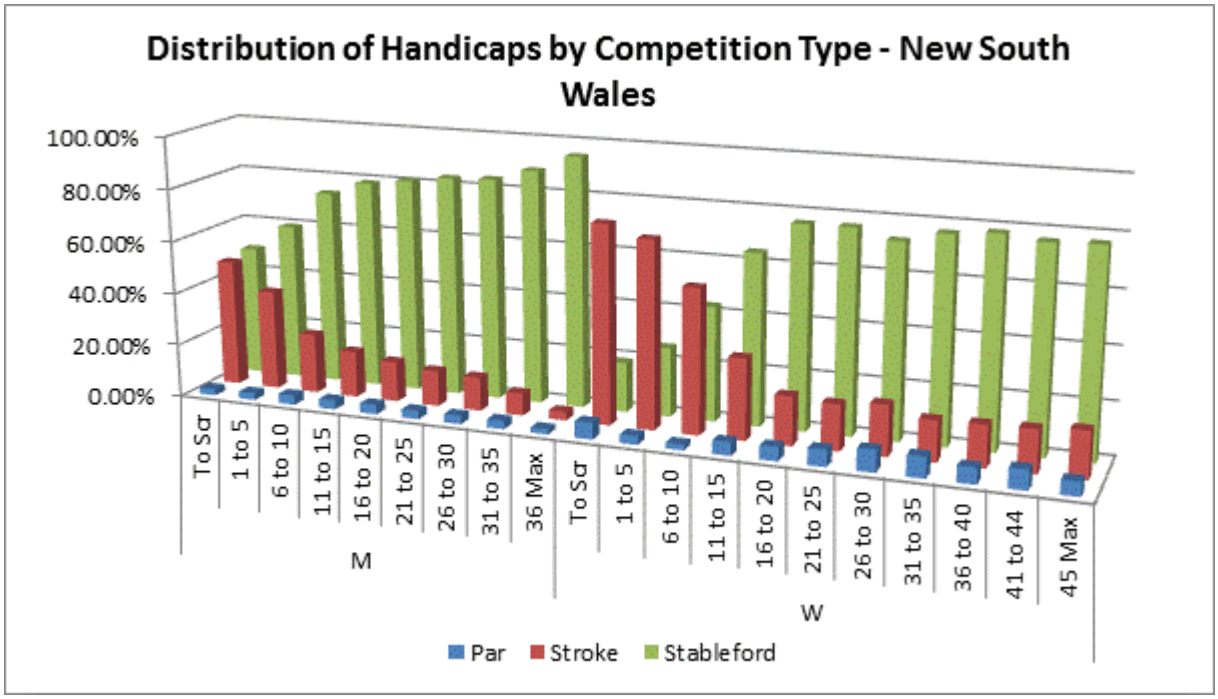


		Phase 2 -Narrabri			
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	25.9	20.6	-17.2	20.0
	Eight20 0.94	10.6	13.2	-15.5	22.0
	Eight20 0.93	5.0	8.7	-26.3	29.8
	Eight20 0.92	-0.6	11.9	-26.9	32.9
	Eight20 0.91	-0.7	14.4	-25.4	28.9
	Eight20 0.93 No Grade	5.0	8.7	-26.3	29.8
	Eight20 0.95 & Anchor	27.1	21.0	-16.7	24.0
	Eight20 0.94 & Anchor	9.0	11.1	-15.1	27.0
	Eight20 0.93 & Anchor	-1.5	6.6	-29.4	35.5
	Eight20 0.92 & Anchor	-6.0	10.1	-28.6	35.5
	Eight20 0.91 & Anchor	-7.1	7.3	-26.9	31.6
	Eight20 0.93 & Anchor No Grade	-1.5	6.6	-29.4	35.5
Leaders	Eight20 0.95	-28.8	19.7	-14.0	15.5
	Eight20 0.94	-36.0	23.2	-15.7	18.0
	Eight20 0.93	-40.6	25.8	-14.6	17.2
	Eight20 0.92	-42.3	26.6	-19.7	19.8
	Eight20 0.91	-43.9	29.5	-22.0	22.5
	Eight20 0.93 No Grade	-40.6	25.8	-14.6	17.2
	Eight20 0.95 & Anchor	-29.5	21.3	-16.0	18.9
	Eight20 0.94 & Anchor	-38.7	25.8	-17.6	23.8
	Eight20 0.93 & Anchor	-28.5	21.8	-13.5	16.1
	Eight20 0.92 & Anchor	-27.9	21.2	-12.5	14.9
	Eight20 0.91 & Anchor	-28.0	22.7	-12.2	14.6
	Eight20 0.93 & Anchor No Grade	-28.5	21.8	-13.5	16.1

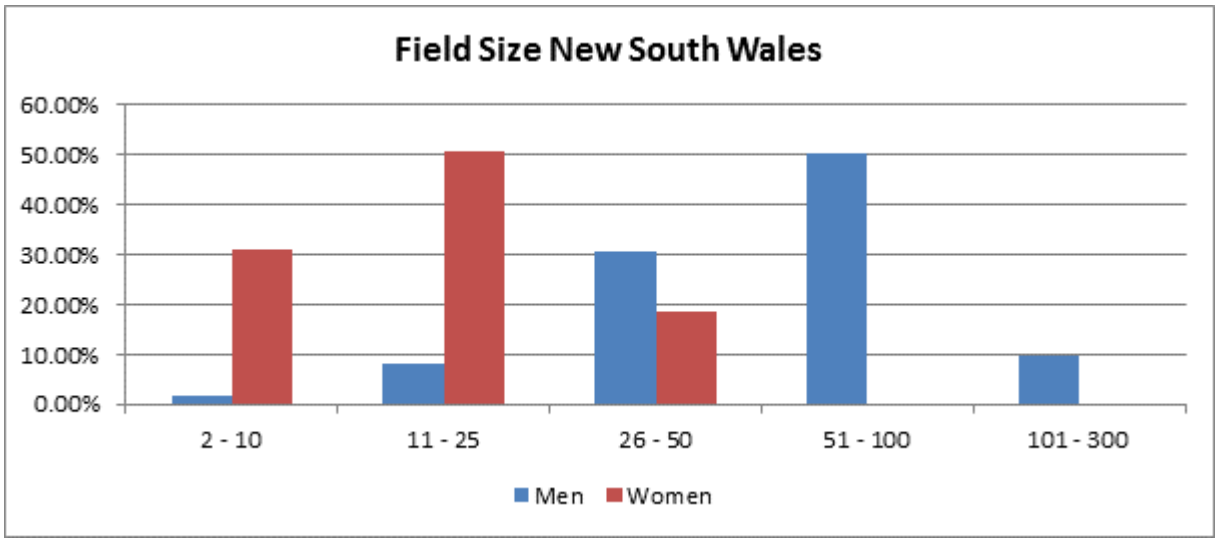
Appendix 10 – New South Wales

Phase 1

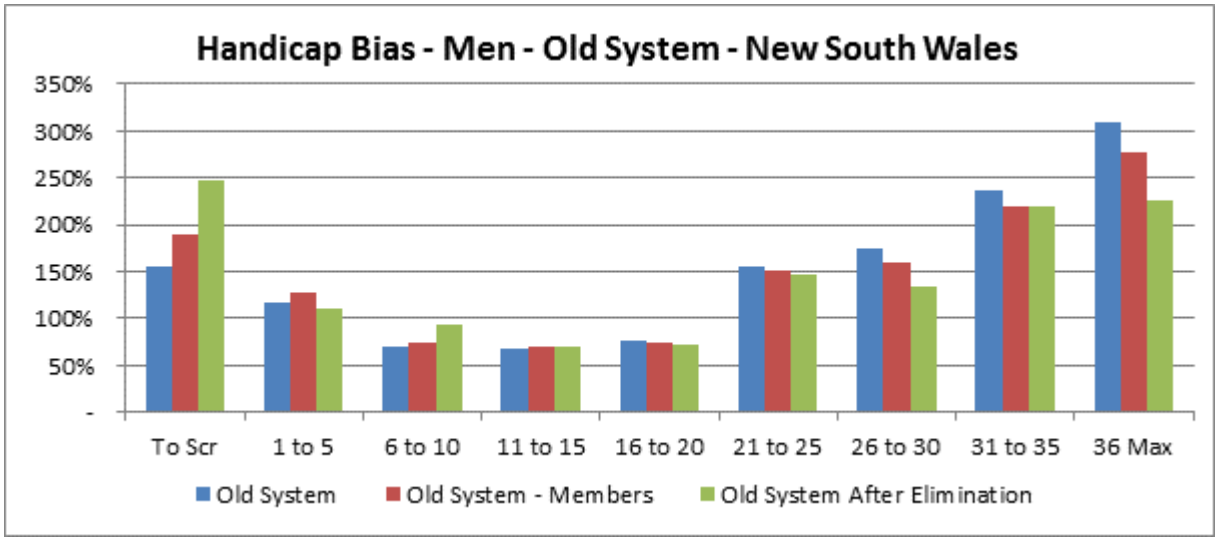
New South Wales	Men	Women	Total
Players in Database	2,117	491	2,608
Members	615	144	759
Visitors	1,502	347	1,849
Members who have Played 33 Rounds	577	134	711
Members with Last Round In Old System	111	27	138
Members with Last Round in Current System	504	117	621
Earliest Round	30/11/2007	3/12/2007	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			213
Number of Home Competitions	830	589	1,419
Number of Rounds of Golf	52,367	11,604	63,971
Number of Rounds at Home	42,058	8,191	50,249
Number of Rounds at Home Old	33,238	6,352	39,590
Number of Rounds at Home Current	8,820	1,839	10,659
Num Rnds Members at Home	38,262	7,020	45,282
Num Rnds Members at Home Old	30,191	5,414	35,605
Num Rnds Members at Home Cur	8,071	1,606	9,677
Num Rnds After Eliminations	22,376	4,048	26,424
Num Rnds After Eliminations Old	14,873	2,578	17,451
Num Rnds After Eliminations Cur	7,503	1,470	8,973

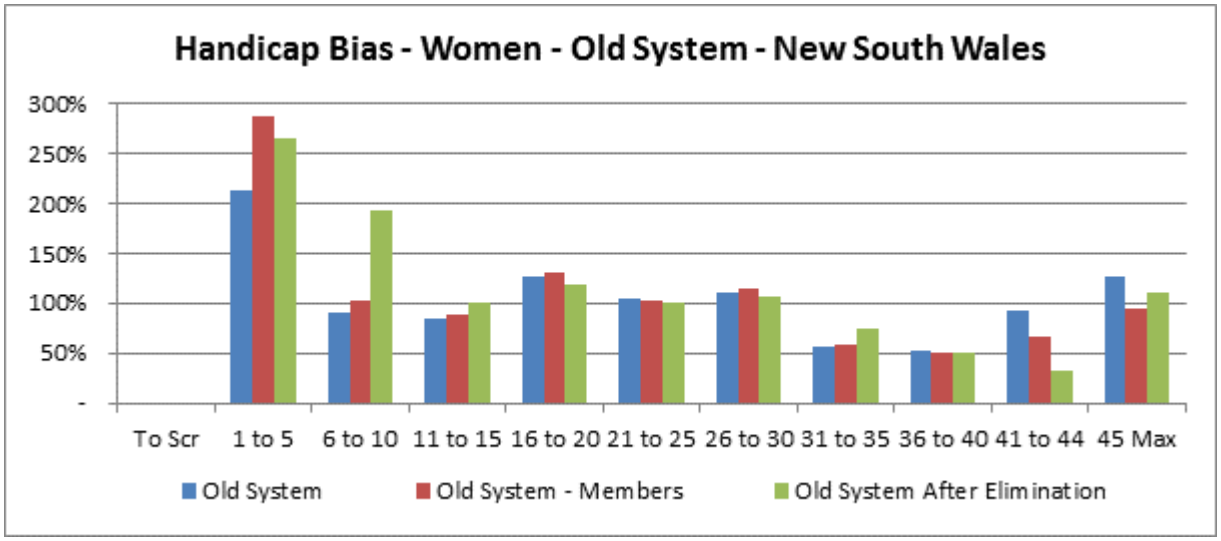


Most men's competitions are with a field of over 50, the women mainly field 11-25.

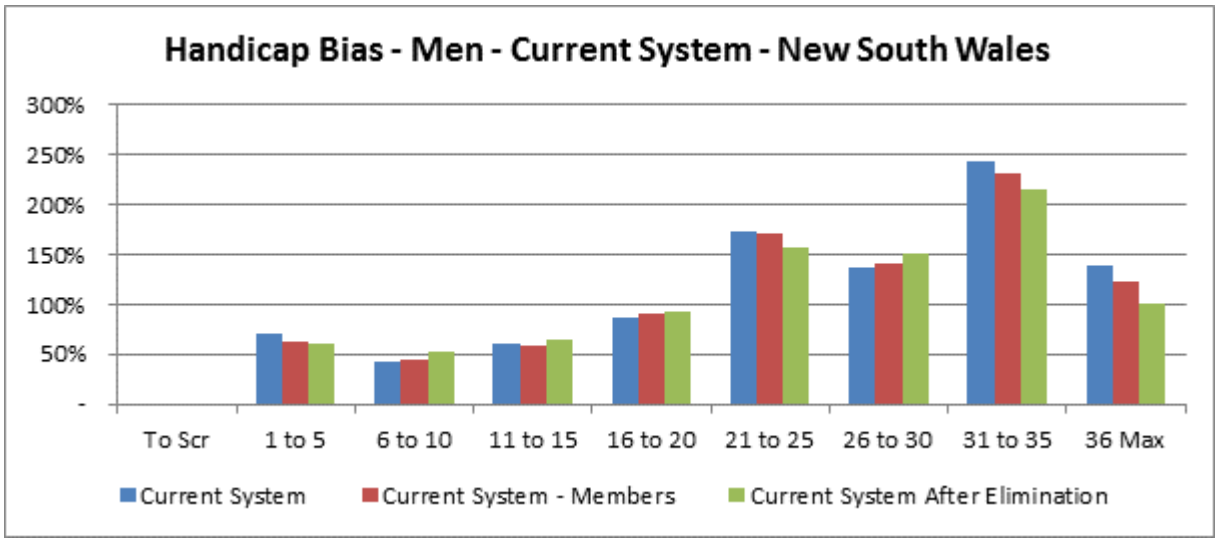


Under the Old System, there was a mixed bias. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

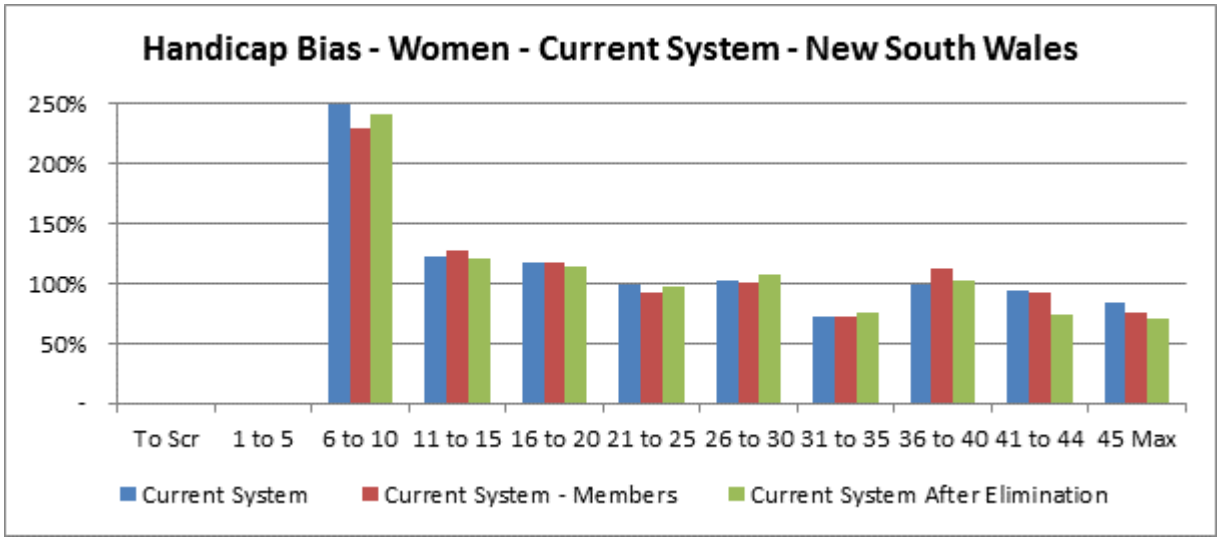




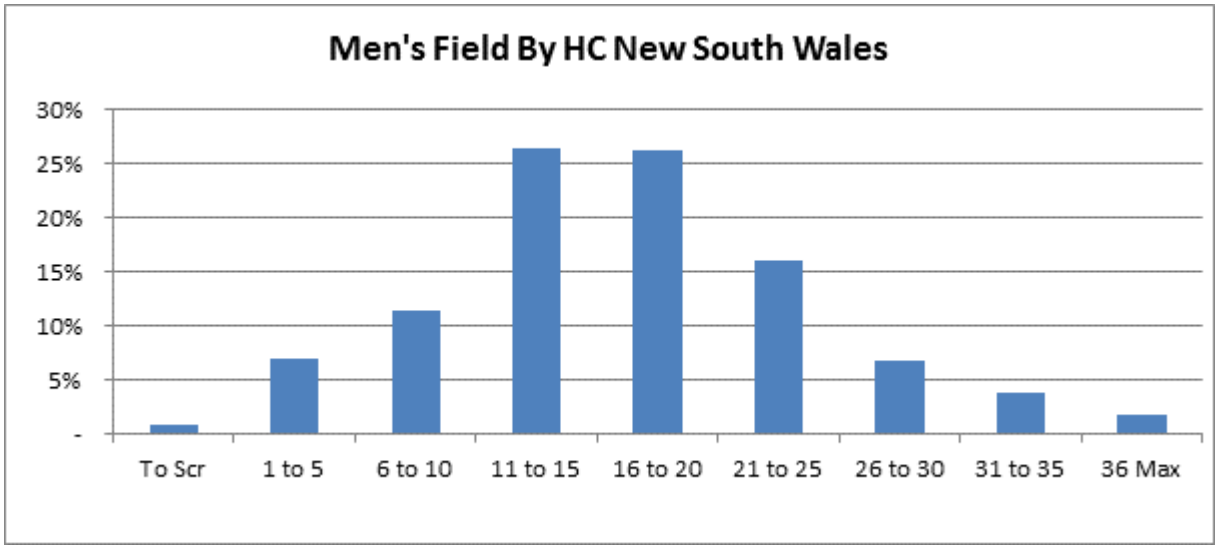
Under the Current System, the bias is in favour of the high markers for men.

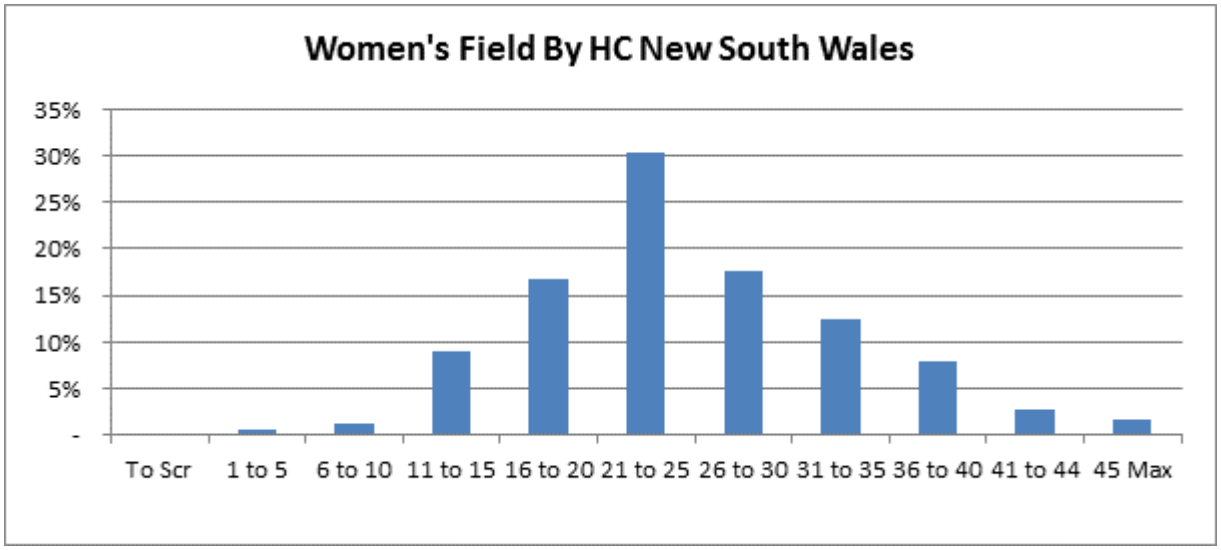


The picture is different for the women, with the low markers having a slight advantage.



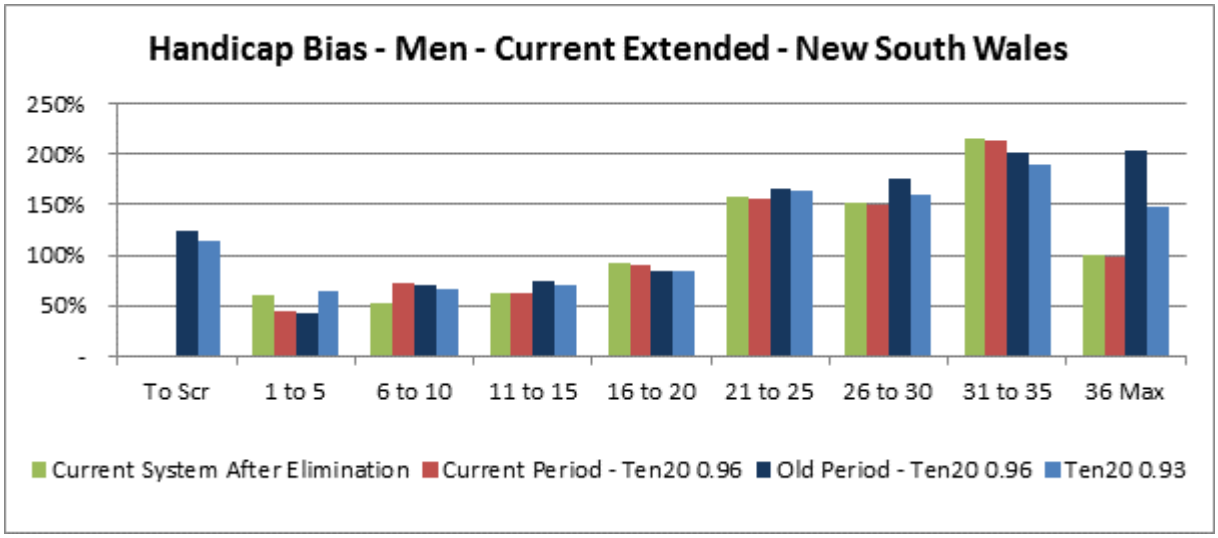
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be "lumpy", and not too much store should be put on the bias for the lowest and highest markers.



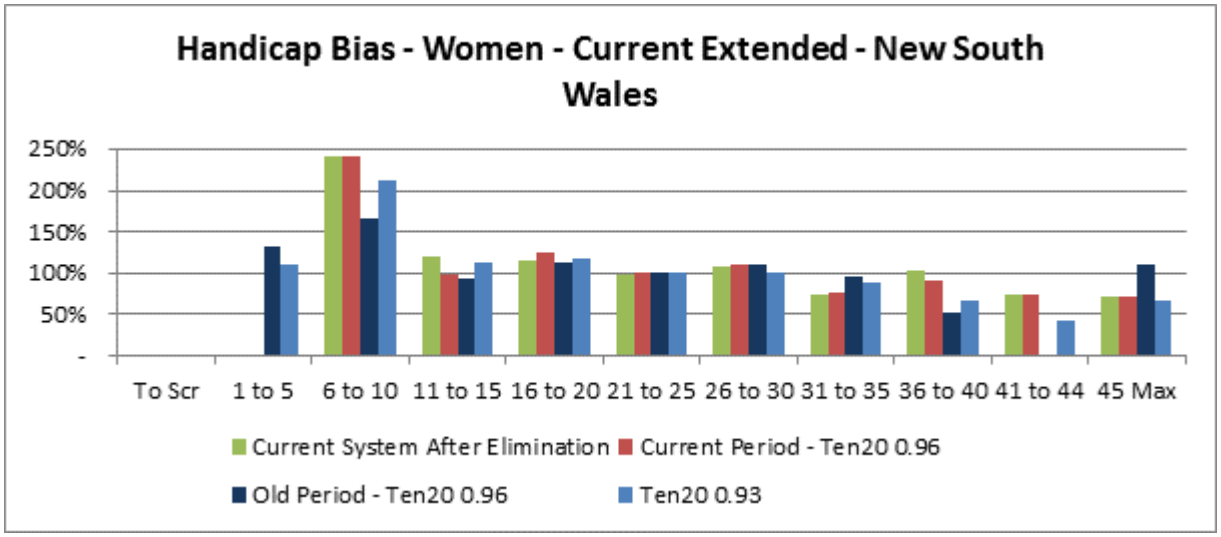


In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

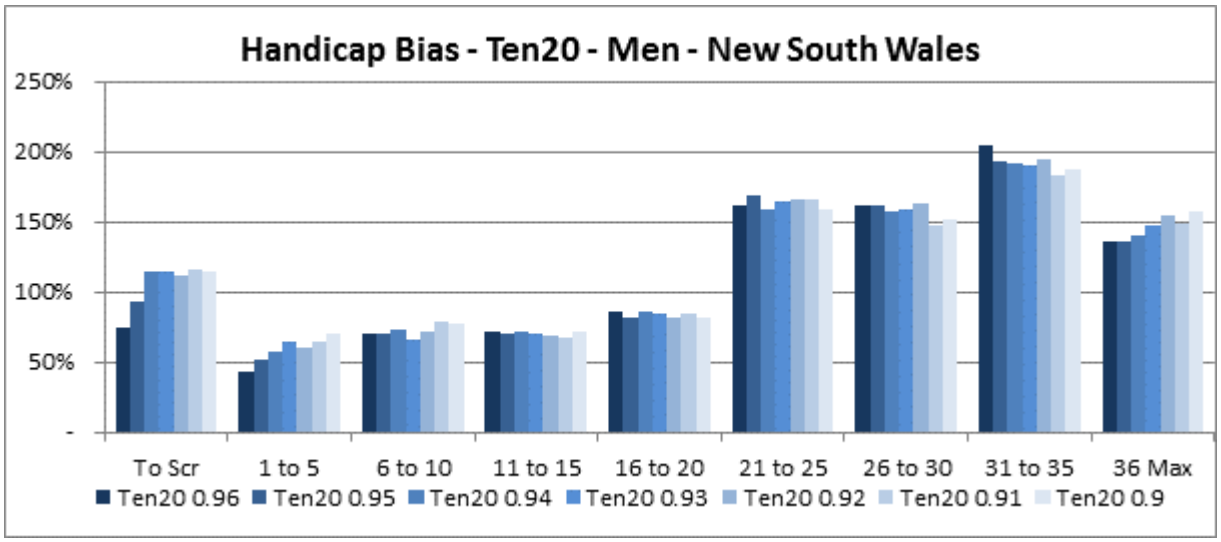
In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

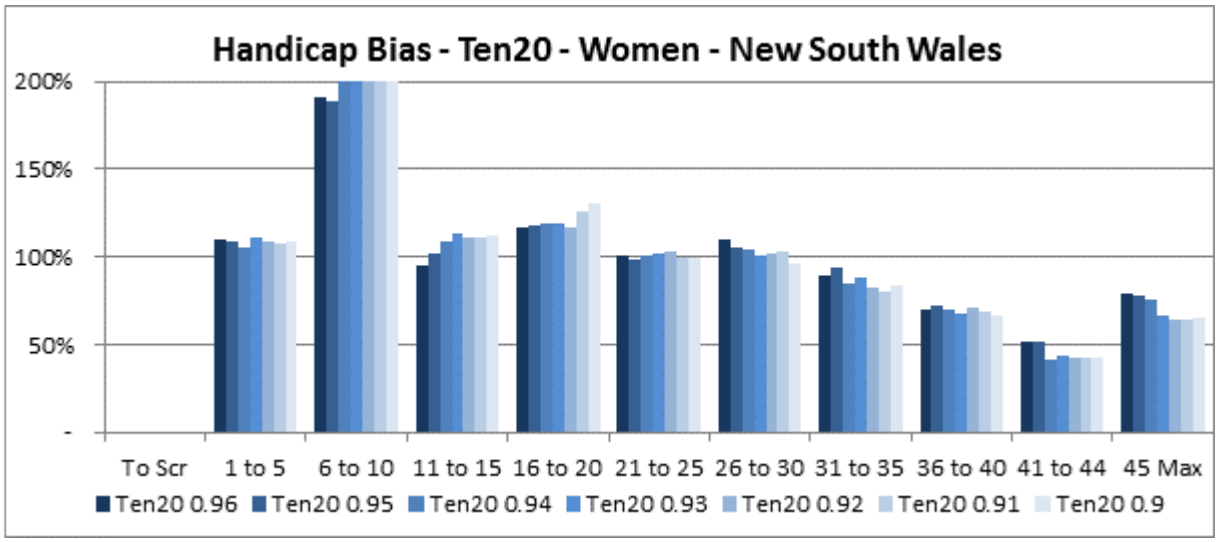


For women, the low markers would have dominated over the two-years.

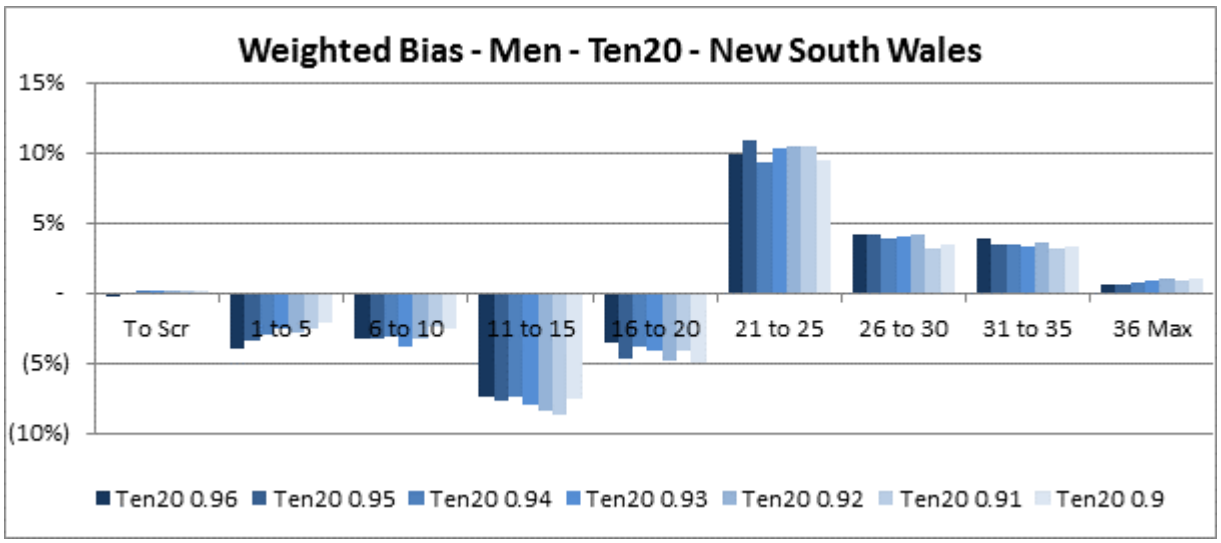


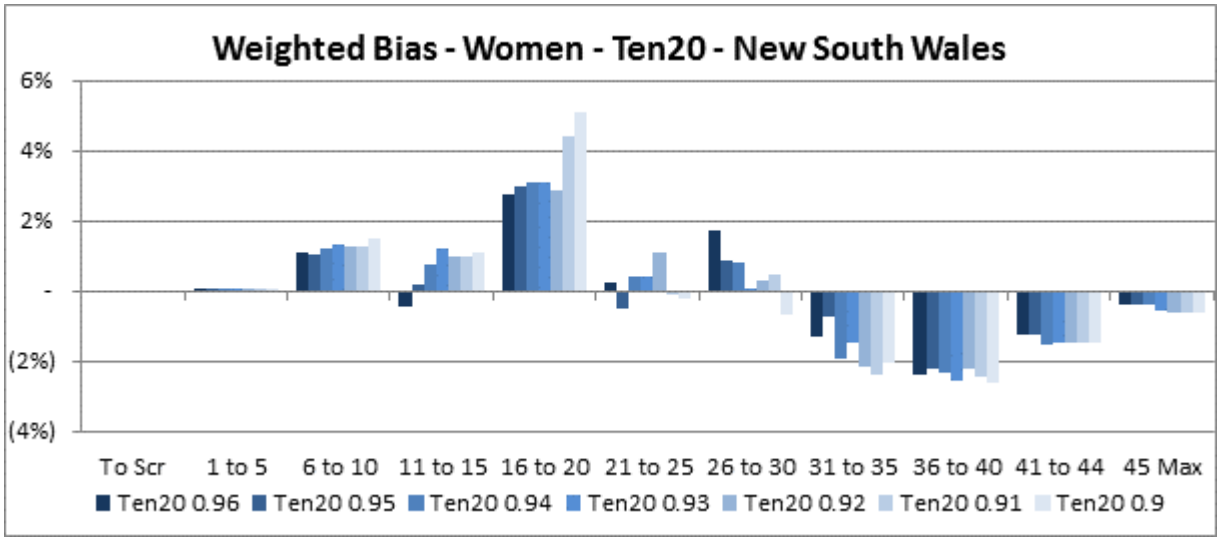
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

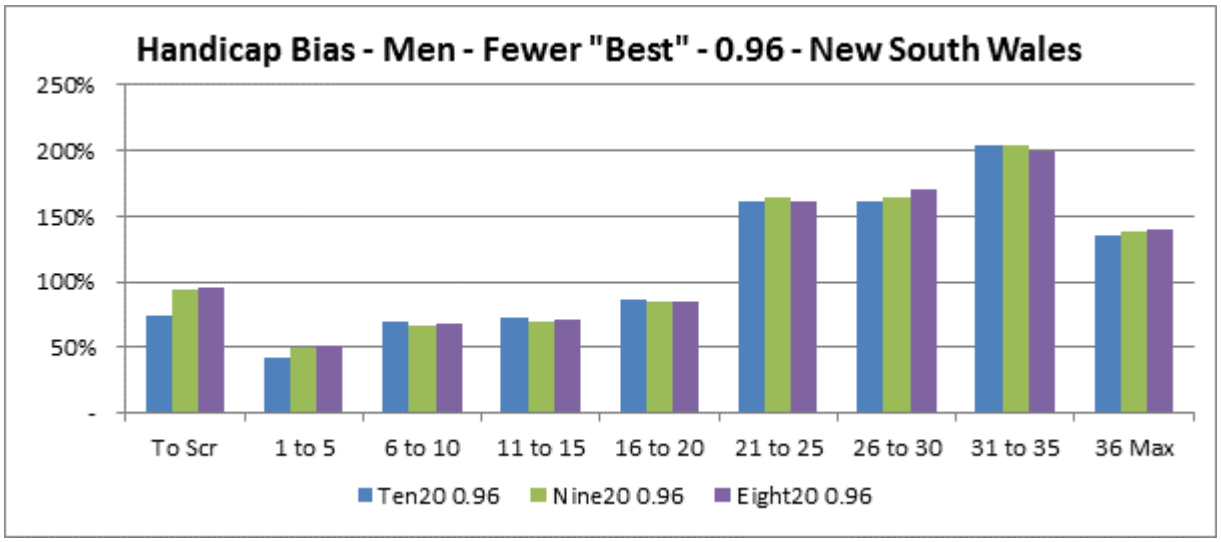


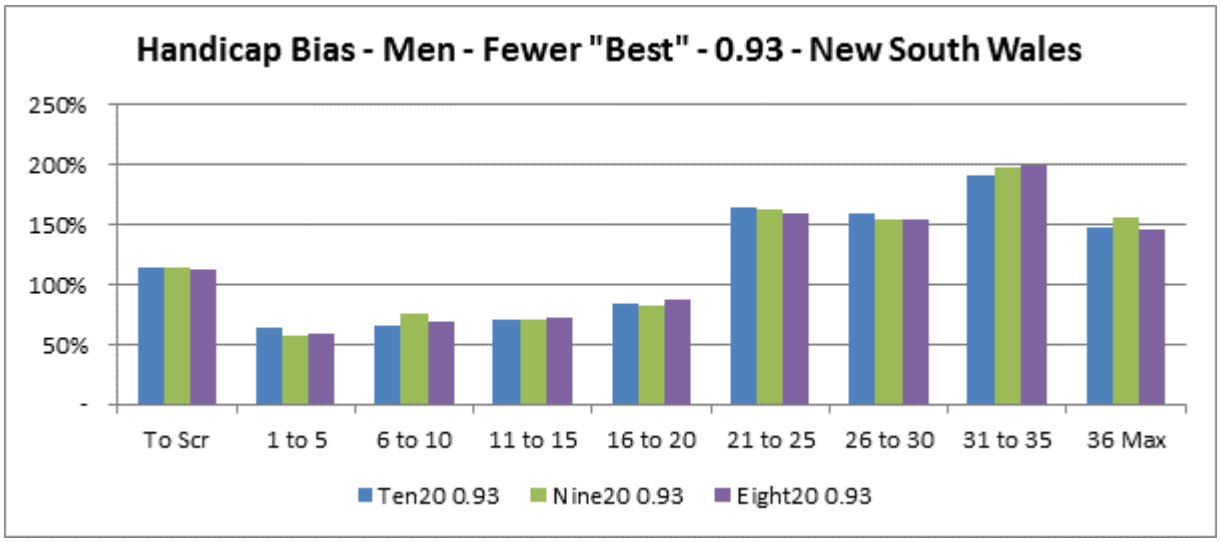


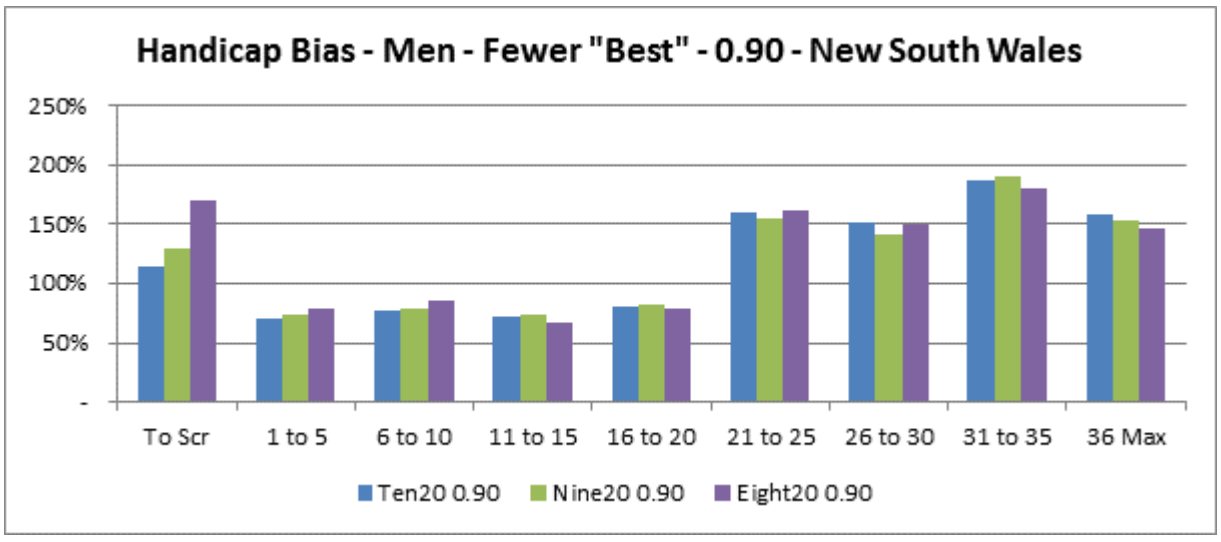
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

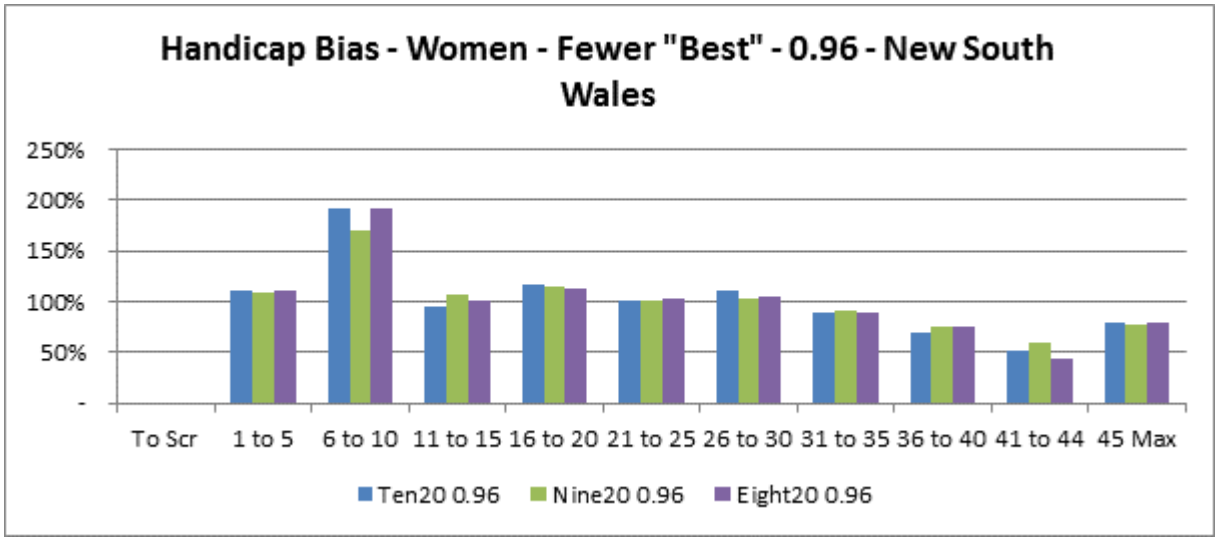
New South Wales				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	99.0	53.0	-18.3	14.5
Ten20 0.95	95.2	56.3	-18.9	13.6
Ten20 0.94	87.2	50.6	-24.3	15.6
Ten20 0.93	91.3	54.6	-26.4	15.6
Ten20 0.92	93.7	56.2	-25.9	15.6
Ten20 0.91	83.5	53.9	-28.2	19.1
Ten20 0.9	81.0	50.7	-30.5	20.9

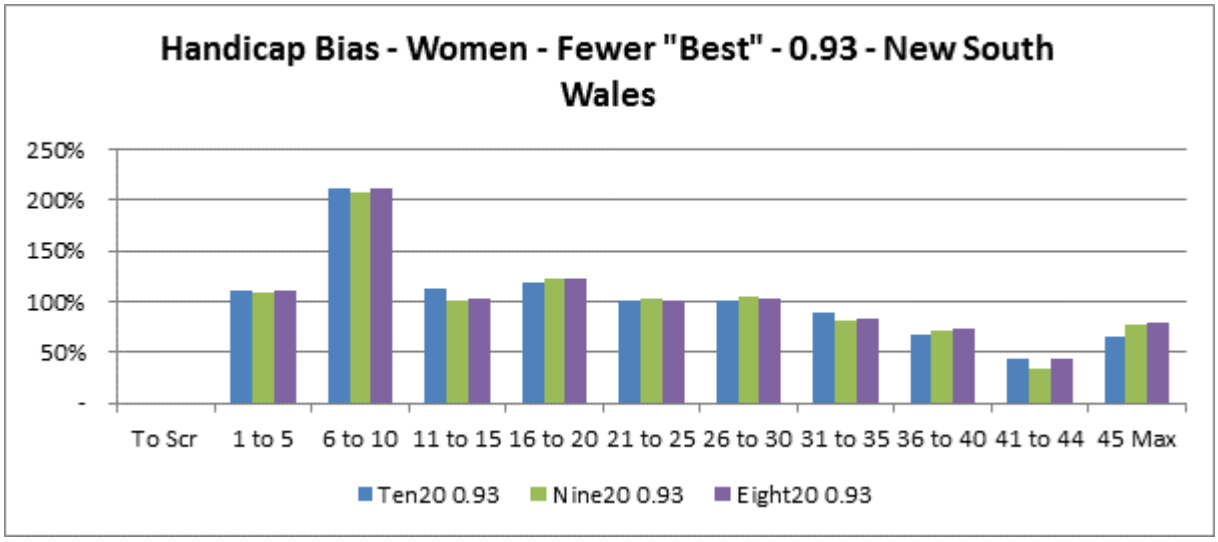
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

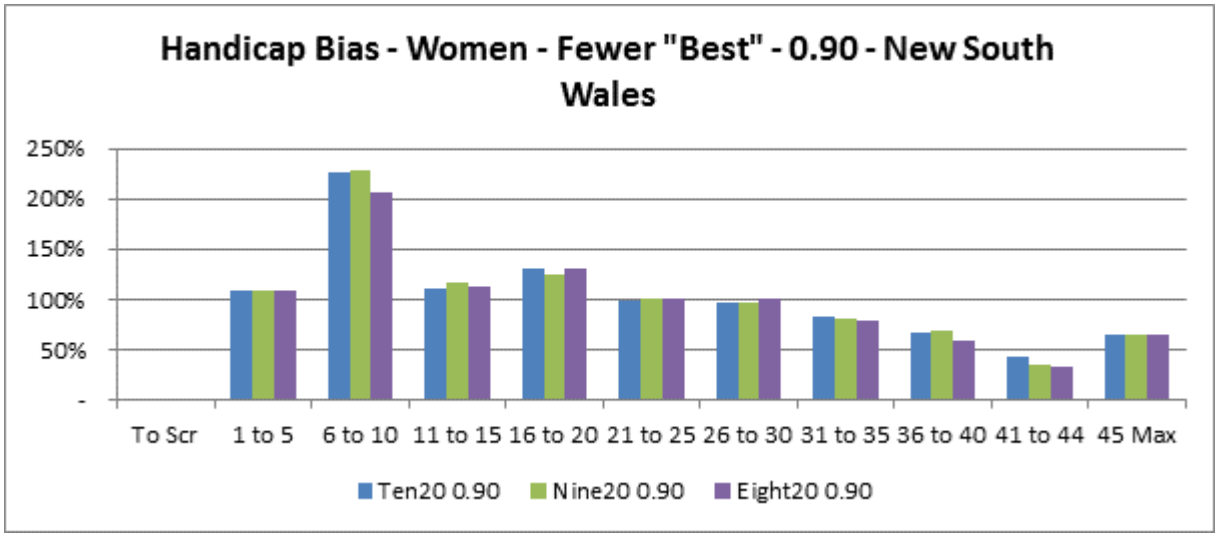







Handicap Bias - Women - Fewer "Best" - 0.96 - New South Wales
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

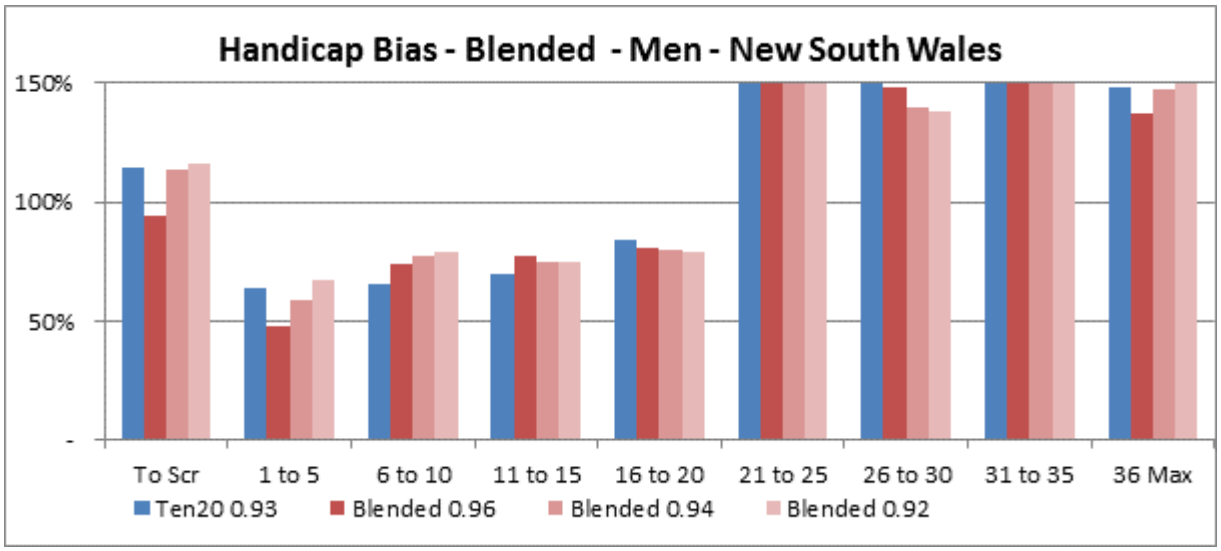

Handicap Bias - Women - Fewer "Best" - 0.93 - New South Wales
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

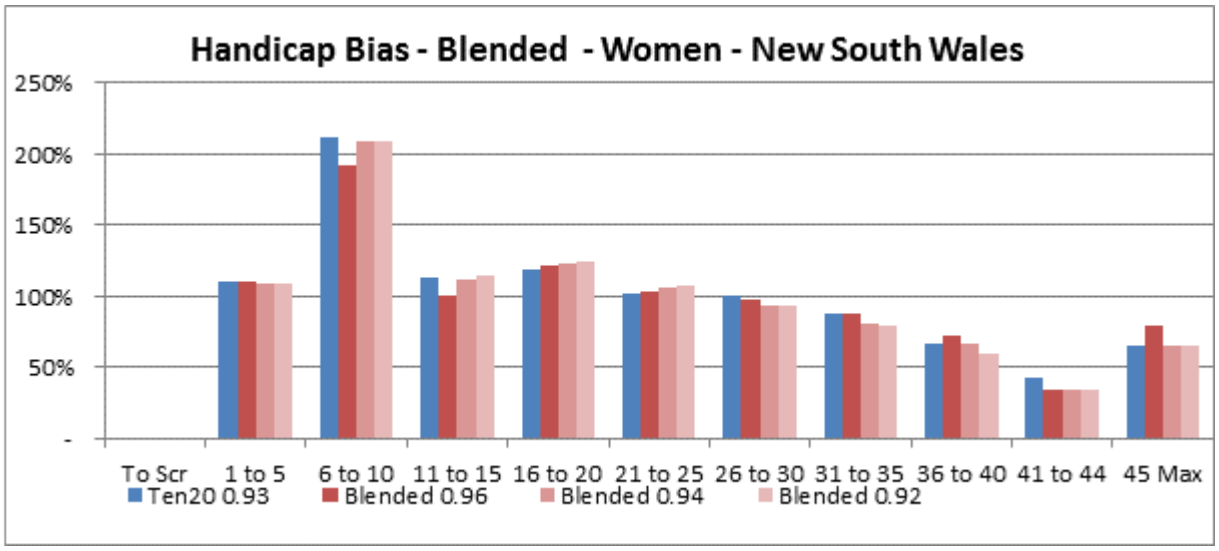

Handicap Bias - Women - Fewer "Best" - 0.90 - New South Wales
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

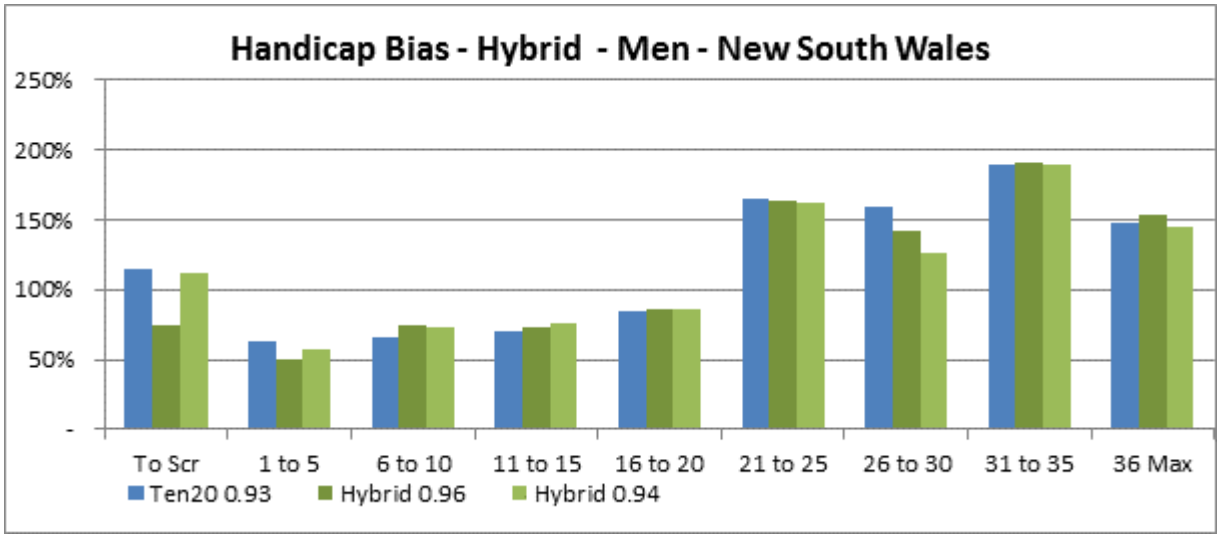
New South Wales	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	99.0	53.0	-18.3	14.5
Nine20 0.96	99.5	55.5	-18.6	11.9
Eight20 0.96	98.0	54.1	-19.2	12.6
Ten20 0.93	91.3	54.6	-26.4	15.6
Nine20 0.93	90.2	53.0	-24.9	17.6
Eight20 0.93	90.1	50.7	-23.7	16.2
Ten20 0.90	81.0	50.7	-30.5	20.9
Nine20 0.90	74.6	46.8	-30.7	18.8
Eight20 0.90	71.8	53.9	-32.6	22.2

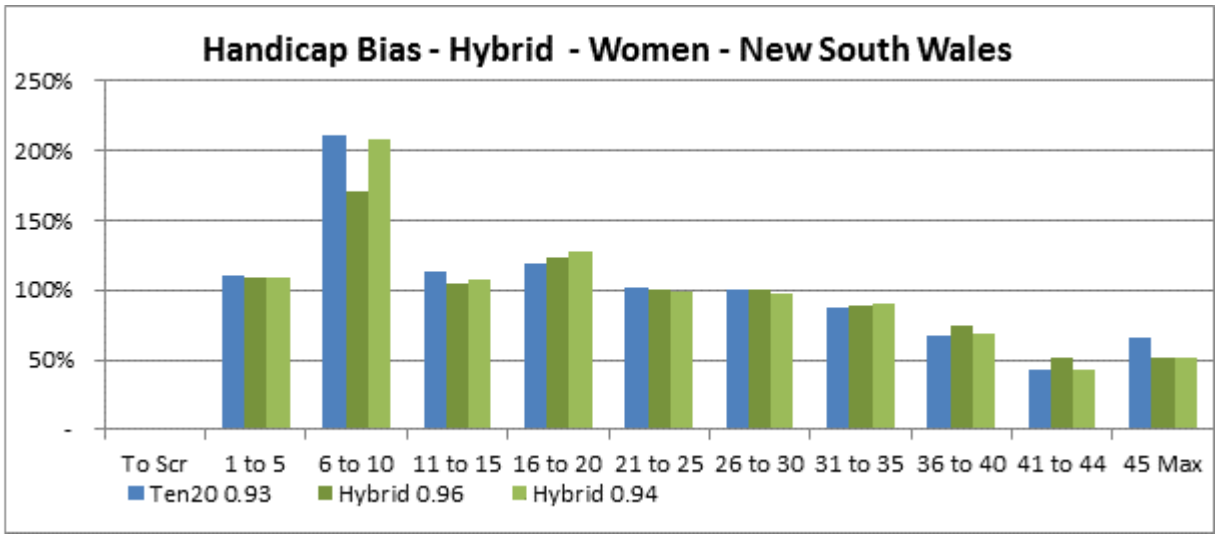
For the Blended:





For the Hybrid:

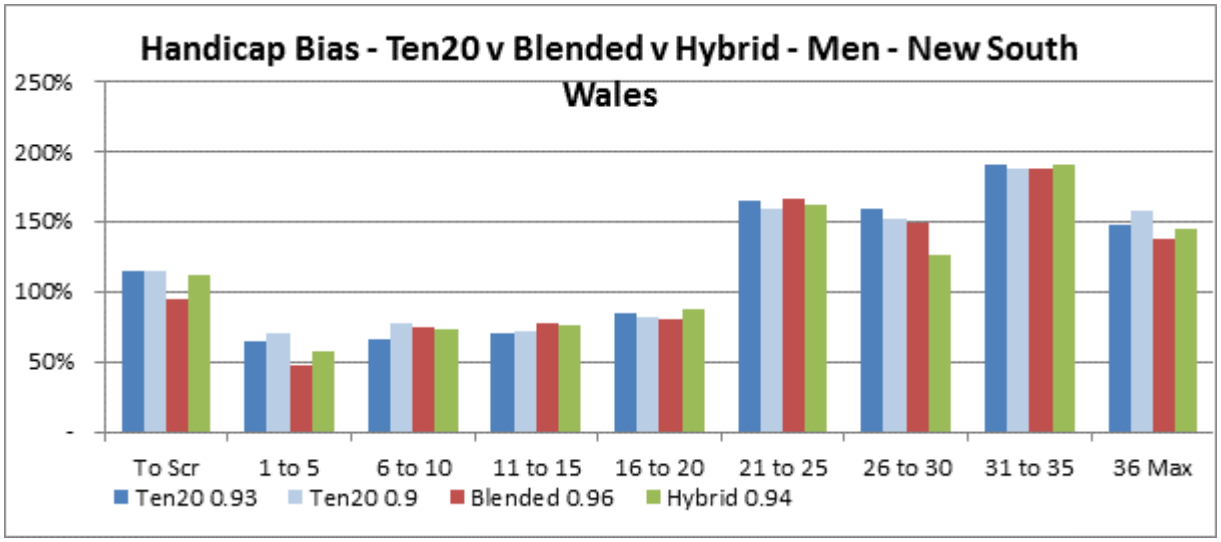


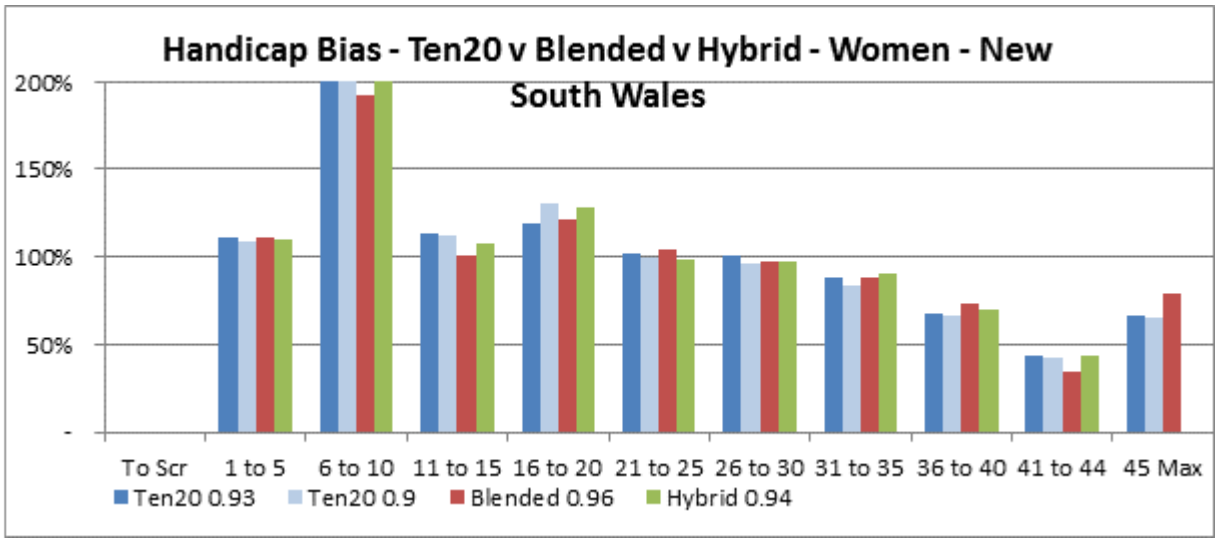


The Corresponding Tilt and Level Indices are:

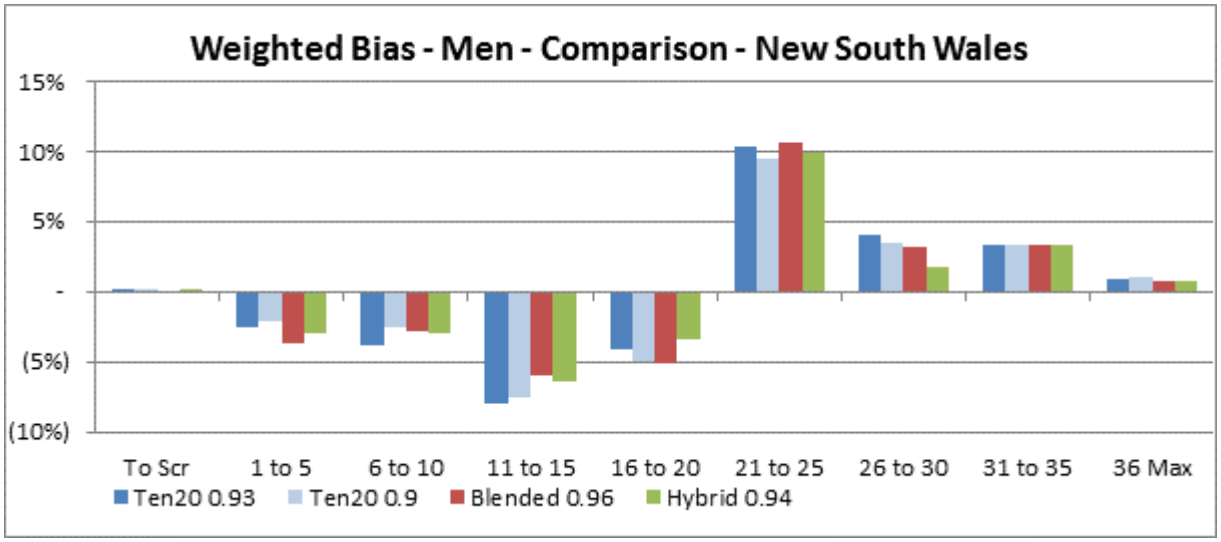
	New South Wales			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	87.7	52.3	-23.1	15.9
Blended 0.94	81.6	52.3	-30.5	19.8
Blended 0.92	76.9	50.7	-32.8	21.5
Hybrid 0.96	90.2	51.1	-22.9	15.8
Hybrid 0.94	79.1	47.8	-27.2	18.5

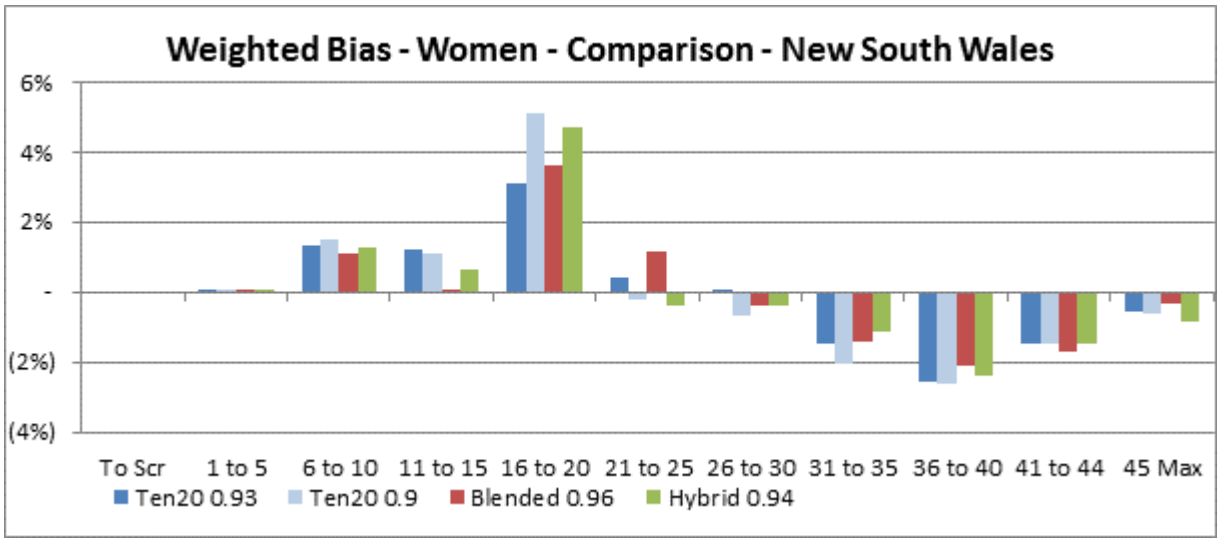
Comparing representatives of each of the three methods:





The Weighted Bias is:





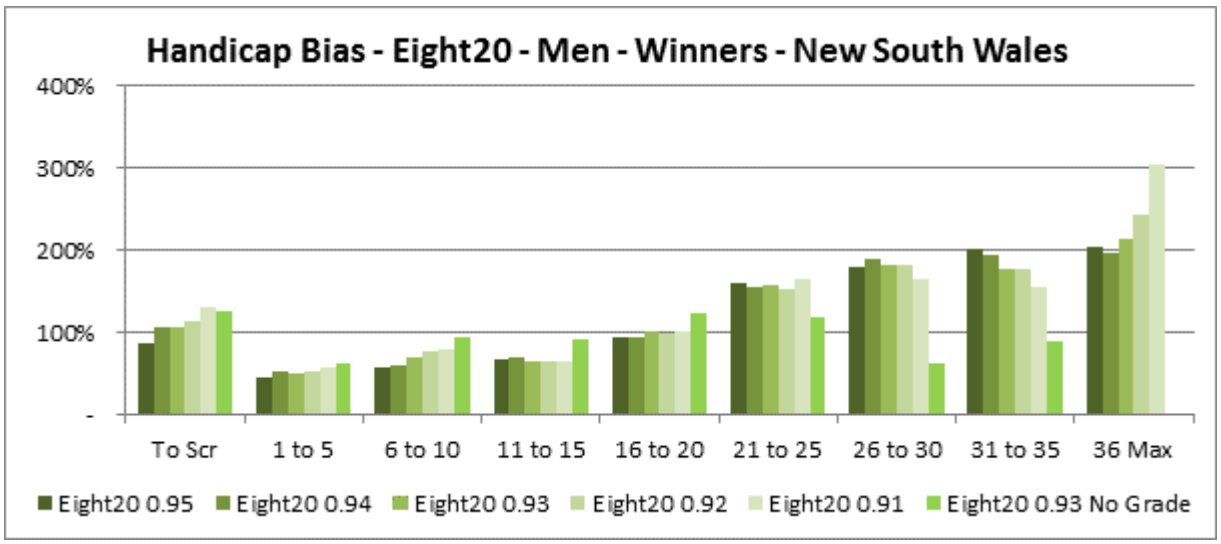
	New South Wales			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	91.3	54.6	-26.4	15.6
Ten20 0.9	81.0	50.7	-30.5	20.9
Blended 0.96	87.7	52.3	-23.1	15.9
Hybrid 0.94	79.1	47.8	-27.2	18.5

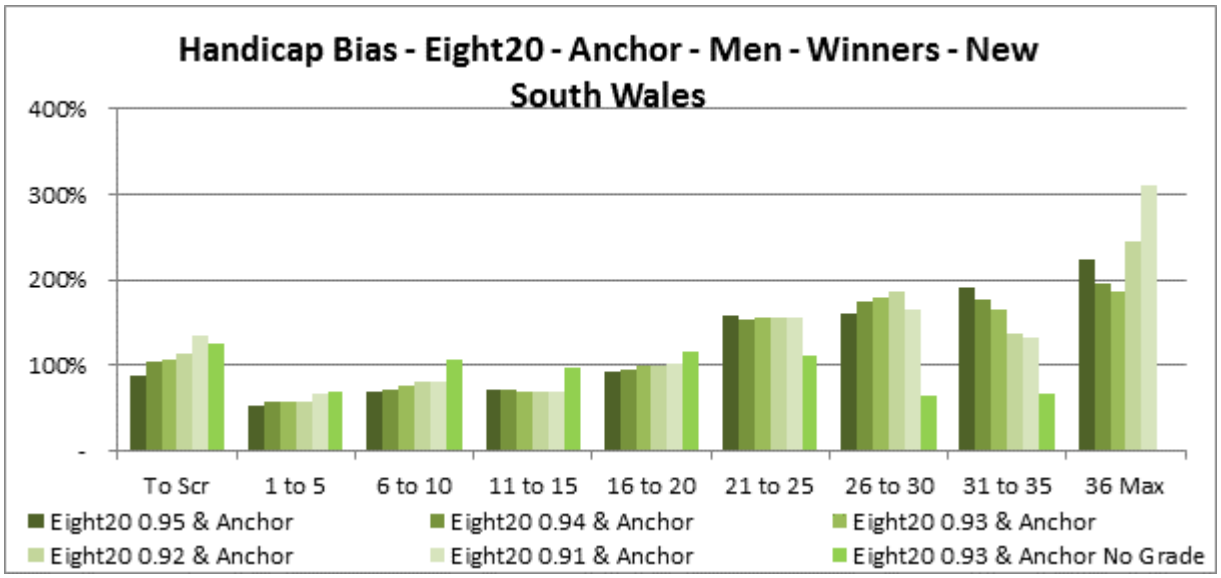
Putting it all together, with the Old System as a reference:

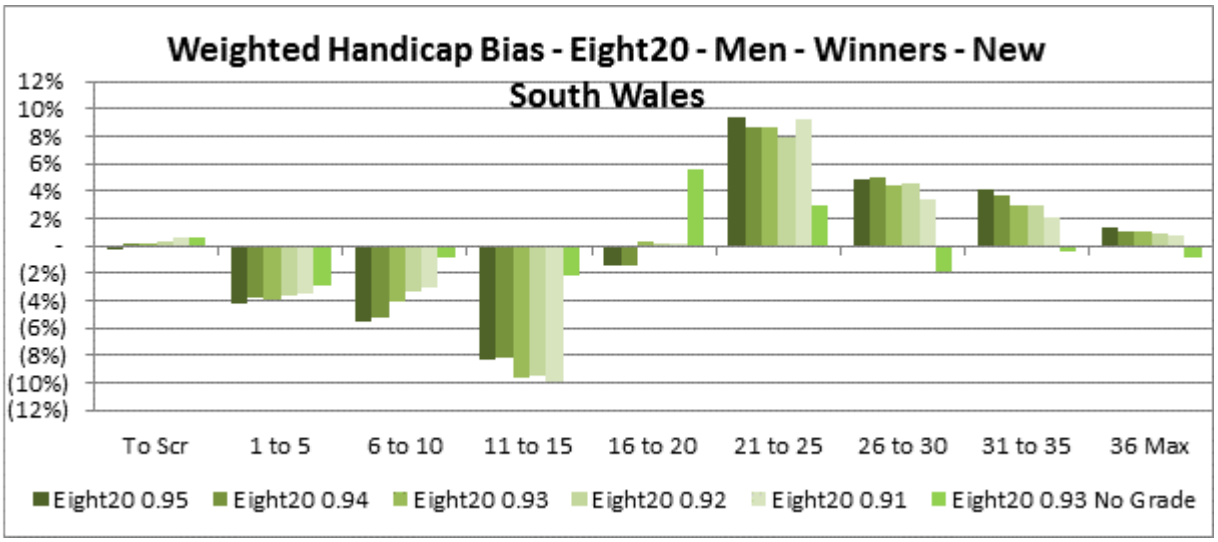
New South Wales				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	60.7	50.2	-30.3	20.3
Current Period - Ten20 0.96	98.9	54.4	-16.2	18.7
Old Period - Ten20 0.96	107.1	54.6	-21.8	17.0
Ten20 0.96	99.0	53.0	-18.3	14.5
Ten20 0.95	95.2	56.3	-18.9	13.6
Ten20 0.94	87.2	50.6	-24.3	15.6
Ten20 0.93	91.3	54.6	-26.4	15.6
Ten20 0.92	93.7	56.2	-25.9	15.6
Ten20 0.91	83.5	53.9	-28.2	19.1
Ten20 0.9	81.0	50.7	-30.5	20.9
Nine20 0.96	99.5	55.5	-18.6	11.9
Nine20 0.93	90.2	53.0	-24.9	17.6
Nine20 0.90	74.6	46.8	-30.7	18.8
Eight20 0.96	98.0	54.1	-19.2	12.6
Eight20 0.93	90.1	50.7	-23.7	16.2
Eight20 0.90	71.8	53.9	-32.6	22.2
Blended 0.96	87.7	52.3	-23.1	15.9
Blended 0.94	81.6	52.3	-30.5	19.8
Blended 0.92	76.9	50.7	-32.8	21.5
Hybrid 0.96	90.2	51.1	-22.9	15.8
Hybrid 0.94	79.1	47.8	-27.2	18.5

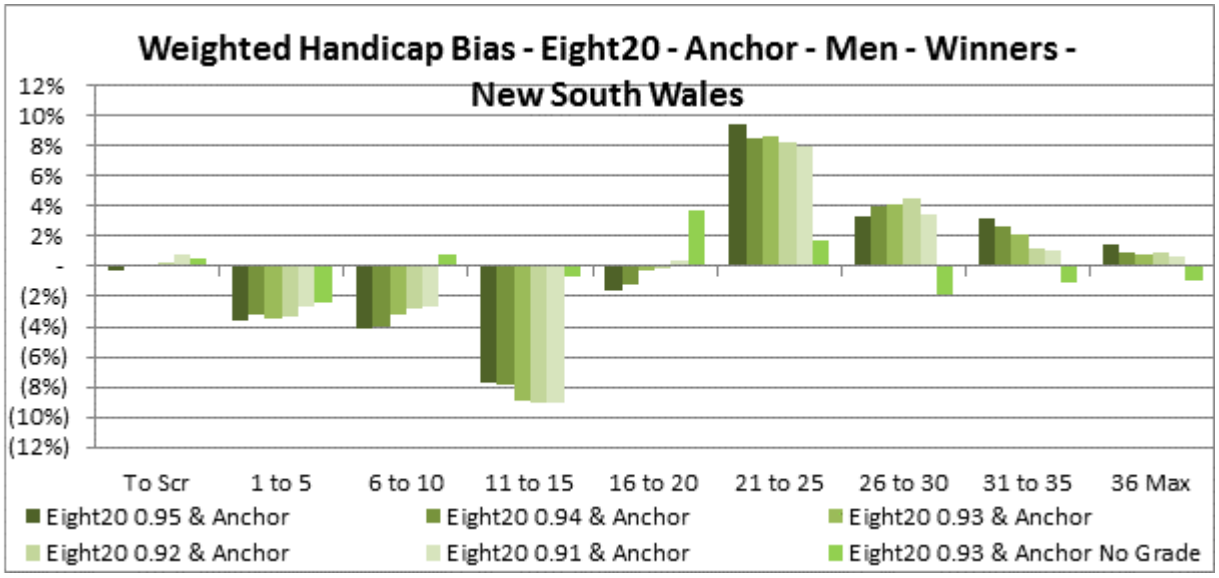
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

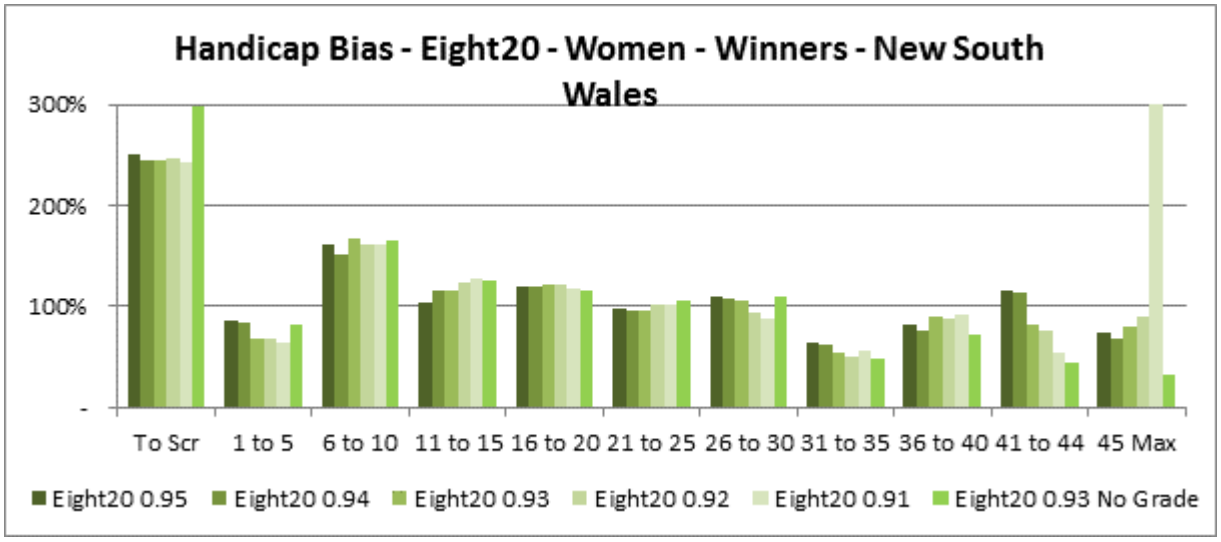
Phase 2

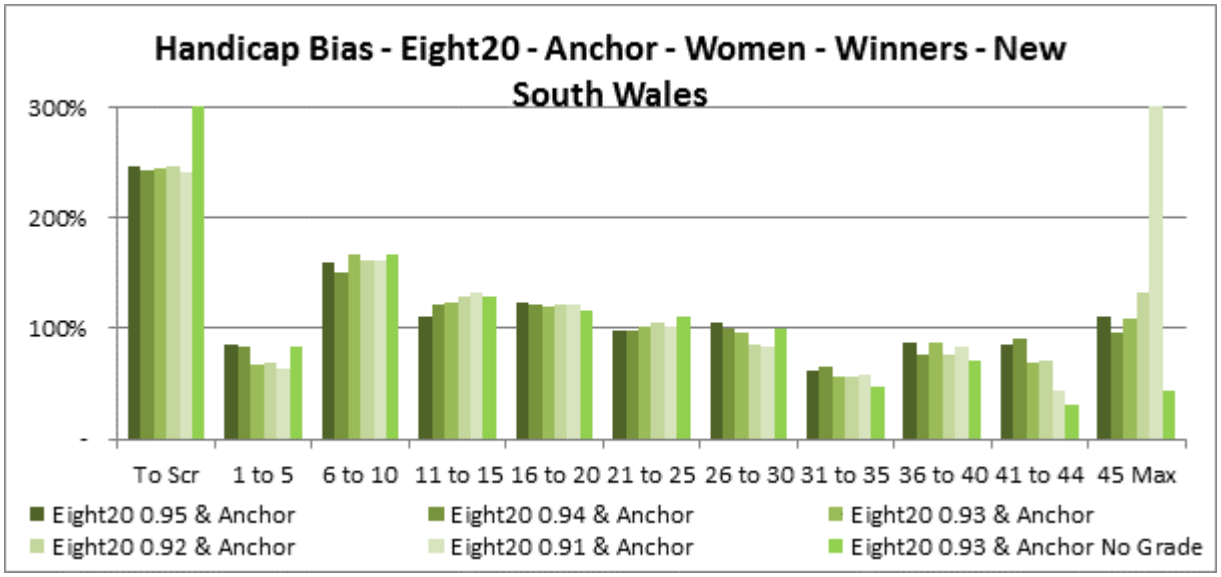

Handicap Bias - Eight20 - Men - Winners - New South Wales
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

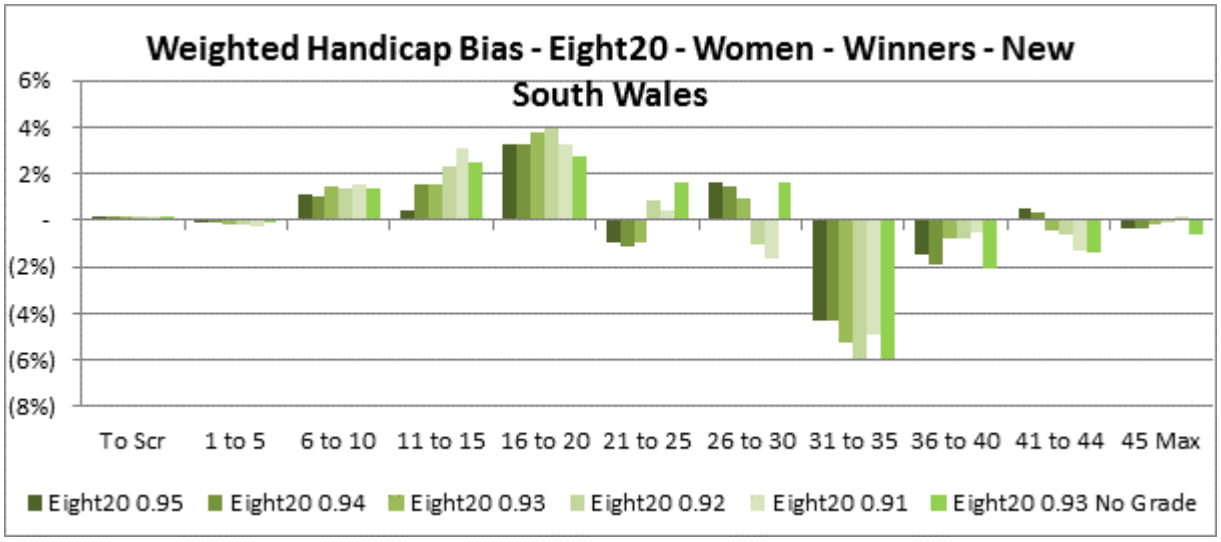

Handicap Bias - Eight20 - Anchor - Men - Winners - New South Wales
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

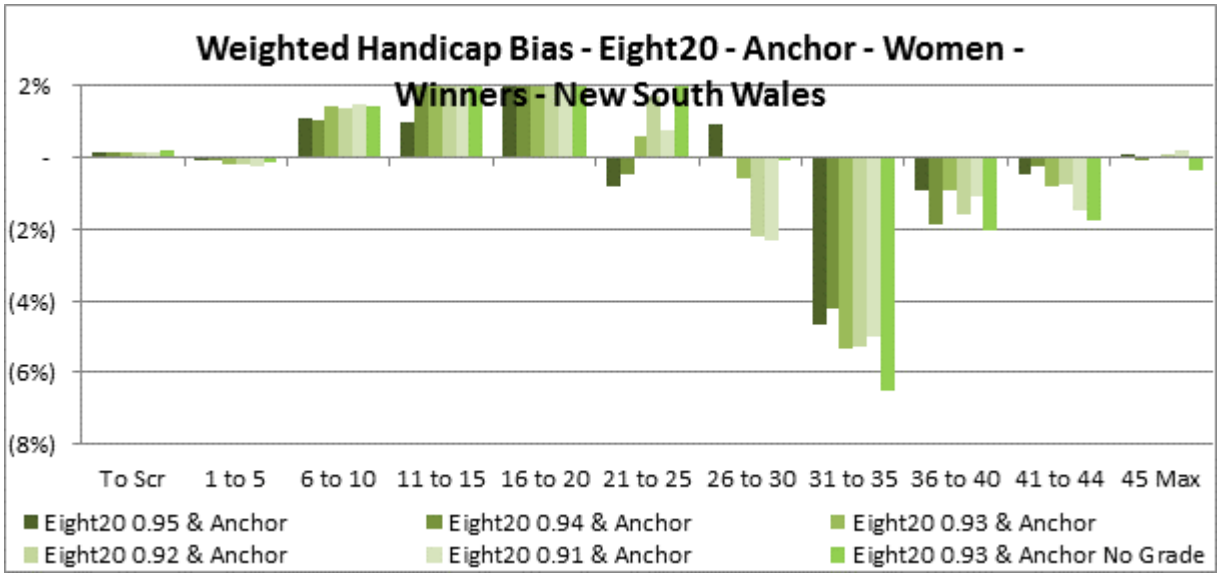

Weighted Handicap Bias - Eight20 - Men - Winners - New South Wales
12%
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
(12%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

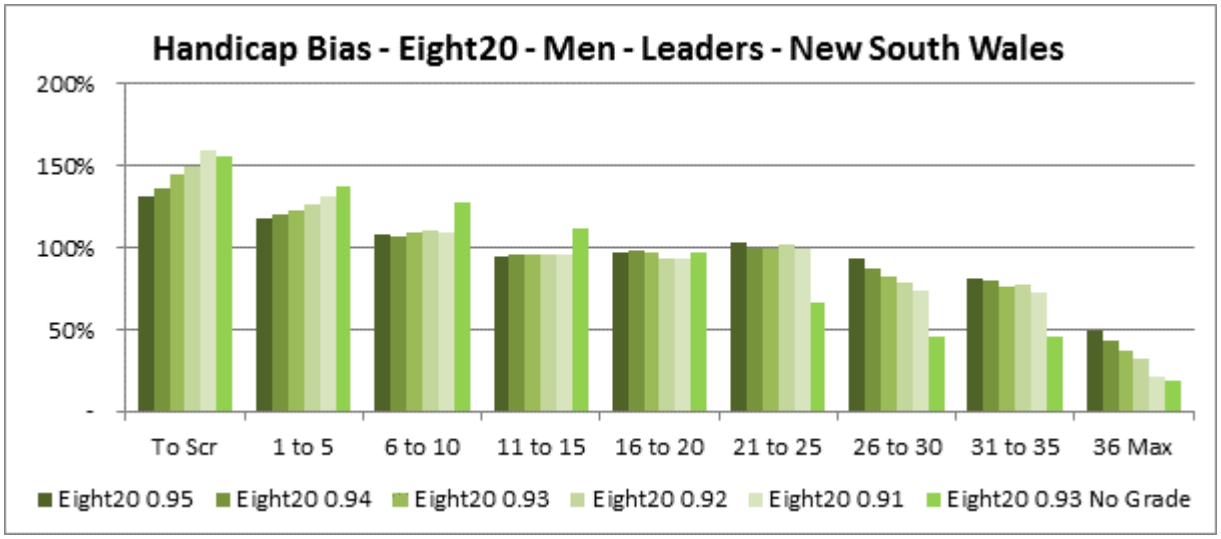

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - New South Wales
12%
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
(12%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

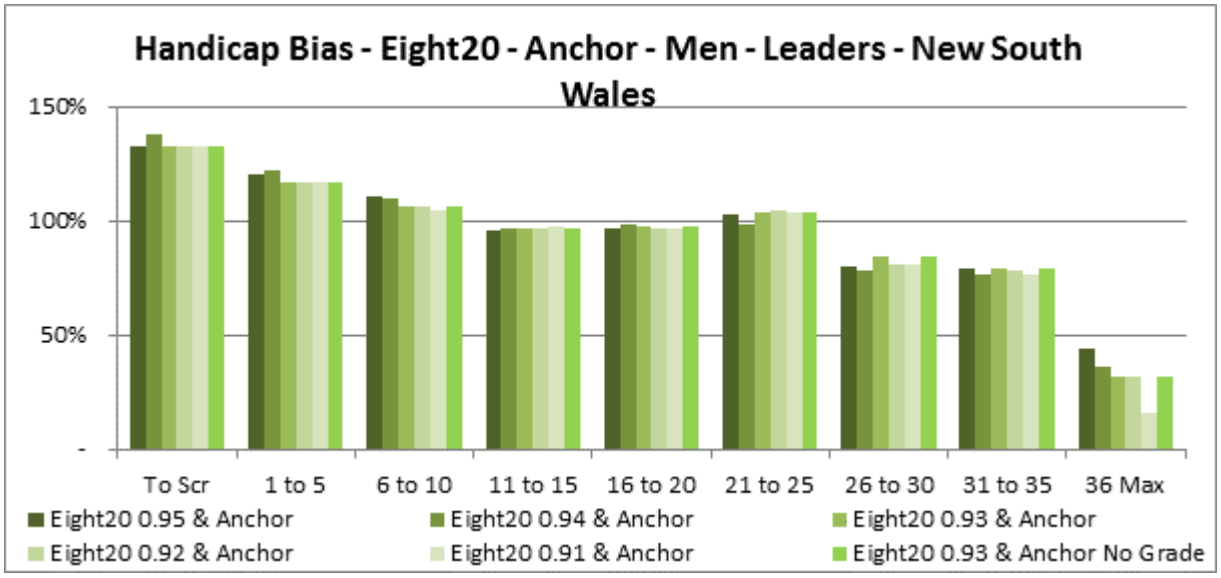

Handicap Bias - Eight20 - Women - Winners - New South Wales
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

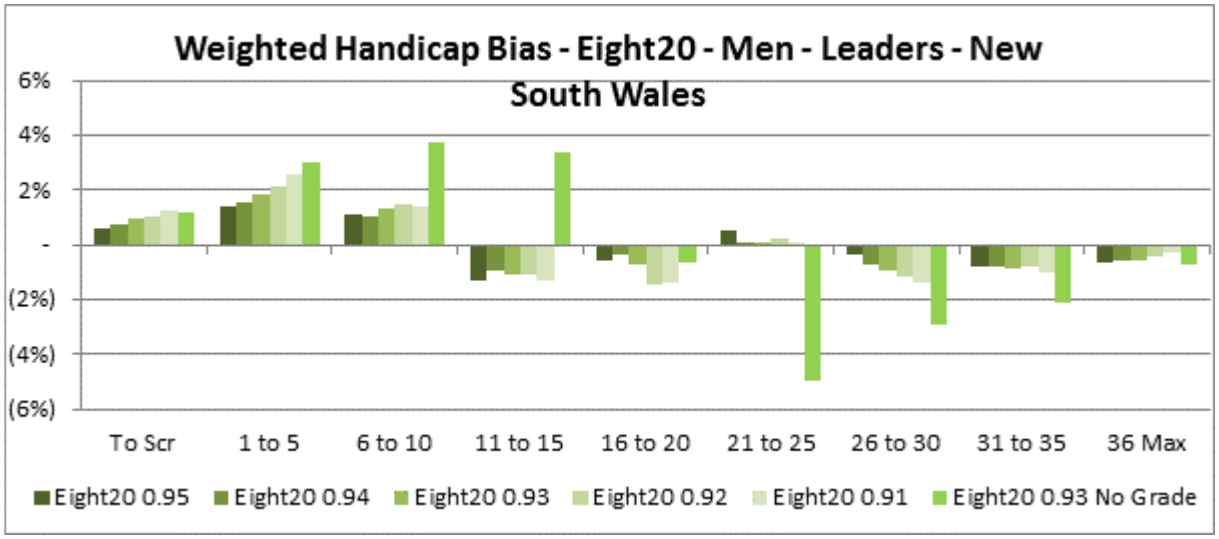

Handicap Bias - Eight20 - Anchor - Women - Winners - New South Wales
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

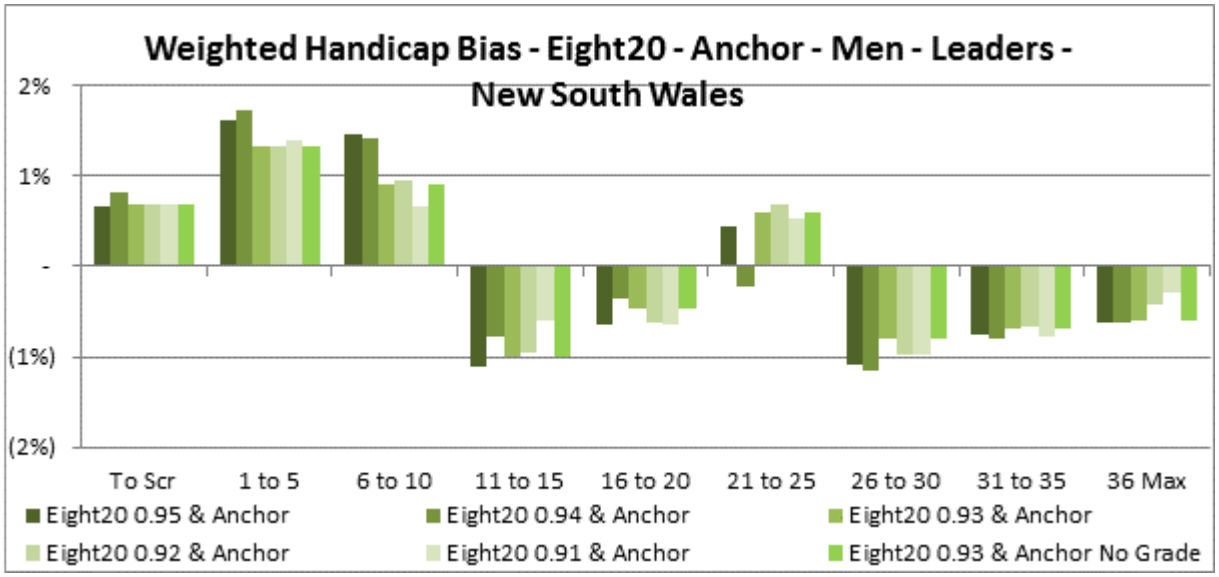

Weighted Handicap Bias - Eight20 - Women - Winners - New South Wales
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

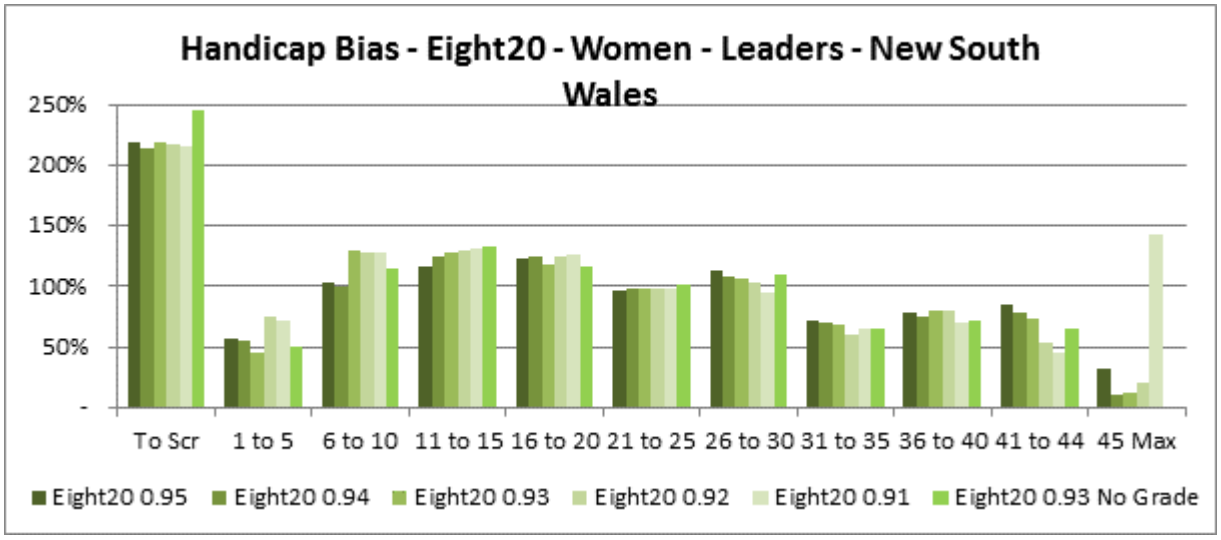

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - New South Wales
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

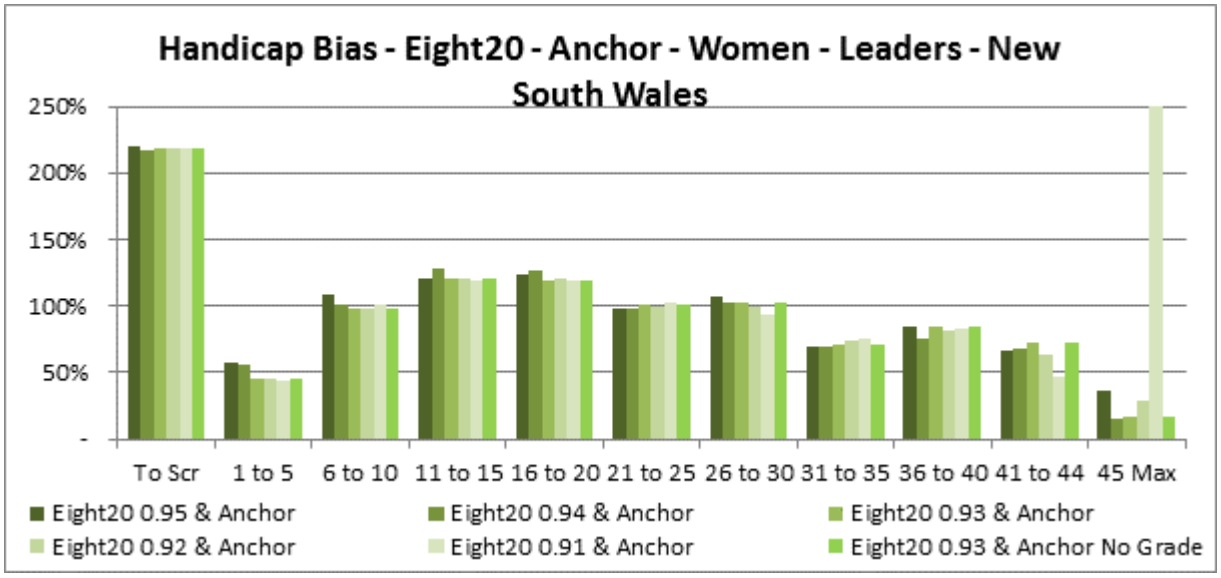

Handicap Bias - Eight20 - Men - Leaders - New South Wales
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

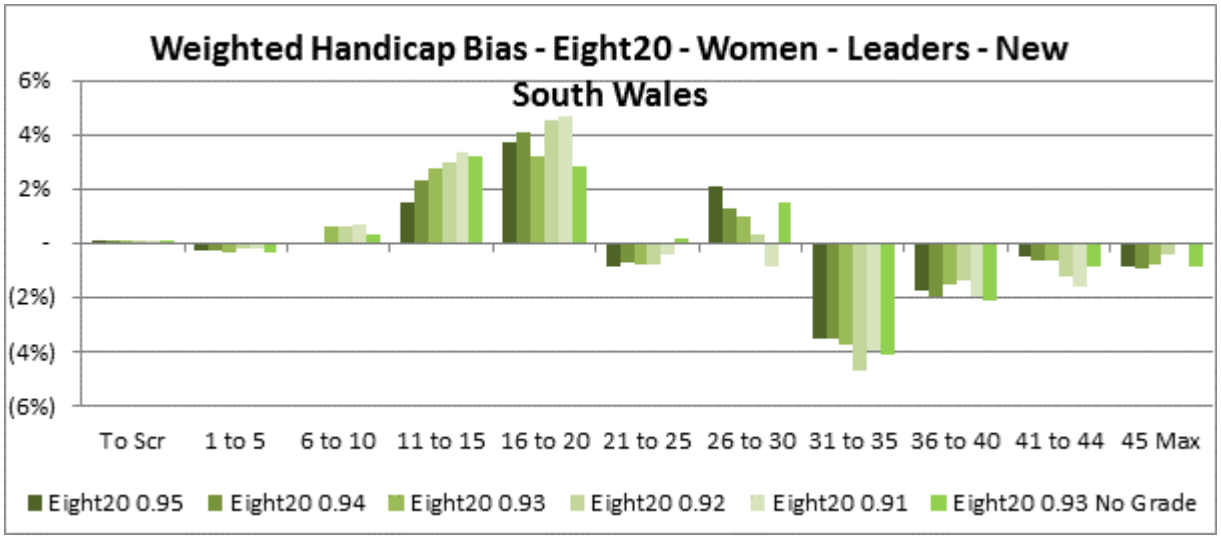

Handicap Bias - Eight20 - Anchor - Men - Leaders - New South Wales
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

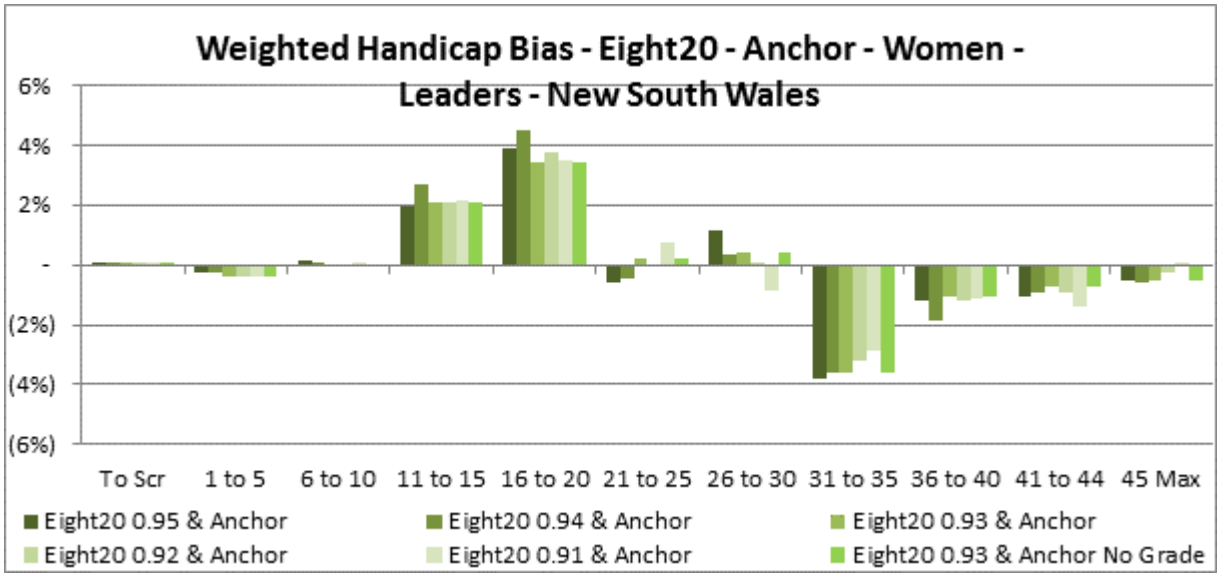

Weighted Handicap Bias - Eight20 - Men - Leaders - New South Wales
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - New South Wales
2%
1%
-
(1%)
(2%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - New South Wales
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - New South Wales
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - New South Wales
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade



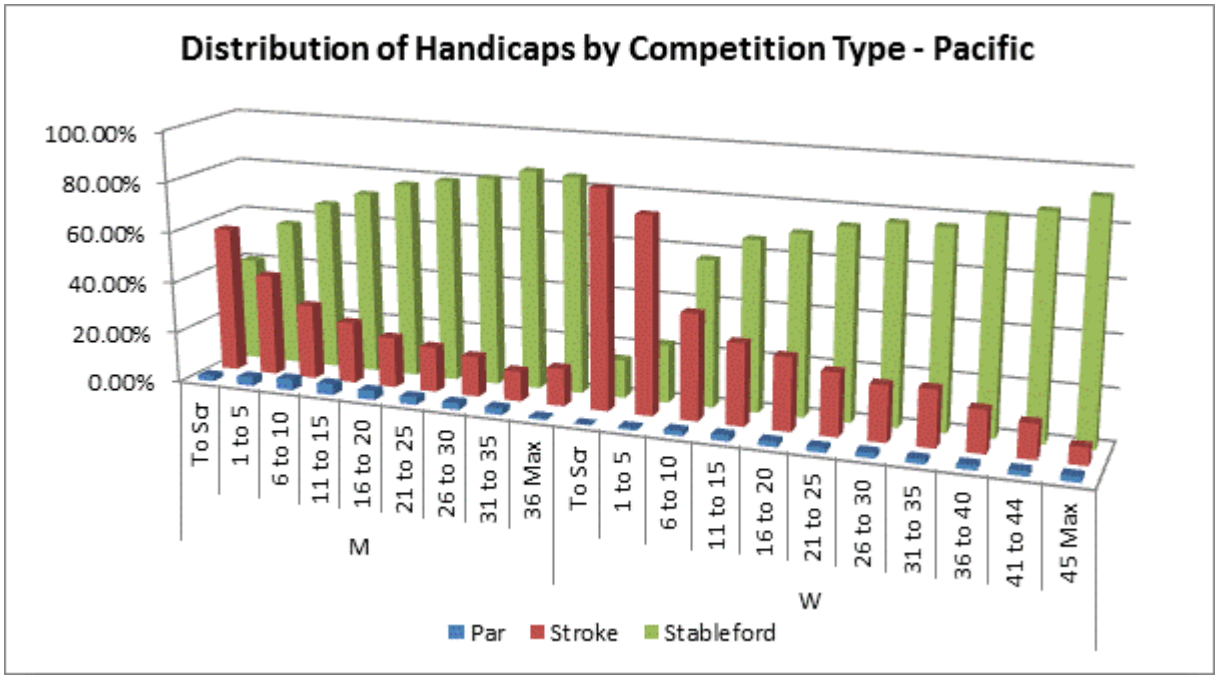
Phase 2 -New South Wales					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	116.3	55.7	-17.3	19.3
	Eight20 0.94	106.0	53.4	-20.8	19.9
	Eight20 0.93	99.2	53.4	-23.2	22.1
	Eight20 0.92	92.1	50.8	-27.7	24.7
	Eight20 0.91	80.9	52.5	-28.4	22.7
	Eight20 0.93 No Grade	7.6	27.2	-33.7	25.1
	Eight20 0.95 & Anchor	98.9	50.7	-20.0	20.2
	Eight20 0.94 & Anchor	89.2	48.4	-23.9	19.9
	Eight20 0.93 & Anchor	86.0	49.9	-26.3	22.2
	Eight20 0.92 & Anchor	79.7	49.0	-30.3	25.2
	Eight20 0.91 & Anchor	67.6	46.7	-32.7	25.6
	Eight20 0.93 & Anchor No Grade	-7.9	19.3	-37.4	28.3
Leaders	Eight20 0.95	-21.1	9.4	-20.6	19.5
	Eight20 0.94	-25.2	9.1	-24.4	20.5
	Eight20 0.93	-29.5	11.1	-24.6	19.2
	Eight20 0.92	-31.0	12.8	-29.4	23.7
	Eight20 0.91	-35.1	14.4	-30.8	23.7
	Eight20 0.93 No Grade	-74.4	30.5	-27.6	20.9
	Eight20 0.95 & Anchor	-26.5	10.7	-22.5	19.6
	Eight20 0.94 & Anchor	-29.9	10.5	-26.0	21.4
	Eight20 0.93 & Anchor	-21.7	8.7	-20.0	17.8
	Eight20 0.92 & Anchor	-21.2	9.0	-19.8	17.7
	Eight20 0.91 & Anchor	-21.0	8.4	-20.0	17.3

	Eight20 0.93 & Anchor No Grade	-21.7	8.7	-20.0	17.8

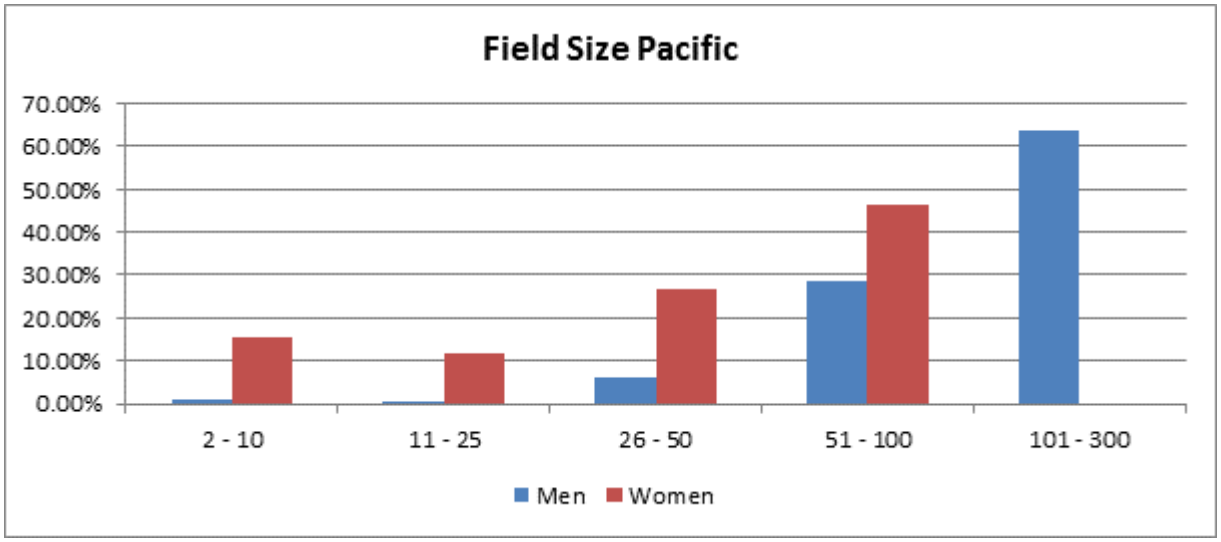
Appendix 11 – Pacific

Phase 1

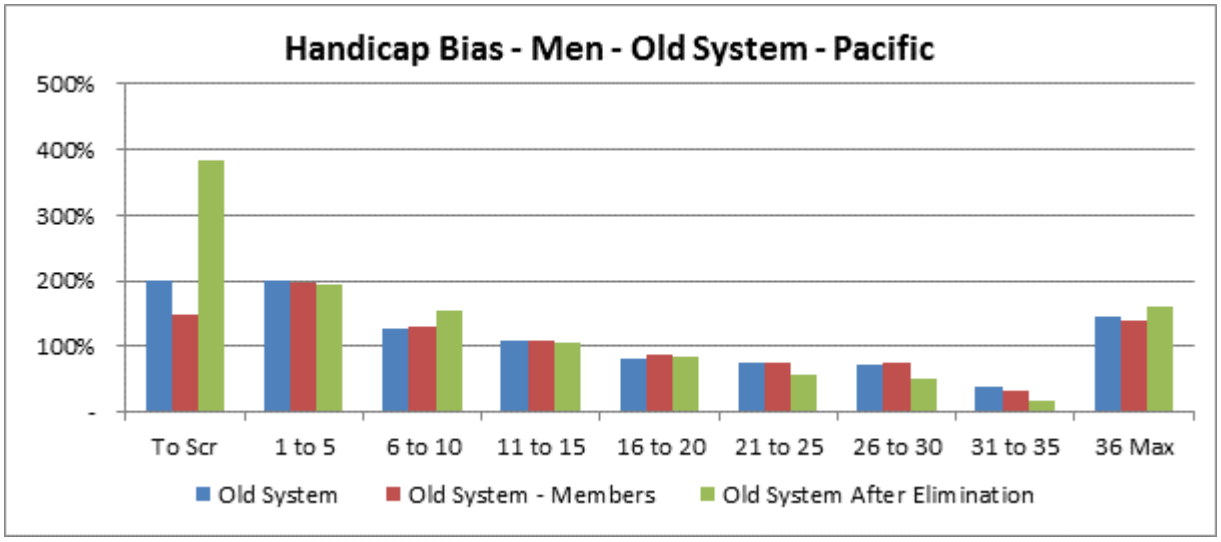
Pacific	Men	Women	Total
Players in Database	1,921	512	2,433
Members	1,144	266	1,410
Visitors	777	246	1,023
Members who have Played 33 Rounds	1,046	247	1,293
Members with Last Round In Old System	274	53	327
Members with Last Round in Current System	870	213	1,083
Earliest Round	1/12/2007	29/12/2007	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			188
Number of Home Competitions	710	694	1,404
Number of Rounds of Golf	84,626	18,169	102,795
Number of Rounds at Home	71,068	15,310	86,378
Number of Rounds at Home Old	54,036	11,630	65,666
Number of Rounds at Home Current	17,032	3,680	20,712
Num Rnds Members at Home	67,783	14,759	82,542
Num Rnds Members at Home Old	51,273	11,195	62,468
Num Rnds Members at Home Cur	16,510	3,564	20,074
Num Rnds After Eliminations	39,679	8,429	48,108
Num Rnds After Eliminations Old	24,553	5,146	29,699
Num Rnds After Eliminations Cur	15,126	3,283	18,409

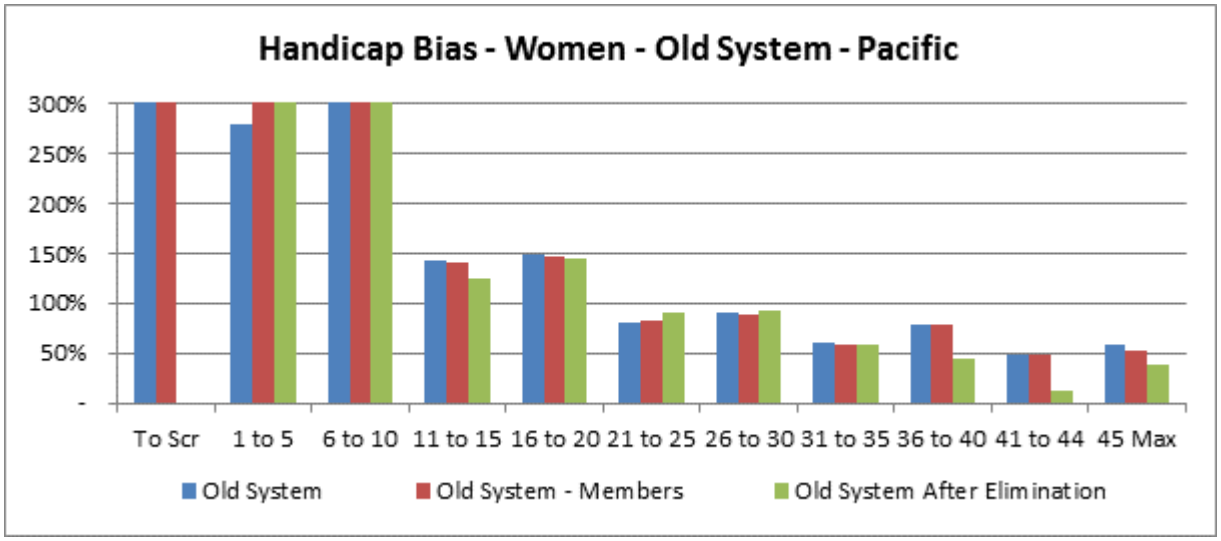


Most men's competitions are with a field of over 100, the women mainly field 51-100.

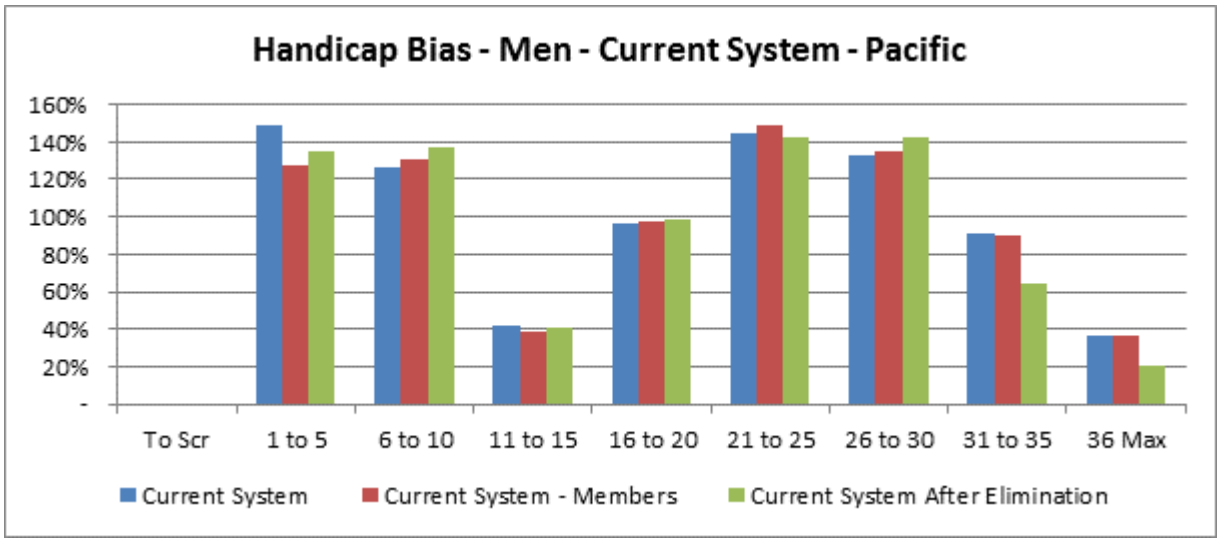


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

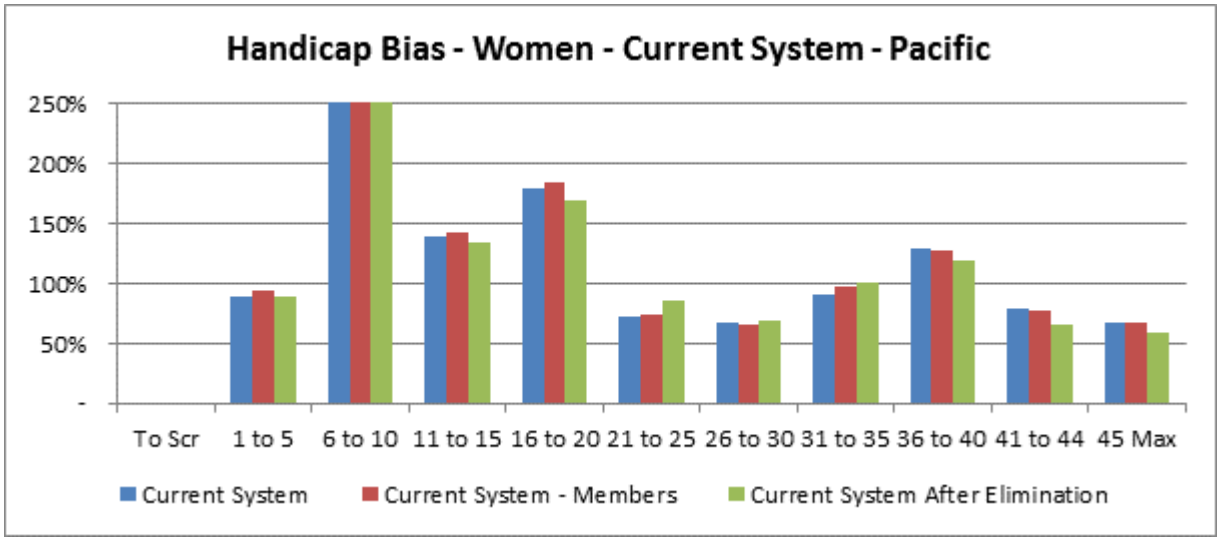




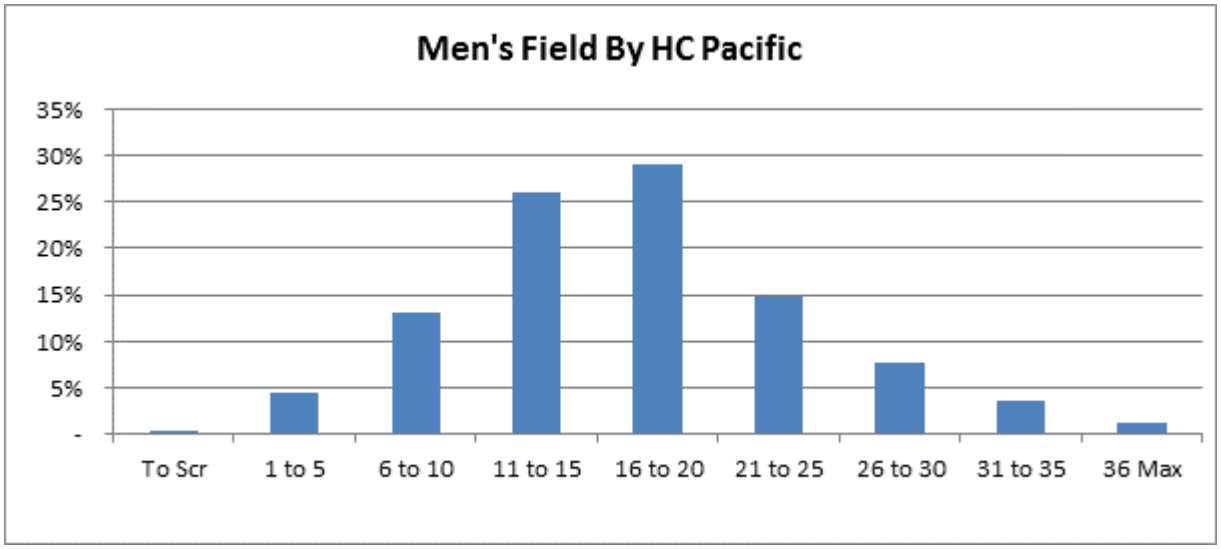
Under the Current System, this bias has changed for men, so that there is now a bias in favour of the low and 21 to 30 markers.

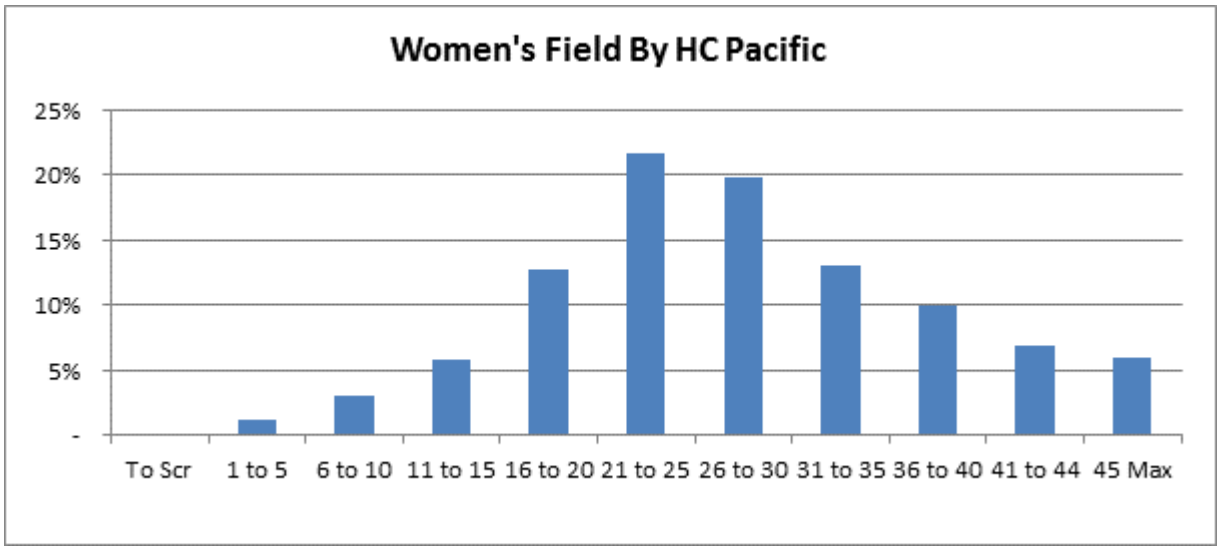


The picture is somewhat similar for the women.



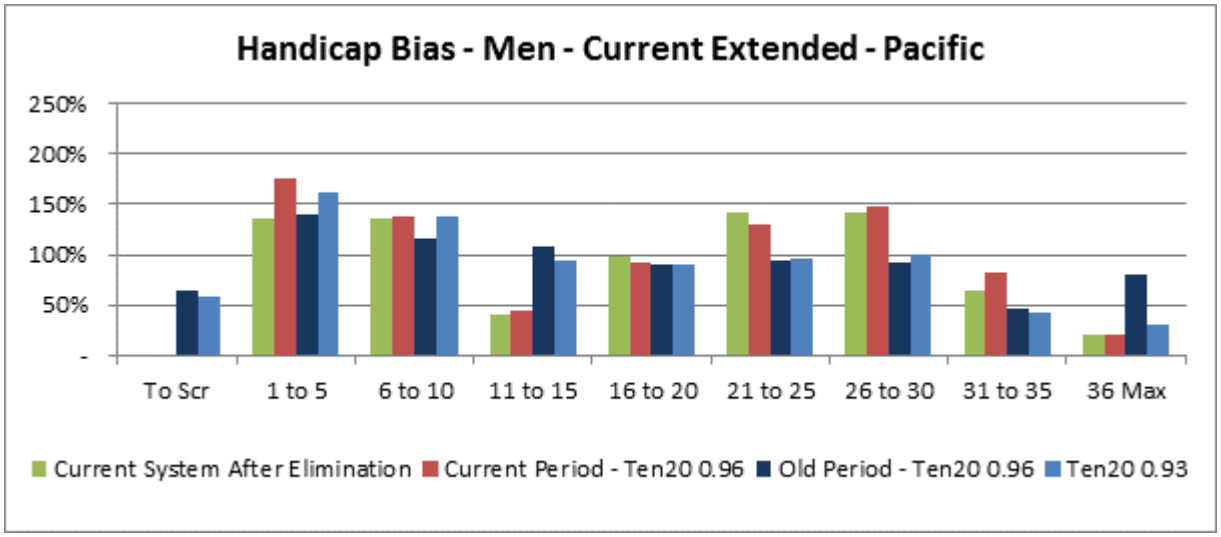
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





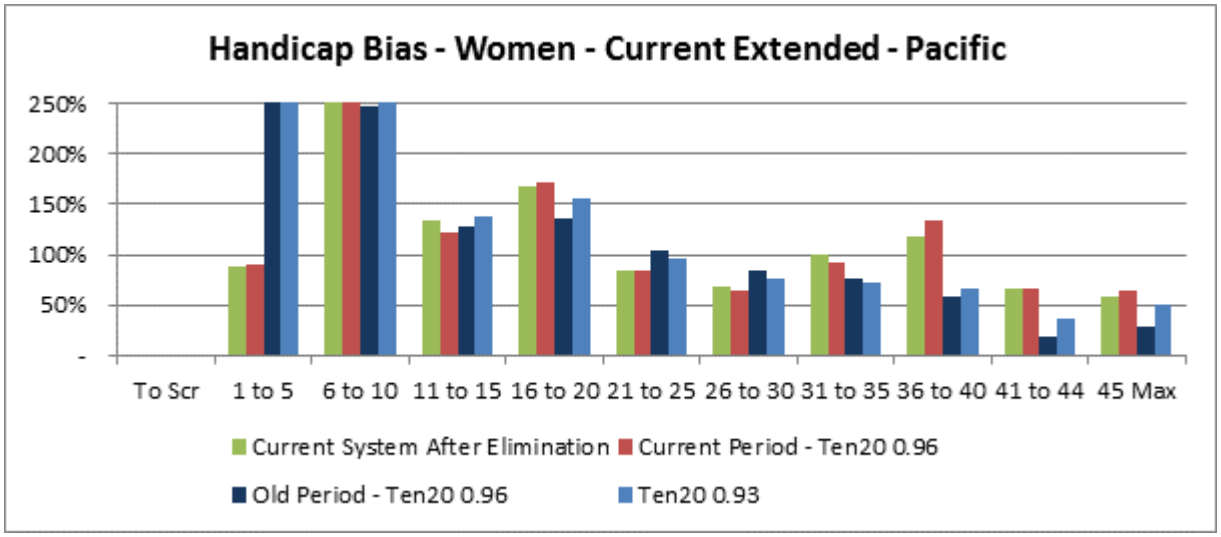
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

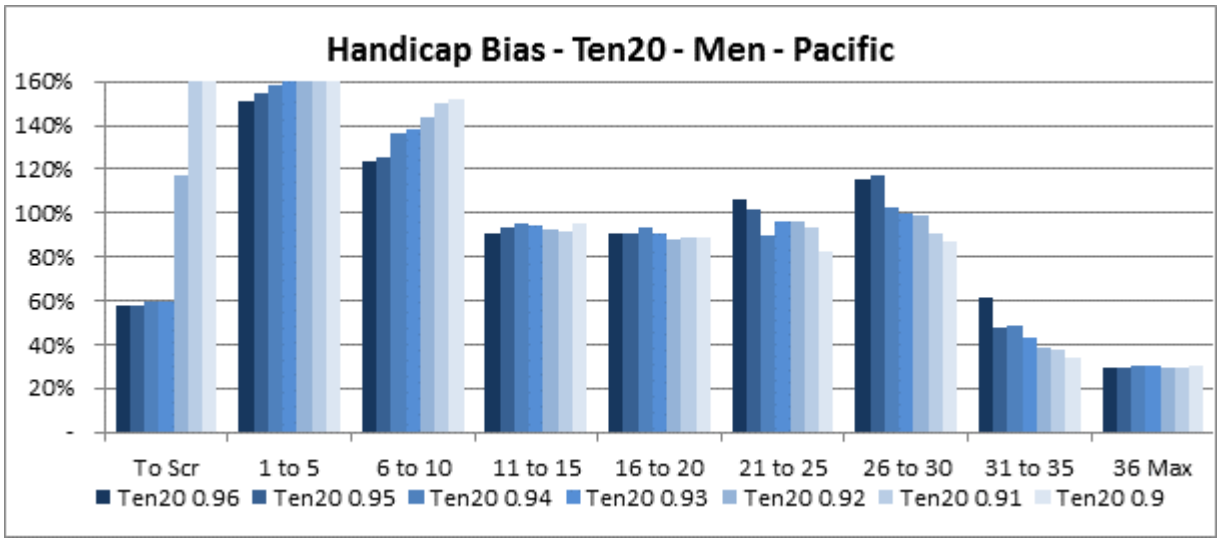


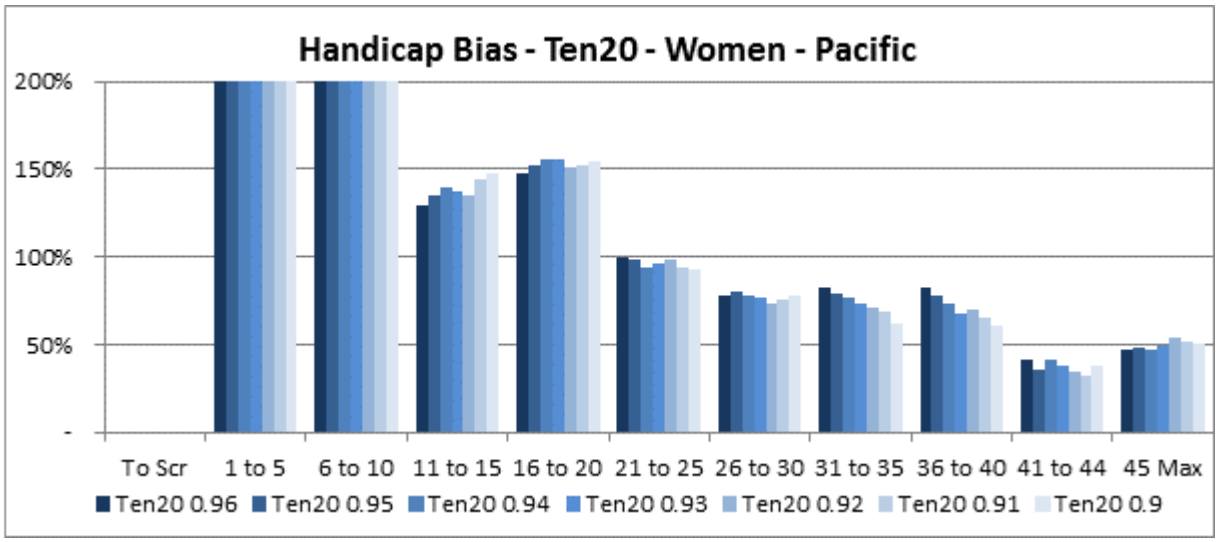
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low markers would have dominated over the two-years.

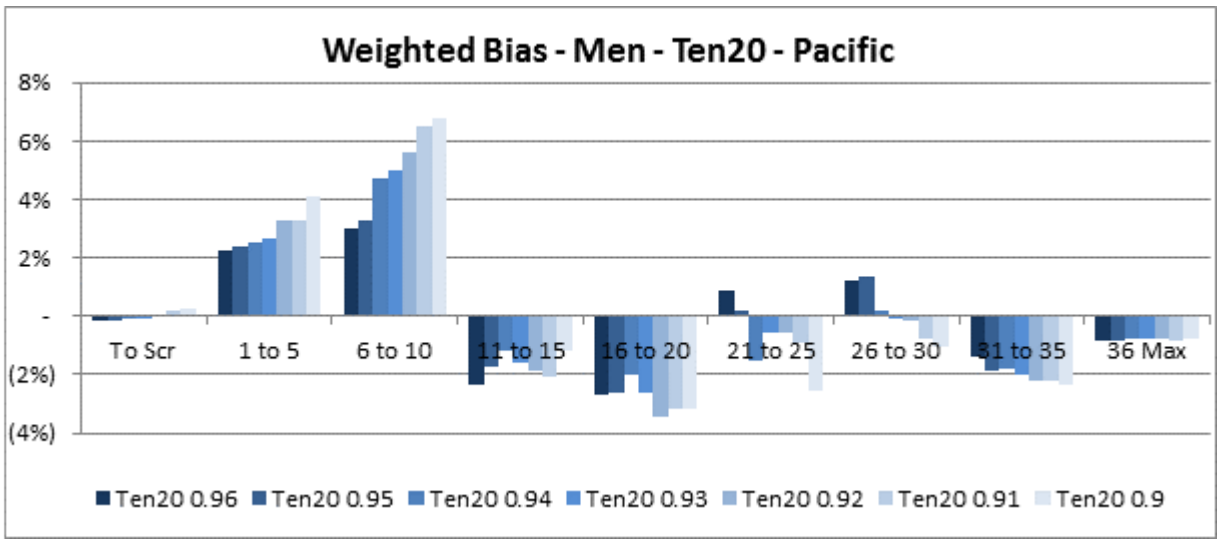


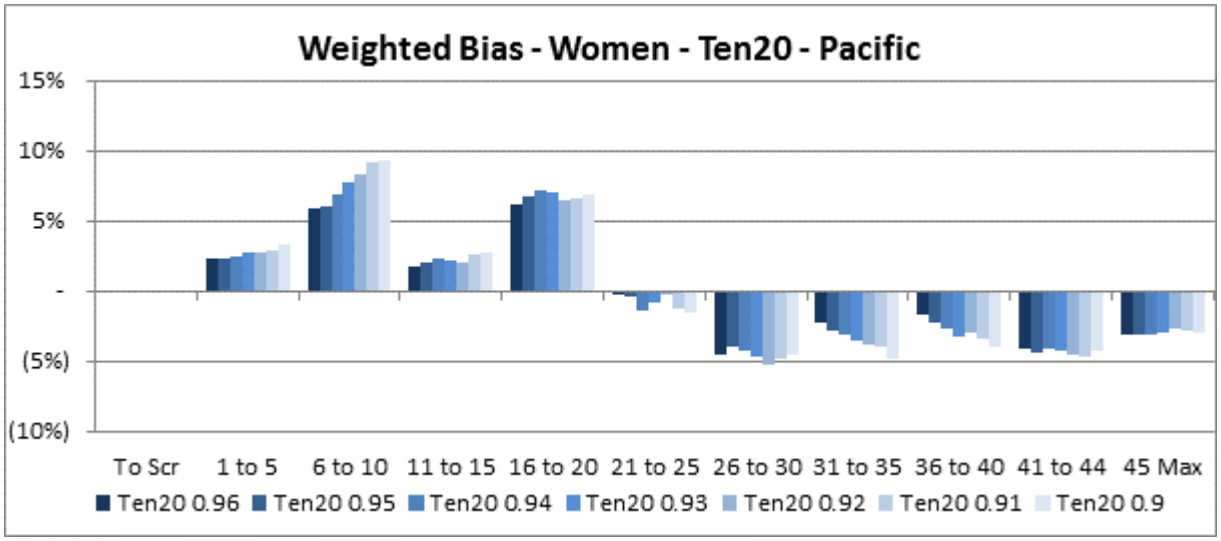
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

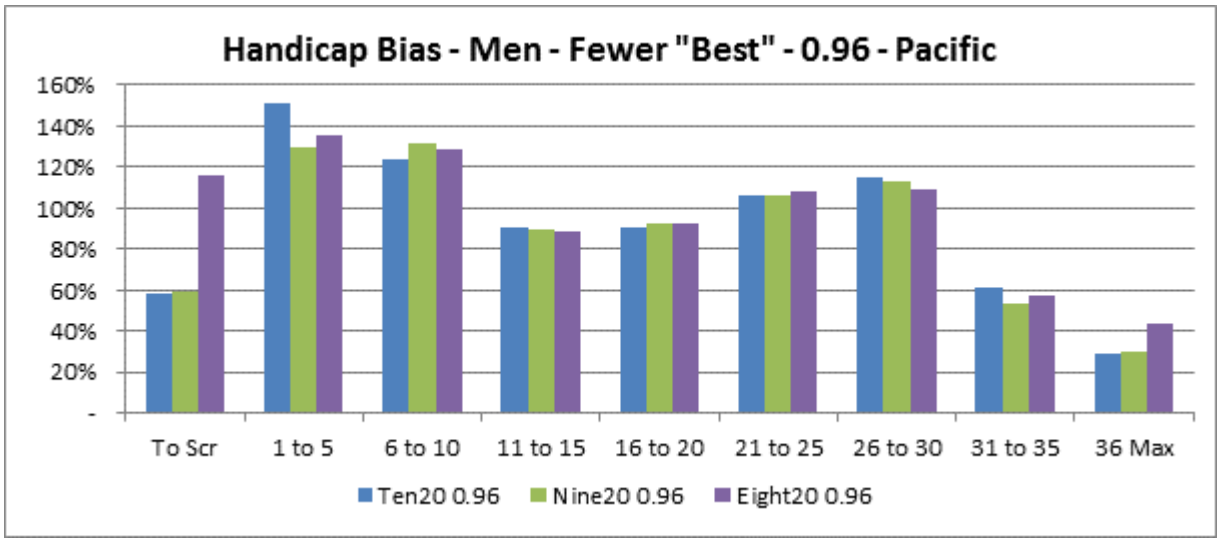


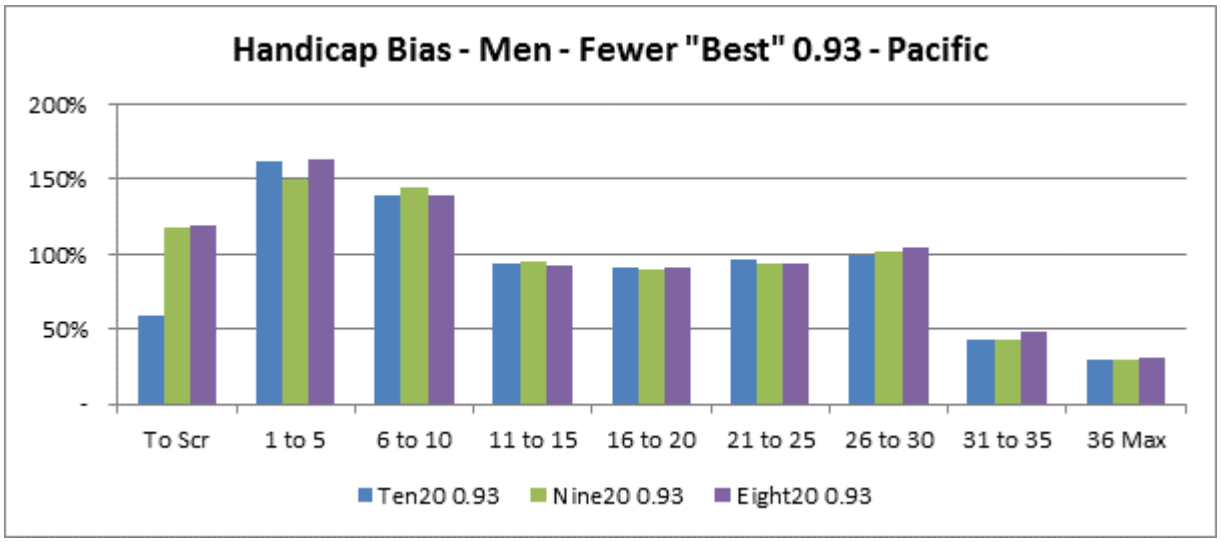


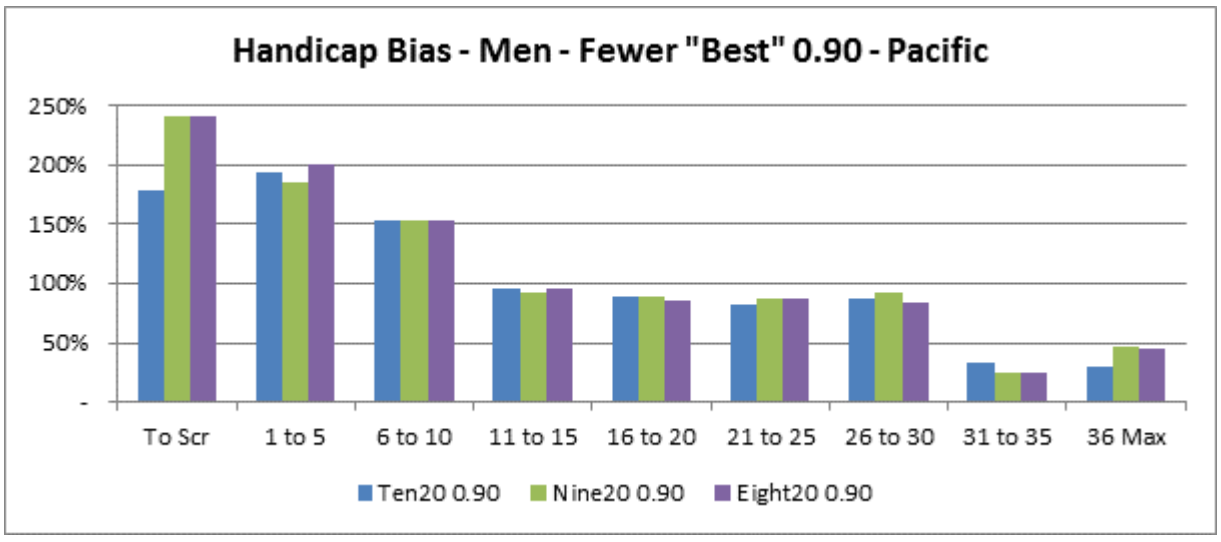
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

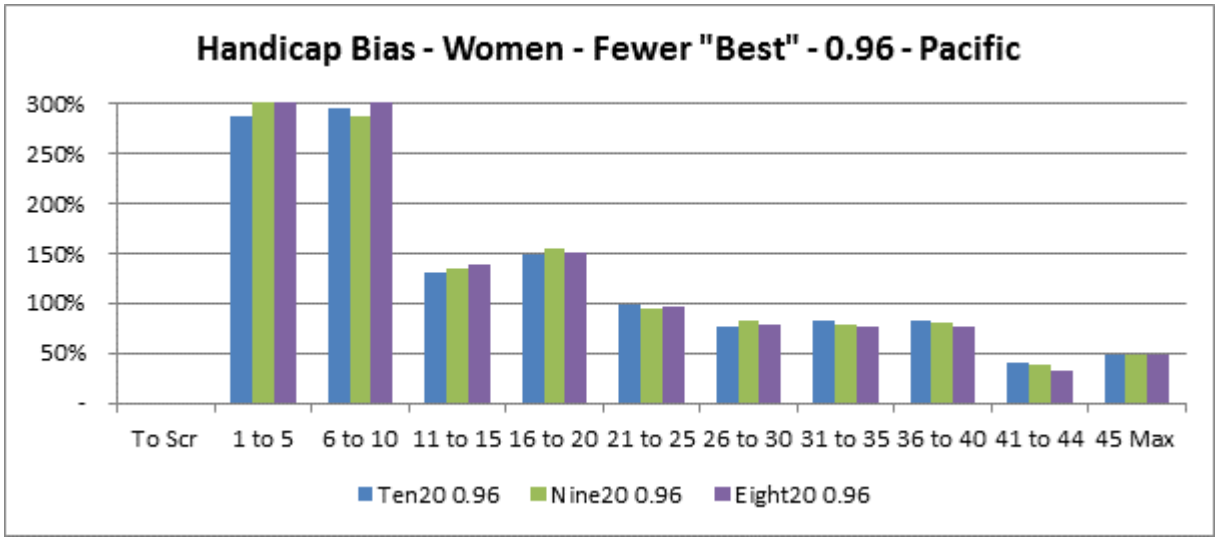
	Pacific			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-23.2	19.9	-74.8	36.7
Ten20 0.95	-29.1	20.1	-79.3	38.4
Ten20 0.94	-42.1	22.5	-84.3	41.6
Ten20 0.93	-43.0	24.1	-90.1	44.1
Ten20 0.92	-50.0	28.2	-91.4	45.1
Ten20 0.91	-56.6	30.6	-97.6	47.6
Ten20 0.9	-67.3	33.2	-101.0	49.2

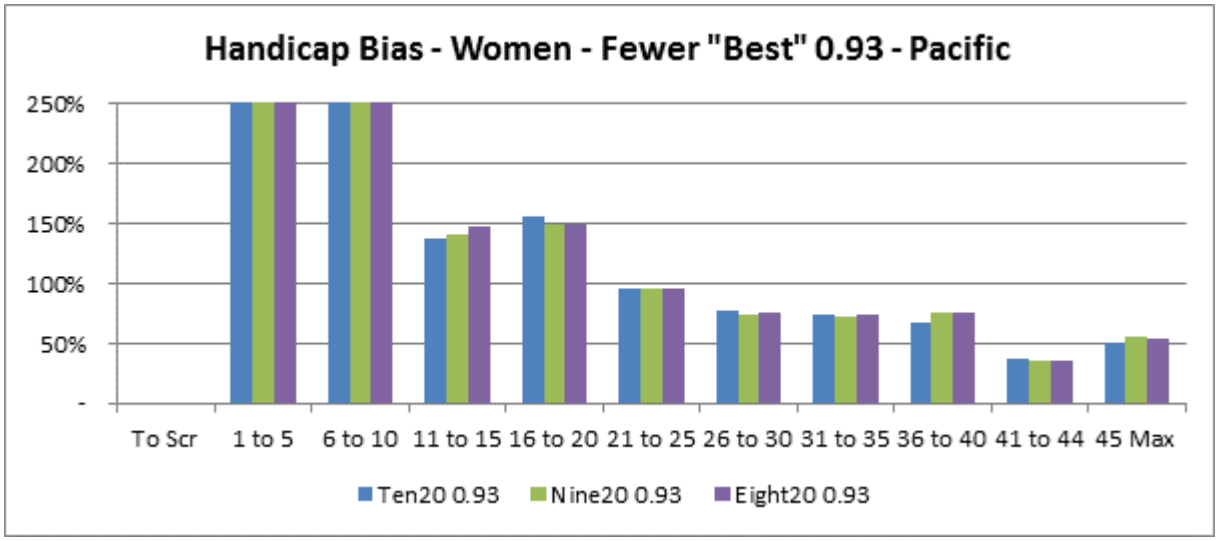
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

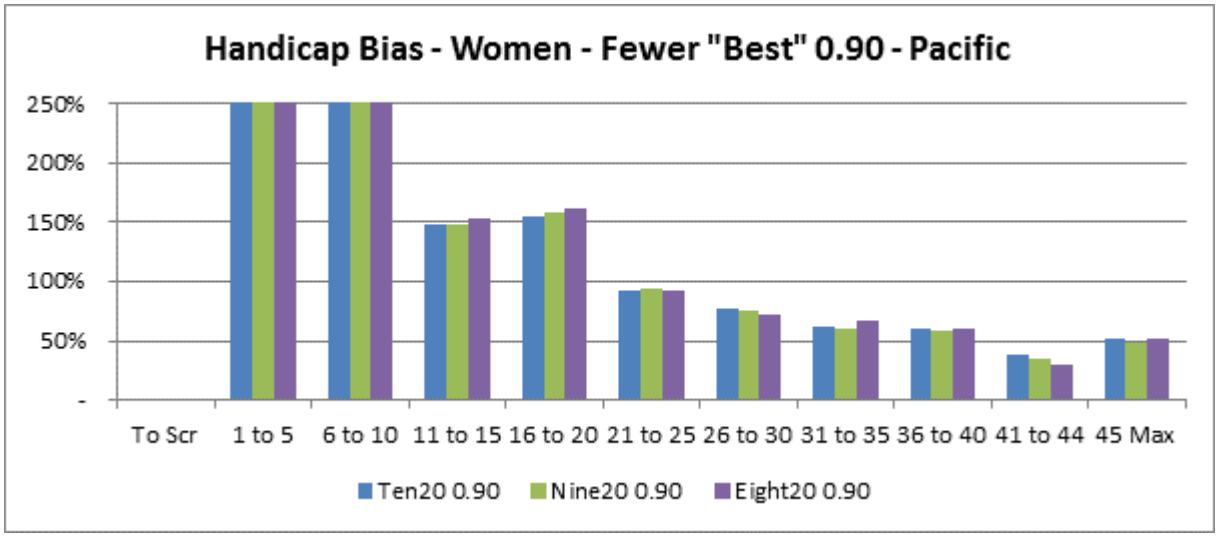







Handicap Bias - Women - Fewer "Best" - 0.96 - Pacific
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

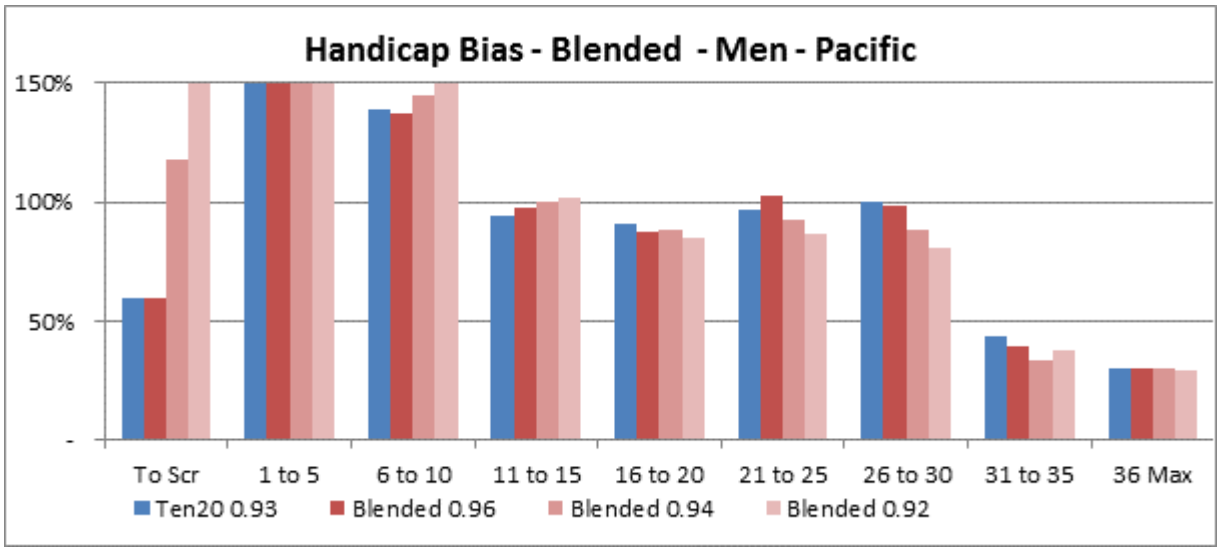

Handicap Bias - Women - Fewer "Best" 0.93 - Pacific
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

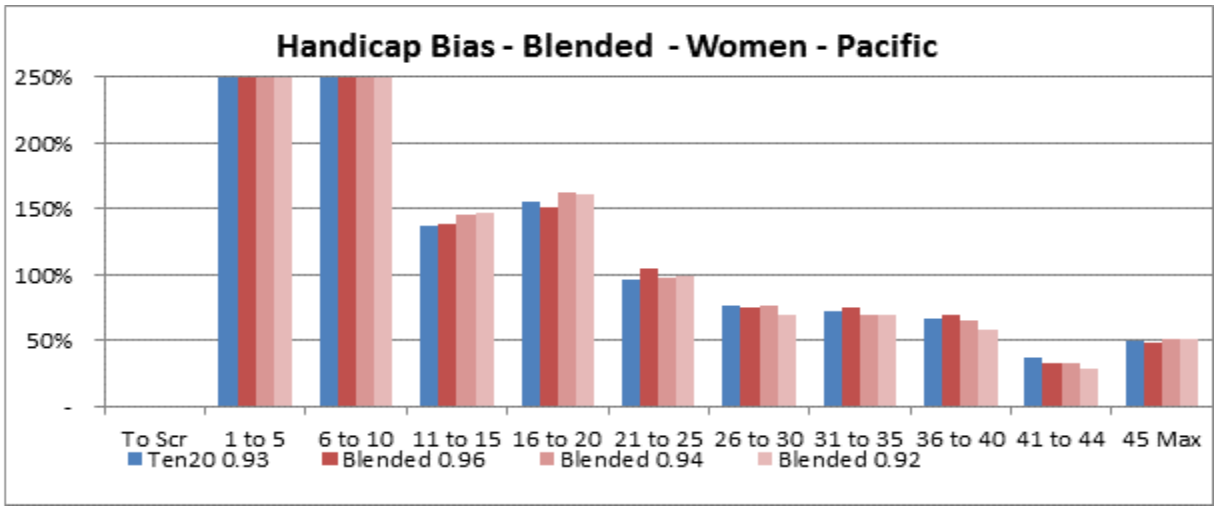

Handicap Bias - Women - Fewer "Best" 0.90 - Pacific
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

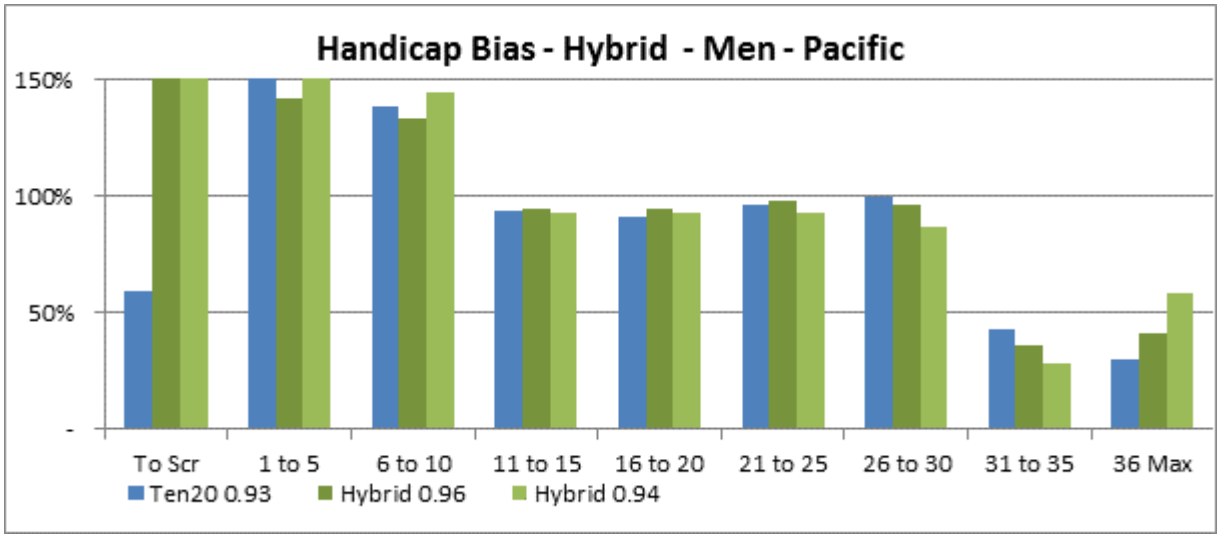
Method	Pacific Men		Women	
	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-23.2	19.9	-74.8	36.7
Nine20 0.96	-23.8	21.1	-77.8	37.8
Eight20 0.96	-22.9	20.6	-84.9	40.8
Ten20 0.93	-43.0	24.1	-90.1	44.1
Nine20 0.93	-44.3	26.0	-88.9	44.1
Eight20 0.93	-42.5	25.2	-87.1	43.0
Ten20 0.90	-67.3	33.2	-101.0	49.2
Nine20 0.90	-63.3	32.6	-104.9	51.1
Eight20 0.90	-71.3	35.2	-104.4	51.6

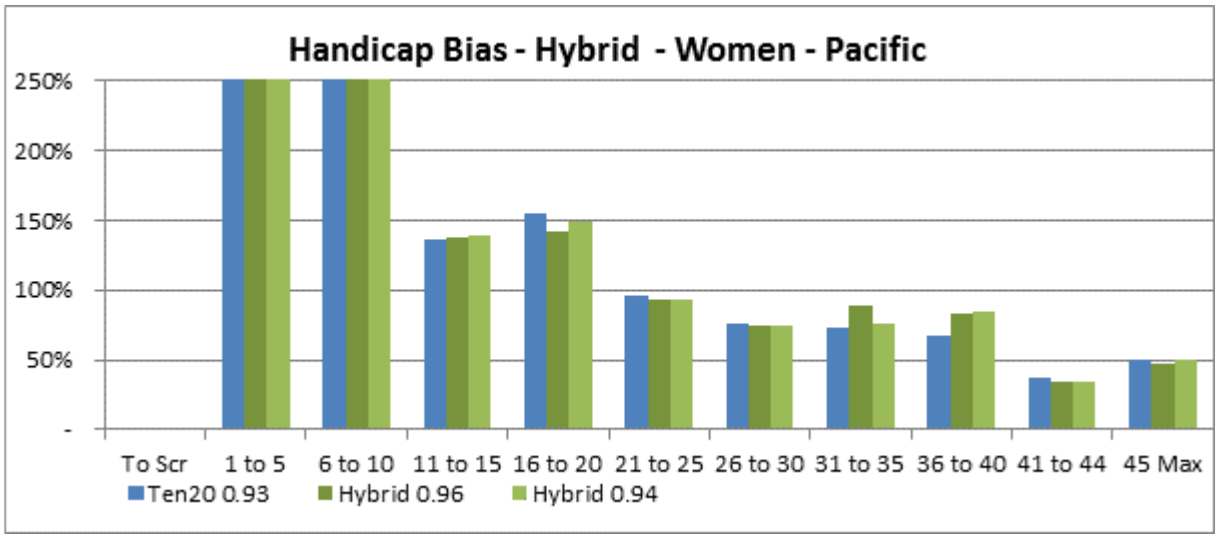
For the Blended:





For the Hybrid:

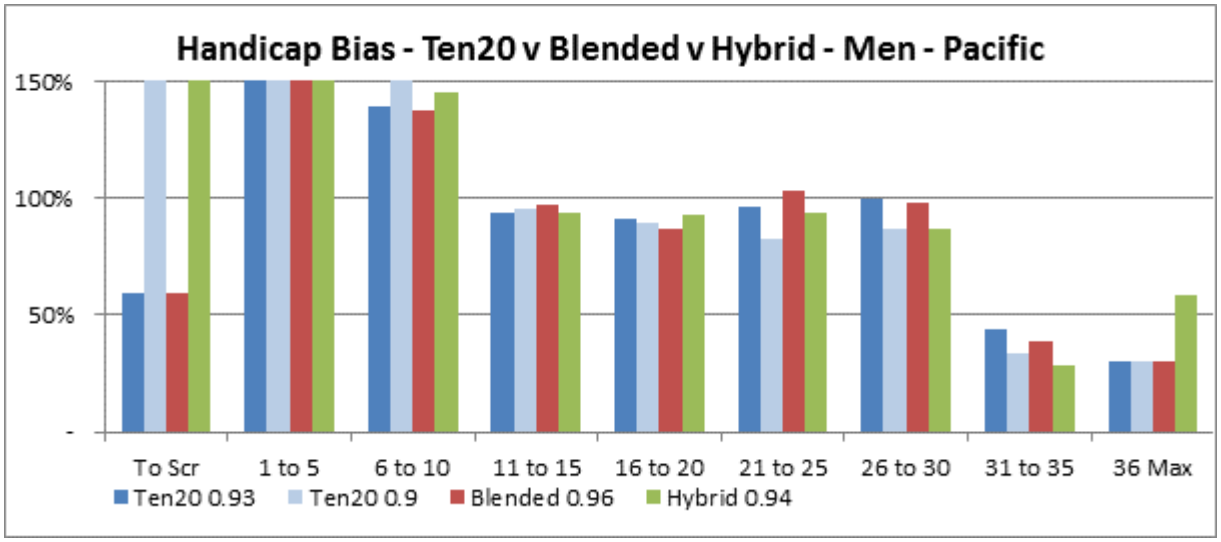


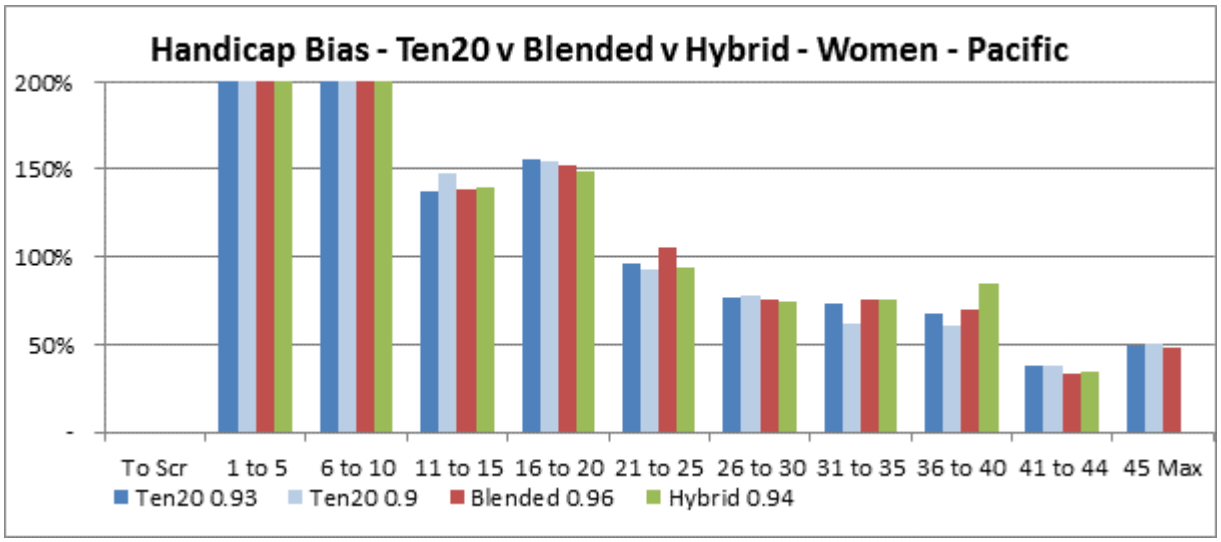


The Corresponding Tilt and Level Indices are:

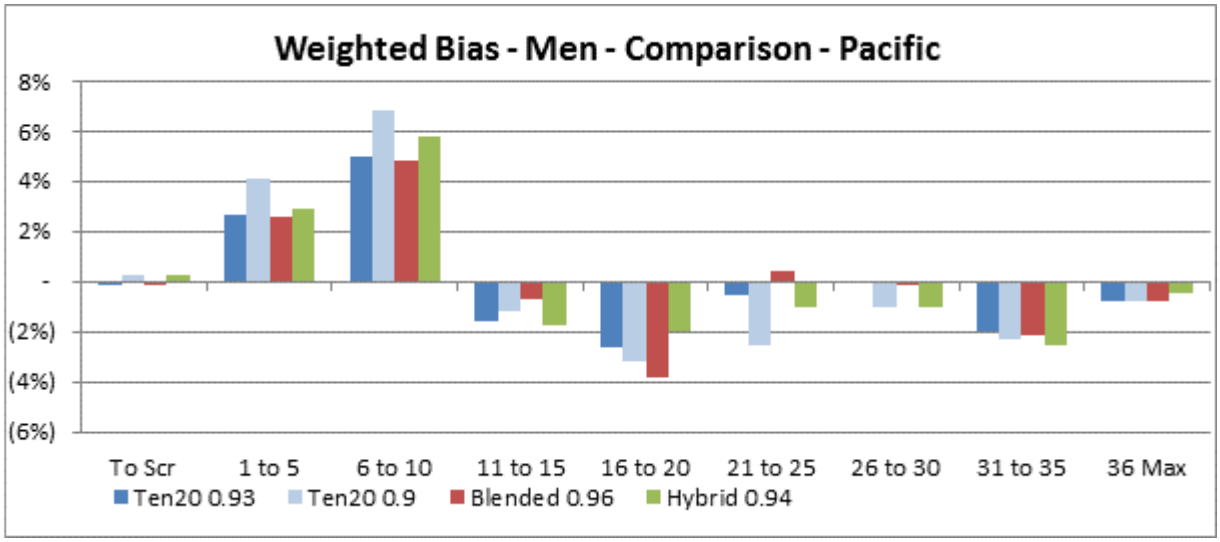
	Pacific			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-42.7	25.0	-86.0	41.4
Blended 0.94	-55.8	27.9	-91.7	45.7
Blended 0.92	-66.6	33.3	-101.5	50.6
Hybrid 0.96	-40.0	20.0	-80.0	39.4
Hybrid 0.94	-53.0	26.9	-84.4	42.5

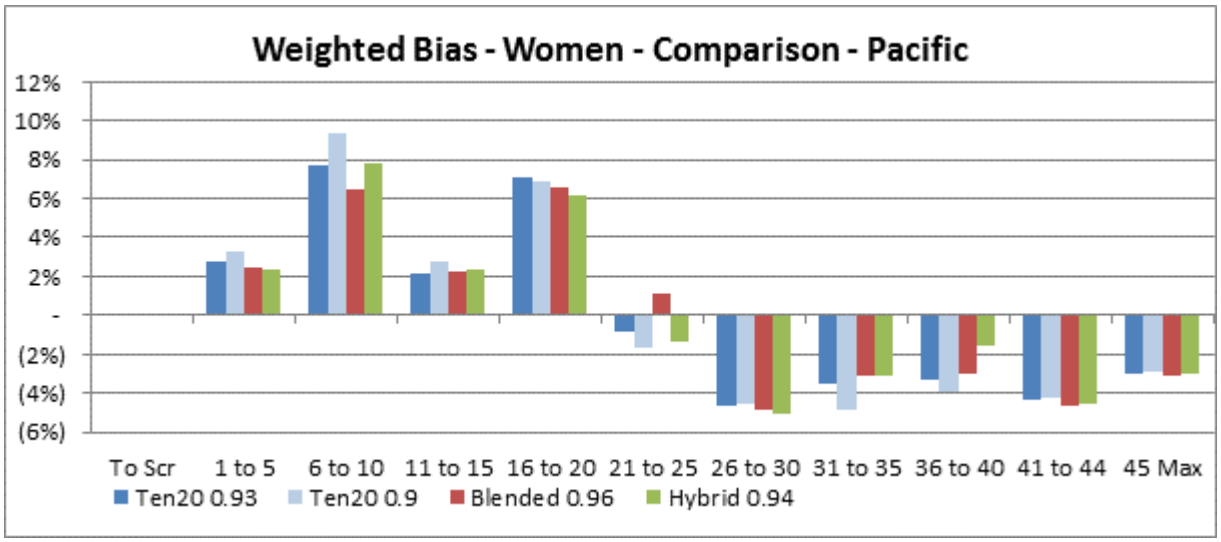
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

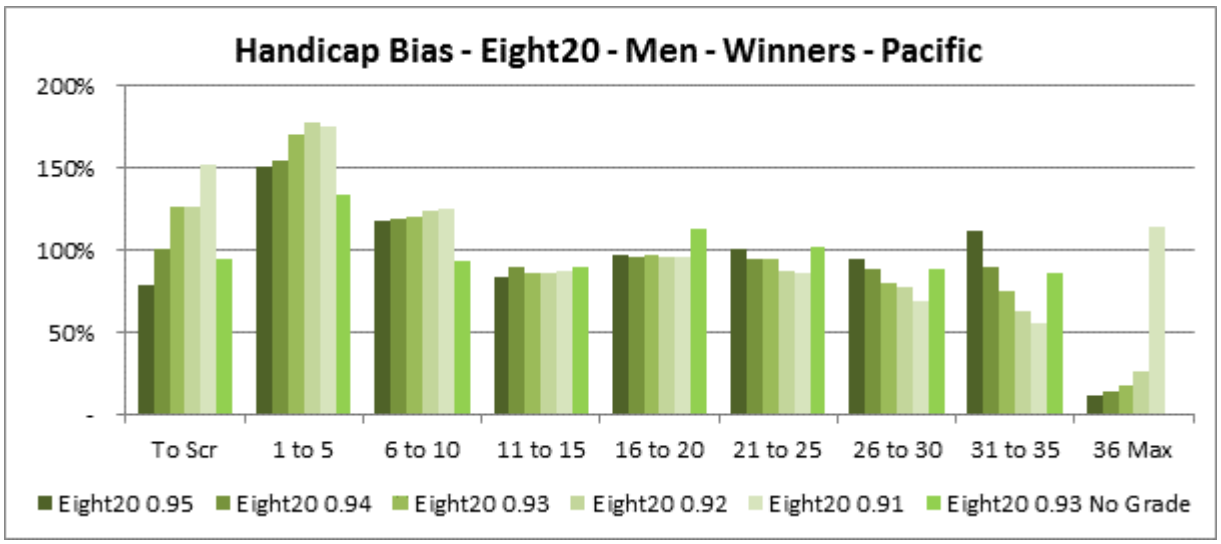
	Pacific			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-43.0	24.1	-90.1	44.1
Ten20 0.9	-67.3	33.2	-101.0	49.2
Blended 0.96	-42.7	25.0	-86.0	41.4
Hybrid 0.94	-53.0	26.9	-84.4	42.5

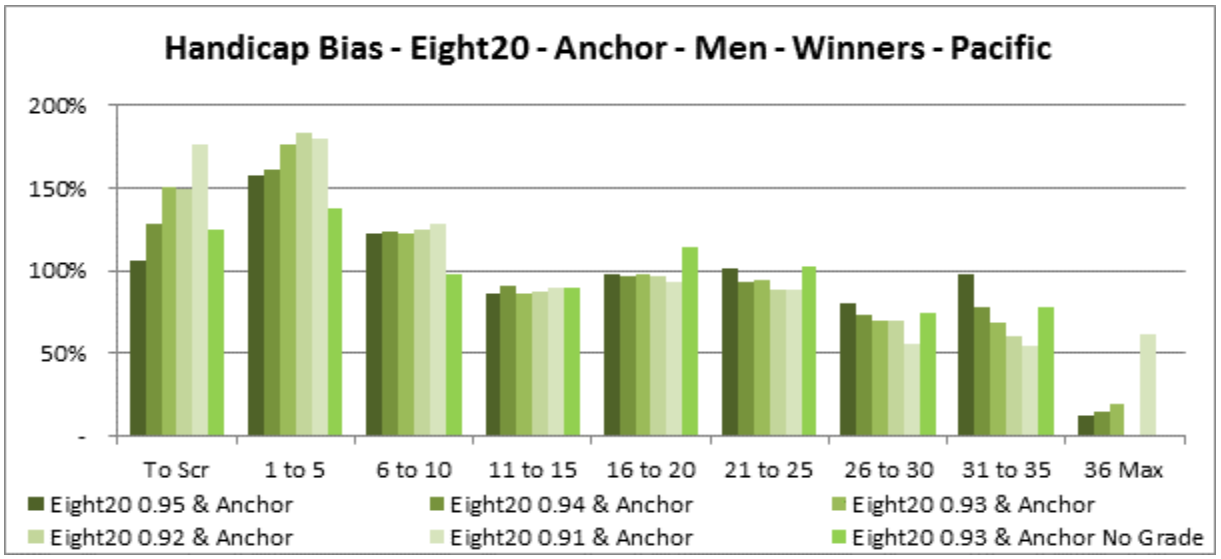
Putting it all together, with the Old System as a reference:

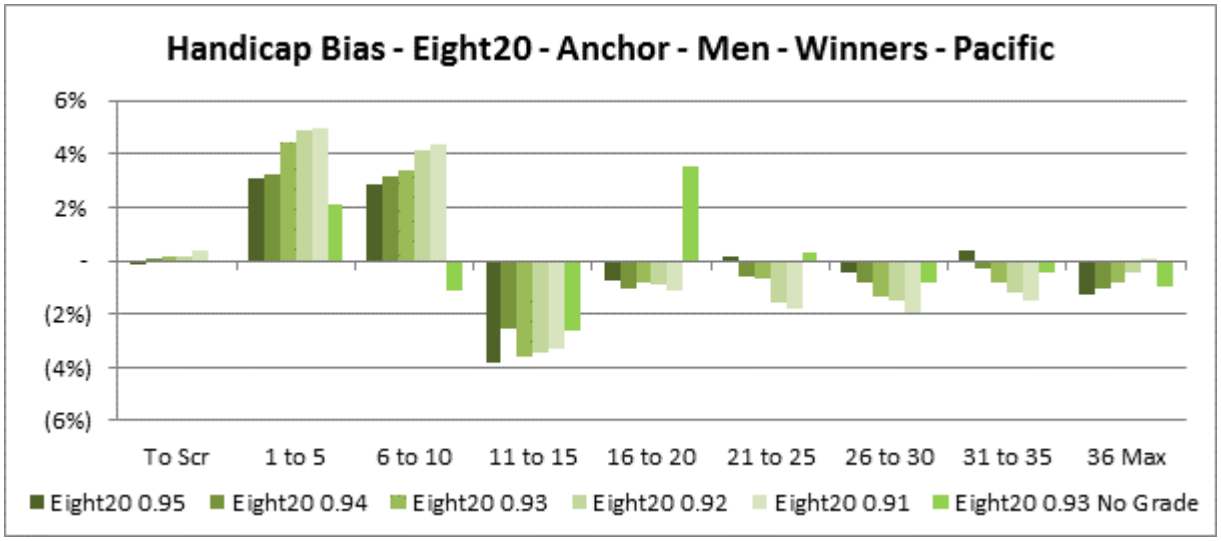
Pacific				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-86.4	44.0	-104.9	46.0
Current Period - Ten20 0.96	4.2	59.7	-54.0	51.0
Old Period - Ten20 0.96	-32.6	17.7	-87.8	36.3
Ten20 0.96	-23.2	19.9	-74.8	36.7
Ten20 0.95	-29.1	20.1	-79.3	38.4
Ten20 0.94	-42.1	22.5	-84.3	41.6
Ten20 0.93	-43.0	24.1	-90.1	44.1
Ten20 0.92	-50.0	28.2	-91.4	45.1
Ten20 0.91	-56.6	30.6	-97.6	47.6
Ten20 0.9	-67.3	33.2	-101.0	49.2
Nine20 0.96	-23.8	21.1	-77.8	37.8
Nine20 0.93	-44.3	26.0	-88.9	44.1
Nine20 0.90	-63.3	32.6	-104.9	51.1
Eight20 0.96	-22.9	20.6	-84.9	40.8
Eight20 0.93	-42.5	25.2	-87.1	43.0
Eight20 0.90	-71.3	35.2	-104.4	51.6
Blended 0.96	-42.7	25.0	-86.0	41.4
Blended 0.94	-55.8	27.9	-91.7	45.7
Blended 0.92	-66.6	33.3	-101.5	50.6
Hybrid 0.96	-40.0	20.0	-80.0	39.4
Hybrid 0.94	-53.0	26.9	-84.4	42.5

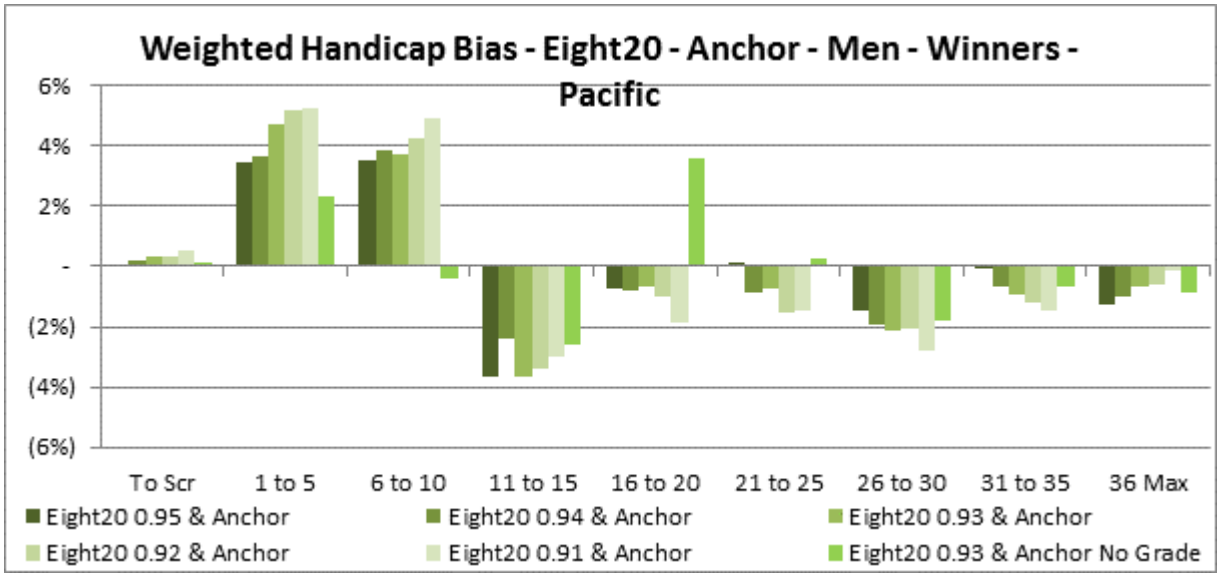
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

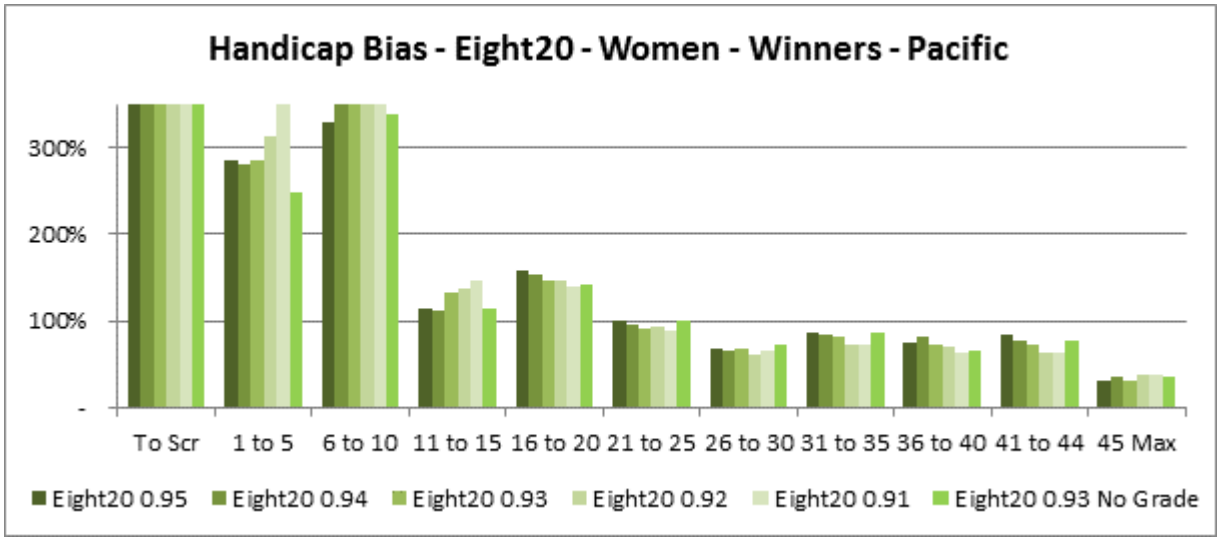
Phase 2

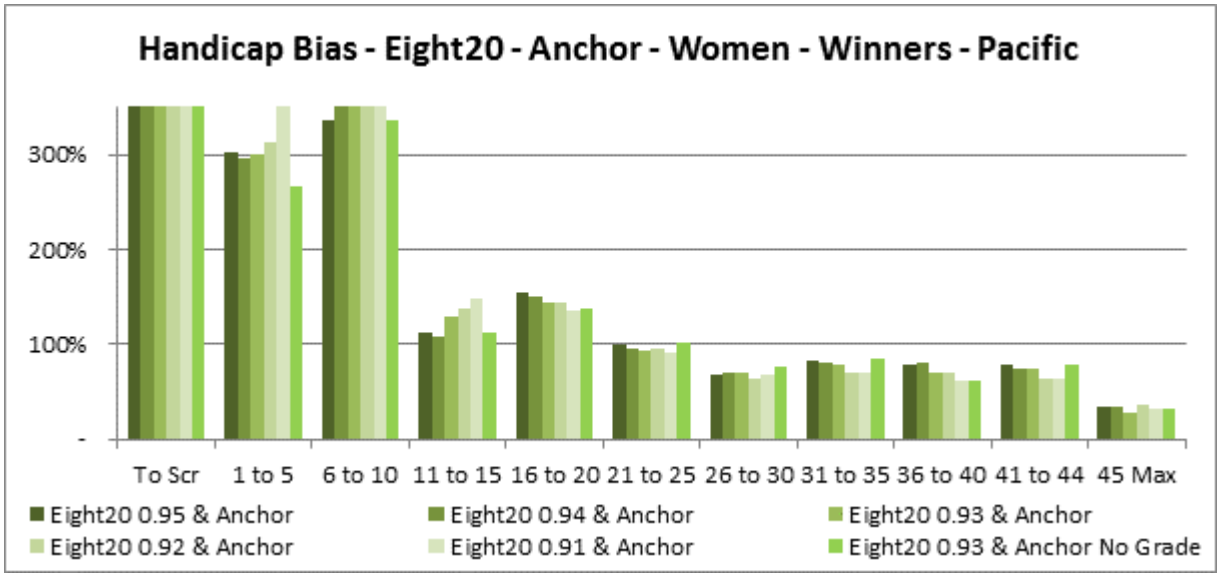

Handicap Bias - Eight20 - Men - Winners - Pacific
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

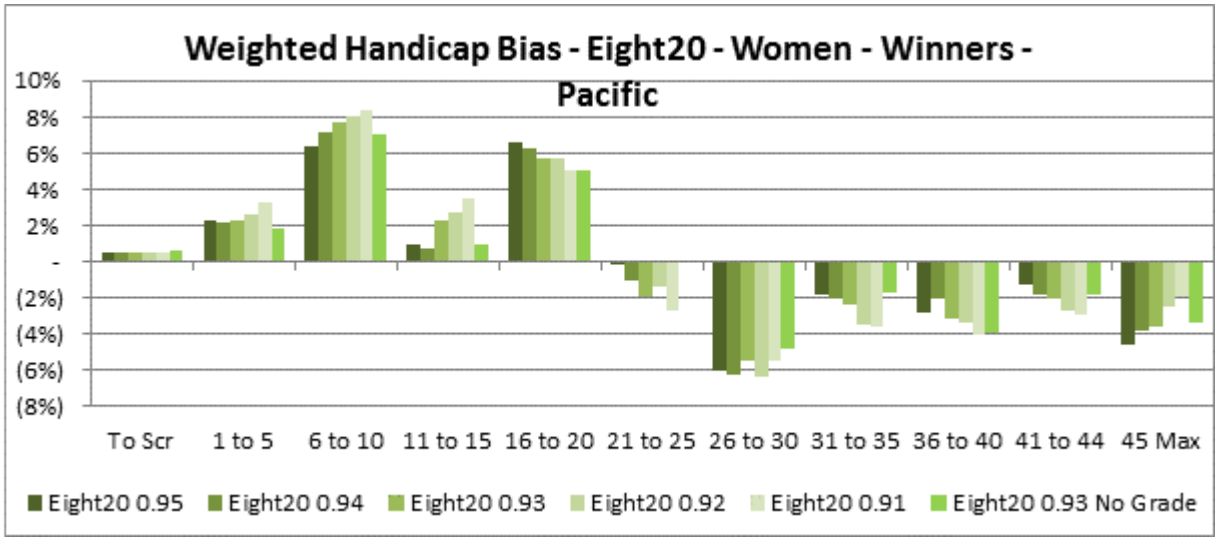

Handicap Bias - Eight20 - Anchor - Men - Winners - Pacific
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

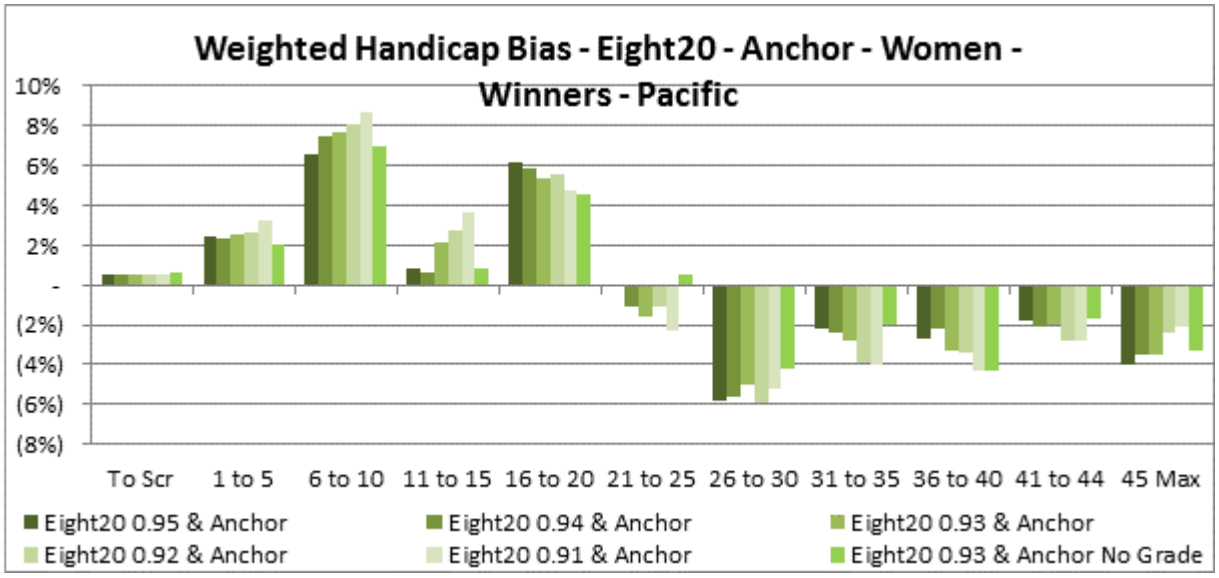

Handicap Bias - Eight20 - Anchor - Men - Winners - Pacific
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

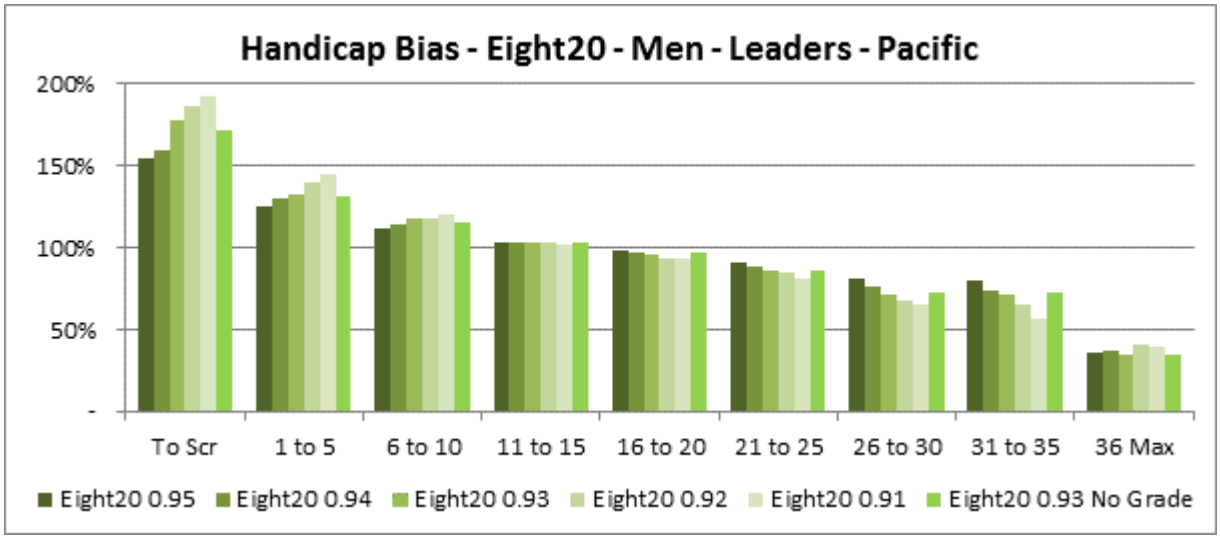

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Pacific
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

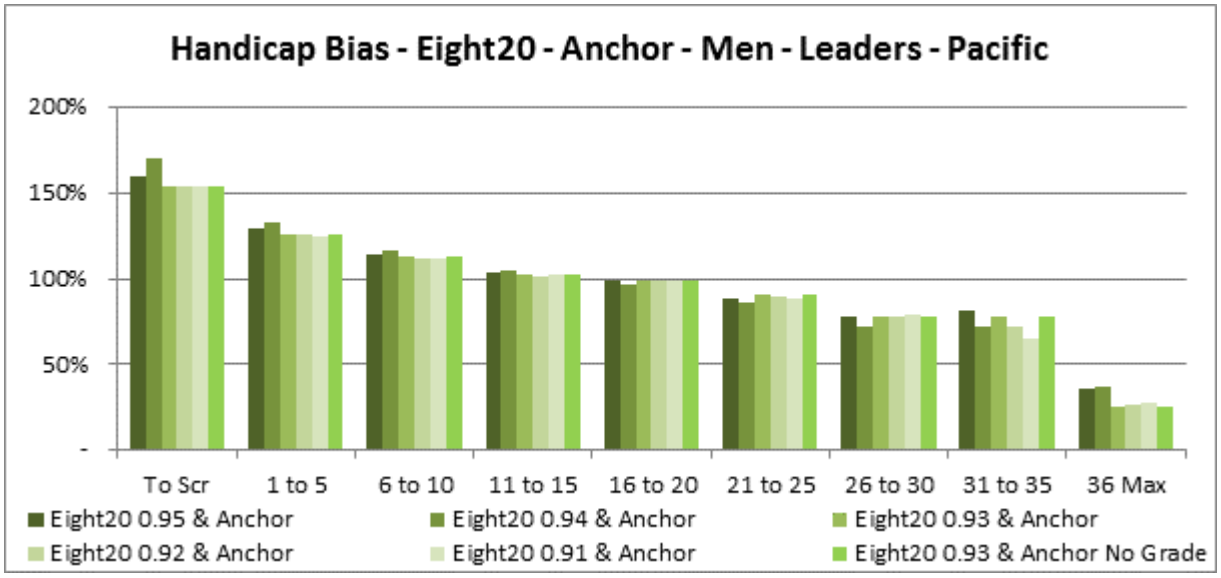

Handicap Bias - Eight20 - Women - Winners - Pacific
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

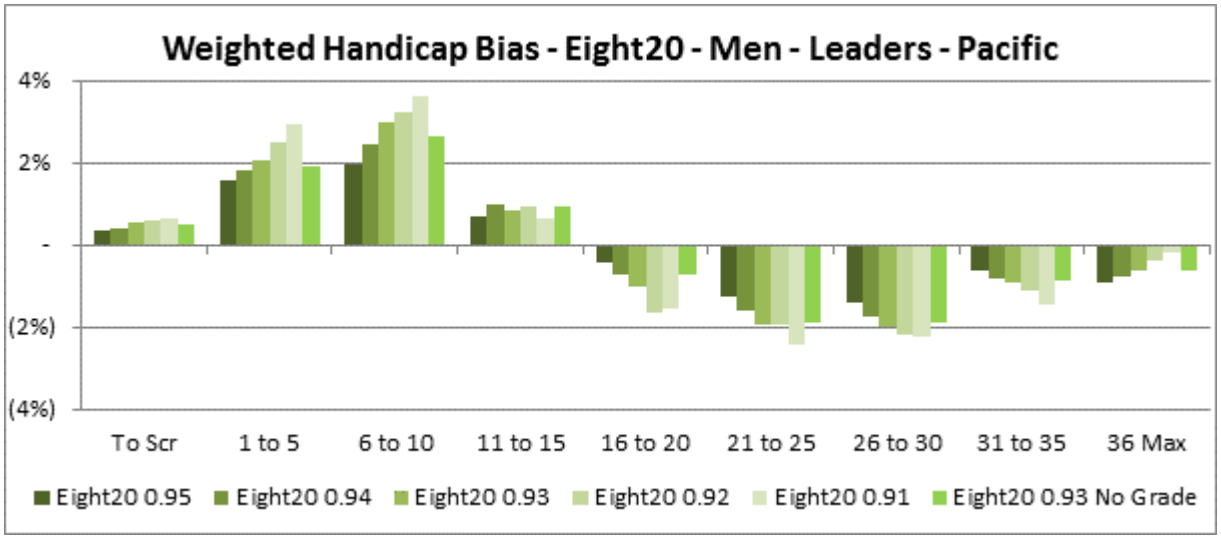

Handicap Bias - Eight20 - Anchor - Women - Winners - Pacific
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

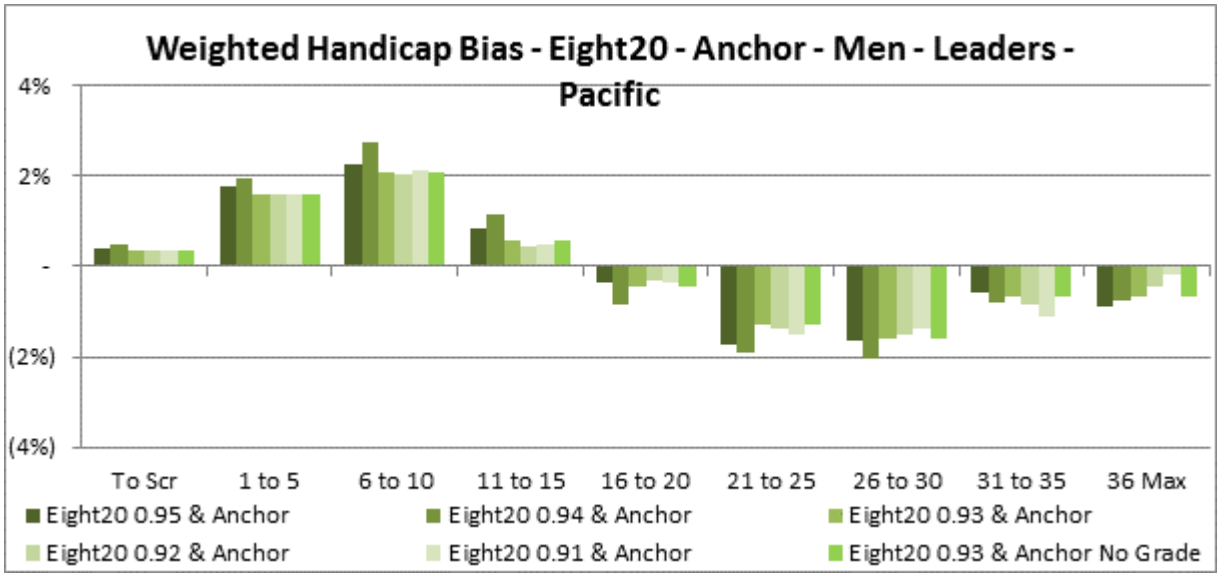

Weighted Handicap Bias - Eight20 - Women - Winners - Pacific
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

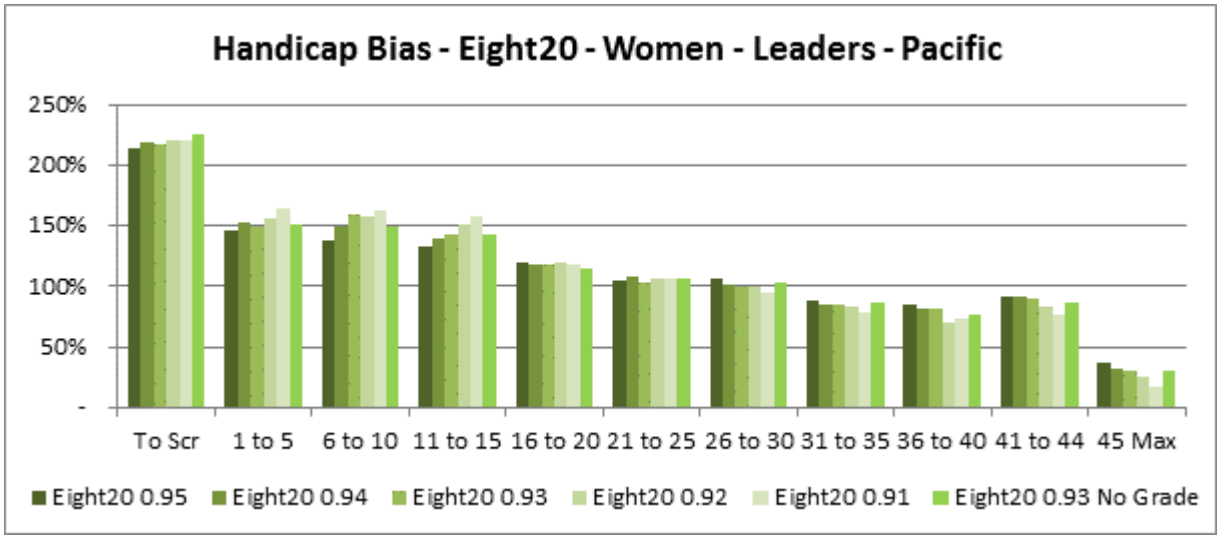

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Pacific
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

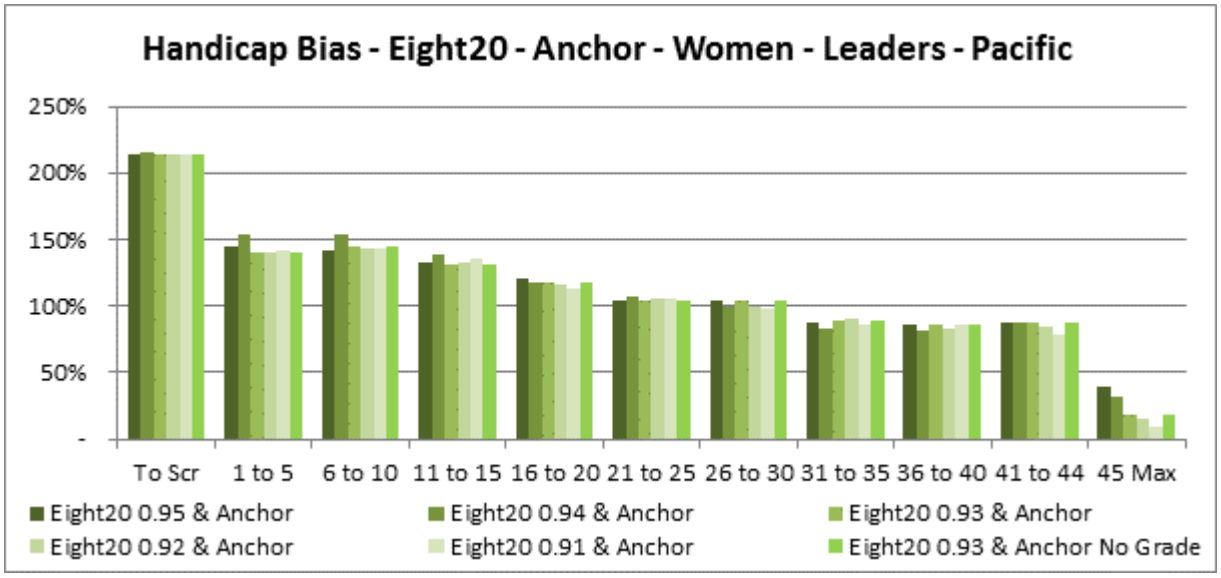

Handicap Bias - Eight20 - Men - Leaders - Pacific
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

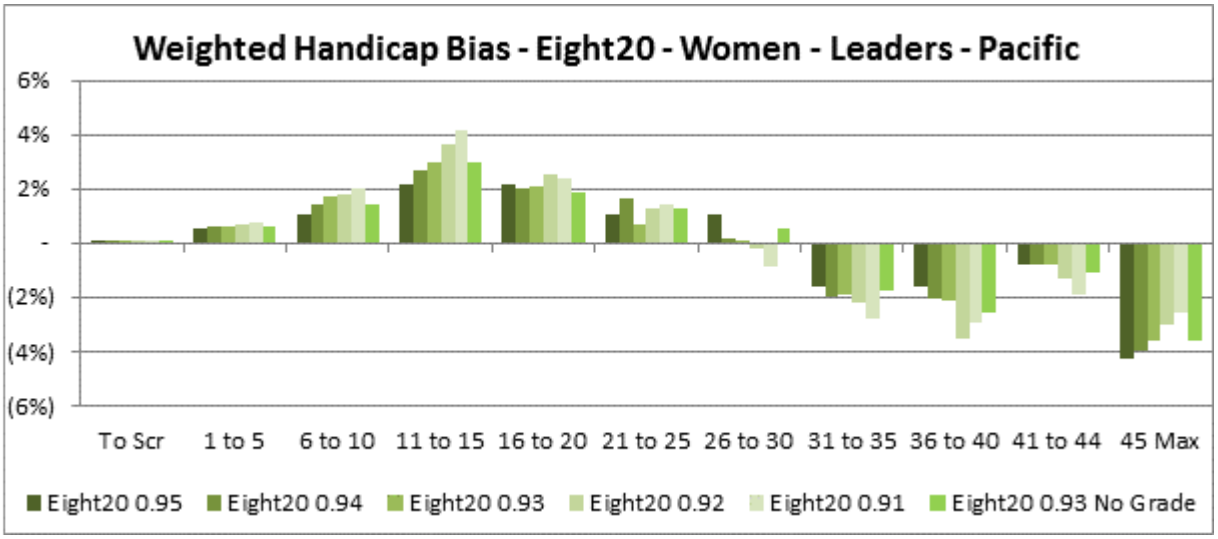

Handicap Bias - Eight20 - Anchor - Men - Leaders - Pacific
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

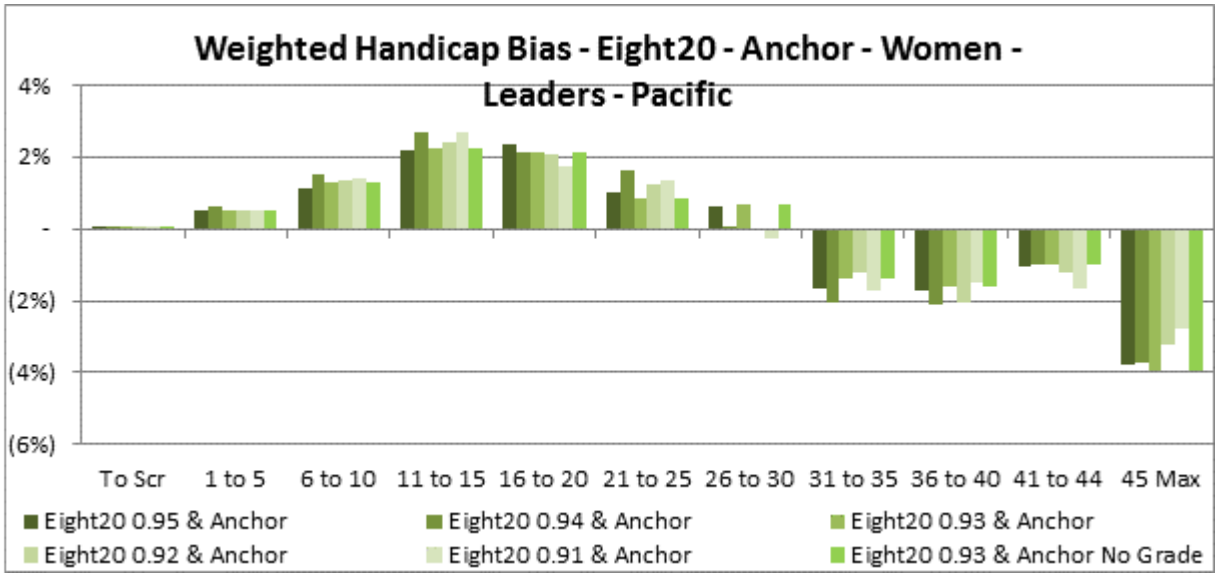

Weighted Handicap Bias - Eight20 - Men - Leaders - Pacific
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Pacific
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Pacific
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Pacific
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Pacific
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

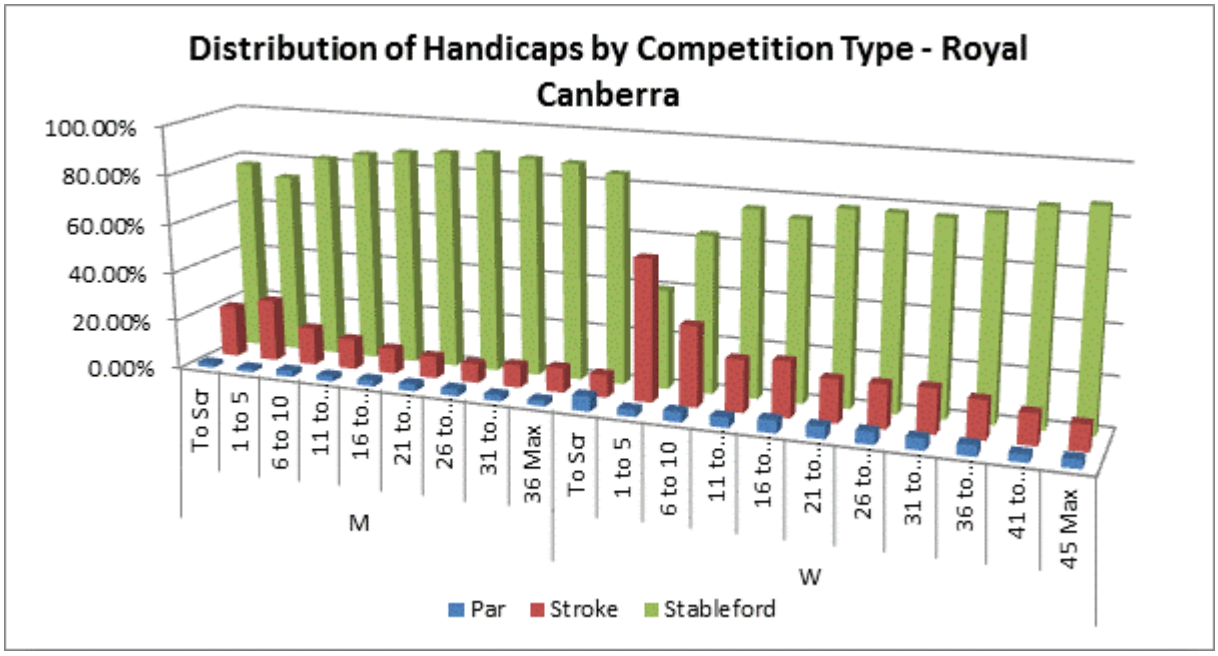


Phase 2 -Pacific					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	-25.3	21.0	-77.7	40.1
	Eight20 0.94	-35.1	19.5	-75.5	40.2
	Eight20 0.93	-43.6	24.5	-82.3	41.0
	Eight20 0.92	-50.6	27.5	-86.3	43.7
	Eight20 0.91	-52.8	28.6	-89.8	44.5
	Eight20 0.93 No Grade	-13.0	18.3	-74.8	36.8
	Eight20 0.95 & Anchor	-36.6	22.9	-77.5	39.2
	Eight20 0.94 & Anchor	-46.5	22.6	-76.8	39.6
	Eight20 0.93 & Anchor	-50.0	26.7	-82.6	40.1
	Eight20 0.92 & Anchor	-56.3	28.9	-87.1	43.3
	Eight20 0.91 & Anchor	-60.9	30.9	-92.1	44.8
	Eight20 0.93 & Anchor No Grade	-21.8	19.3	-75.3	36.0
Leaders	Eight20 0.95	-34.0	12.2	-39.7	19.3
	Eight20 0.94	-39.4	14.9	-43.2	20.3
	Eight20 0.93	-43.7	17.4	-43.1	19.7
	Eight20 0.92	-47.5	19.5	-48.9	23.0
	Eight20 0.91	-52.0	21.8	-50.9	23.9
	Eight20 0.93 No Grade	-41.3	16.1	-43.6	20.0
	Eight20 0.95 & Anchor	-37.4	14.2	-39.7	18.6
	Eight20 0.94 & Anchor	-43.3	16.9	-43.8	20.2
	Eight20 0.93 & Anchor	-33.4	12.6	-39.6	18.4
	Eight20 0.92 & Anchor	-32.6	12.4	-39.2	17.7
	Eight20 0.91 & Anchor	-32.2	12.7	-38.6	17.3
	Eight20 0.93 & Anchor No Grade	-33.4	12.6	-39.6	18.4

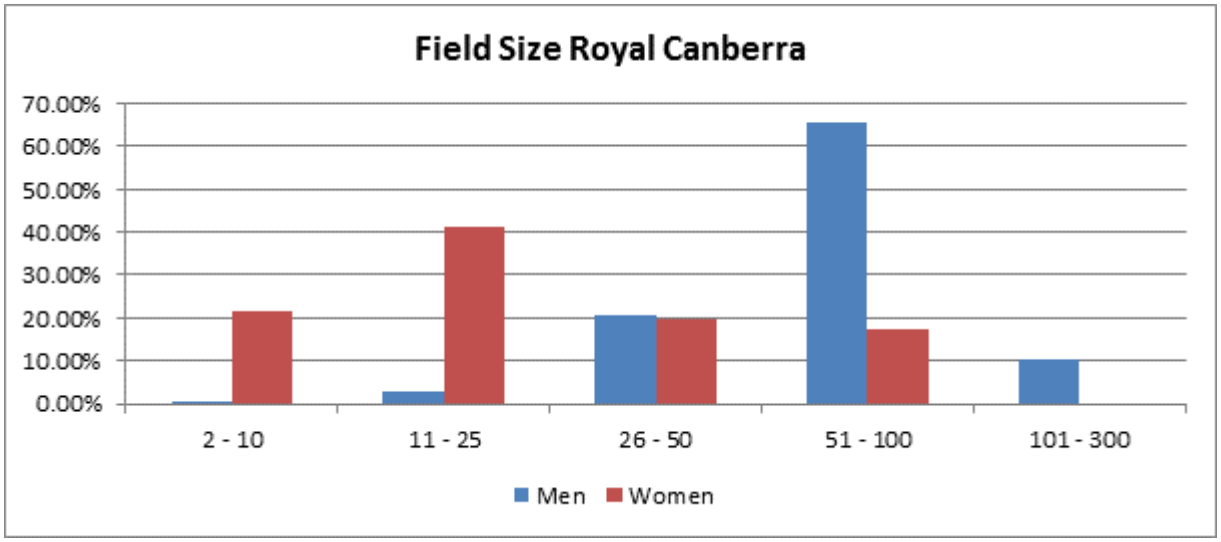
Appendix 12 – Royal Canberra

Phase 1

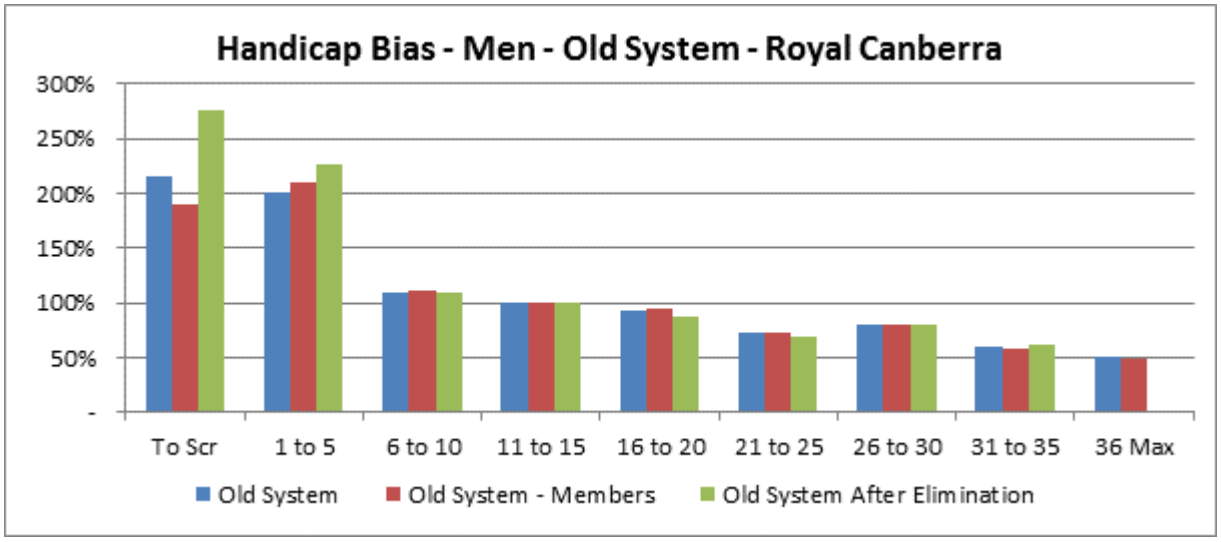
Royal Canberra	Men	Women	Total
Players in Database	2,640	869	3,509
Members	1,020	273	1,293
Visitors	1,620	596	2,216
Members who have Played 33 Rounds	960	261	1,221
Members with Last Round In Old System	161	43	204
Members with Last Round in Current System	859	230	1,089
Earliest Round	8/12/2007	13/1/2008	
Latest Round	28/11/2010	28/11/2010	
Number of Visiting Clubs			273
Number of Home Competitions	1,609	1,207	2,816
Number of Rounds of Golf	111,888	21,109	132,997
Number of Rounds at Home	103,535	19,450	122,985
Number of Rounds at Home Old	82,483	15,260	97,743
Number of Rounds at Home Current	21,052	4,190	25,242
Num Rnds Members at Home	98,892	18,207	117,099
Num Rnds Members at Home Old	78,535	14,326	92,861
Num Rnds Members at Home Cur	20,357	3,881	24,238
Num Rnds After Eliminations	61,567	10,268	71,835
Num Rnds After Eliminations Old	41,865	6,704	48,569
Num Rnds After Eliminations Cur	19,702	3,564	23,266

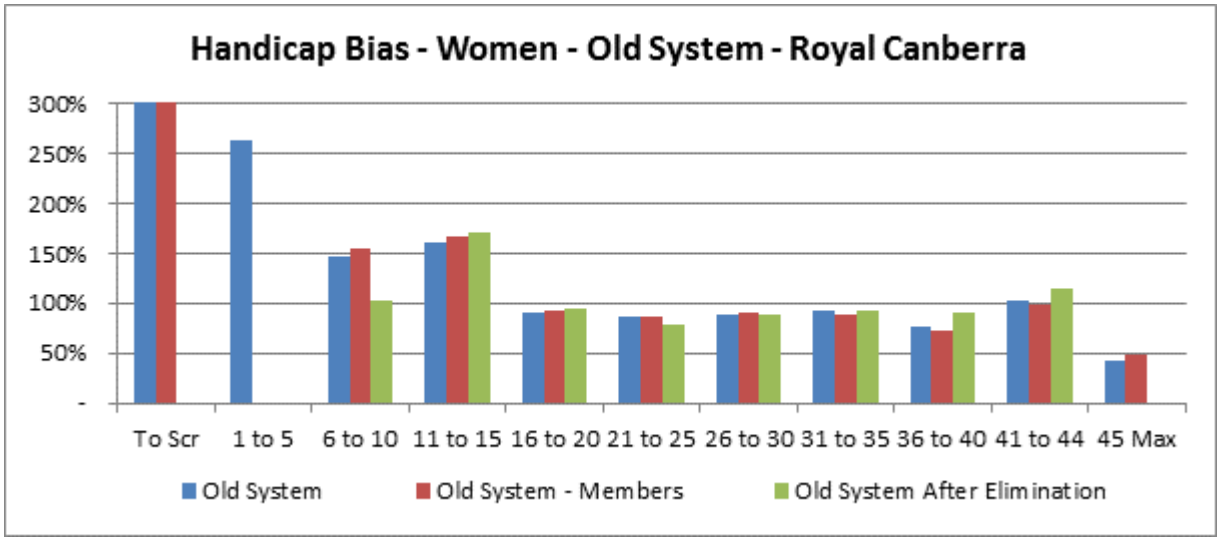


Most men's competitions are with a field of over 100, the women mainly field 51-100.

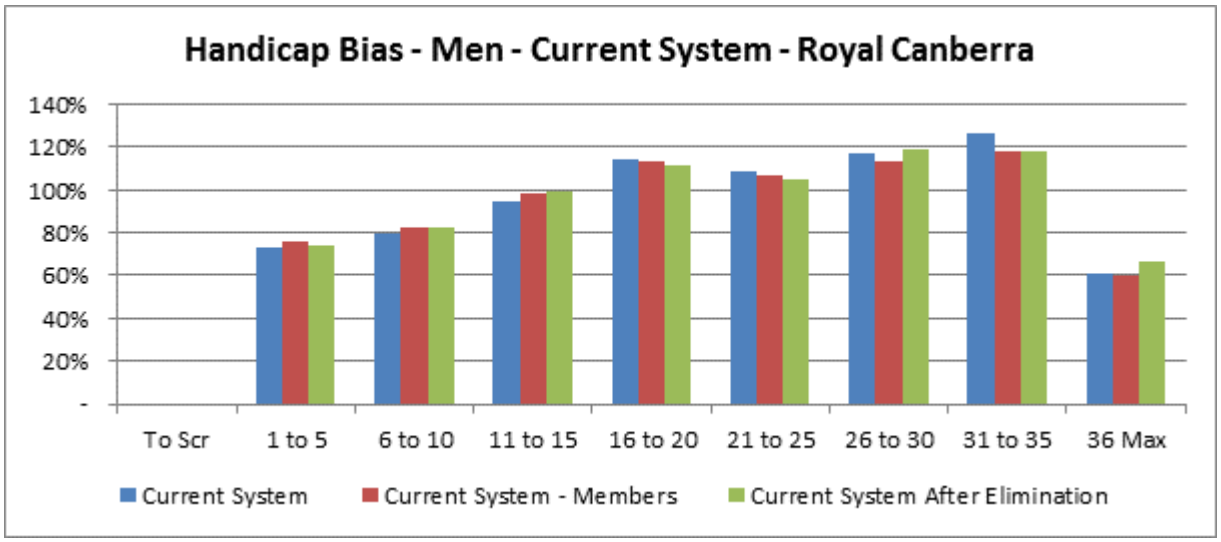


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

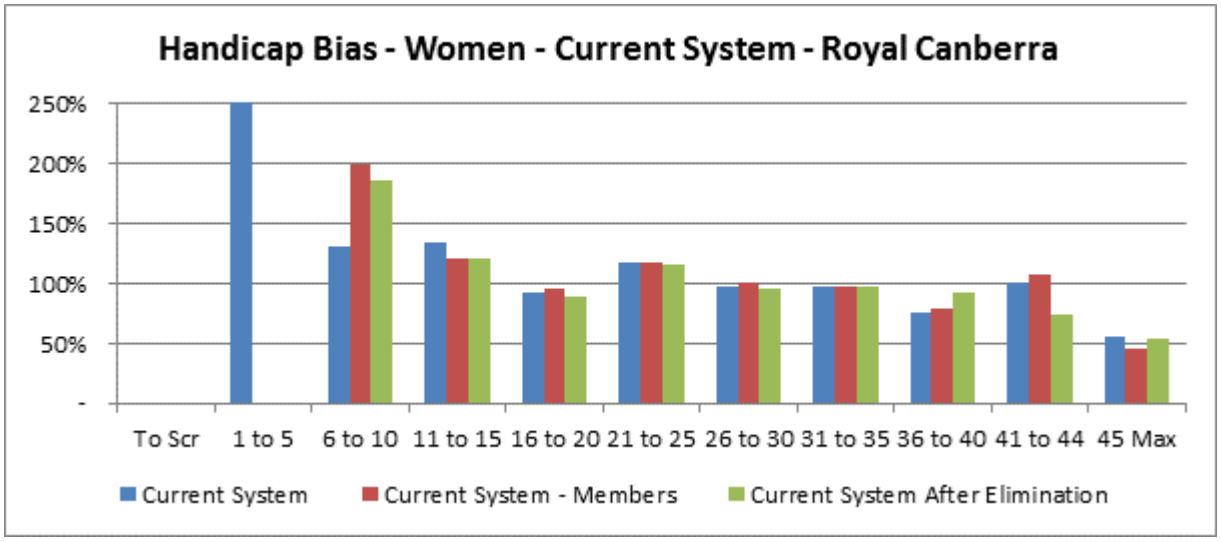




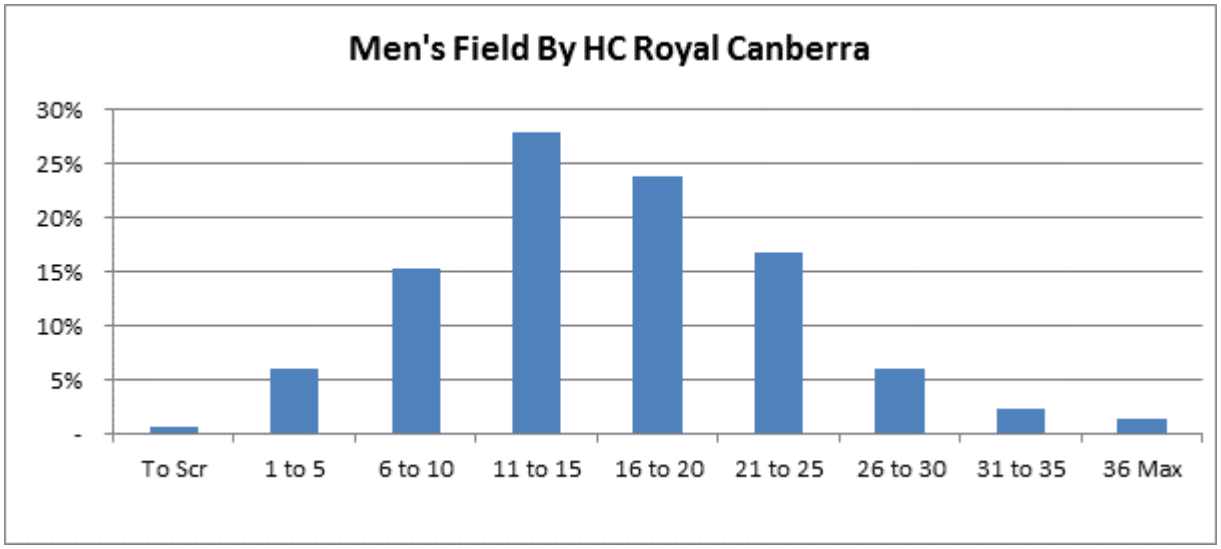
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

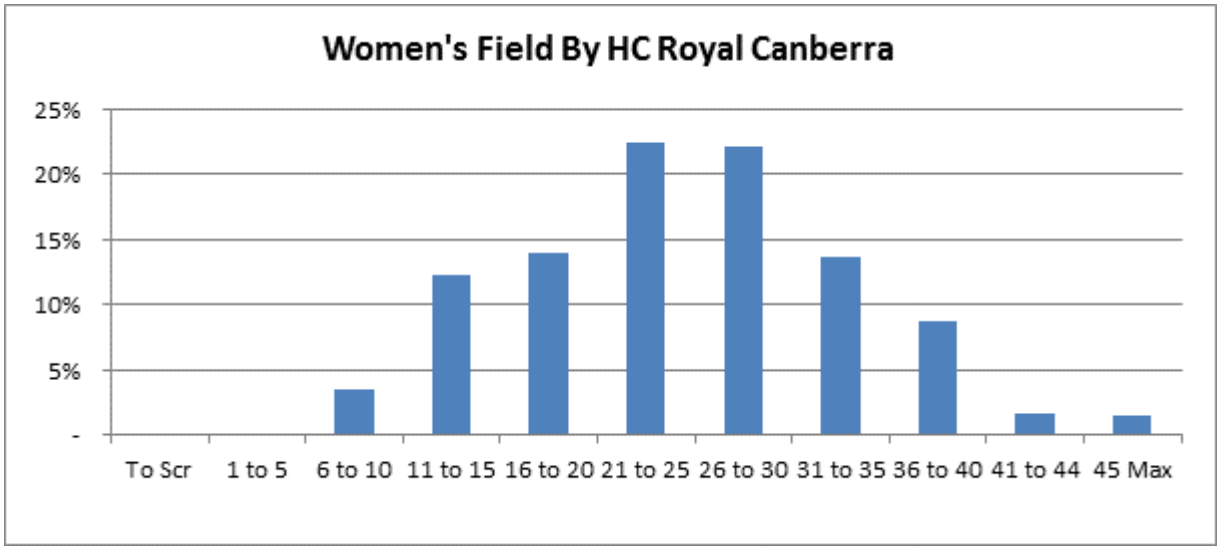


The picture is less changed for the women. There has been some increased bias for the 21 to 30 ranges.



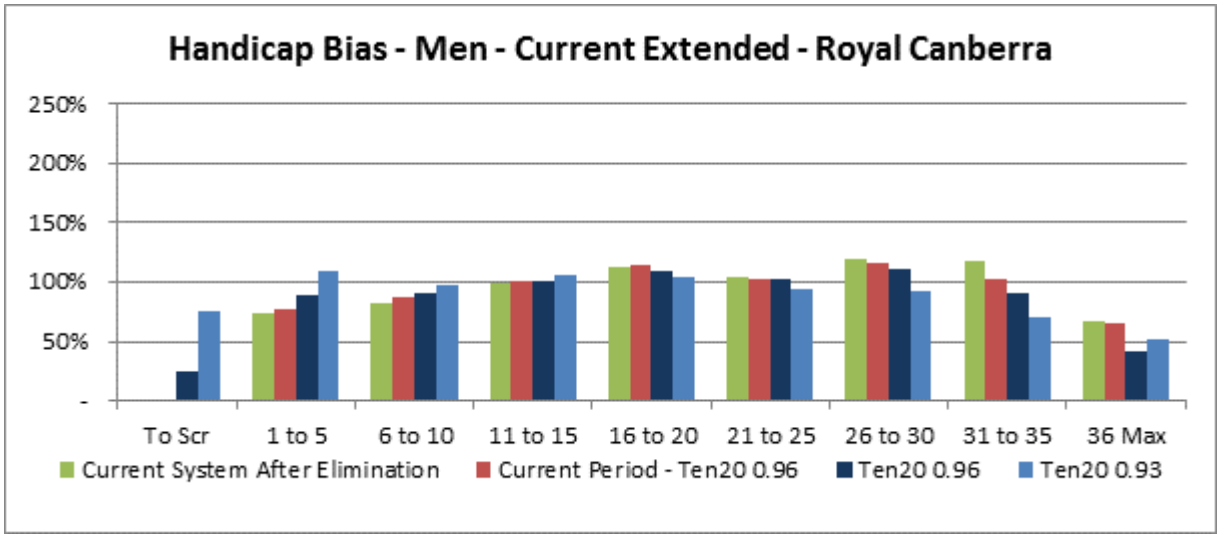
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be "lumpy", and not too much store should be put on the bias for the lowest and highest markers.





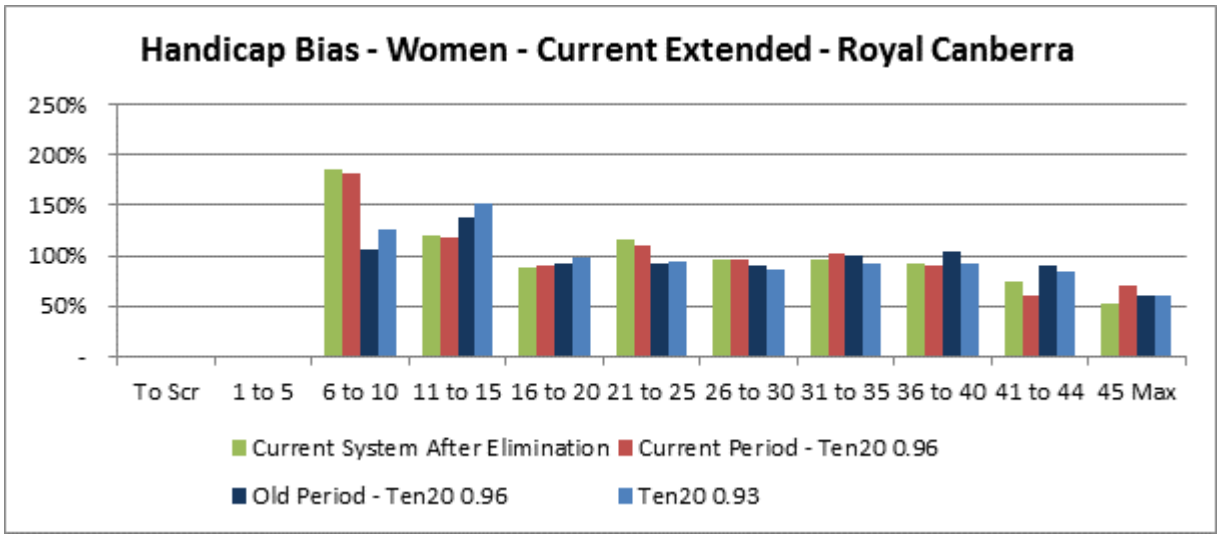
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

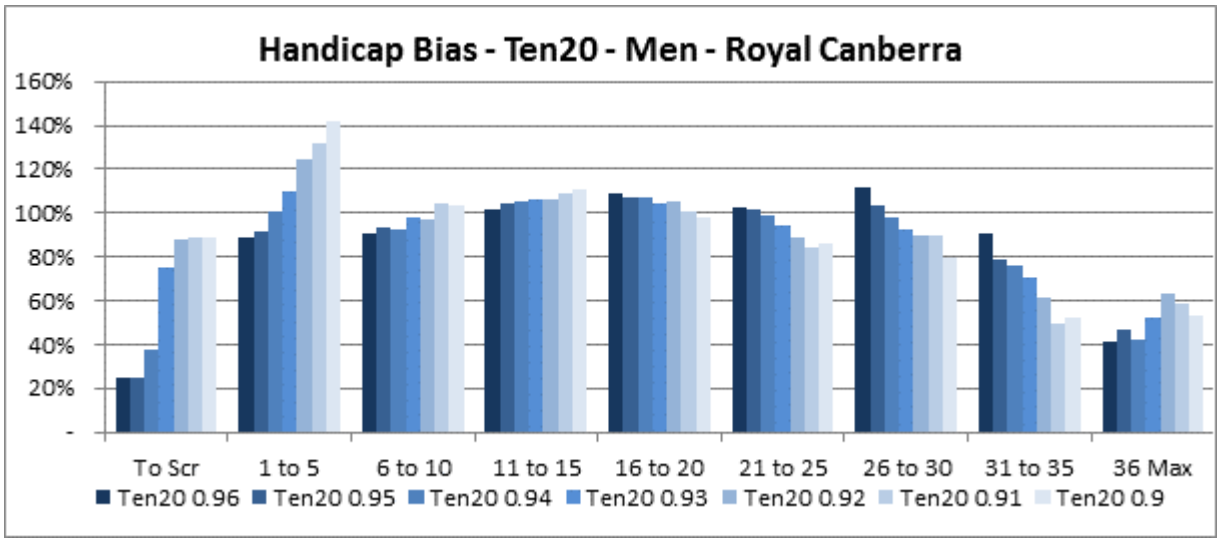


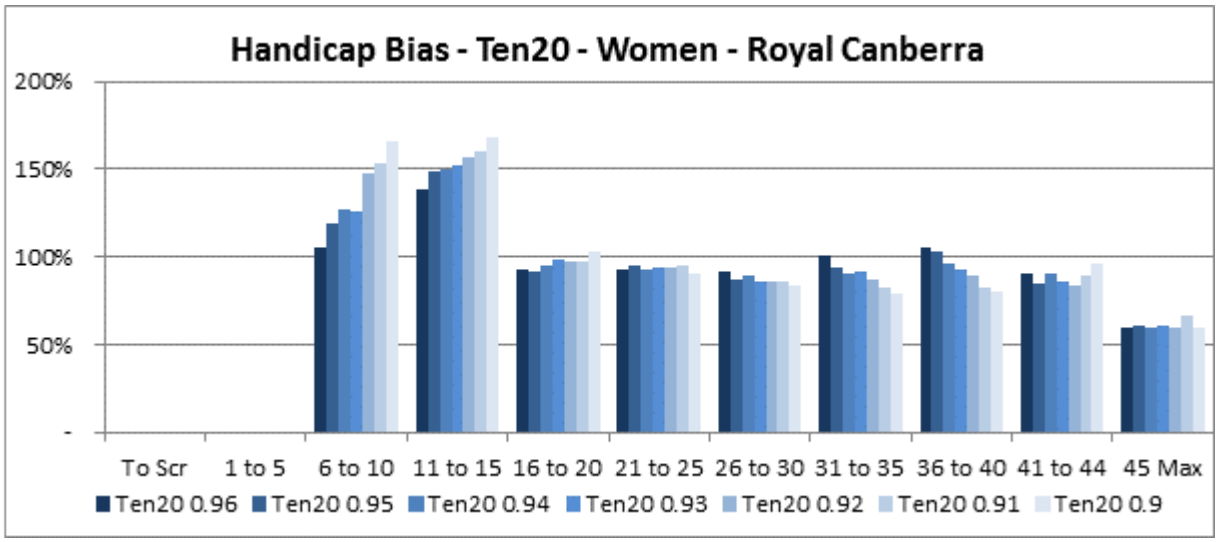
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low markers would still have dominated over the two-years.

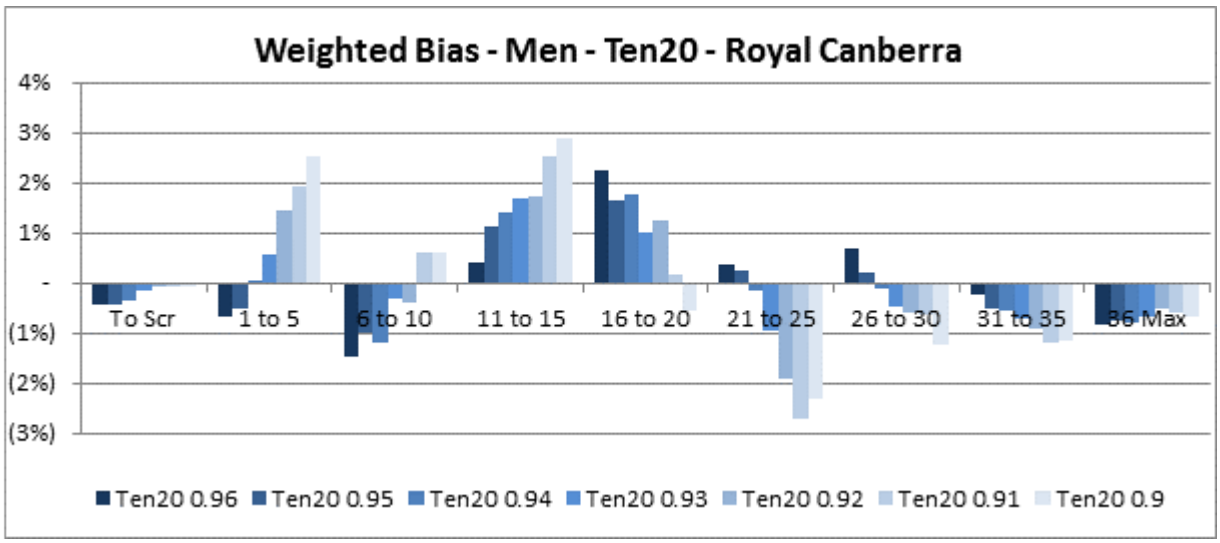


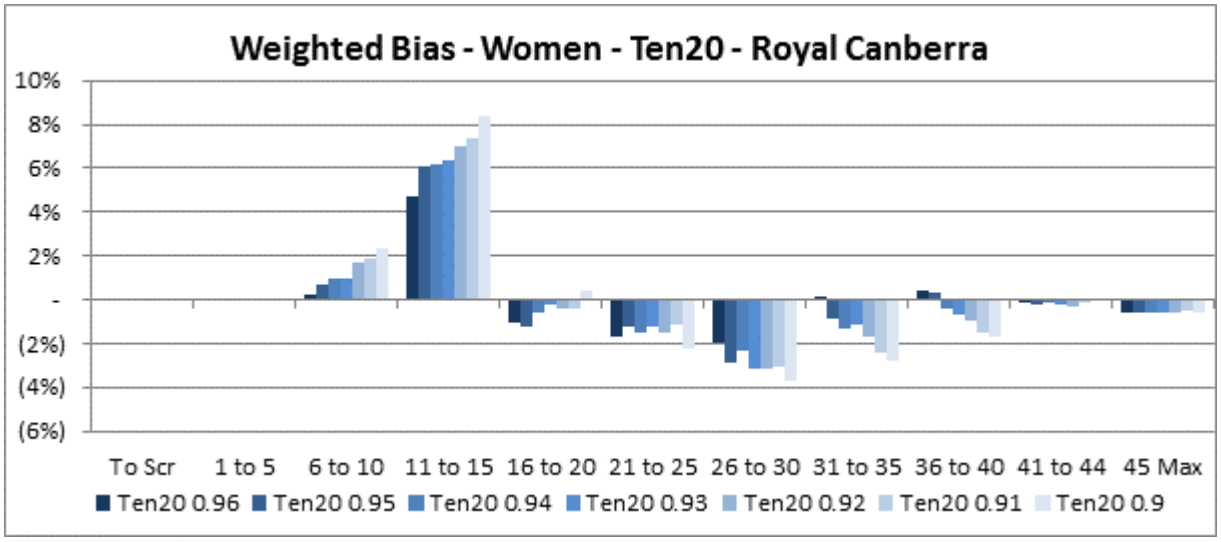
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

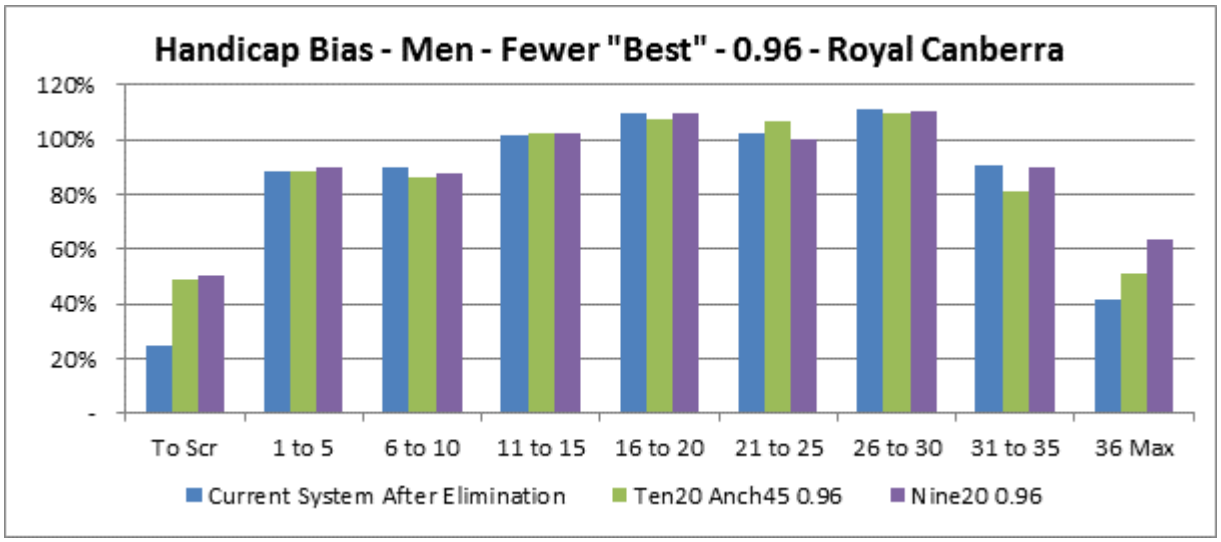


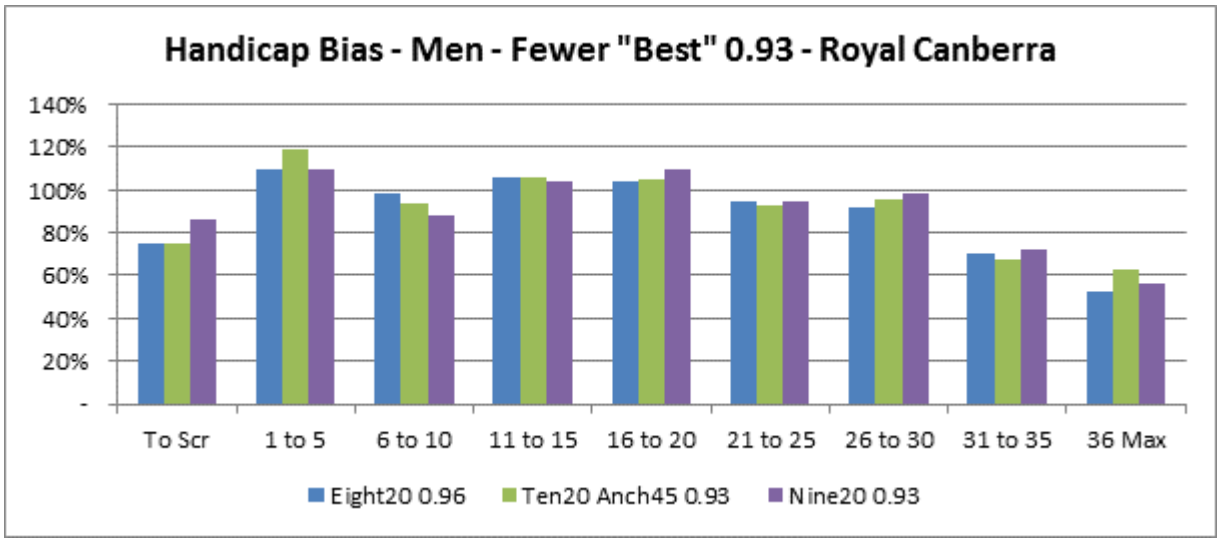


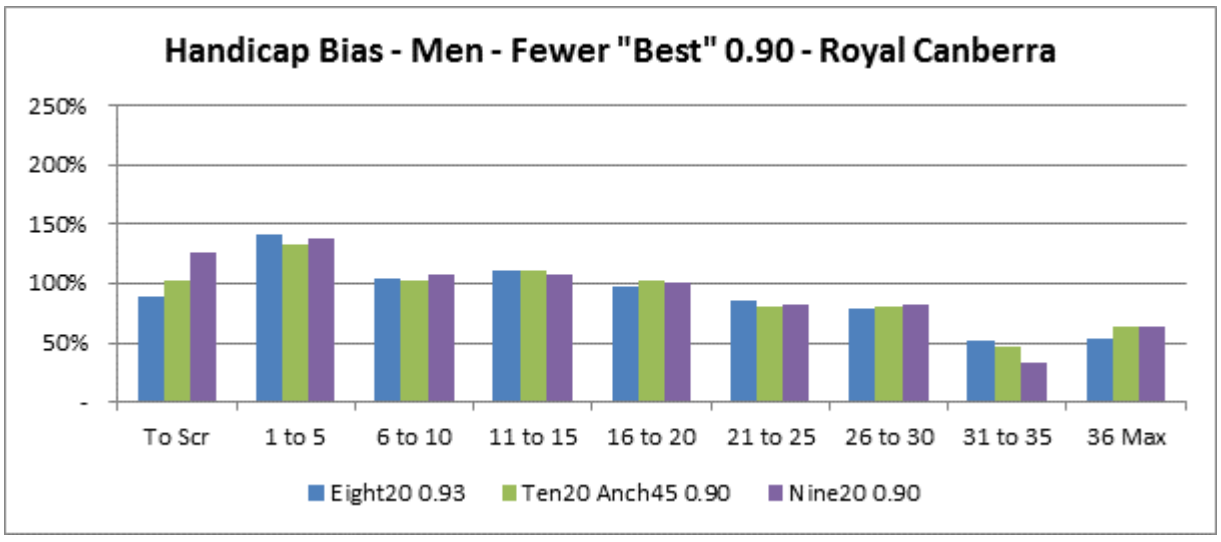
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

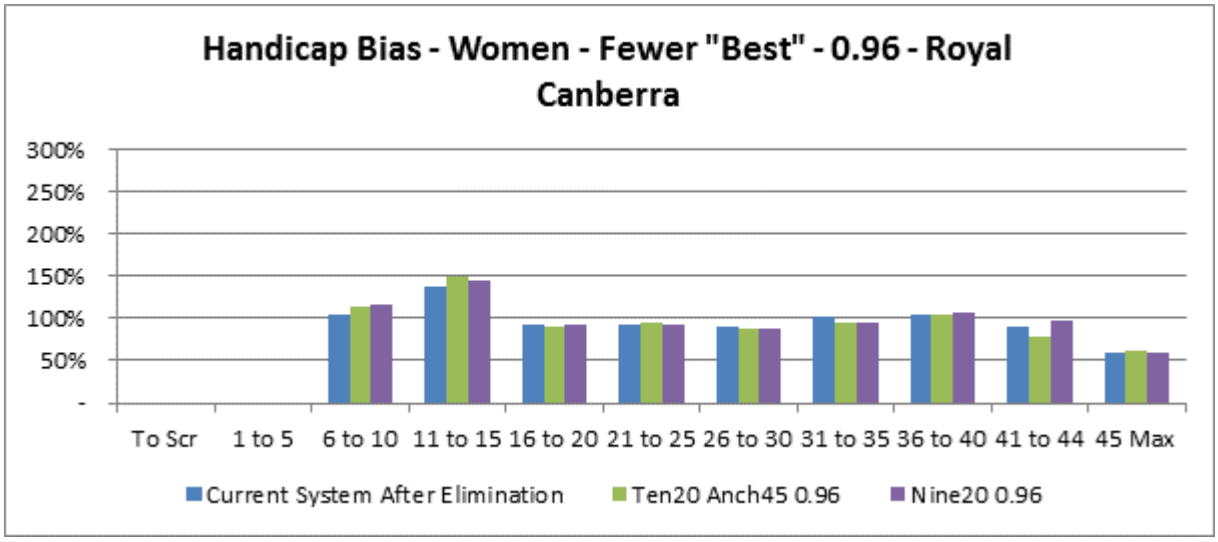
	Royal Canberra			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	7.0	10.8	-11.7	17.4
Ten20 0.95	0.5	8.9	-18.7	22.3
Ten20 0.94	-5.0	9.7	-22.1	22.2
Ten20 0.93	-14.7	8.8	-24.1	23.4
Ten20 0.92	-21.7	12.2	-29.2	26.1
Ten20 0.91	-31.8	15.8	-32.5	27.9
Ten20 0.9	-37.1	17.4	-38.2	32.6

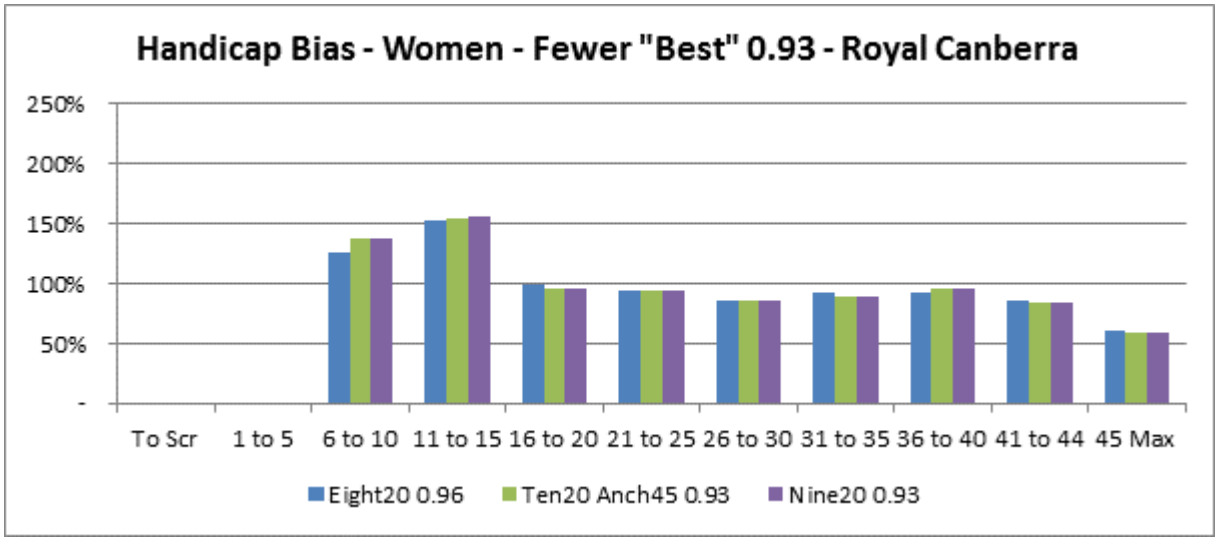
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

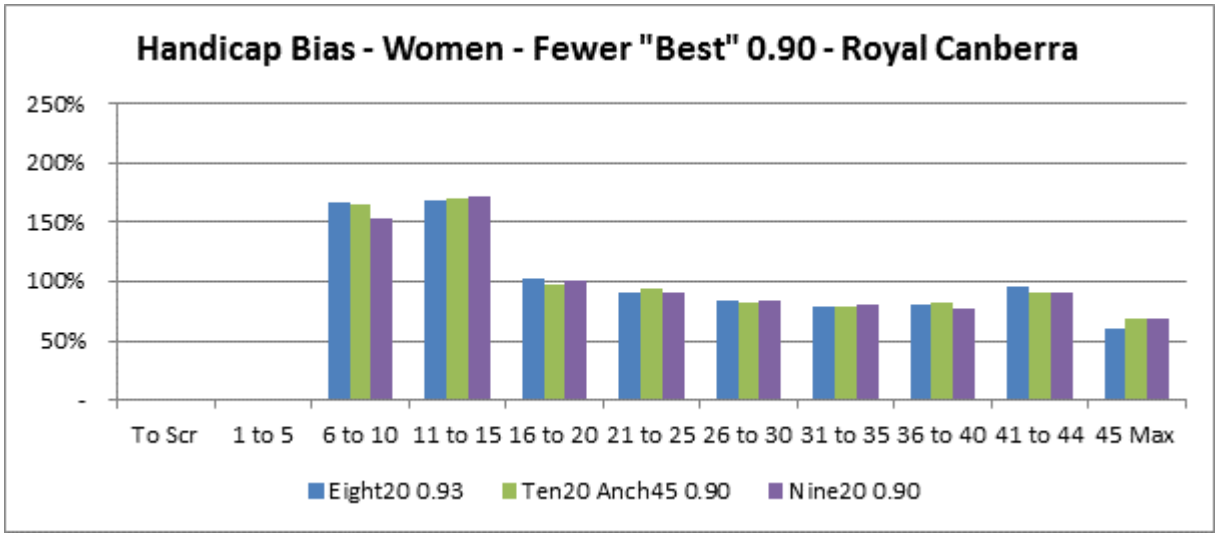







Handicap Bias - Women - Fewer "Best" - 0.96 - Royal Canberra
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Current System After Elimination
Ten20 Anch45 0.96
Nine20 0.96

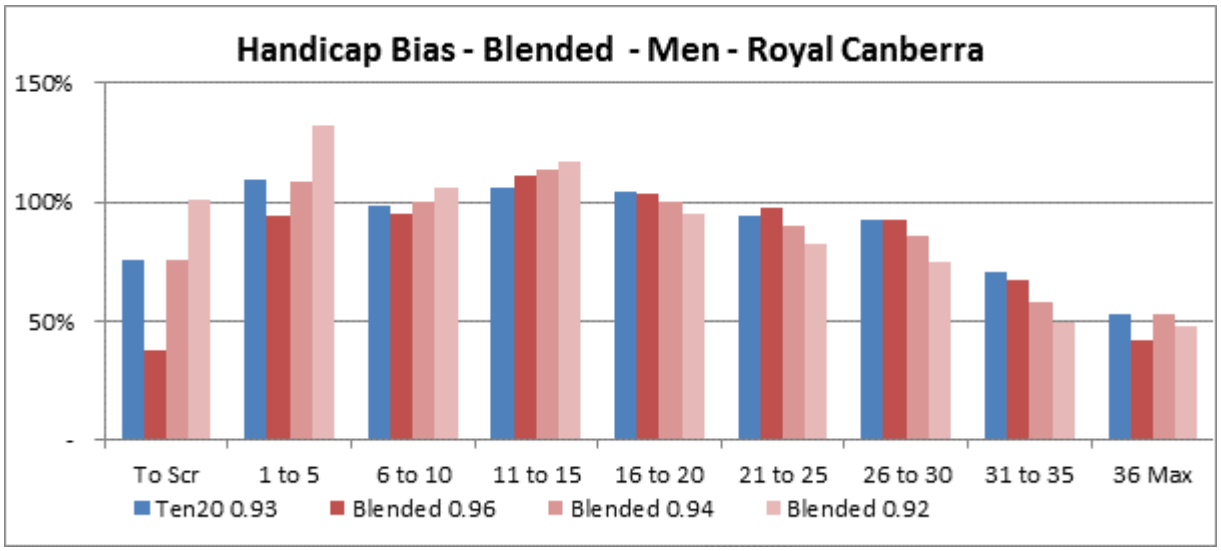

Handicap Bias - Women - Fewer "Best" 0.93 - Royal Canberra
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.96
Ten20 Anch45 0.93
Nine20 0.93

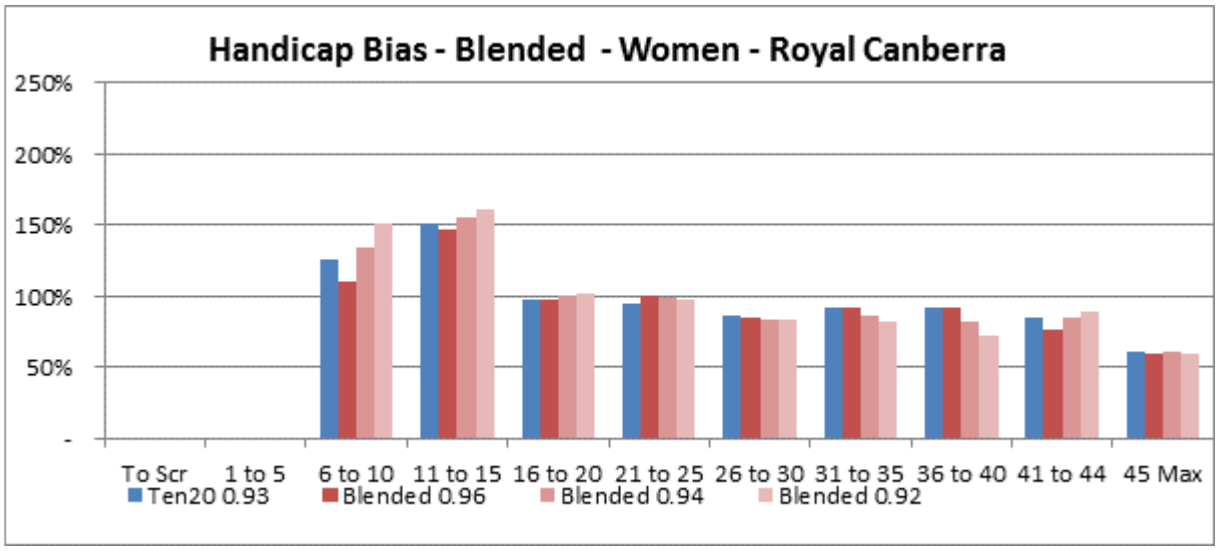

Handicap Bias - Women - Fewer "Best" 0.90 - Royal Canberra
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.93
Ten20 Anch45 0.90
Nine20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

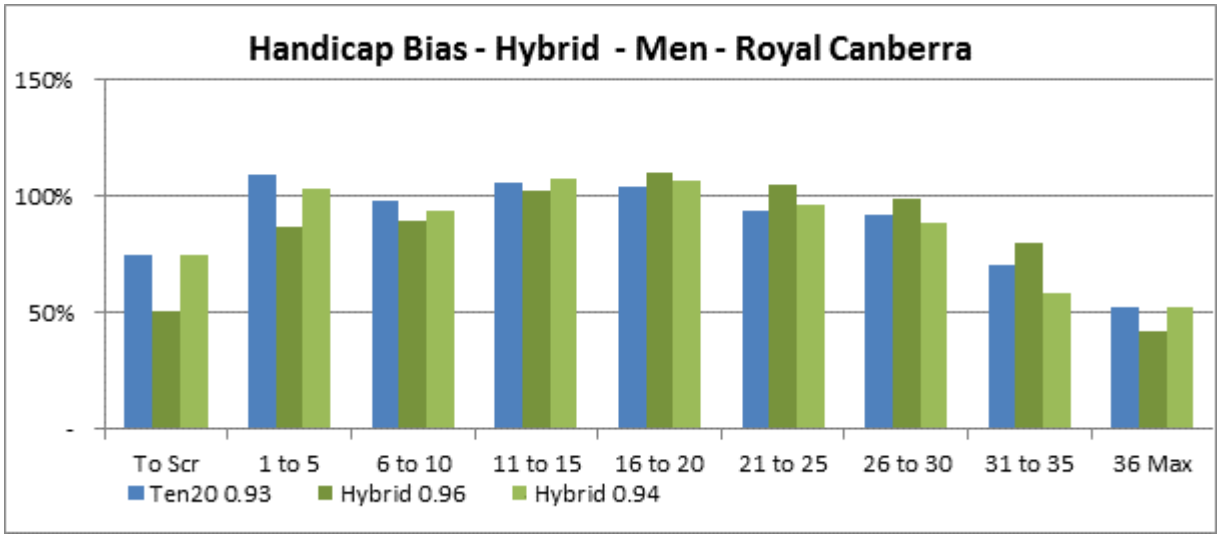
Method	Royal Canberra Men		Women	
	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	62.1	101.5	-36.8	84.4
Nine20 0.96	8.1	11.7	-17.7	22.2
Eight20 0.96	7.7	11.3	-15.7	20.9
Ten20 0.93	-14.7	8.8	-24.1	23.4
Nine20 0.93	-14.7	10.4	-25.9	25.0
Eight20 0.93	-7.3	12.4	-25.8	25.5
Ten20 0.90	-37.1	17.4	-38.2	32.6
Nine20 0.90	-35.8	19.1	-37.8	32.8
Eight20 0.90	-39.6	17.2	-37.1	32.7

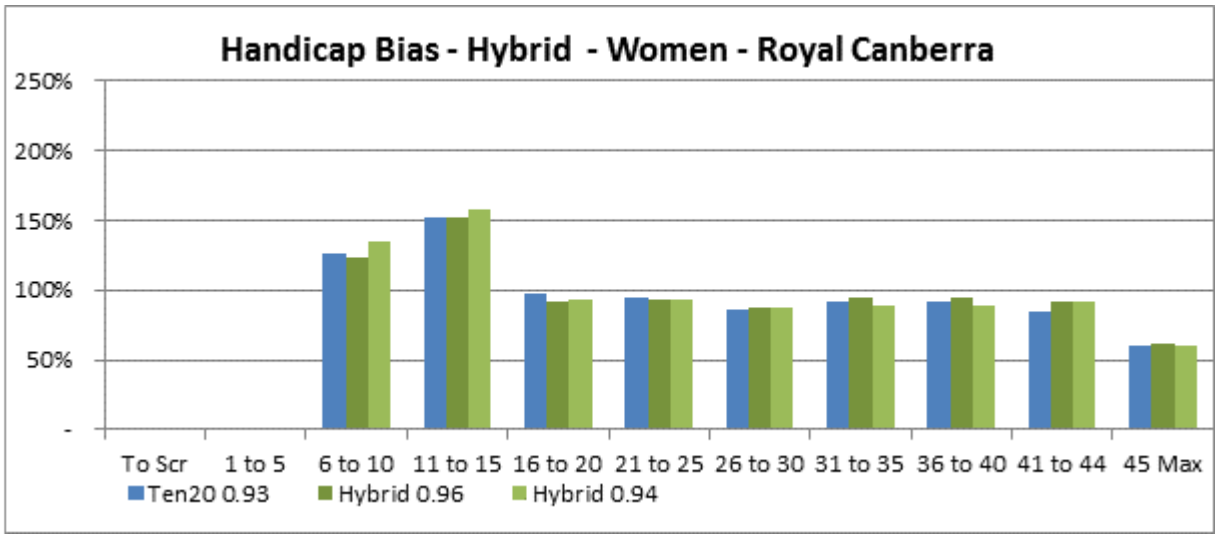
For the Blended:





For the Hybrid:

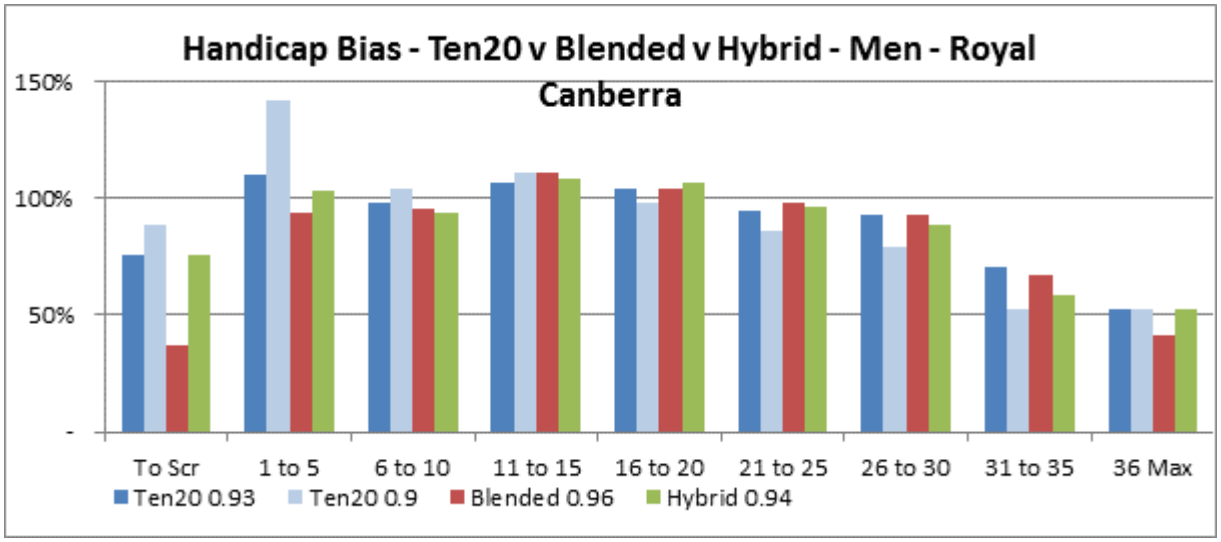


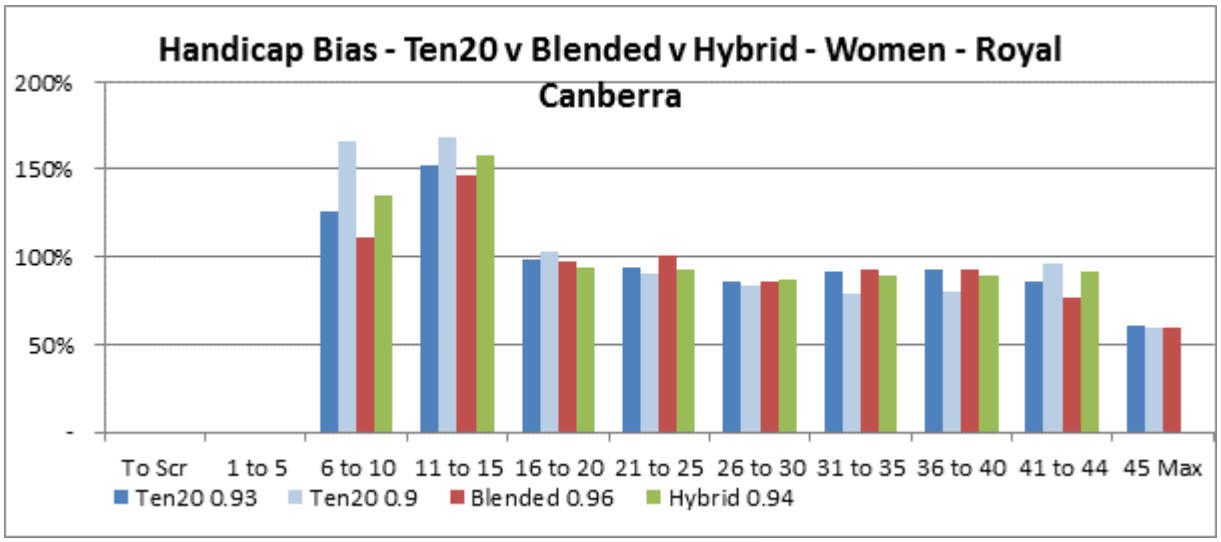


The Corresponding Tilt and Level Indices are:

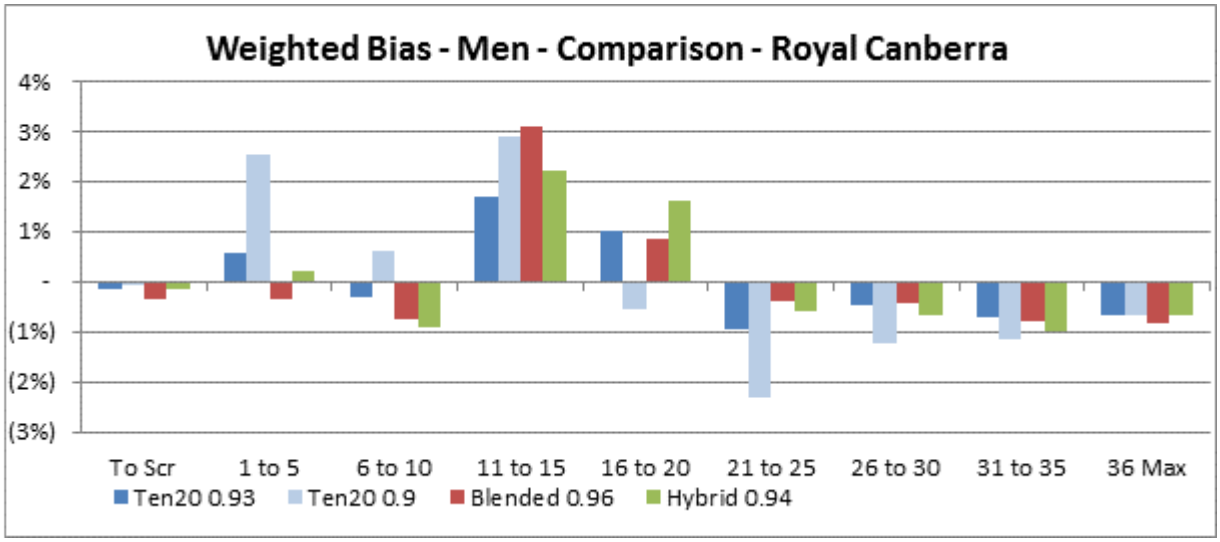
	Royal Canberra			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-9.9	12.7	-21.7	21.3
Blended 0.94	-23.1	16.0	-30.2	26.0
Blended 0.92	-41.6	22.7	-36.4	29.3
Hybrid 0.96	3.5	11.9	-20.9	23.0
Hybrid 0.94	-13.4	11.6	-26.4	25.9

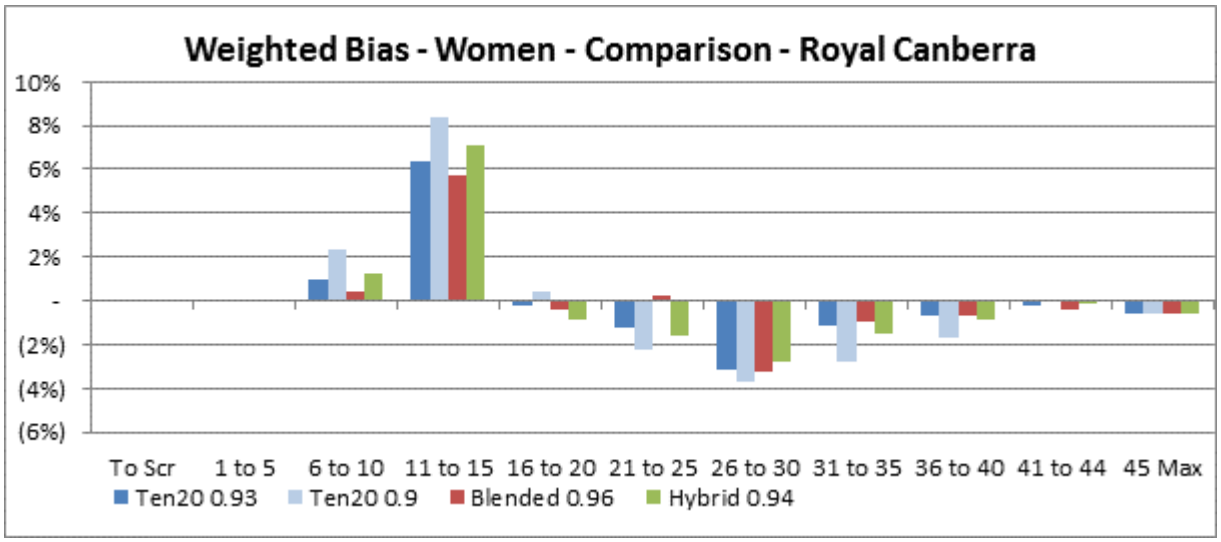
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

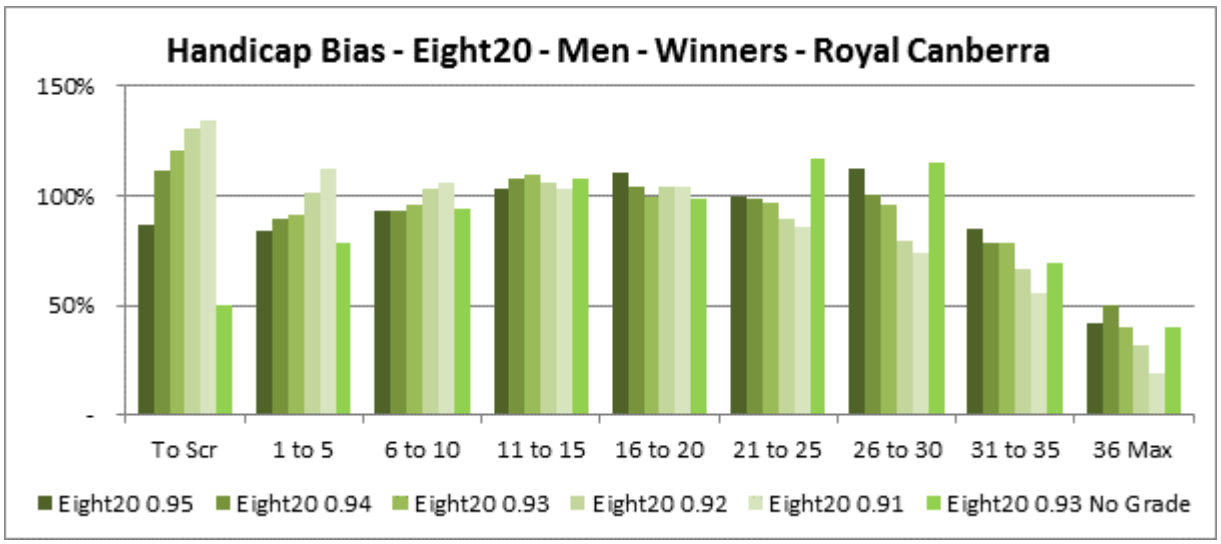
	Royal Canberra			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-14.7	8.8	-24.1	23.4
Ten20 0.9	-37.1	17.4	-38.2	32.6
Blended 0.96	-9.9	12.7	-21.7	21.3
Hybrid 0.94	-13.4	11.6	-26.4	25.9

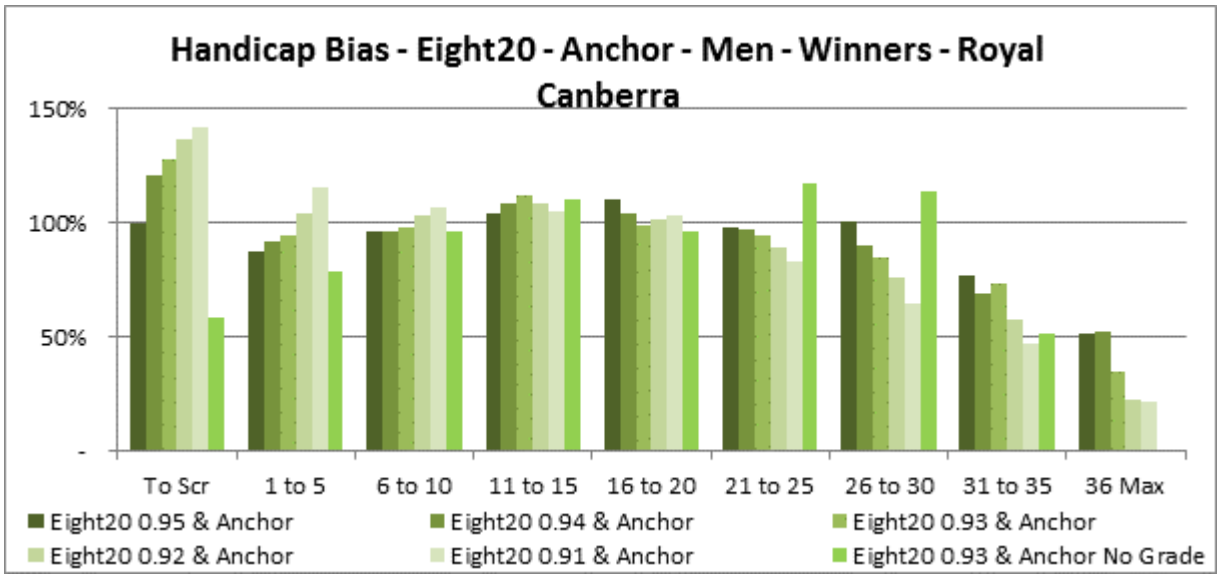
Putting it all together, with the Old System as a reference:

Royal Canberra	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-76.4	35.4	-27.7	33.7
Current Period - Ten20 0.96	18.3	15.0	-17.9	15.0
Old Period - Ten20 0.96	-1.8	9.7	-10.9	22.5
Ten20 0.96	7.0	10.8	-11.7	17.4
Ten20 0.95	0.5	8.9	-18.7	22.3
Ten20 0.94	-5.0	9.7	-22.1	22.2
Ten20 0.93	-14.7	8.8	-24.1	23.4
Ten20 0.92	-21.7	12.2	-29.2	26.1
Ten20 0.91	-31.8	15.8	-32.5	27.9
Ten20 0.9	-37.1	17.4	-38.2	32.6
Nine20 0.96	8.1	11.7	-17.7	22.2
Nine20 0.93	-14.7	10.4	-25.9	25.0
Nine20 0.90	-35.8	19.1	-37.8	32.8
Eight20 0.96	7.7	11.3	-15.7	20.9
Eight20 0.93	-7.3	12.4	-25.8	25.5
Eight20 0.90	-39.6	17.2	-37.1	32.7
Blended 0.96	-9.9	12.7	-21.7	21.3
Blended 0.94	-23.1	16.0	-30.2	26.0
Blended 0.92	-41.6	22.7	-36.4	29.3
Hybrid 0.96	3.5	11.9	-20.9	23.0
Hybrid 0.94	-13.4	11.6	-26.4	25.9

Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

Phase 2


Handicap Bias - Eight20 - Men - Winners - Royal Canberra
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Winners - Royal Canberra
150%
100%
50%
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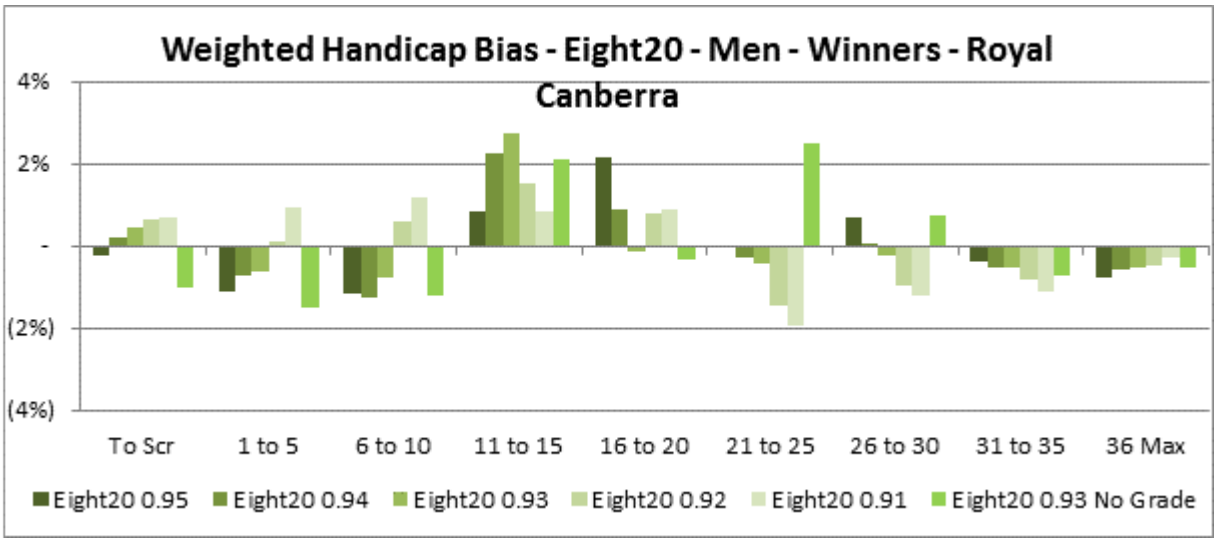
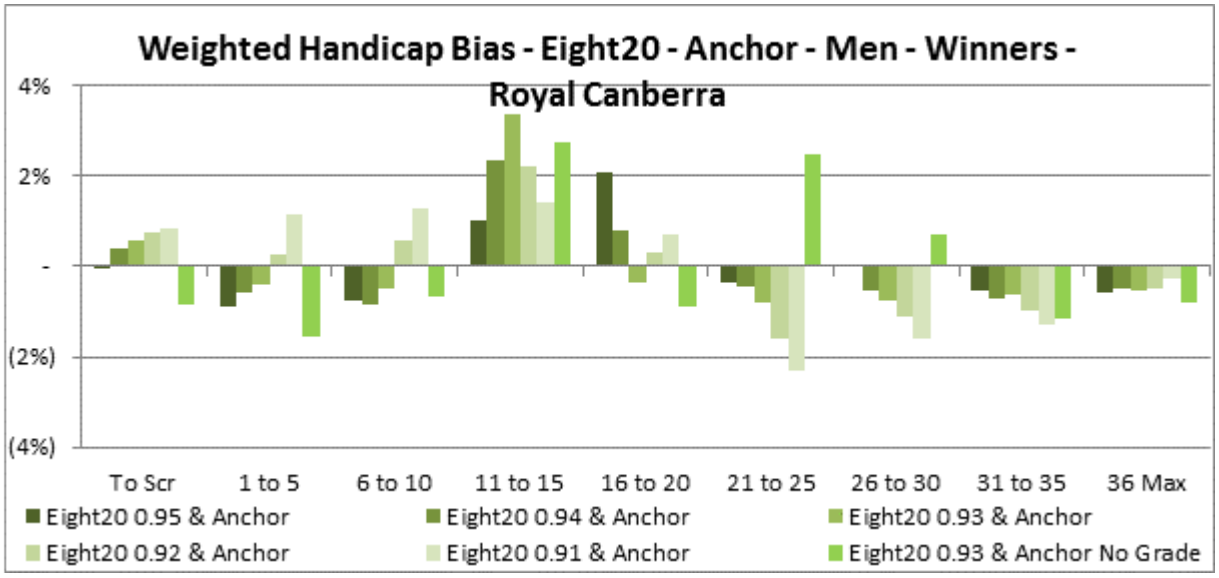
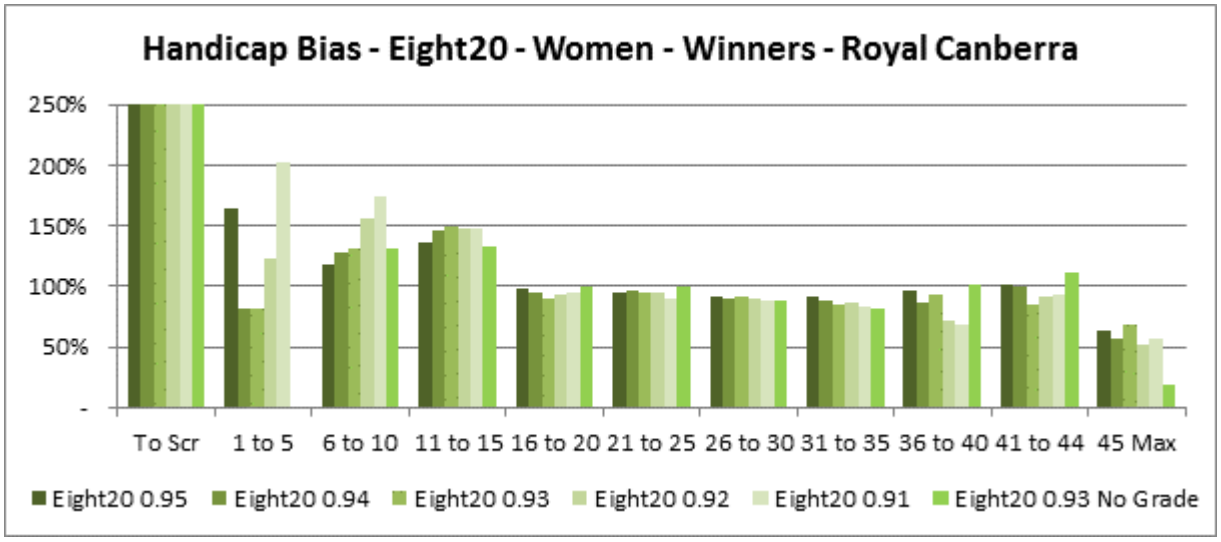
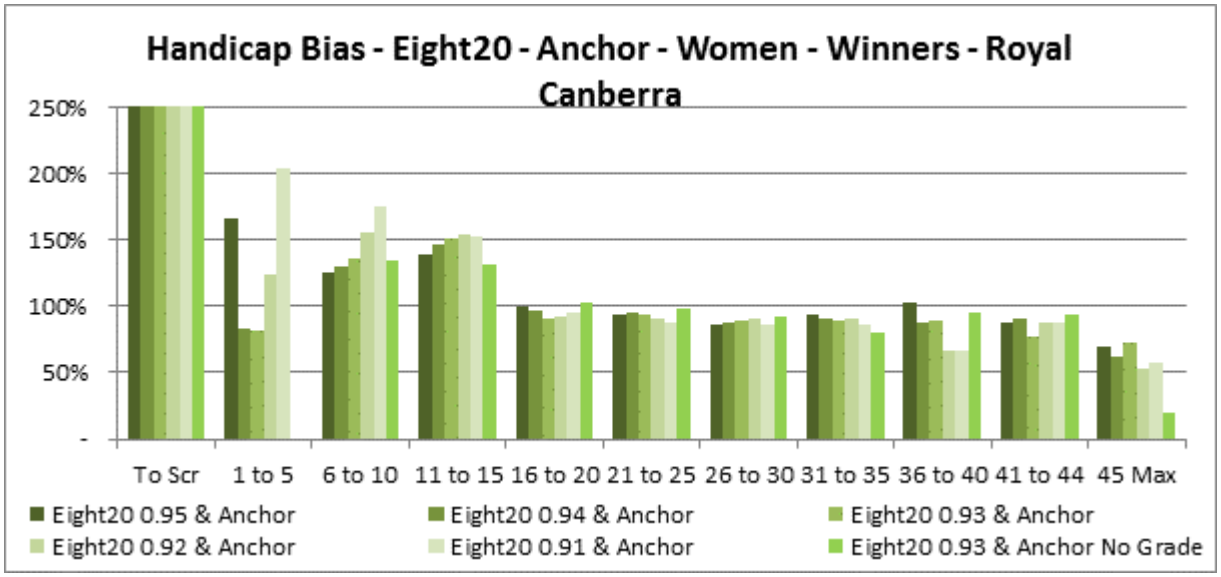
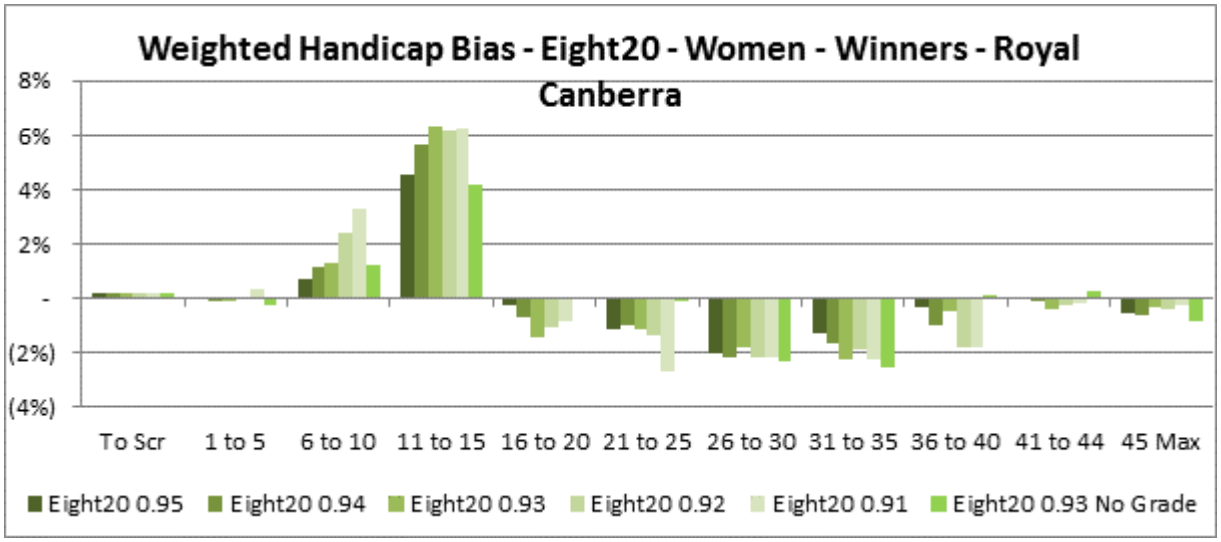
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

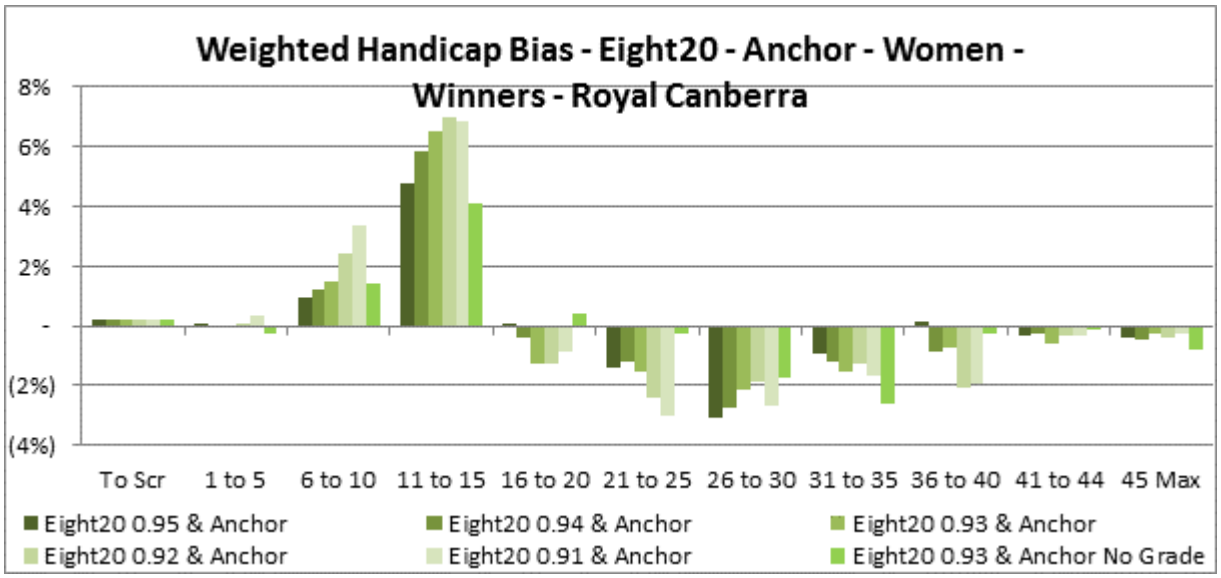

Weighted Handicap Bias - Eight20 - Men - Winners - Royal Canberra
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

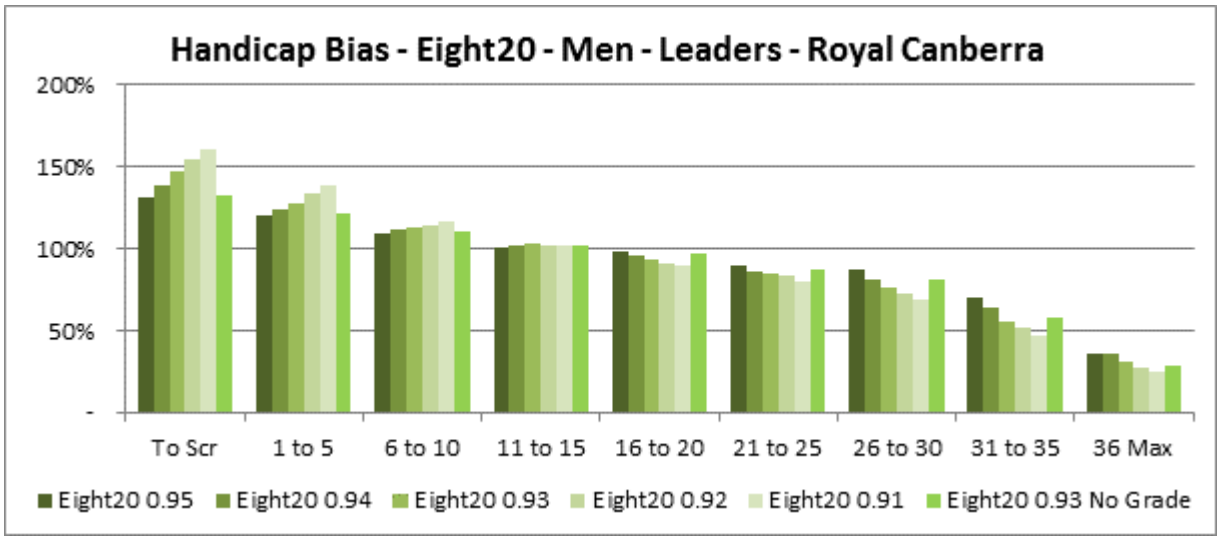

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Royal Canberra
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

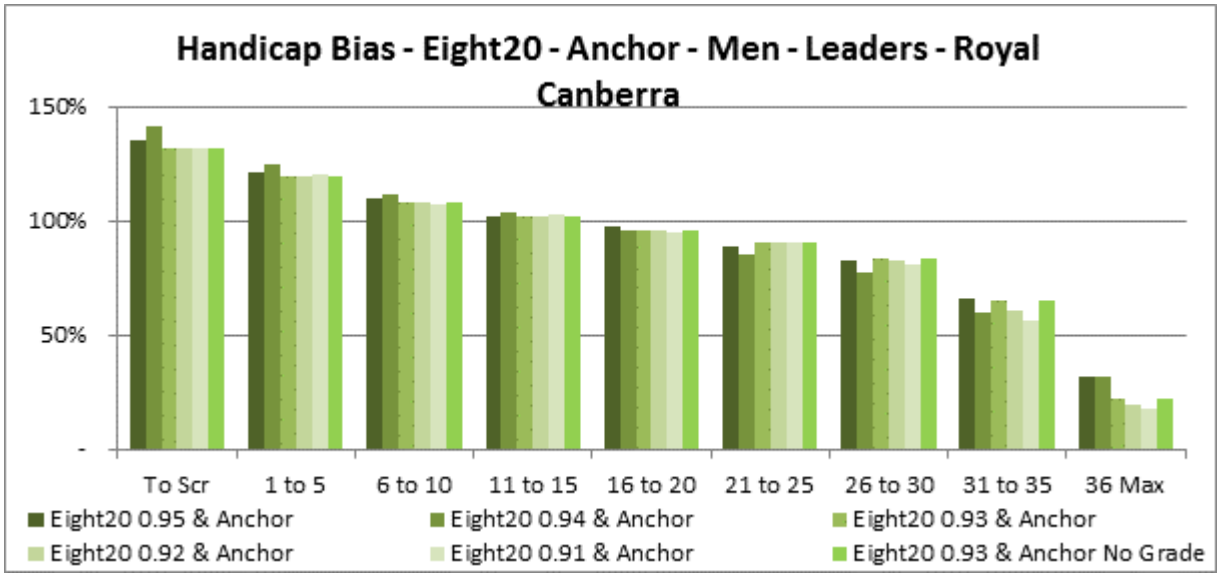

Handicap Bias - Eight20 - Women - Winners - Royal Canberra
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

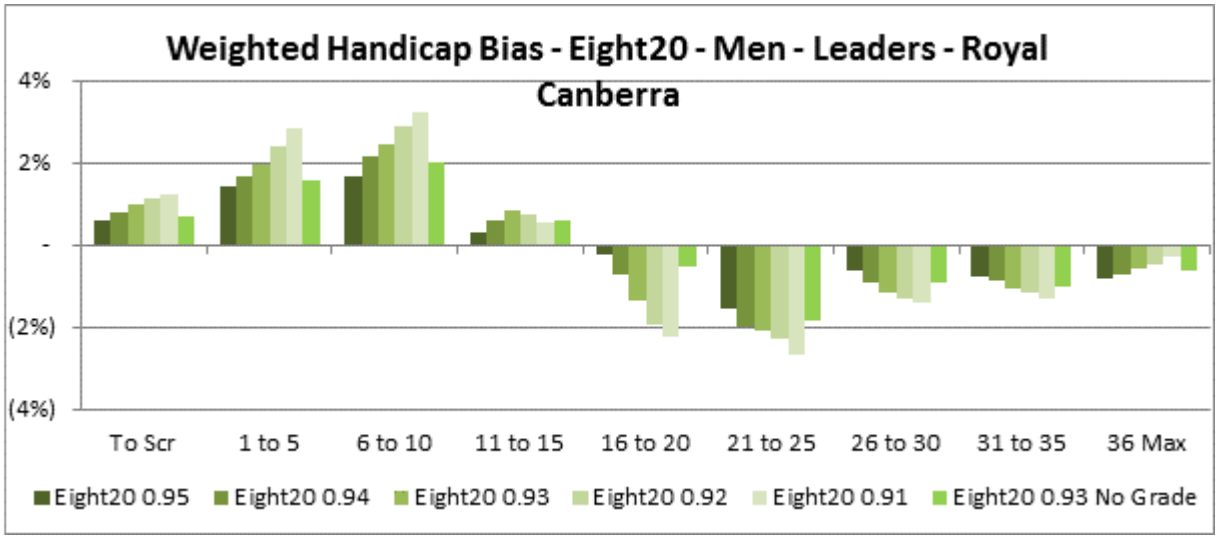

Handicap Bias - Eight20 - Anchor - Women - Winners - Royal Canberra
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

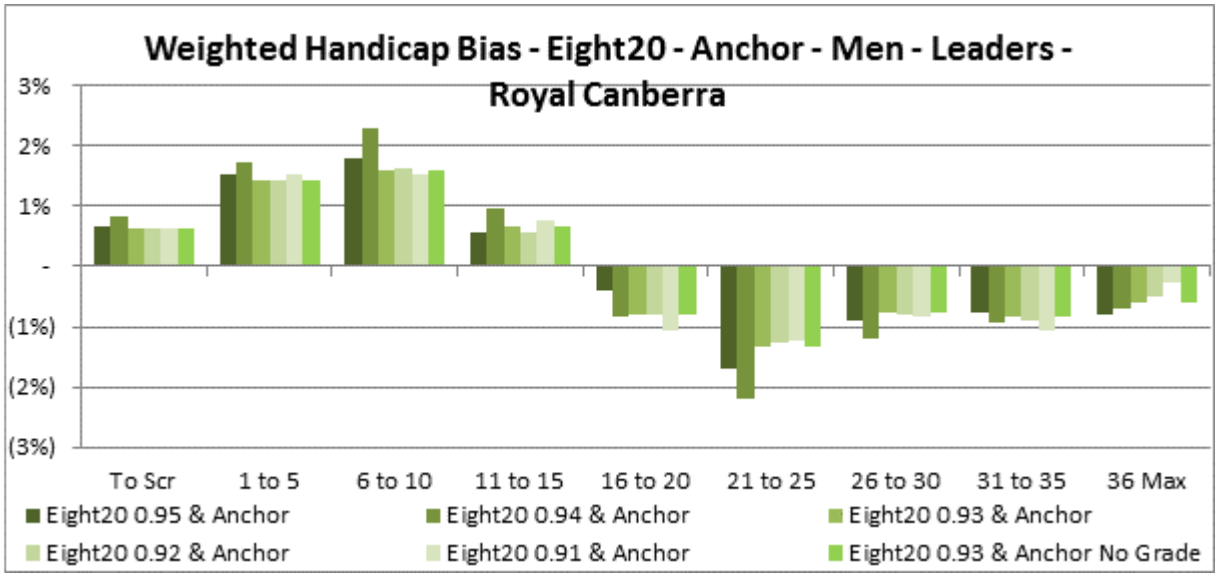

Weighted Handicap Bias - Eight20 - Women - Winners - Royal Canberra
8%
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

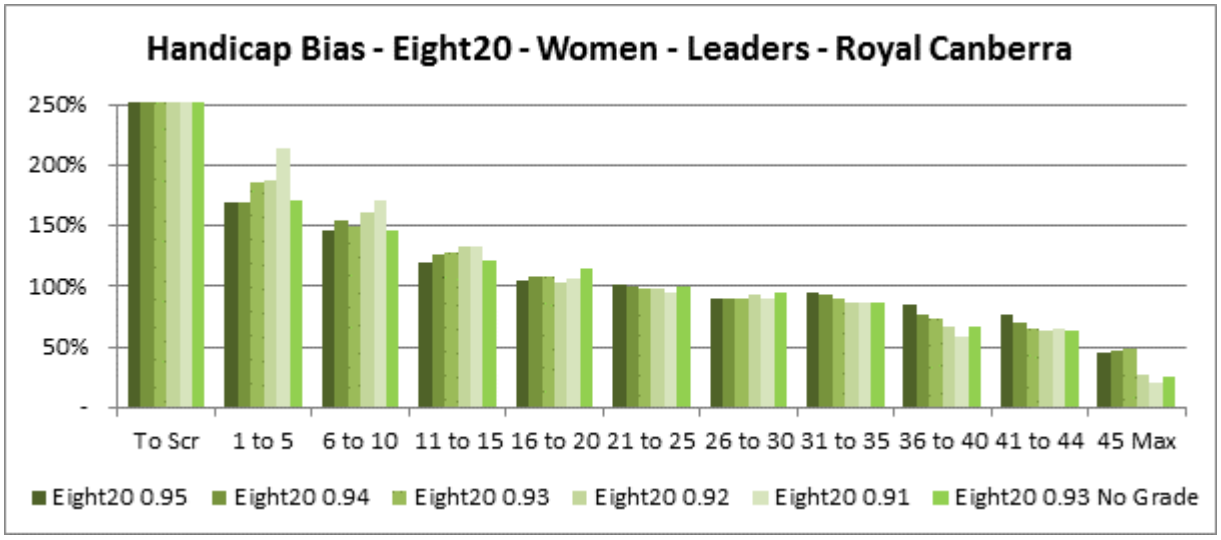

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Royal Canberra
8%
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Men - Leaders - Royal Canberra
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Leaders - Royal Canberra
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Leaders - Royal Canberra
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Royal Canberra
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Royal Canberra
250%
200%
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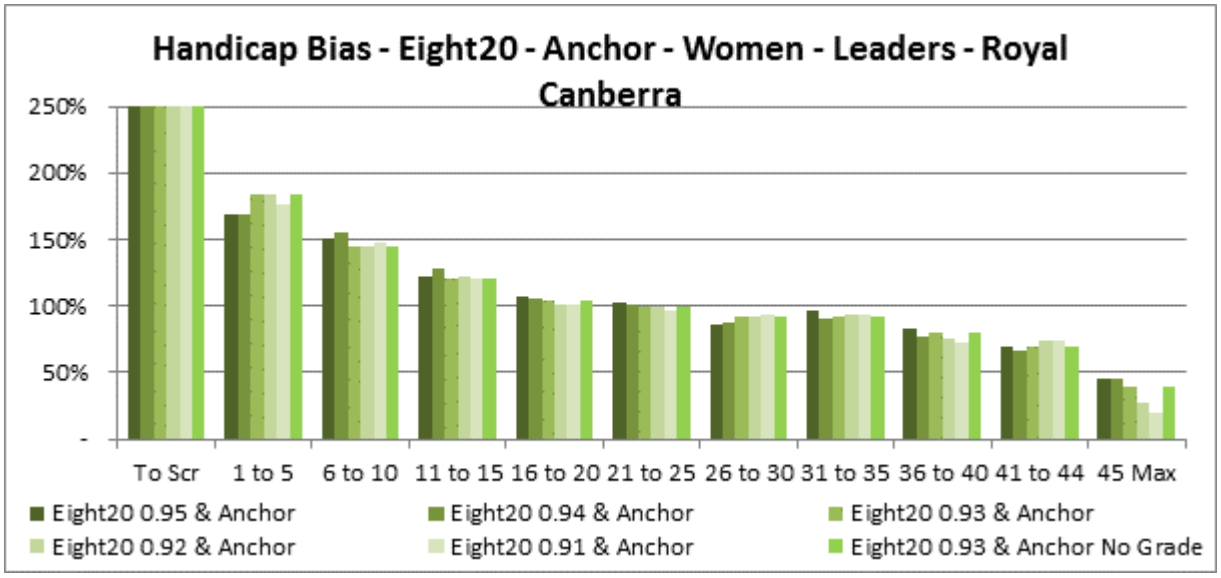
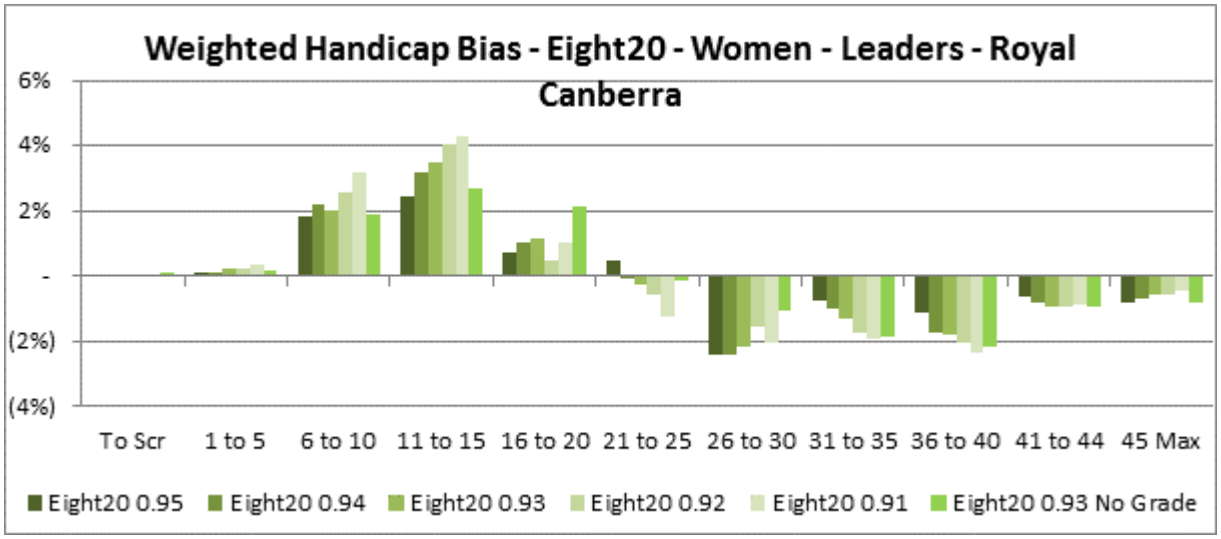
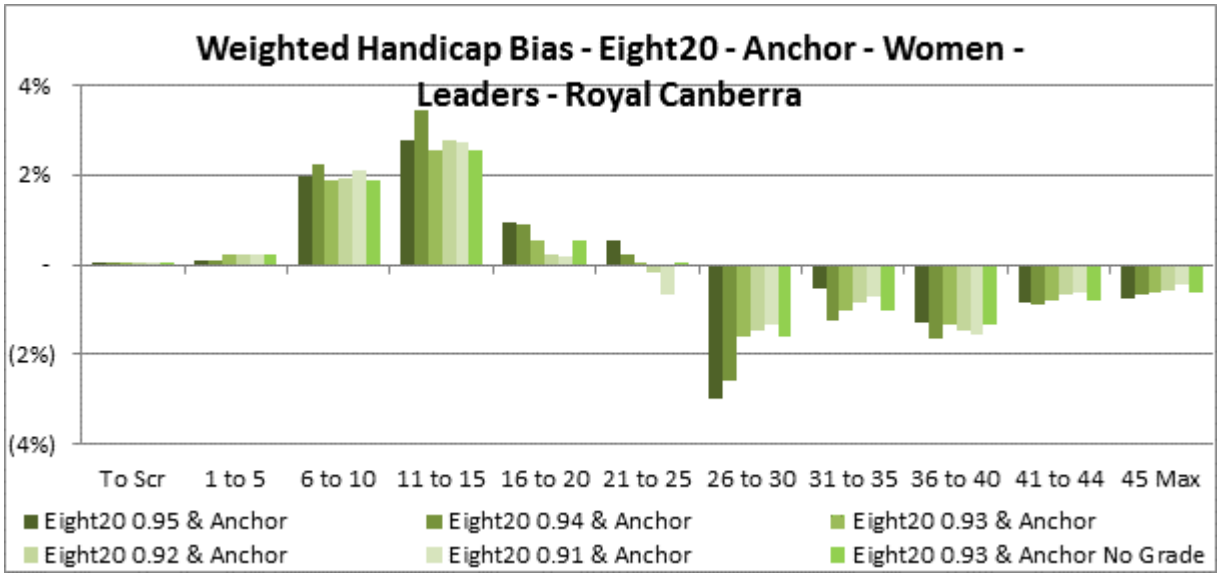
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Royal Canberra
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Royal Canberra
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

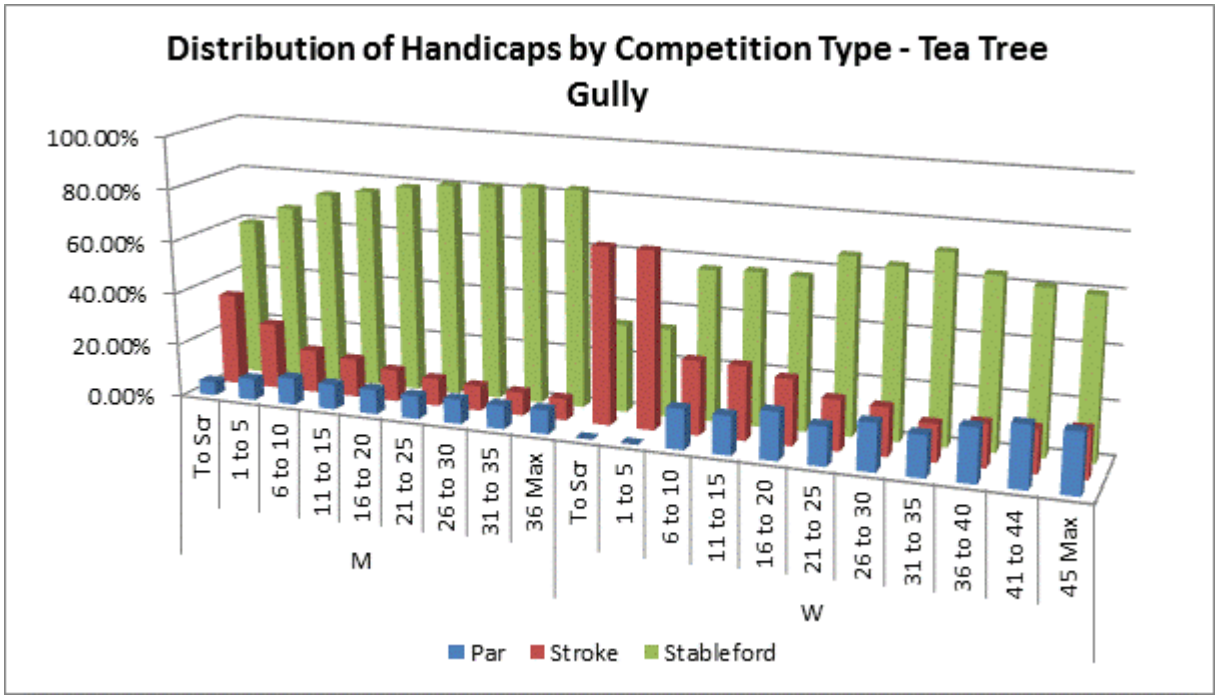


Phase 2 -Royal Canberra					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	5.0	10.8	-18.5	16.9
	Eight20 0.94	-4.1	10.3	-23.8	20.8
	Eight20 0.93	-9.2	10.9	-24.3	23.2
	Eight20 0.92	-22.0	9.8	-30.6	24.1
	Eight20 0.91	-29.3	11.6	-34.2	26.6
	Eight20 0.93 No Grade	14.4	14.5	-20.2	17.9
	Eight20 0.95 & Anchor	-1.7	9.7	-19.8	19.1
	Eight20 0.94 & Anchor	-10.3	10.3	-24.6	21.8
	Eight20 0.93 & Anchor	-16.2	13.3	-25.6	23.8
	Eight20 0.92 & Anchor	-26.6	11.8	-31.7	26.7
	Eight20 0.91 & Anchor	-35.4	14.0	-35.8	28.6
	Eight20 0.93 & Anchor No Grade	6.6	16.1	-22.9	17.2
Leaders	Eight20 0.95	-31.2	10.9	-23.3	13.7
	Eight20 0.94	-37.2	13.7	-28.1	16.4
	Eight20 0.93	-42.5	16.1	-29.0	16.8
	Eight20 0.92	-47.6	18.8	-32.3	18.6
	Eight20 0.91	-51.8	21.3	-36.0	21.4
	Eight20 0.93 No Grade	-35.3	12.8	-30.5	16.3
	Eight20 0.95 & Anchor	-34.2	12.0	-25.6	15.8
	Eight20 0.94 & Anchor	-40.4	15.0	-29.1	17.3
	Eight20 0.93 & Anchor	-30.9	10.9	-23.9	13.0
	Eight20 0.92 & Anchor	-30.5	10.9	-23.5	13.2
	Eight20 0.91 & Anchor	-30.2	11.3	-23.2	13.4
	Eight20 0.93 & Anchor No Grade	-30.9	10.9	-23.9	13.0

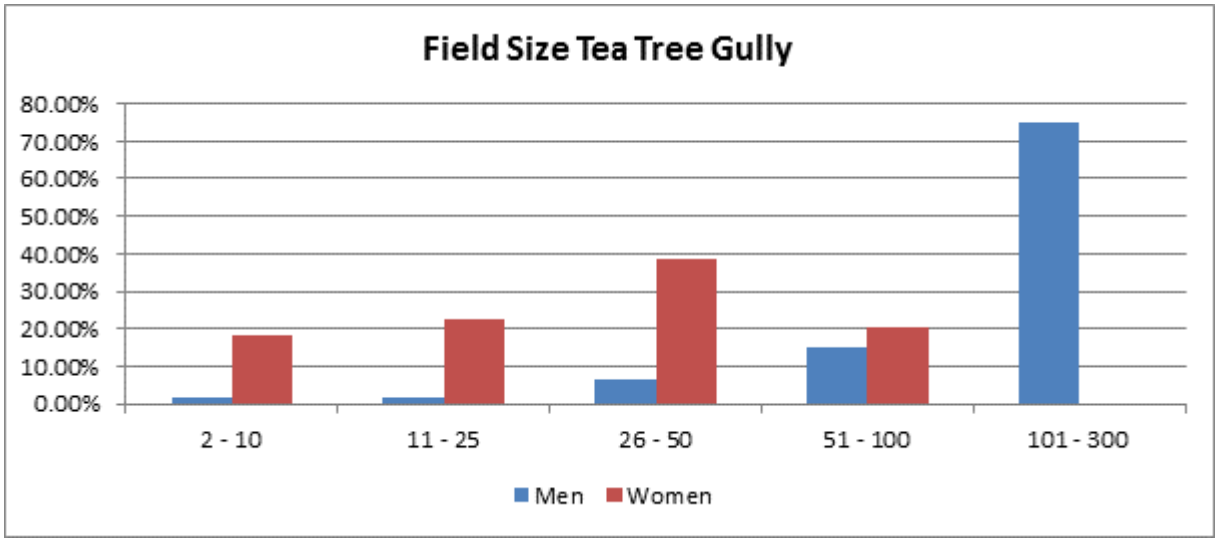
Appendix 13 – Tea Tree Gully

Phase 1

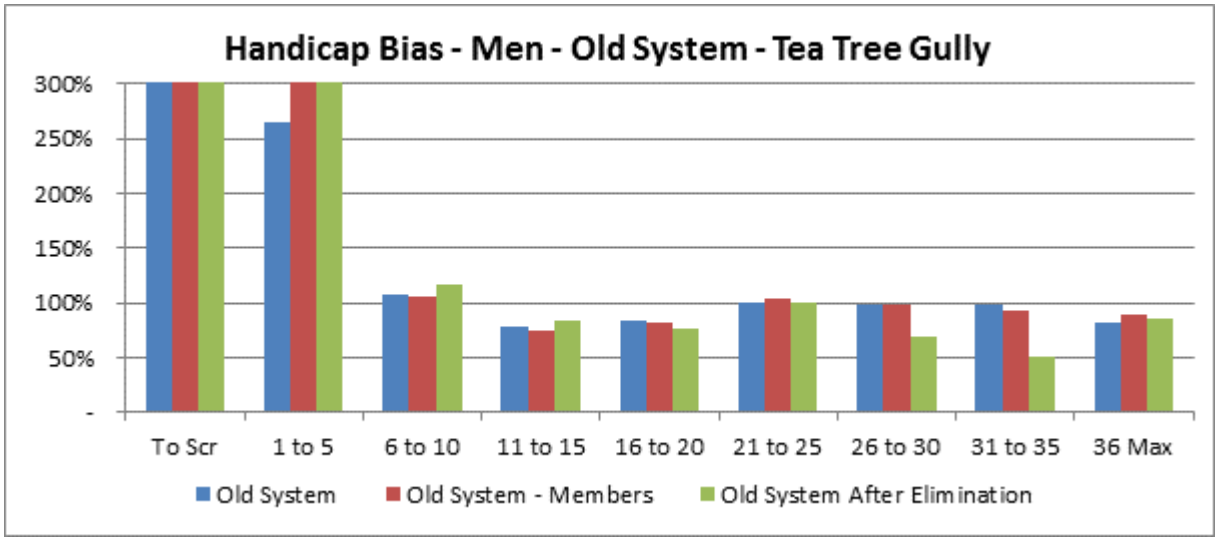
Tea Tree Gully	Men	Women	Total
Players in Database	2,012	359	2,371
Members	1,009	140	1,149
Visitors	1,003	219	1,222
Members who have Played 33 Rounds	937	132	1,069
Members with Last Round In Old System	190	22	212
Members with Last Round in Current System	819	118	937
Earliest Round	30/11/2007	9/12/2007	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			183
Number of Home Competitions	1,030	532	1,562
Number of Rounds of Golf	106,147	11,011	117,158
Number of Rounds at Home	97,591	9,598	107,189
Number of Rounds at Home Old	75,822	7,528	83,350
Number of Rounds at Home Current	21,769	2,070	23,839
Num Rnds Members at Home	93,576	9,060	102,636
Num Rnds Members at Home Old	72,288	7,086	79,374
Num Rnds Members at Home Cur	21,288	1,974	23,262
Num Rnds After Eliminations	57,613	5,107	62,720
Num Rnds After Eliminations Old	37,625	3,300	40,925
Num Rnds After Eliminations Cur	19,988	1,807	21,795

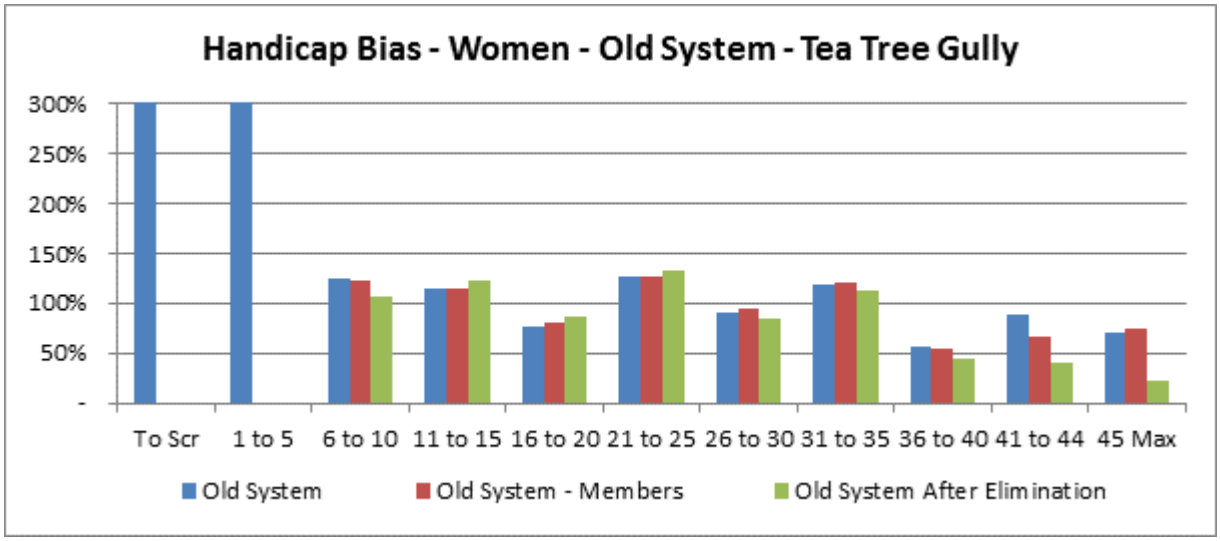


Most men's competitions are with a field of over 100, the women mainly field 26 - 50.

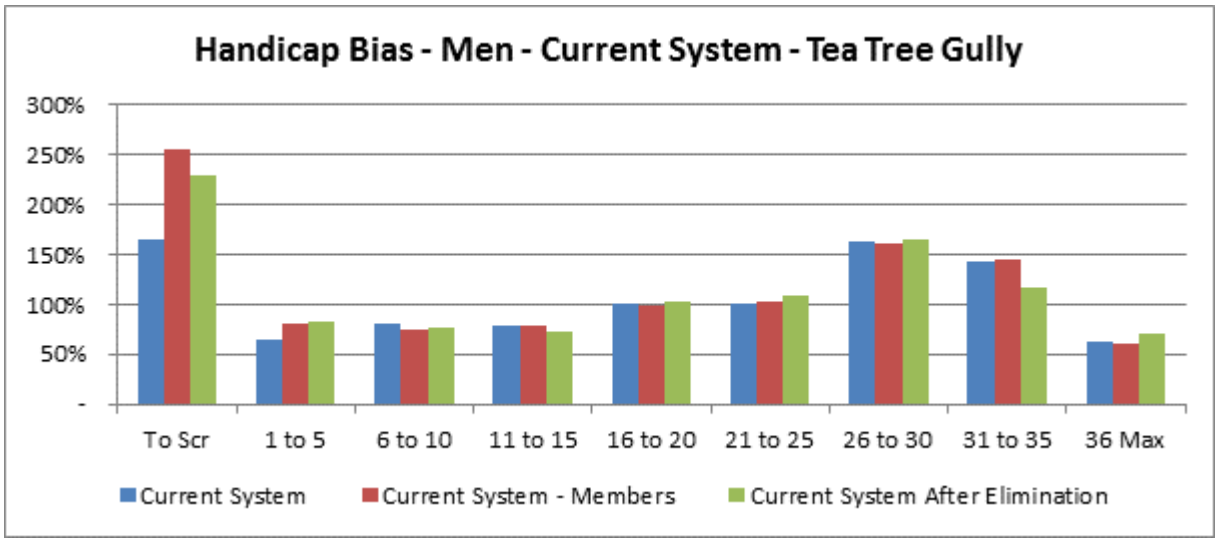


Under the Old System, there was a bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

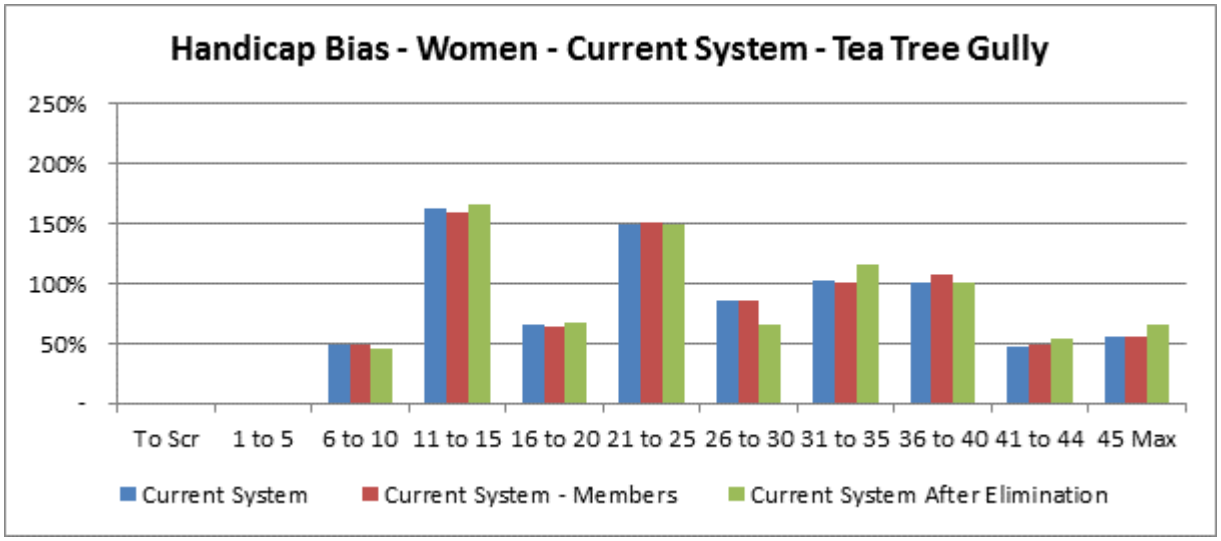




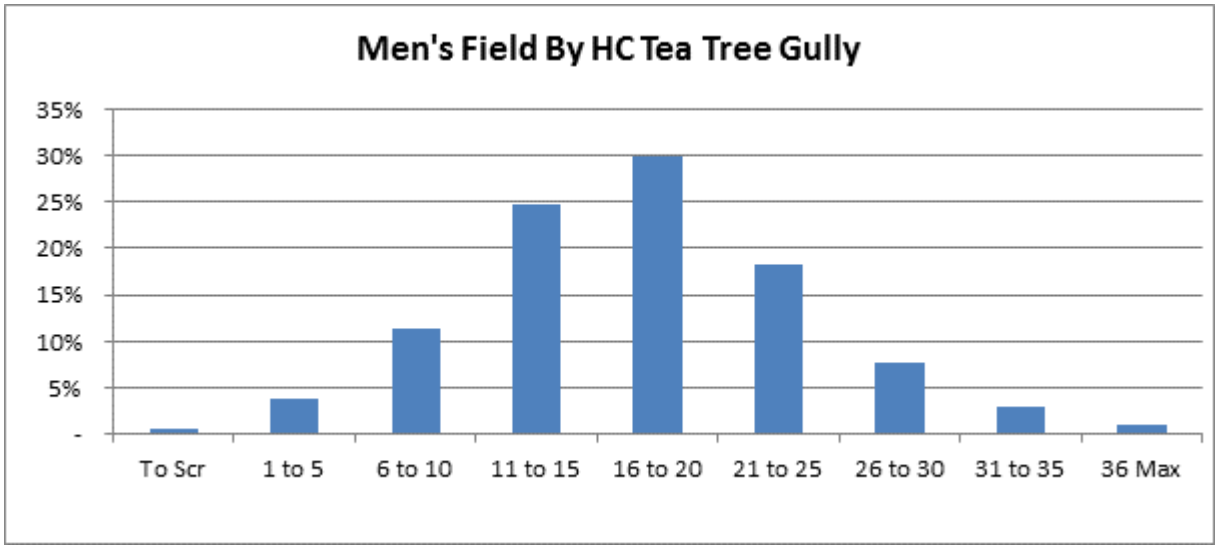
Under the Current System, this bias has reversed for men, so that there is now a bias in favour of the high markers.

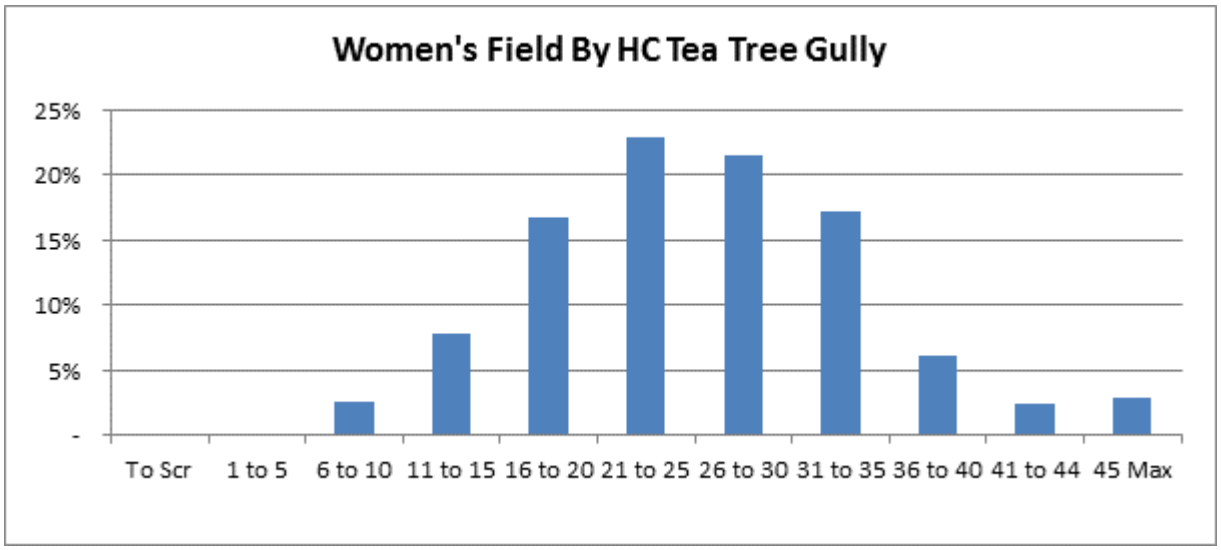


The picture is somewhat mixed for the women.



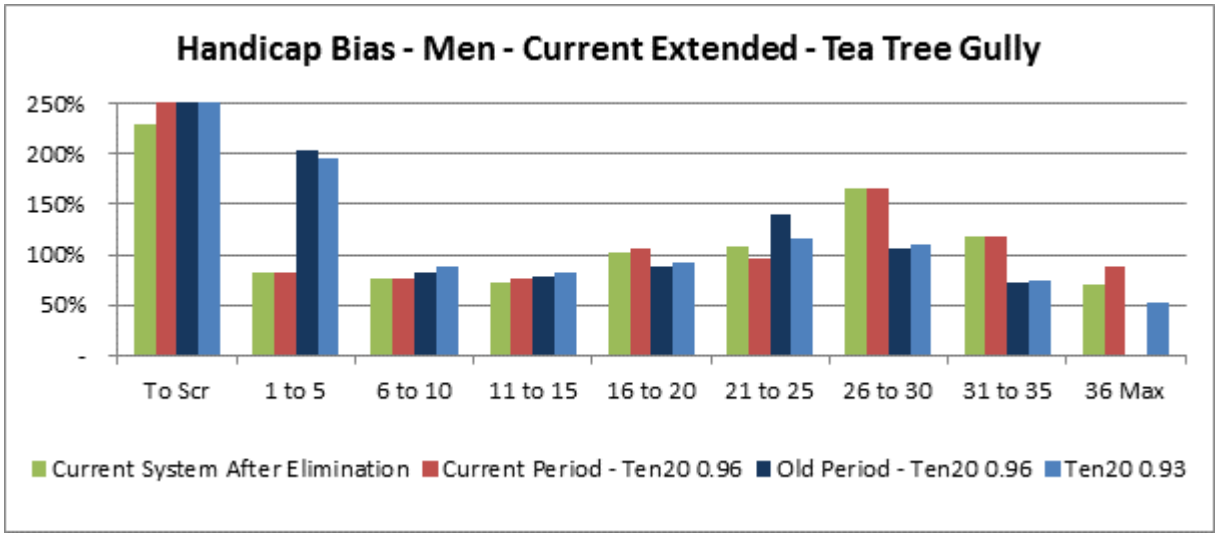
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.





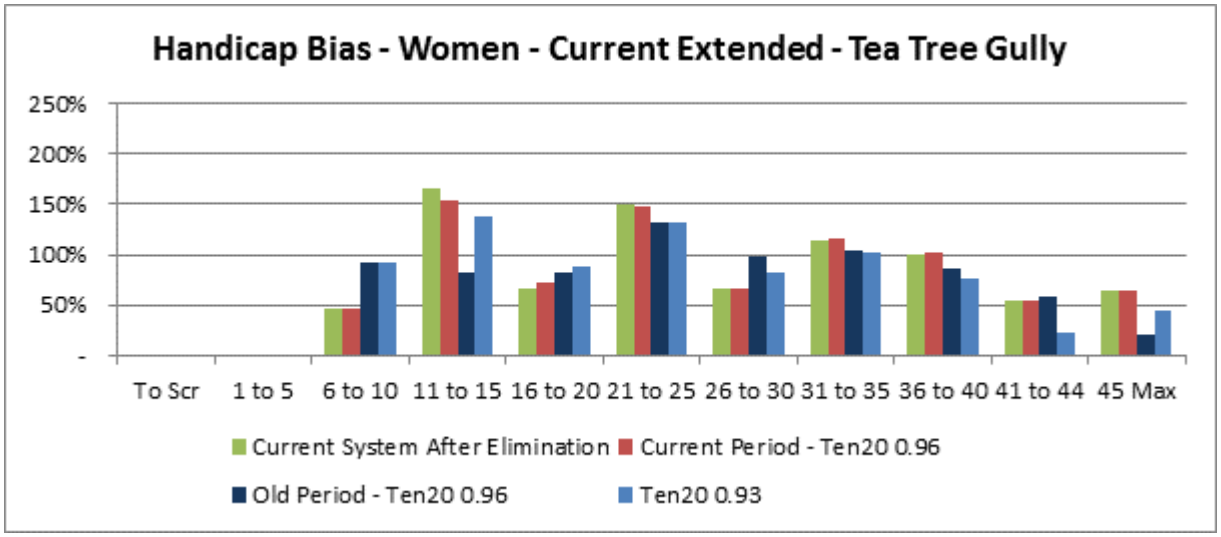
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

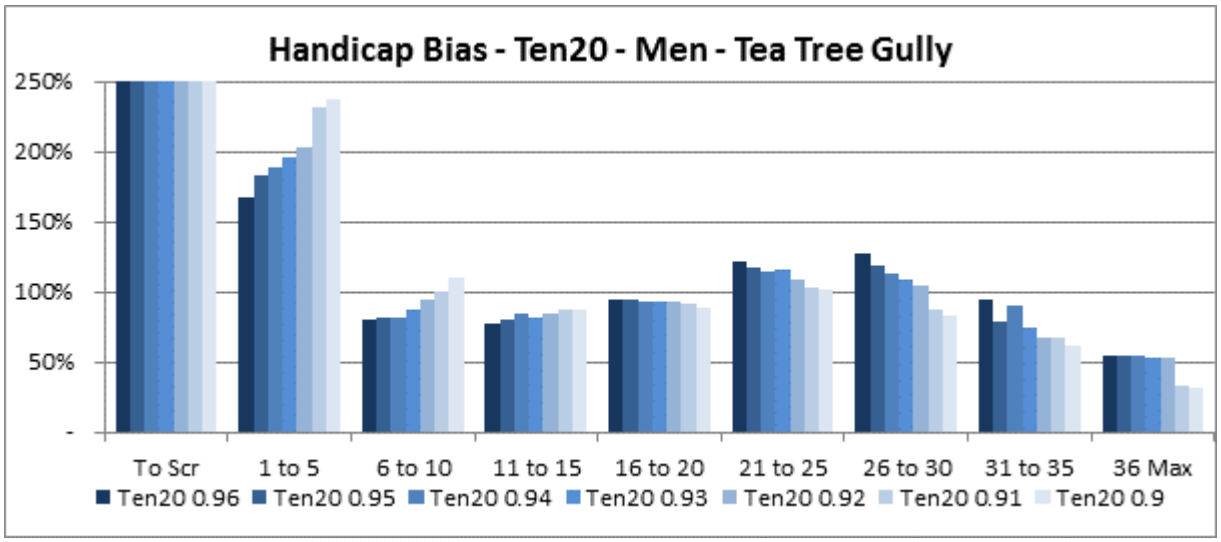


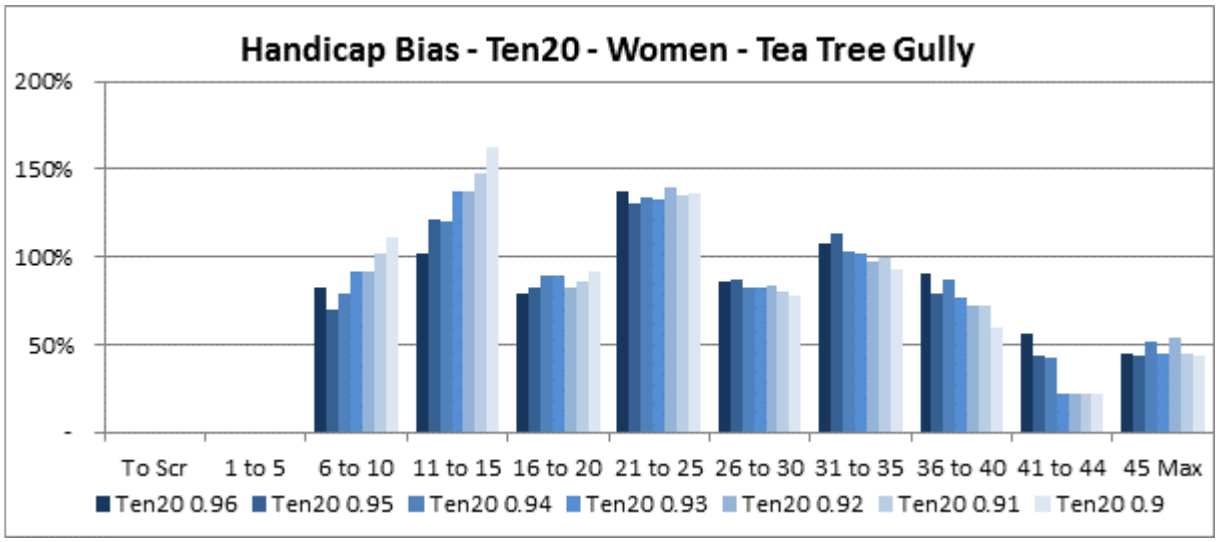
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low markers would have dominated over the two-years.

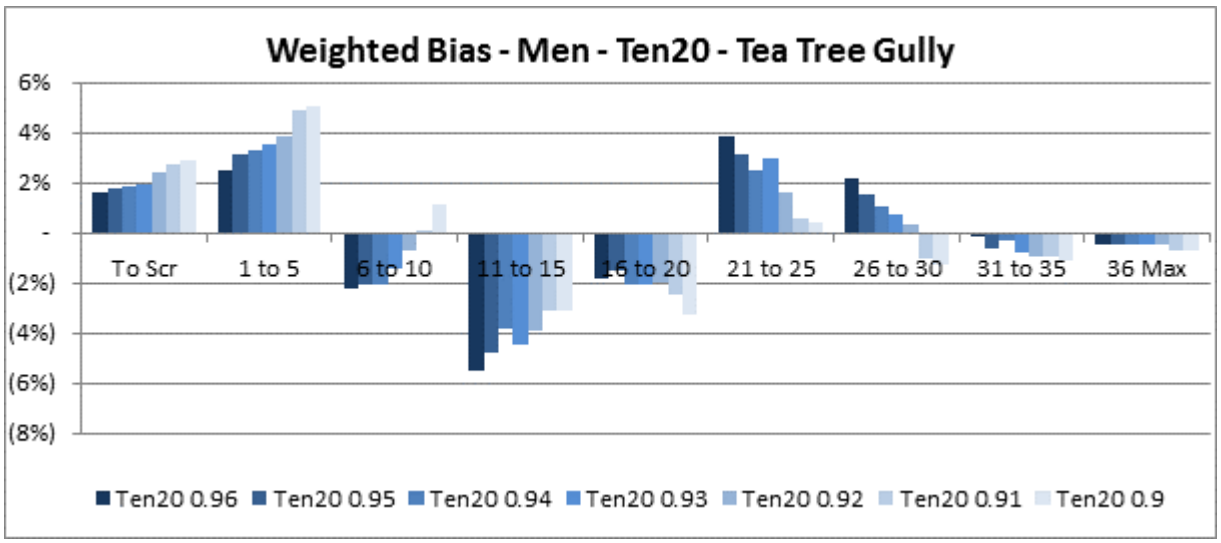


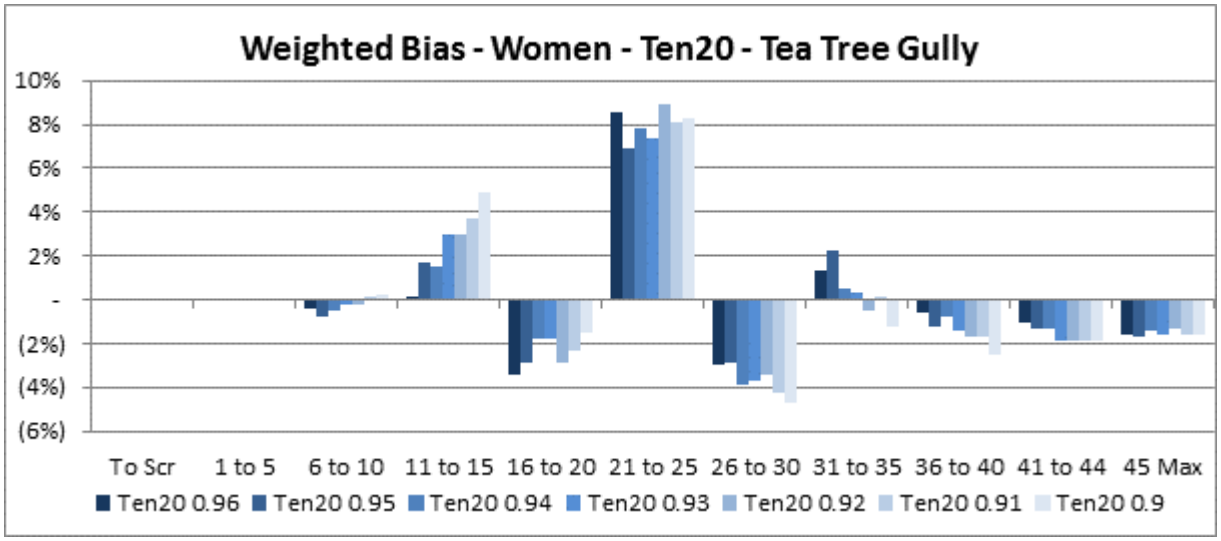
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

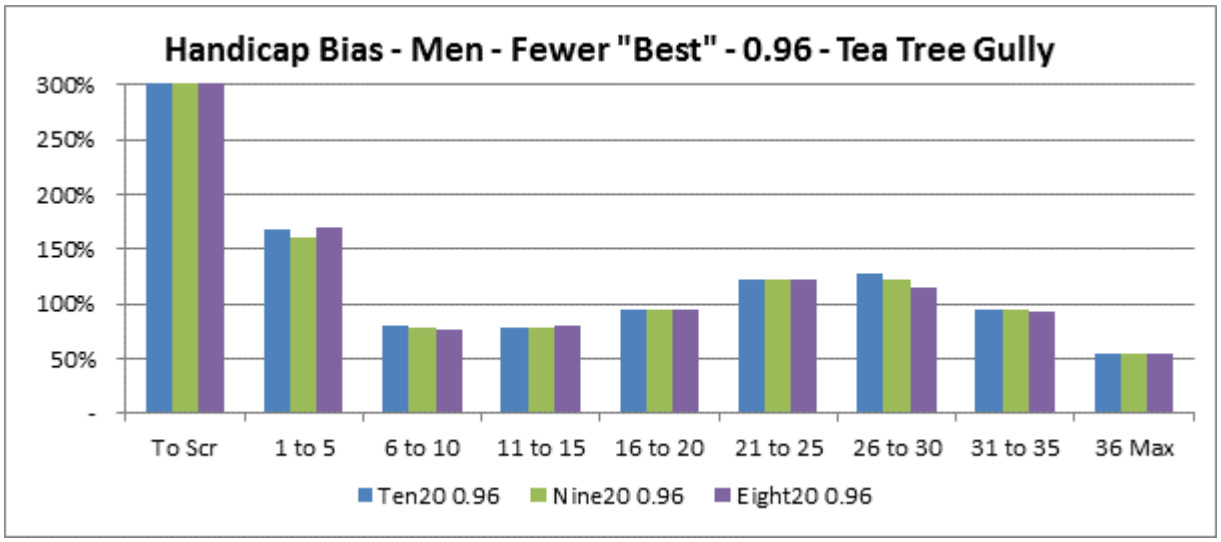


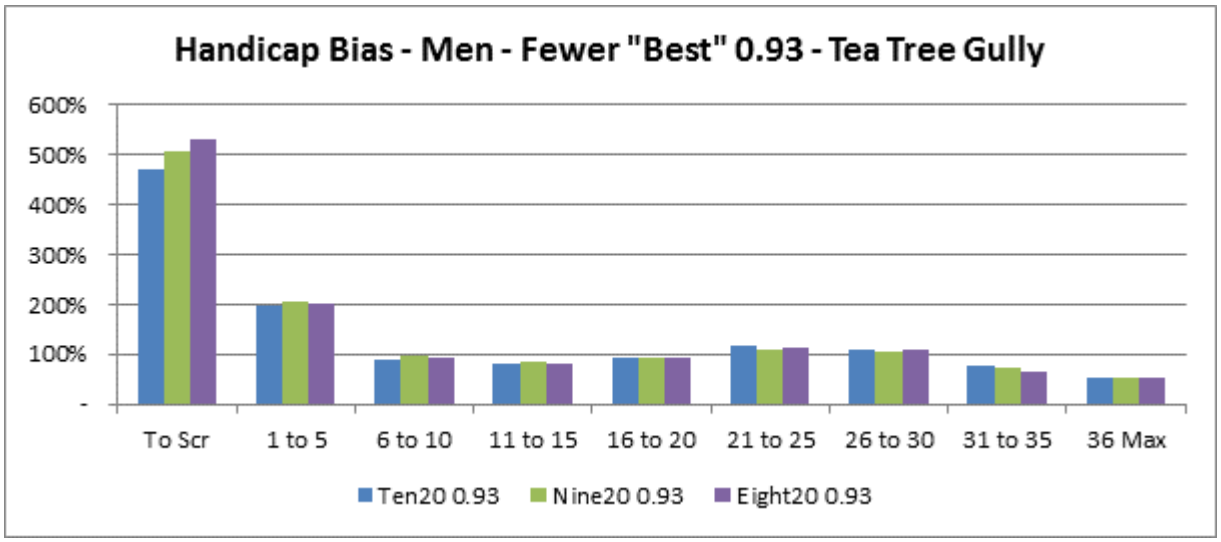


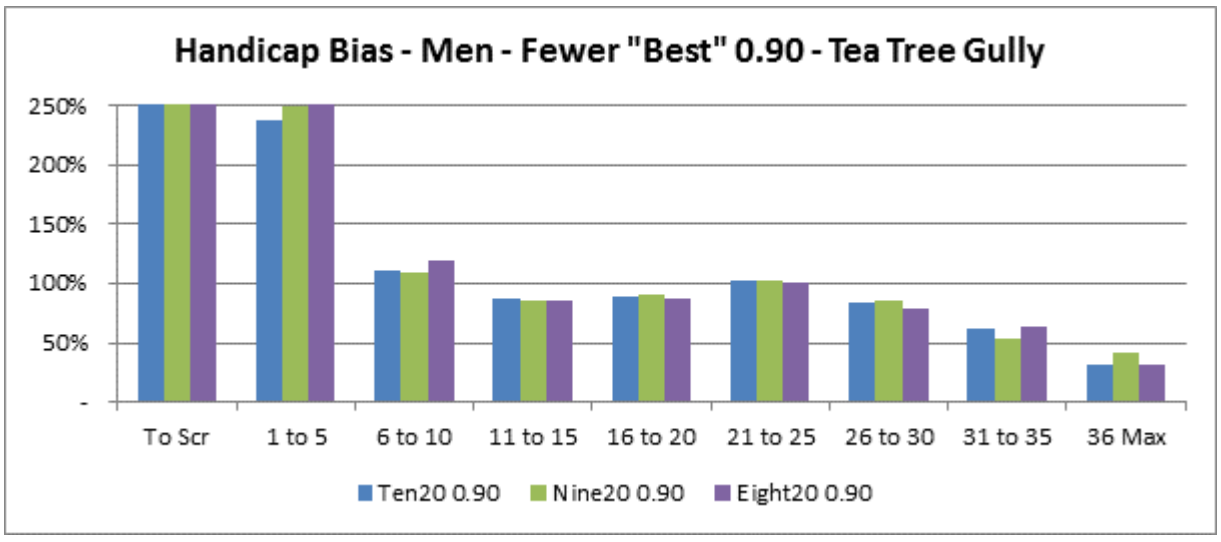
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

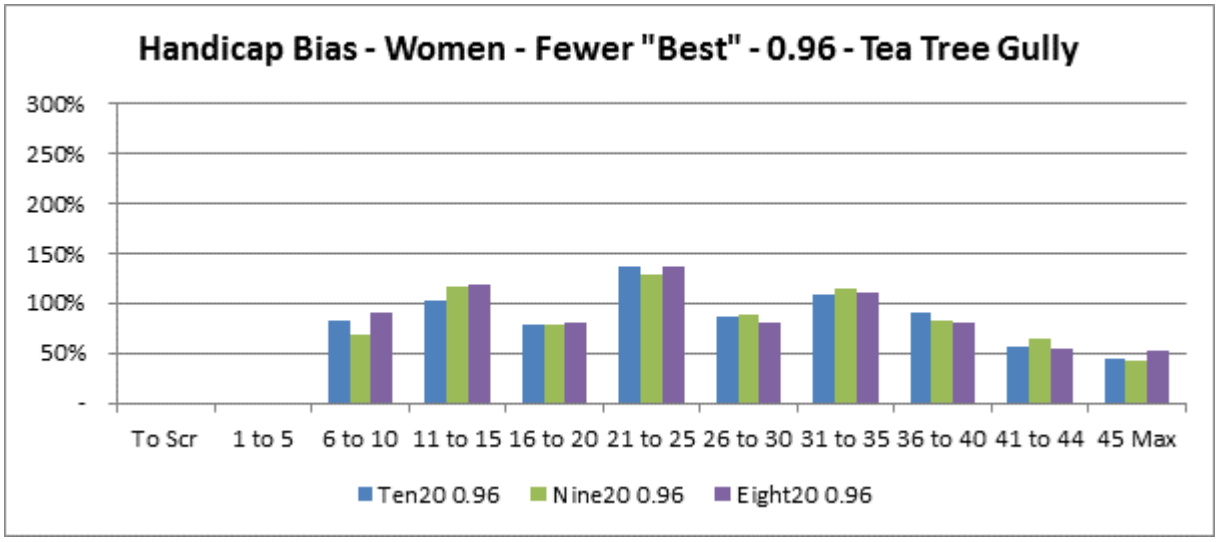
	Tea Tree Gully			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	2.7	29.0	-8.8	31.7
Ten20 0.95	-8.3	26.1	-12.7	28.1
Ten20 0.94	-12.6	23.7	-16.0	29.5
Ten20 0.93	-18.4	25.7	-23.9	29.7
Ten20 0.92	-30.7	23.5	-23.6	34.2
Ten20 0.91	-49.7	25.1	-27.3	33.4
Ten20 0.9	-57.5	27.2	-35.7	36.1

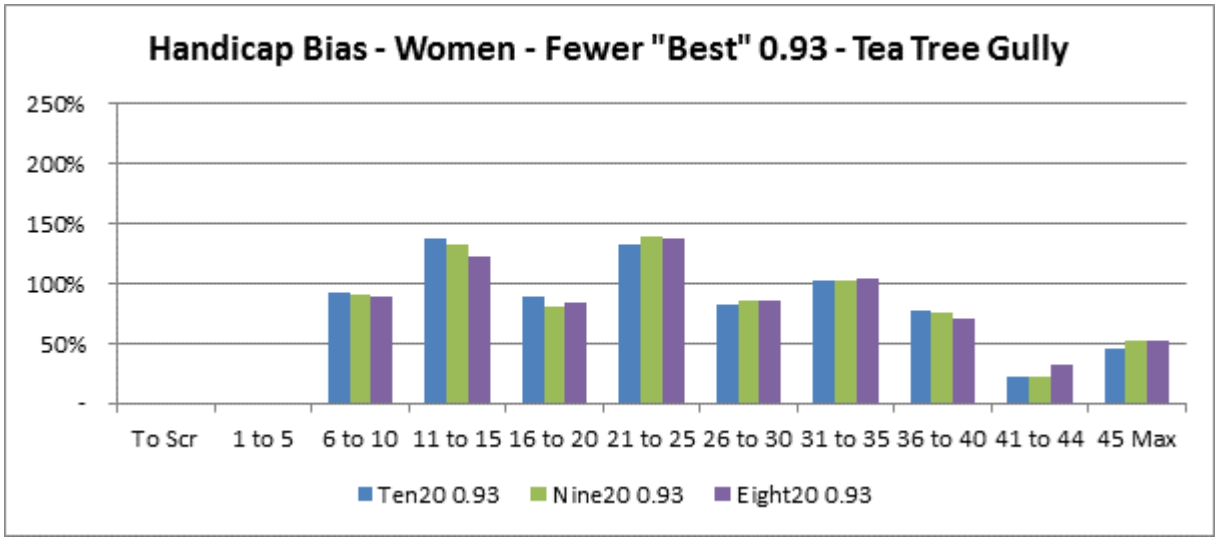
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

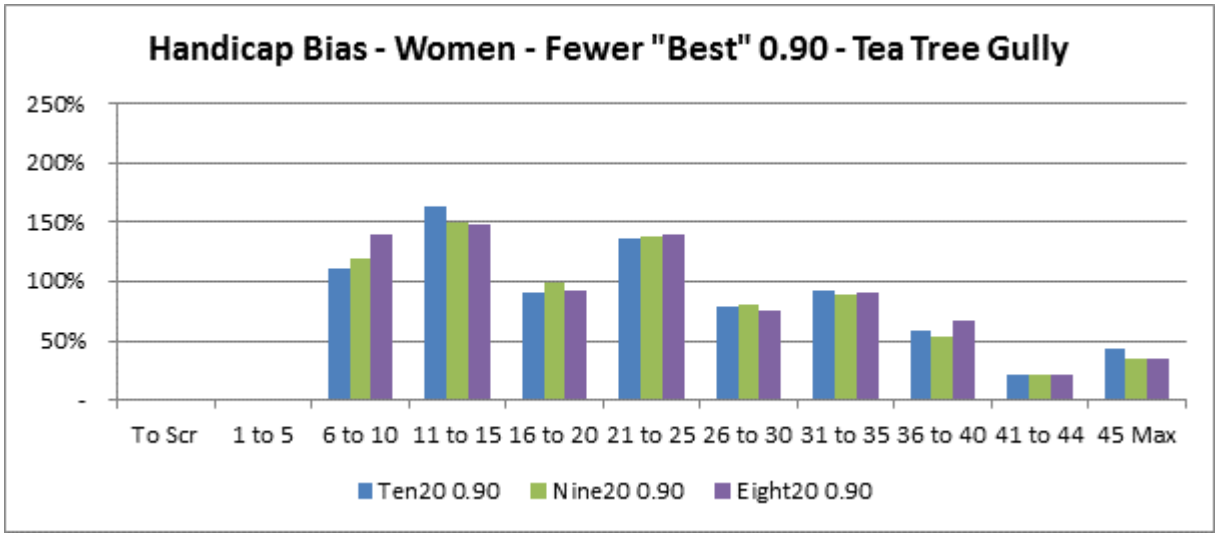







Handicap Bias - Women - Fewer "Best" - 0.96 - Tea Tree Gully
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

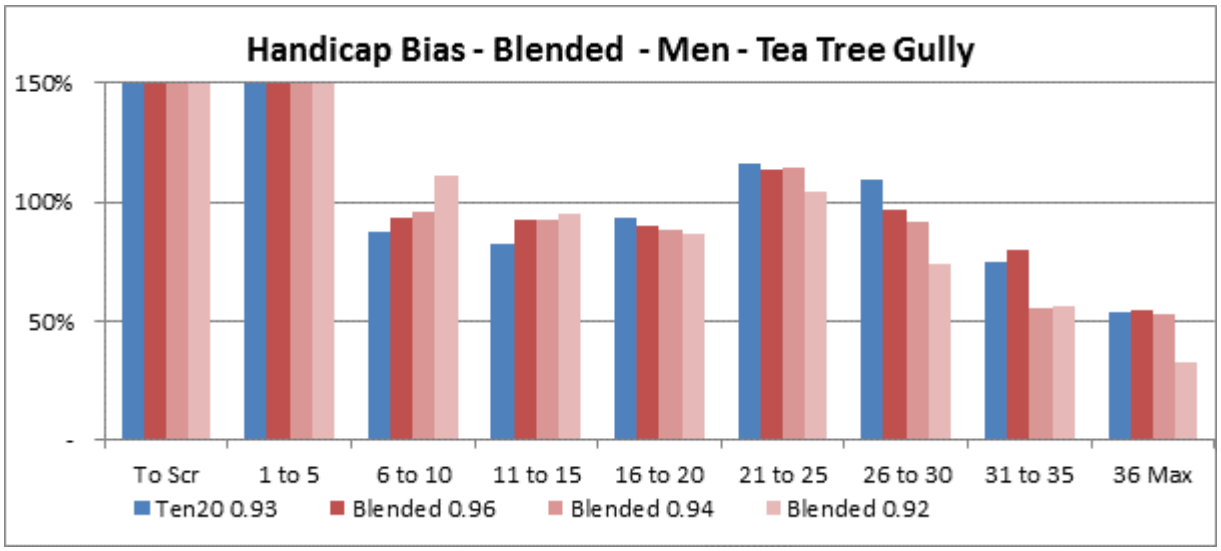

Handicap Bias - Women - Fewer "Best" 0.93 - Tea Tree Gully
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

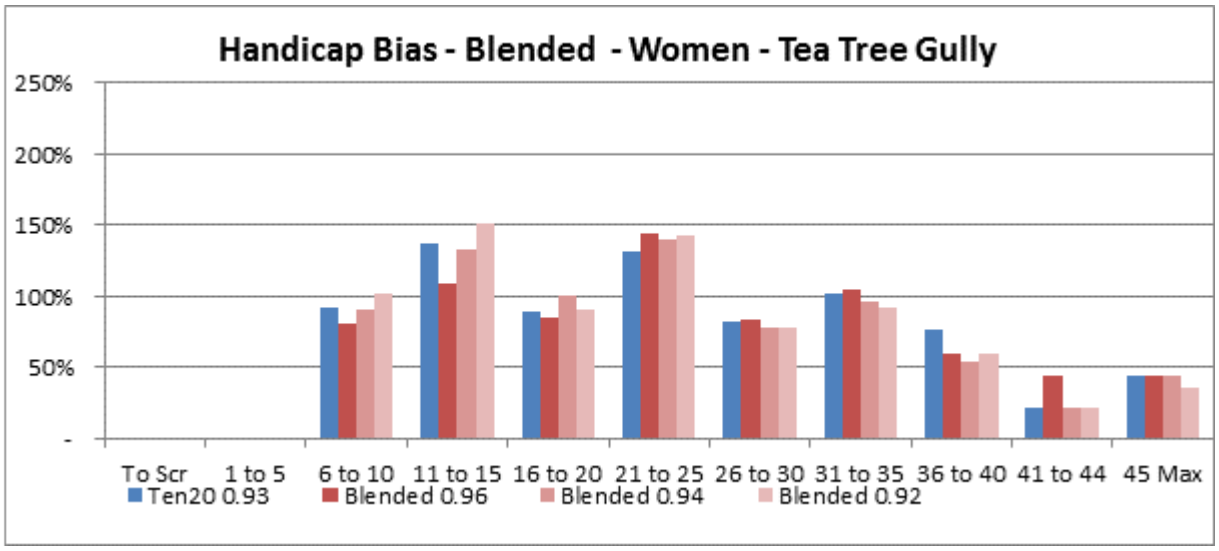

Handicap Bias - Women - Fewer "Best" 0.90 - Tea Tree Gully
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

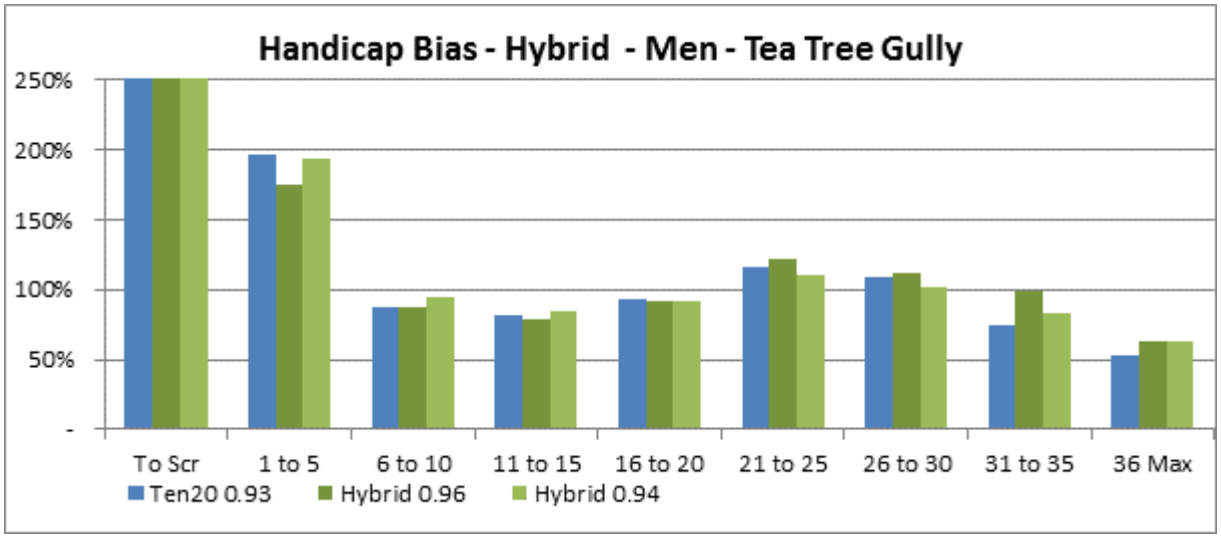
Method	Tea Tree Gully Men Tilt M	Men Level M	Women Tilt MW	Women Level W
Ten20 0.96	2.7	29.0	-8.8	31.7
Nine20 0.96	3.7	28.4	-8.2	27.2
Eight20 0.96	-4.0	28.2	-13.1	32.6
Ten20 0.93	-18.4	25.7	-23.9	29.7
Nine20 0.93	-29.7	22.7	-20.4	33.9
Eight20 0.93	-26.6	25.0	-18.5	31.5
Ten20 0.90	-57.5	27.2	-35.7	36.1
Nine20 0.90	-57.6	28.3	-38.8	35.4
Eight20 0.90	-66.2	31.8	-36.8	37.2

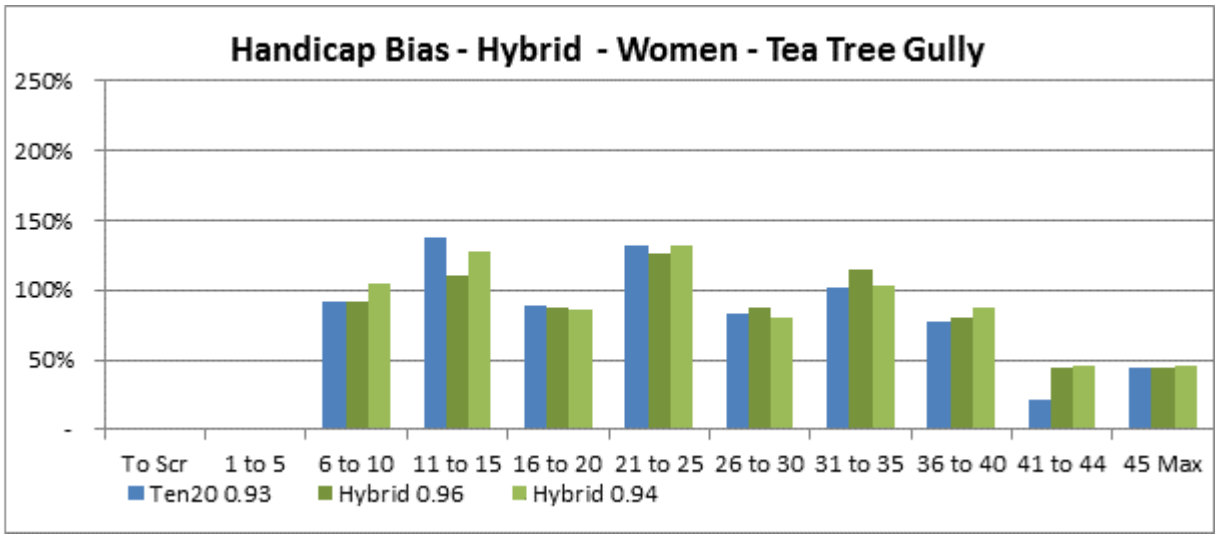
For the Blended:





For the Hybrid:

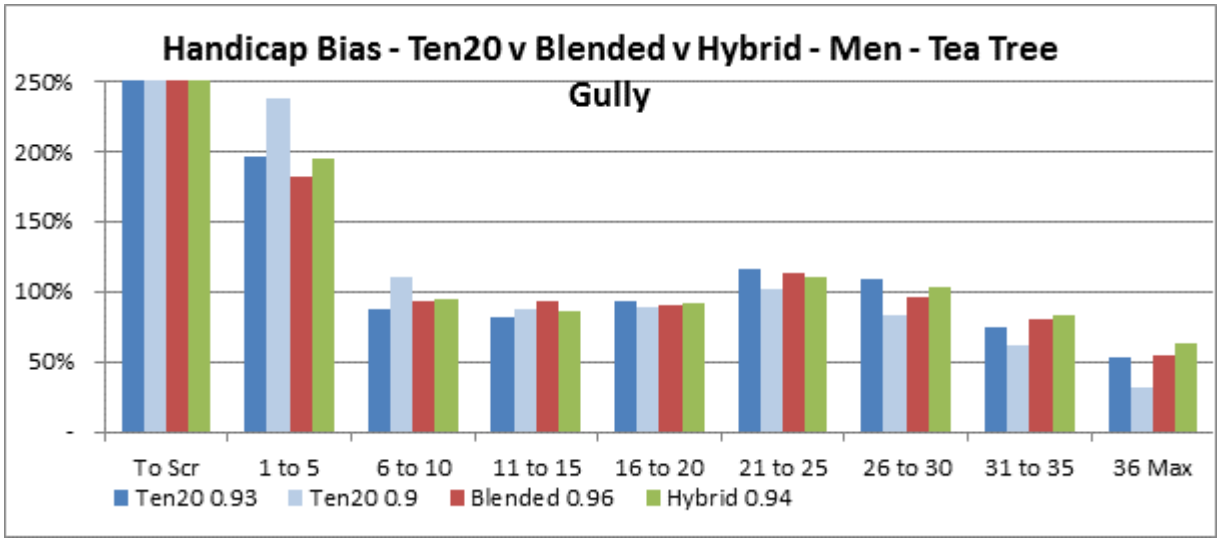


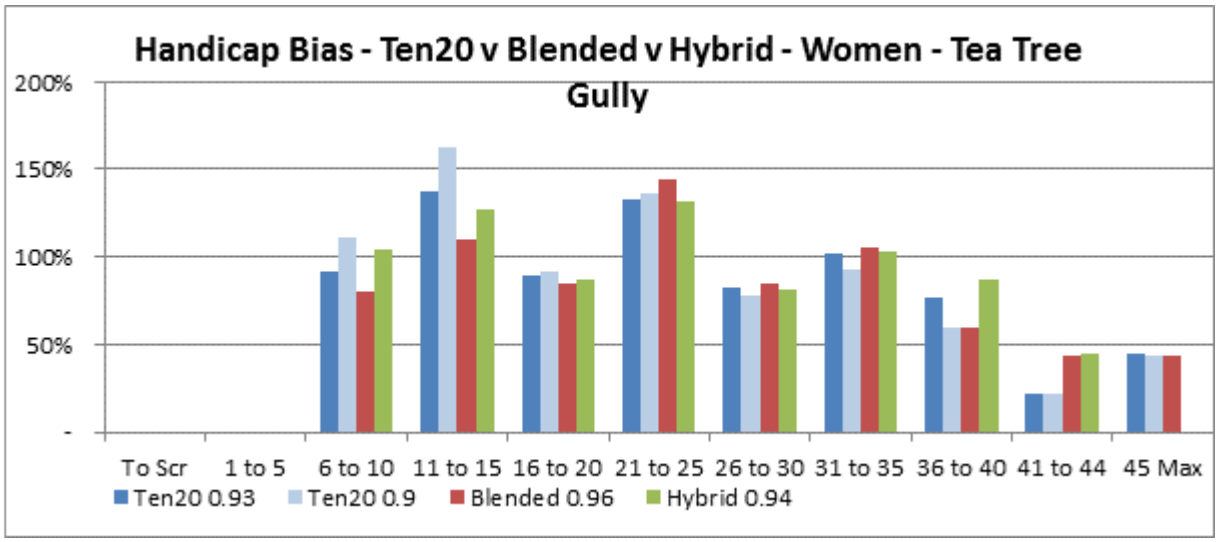


The Corresponding Tilt and Level Indices are:

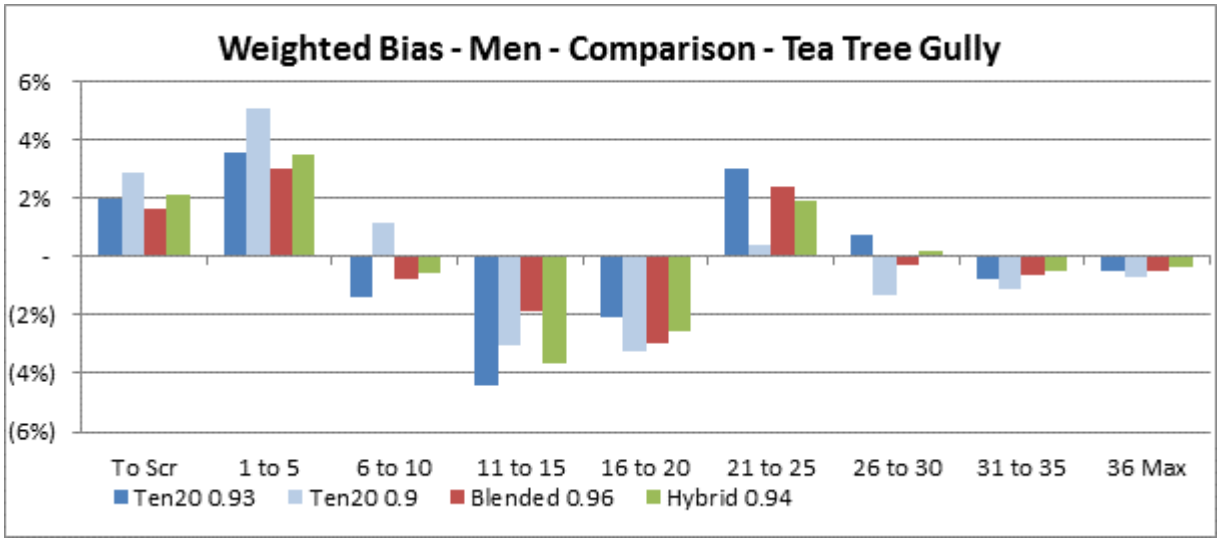
	Tea Tree Gully			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-23.3	19.7	-18.3	36.5
Blended 0.94	-35.3	23.4	-31.3	36.0
Blended 0.92	-59.5	26.0	-34.6	38.7
Hybrid 0.96	-3.7	27.9	-12.2	24.6
Hybrid 0.94	-24.8	22.6	-19.1	29.1

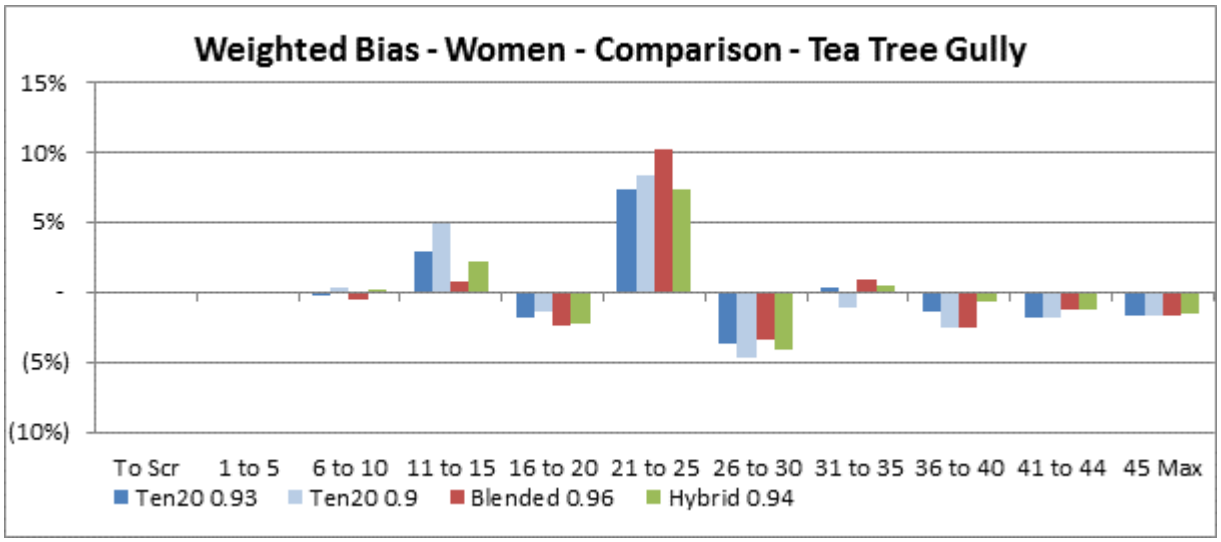
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

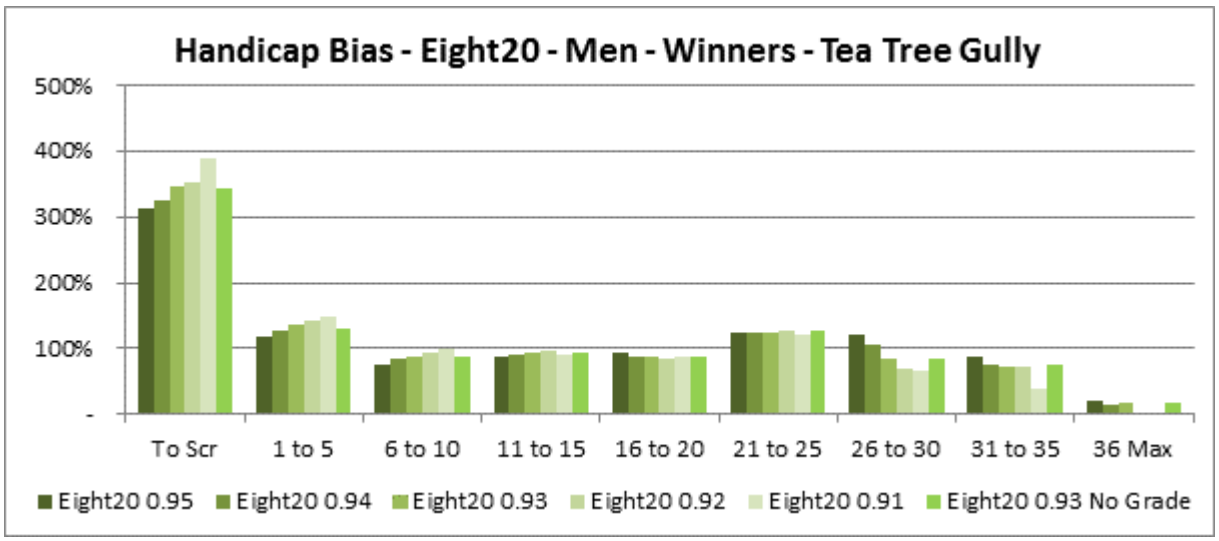
	Tea Tree Gully			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-18.4	25.7	-23.9	29.7
Ten20 0.9	-57.5	27.2	-35.7	36.1
Blended 0.96	-23.3	19.7	-18.3	36.5
Hybrid 0.94	-24.8	22.6	-19.1	29.1

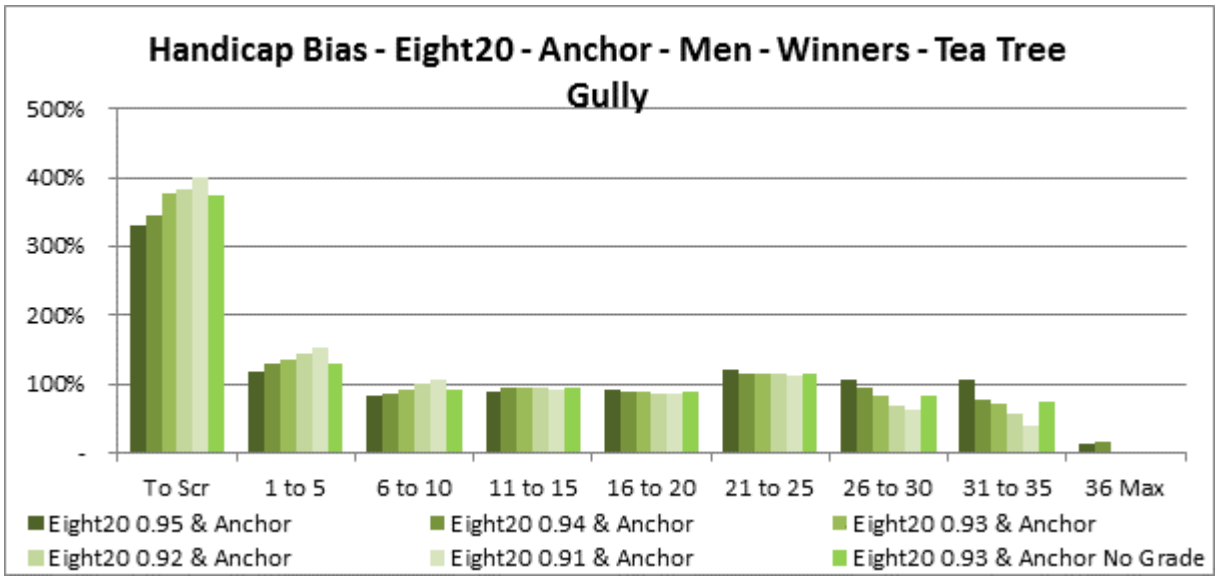
Putting it all together, with the Old System as a reference:

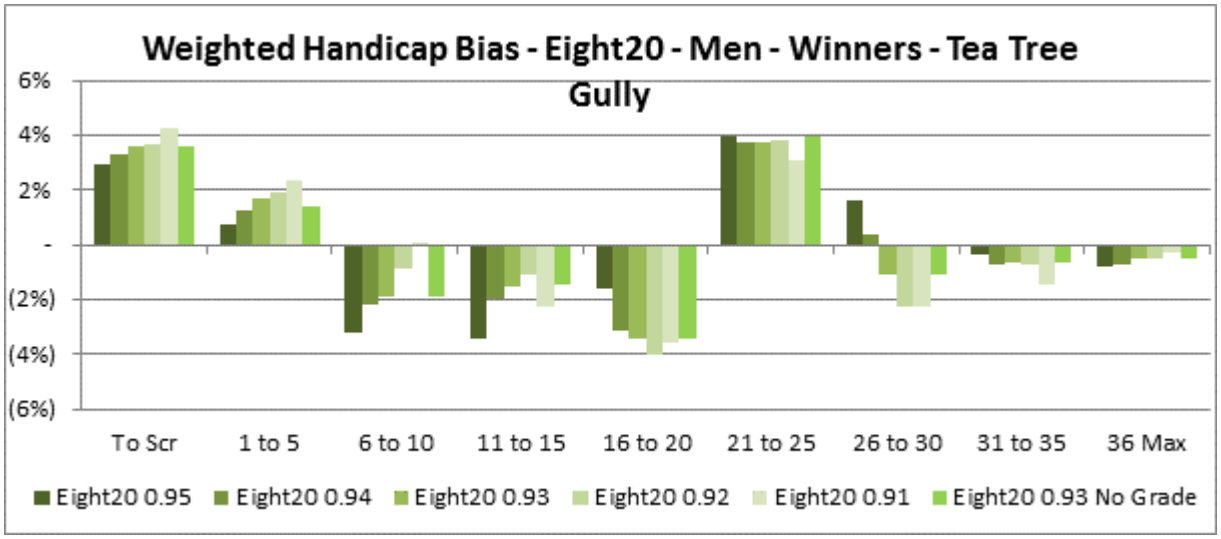
Tea Tree Gully	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-87.0	47.2	-25.5	31.1
Current Period - Ten20 0.96	32.9	29.8	-9.6	46.8
Old Period - Ten20 0.96	-14.5	38.4	-9.9	27.2
Ten20 0.96	2.7	29.0	-8.8	31.7
Ten20 0.95	-8.3	26.1	-12.7	28.1
Ten20 0.94	-12.6	23.7	-16.0	29.5
Ten20 0.93	-18.4	25.7	-23.9	29.7
Ten20 0.92	-30.7	23.5	-23.6	34.2
Ten20 0.91	-49.7	25.1	-27.3	33.4
Ten20 0.9	-57.5	27.2	-35.7	36.1
Nine20 0.96	3.7	28.4	-8.2	27.2
Nine20 0.93	-29.7	22.7	-20.4	33.9
Nine20 0.90	-57.6	28.3	-38.8	35.4
Eight20 0.96	-4.0	28.2	-13.1	32.6
Eight20 0.93	-26.6	25.0	-18.5	31.5
Eight20 0.90	-66.2	31.8	-36.8	37.2
Blended 0.96	-23.3	19.7	-18.3	36.5
Blended 0.94	-35.3	23.4	-31.3	36.0
Blended 0.92	-59.5	26.0	-34.6	38.7
Hybrid 0.96	-3.7	27.9	-12.2	24.6
Hybrid 0.94	-24.8	22.6	-19.1	29.1

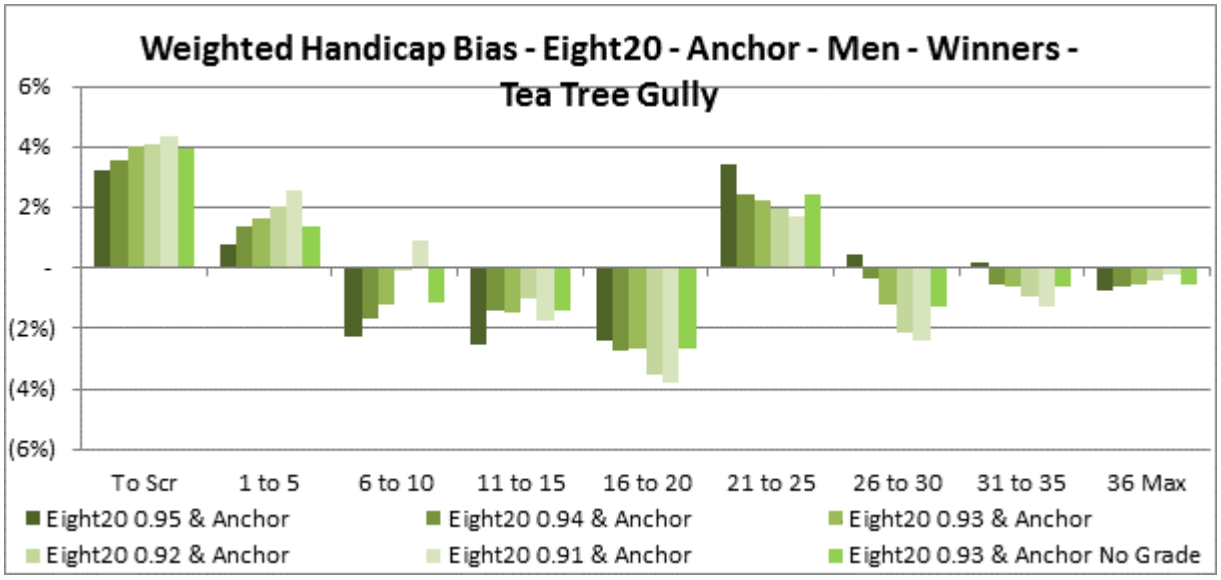
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

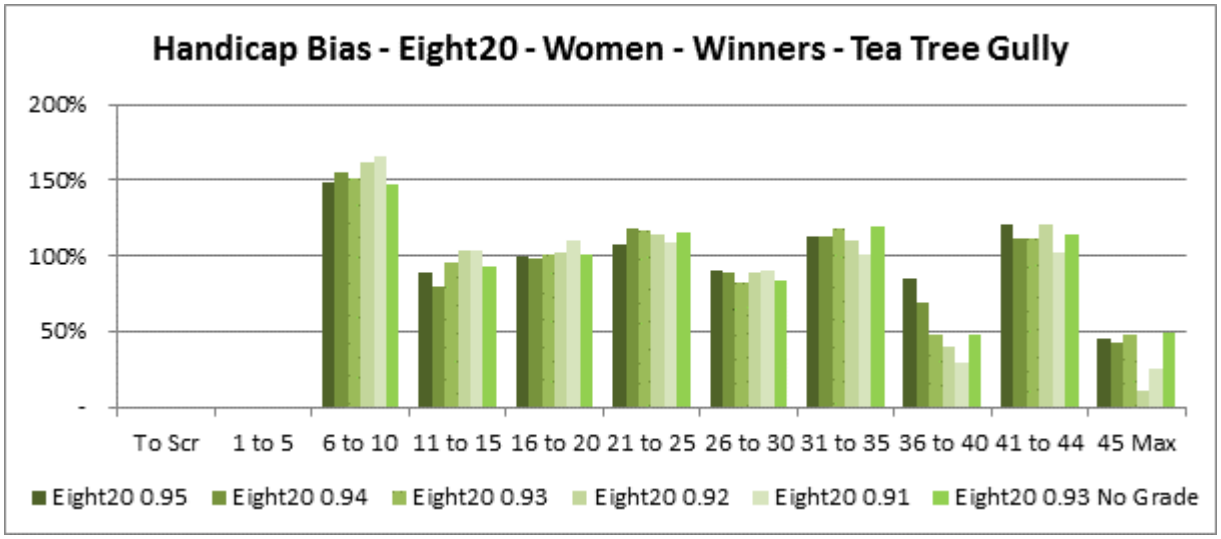
Phase 2

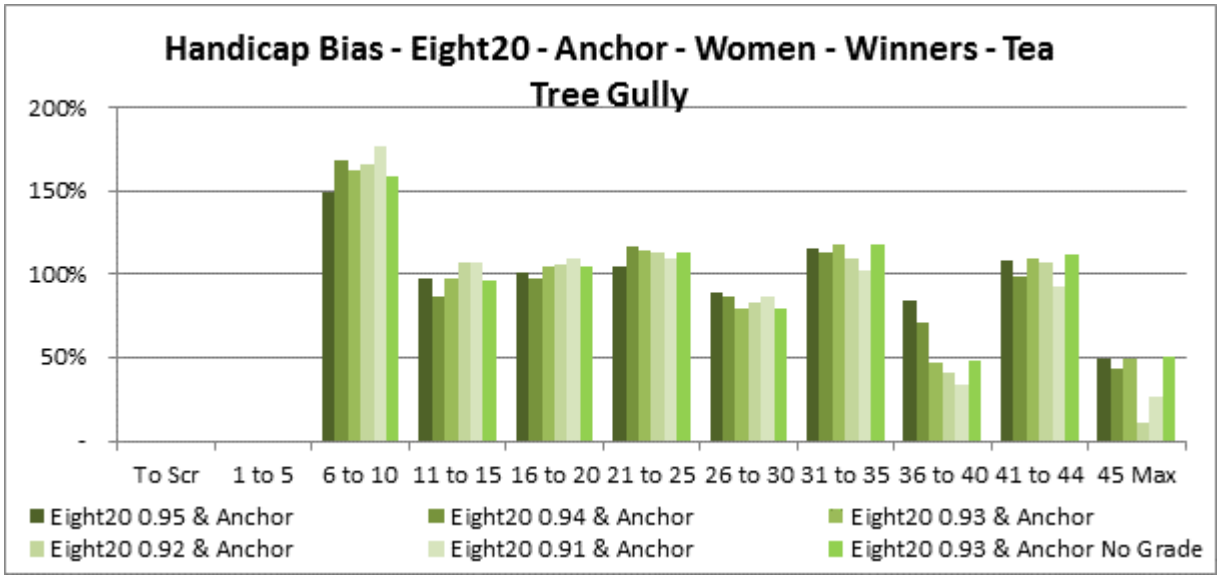

Handicap Bias - Eight20 - Men - Winners - Tea Tree Gully
500%
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

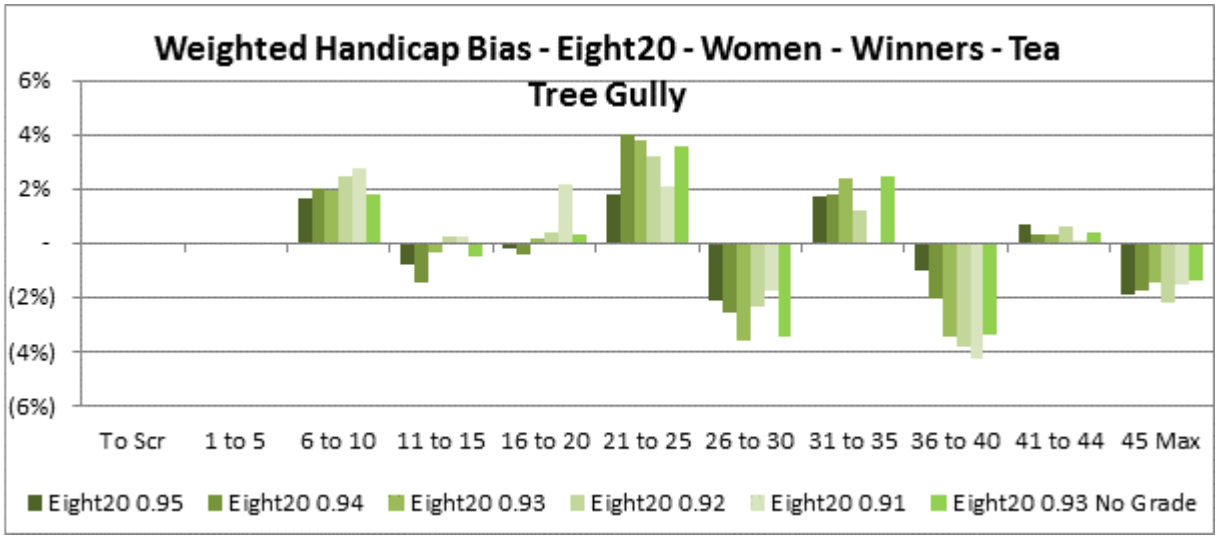

Handicap Bias - Eight20 - Anchor - Men - Winners - Tea Tree Gully
500%
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

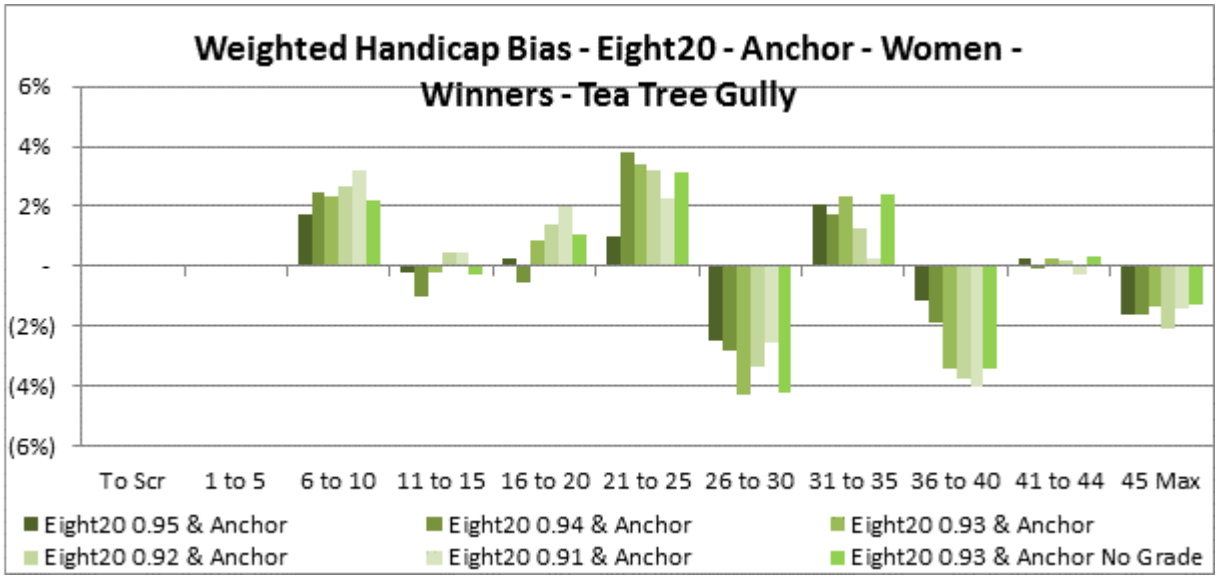

Weighted Handicap Bias - Eight20 - Men - Winners - Tea Tree Gully
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

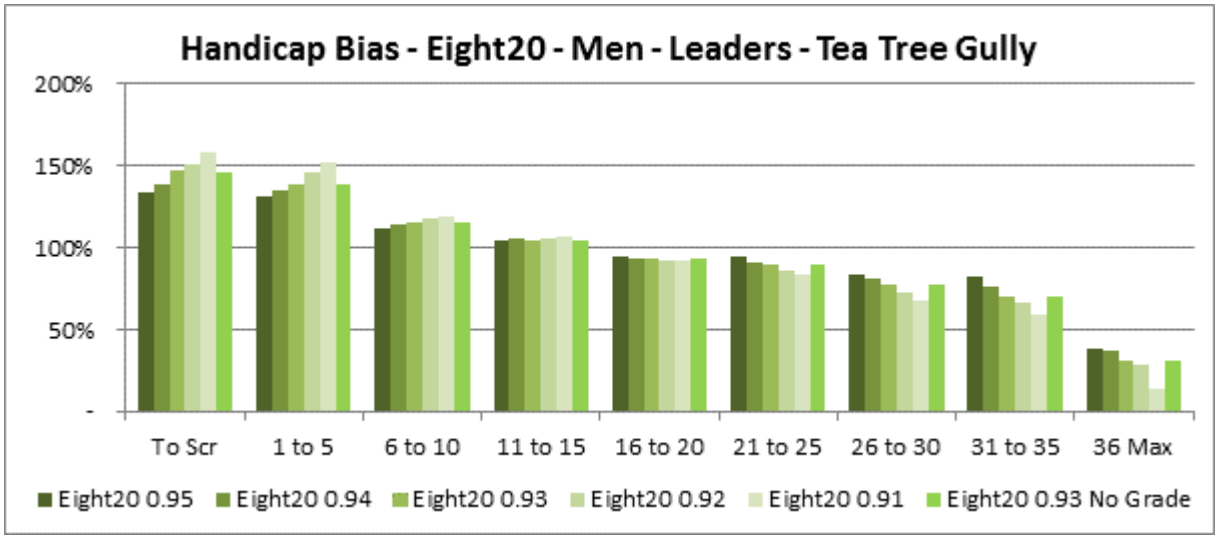

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Tea Tree Gully
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

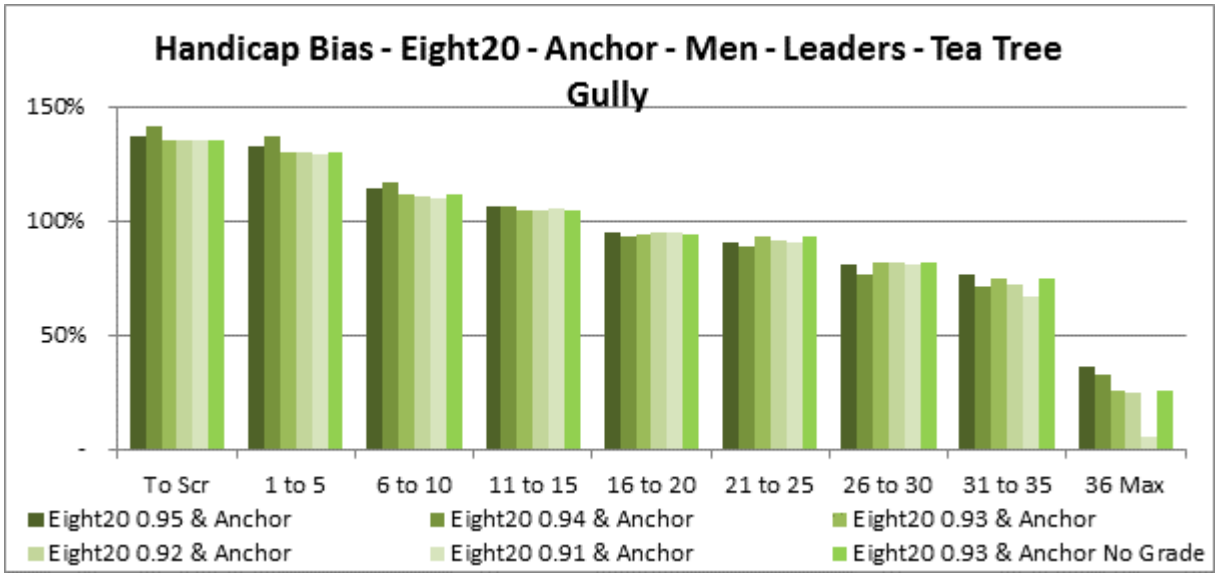

Handicap Bias - Eight20 - Women - Winners - Tea Tree Gully
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

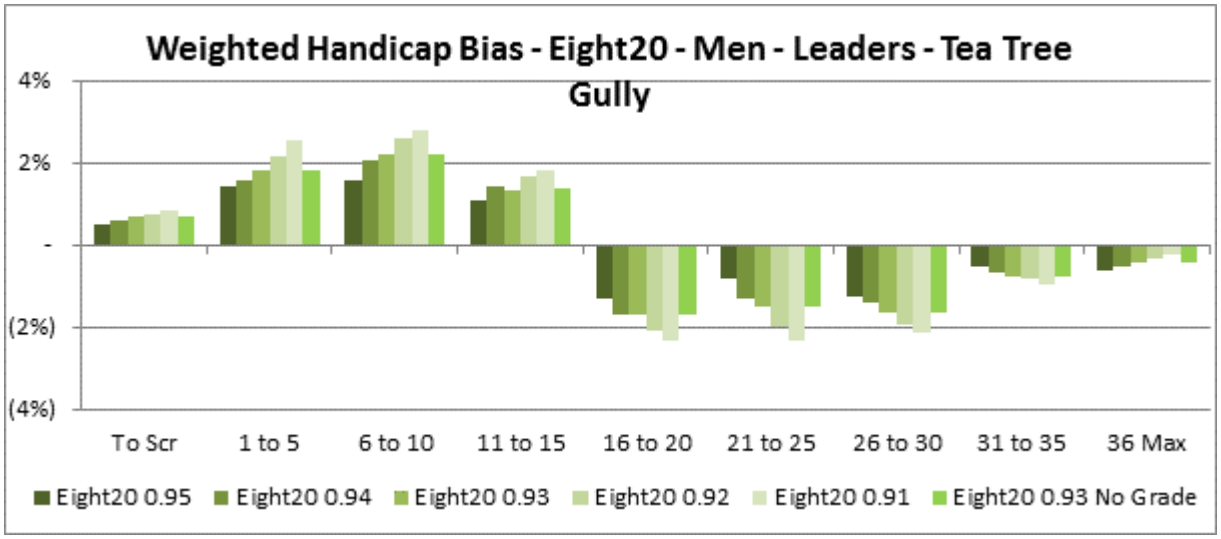

Handicap Bias - Eight20 - Anchor - Women - Winners - Tea Tree Gully
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

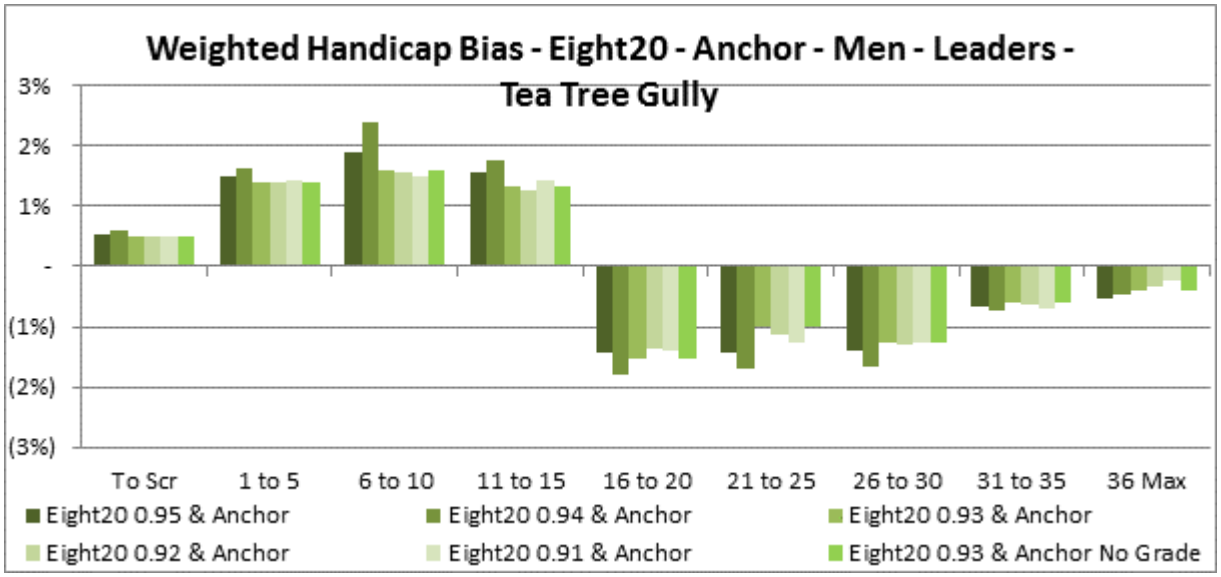

Weighted Handicap Bias - Eight20 - Women - Winners - Tea Tree Gully
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

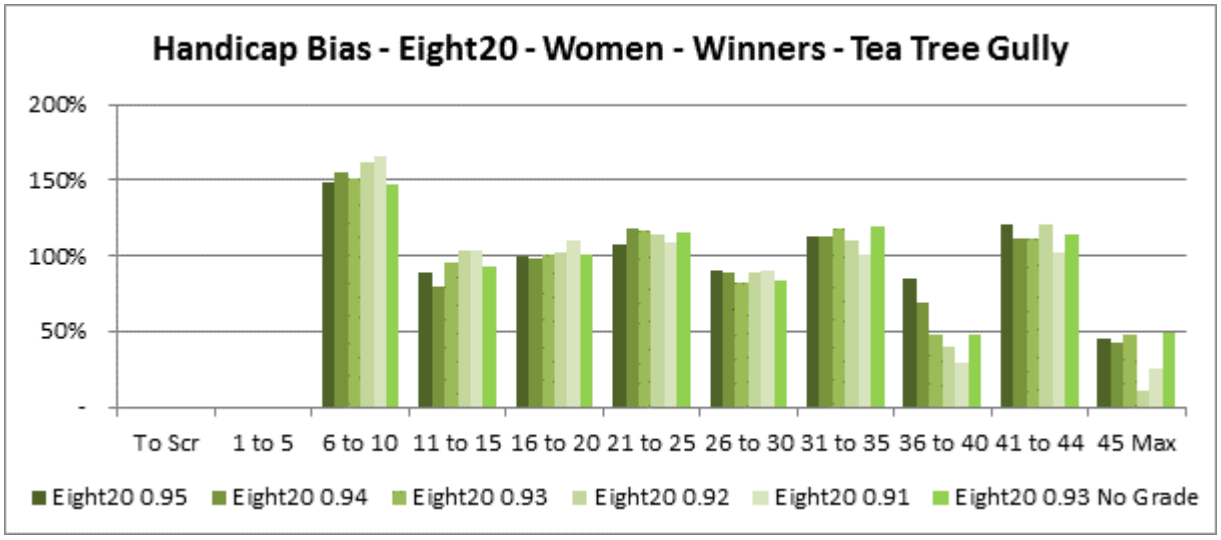

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Tea Tree Gully
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

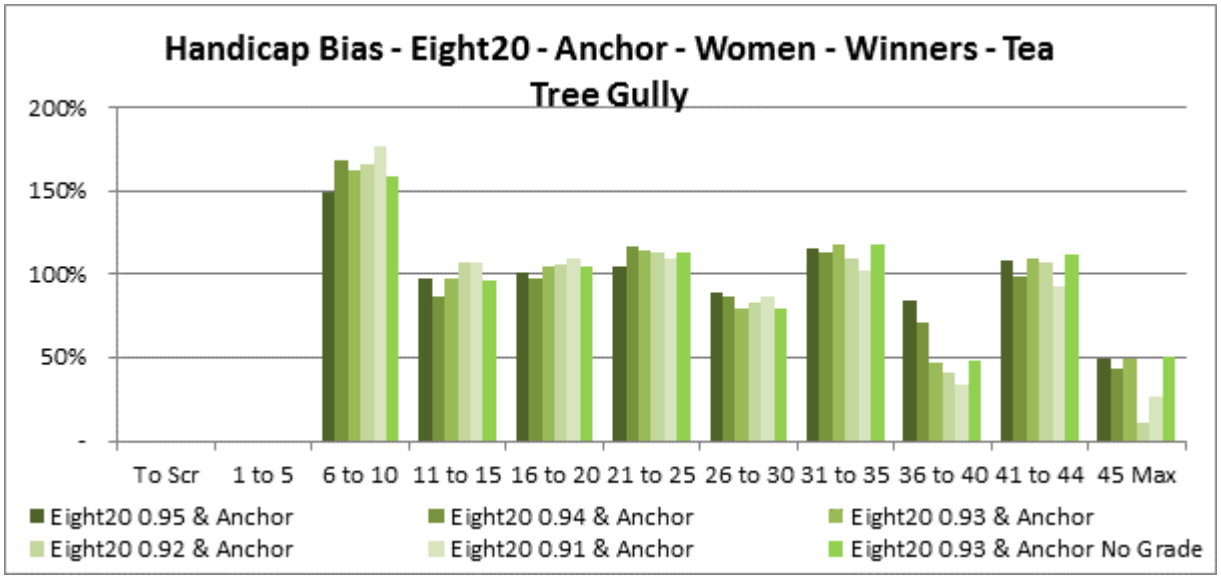

Handicap Bias - Eight20 - Men - Leaders - Tea Tree Gully
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

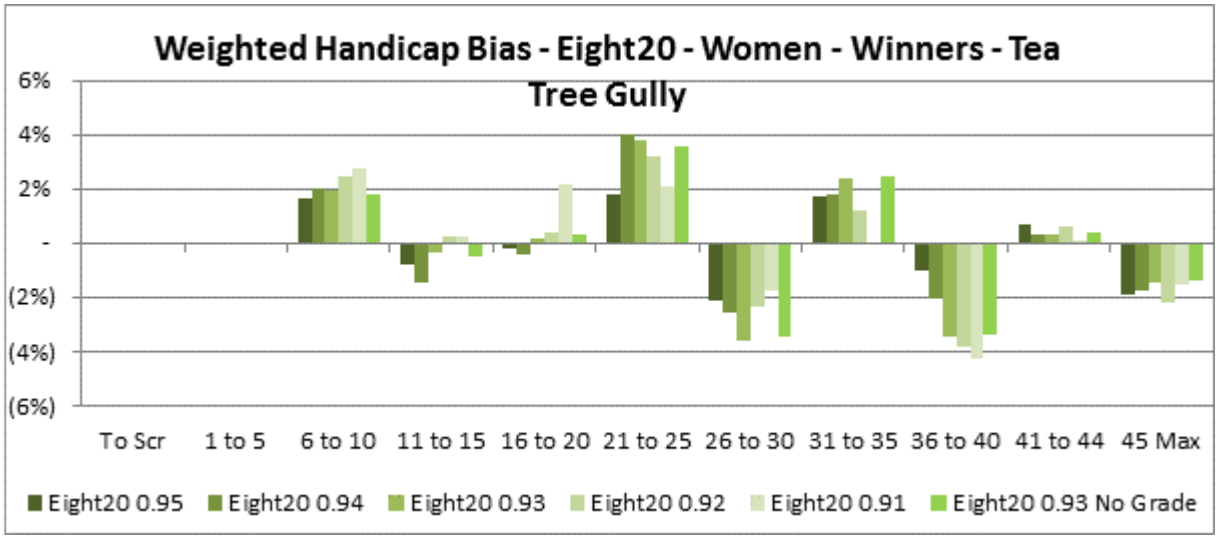

Handicap Bias - Eight20 - Anchor - Men - Leaders - Tea Tree Gully
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

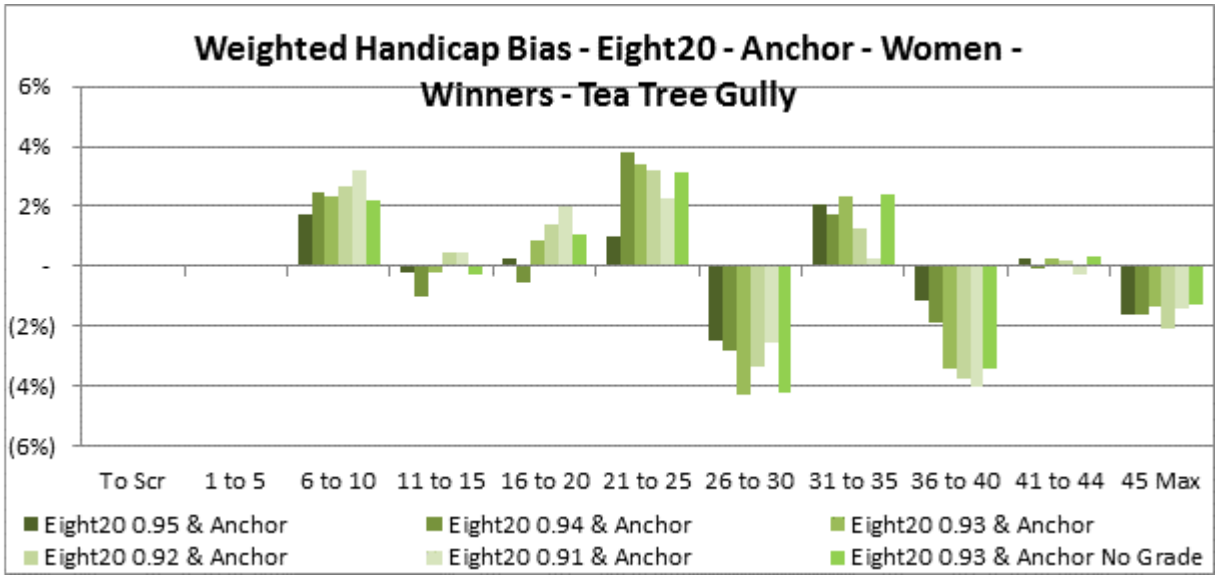

Weighted Handicap Bias - Eight20 - Men - Leaders - Tea Tree Gully
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Tea Tree Gully
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Winners - Tea Tree Gully
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Winners - Tea Tree Gully
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Winners - Tea Tree Gully
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

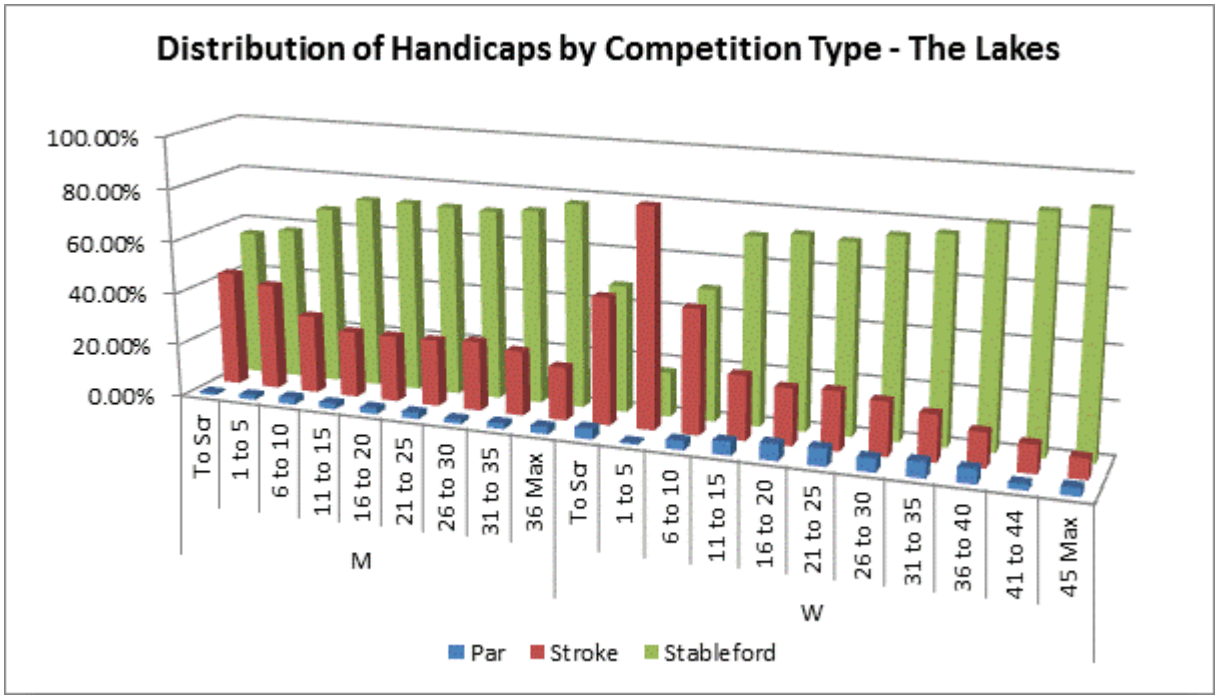


Phase 2 -Tea Tree Gully					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	-2.3	25.7	-10.5	13.8
	Eight20 0.94	-18.3	24.0	-13.7	19.9
	Eight20 0.93	-27.7	24.8	-18.1	22.5
	Eight20 0.92	-37.6	26.4	-25.3	20.7
	Eight20 0.91	-48.1	27.0	-29.3	19.9
	Eight20 0.93 No Grade	-25.9	25.0	-16.8	21.9
	Eight20 0.95 & Anchor	-10.2	22.7	-12.6	13.7
	Eight20 0.94 & Anchor	-26.3	20.4	-16.6	19.7
	Eight20 0.93 & Anchor	-35.6	21.5	-20.9	23.5
	Eight20 0.92 & Anchor	-47.2	23.6	-28.8	22.5
	Eight20 0.91 & Anchor	-55.1	26.0	-31.4	21.0
	Eight20 0.93 & Anchor No Grade	-34.0	21.4	-19.8	23.0
Leaders	Eight20 0.95	-29.6	11.5	-30.0	15.9
	Eight20 0.94	-34.6	14.3	-32.5	17.1
	Eight20 0.93	-38.0	15.4	-34.2	18.5
	Eight20 0.92	-43.4	18.6	-38.4	20.6
	Eight20 0.91	-47.9	20.8	-39.7	21.4
	Eight20 0.93 No Grade	-38.0	15.5	-34.4	19.0
	Eight20 0.95 & Anchor	-33.7	13.8	-32.1	17.5
	Eight20 0.94 & Anchor	-38.4	16.4	-34.9	18.7
	Eight20 0.93 & Anchor	-29.6	12.3	-28.8	14.0
	Eight20 0.92 & Anchor	-29.2	12.0	-29.1	14.5
	Eight20 0.91 & Anchor	-29.2	12.4	-28.5	14.5
	Eight20 0.93 & Anchor No Grade	-29.6	12.3	-28.8	14.0

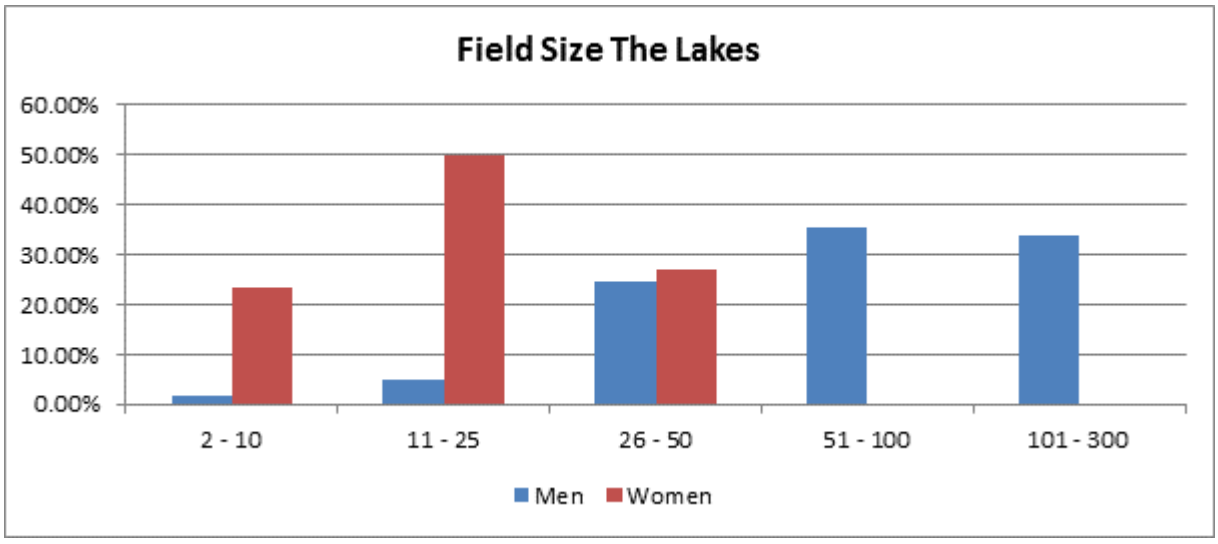
Appendix 14 – The Lakes

Phase 1

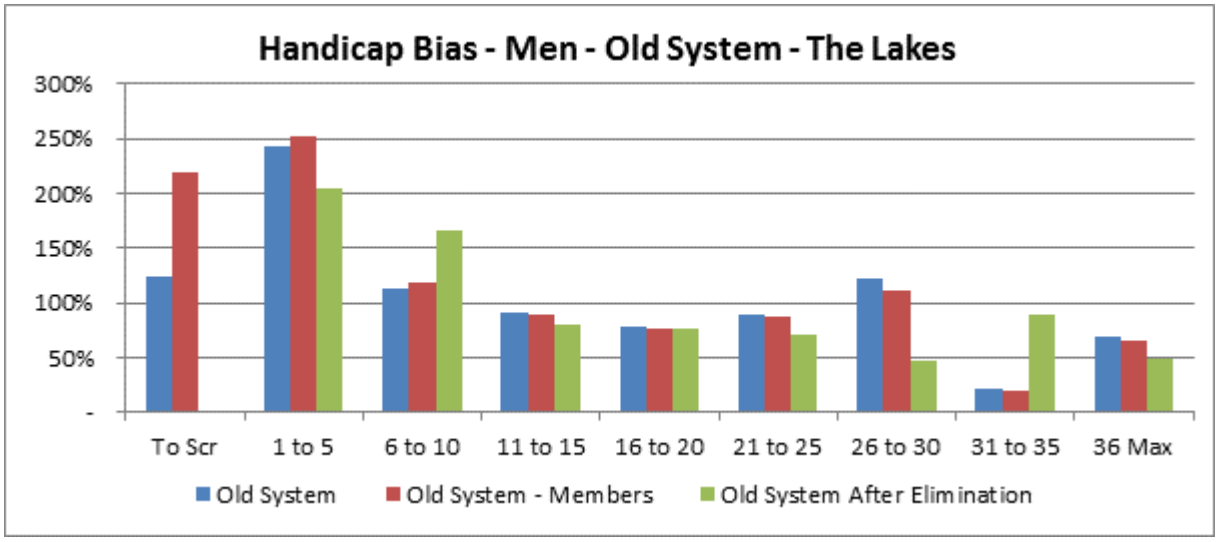
The Lakes	Men	Women	Total
Players in Database	1,336	370	1,706
Members	643	162	805
Visitors	693	208	901
Members who have Played 33 Rounds	609	150	759
Members with Last Round In Old System	127	25	152
Members with Last Round in Current System	516	137	653
Earliest Round	22/12/2007	18/12/2007	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			145
Number of Home Competitions	452	363	815
Number of Rounds of Golf	43,775	10,954	54,729
Number of Rounds at Home	30,079	6,733	36,812
Number of Rounds at Home Old	21,735	4,746	26,481
Number of Rounds at Home Current	8,344	1,987	10,331
Num Rnds Members at Home	28,234	6,100	34,334
Num Rnds Members at Home Old	20,526	4,249	24,775
Num Rnds Members at Home Cur	7,708	1,851	9,559
Num Rnds After Eliminations	16,951	3,412	20,363
Num Rnds After Eliminations Old	10,039	1,830	11,869
Num Rnds After Eliminations Cur	6,912	1,582	8,494

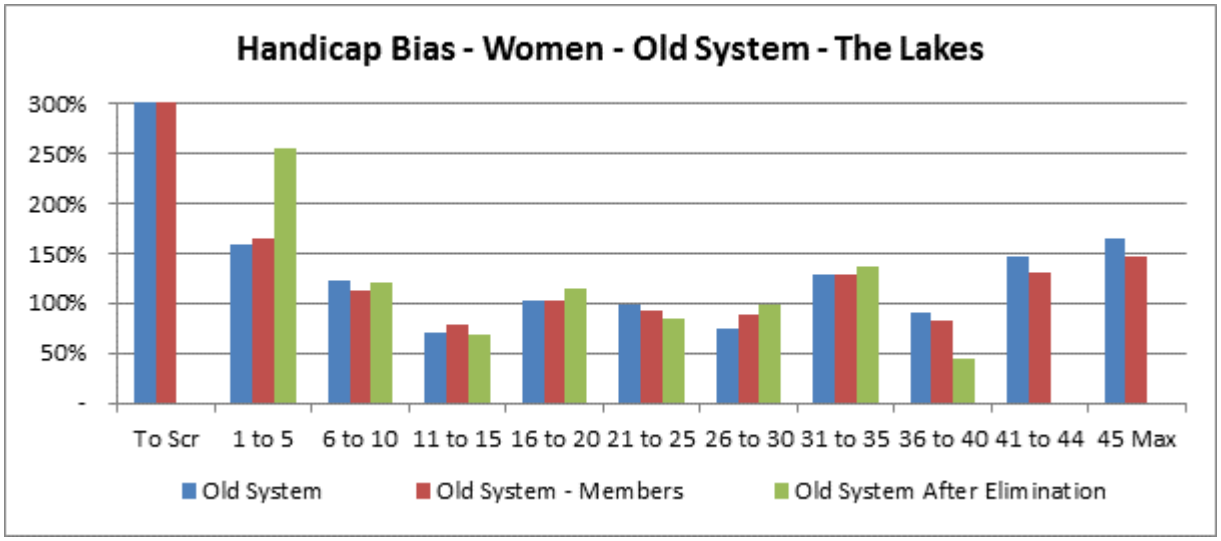


Most men's competitions are with a field of over 50 and over 100, the women mainly field 11-25.

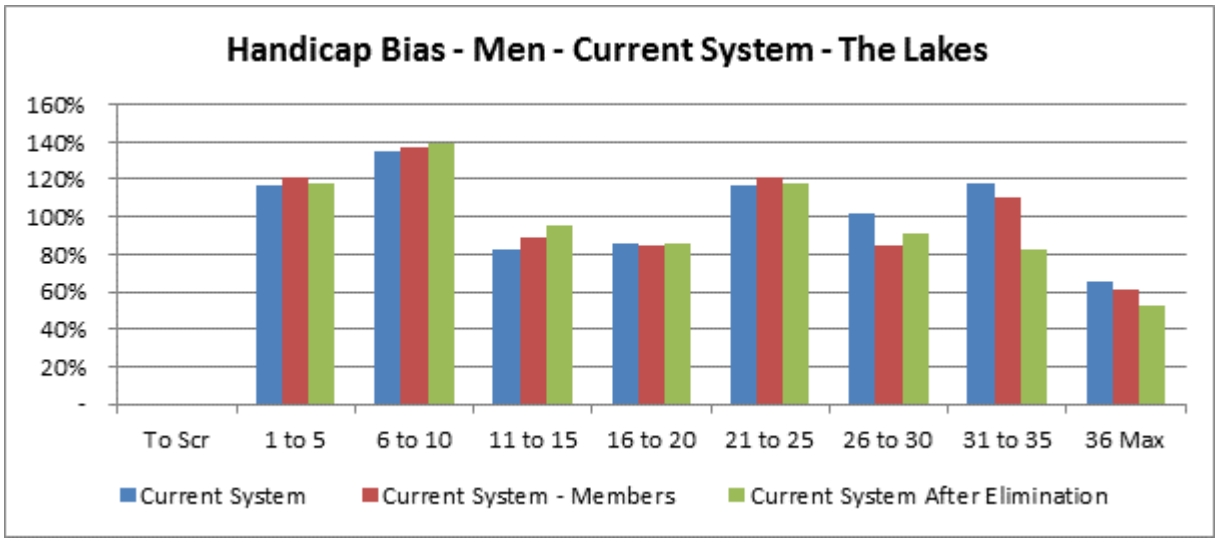


Under the Old System, there was a strong bias in favour of the low handicapper. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

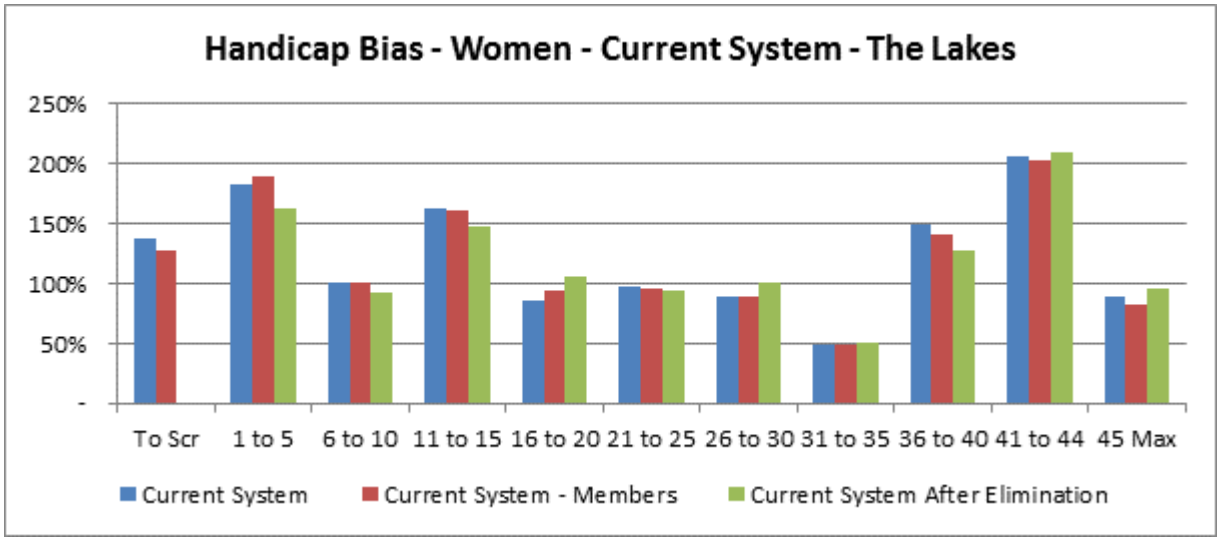




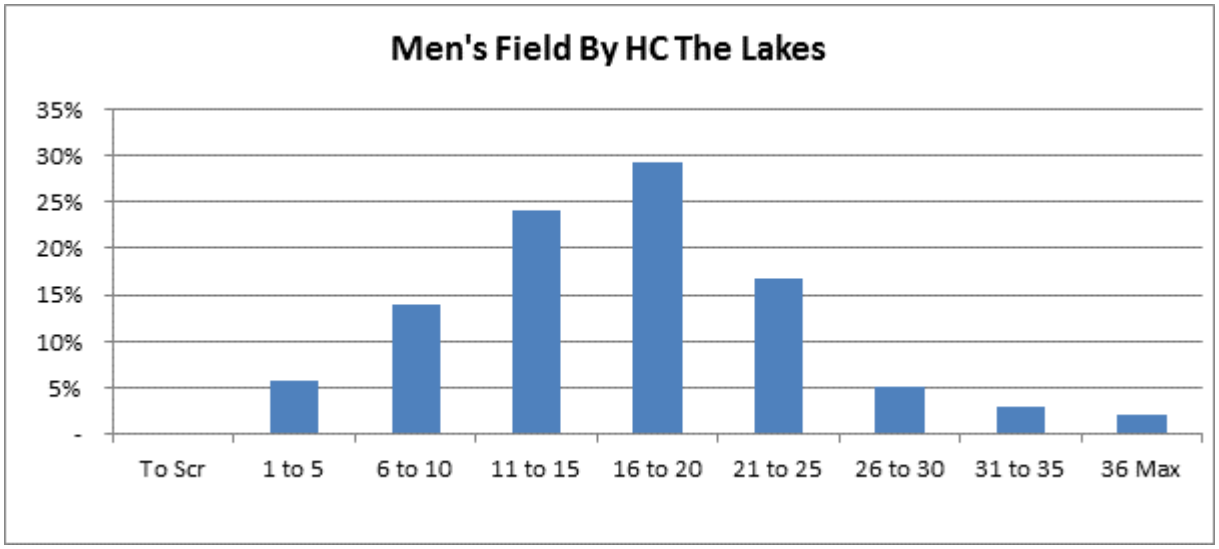
Under the Current System, this bias has become more even for men.

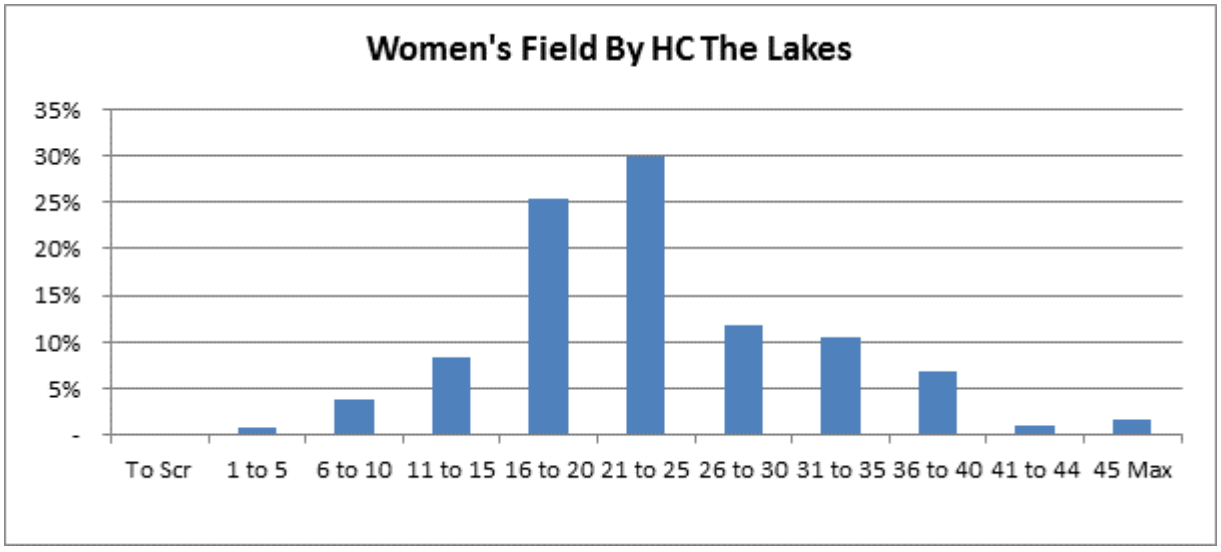


The picture is somewhat similar for the women, with a boost for the 36 and overs.



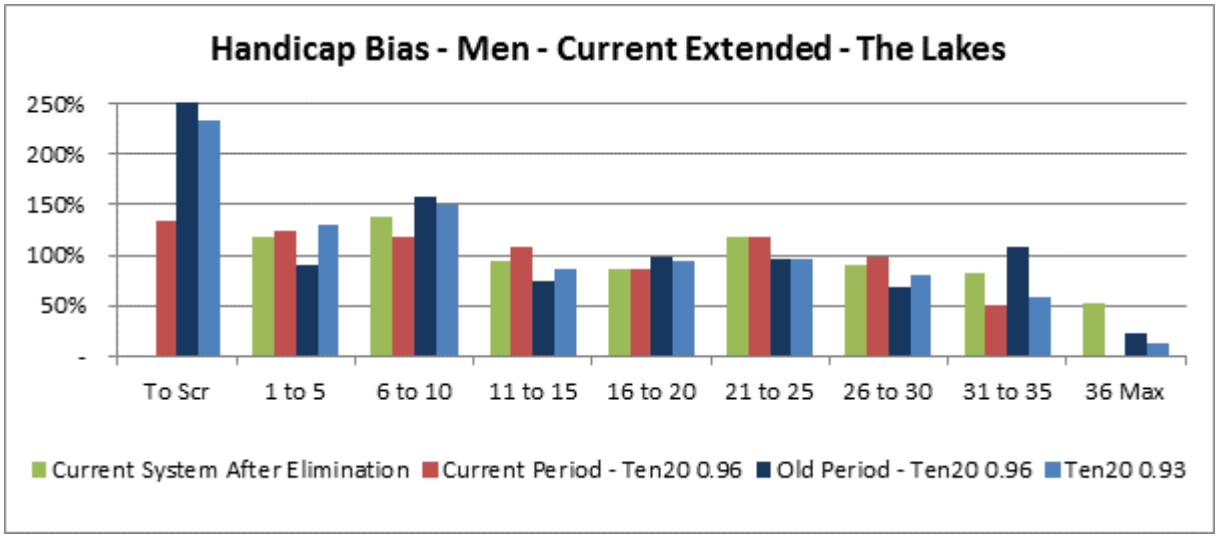
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be "lumpy", and not too much store should be put on the bias for the lowest and highest markers.





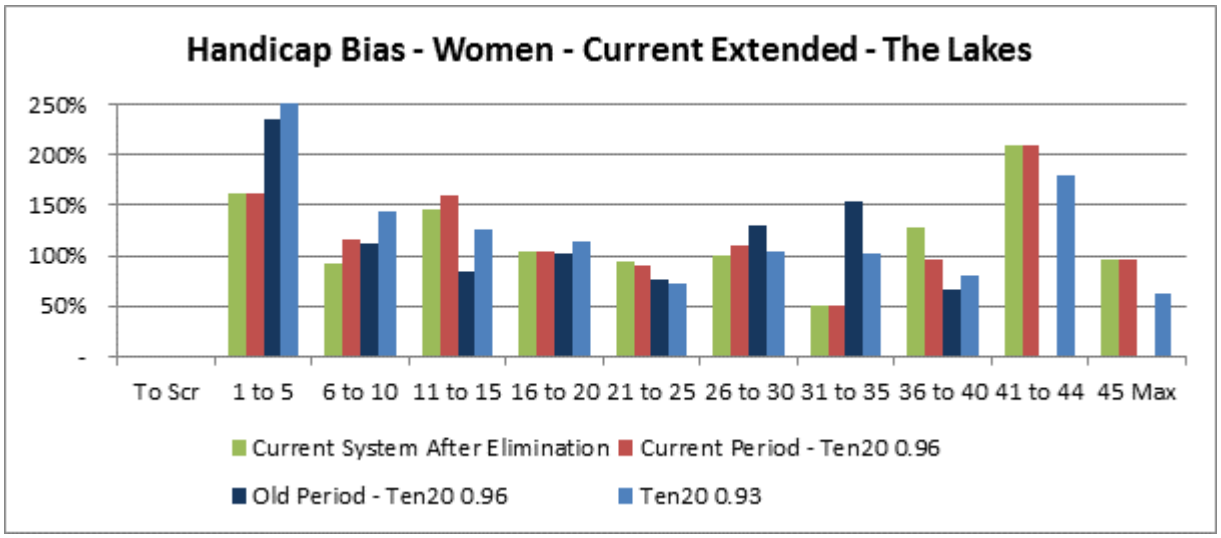
In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

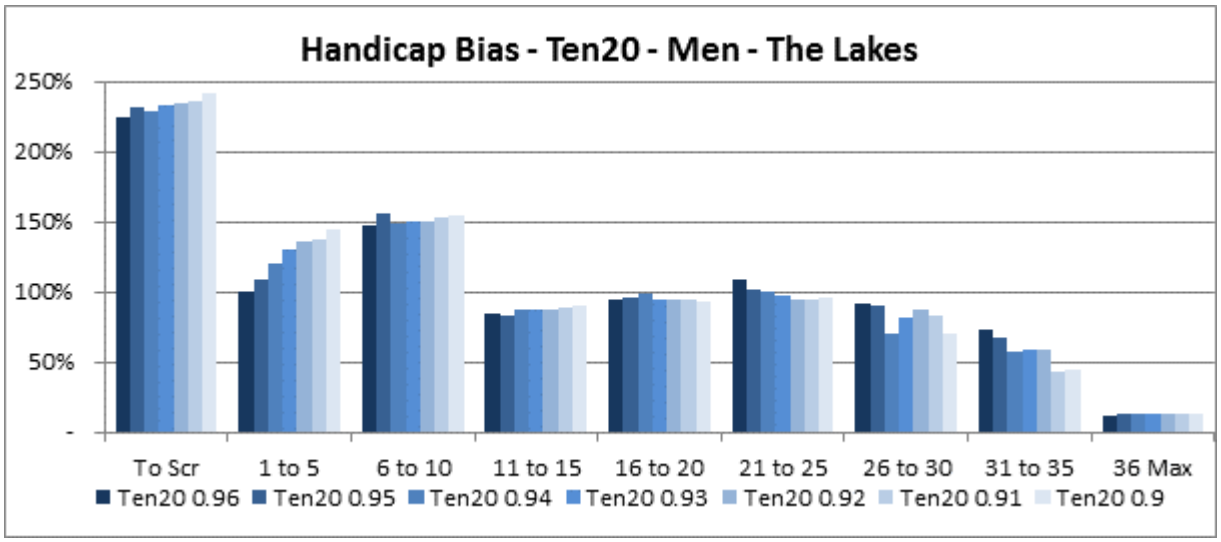


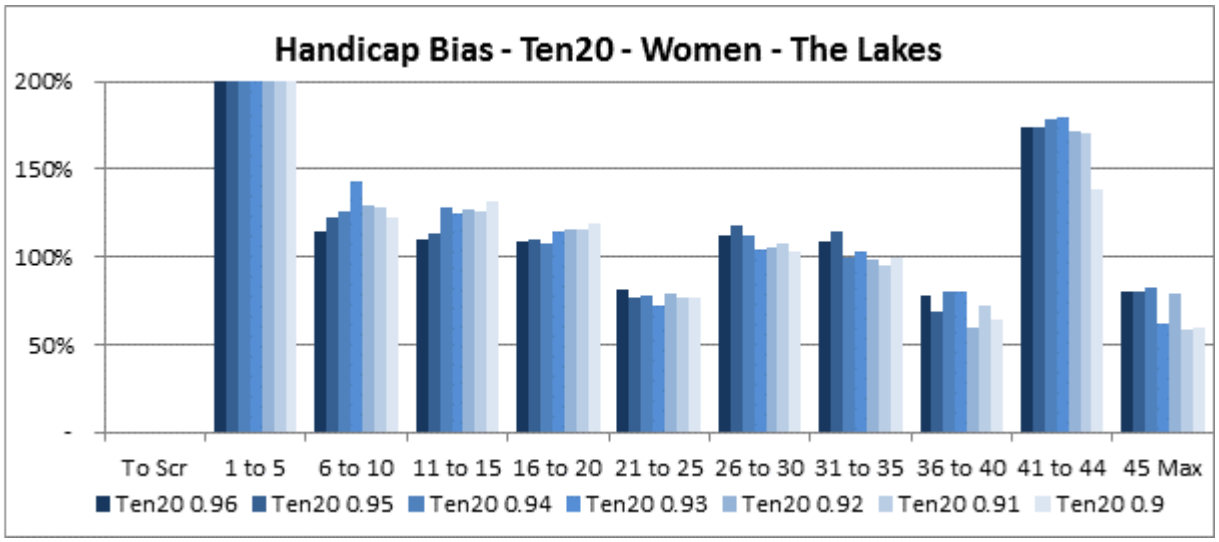
Of interest is the finding that the current system taken over two-years (the dark blue series) the bias is less tilted in favour of the high markers.

For women, the low and high markers would have dominated over the two-years.

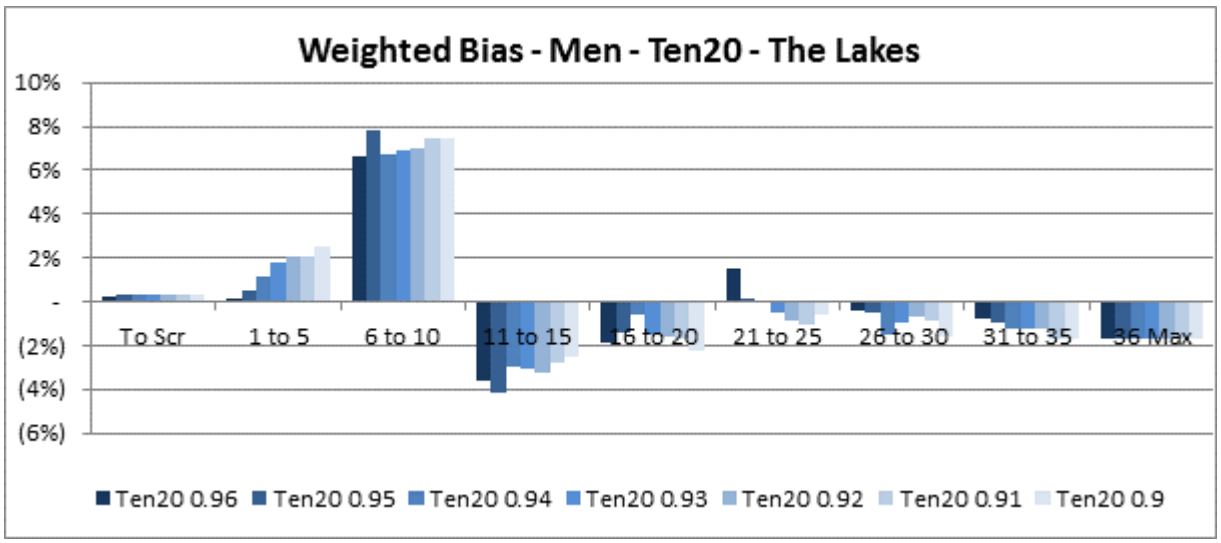


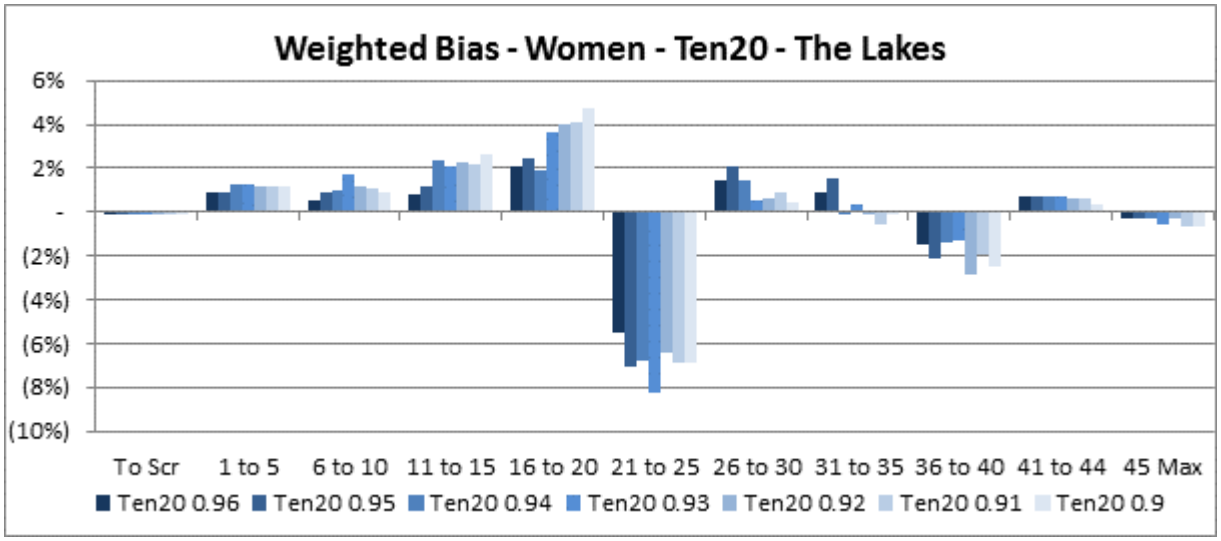
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

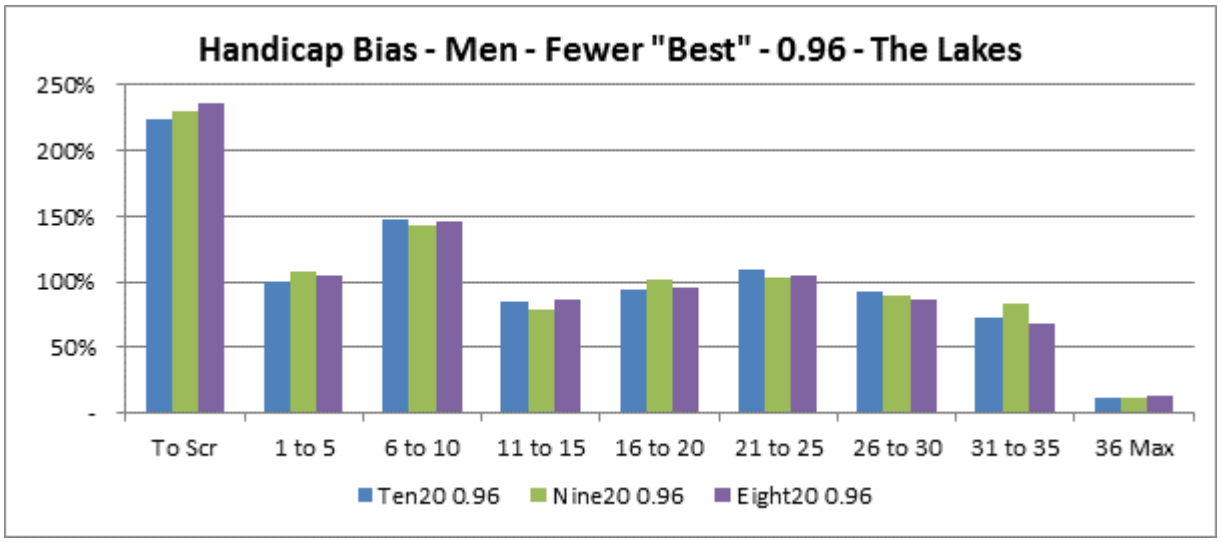


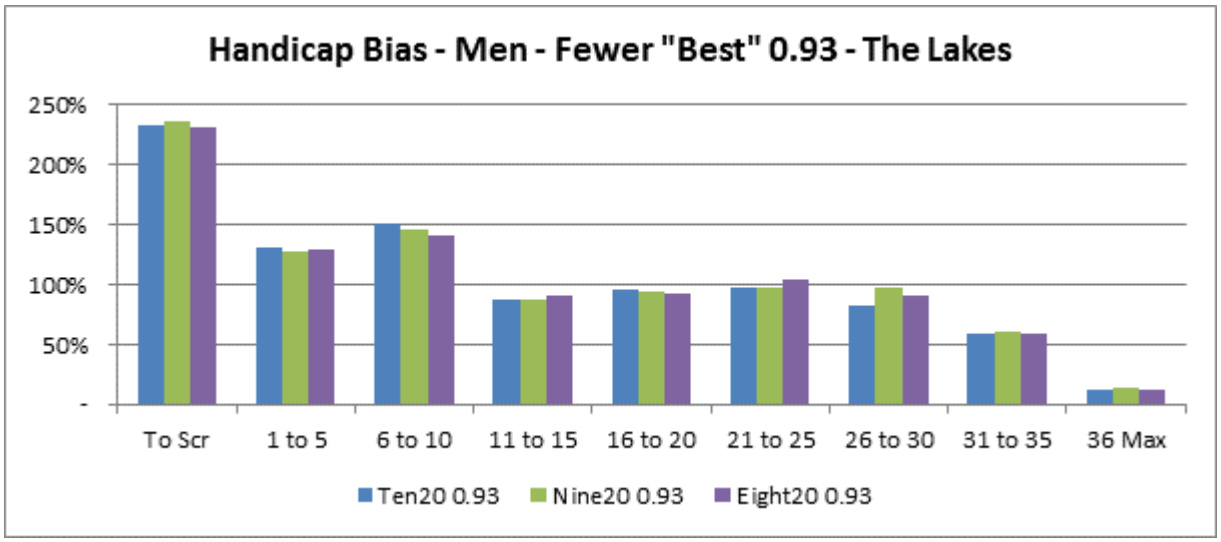


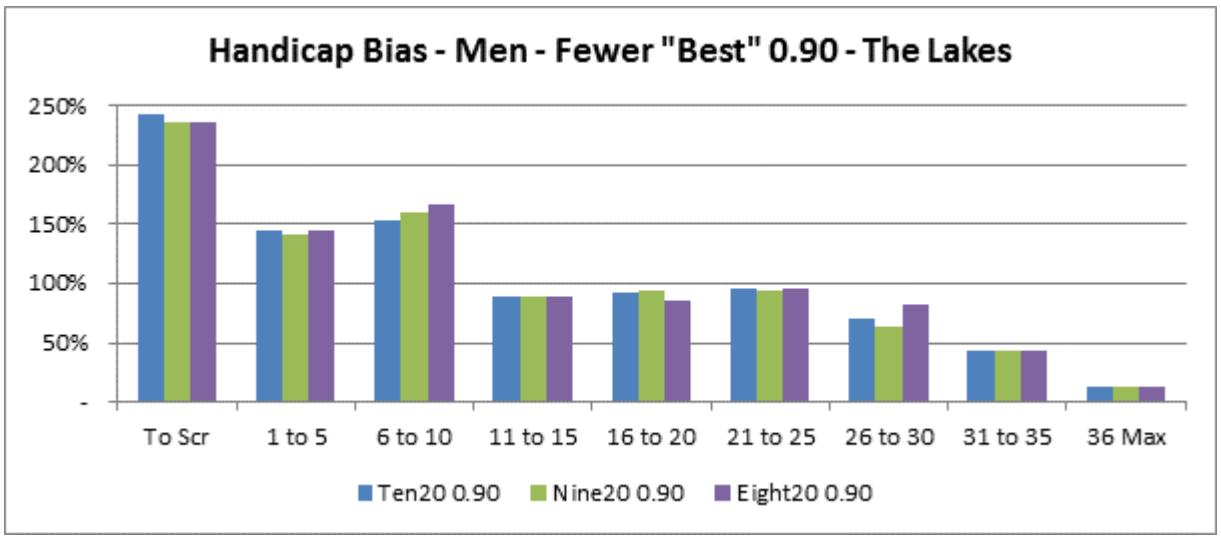
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

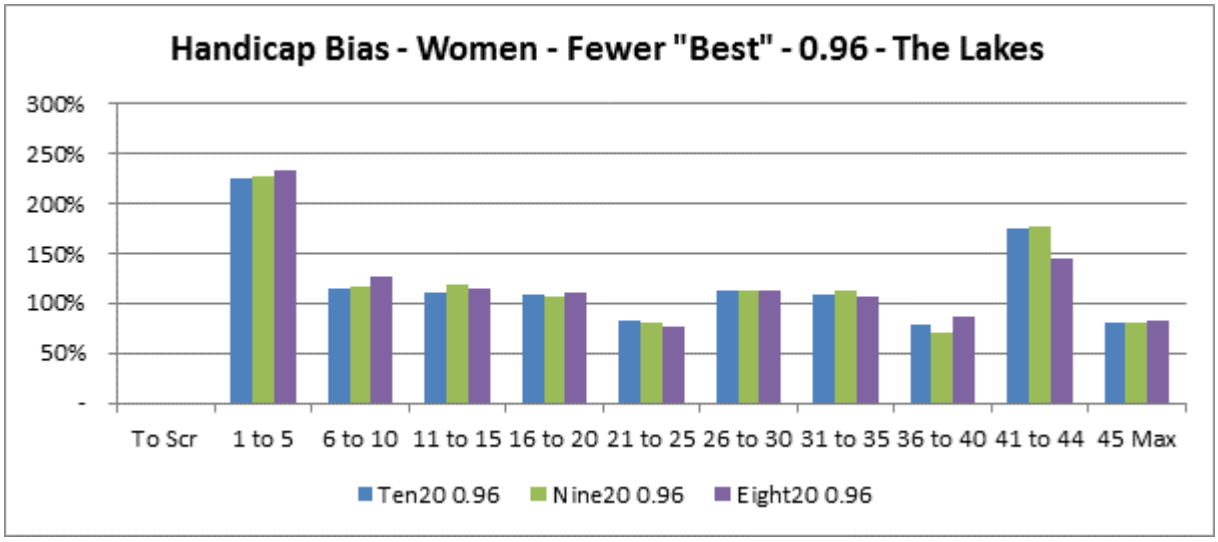
	The Lakes			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-32.2	28.8	-7.7	20.5
Ten20 0.95	-41.0	32.5	-9.5	26.5
Ten20 0.94	-47.8	28.1	-14.0	24.9
Ten20 0.93	-50.1	29.2	-18.5	30.6
Ten20 0.92	-51.3	30.0	-21.1	27.1
Ten20 0.91	-57.1	31.2	-20.4	27.7
Ten20 0.9	-61.4	32.0	-23.5	29.4

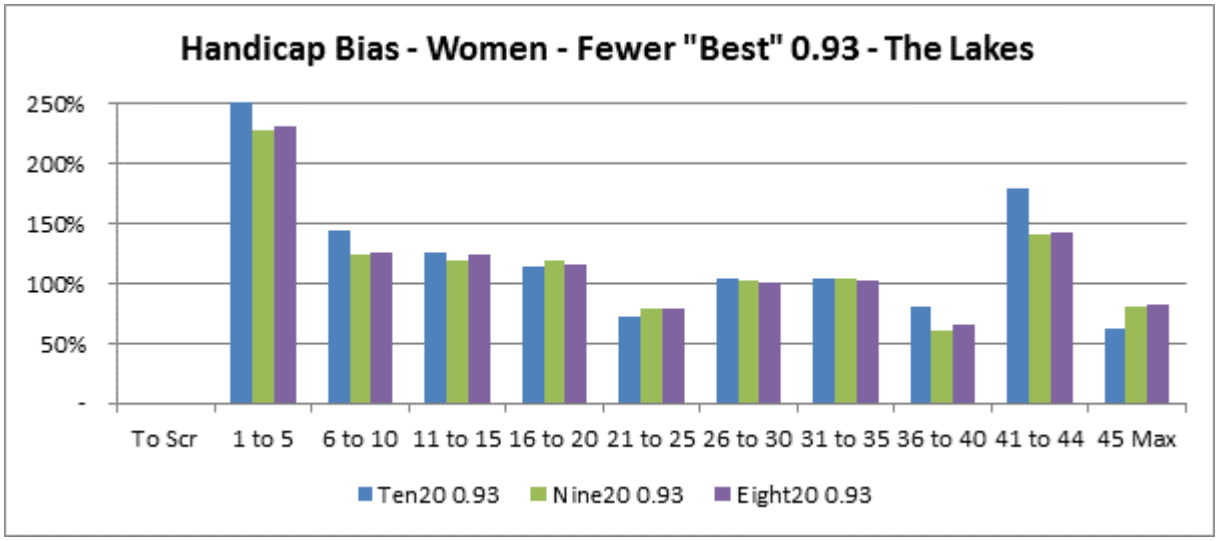
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

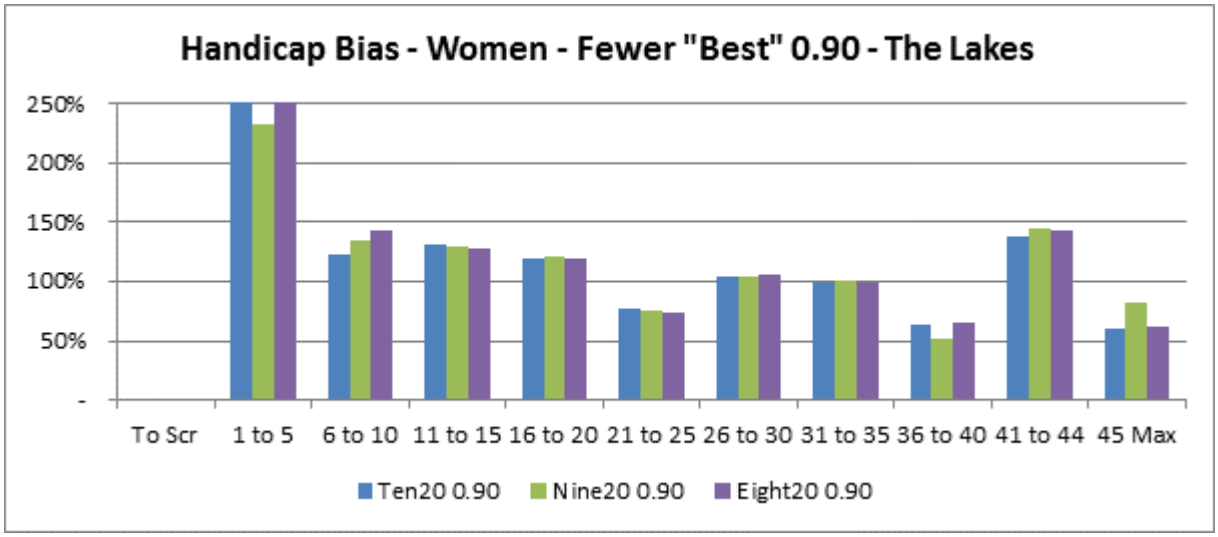







Handicap Bias - Women - Fewer "Best" - 0.96 - The Lakes
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

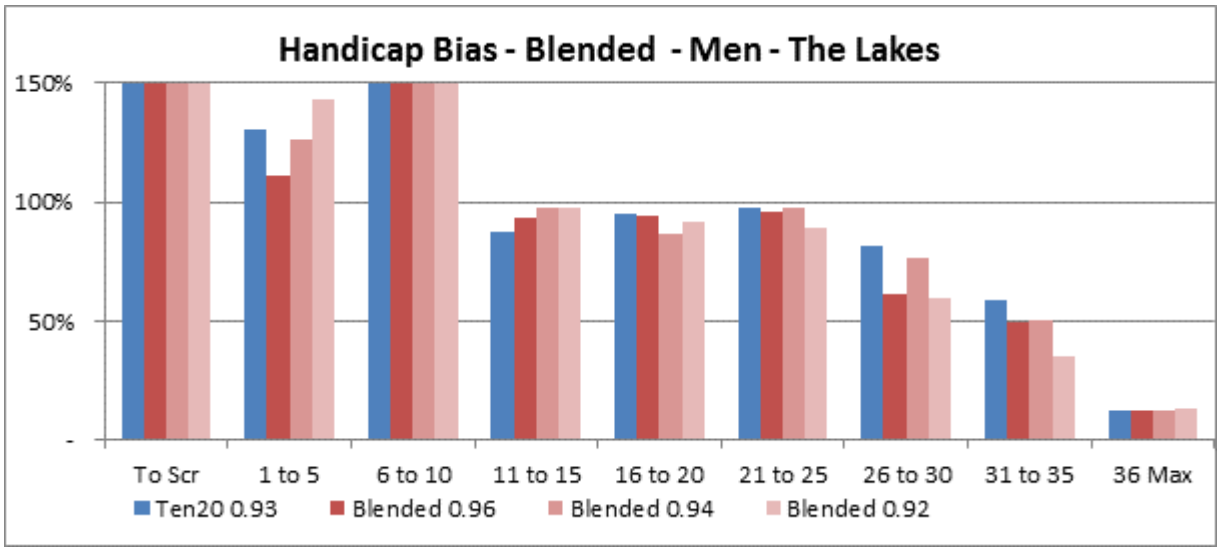

Handicap Bias - Women - Fewer "Best" 0.93 - The Lakes
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

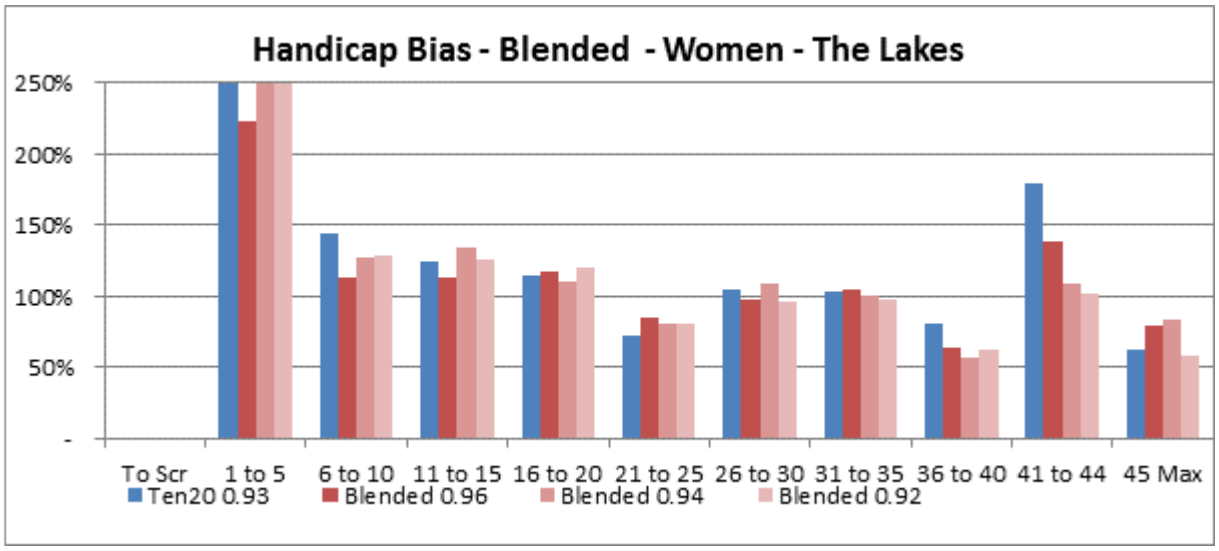

Handicap Bias - Women - Fewer "Best" 0.90 - The Lakes
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the twelve cases, for each of men and women, the Tilt and Level Indices can be calculated.

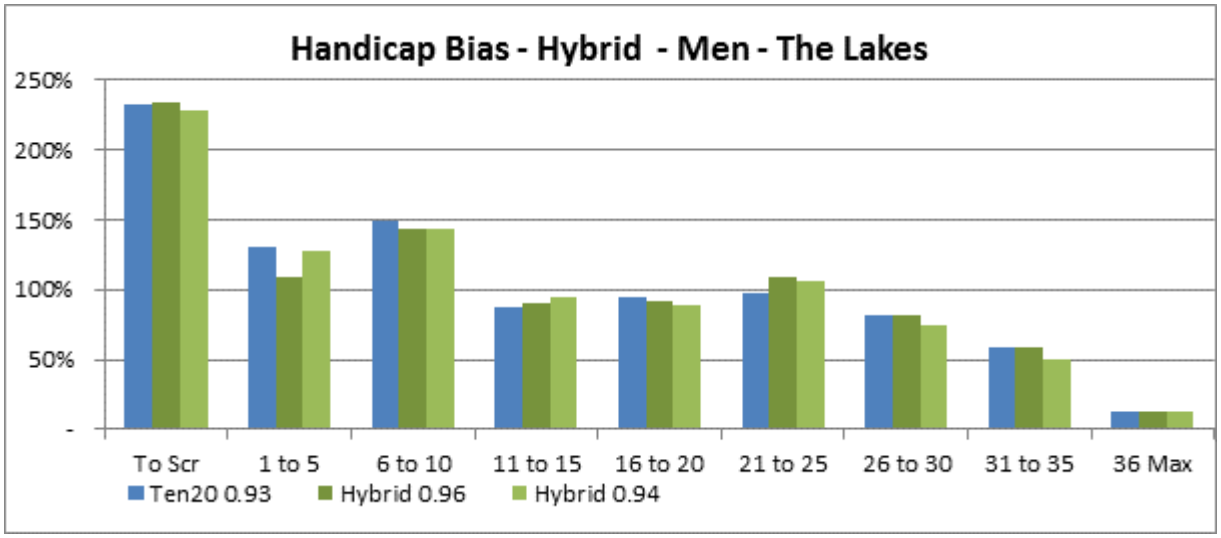
The Lakes	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	-32.2	28.8	-7.7	20.5
Nine20 0.96	-30.2	28.5	-9.5	23.2
Eight20 0.96	-36.0	27.1	-10.1	25.9
Ten20 0.93	-50.1	29.2	-18.5	30.6
Nine20 0.93	-45.0	27.5	-18.8	26.8
Eight20 0.93	-43.6	25.3	-18.7	25.8
Ten20 0.90	-61.4	32.0	-23.5	29.4
Nine20 0.90	-64.4	34.4	-24.1	31.8
Eight20 0.90	-65.4	39.4	-24.2	31.6

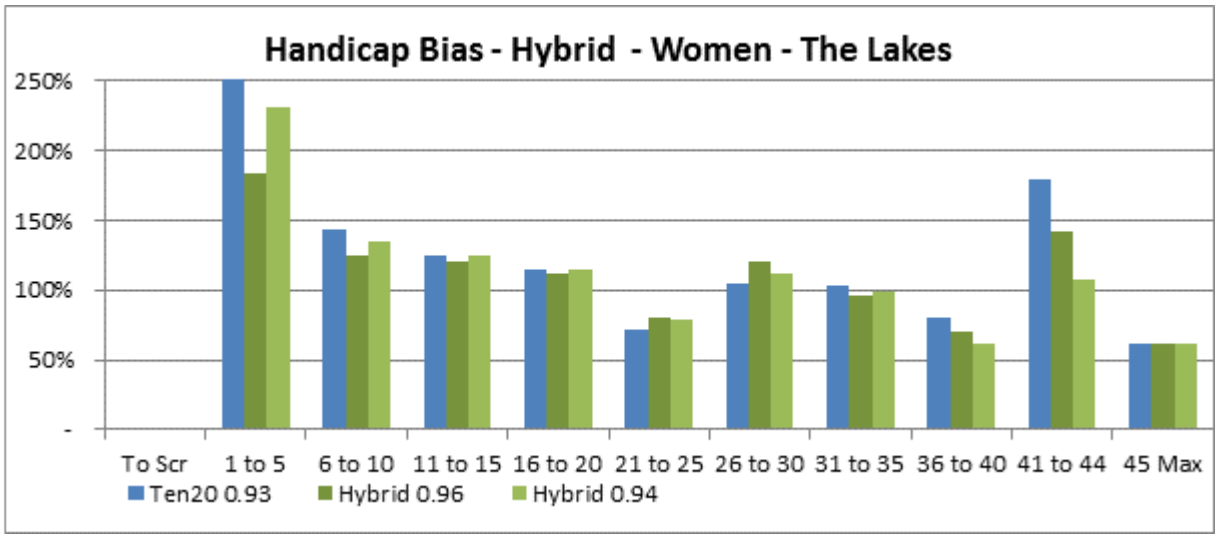
For the Blended:





For the Hybrid:

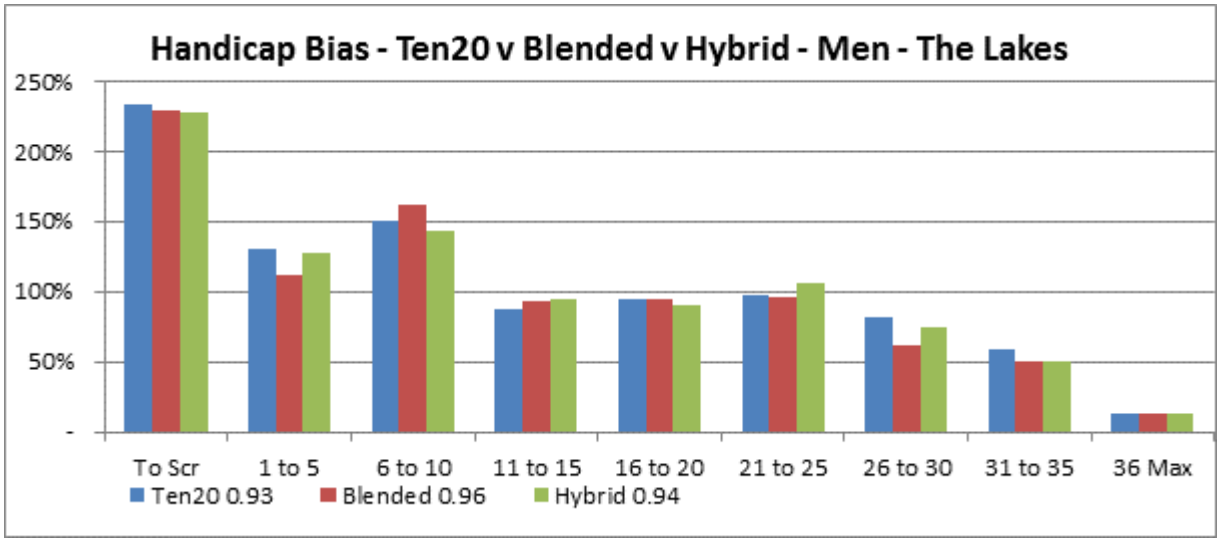


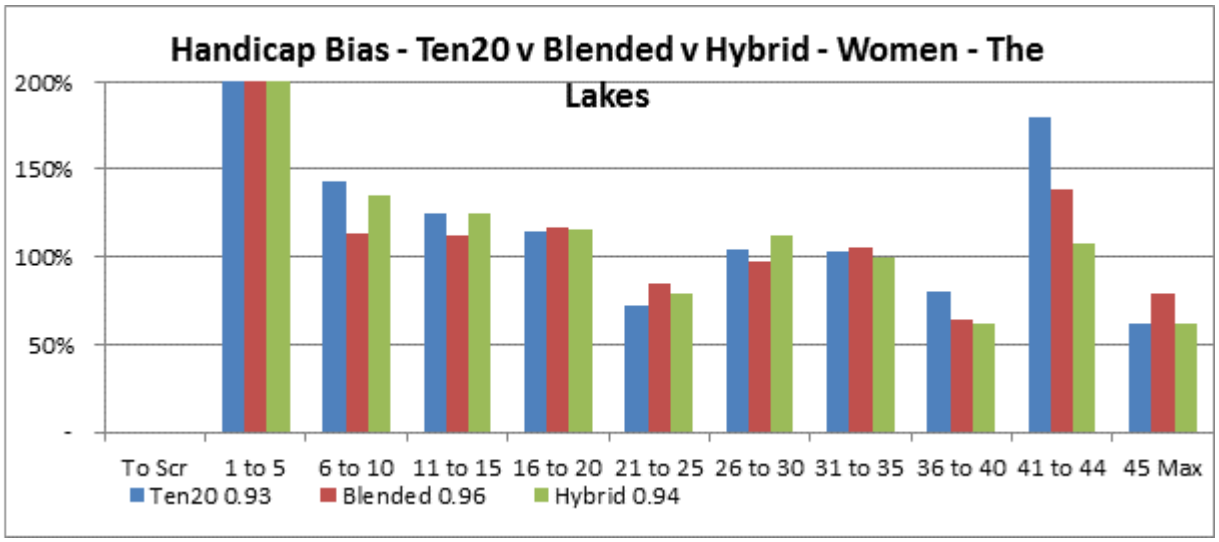


The Corresponding Tilt and Level Indices are:

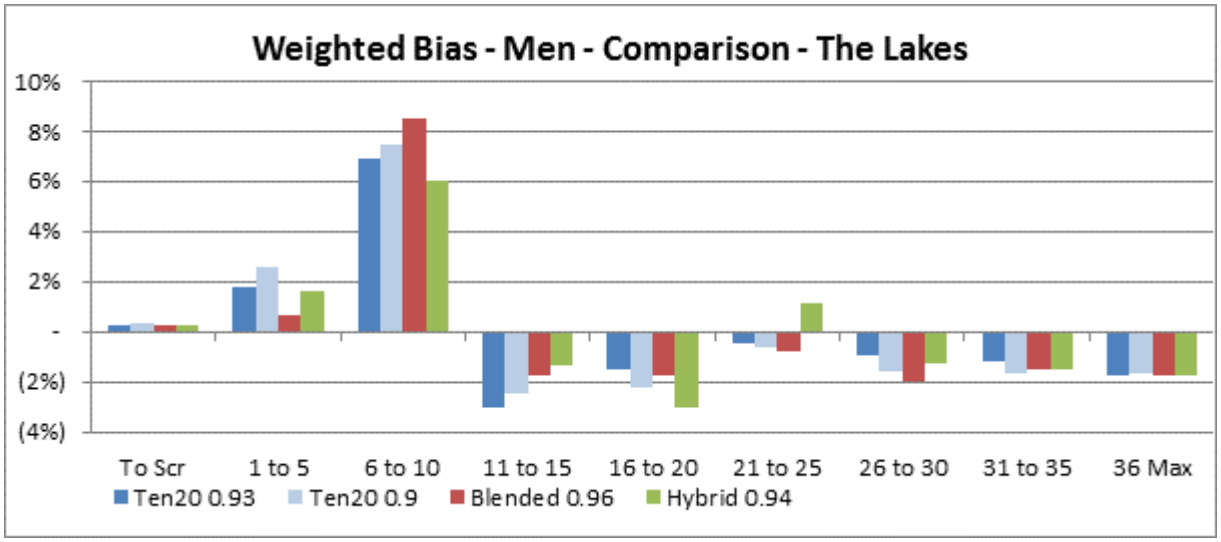
	The Lakes			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	-57.4	33.3	-16.3	21.9
Blended 0.94	-57.5	32.4	-22.5	24.6
Blended 0.92	-70.9	33.8	-25.8	26.7
Hybrid 0.96	-38.9	26.2	-15.7	24.2
Hybrid 0.94	-48.8	26.8	-22.3	26.9

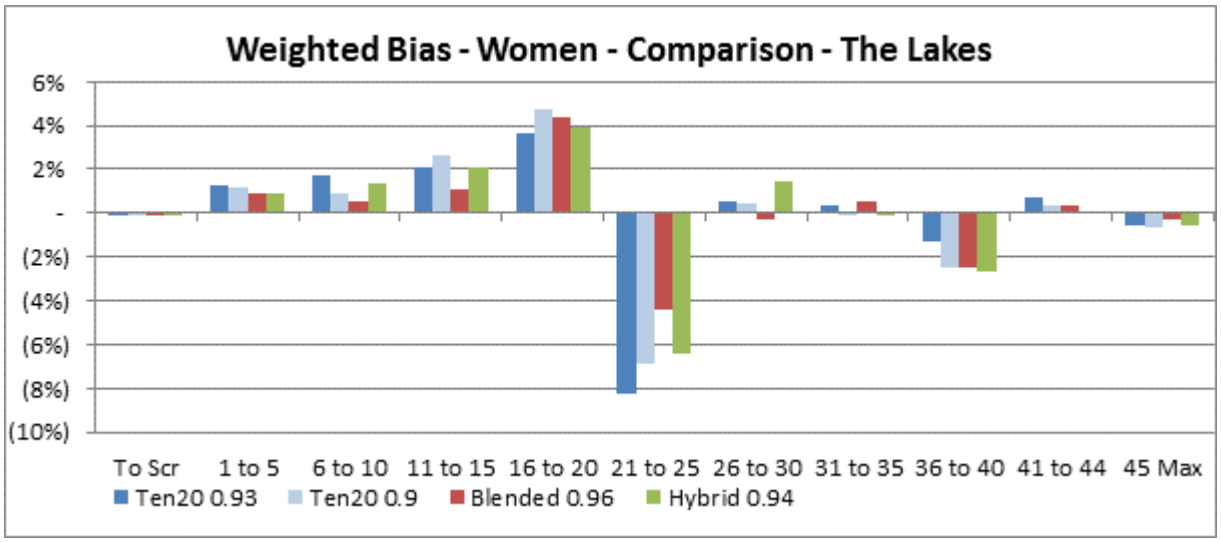
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

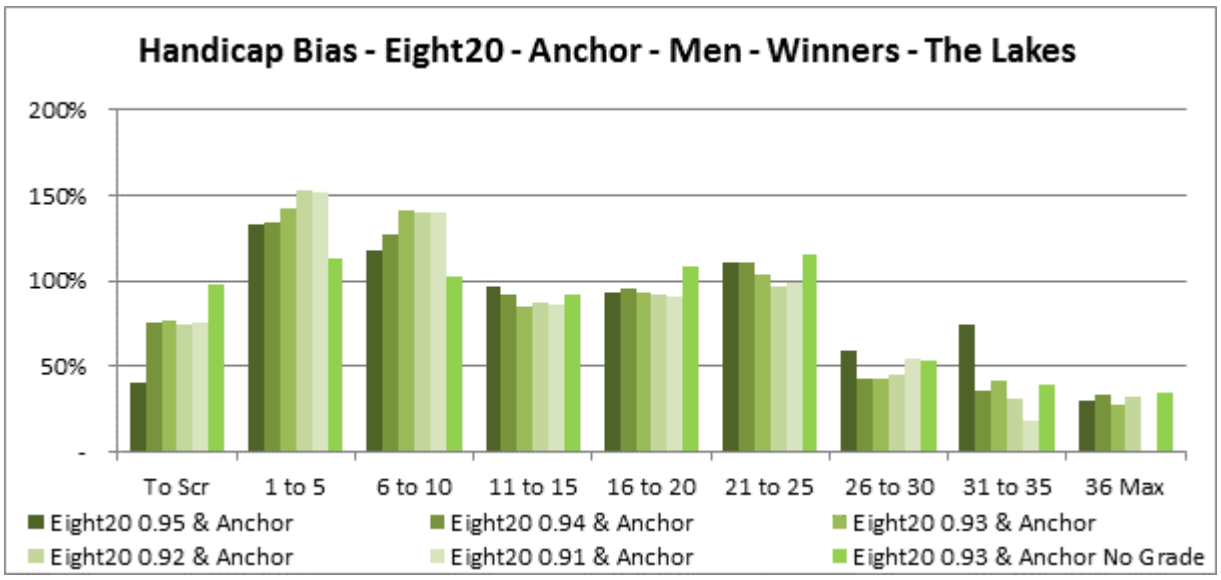
	The Lakes			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	-50.1	29.2	-18.5	30.6
Ten20 0.9	-61.4	32.0	-23.5	29.4
Blended 0.96	-57.4	33.3	-16.3	21.9
Hybrid 0.94	-48.8	26.8	-22.3	26.9

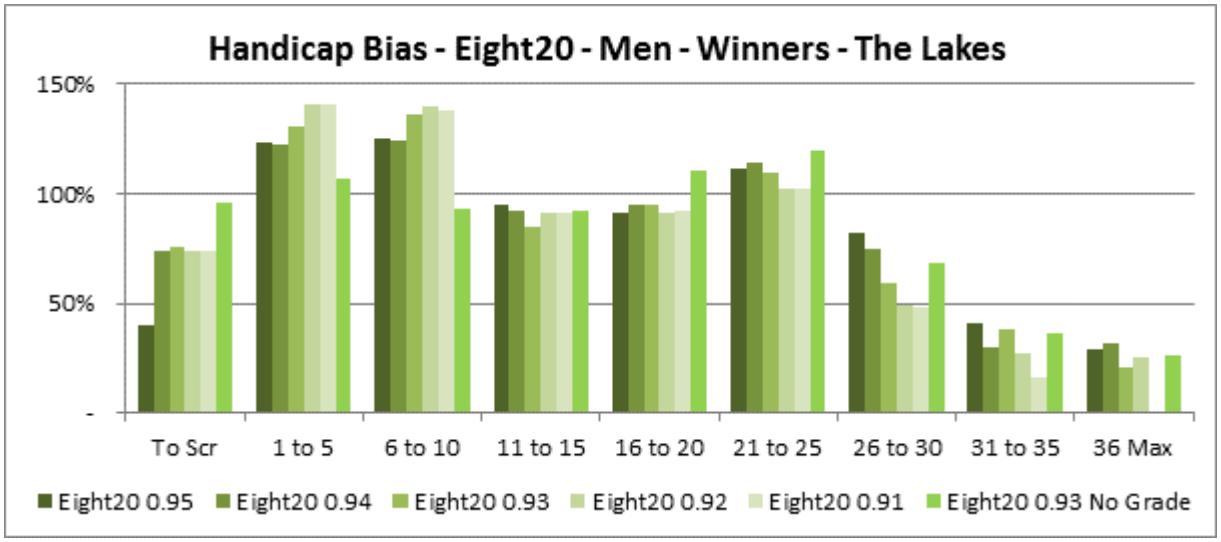
Putting it all together, with the Old System as a reference:

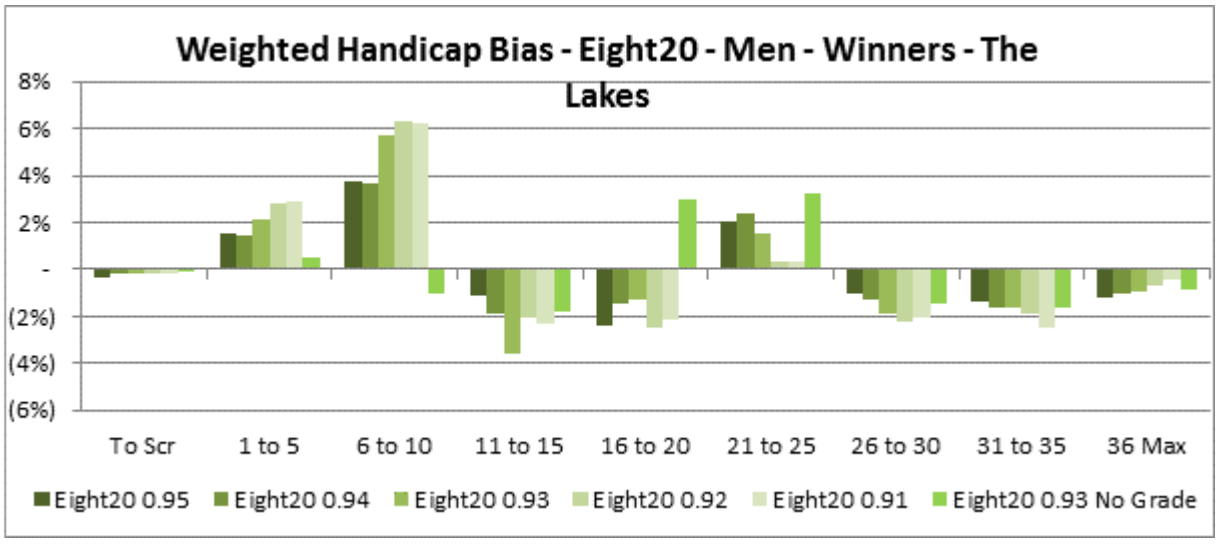
	The Lakes			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-76.1	52.0	-18.0	27.1
Current Period - Ten20 0.96	-34.1	22.8	-18.6	25.0
Old Period - Ten20 0.96	-36.7	37.5	-5.4	32.1
Ten20 0.96	-32.2	28.8	-7.7	20.5
Ten20 0.95	-41.0	32.5	-9.5	26.5
Ten20 0.94	-47.8	28.1	-14.0	24.9
Ten20 0.93	-50.1	29.2	-18.5	30.6
Ten20 0.92	-51.3	30.0	-21.1	27.1
Ten20 0.91	-57.1	31.2	-20.4	27.7
Ten20 0.9	-61.4	32.0	-23.5	29.4
Nine20 0.96	-30.2	28.5	-9.5	23.2
Nine20 0.93	-45.0	27.5	-18.8	26.8
Nine20 0.90	-64.4	34.4	-24.1	31.8
Eight20 0.96	-36.0	27.1	-10.1	25.9
Eight20 0.93	-43.6	25.3	-18.7	25.8
Eight20 0.90	-65.4	39.4	-24.2	31.6
Blended 0.96	-57.4	33.3	-16.3	21.9
Blended 0.94	-57.5	32.4	-22.5	24.6
Blended 0.92	-70.9	33.8	-25.8	26.7
Hybrid 0.96	-38.9	26.2	-15.7	24.2
Hybrid 0.94	-48.8	26.8	-22.3	26.9

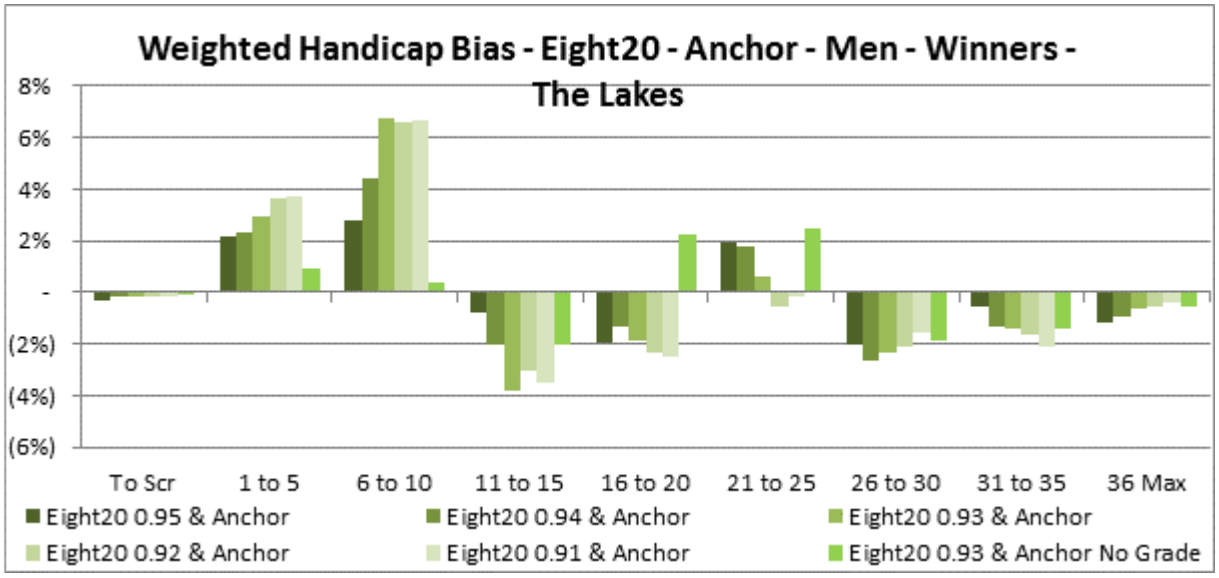
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

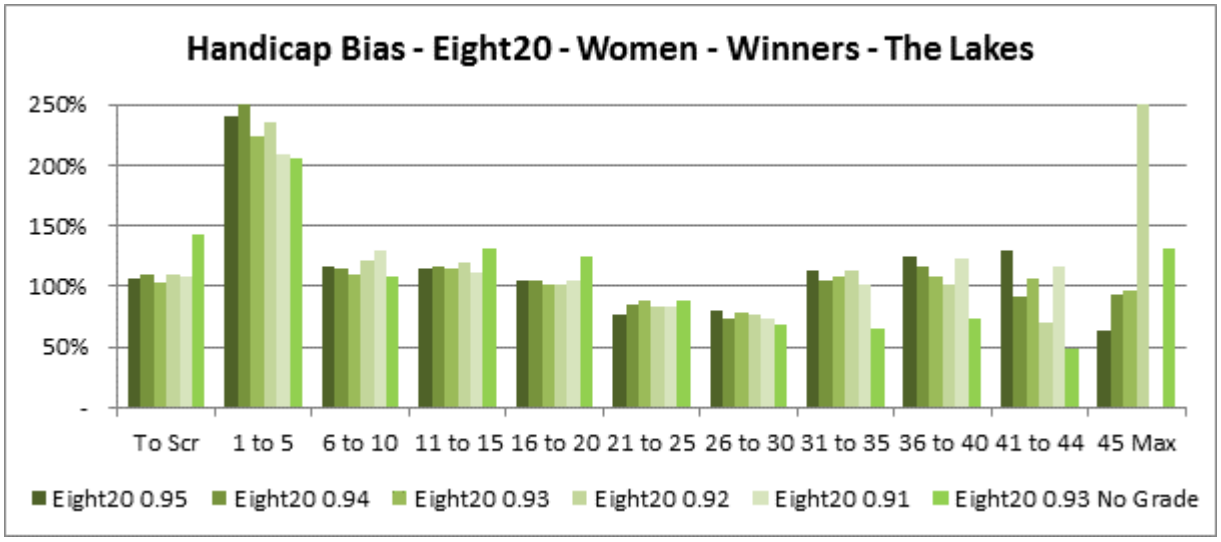
Phase 2

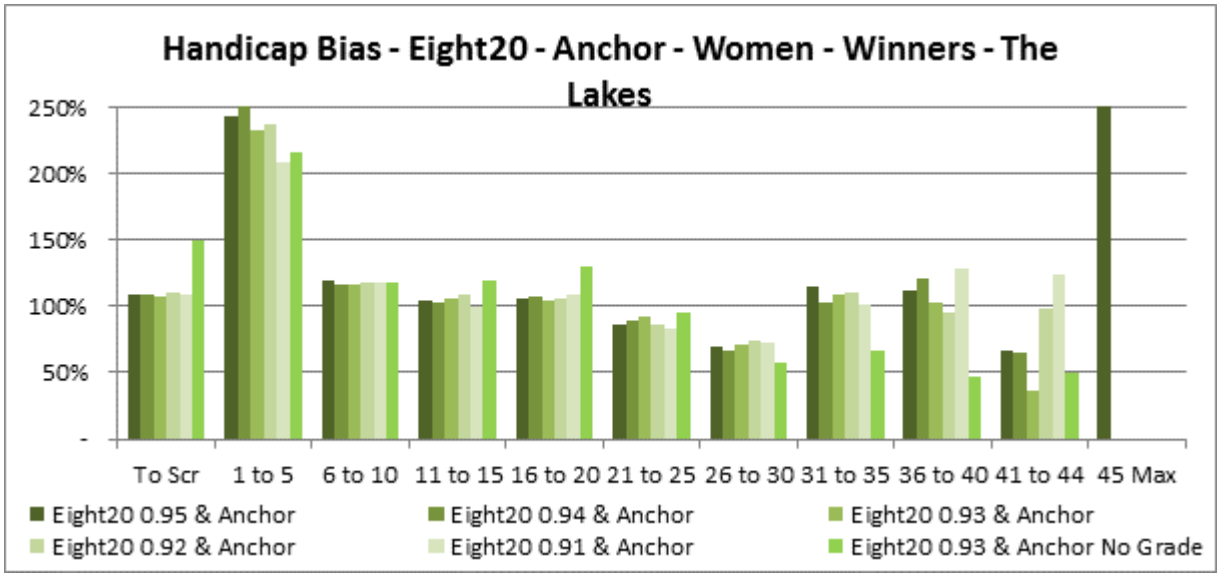

Handicap Bias - Eight20 - Anchor - Men - Winners - The Lakes
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

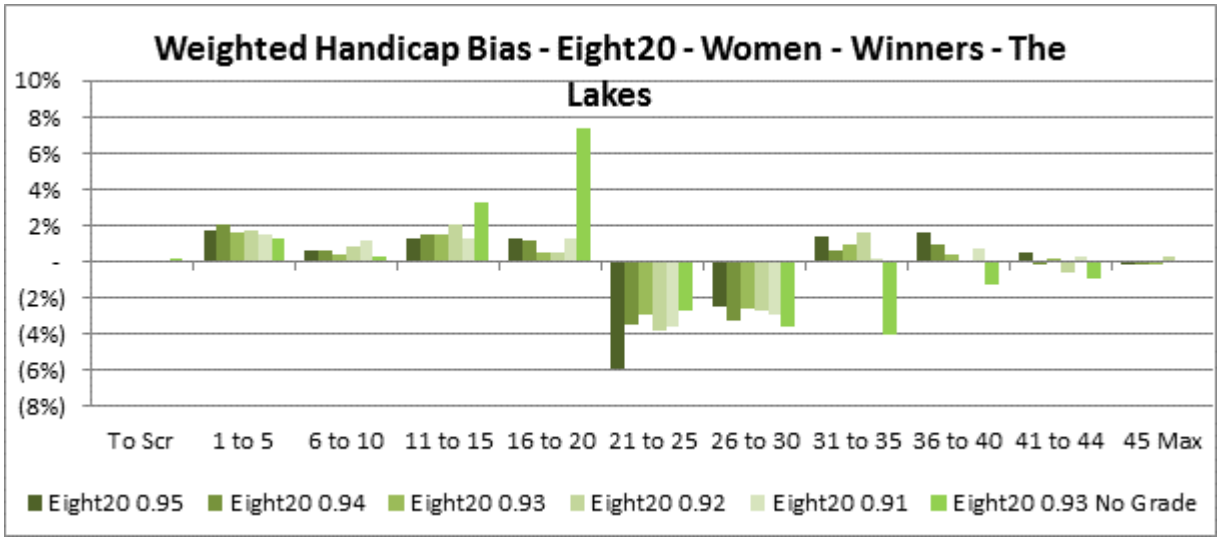

Handicap Bias - Eight20 - Men - Winners - The Lakes
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

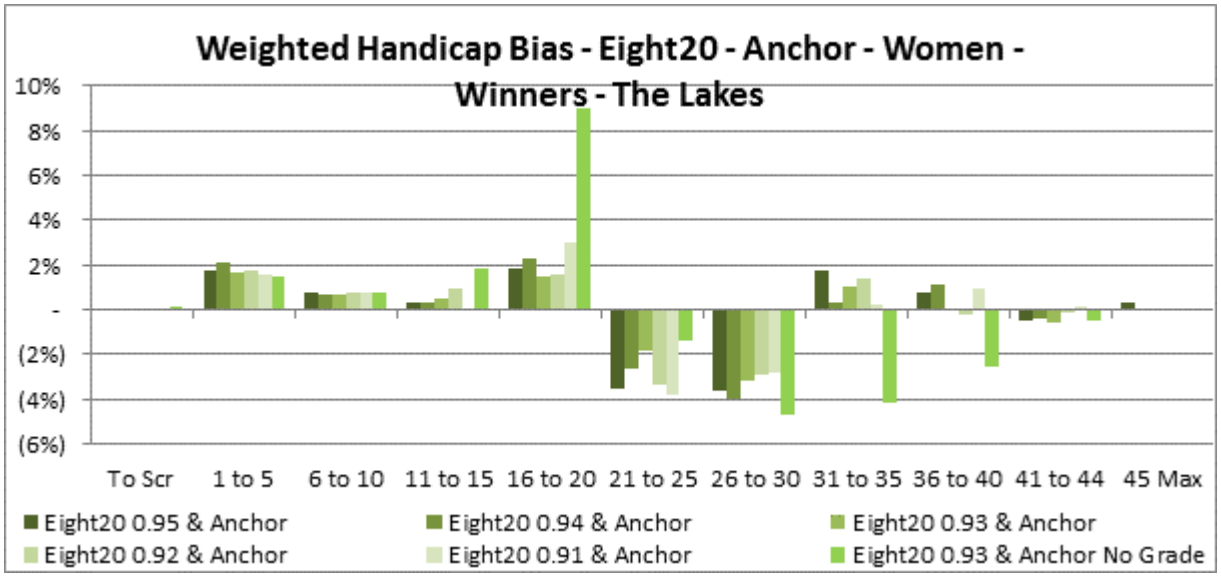

Weighted Handicap Bias - Eight20 - Men - Winners - The Lakes
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

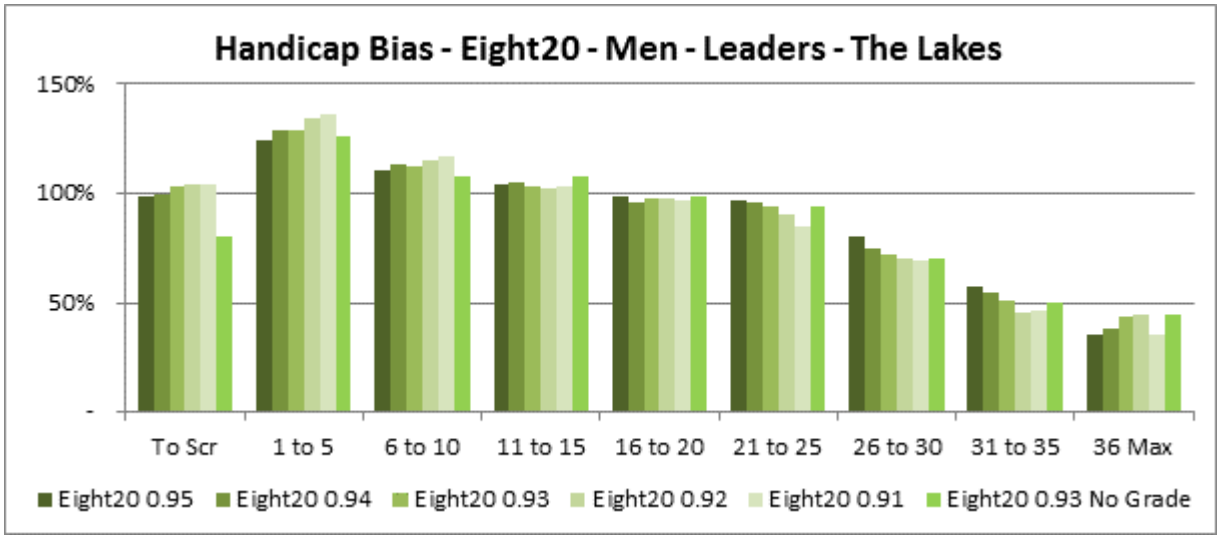

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - The Lakes
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

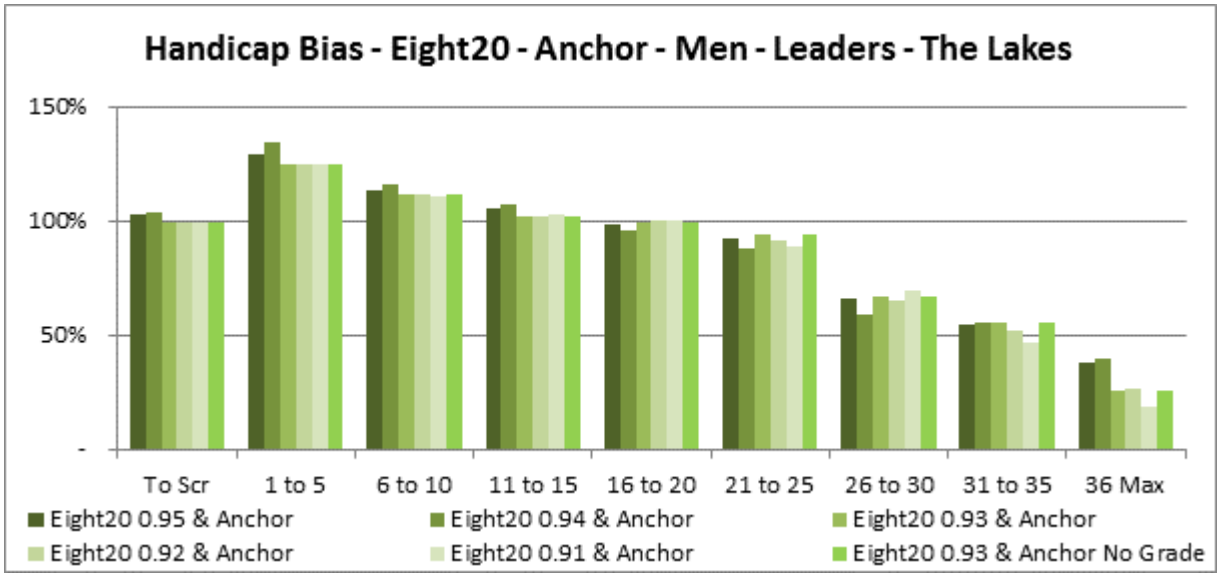

Handicap Bias - Eight20 - Women - Winners - The Lakes
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

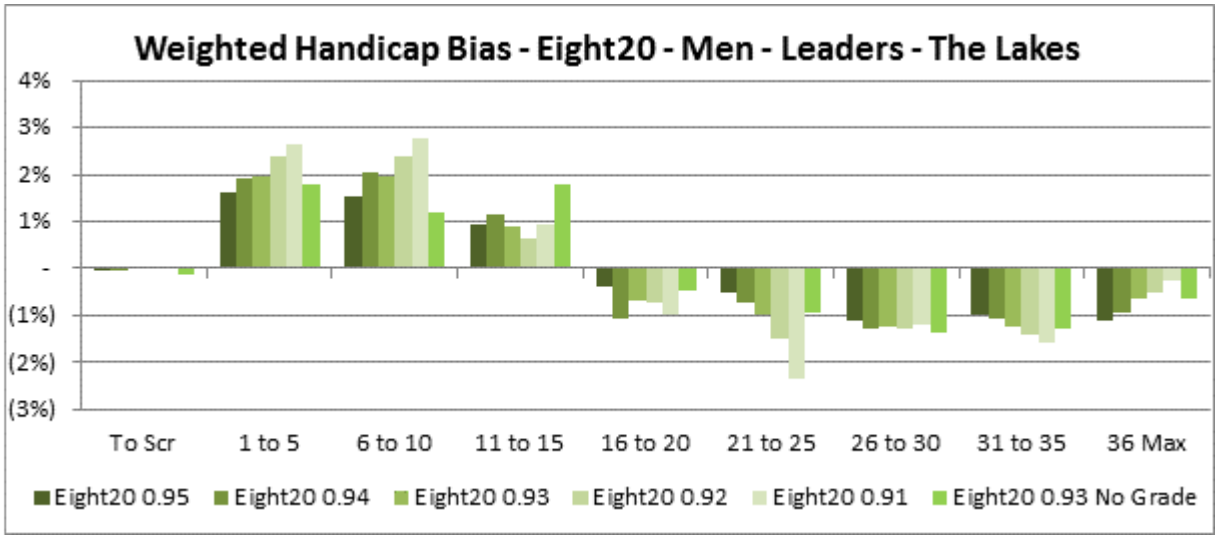

Handicap Bias - Eight20 - Anchor - Women - Winners - The Lakes
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

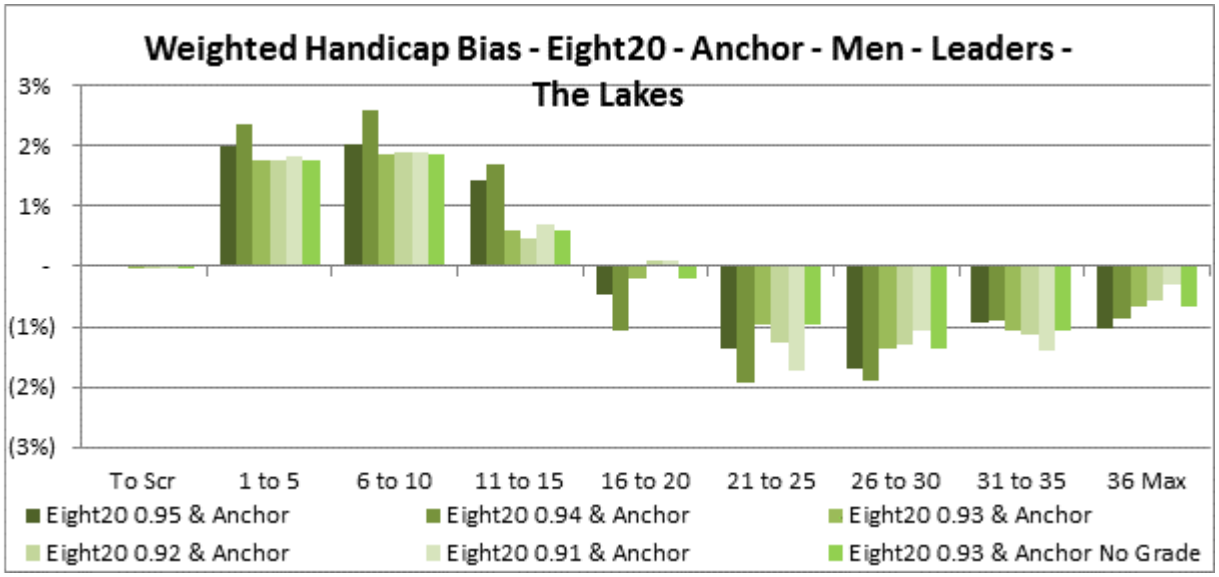

Weighted Handicap Bias - Eight20 - Women - Winners - The Lakes
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

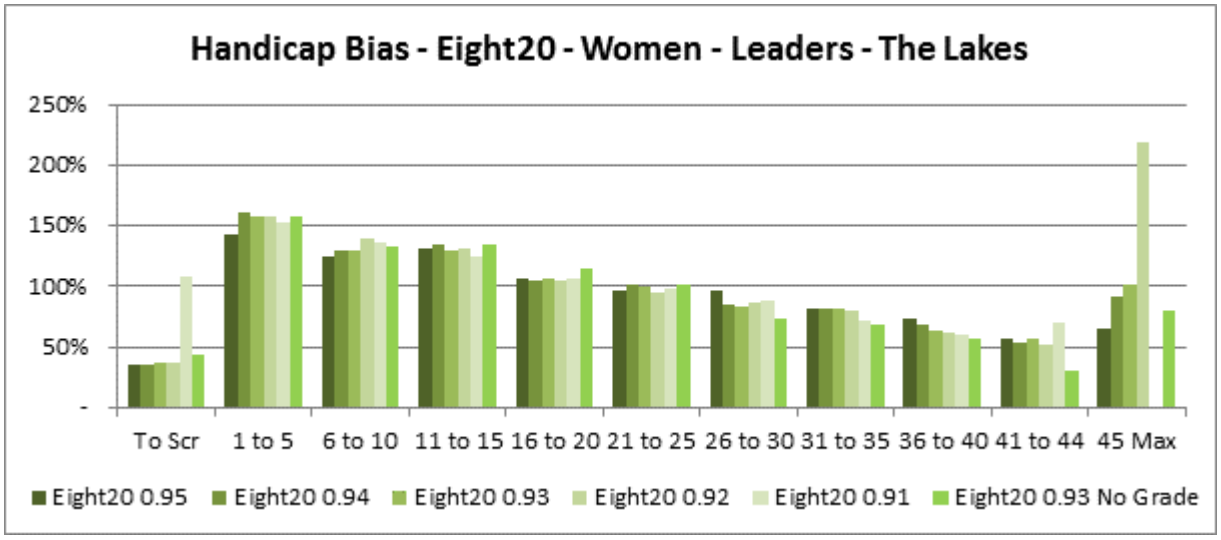

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - The Lakes
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

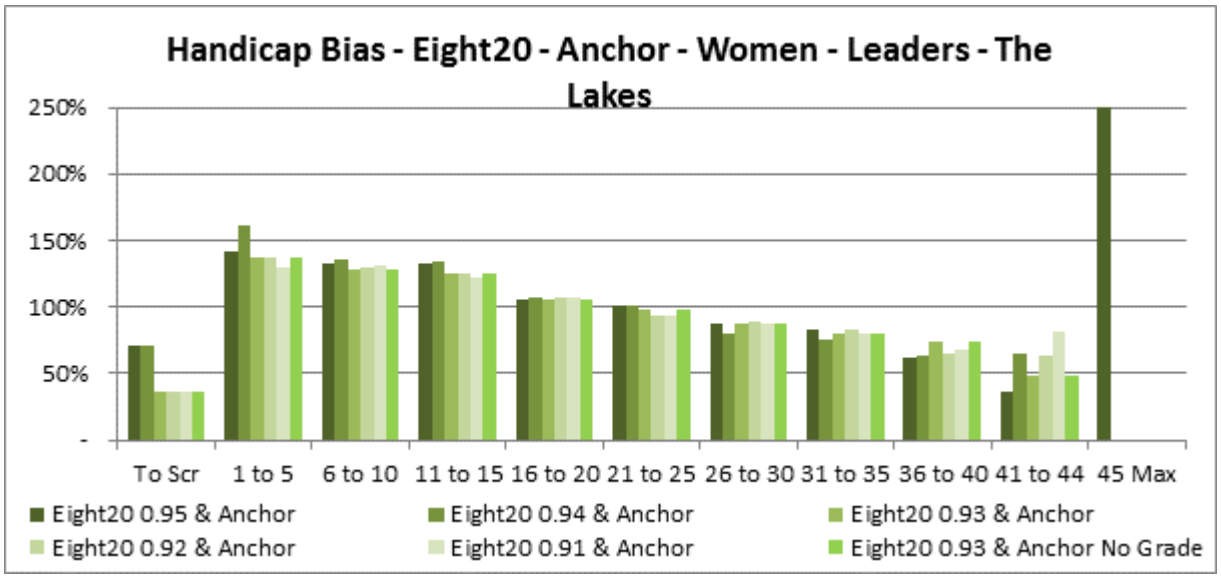

Handicap Bias - Eight20 - Men - Leaders - The Lakes
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

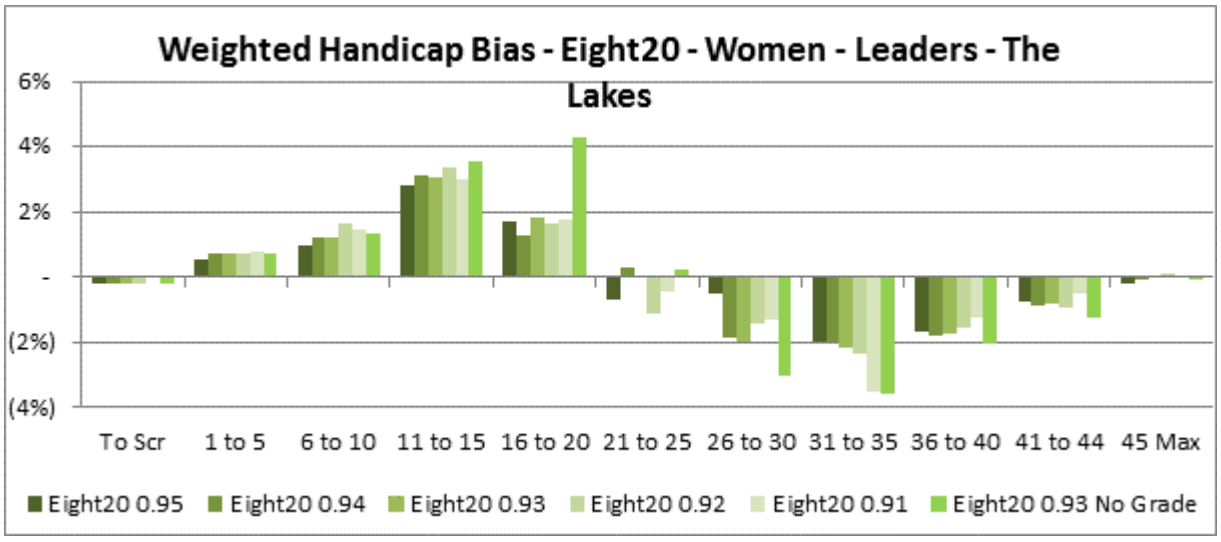

Handicap Bias - Eight20 - Anchor - Men - Leaders - The Lakes
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

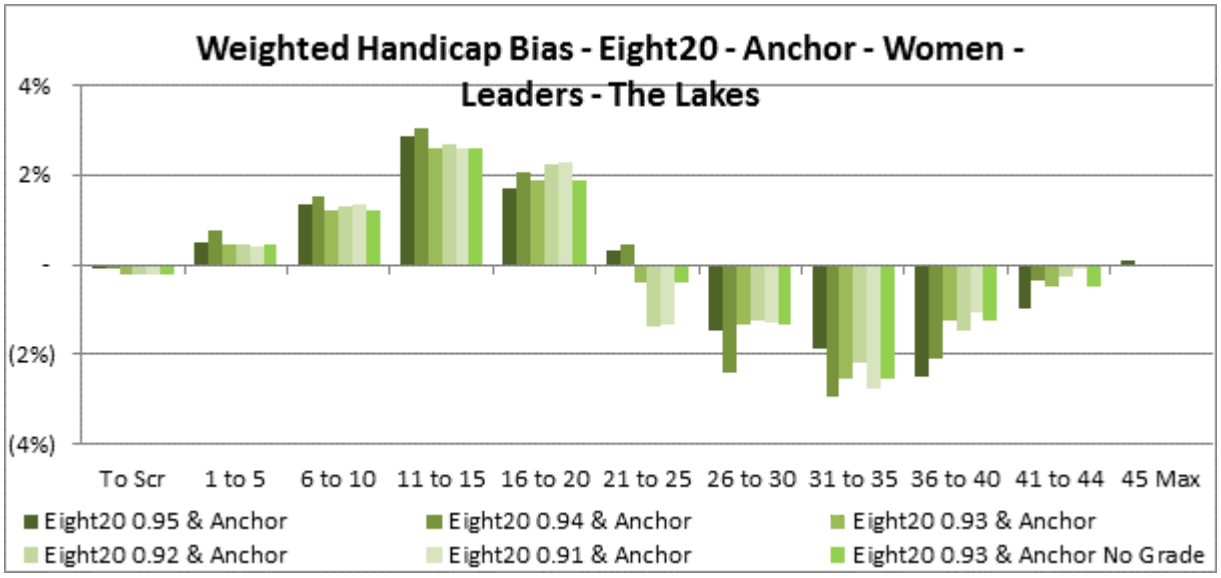

Weighted Handicap Bias - Eight20 - Men - Leaders - The Lakes
4%
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - The Lakes
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - The Lakes
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - The Lakes
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - The Lakes
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

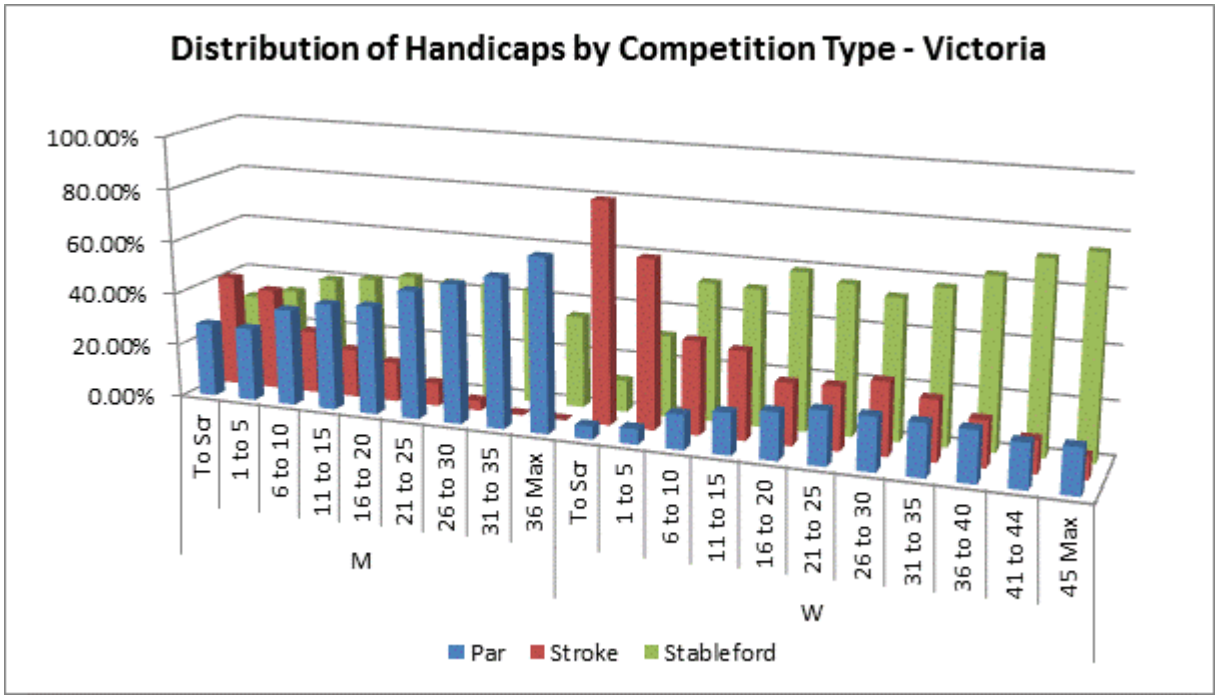


Phase 2 -The Lakes					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	-30.9	20.0	-5.7	22.9
	Eight20 0.94	-31.0	20.2	-13.2	18.0
	Eight20 0.93	-40.2	27.5	-9.4	14.5
	Eight20 0.92	-51.5	29.2	-13.5	18.3
	Eight20 0.91	-51.6	29.1	-11.8	17.2
	Eight20 0.93 No Grade	-9.1	19.2	-35.8	32.6
	Eight20 0.95 & Anchor	-30.9	18.3	-9.4	19.1
	Eight20 0.94 & Anchor	-40.7	23.2	-13.4	18.6
	Eight20 0.93 & Anchor	-48.0	31.8	-13.2	14.4
	Eight20 0.92 & Anchor	-53.5	31.4	-12.4	17.0
	Eight20 0.91 & Anchor	-52.7	32.5	-9.8	18.9
	Eight20 0.93 & Anchor No Grade	-15.7	16.7	-40.2	36.7
Leaders	Eight20 0.95	-31.7	11.1	-22.7	14.2
	Eight20 0.94	-35.6	13.5	-25.3	15.7
	Eight20 0.93	-34.4	13.0	-25.5	16.4
	Eight20 0.92	-38.4	15.2	-26.4	17.1
	Eight20 0.91	-41.6	18.0	-26.8	17.6
	Eight20 0.93 No Grade	-31.9	12.7	-35.4	24.7
	Eight20 0.95 & Anchor	-38.8	14.6	-26.6	16.2
	Eight20 0.94 & Anchor	-43.3	17.7	-28.5	18.9
	Eight20 0.93 & Anchor	-32.0	11.9	-21.5	14.9
	Eight20 0.92 & Anchor	-31.7	12.2	-21.3	15.7
	Eight20 0.91 & Anchor	-32.0	13.0	-20.6	16.2
	Eight20 0.93 & Anchor No Grade	-32.0	11.9	-21.5	14.9

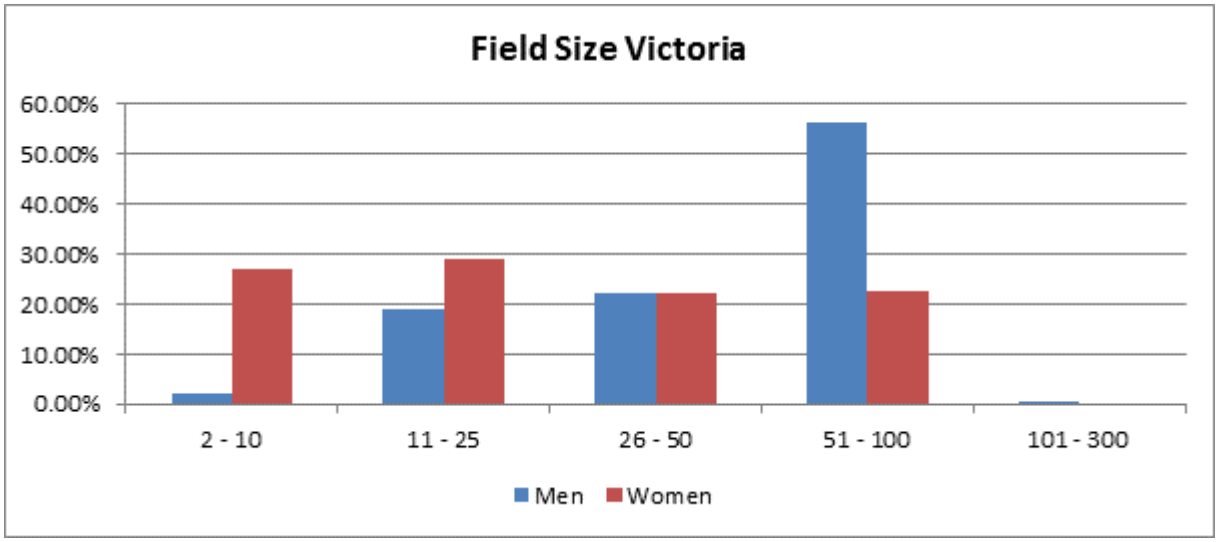
Appendix 15 – Victoria

Phase 1

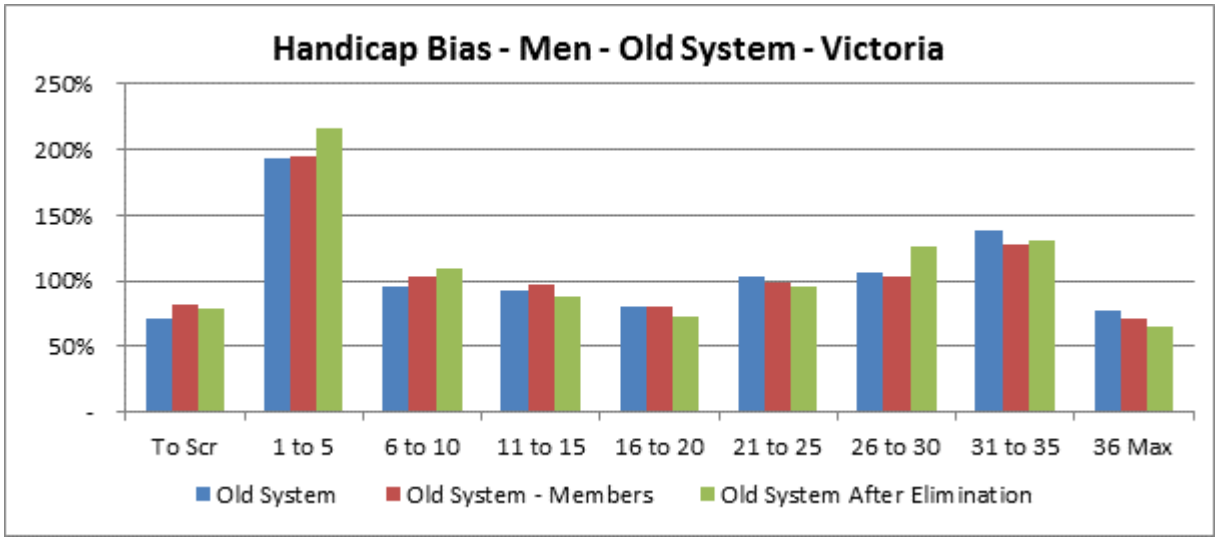
Victoria	Men	Women	Total
Players in Database	1,778	694	2,472
Members	670	343	1,013
Visitors	1,108	351	1,459
Members who have Played 33 Rounds	636	331	967
Members with Last Round In Old System	144	40	184
Members with Last Round in Current System	526	303	829
Earliest Round	27/12/2007	11/12/2007	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			254
Number of Home Competitions	780	827	1,607
Number of Rounds of Golf	46,690	17,518	64,208
Number of Rounds at Home	38,138	13,983	52,121
Number of Rounds at Home Old	30,206	10,201	40,407
Number of Rounds at Home Current	7,932	3,782	11,714
Num Rnds Members at Home	34,839	13,350	48,189
Num Rnds Members at Home Old	27,627	9,801	37,428
Num Rnds Members at Home Cur	7,212	3,549	10,761
Num Rnds After Eliminations	19,976	5,951	25,927
Num Rnds After Eliminations Old	13,420	3,221	16,641
Num Rnds After Eliminations Cur	6,556	2,730	9,286

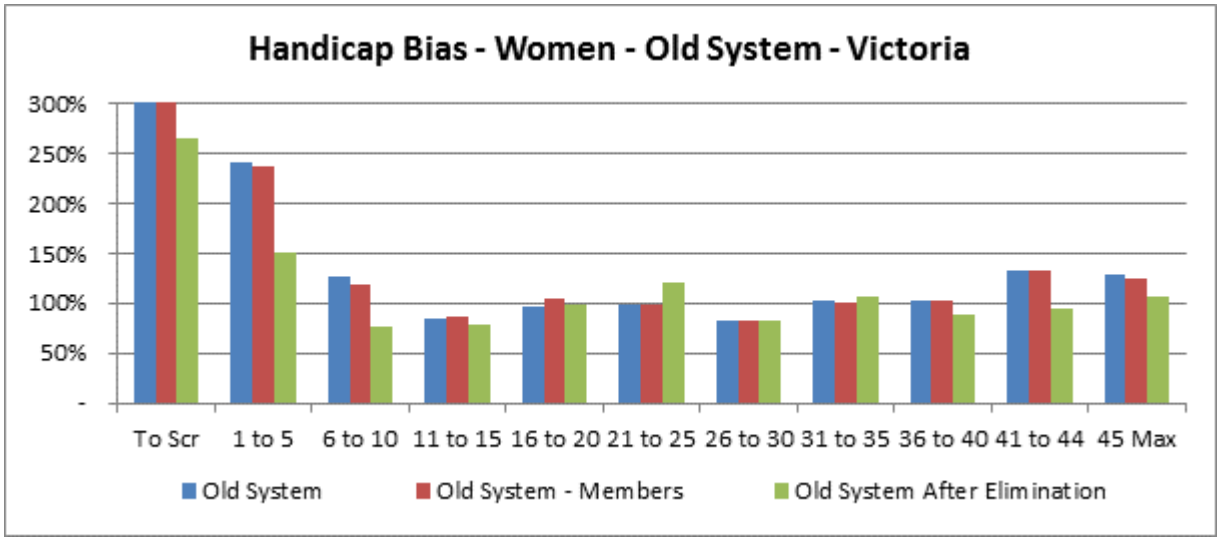


Most men's competitions are with a field of 51 - 100, the women's field is spread.

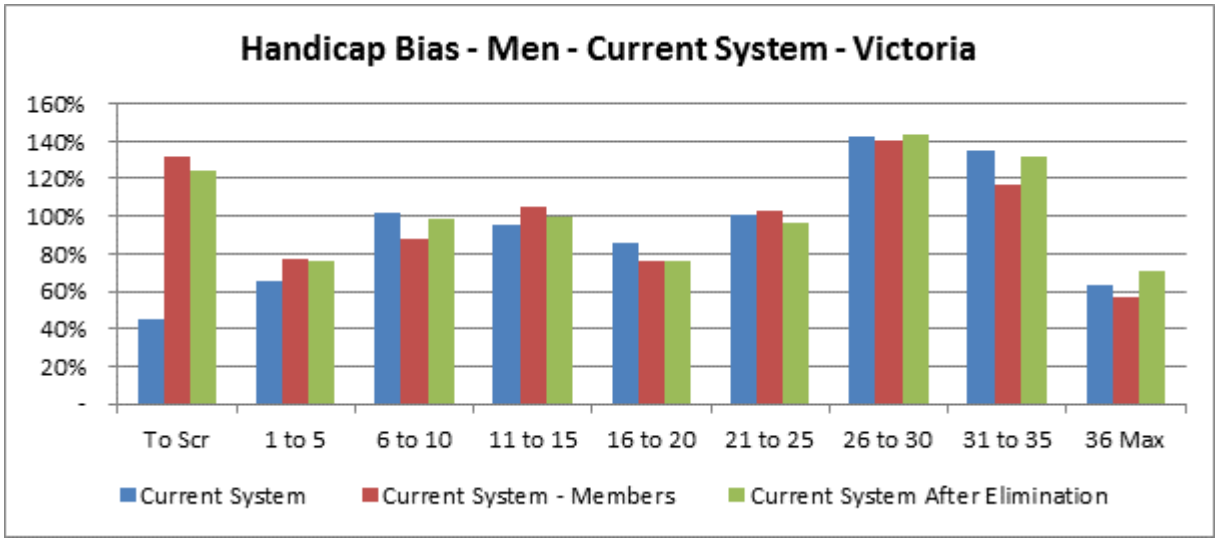


Under the Old System, there was a bias in favour of the low and high handicappers. What is shown below is the bias for all players, then Members only, and finally the case with those members who had played only 32 rounds or less eliminated, and for competitions played from 1/12/2008.

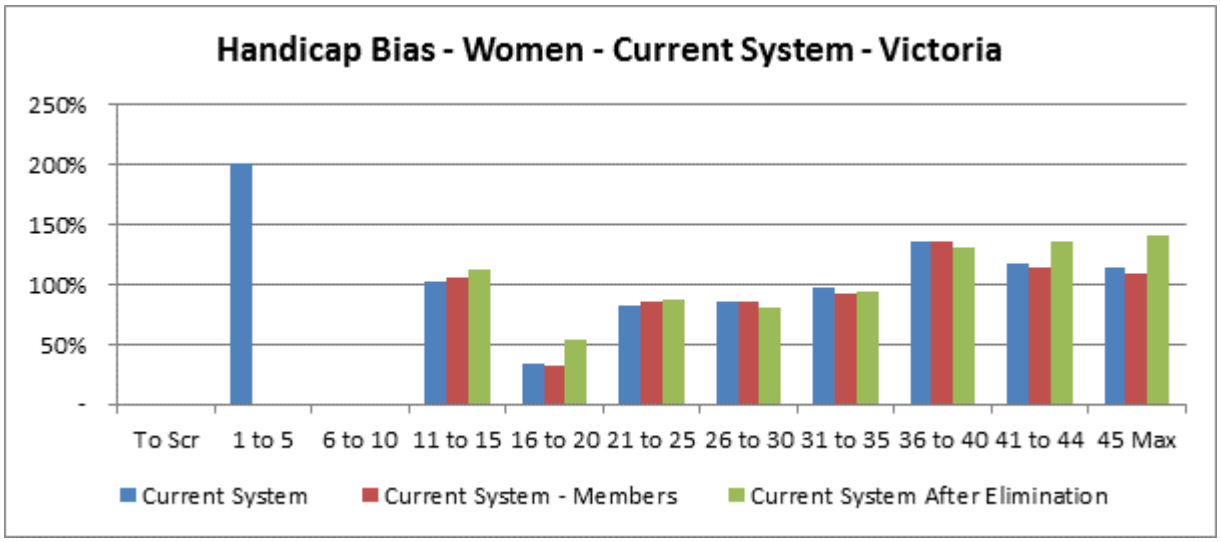




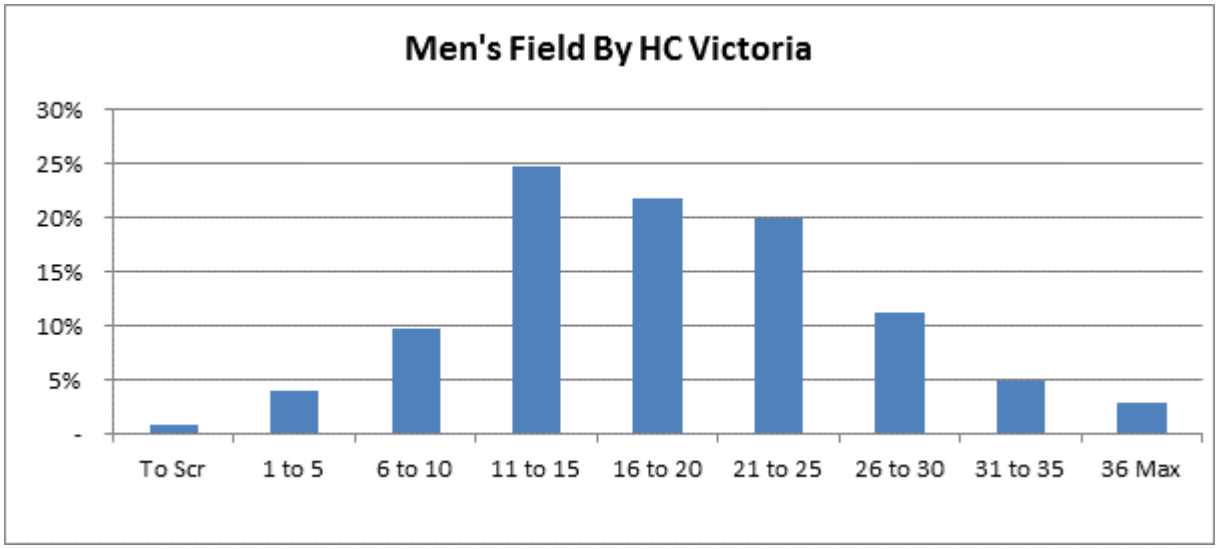
Under the Current System, this bias is now only in favour of the high markers.

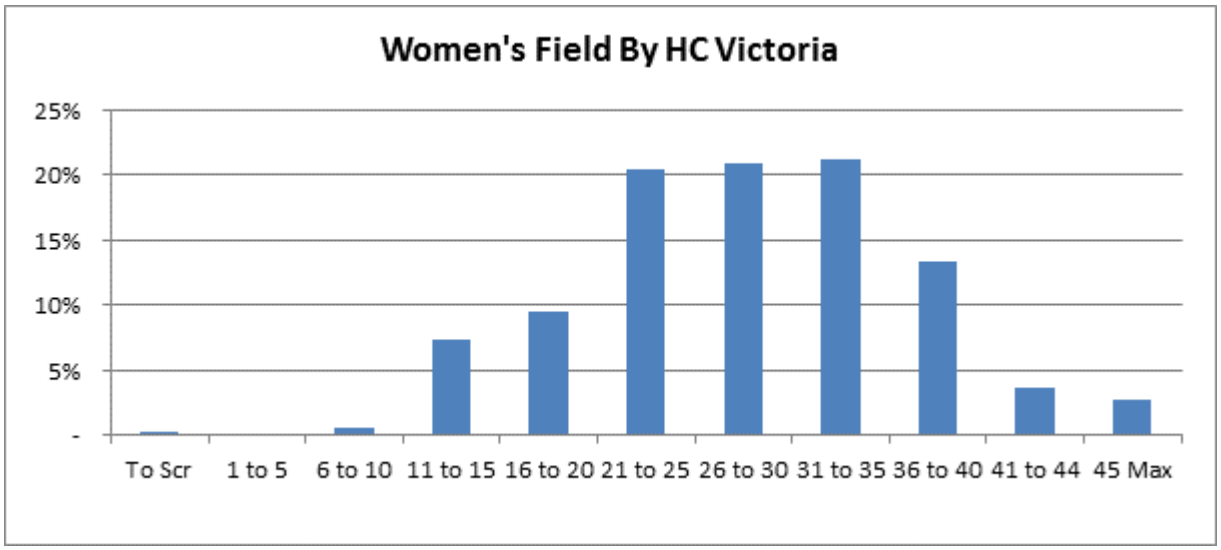


The picture is somewhat similar for the women.



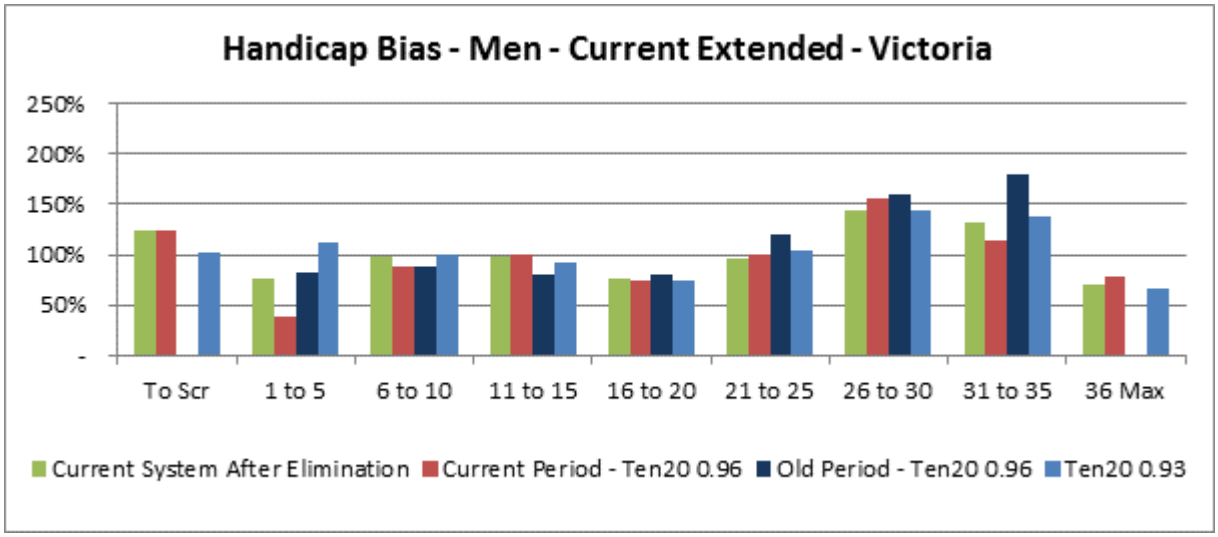
A point to make regarding the very low and very high handicappers is that they represent a very small proportion of the field. When dealing with very small numbers the results tend to be “lumpy”, and not too much store should be put on the bias for the lowest and highest markers.



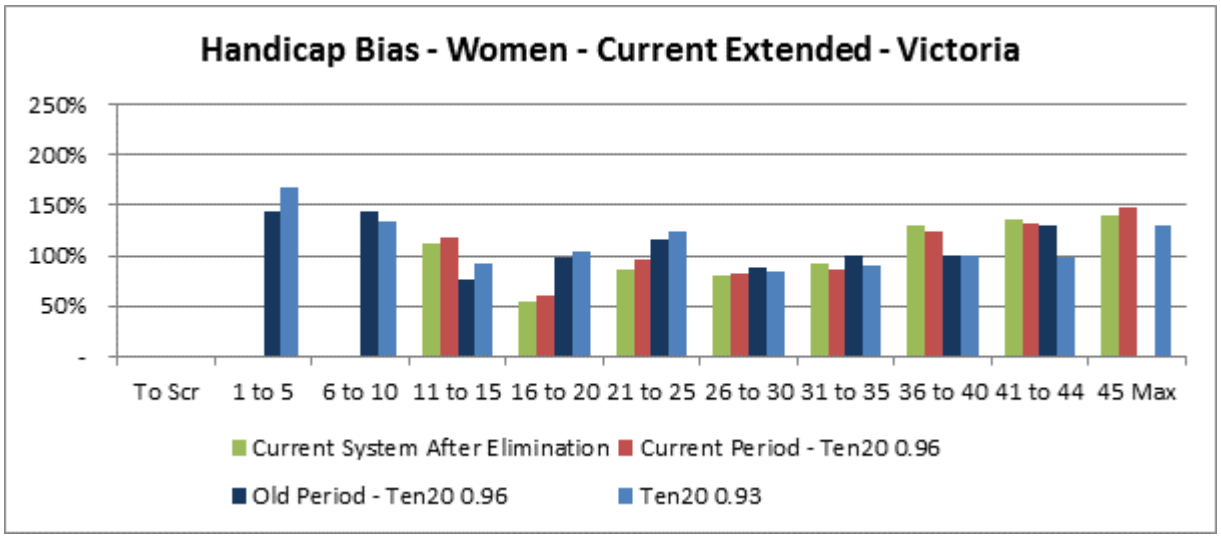


In order to consider various alternate handicap models, it was necessary to compare like with like, and so, as was mentioned above, players with 32 or fewer rounds were eliminated. The handicap bias based of the current system (Ten20 0.96) was calculated, firstly for just the period of the current system, namely from 9th April 2010, and then for the whole period of the data, dating back to 2008.

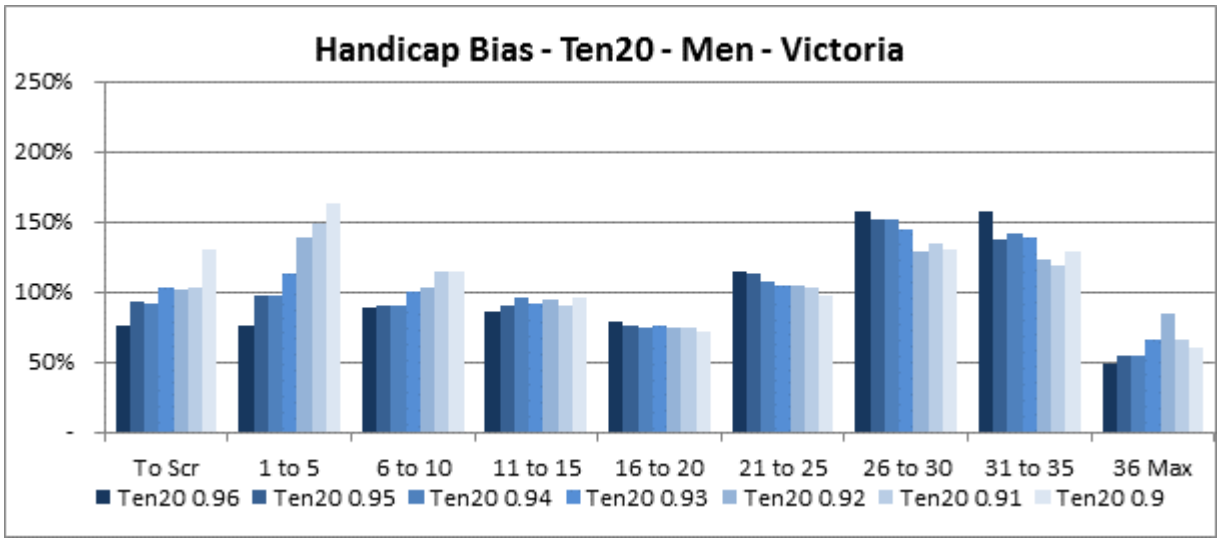
In the chart below, the green and red series should theoretically be the same, and they are indeed quite close. Differences are accounted for my manual adjustments, input error, playing off a handicap that was not equal to the calculated exact, etc. The blue series are Ten20 for the whole two-year period.

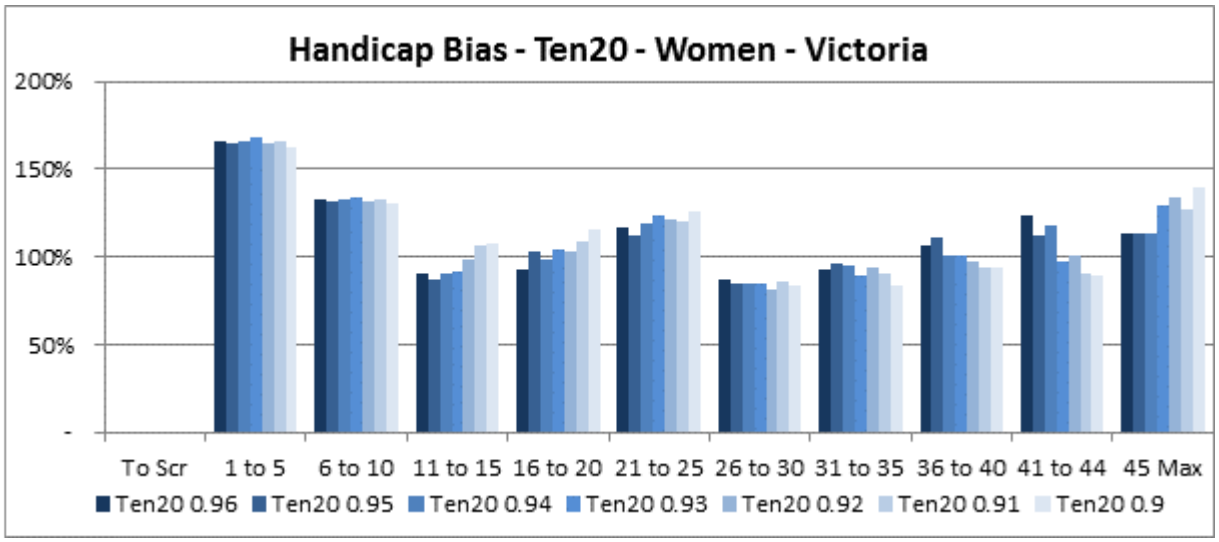


For women, the low and high markers would have dominated over the two-years.

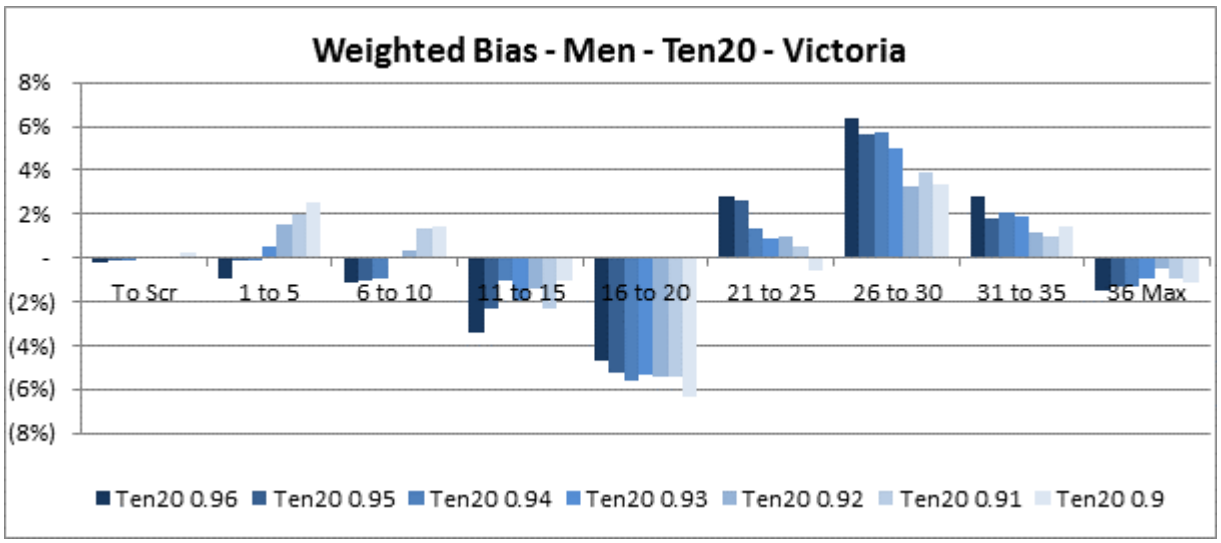


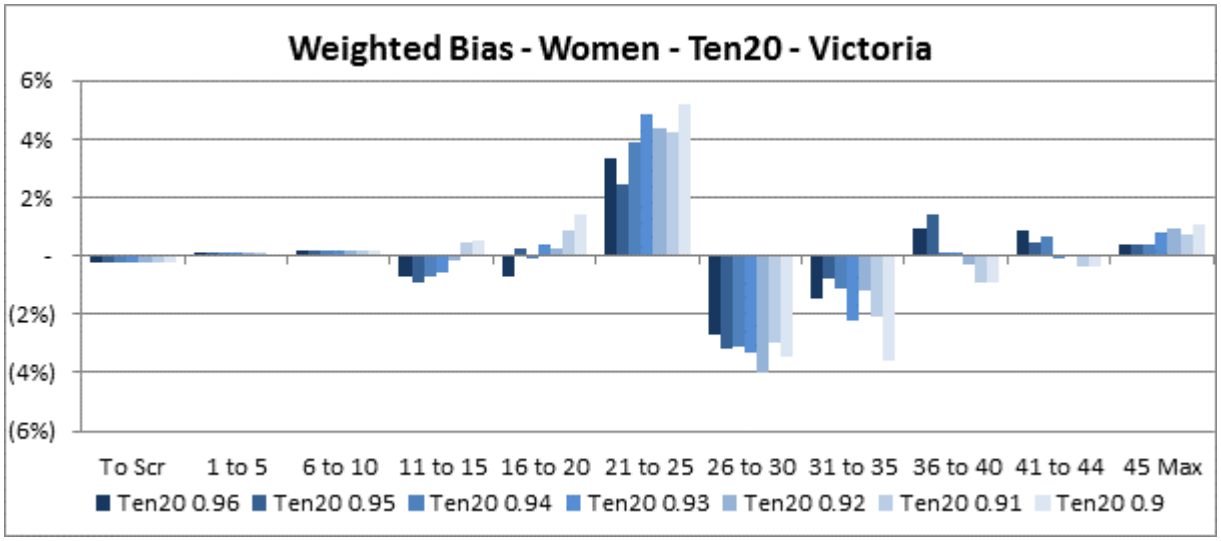
The simplest way to adjust the Tilt of the bias is to vary the BFE. Here seven different BFEs are compared from the current 0.96 to 0.90.





In order to assess how the above biases impact on the membership, one can calculate the bias, weighted by the number of players in each range. To highlight the differences from the 100% norm, these weighted differences are given as a plus or minus from 100%.

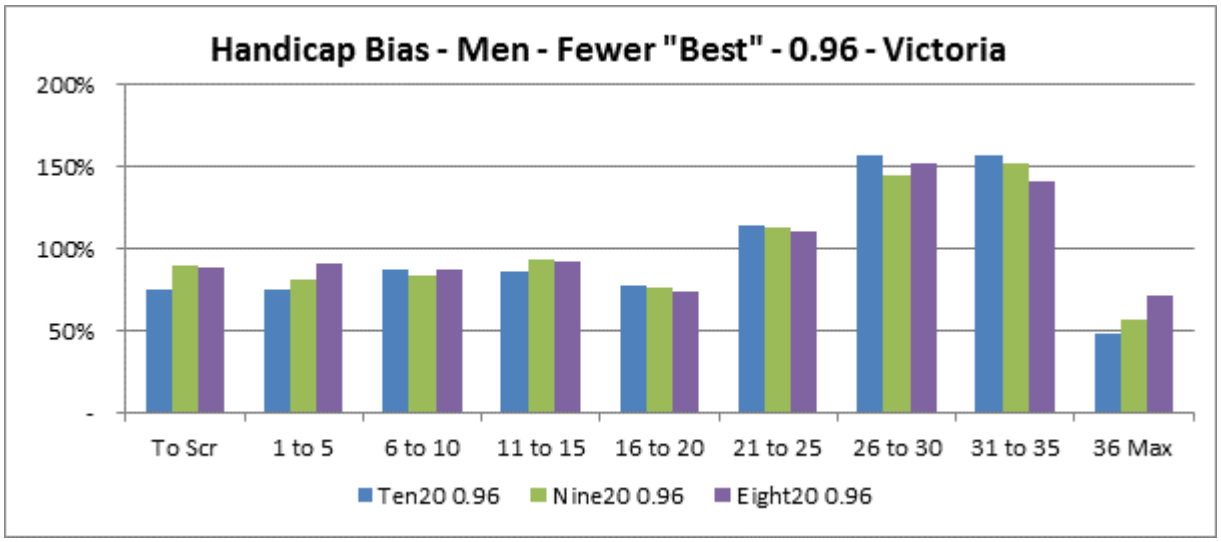


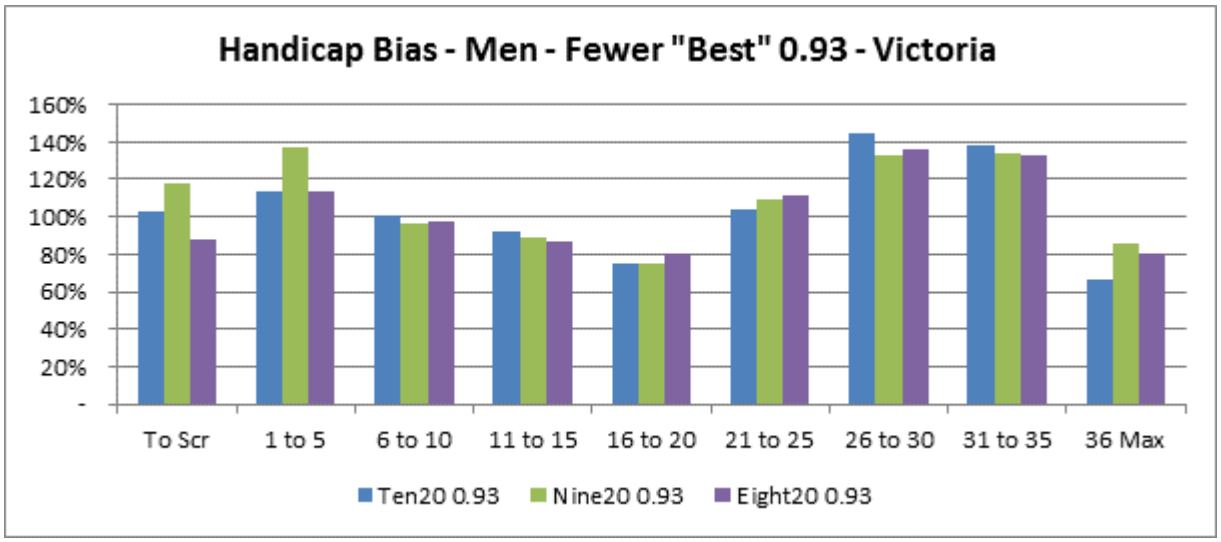


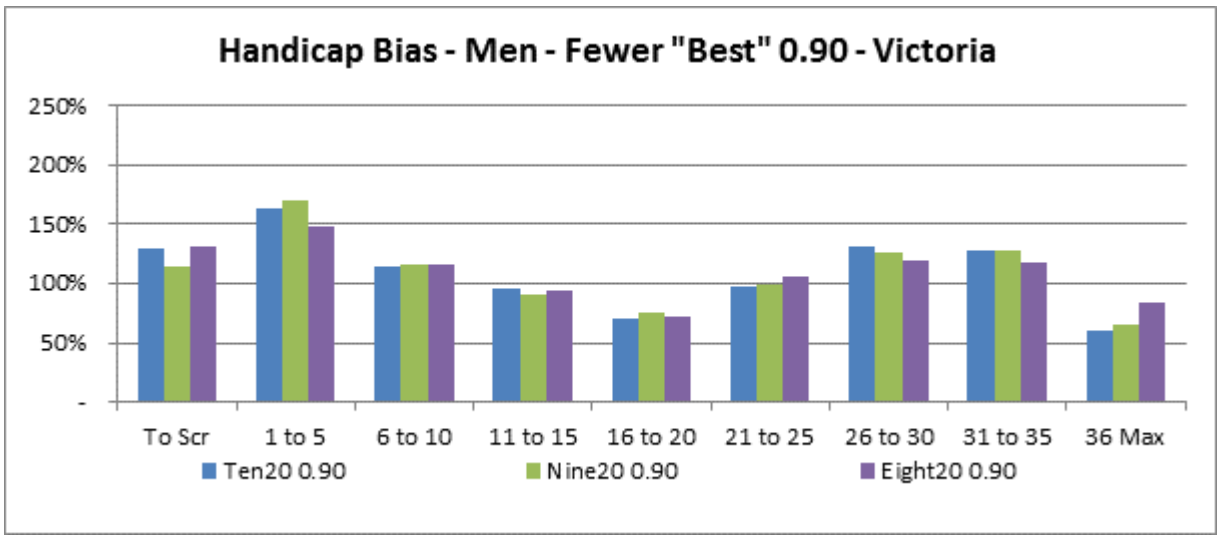
Computing the Tilt Index and the Level Index (see the methodology section) enables ready comparison: a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

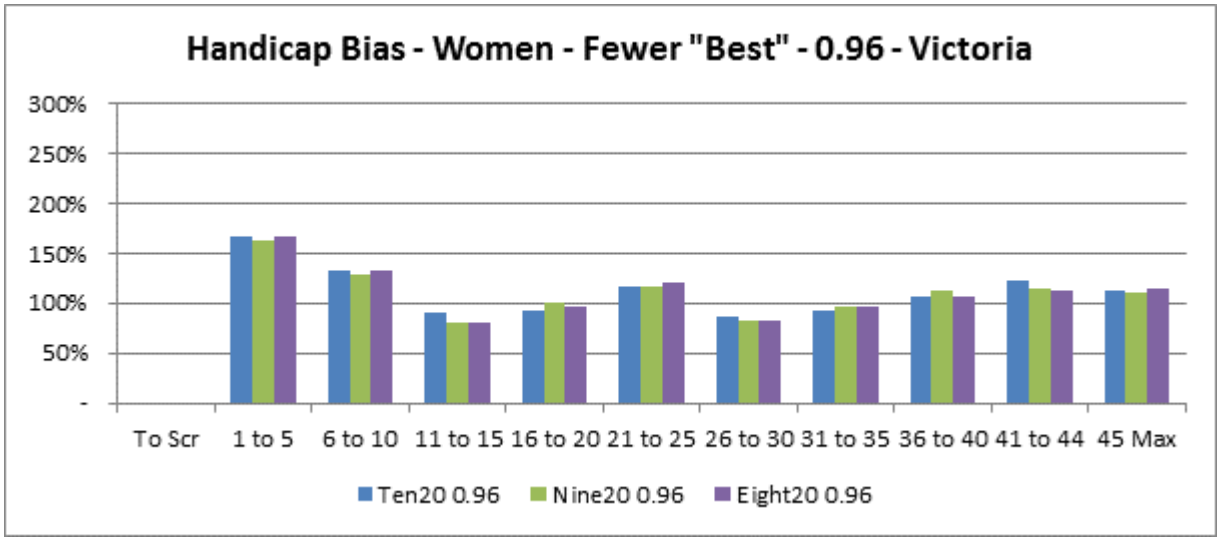
	Victoria			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	46.2	34.4	4.1	15.3
Ten20 0.95	32.0	31.3	4.2	14.2
Ten20 0.94	29.2	30.4	0.9	16.5
Ten20 0.93	21.5	28.1	-2.6	20.1
Ten20 0.92	8.7	24.2	-2.1	19.4
Ten20 0.91	1.3	26.8	-8.3	18.4
Ten20 0.9	-7.9	28.5	-10.7	23.7

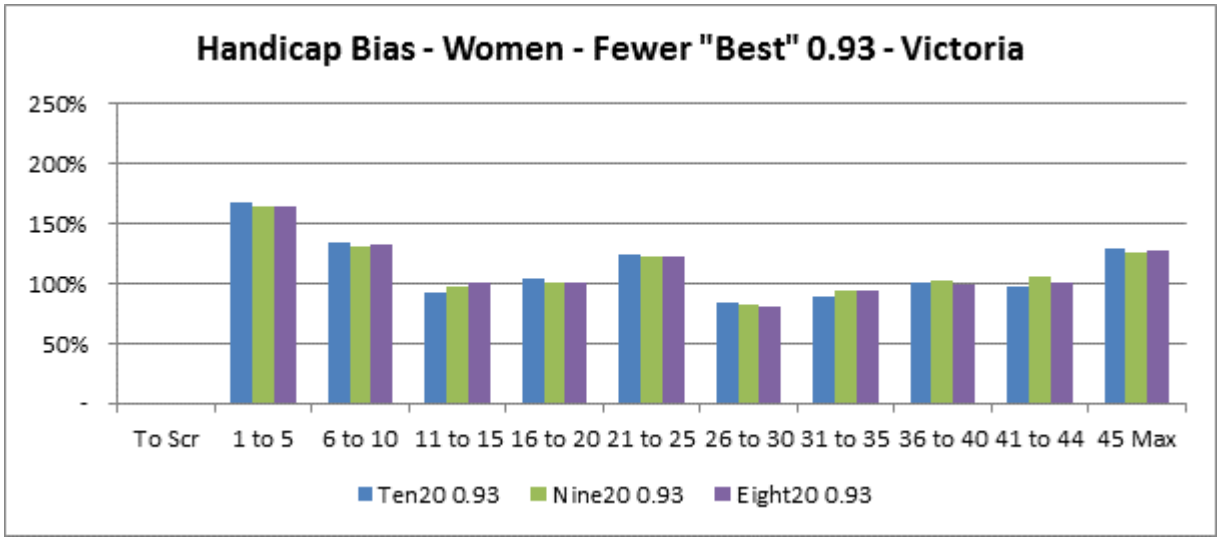
As described in the Methodology section, other systems have been considered: the Fewer Best Scores, the Blended and the Hybrid. Starting with the Fewer Best for various BFEs:

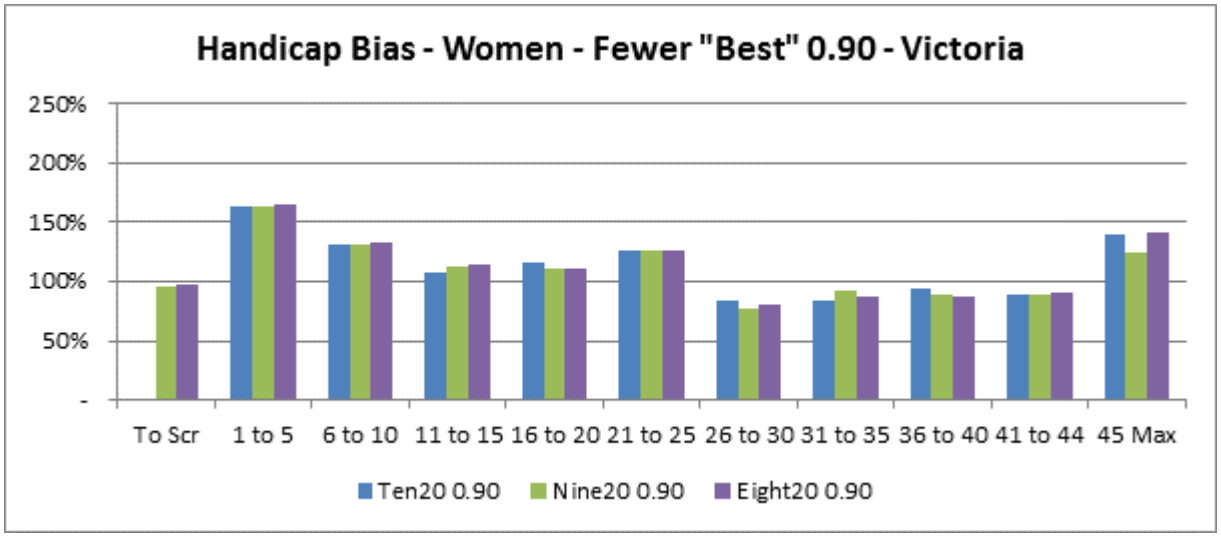







Handicap Bias - Women - Fewer "Best" - 0.96 - Victoria
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.96
Nine20 0.96
Eight20 0.96

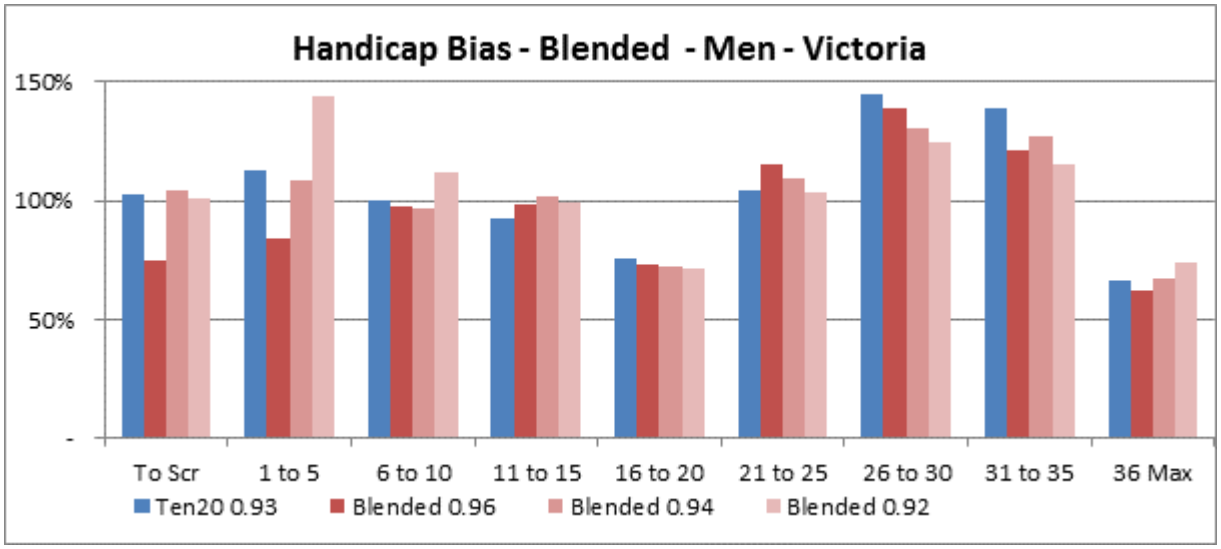

Handicap Bias - Women - Fewer "Best" 0.93 - Victoria
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.93
Nine20 0.93
Eight20 0.93

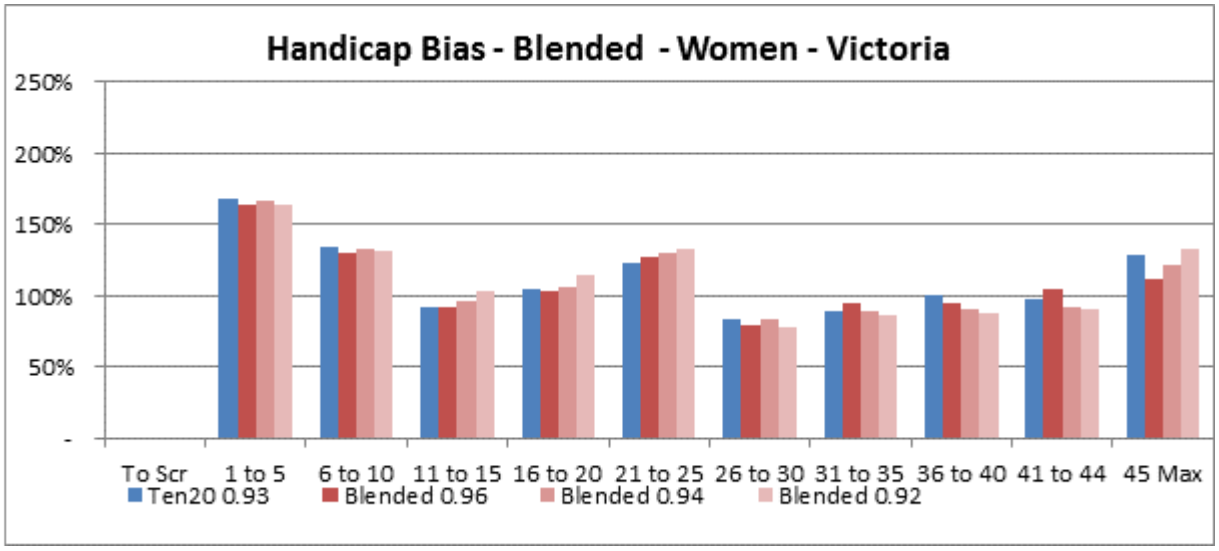

Handicap Bias - Women - Fewer "Best" 0.90 - Victoria
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Ten20 0.90
Nine20 0.90
Eight20 0.90

To compare the nine cases, for each of men and women, the Tilt and Level Indices can be calculated.

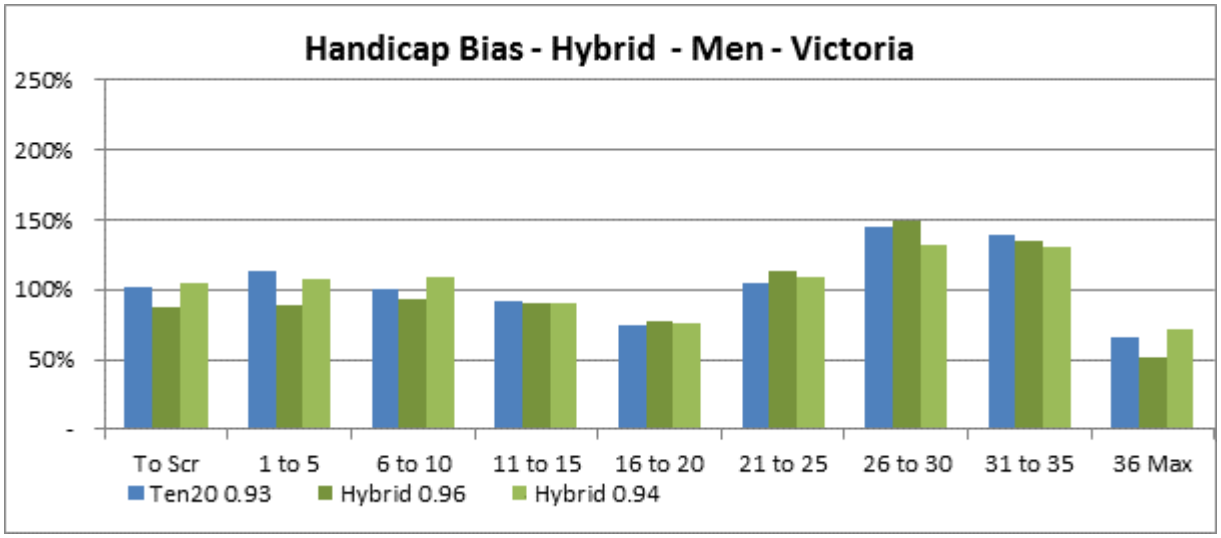
	Victoria			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.96	46.2	34.4	4.1	15.3
Nine20 0.96	38.6	30.1	5.8	17.6
Eight20 0.96	37.2	31.7	4.1	18.6
Ten20 0.93	21.5	28.1	-2.6	20.1
Nine20 0.93	17.9	27.1	-1.2	19.4
Eight20 0.93	25.7	25.8	-3.0	20.5
Ten20 0.90	-7.9	28.5	-10.7	23.7
Nine20 0.90	-6.4	26.6	-12.9	24.4
Eight20 0.90	-4.1	25.0	-12.7	23.7

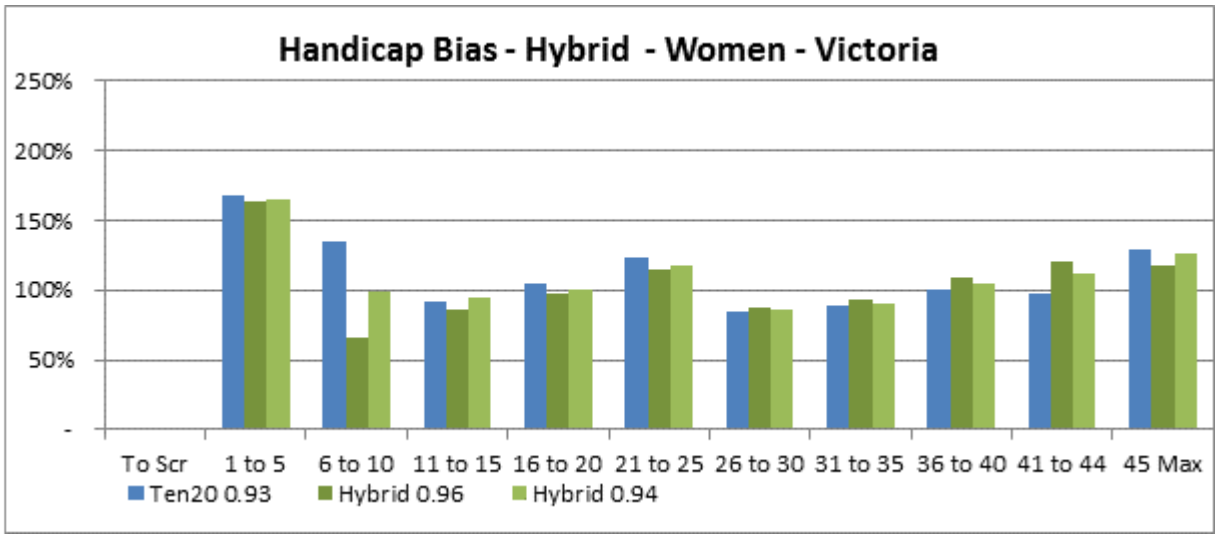
For the Blended:





For the Hybrid:

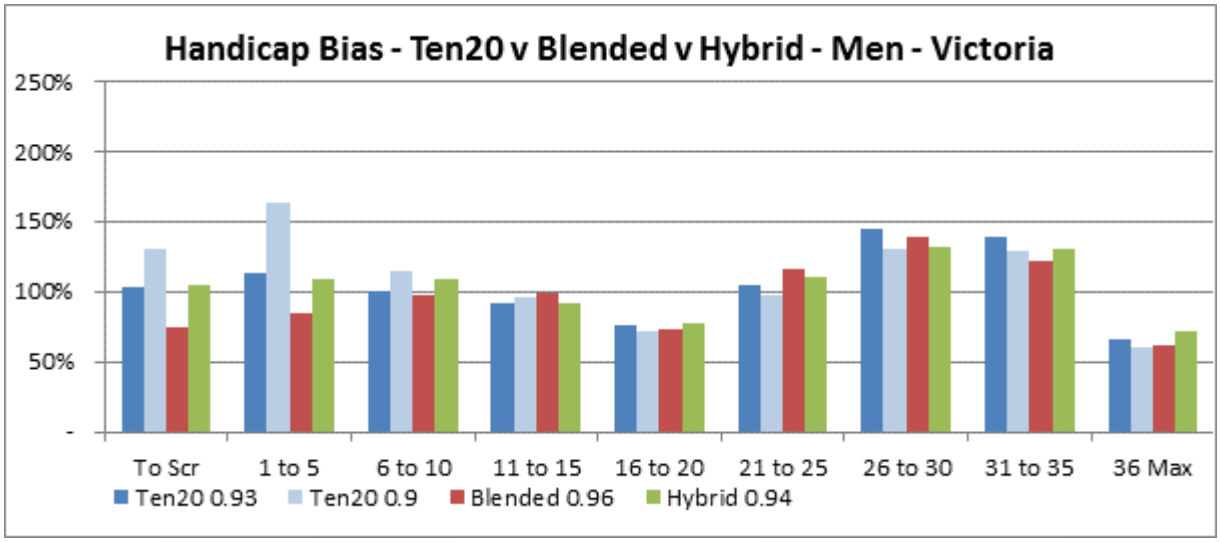


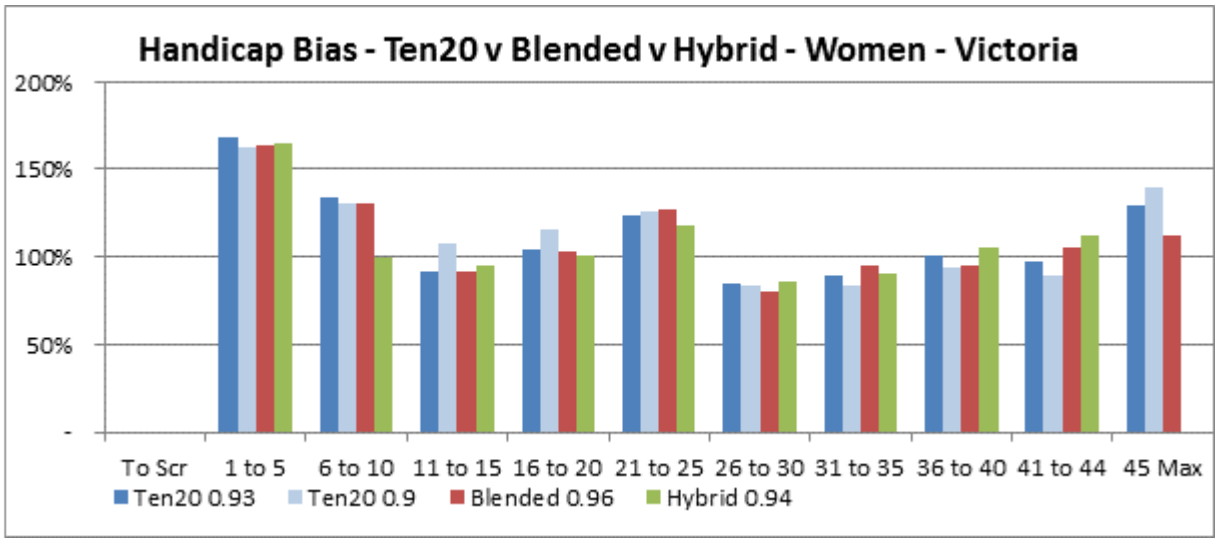


The Corresponding Tilt and Level Indices are:

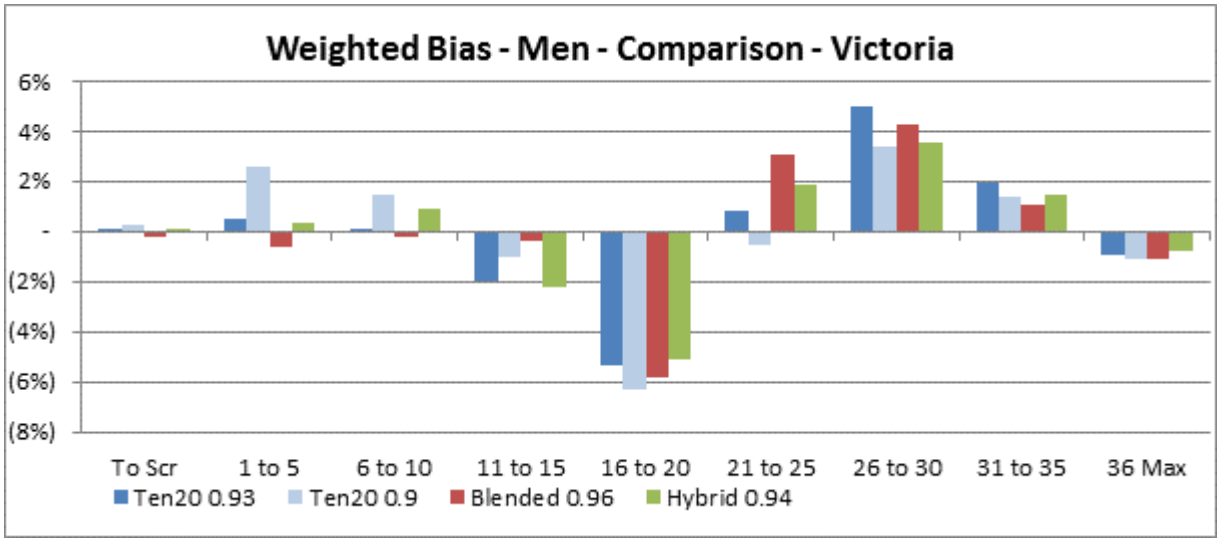
	Victoria			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Blended 0.96	23.6	28.4	-4.2	22.2
Blended 0.94	13.2	26.1	-8.5	23.4
Blended 0.92	-3.8	25.4	-12.3	28.3
Hybrid 0.96	31.2	30.2	6.9	14.2
Hybrid 0.94	15.7	25.1	1.6	16.5

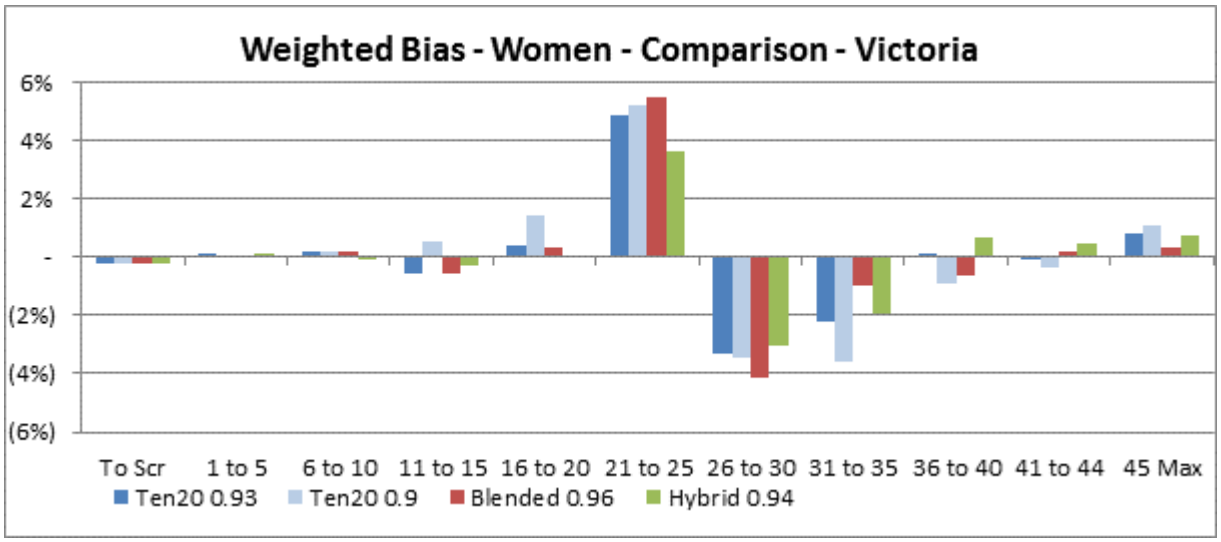
Comparing representatives of each of the three methods:





The Weighted Bias is:





With the corresponding Tilt and Level Indices:

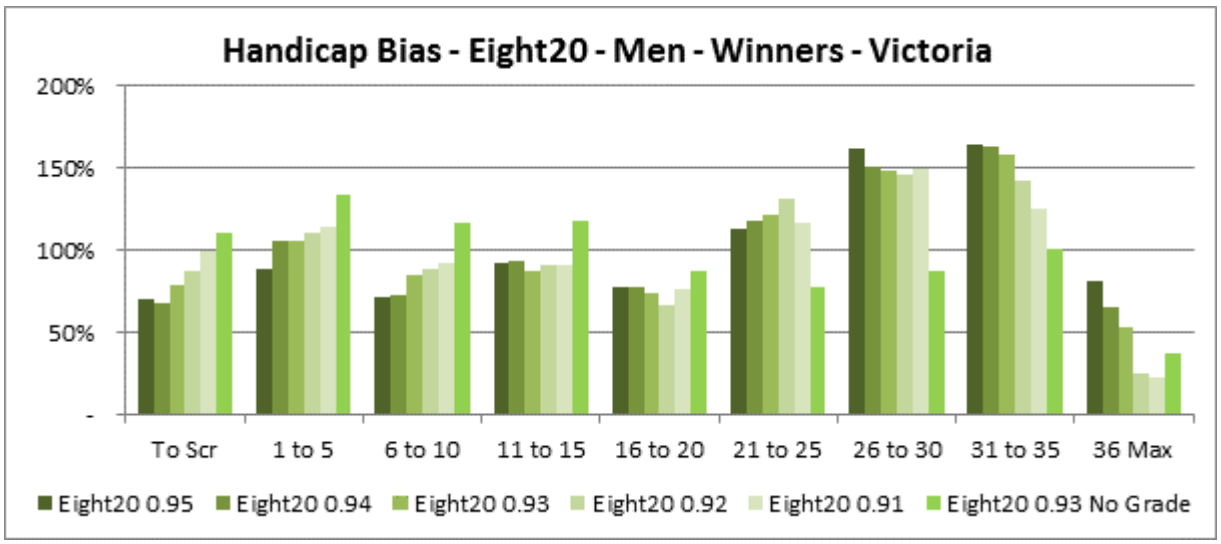
	Victoria			
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Ten20 0.93	21.5	28.1	-2.6	20.1
Ten20 0.9	-7.9	28.5	-10.7	23.7
Blended 0.96	23.6	28.4	-4.2	22.2
Hybrid 0.94	15.7	25.1	1.6	16.5

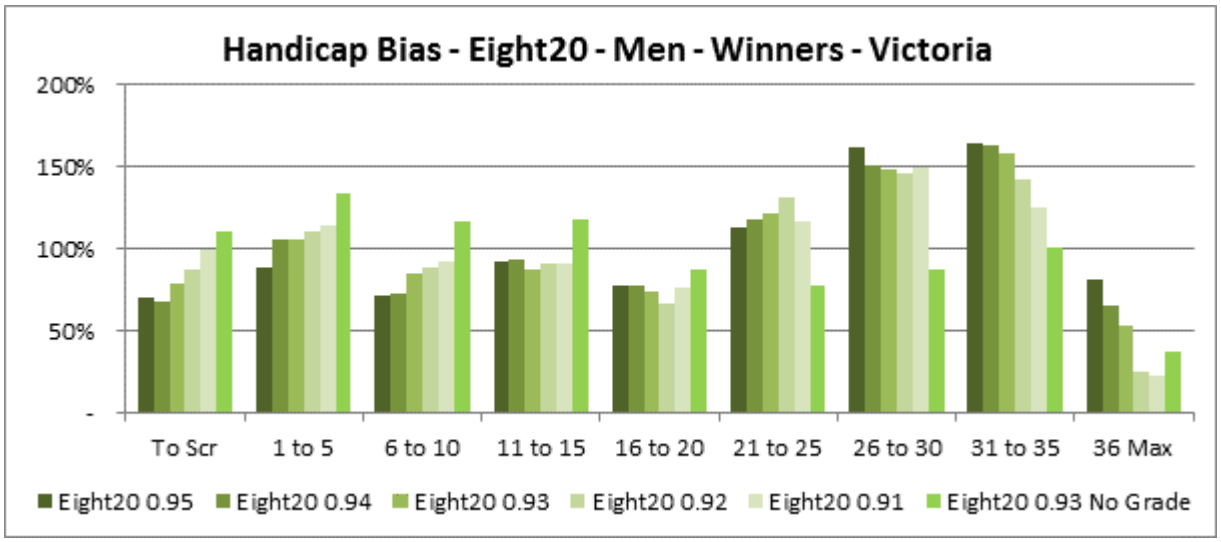
Putting it all together, with the Old System as a reference:

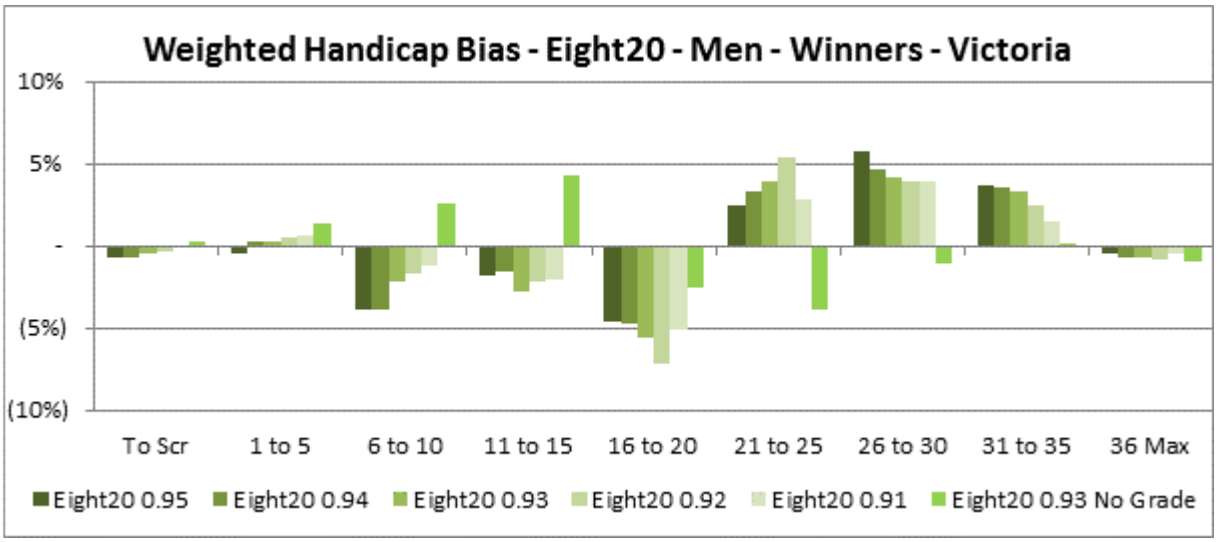
Victoria	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Old System After Elimination	-11.5	31.4	-3.3	19.8
Current Period - Ten20 0.96	34.2	31.1	14.6	22.6
Old Period - Ten20 0.96	51.3	40.2	-7.3	17.1
Ten20 0.96	46.2	34.4	4.1	15.3
Ten20 0.95	32.0	31.3	4.2	14.2
Ten20 0.94	29.2	30.4	0.9	16.5
Ten20 0.93	21.5	28.1	-2.6	20.1
Ten20 0.92	8.7	24.2	-2.1	19.4
Ten20 0.91	1.3	26.8	-8.3	18.4
Ten20 0.9	-7.9	28.5	-10.7	23.7
Nine20 0.96	38.6	30.1	5.8	17.6
Nine20 0.93	17.9	27.1	-1.2	19.4
Nine20 0.90	-6.4	26.6	-12.9	24.4
Eight20 0.96	37.2	31.7	4.1	18.6
Eight20 0.93	25.7	25.8	-3.0	20.5
Eight20 0.90	-4.1	25.0	-12.7	23.7
Blended 0.96	23.6	28.4	-4.2	22.2
Blended 0.94	13.2	26.1	-8.5	23.4
Blended 0.92	-3.8	25.4	-12.3	28.3
Hybrid 0.96	31.2	30.2	6.9	14.2
Hybrid 0.94	15.7	25.1	1.6	16.5

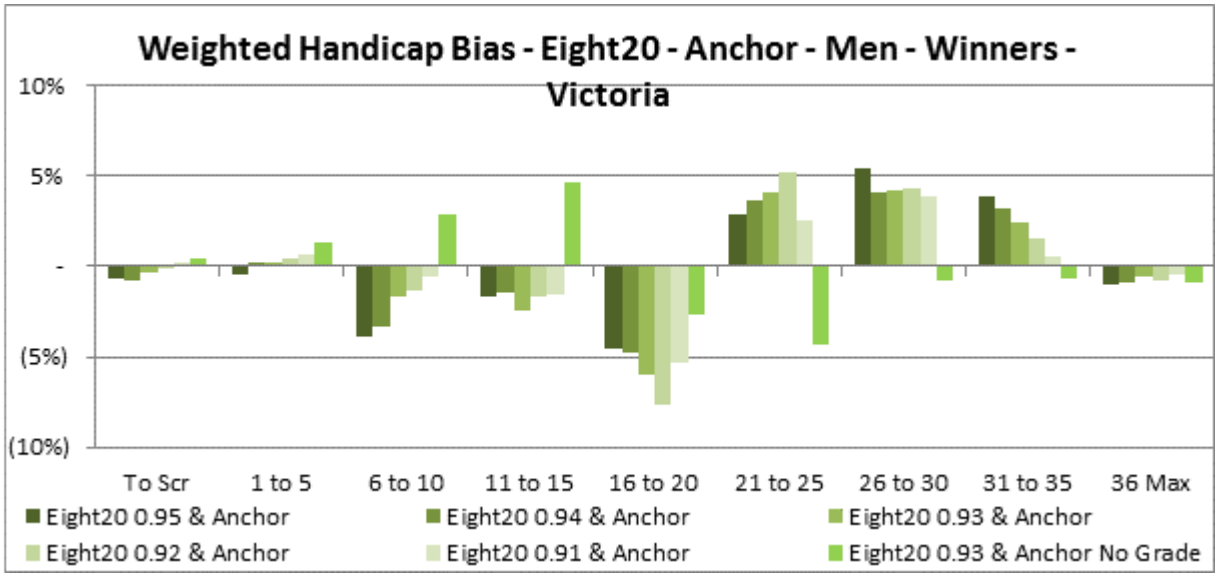
Recall, a Tilt favouring the high marker is reddish, a Tilt favouring the low marker is blue, a close to zero Tilt is green. For the Level Index, green is more Level, orange is more lumpy.

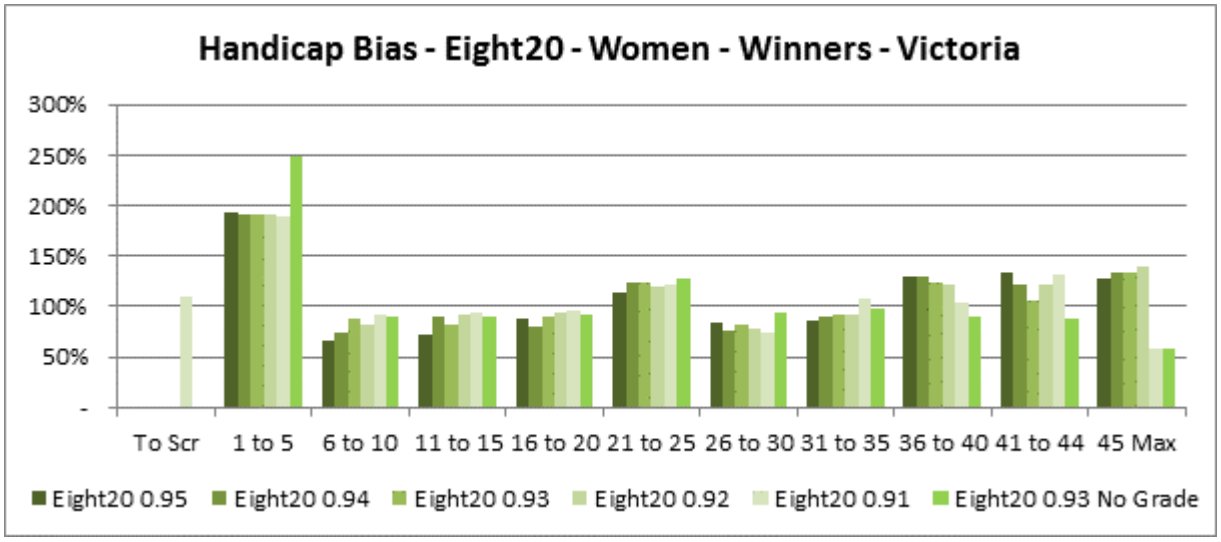
Phase 2

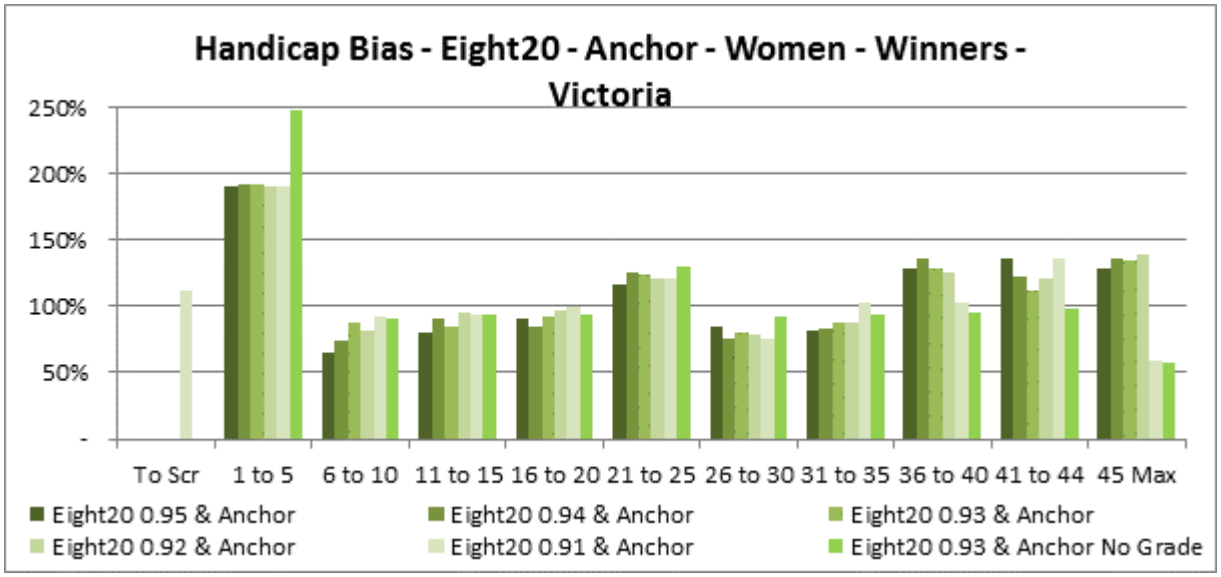

Handicap Bias - Eight20 - Men - Winners - Victoria
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

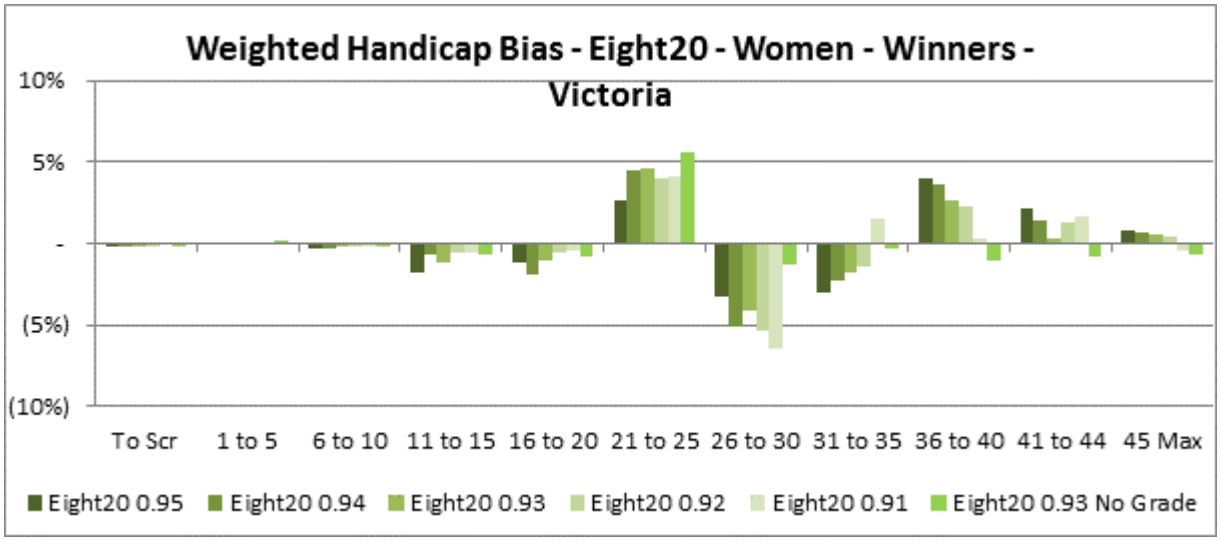

Handicap Bias - Eight20 - Men - Winners - Victoria
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

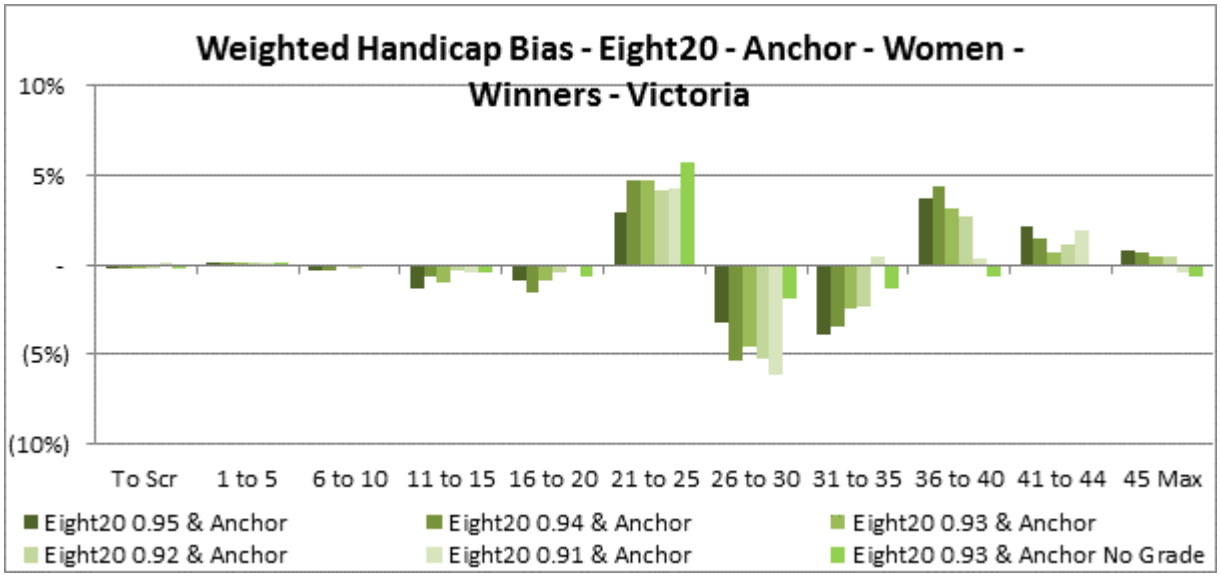

Weighted Handicap Bias - Eight20 - Men - Winners - Victoria
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

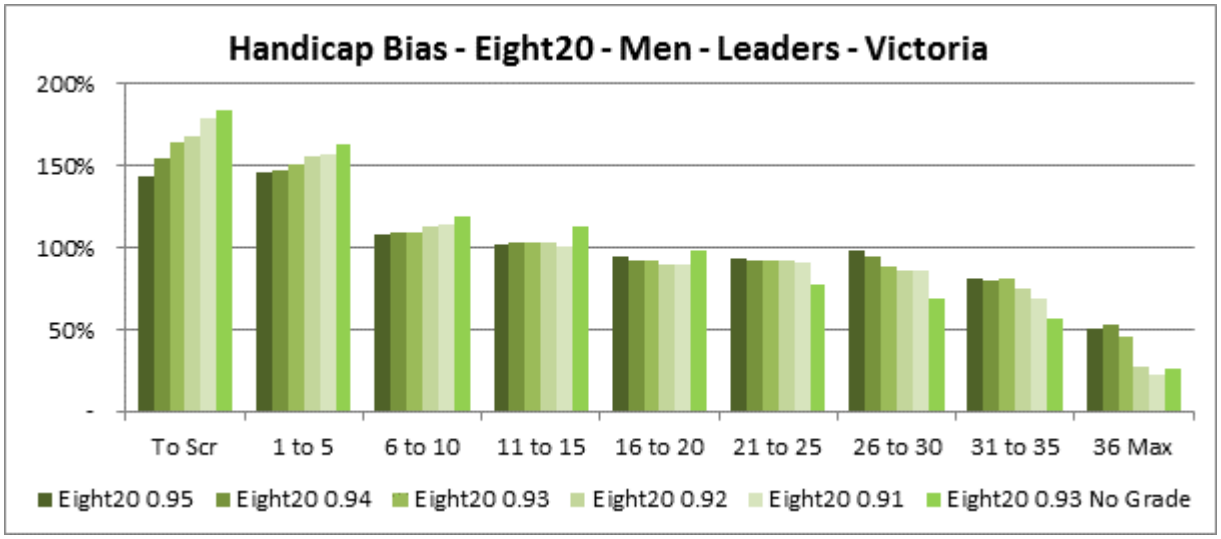

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Victoria
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

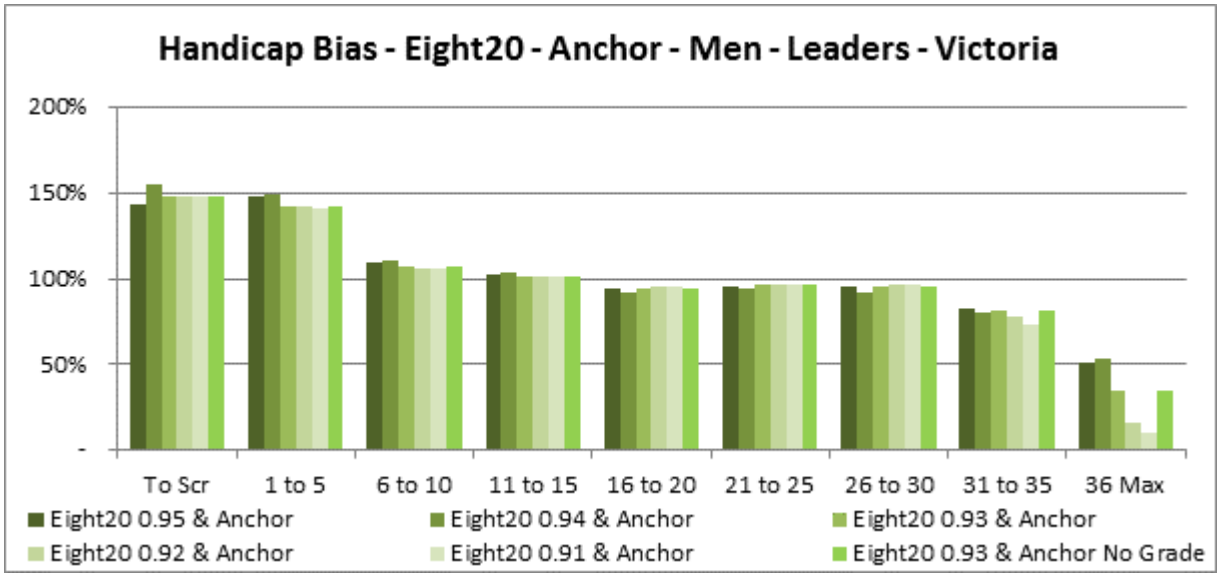

Handicap Bias - Eight20 - Women - Winners - Victoria
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

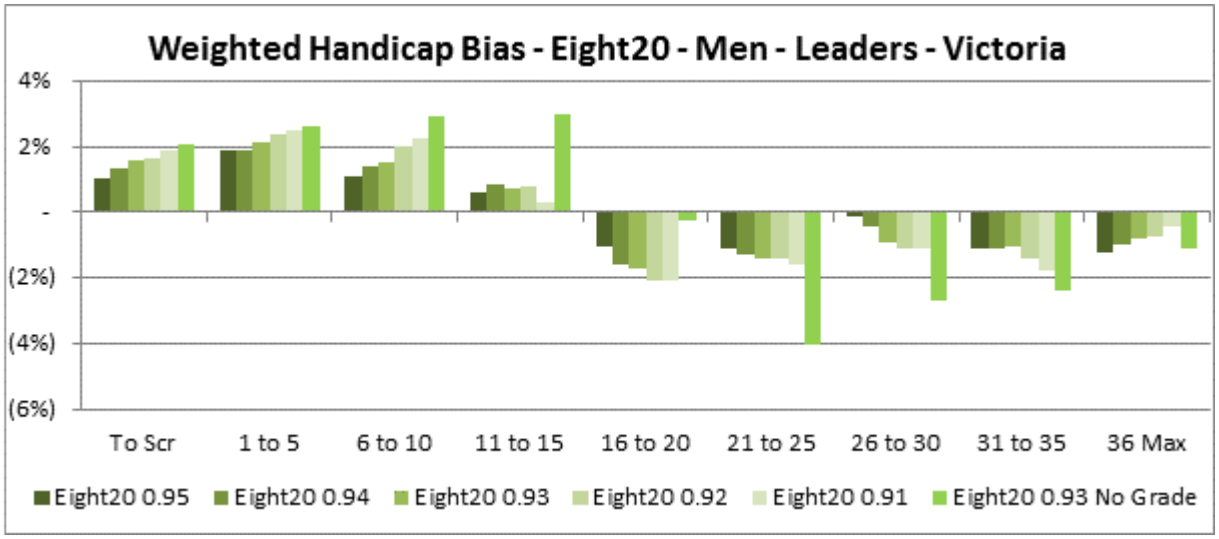

Handicap Bias - Eight20 - Anchor - Women - Winners - Victoria
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

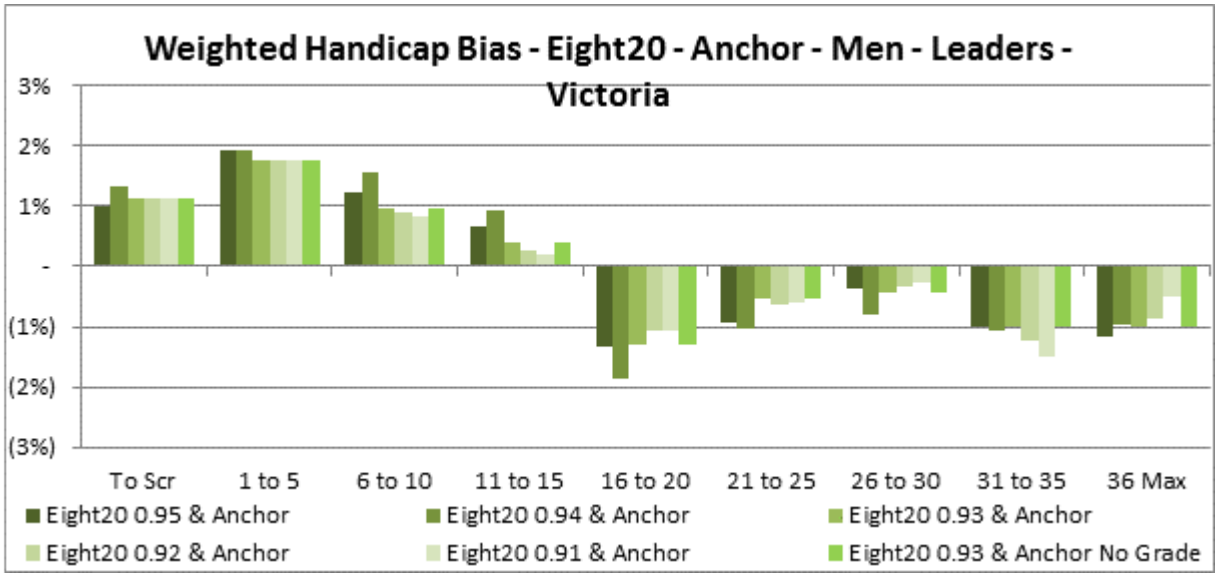

Weighted Handicap Bias - Eight20 - Women - Winners - Victoria
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

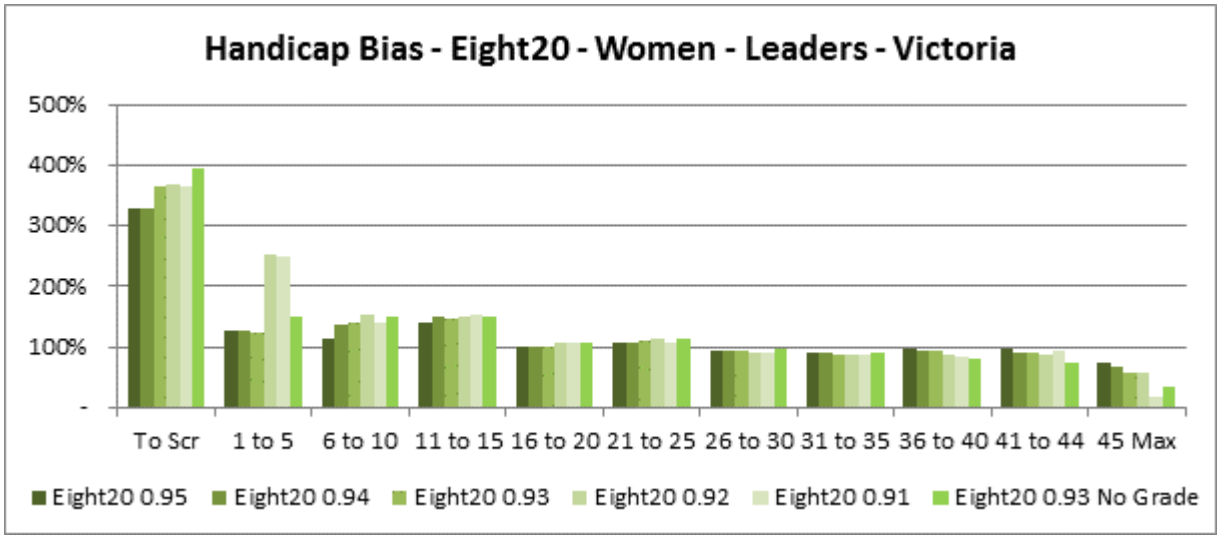

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Victoria
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

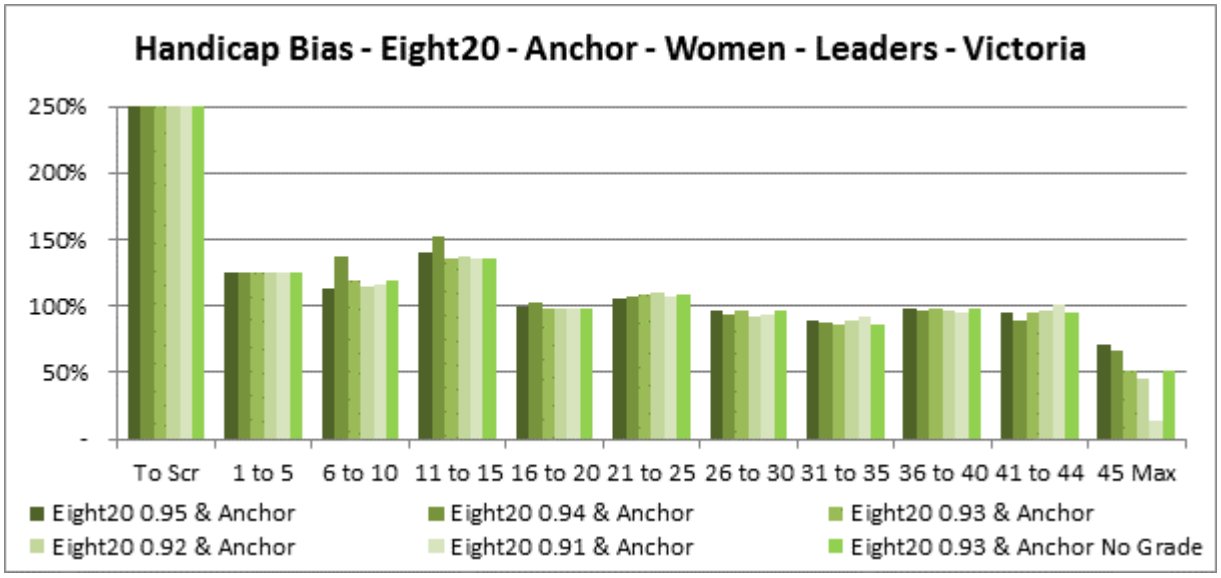

Handicap Bias - Eight20 - Men - Leaders - Victoria
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

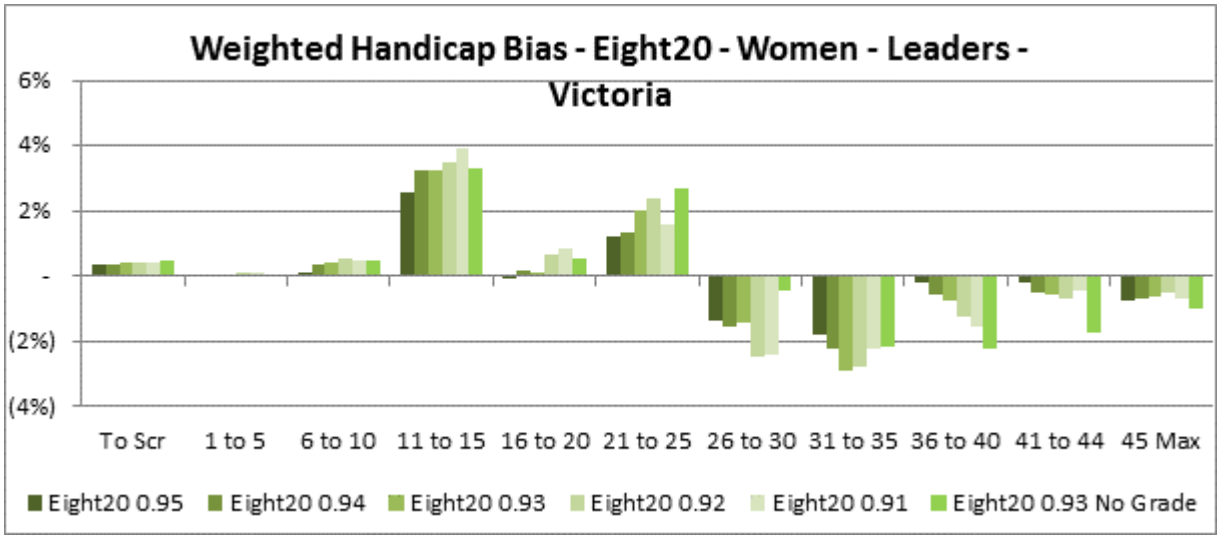

Handicap Bias - Eight20 - Anchor - Men - Leaders - Victoria
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

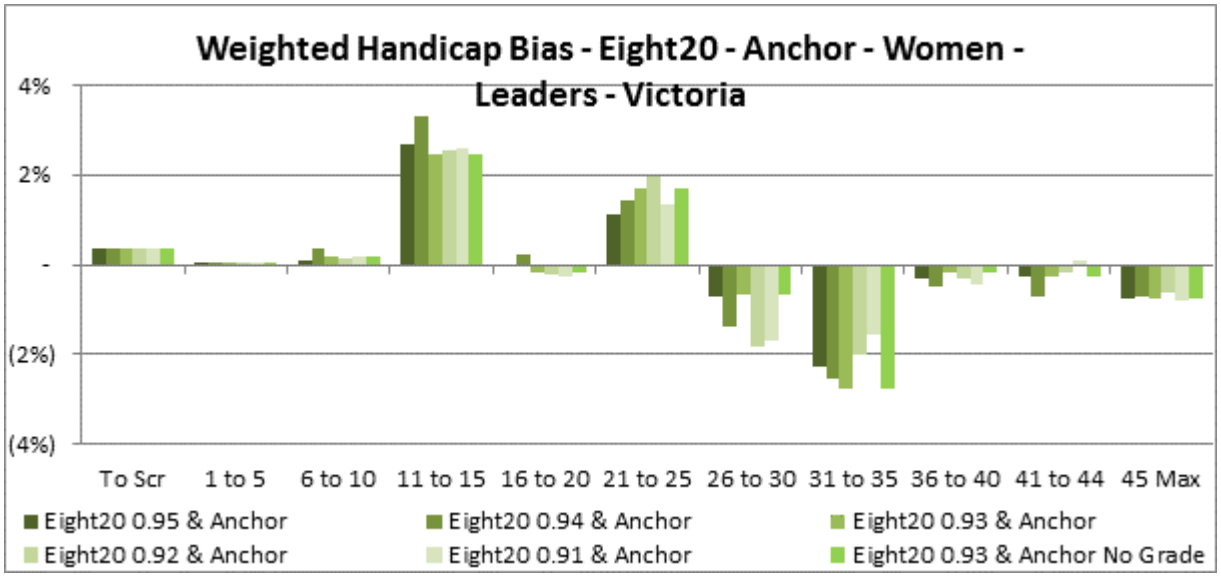

Weighted Handicap Bias - Eight20 - Men - Leaders - Victoria
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Victoria
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Victoria
500%
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Victoria
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Victoria
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

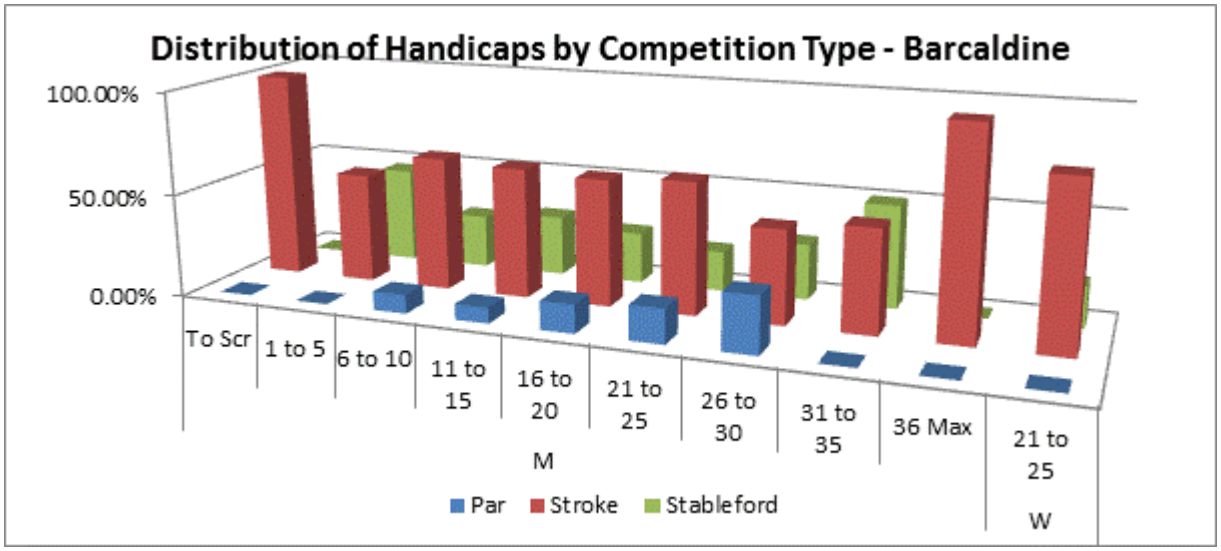


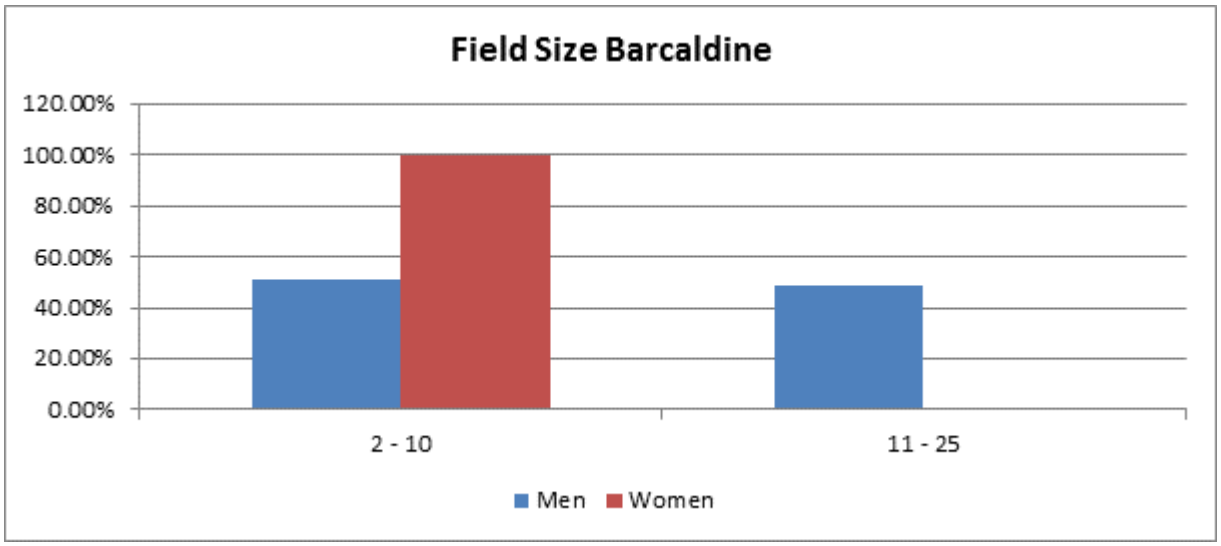
Phase 2 -Victoria					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	61.1	34.1	19.1	22.7
	Eight20 0.94	53.3	32.8	13.6	26.6
	Eight20 0.93	46.4	33.1	7.9	22.7
	Eight20 0.92	38.1	37.1	8.0	23.6
	Eight20 0.91	26.8	26.9	3.5	25.4
	Eight20 0.93 No Grade	-40.4	25.1	-8.0	19.1
	Eight20 0.95 & Anchor	57.8	33.9	16.1	23.8
	Eight20 0.94 & Anchor	47.3	31.5	13.2	29.6
	Eight20 0.93 & Anchor	40.4	32.6	8.5	24.8
	Eight20 0.92 & Anchor	32.1	37.5	6.5	24.3
	Eight20 0.91 & Anchor	16.5	25.9	2.0	24.6
	Eight20 0.93 & Anchor No Grade	-46.2	27.3	-7.2	20.0
Leaders	Eight20 0.95	-36.5	11.8	-15.9	11.9
	Eight20 0.94	-39.9	13.5	-20.6	14.4
	Eight20 0.93	-43.6	14.8	-22.7	16.3
	Eight20 0.92	-48.9	16.9	-26.3	18.7
	Eight20 0.91	-51.2	18.1	-26.8	18.1
	Eight20 0.93 No Grade	-76.6	27.2	-31.5	18.2
	Eight20 0.95 & Anchor	-37.3	12.2	-16.9	12.2
	Eight20 0.94 & Anchor	-41.3	14.1	-21.9	15.2
	Eight20 0.93 & Anchor	-34.3	11.0	-17.0	13.4
	Eight20 0.92 & Anchor	-33.9	10.7	-15.9	13.5
	Eight20 0.91 & Anchor	-32.4	10.8	-15.4	12.2
	Eight20 0.93 & Anchor No Grade	-34.3	11.0	-17.0	13.4

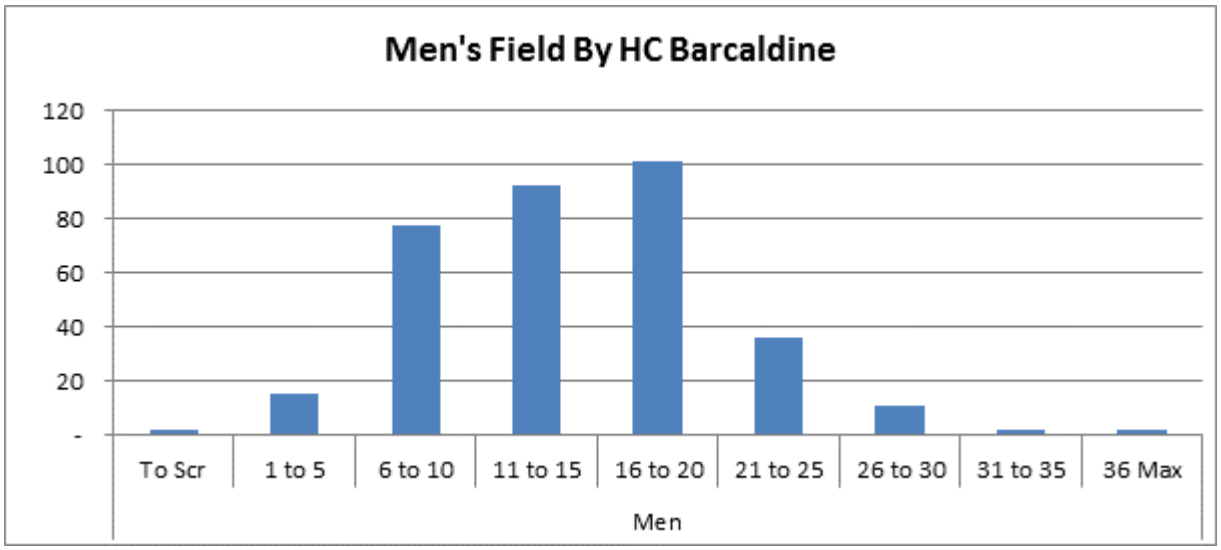
Appendix 16 – Barcaldine – Phase 2

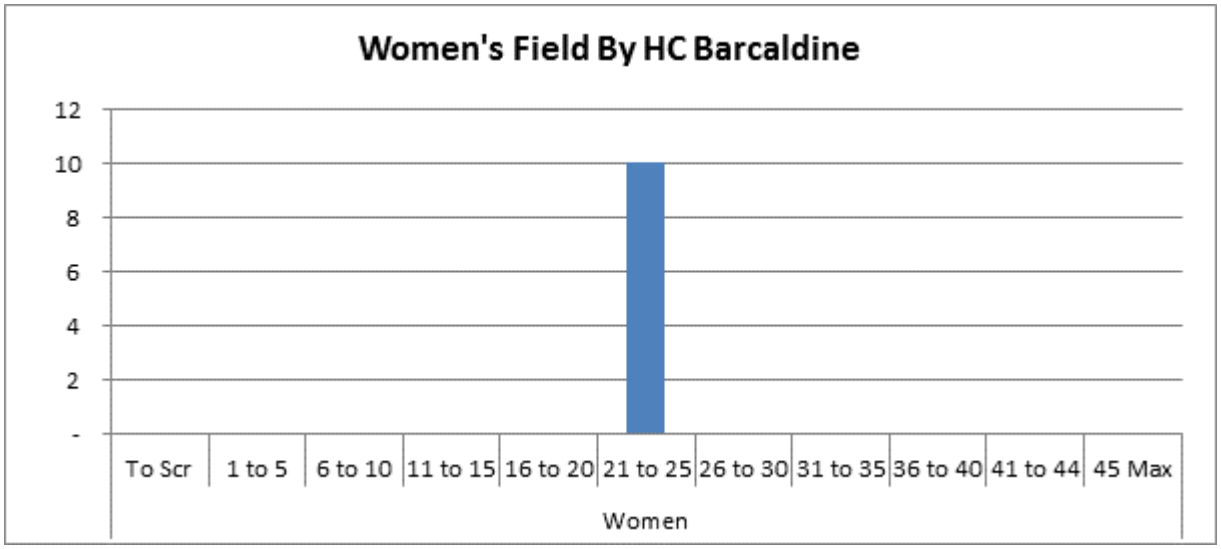
Barcaldine	Men	Women	Total
Players in Database	106	18	124
Members	41	4	45
Visitors	65	14	79
Members who have Played 21 Rounds	38	4	42
Members with Last Round In Old System	7	-	7
Members with Last Round in Current System	34	4	38
Earliest Round	30/3/2008	20/6/2010	
Latest Round	21/11/2010	21/11/2010	
Number of Visiting Clubs			17
Number of Home Competitions	94	49	143
Number of Rounds of Golf	760	22	782
Number of Rounds at Home	760	22	782
Number of Rounds at Home Old	433	2	435
Number of Rounds at Home Current	327	20	347
Num Rnds Members at Home	698	13	711
Num Rnds Members at Home Old	404	2	406
Num Rnds Members at Home Cur	294	11	305
Num Rnds After Eliminations	517	22	539
Num Rnds After Eliminations Old	190	2	192
Num Rnds After Eliminations Cur	327	20	347

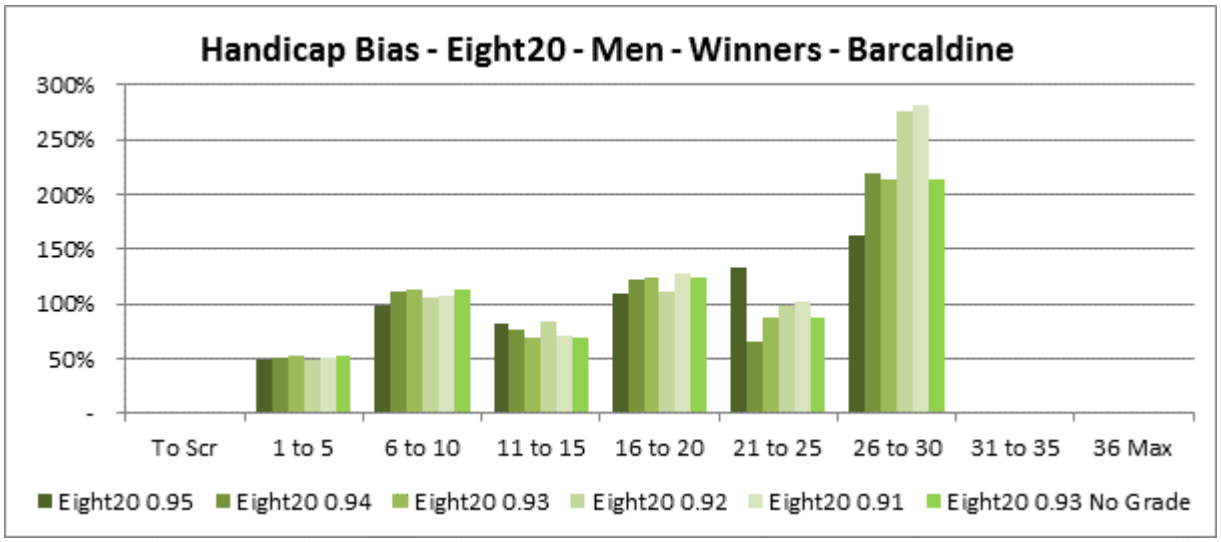
Barcaldine is a small club. The paradox in the Women's field above, where the number of rounds is fewer than the number of competitions, is explained by the fact that "competitions" with only a sole competitor are eliminated.

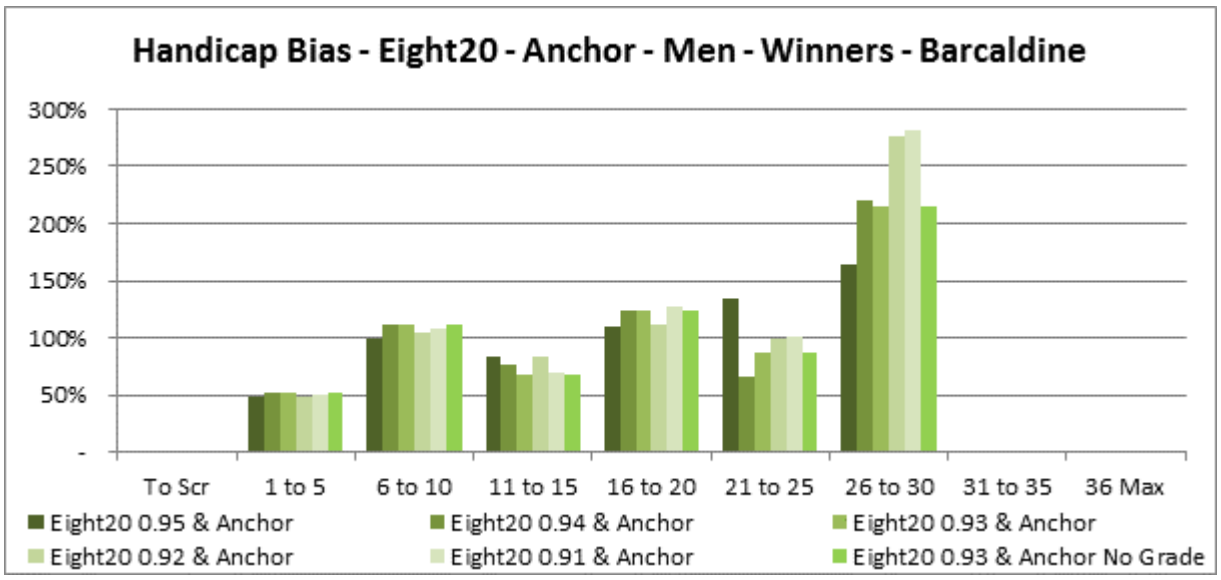

Distribution of Handicaps by Competition Type - Barcaldine
100.00%
50.00%
0.00%
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
21 to 25
M
W
Par
Stroke
Stableford

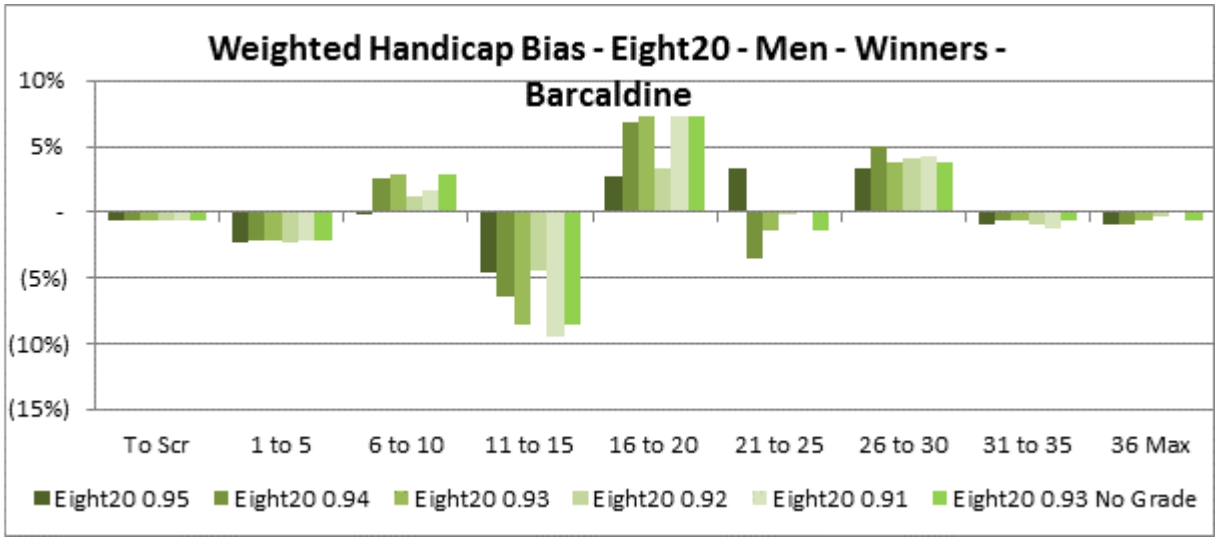

Field Size Barcaldine
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
2 - 10
11 - 25
Men
Women

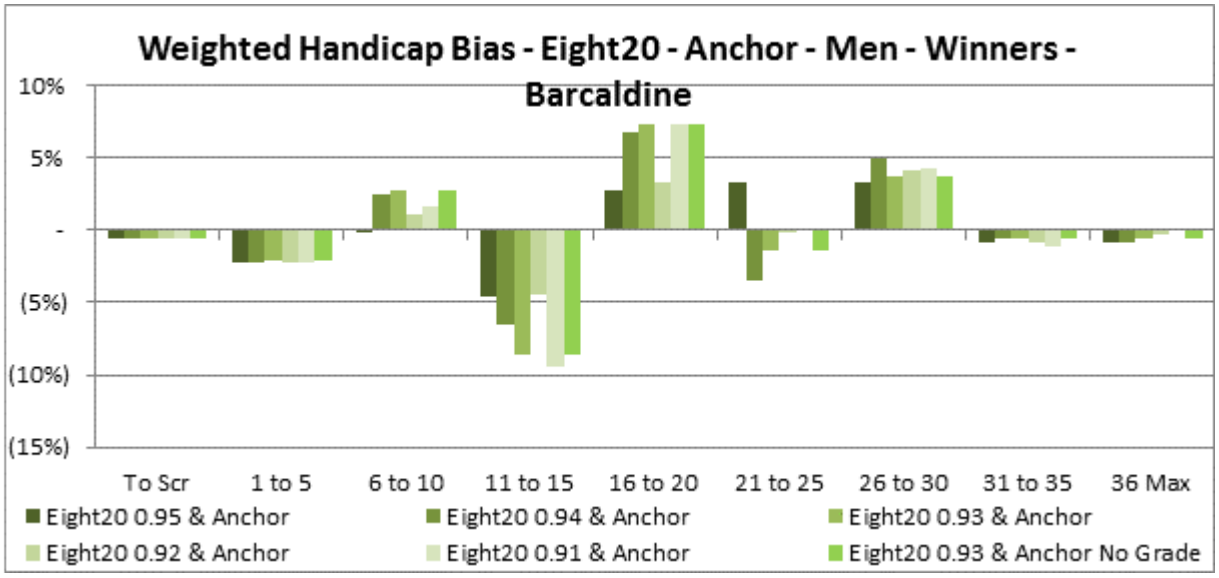

Men's Field By HC Barcaldine
120
100
80
60
40
20
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

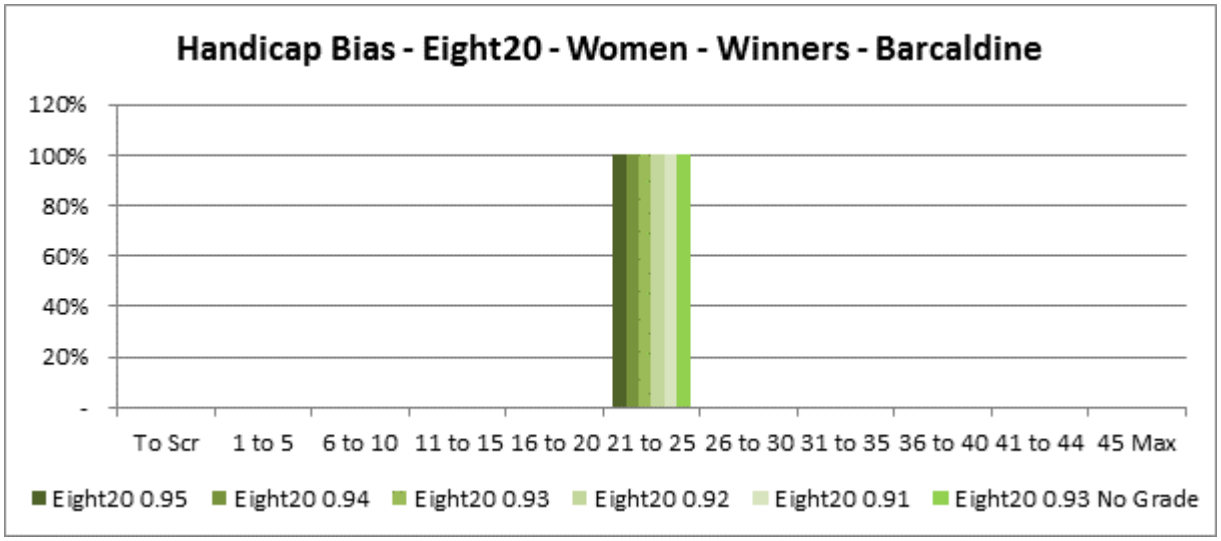

Women's Field By HC Barcaldine
12
10
8
6
4
2
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

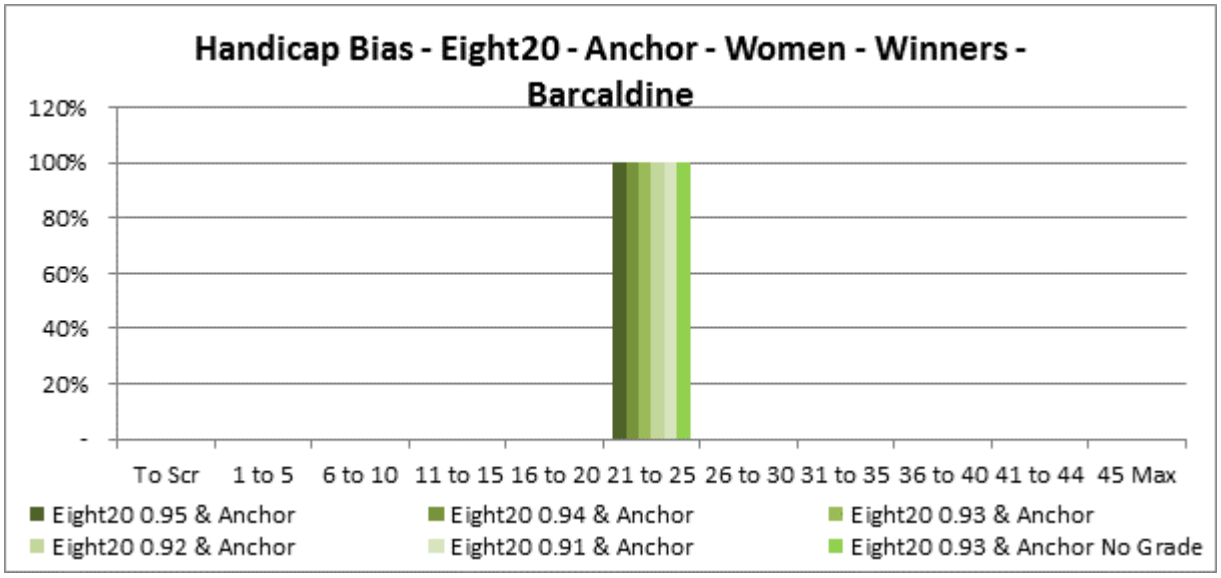

Handicap Bias - Eight20 - Men - Winners - Barcaldine
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Winners - Barcaldine
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

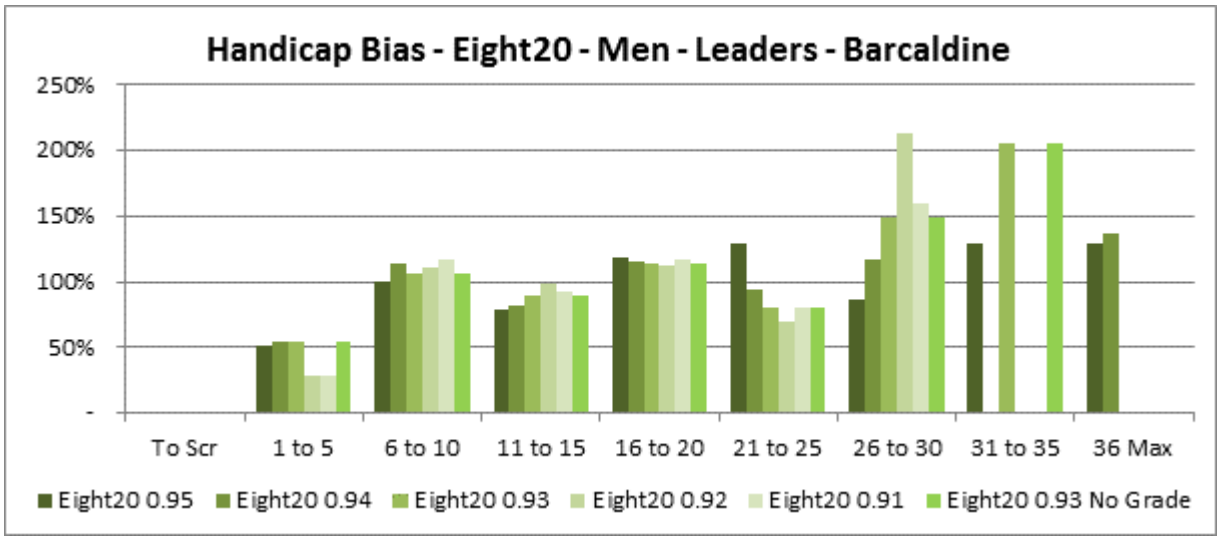

Weighted Handicap Bias - Eight20 - Men - Winners - Barcaldine
10%
5%
-
(5%)
(10%)
(15%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

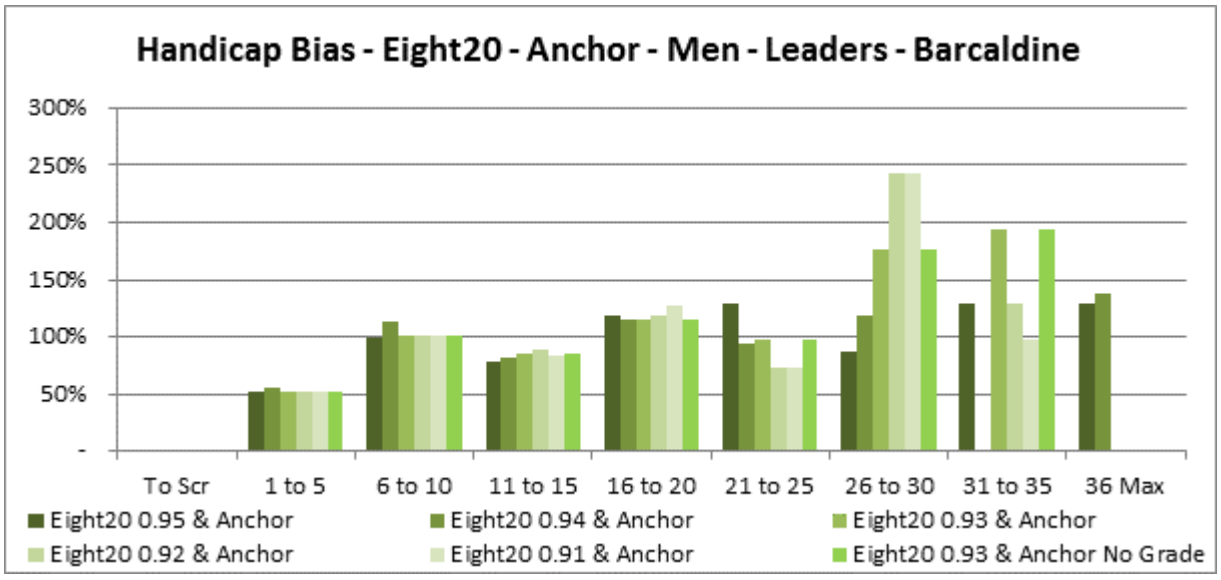

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Barcaldine
10%
5%
-
(5%)
(10%)
(15%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

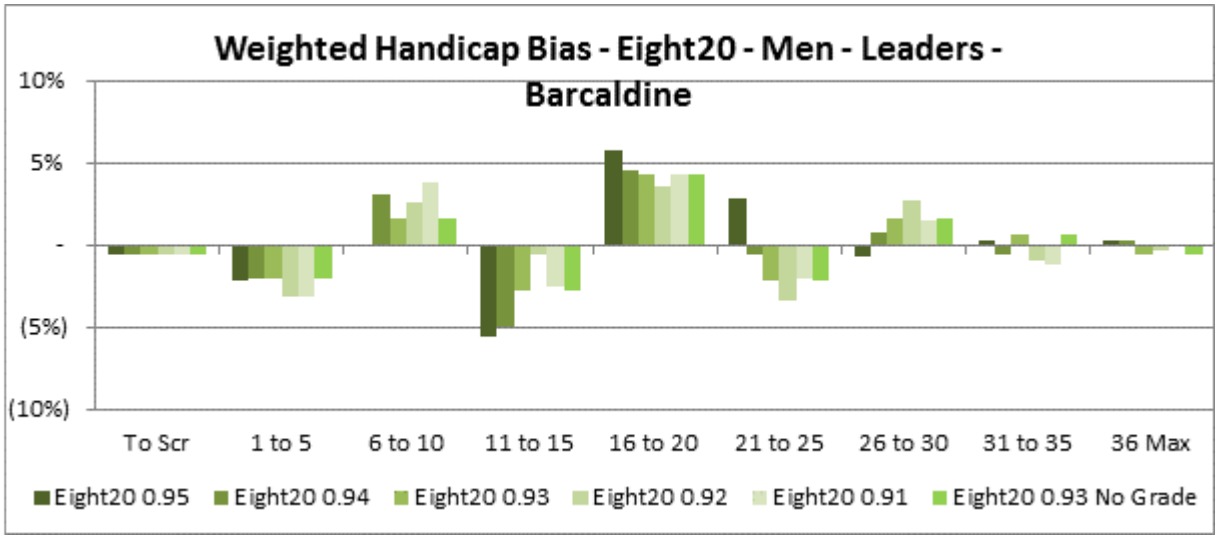

Handicap Bias - Eight20 - Women - Winners - Barcaldine
120%
100%
80%
60%
40%
20%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

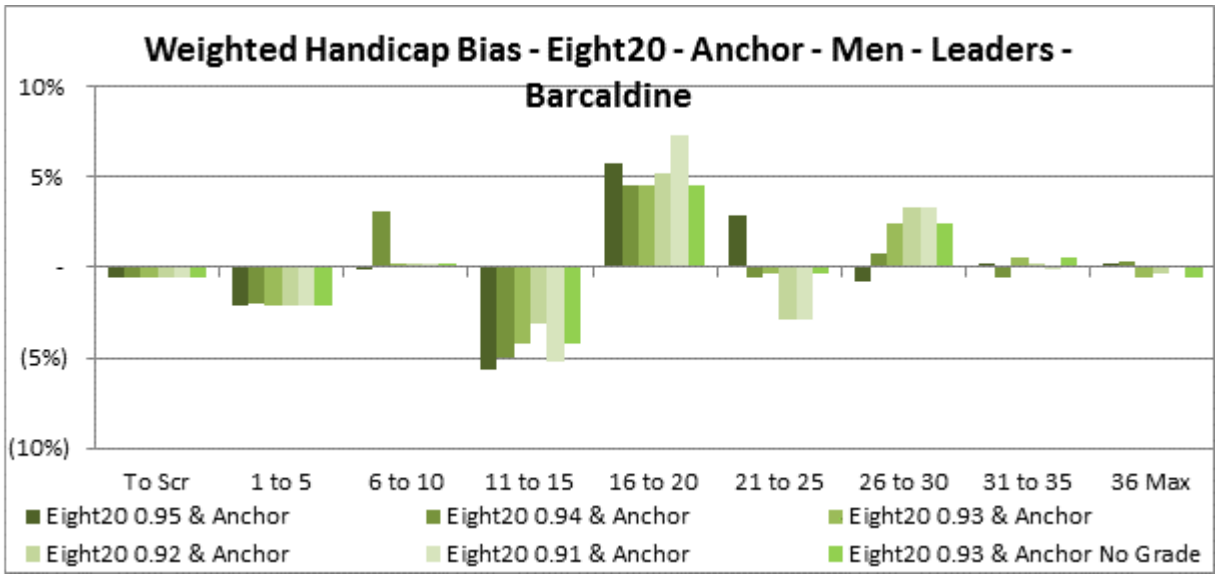


As there is no bias for the Women, the two Weighted Bias charts have been omitted.









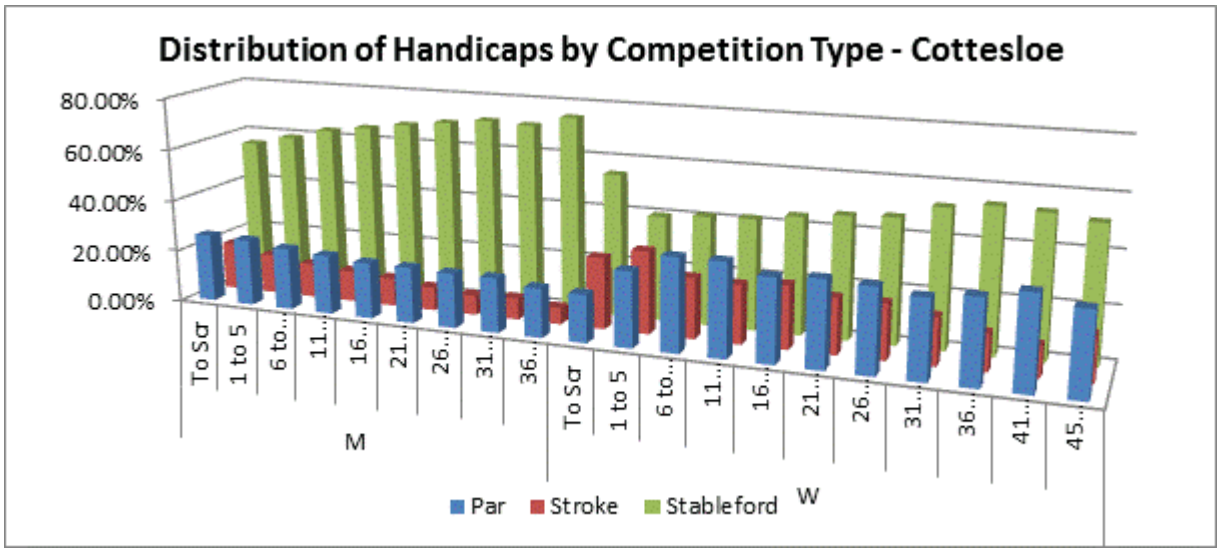
There are no Leaders charts for the Women, as 20% of the field was always less than one person.

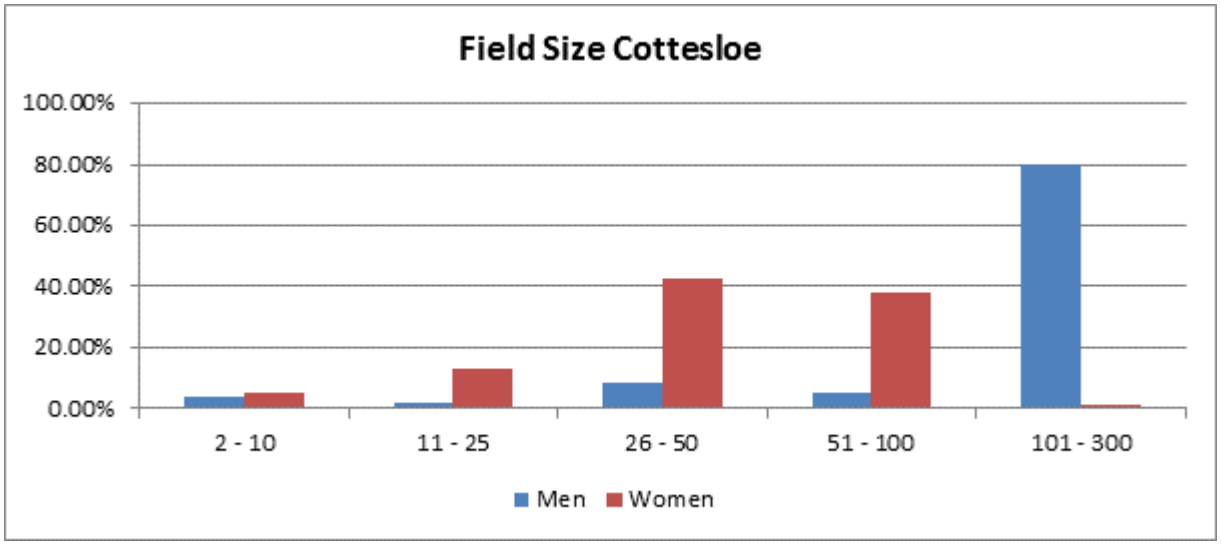
		Phase 2 -Barcaldine			
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	29.8	26.9	0.0	0.0
	Eight20 0.94	18.9	41.4	0.0	0.0
	Eight20 0.93	22.8	44.3	0.0	0.0
	Eight20 0.92	26.3	26.5	0.0	0.0
	Eight20 0.91	33.9	46.1	0.0	0.0
	Eight20 0.93 No Grade	22.8	44.3	0.0	0.0
	Eight20 0.95 & Anchor	29.8	26.9	0.0	0.0
	Eight20 0.94 & Anchor	18.9	41.4	0.0	0.0

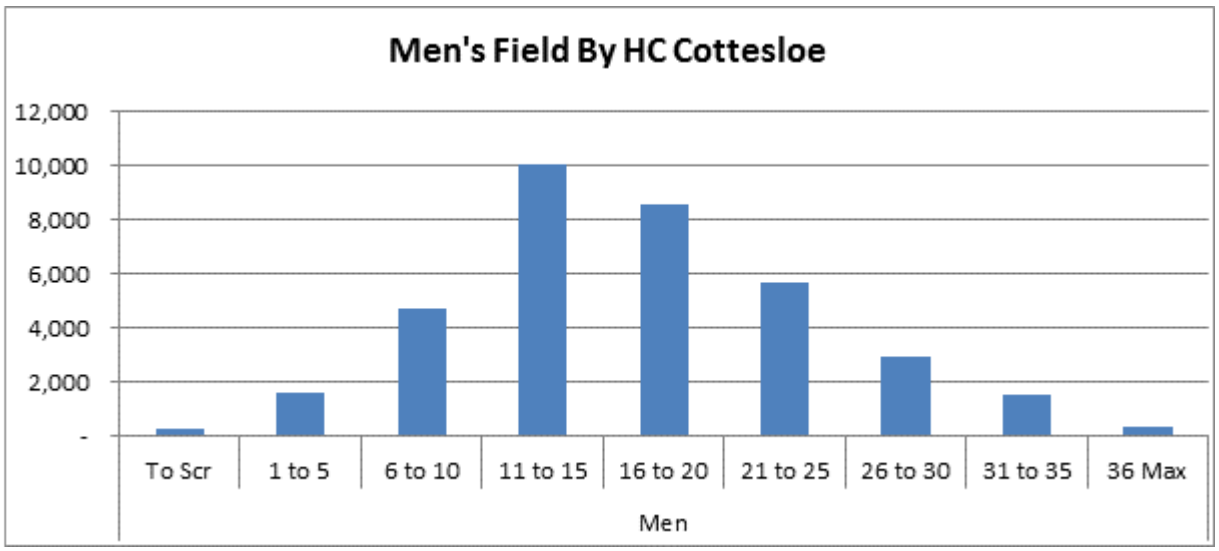
	Eight20 0.93 & Anchor	22.8	44.3	0.0	0.0
	Eight20 0.92 & Anchor	26.3	26.5	0.0	0.0
	Eight20 0.91 & Anchor	33.9	46.1	0.0	0.0
	Eight20 0.93 & Anchor No Grade	22.8	44.3	0.0	0.0
Leaders	Eight20 0.95	29.7	31.4	0.0	0.0
	Eight20 0.94	12.5	27.6	0.0	0.0
	Eight20 0.93	14.4	22.6	0.0	0.0
	Eight20 0.92	9.3	24.9	0.0	0.0
	Eight20 0.91	6.7	26.9	0.0	0.0
	Eight20 0.93 No Grade	14.4	22.6	0.0	0.0
	Eight20 0.95 & Anchor	29.7	31.4	0.0	0.0
	Eight20 0.94 & Anchor	12.5	27.6	0.0	0.0
	Eight20 0.93 & Anchor	27.6	25.2	0.0	0.0
	Eight20 0.92 & Anchor	24.9	27.8	0.0	0.0
	Eight20 0.91 & Anchor	28.9	36.3	0.0	0.0
	Eight20 0.93 & Anchor No Grade	27.6	25.2	0.0	0.0

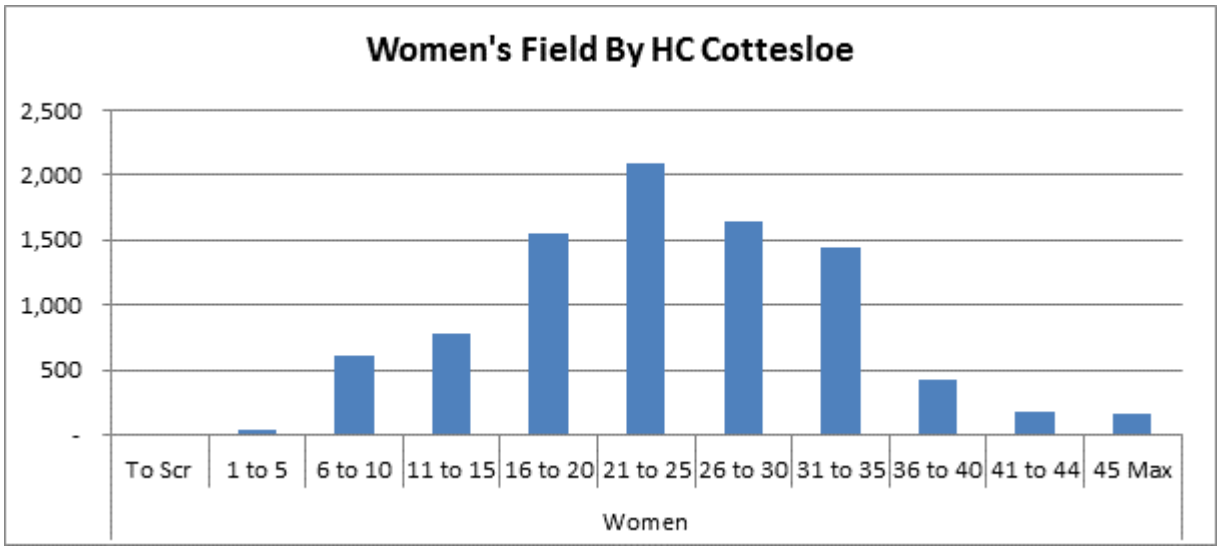
Appendix 17 – Cottesloe – Phase 2

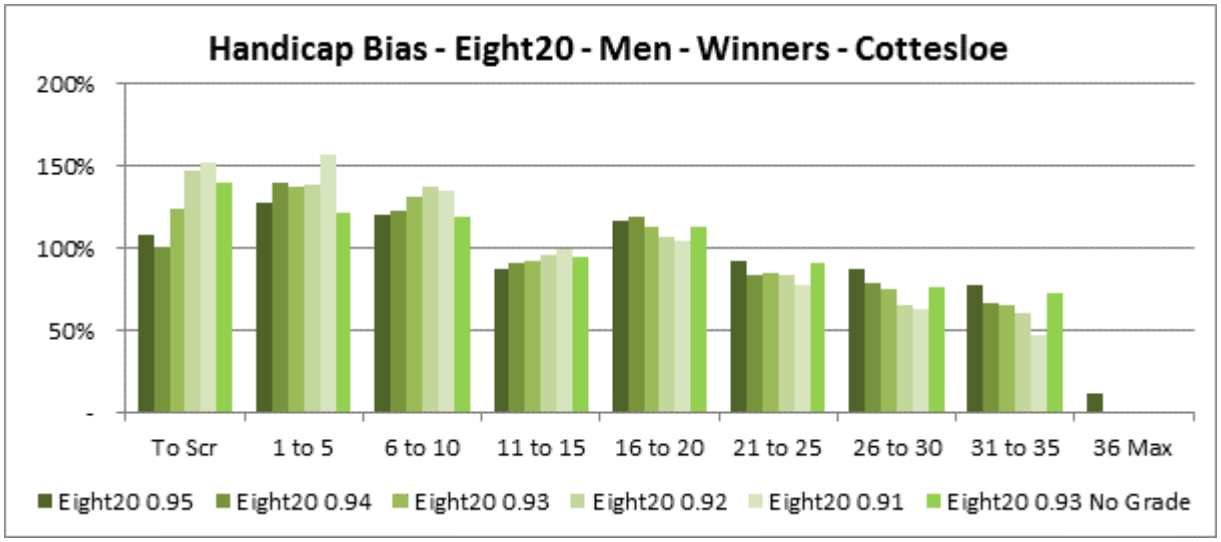
Cottesloe	Men	Women	Total
Players in Database	1,419	408	1,827
Members	779	321	1,100
Visitors	640	87	727
Members who have Played 21 Rounds	703	304	1,007
Members with Last Round In Old System	167	58	225
Members with Last Round in Current System	612	263	875
Earliest Round	3/1/2008	11/2/2008	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			95
Number of Home Competitions	678	528	1,206
Number of Rounds of Golf	55,017	14,191	69,208
Number of Rounds at Home	55,017	14,191	69,208
Number of Rounds at Home Old	41,829	10,104	51,933
Number of Rounds at Home Current	13,188	4,087	17,275
Num Rnds Members at Home	53,469	14,074	67,543
Num Rnds Members at Home Old	40,609	10,025	50,634
Num Rnds Members at Home Cur	12,860	4,049	16,909
Num Rnds After Eliminations	38,920	10,452	49,372
Num Rnds After Eliminations Old	25,732	6,365	32,097
Num Rnds After Eliminations Cur	13,188	4,087	17,275

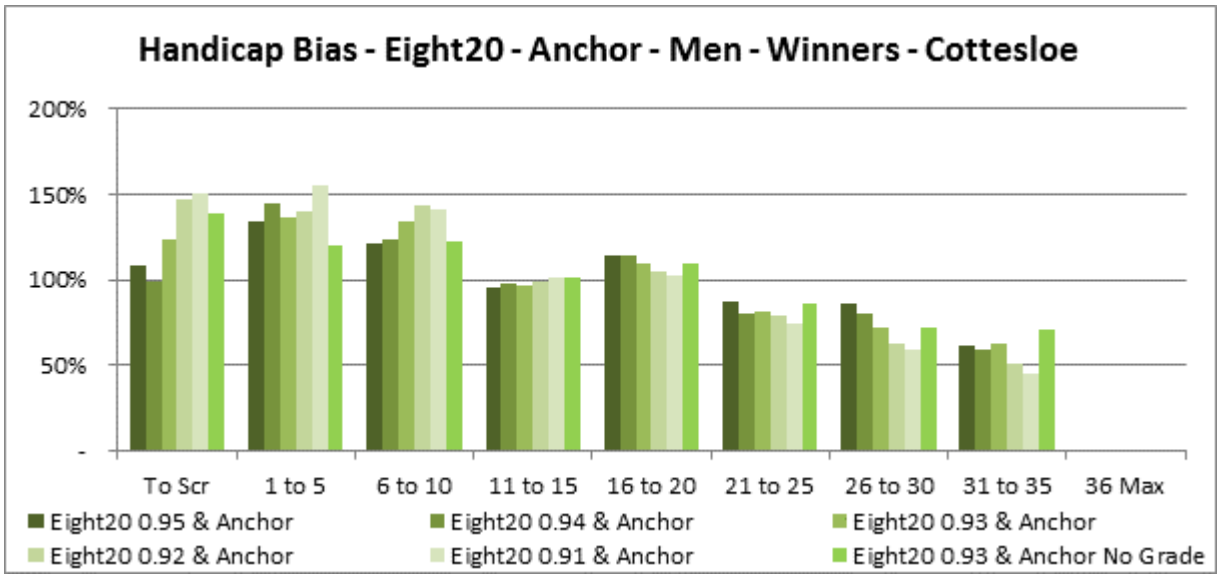


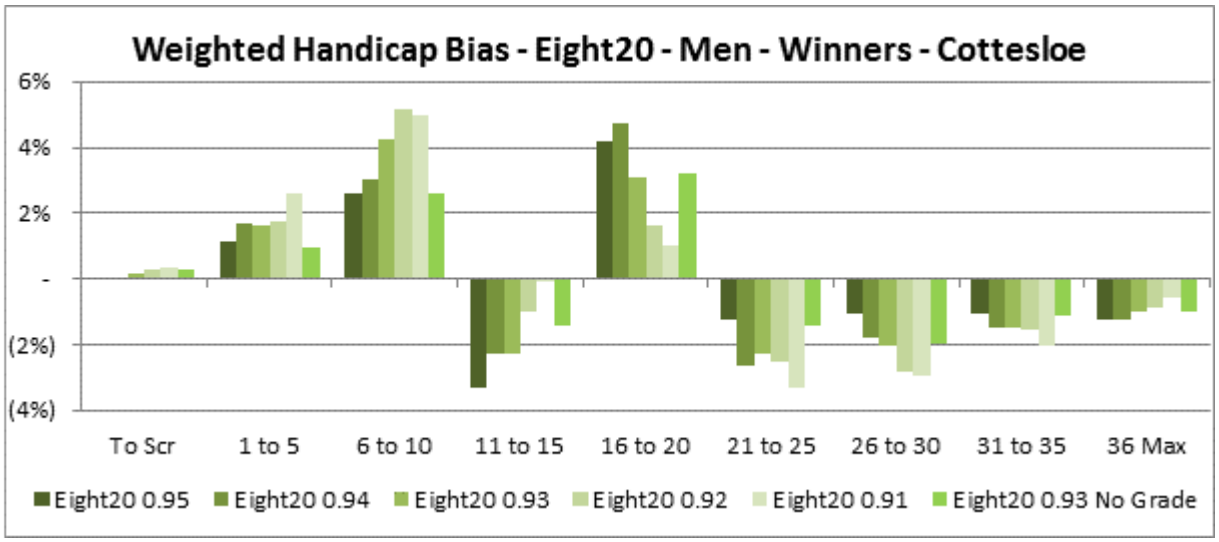

Field Size Cottesloe
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
101 - 300
Men
Women

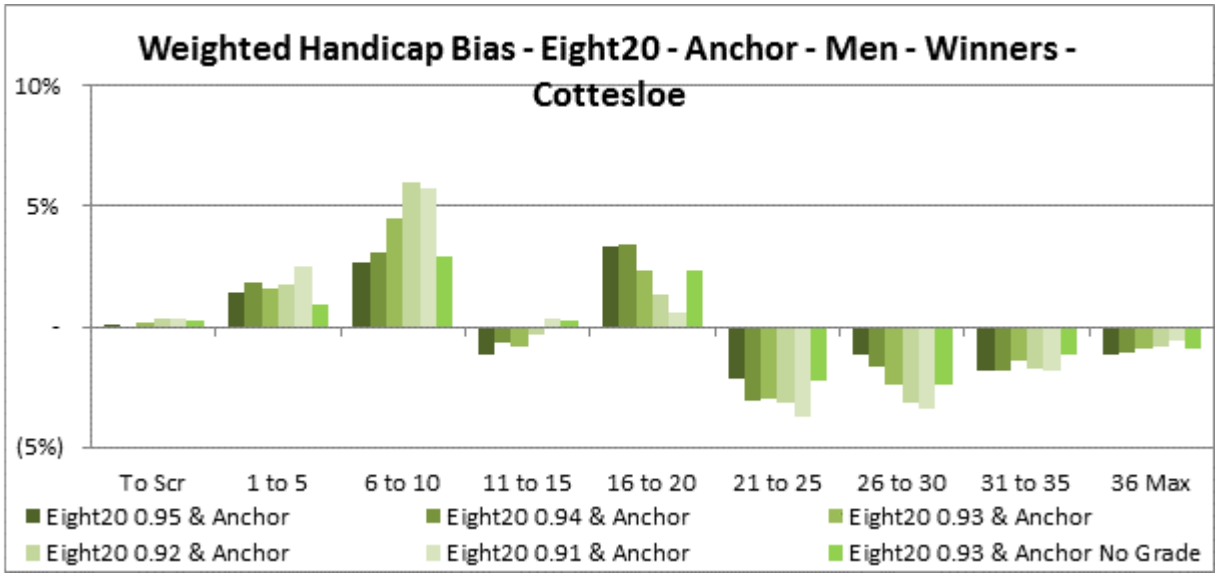

Men's Field By HC Cottesloe
12,000
10,000
8,000
6,000
4,000
2,000
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

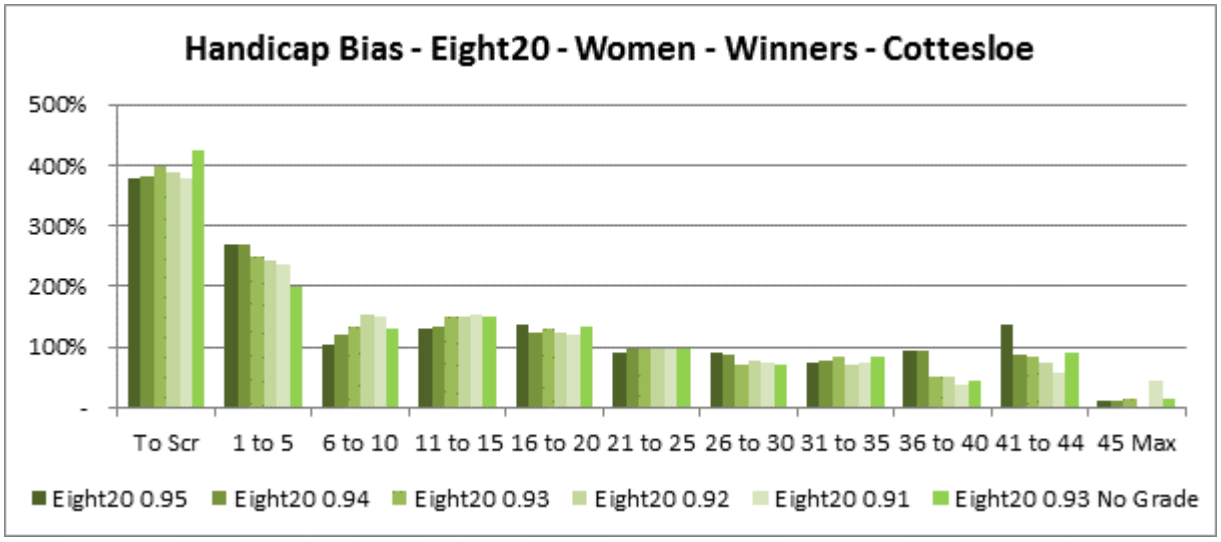

Women's Field By HC Cottesloe
2,500
2,000
1,500
1,000
500
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

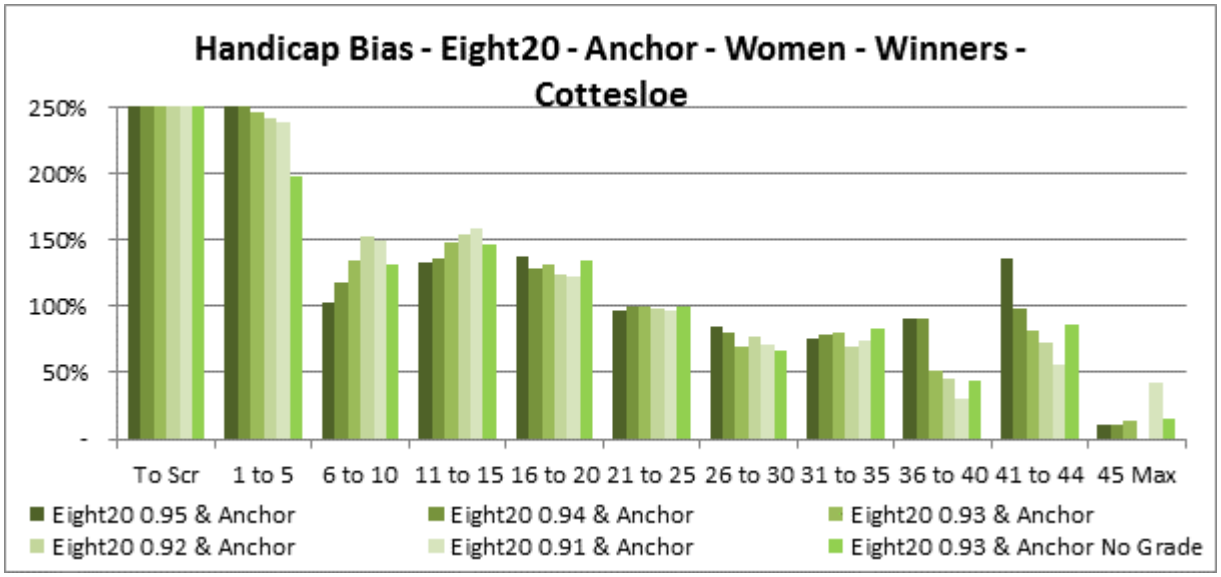

Handicap Bias - Eight20 - Men - Winners - Cottesloe
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

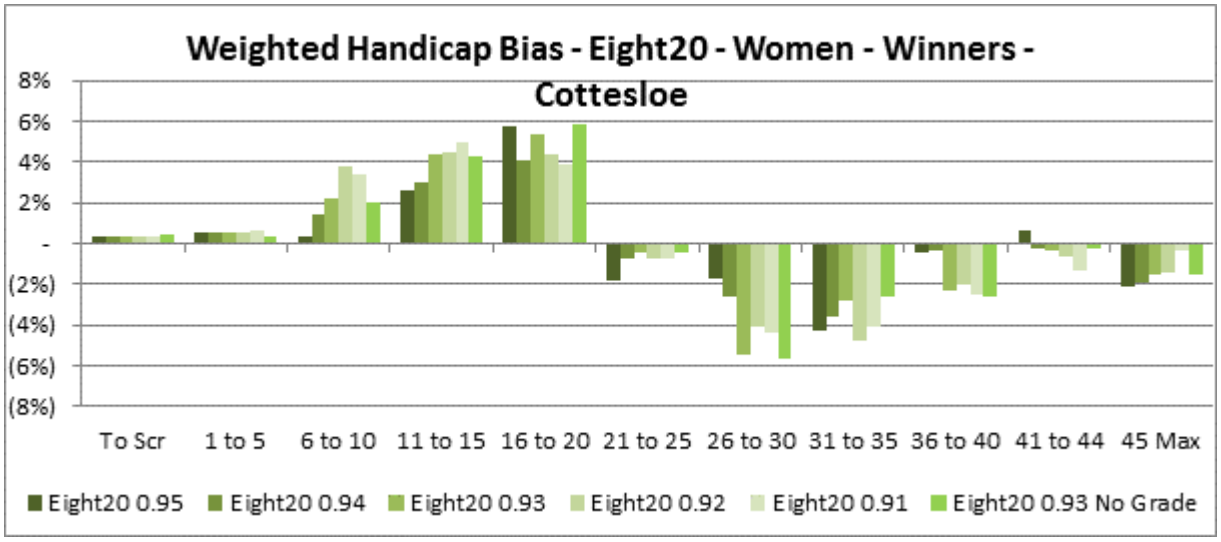

Handicap Bias - Eight20 - Anchor - Men - Winners - Cottesloe
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

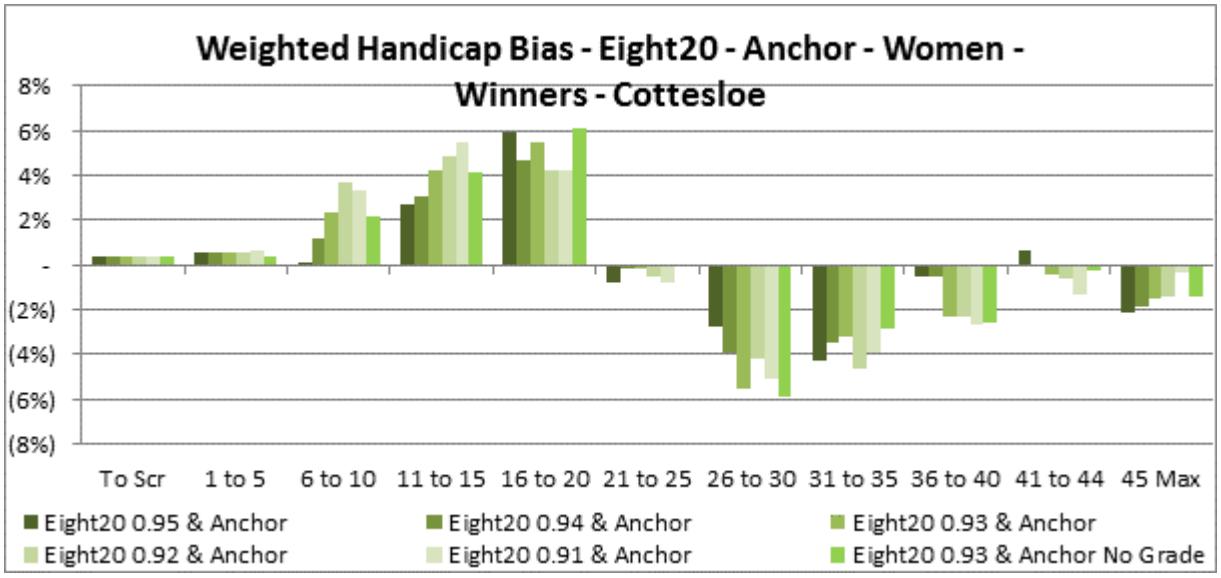

Weighted Handicap Bias - Eight20 - Men - Winners - Cottesloe
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

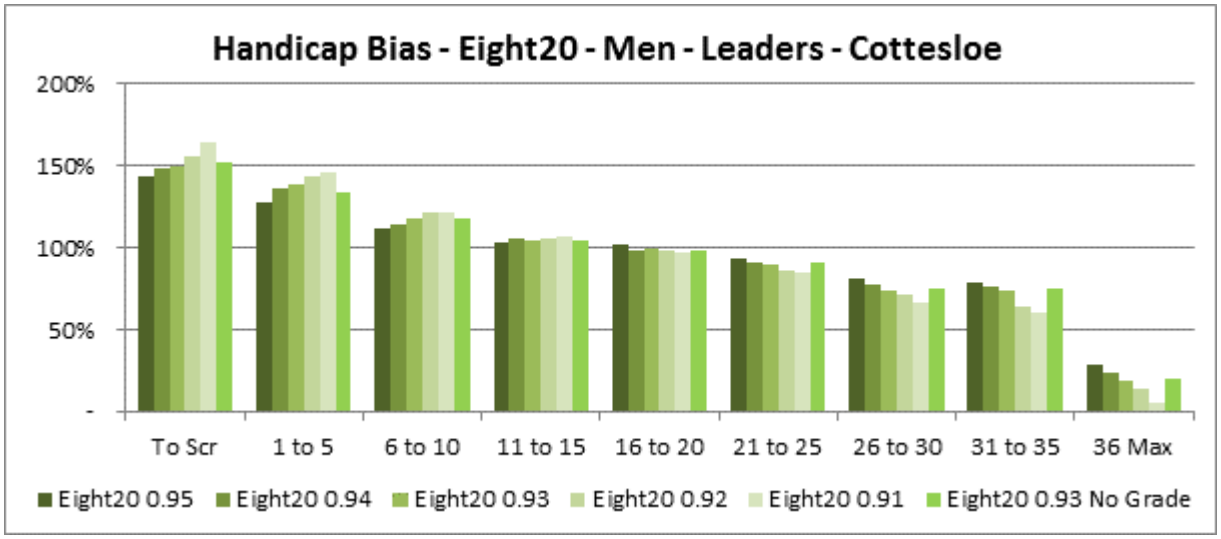

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Cottesloe
10%
5%
-
(5%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

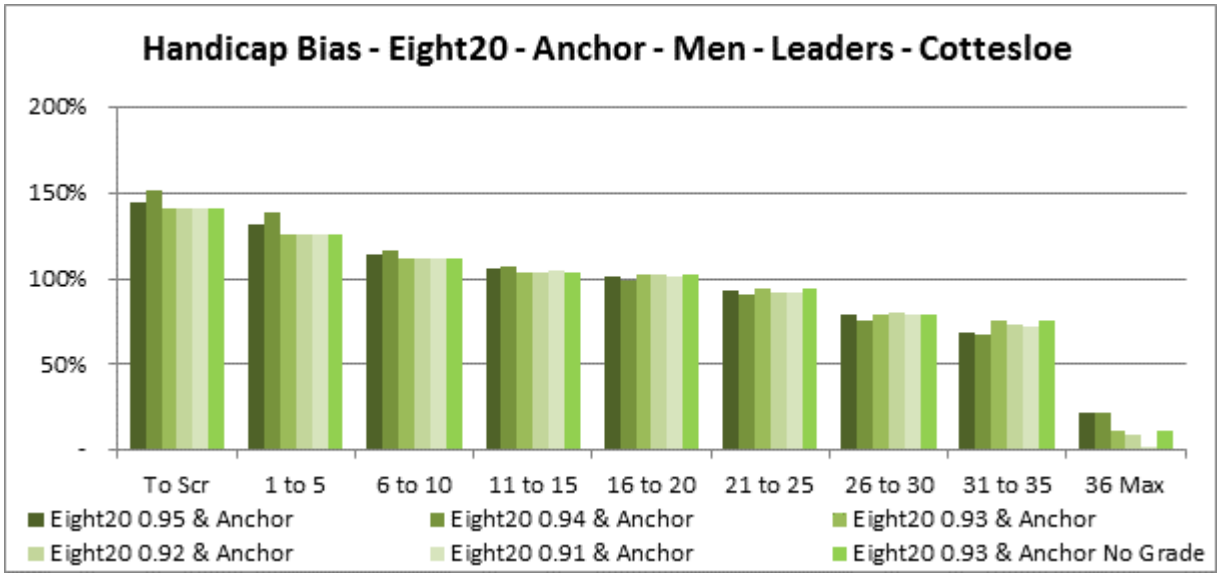

Handicap Bias - Eight20 - Women - Winners - Cottesloe
500%
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Winners - Cottesloe
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Winners - Cottesloe
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Cottesloe
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Men - Leaders - Cottesloe
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Leaders - Cottesloe
200%
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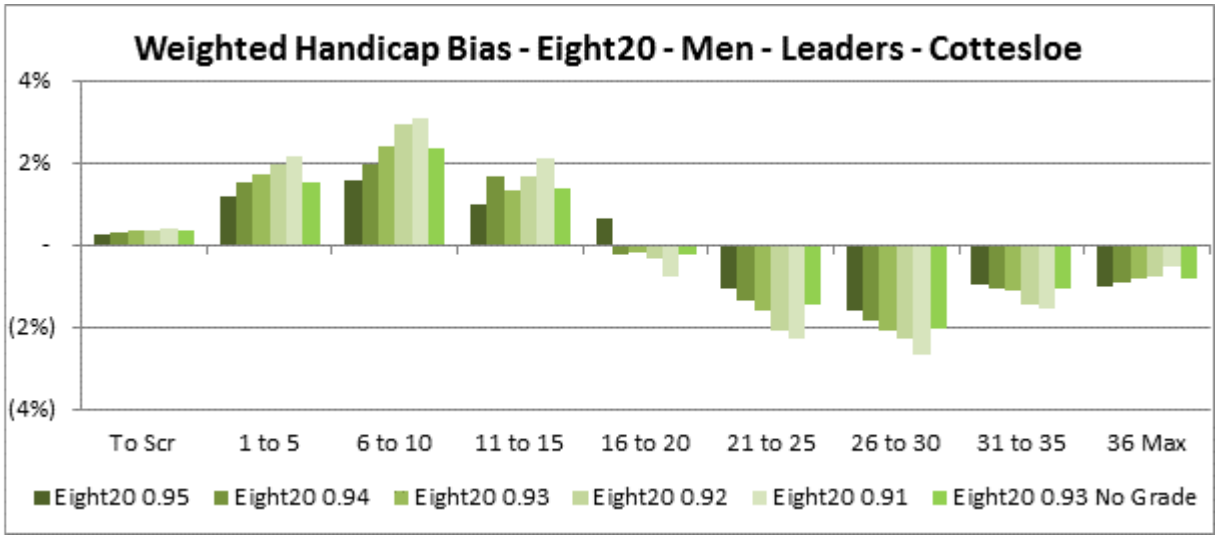
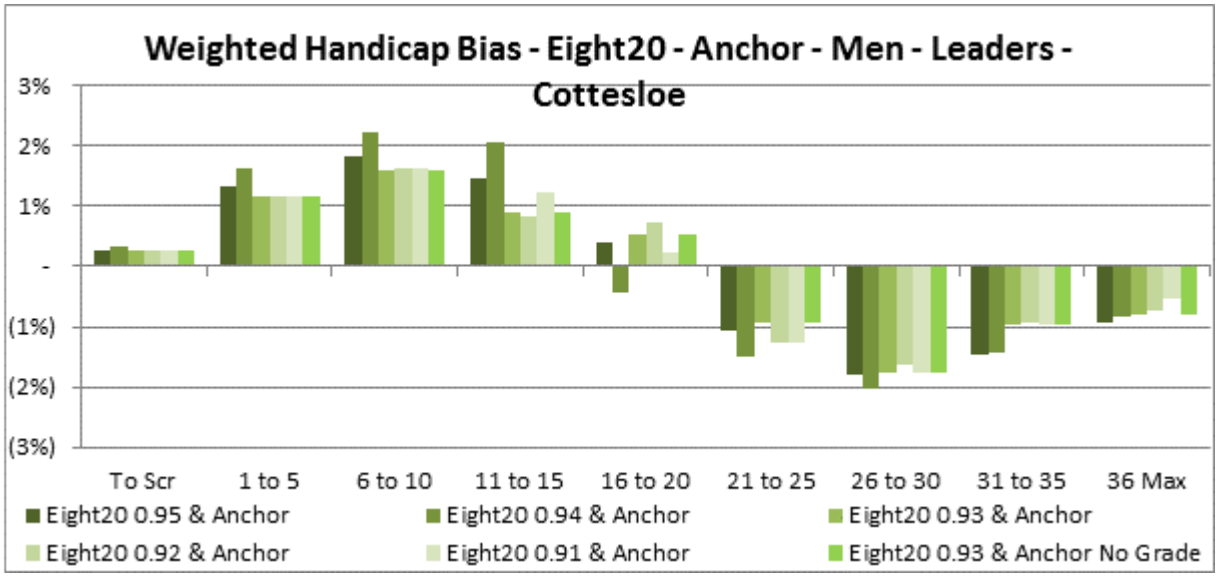
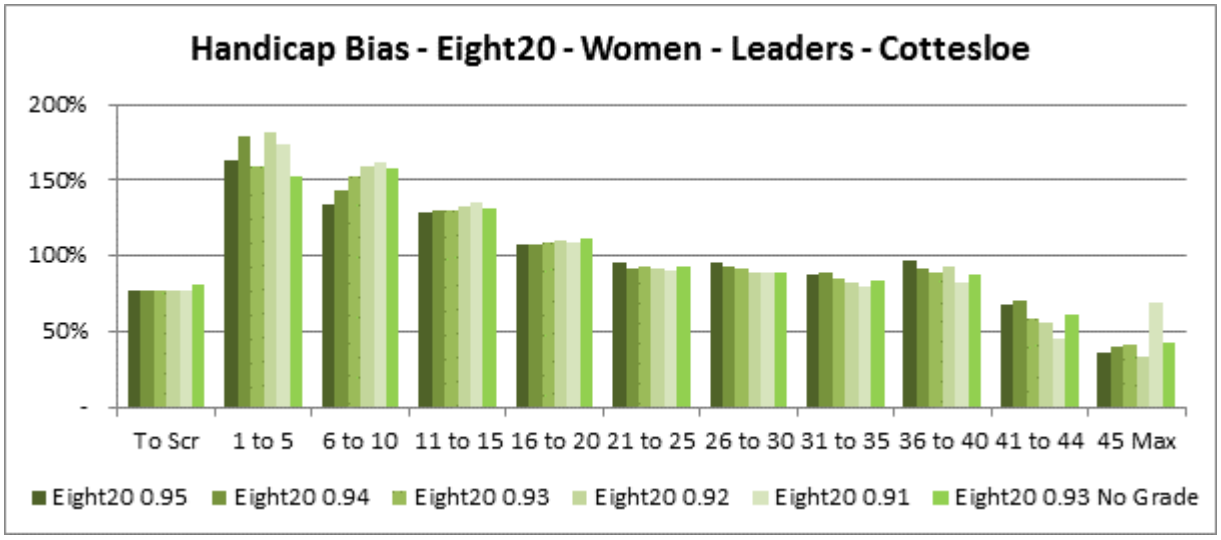
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Leaders - Cottesloe
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Cottesloe
3%
2%
1%
-
(1%)
(2%)
(3%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Cottesloe
200%
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To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
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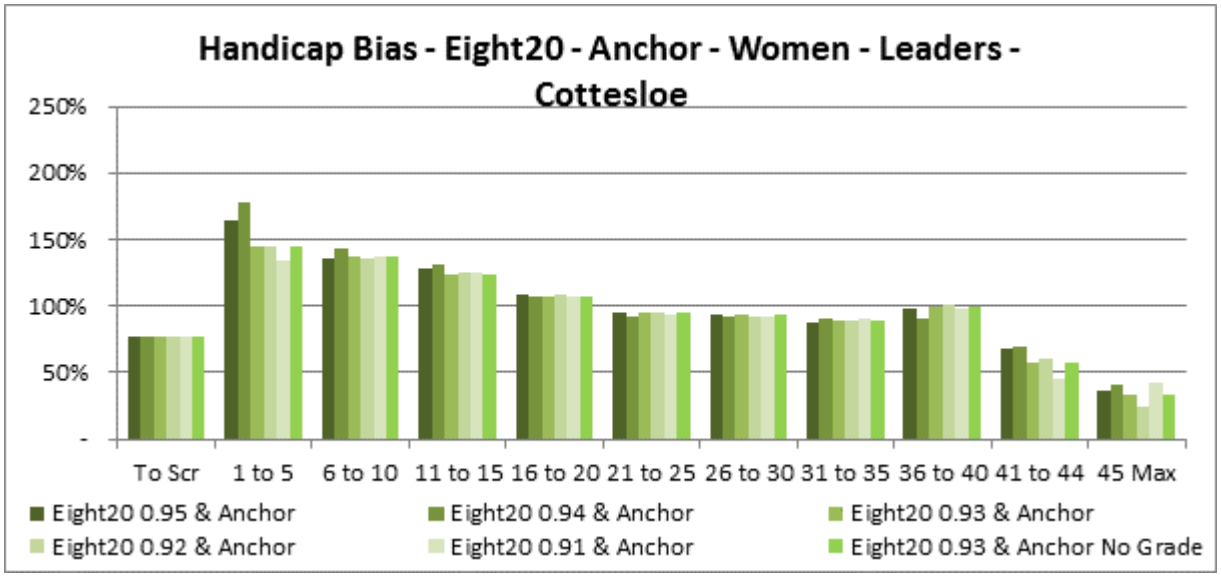
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Cottesloe
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16 to 20
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31 to 35
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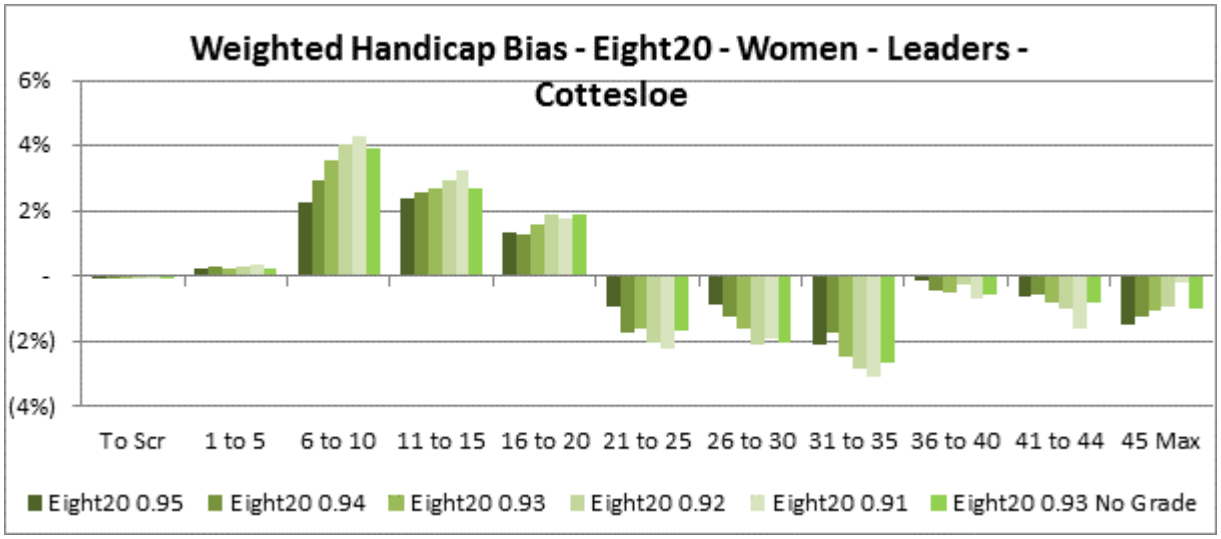
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Cottesloe
6%
4%
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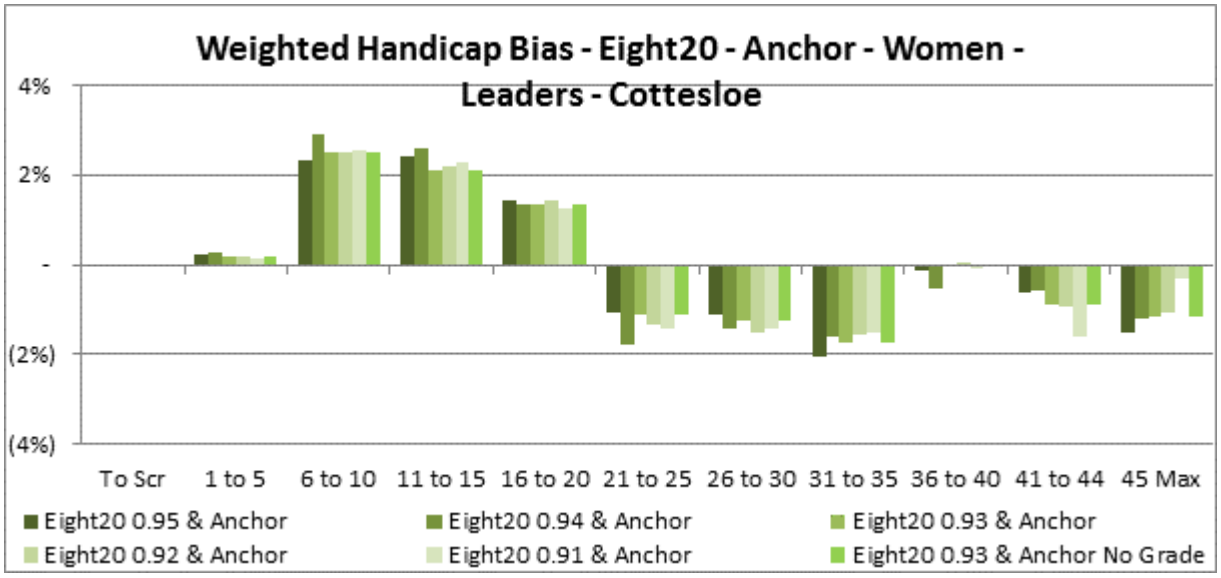
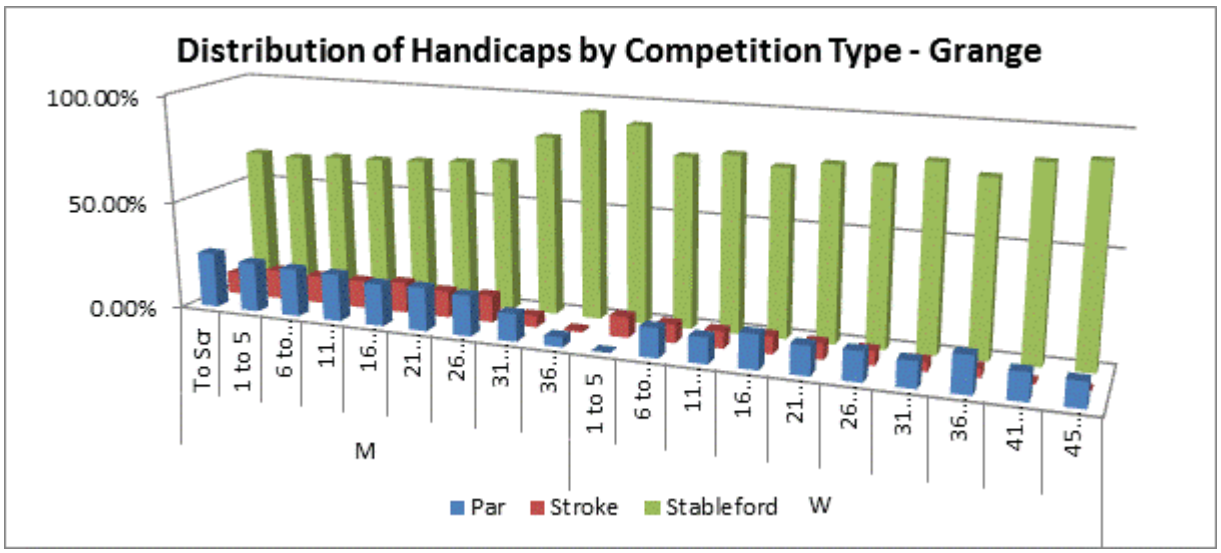
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

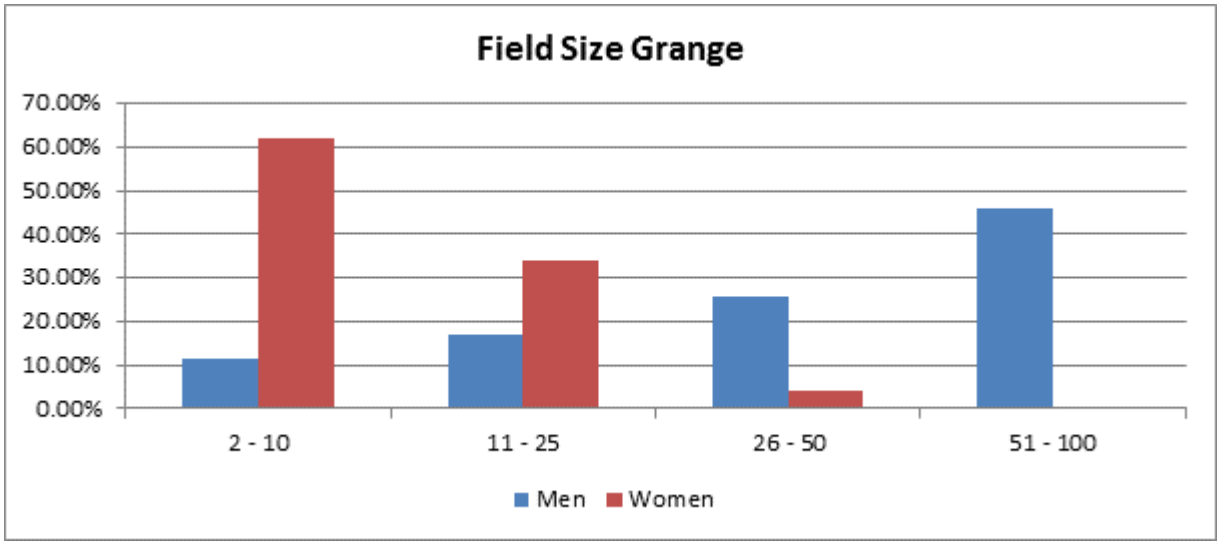


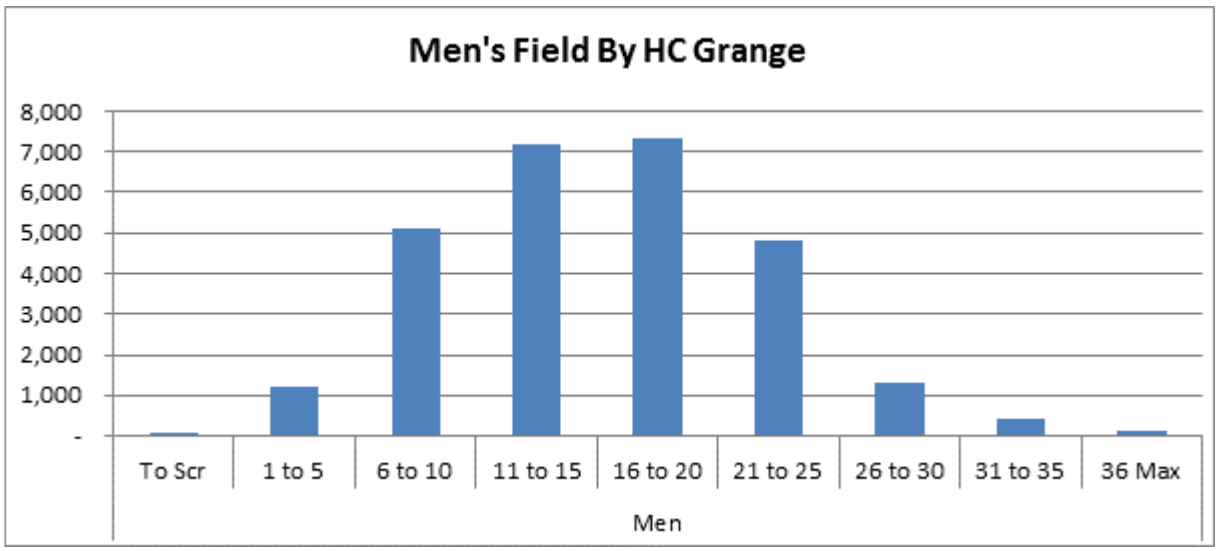
		Phase 2 -Cottesloe			
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	-28.4	22.9	-32.4	26.6
	Eight20 0.94	-41.0	25.9	-35.8	22.7
	Eight20 0.93	-44.3	24.4	-46.9	31.4
	Eight20 0.92	-53.8	25.3	-52.7	31.8
	Eight20 0.91	-61.2	26.7	-50.1	31.0
	Eight20 0.93 No Grade	-34.2	18.7	-46.5	32.4
	Eight20 0.95 & Anchor	-39.0	20.1	-33.3	27.4
	Eight20 0.94 & Anchor	-45.4	22.9	-36.6	25.3
	Eight20 0.93 & Anchor	-48.8	24.1	-47.8	32.0
	Eight20 0.92 & Anchor	-60.0	28.4	-53.5	31.9
	Eight20 0.91 & Anchor	-65.2	29.5	-52.1	33.1
	Eight20 0.93 & Anchor No Grade	-39.6	18.7	-47.3	33.3
Leaders	Eight20 0.95	-33.3	11.7	-26.5	14.7
	Eight20 0.94	-38.9	14.2	-28.0	16.4
	Eight20 0.93	-41.6	15.6	-31.8	18.9
	Eight20 0.92	-48.4	18.7	-34.8	21.8
	Eight20 0.91	-51.1	20.6	-36.1	23.0
	Eight20 0.93 No Grade	-39.9	14.9	-33.7	20.6
	Eight20 0.95 & Anchor	-38.3	13.7	-26.9	15.1
	Eight20 0.94 & Anchor	-43.3	16.3	-28.2	16.5
	Eight20 0.93 & Anchor	-32.0	11.6	-25.3	14.4
	Eight20 0.92 & Anchor	-31.7	11.7	-25.0	14.8
	Eight20 0.91 & Anchor	-31.4	12.0	-24.3	15.0
	Eight20 0.93 & Anchor No Grade	-32.0	11.6	-25.3	14.4

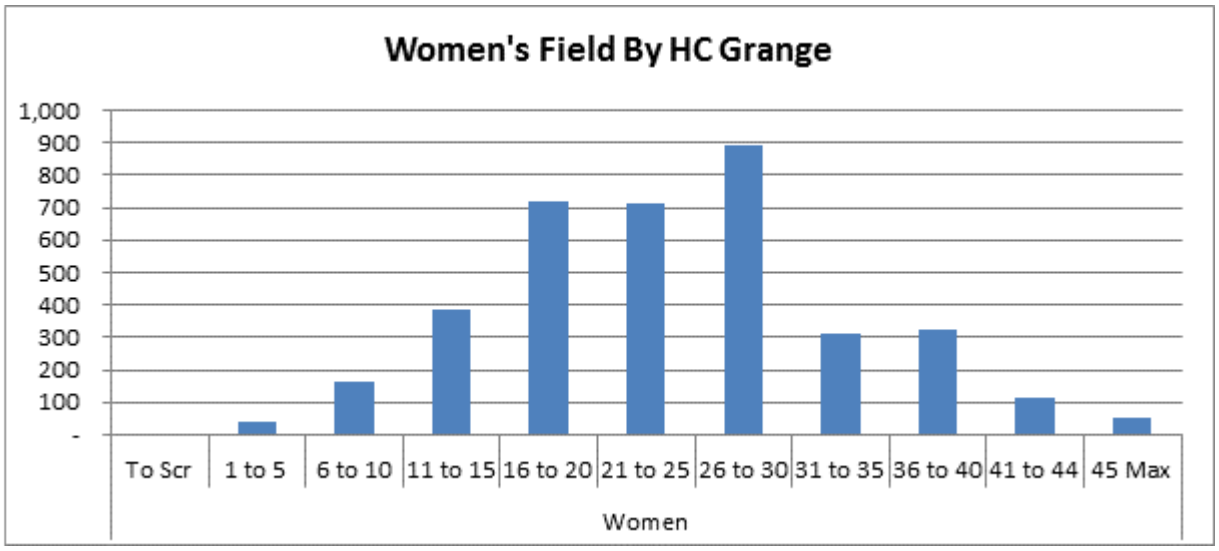
Appendix 18 – Grange – Phase 2

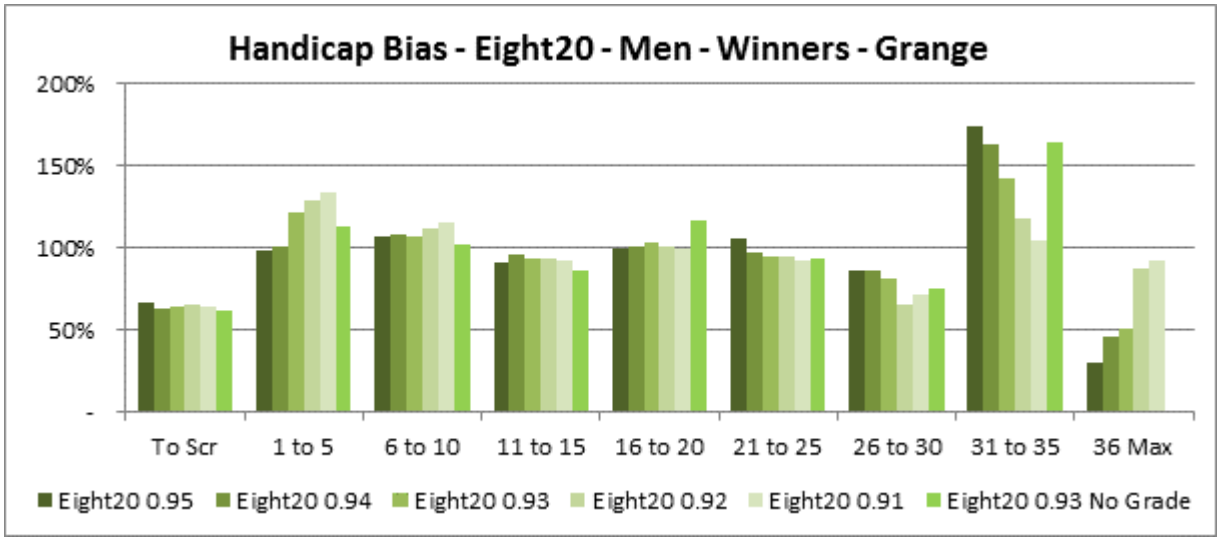
Grange	Men	Women	Total
Players in Database	592	117	709
Members	461	96	557
Visitors	131	21	152
Members who have Played 21 Rounds	328	69	397
Members with Last Round In Old System	419	56	475
Members with Last Round in Current System	42	40	82
Earliest Round	30/11/2007	29/1/2008	
Latest Round	28/11/2010	31/10/2010	
Number of Visiting Clubs			25
Number of Home Competitions	1,950	1,203	3,153
Number of Rounds of Golf	46,291	6,441	52,732
Number of Rounds at Home	46,291	6,441	52,732
Number of Rounds at Home Old	36,726	5,027	41,753
Number of Rounds at Home Current	9,565	1,414	10,979
Num Rnds Members at Home	45,542	6,293	51,835
Num Rnds Members at Home Old	36,022	4,890	40,912
Num Rnds Members at Home Cur	9,520	1,403	10,923
Num Rnds After Eliminations	30,836	4,139	34,975
Num Rnds After Eliminations Old	21,271	2,725	23,996
Num Rnds After Eliminations Cur	9,565	1,414	10,979

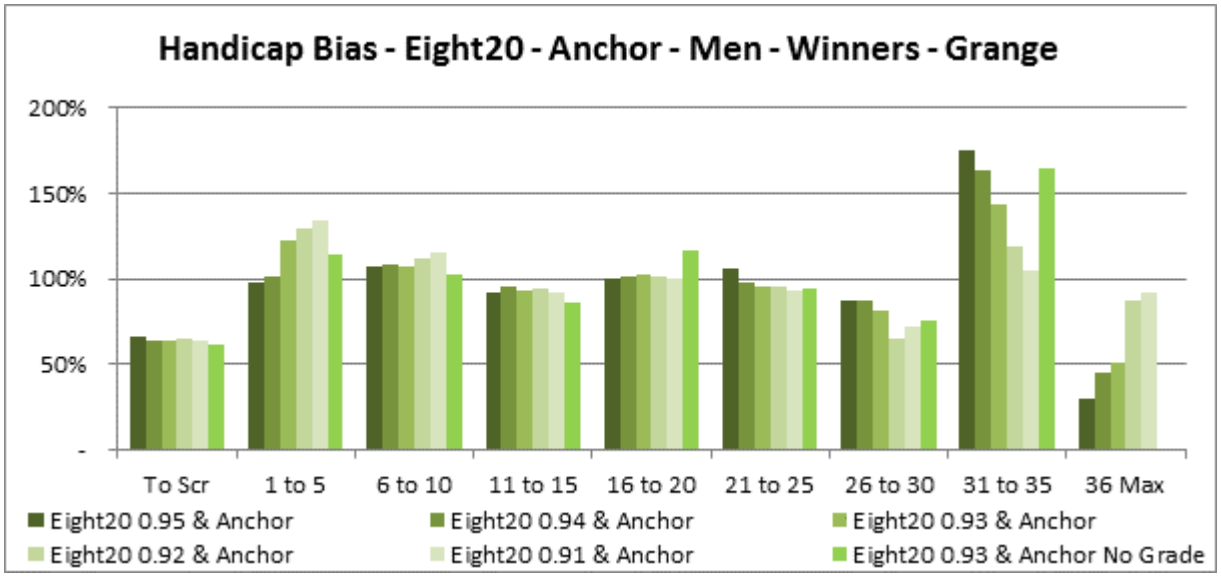


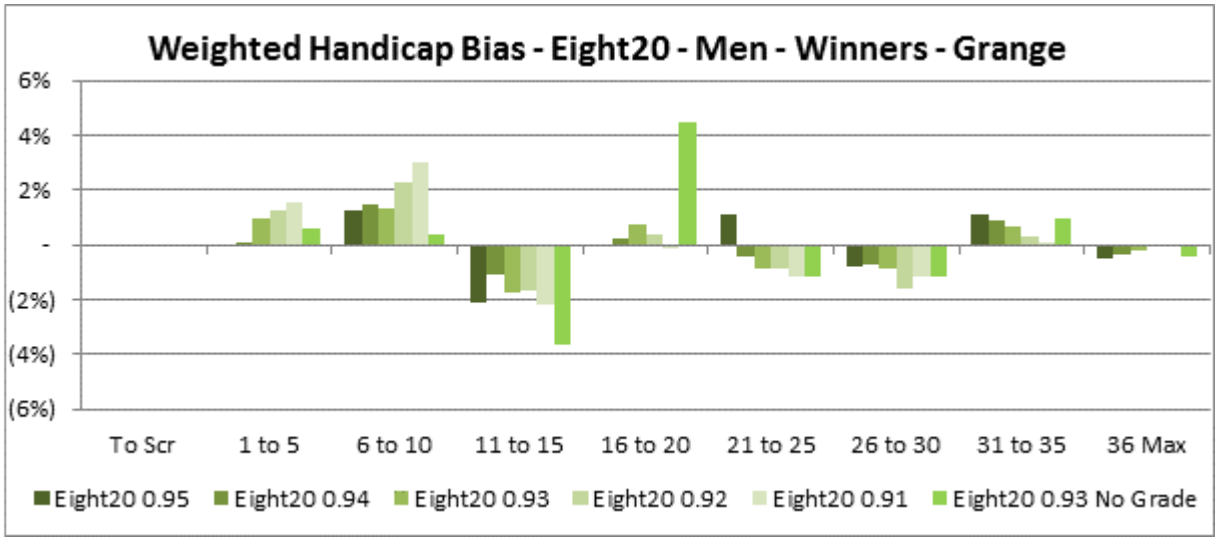

Field Size Grange
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
Men
Women

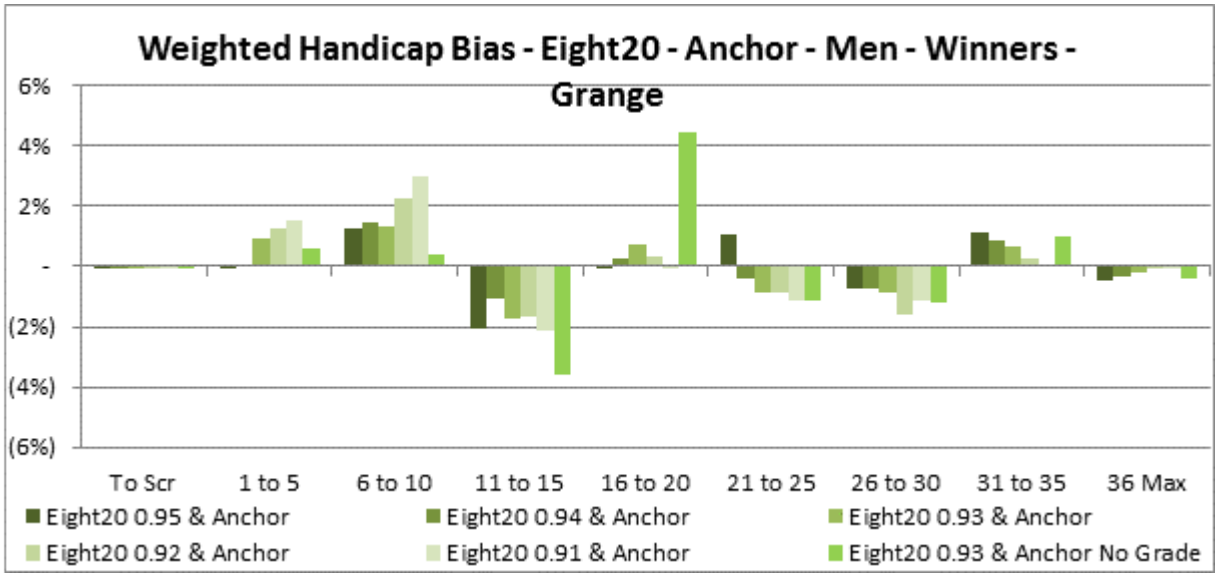

Men's Field By HC Grange
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

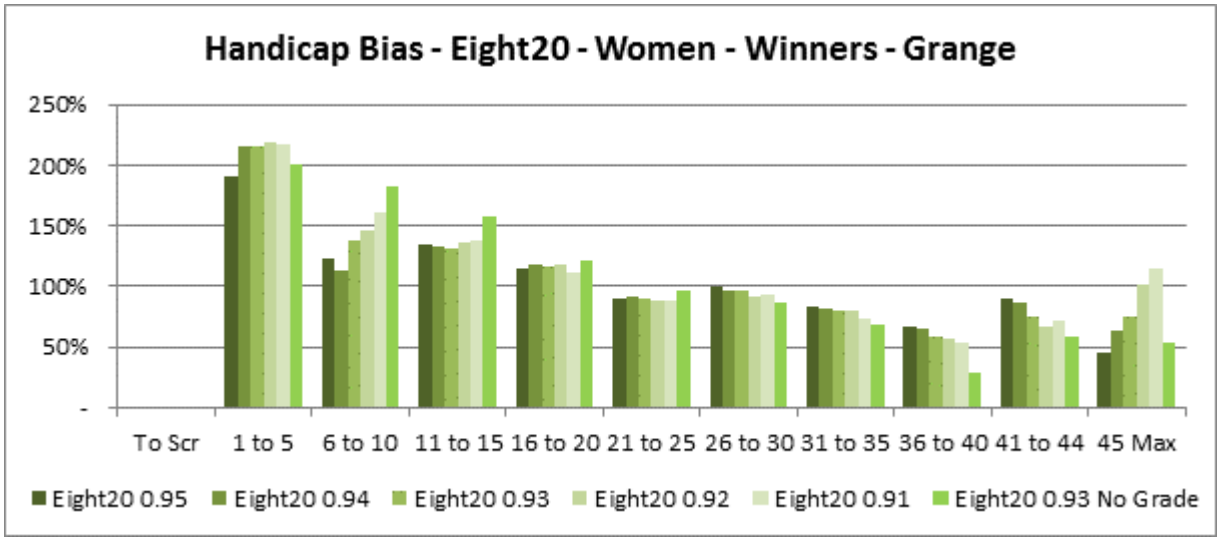

Women's Field By HC Grange
1,000
900
800
700
600
500
400
300
200
100
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

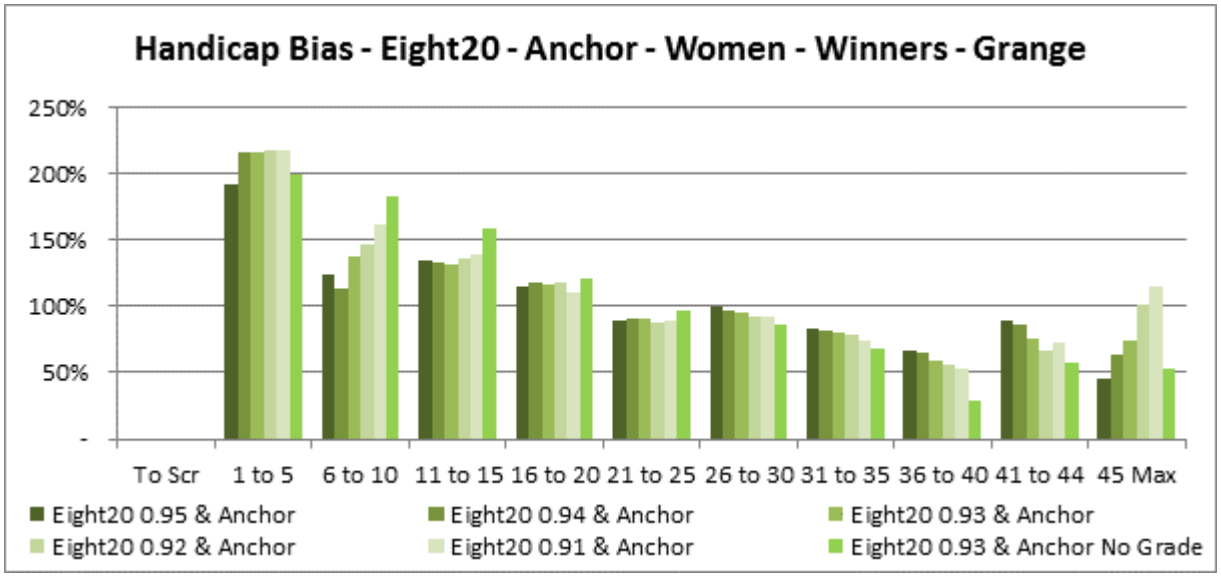

Handicap Bias - Eight20 - Men - Winners - Grange
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Winners - Grange
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Winners - Grange
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Grange
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Winners - Grange
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Winners - Grange
250%
200%
150%
100%
50%
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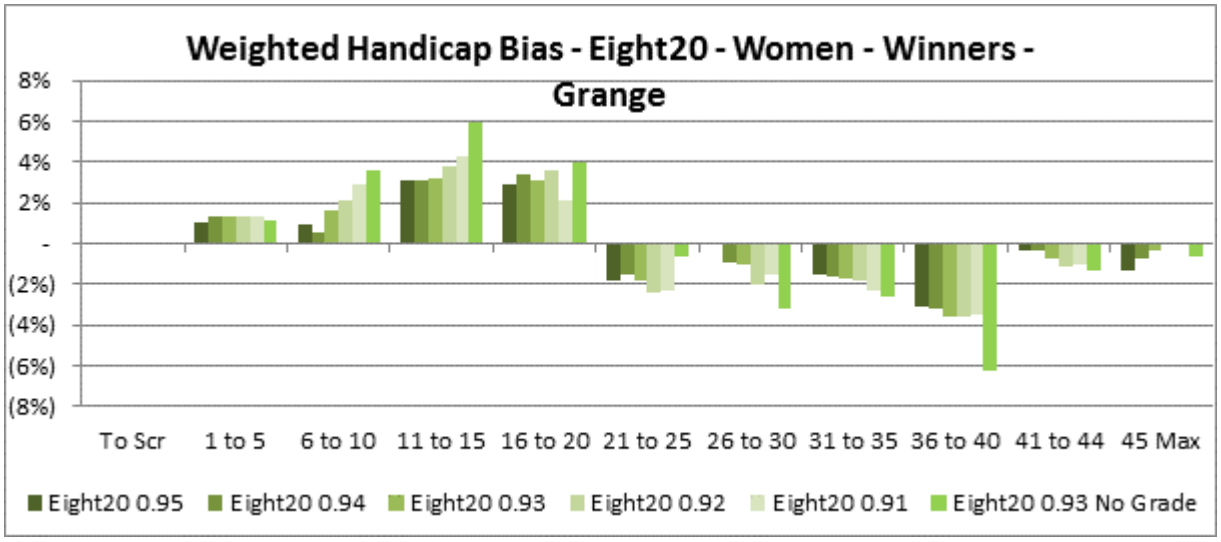
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Winners - Grange
8%
6%
4%
2%
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(2%)
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(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
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45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
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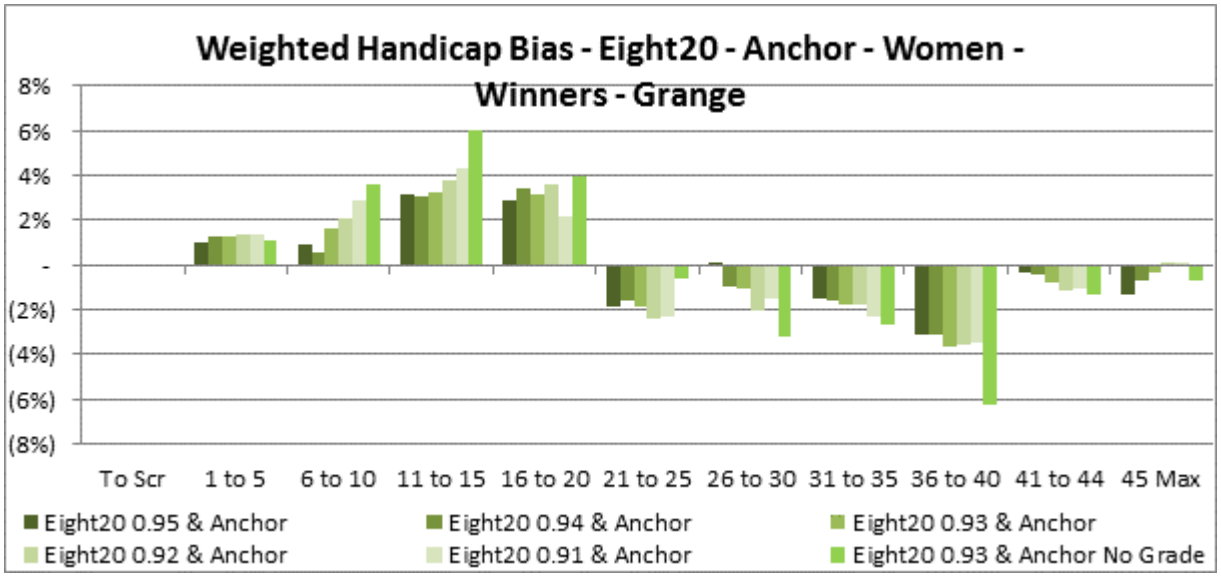
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Grange
8%
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To Scr
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6 to 10
11 to 15
16 to 20
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31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
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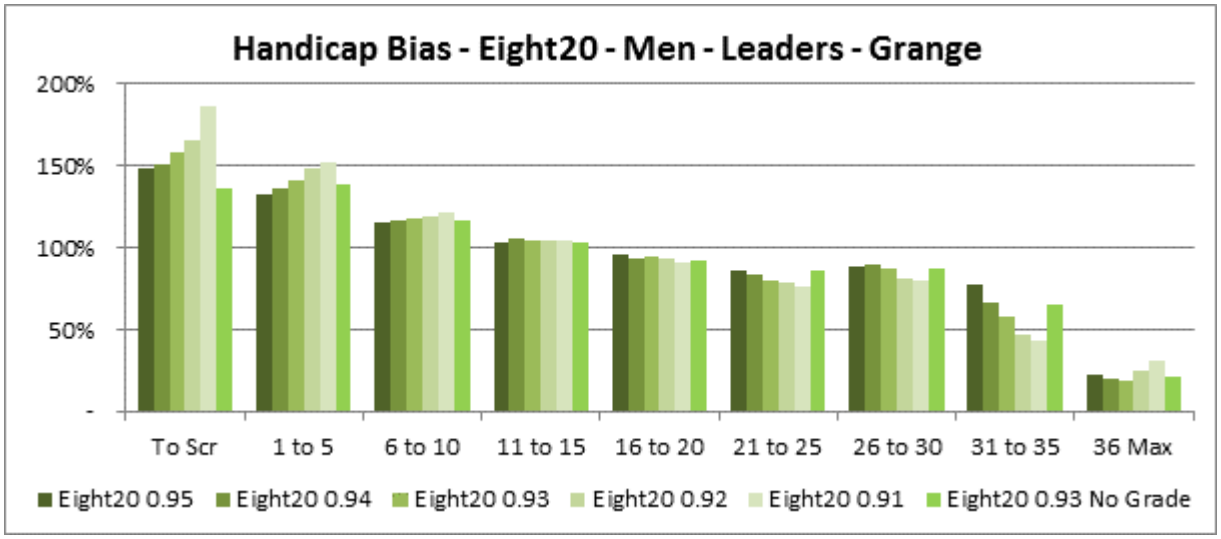
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Men - Leaders - Grange
200%
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To Scr
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6 to 10
11 to 15
16 to 20
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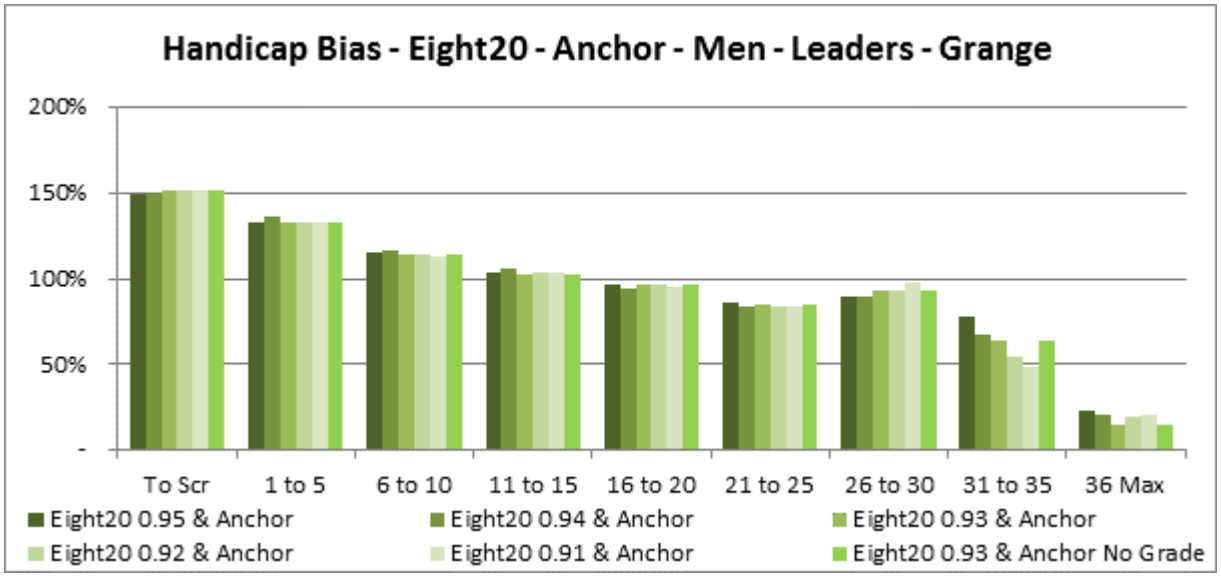
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Men - Leaders - Grange
200%
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To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
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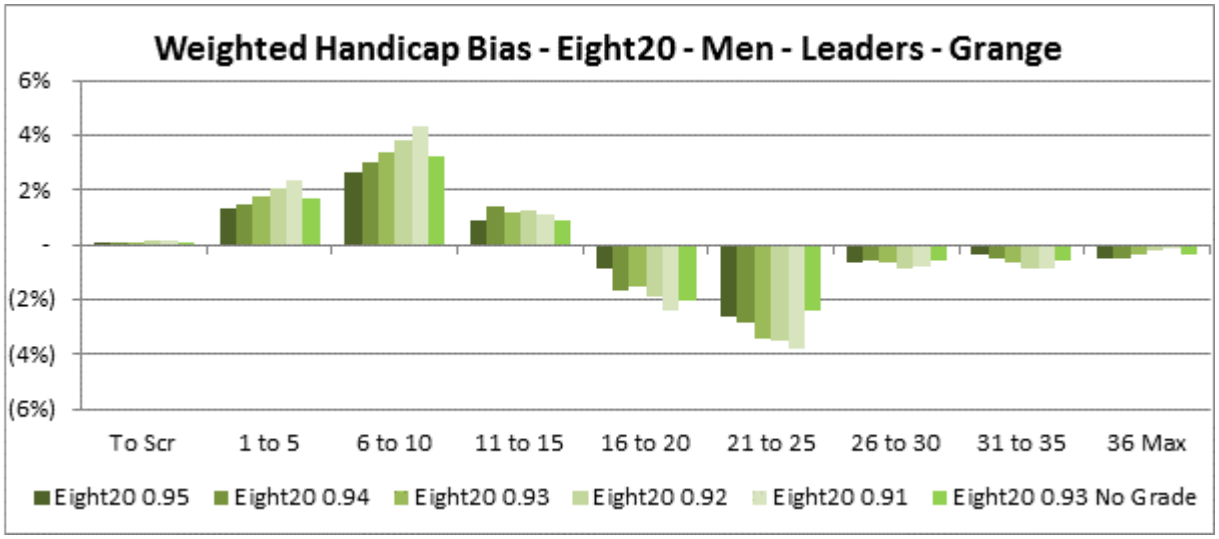
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Men - Leaders - Grange
6%
4%
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To Scr
1 to 5
6 to 10
11 to 15
16 to 20
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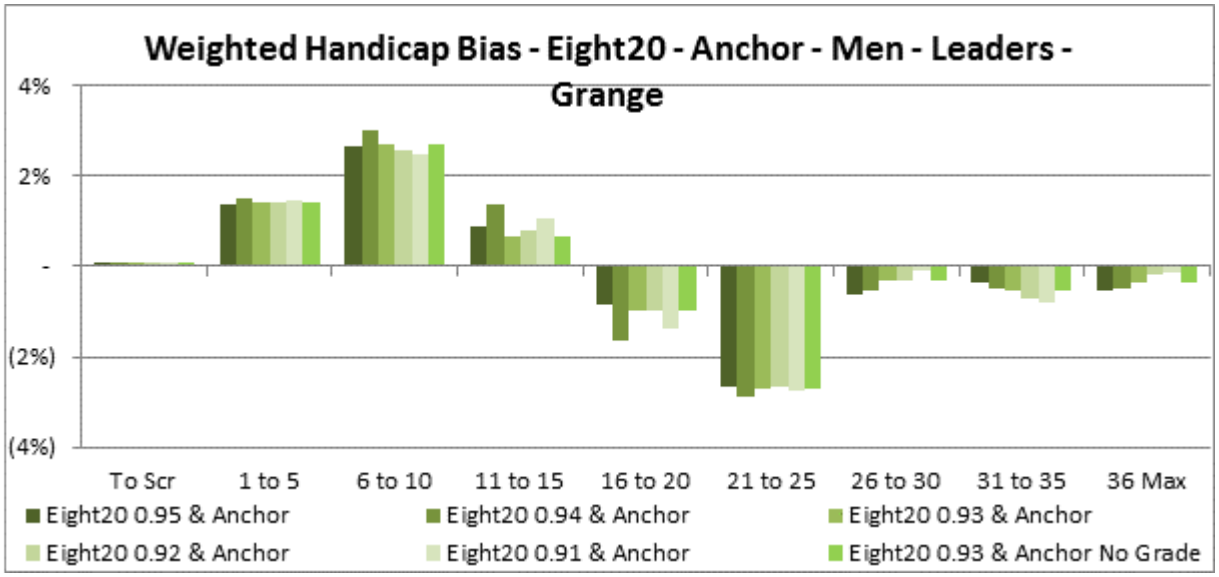
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Grange
4%
2%
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(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
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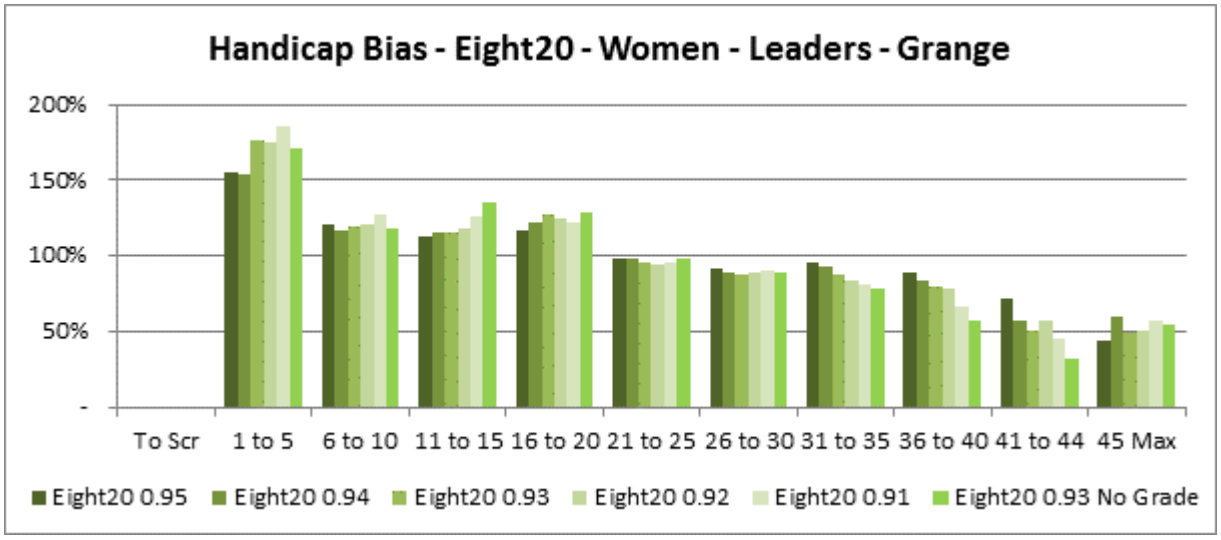
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Grange
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To Scr
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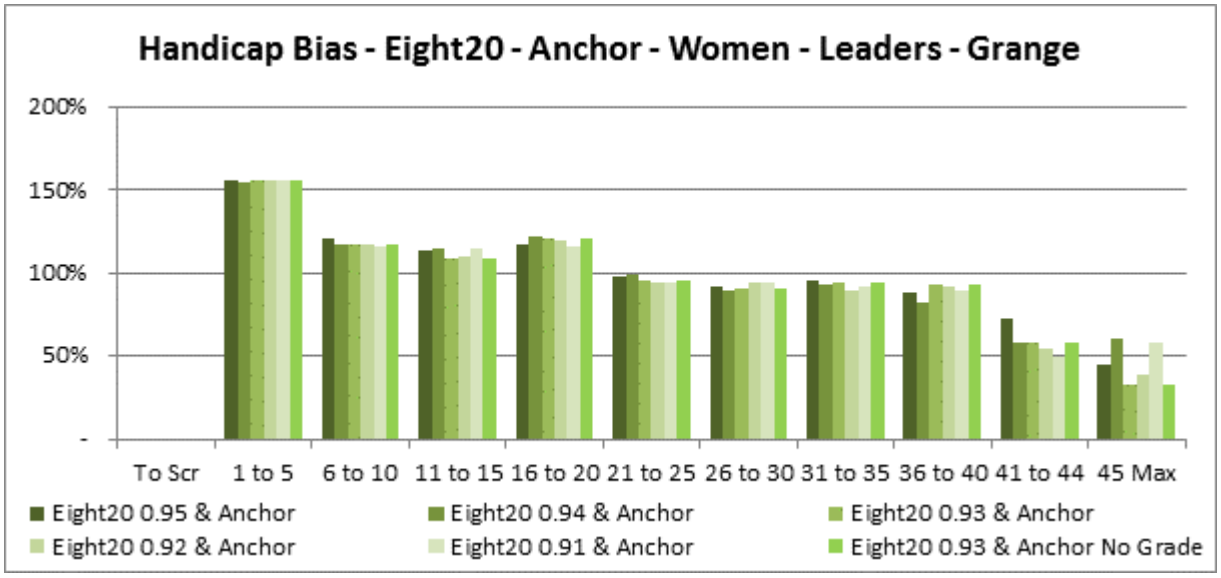
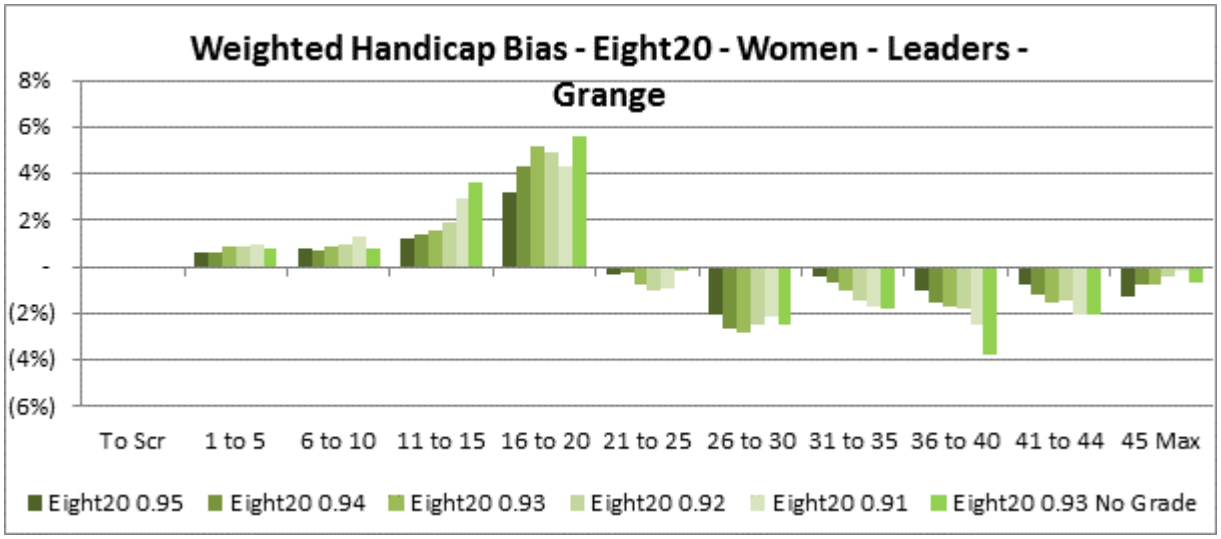
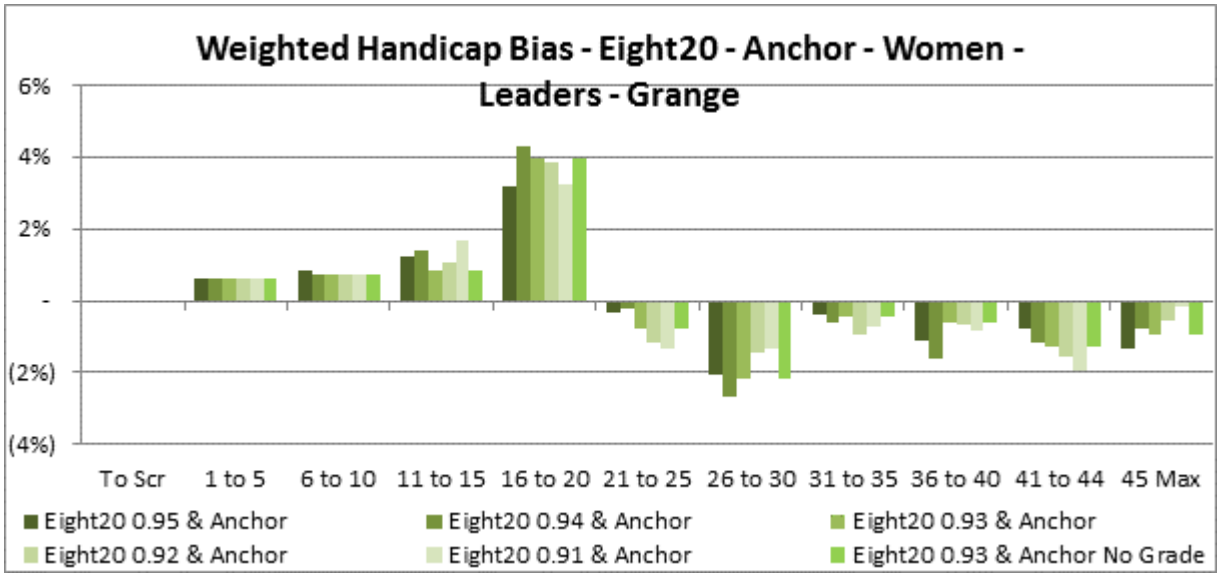
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Grange
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

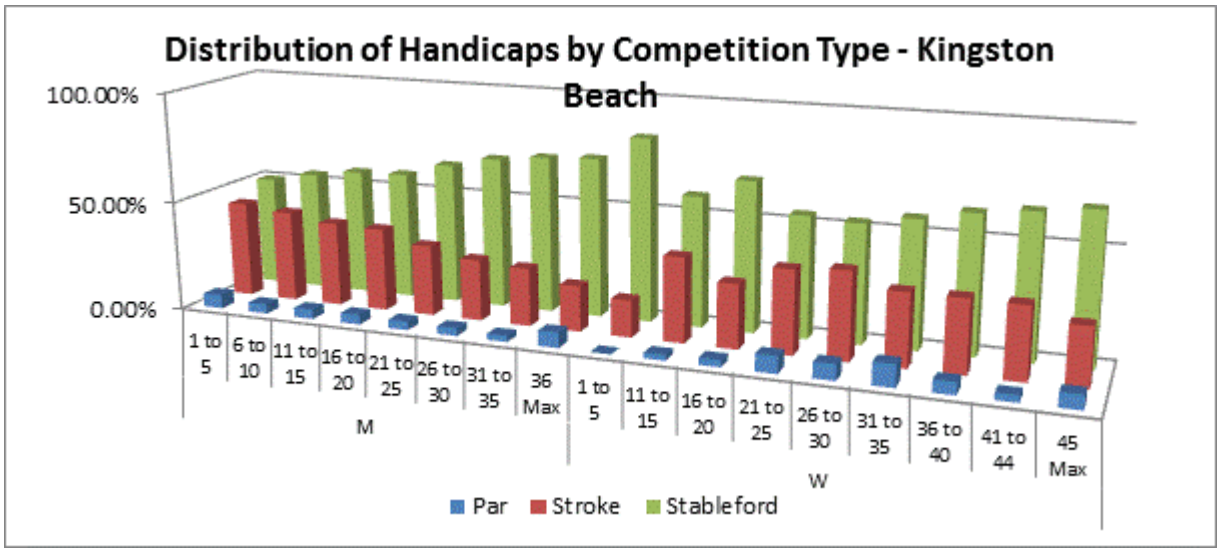

Weighted Handicap Bias - Eight20 - Women - Leaders - Grange
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

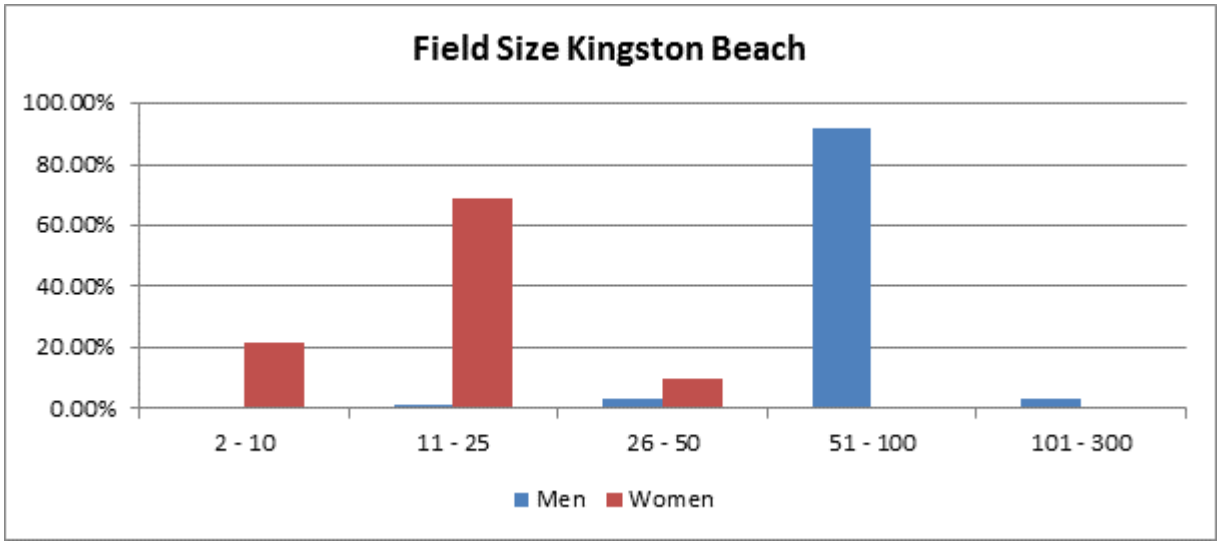


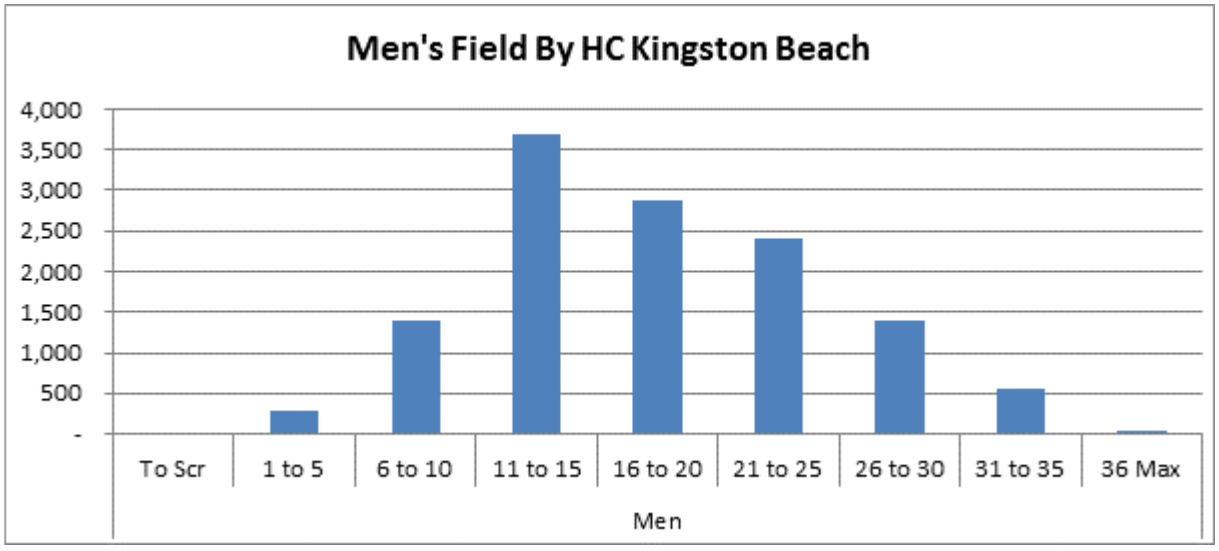
Phase 2 -Grange					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	2.0	10.9	-32.6	19.2
	Eight20 0.94	-3.5	7.9	-31.9	19.9
	Eight20 0.93	-8.2	10.1	-36.4	21.5
	Eight20 0.92	-16.1	12.8	-39.5	24.6
	Eight20 0.91	-18.9	15.3	-41.3	24.5
	Eight20 0.93 No Grade	-1.2	21.6	-61.0	35.4
	Eight20 0.95 & Anchor	1.9	10.8	-32.6	19.2
	Eight20 0.94 & Anchor	-3.5	7.9	-31.9	19.9
	Eight20 0.93 & Anchor	-8.2	10.1	-36.4	21.5
	Eight20 0.92 & Anchor	-16.1	12.8	-39.5	24.6
	Eight20 0.91 & Anchor	-18.9	15.3	-41.3	24.5
	Eight20 0.93 & Anchor No Grade	-1.2	21.6	-61.0	35.4
Leaders	Eight20 0.95	-29.5	15.1	-23.7	14.3
	Eight20 0.94	-32.7	17.6	-26.3	18.2
	Eight20 0.93	-36.3	19.7	-31.1	21.6
	Eight20 0.92	-40.1	21.6	-30.7	21.1
	Eight20 0.91	-43.4	24.2	-36.3	22.0
	Eight20 0.93 No Grade	-32.2	17.7	-43.2	27.4
	Eight20 0.95 & Anchor	-29.5	15.1	-24.0	14.4
	Eight20 0.94 & Anchor	-32.7	17.7	-26.6	18.4
	Eight20 0.93 & Anchor	-28.5	15.2	-22.8	16.1
	Eight20 0.92 & Anchor	-28.3	15.1	-22.9	15.7
	Eight20 0.91 & Anchor	-27.8	15.6	-22.9	15.1
	Eight20 0.93 & Anchor No Grade	-28.5	15.2	-22.8	16.1

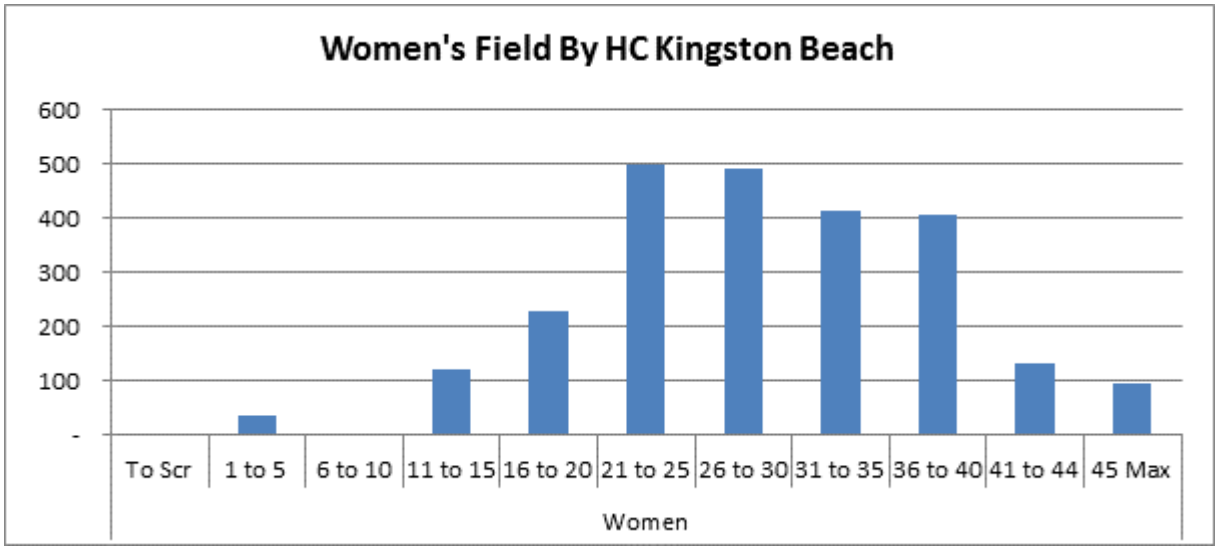
Appendix 19 – Kingston Beach – Phase 2

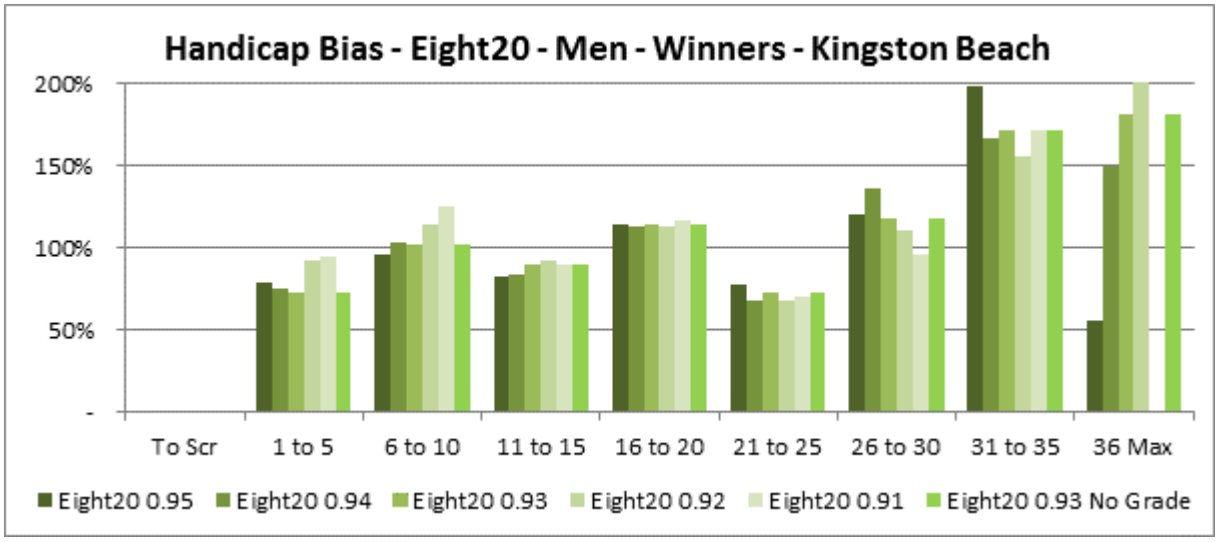
Profile Kingston Beach			
Kingston Beach	Men	Women	Total
Players in Database	742	129	871
Members	357	97	454
Visitors	385	32	417
Members who have Played 21 Rounds	313	88	401
Members with Last Round In Old System	85	21	106
Members with Last Round in Current System	272	76	348
Earliest Round	1/12/2007	19/1/2008	
Latest Round	27/11/2010	27/11/2010	
Number of Visiting Clubs			121
Number of Home Competitions	305	307	612
Number of Rounds of Golf	21,826	3,786	25,612
Number of Rounds at Home	21,826	3,786	25,612
Number of Rounds at Home Old	17,532	2,632	20,164
Number of Rounds at Home Current	4,294	1,154	5,448
Num Rnds Members at Home	21,826	3,786	25,612
Num Rnds Members at Home Old	17,532	2,632	20,164
Num Rnds Members at Home Cur	4,294	1,154	5,448
Num Rnds After Eliminations	14,322	2,720	17,042
Num Rnds After Eliminations Old	10,028	1,566	11,594
Num Rnds After Eliminations Cur	4,294	1,154	5,448

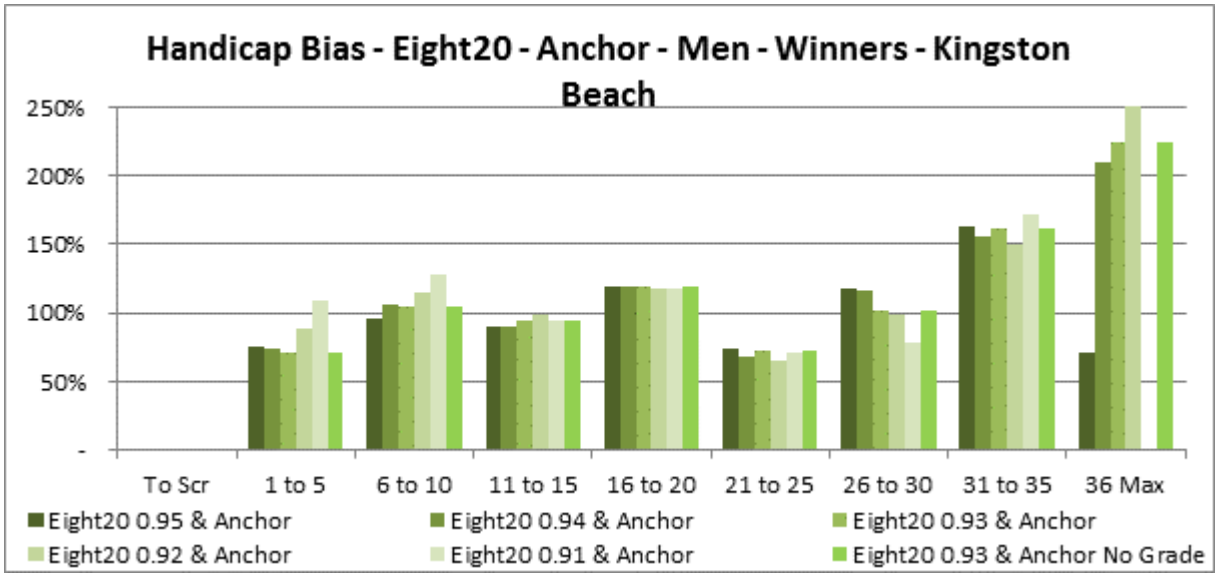


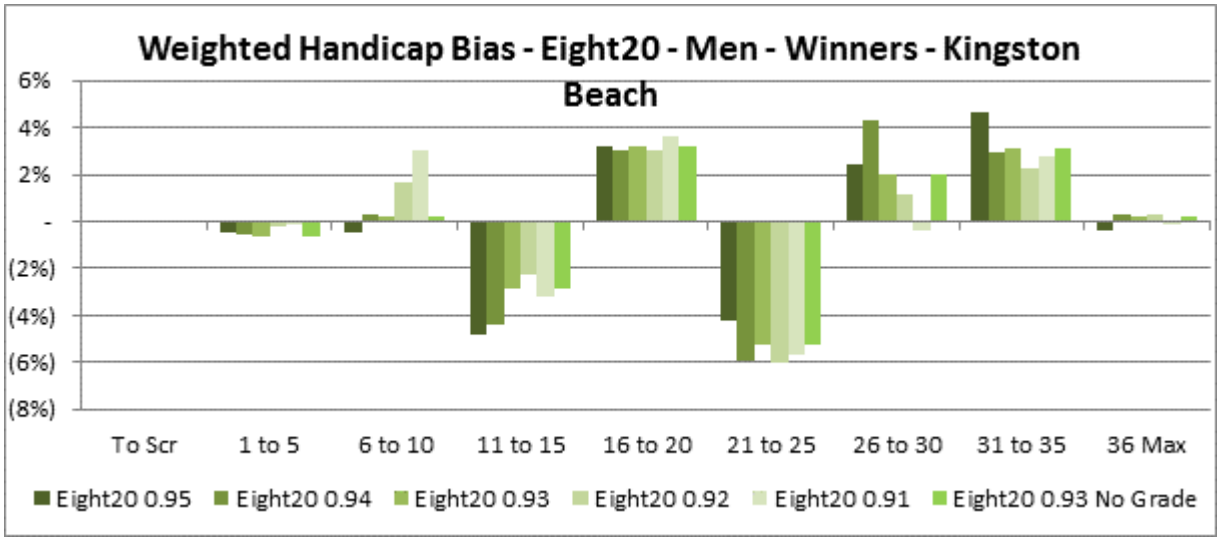

Field Size Kingston Beach
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
101 - 300
Men
Women

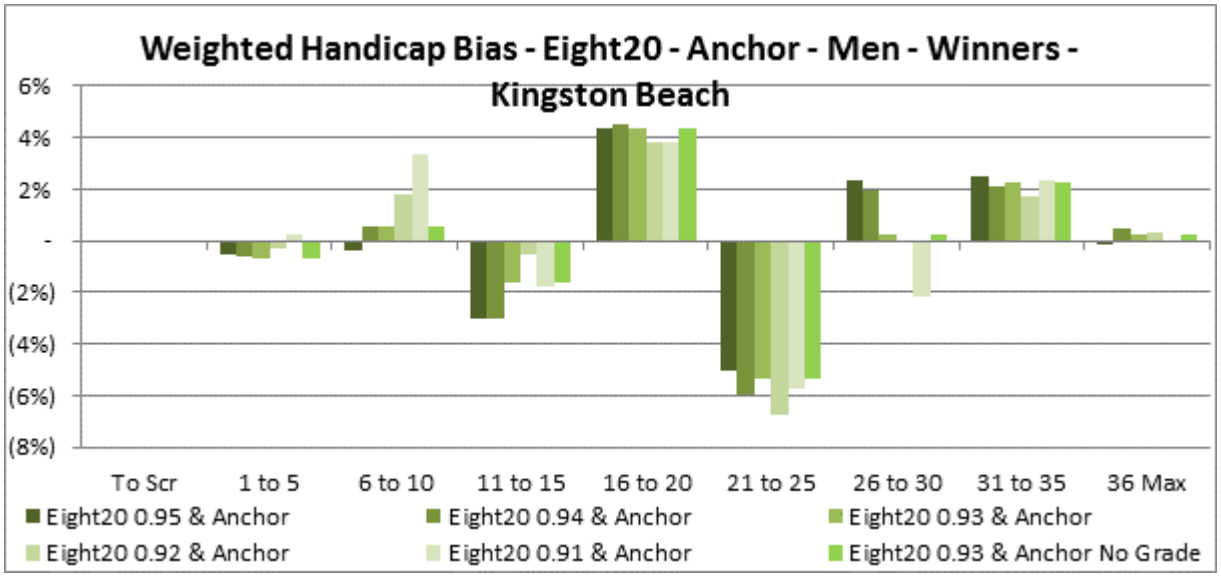

Men's Field By HC Kingston Beach
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

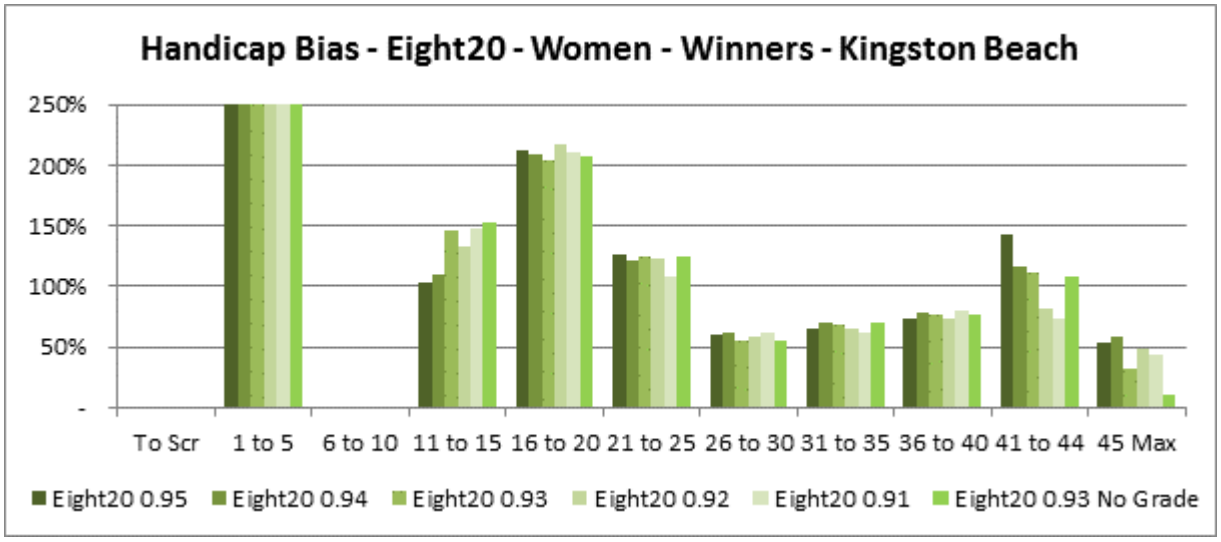

Women's Field By HC Kingston Beach
600
500
400
300
200
100
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

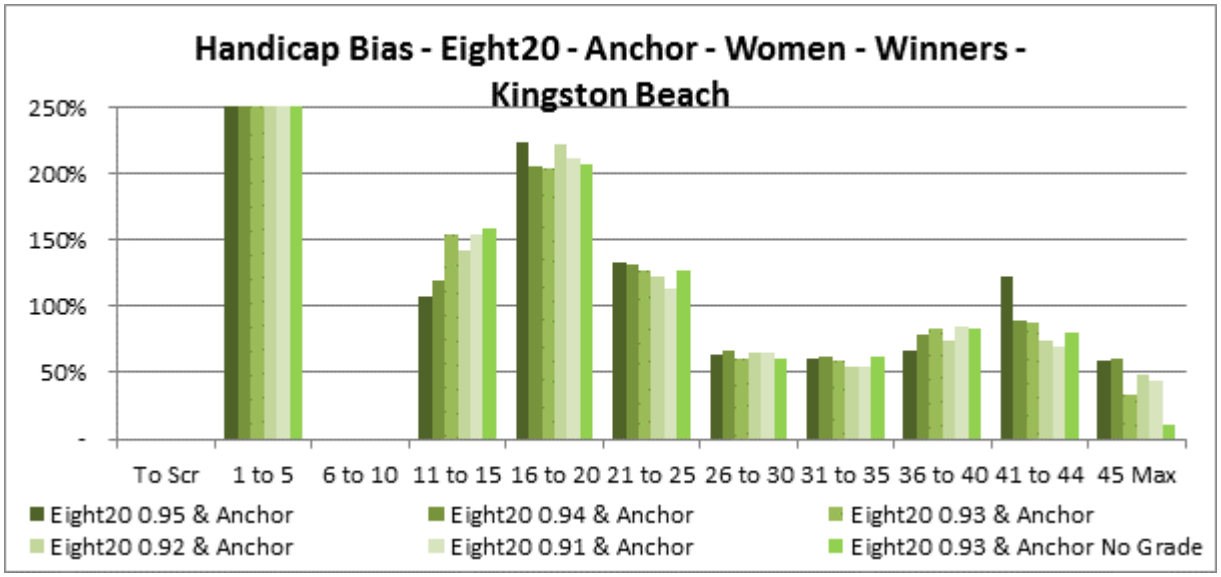

Handicap Bias - Eight20 - Men - Winners - Kingston Beach
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

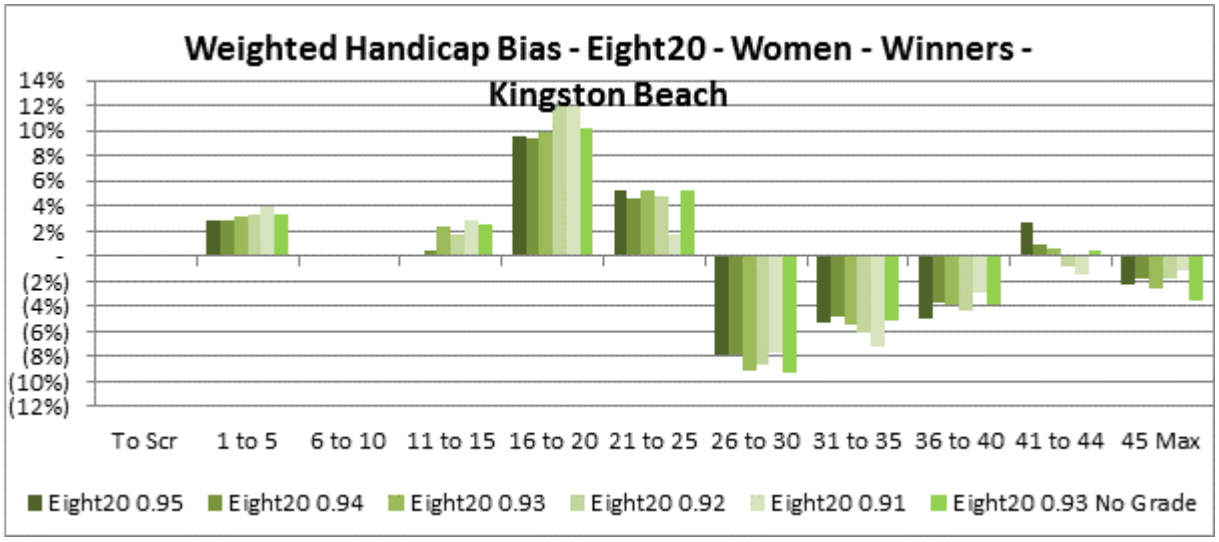

Handicap Bias - Eight20 - Anchor - Men - Winners - Kingston Beach
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

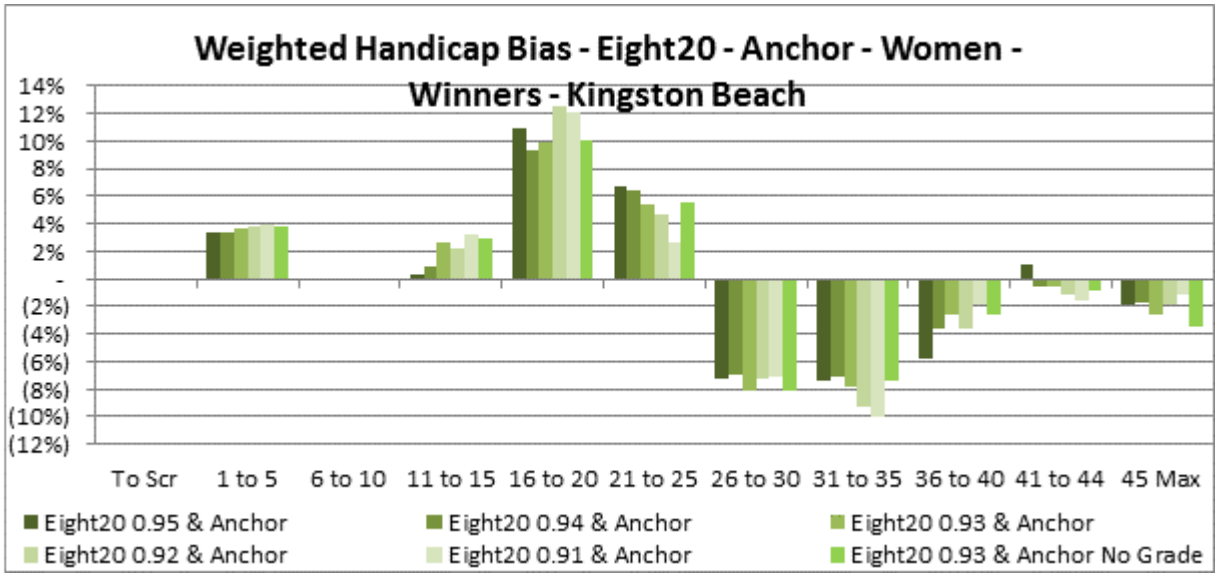

Weighted Handicap Bias - Eight20 - Men - Winners - Kingston Beach
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

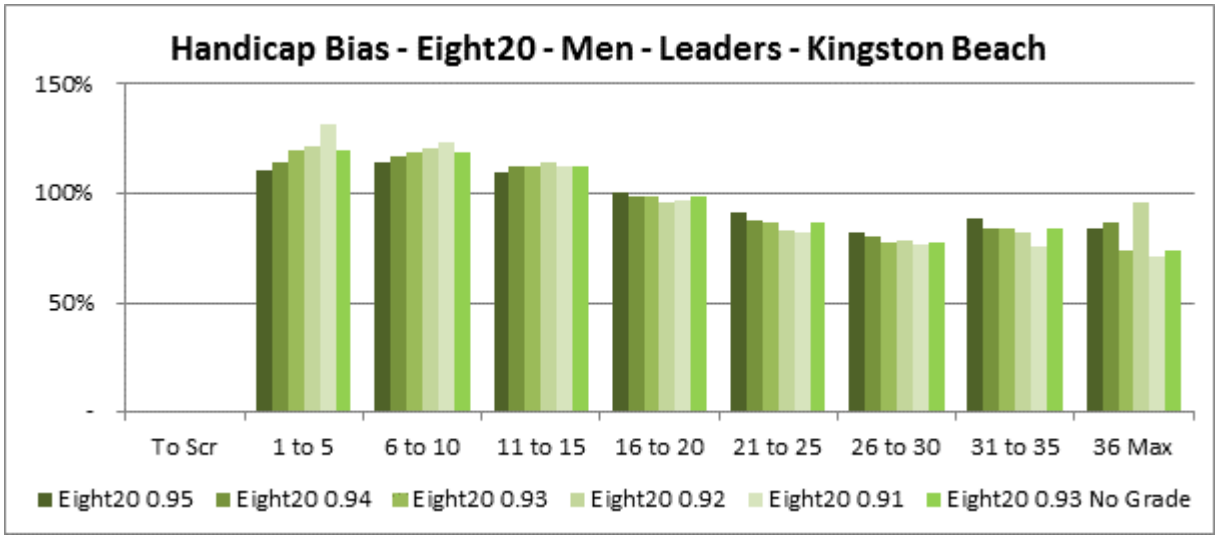

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Kingston Beach
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

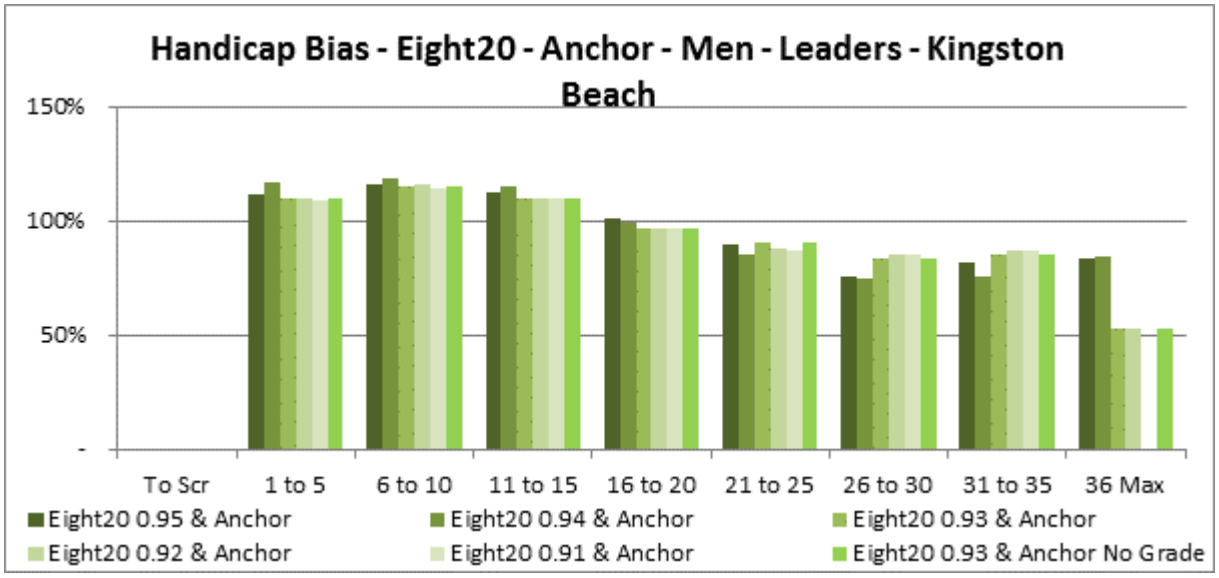

Handicap Bias - Eight20 - Women - Winners - Kingston Beach
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

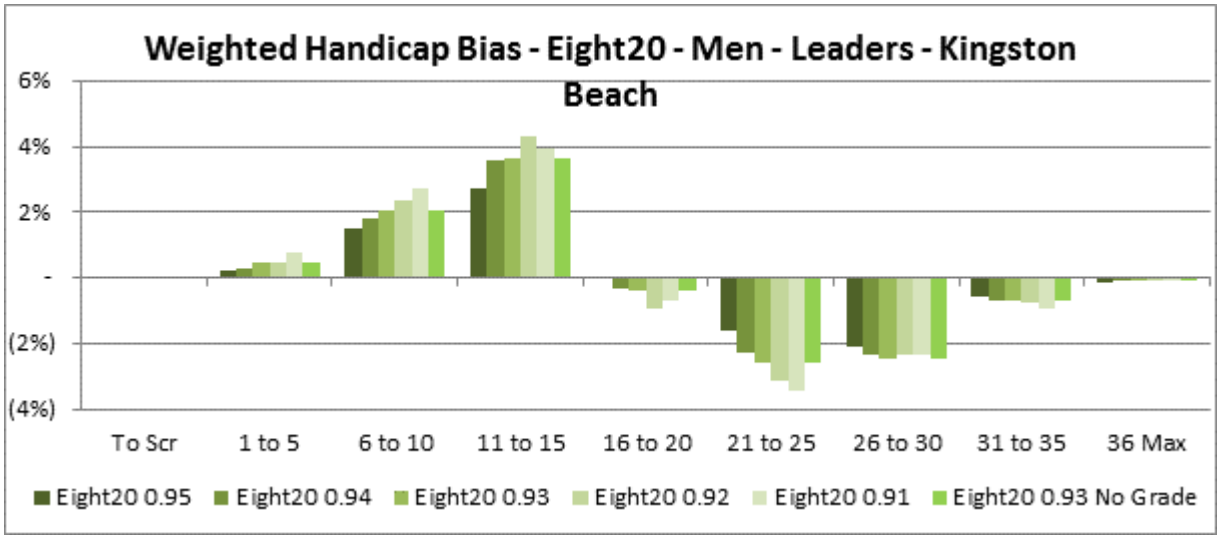

Handicap Bias - Eight20 - Anchor - Women - Winners - Kingston Beach
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

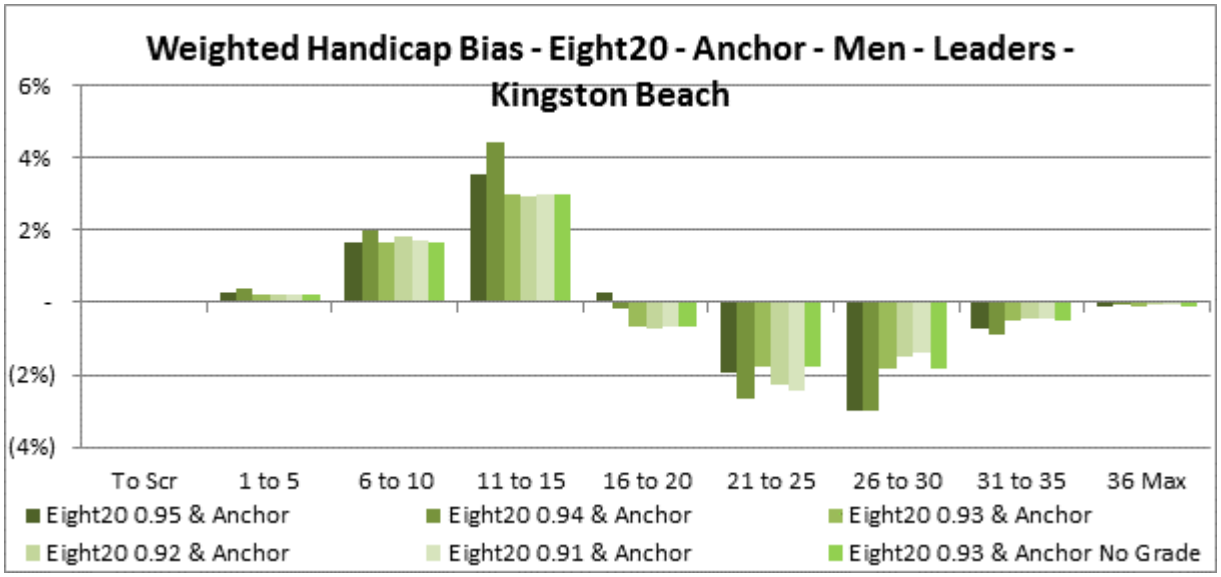

Weighted Handicap Bias - Eight20 - Women - Winners - Kingston Beach
14%
12%
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
(12%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

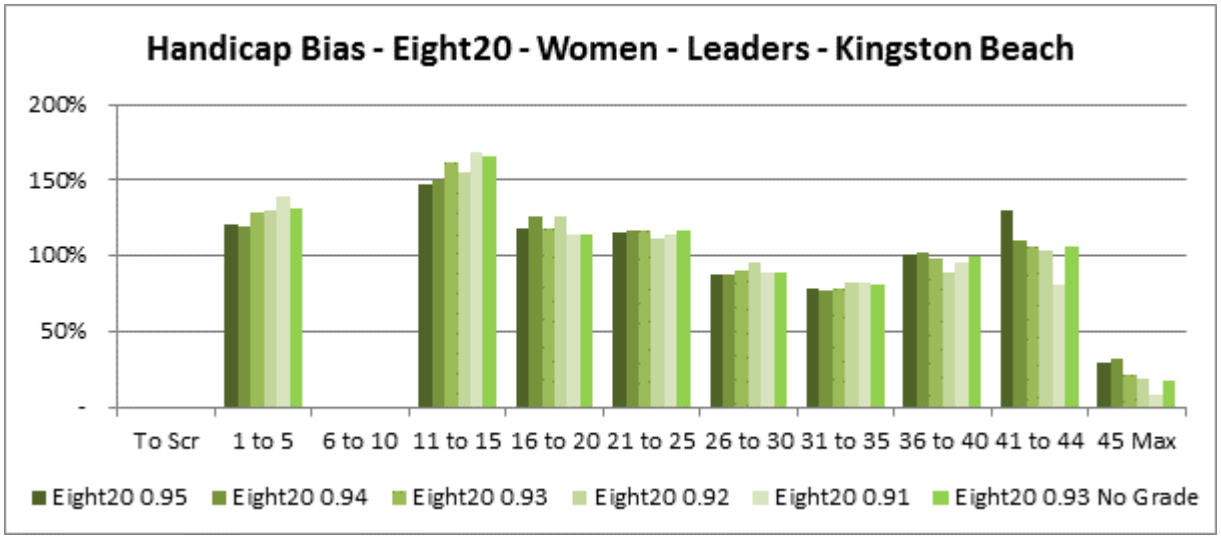

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Kingston Beach
14%
12%
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
(12%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

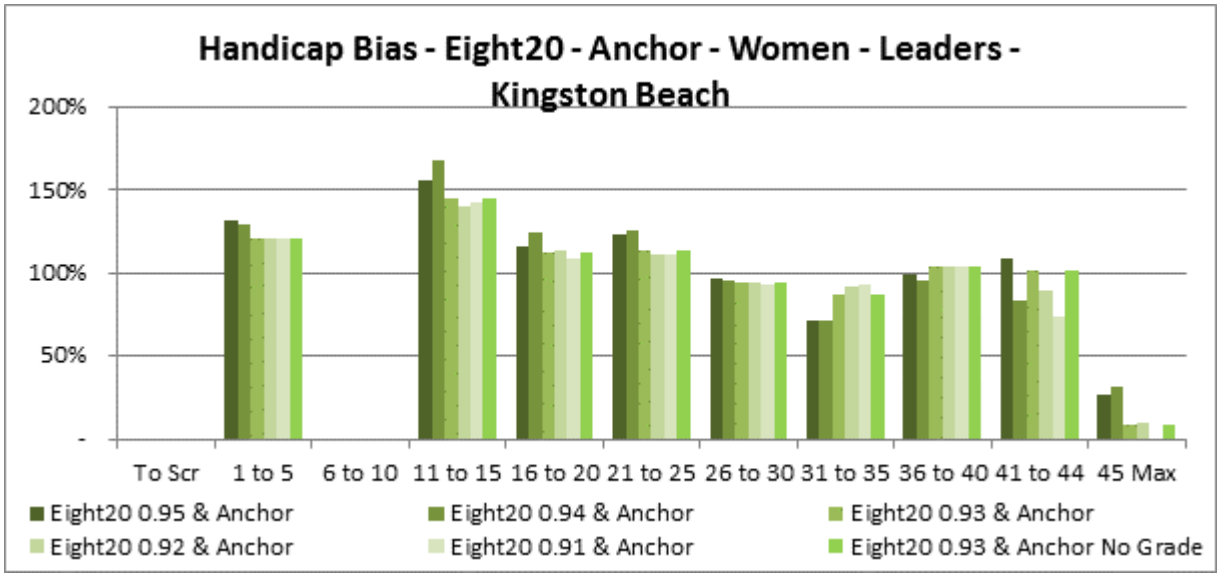

Handicap Bias - Eight20 - Men - Leaders - Kingston Beach
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

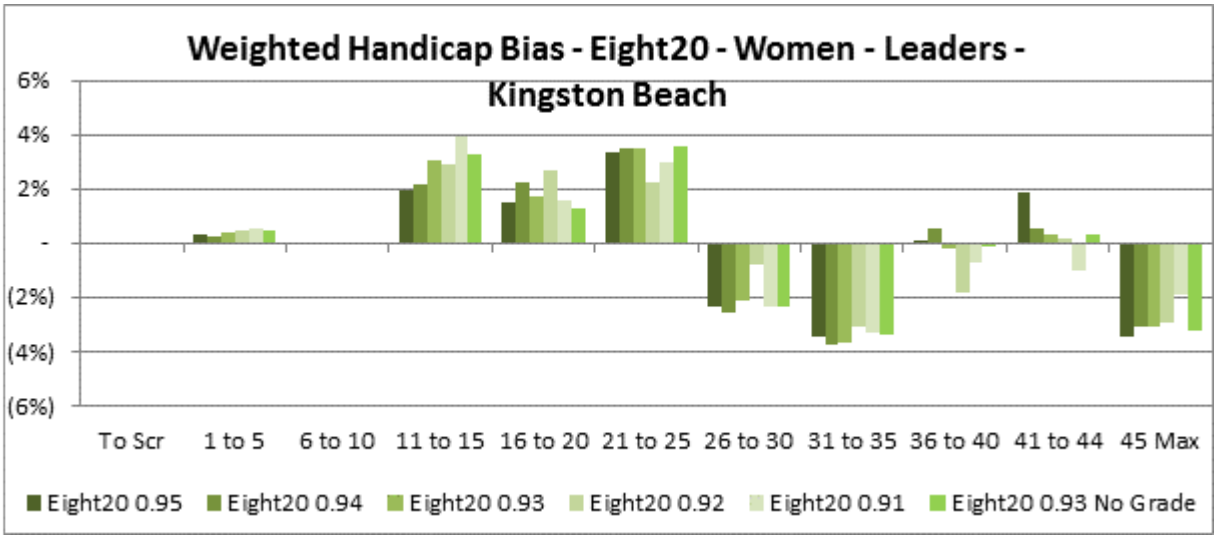

Handicap Bias - Eight20 - Anchor - Men - Leaders - Kingston Beach
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

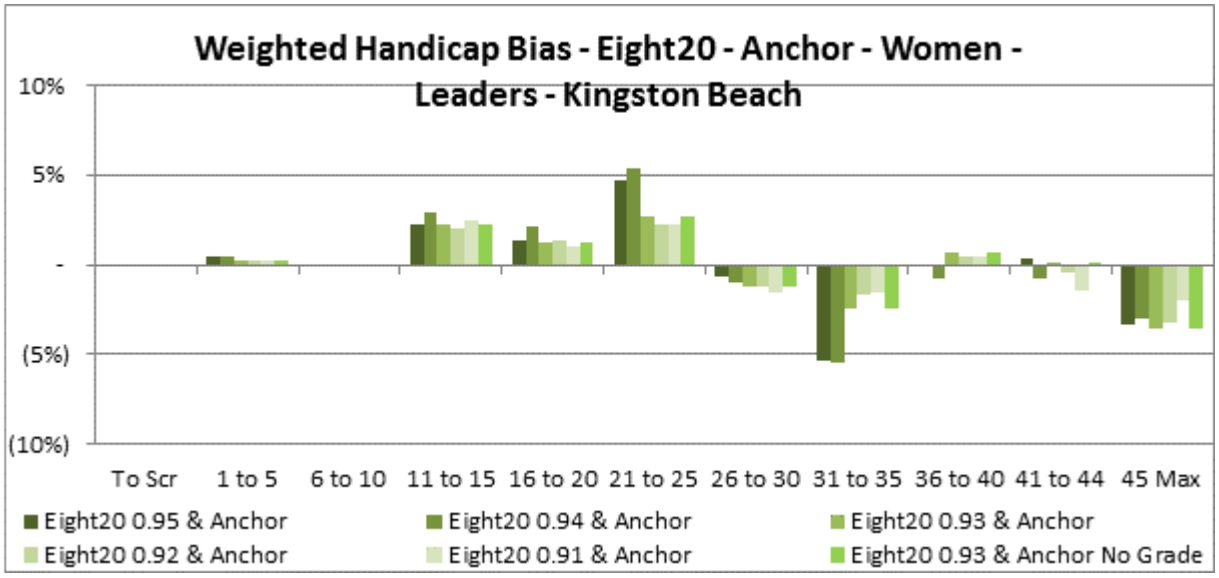

Weighted Handicap Bias - Eight20 - Men - Leaders - Kingston Beach
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Kingston Beach
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Kingston Beach
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Kingston Beach
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Kingston Beach
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

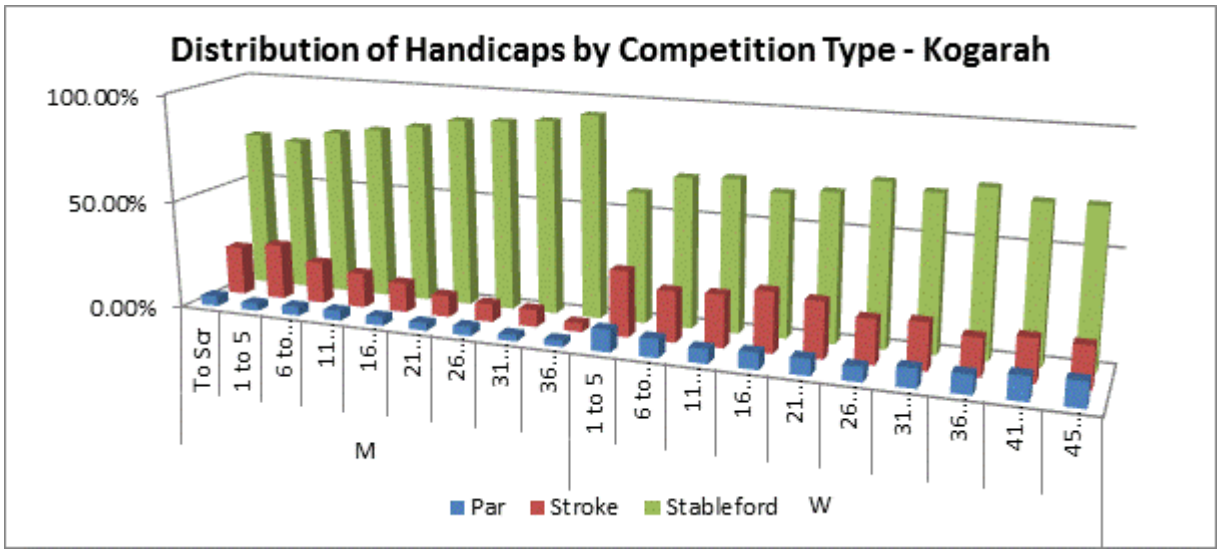


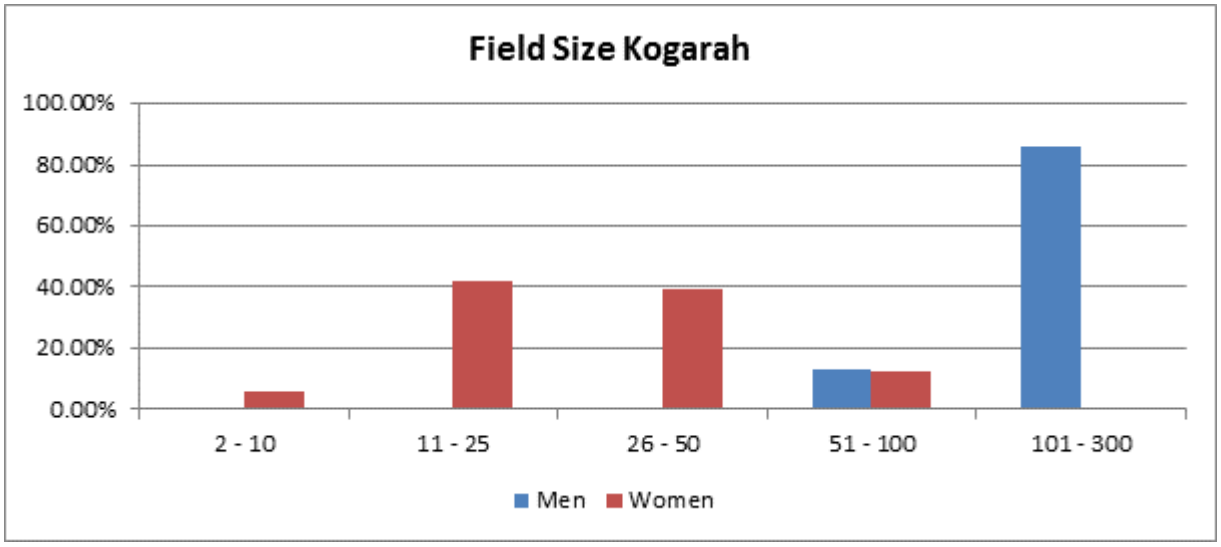
Phase 2 -Kingston Beach					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	33.9	31.5	-50.3	50.5
	Eight20 0.94	30.0	33.7	-51.1	47.2
	Eight20 0.93	21.9	27.3	-63.7	52.7
	Eight20 0.92	6.3	27.5	-68.4	56.0
	Eight20 0.91	-1.1	30.2	-68.7	54.2
	Eight20 0.93 No Grade	21.9	27.3	-68.9	53.5
	Eight20 0.95 & Anchor	19.4	28.6	-63.6	56.5
	Eight20 0.94 & Anchor	15.8	30.4	-61.1	50.8
	Eight20 0.93 & Anchor	9.2	26.5	-70.0	53.8
	Eight20 0.92 & Anchor	-4.7	28.9	-75.1	59.6
	Eight20 0.91 & Anchor	-14.7	29.9	-71.4	57.8
	Eight20 0.93 & Anchor No Grade	9.2	26.5	-75.6	54.5
Leaders	Eight20 0.95	-24.0	14.6	-22.8	22.4
	Eight20 0.94	-29.1	18.5	-26.5	22.8
	Eight20 0.93	-31.7	19.7	-30.4	22.8
	Eight20 0.92	-34.3	22.7	-33.0	20.6
	Eight20 0.91	-37.9	23.0	-32.7	22.0
	Eight20 0.93 No Grade	-31.7	19.7	-30.7	22.8
	Eight20 0.95 & Anchor	-30.3	19.0	-31.3	26.6
	Eight20 0.94 & Anchor	-35.4	22.6	-38.1	28.8
	Eight20 0.93 & Anchor	-24.0	15.4	-26.2	18.7
	Eight20 0.92 & Anchor	-23.6	15.9	-25.1	16.2
	Eight20 0.91 & Anchor	-23.1	16.1	-23.6	15.3

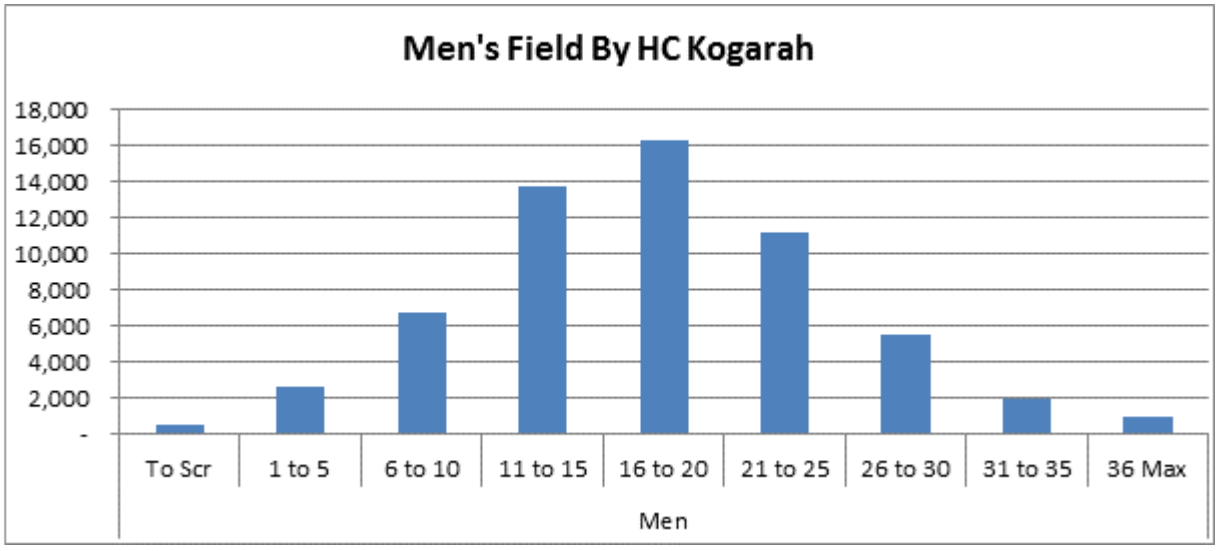
	Eight20 0.93 & Anchor No Grade	-24.0	15.4	-26.2	18.7

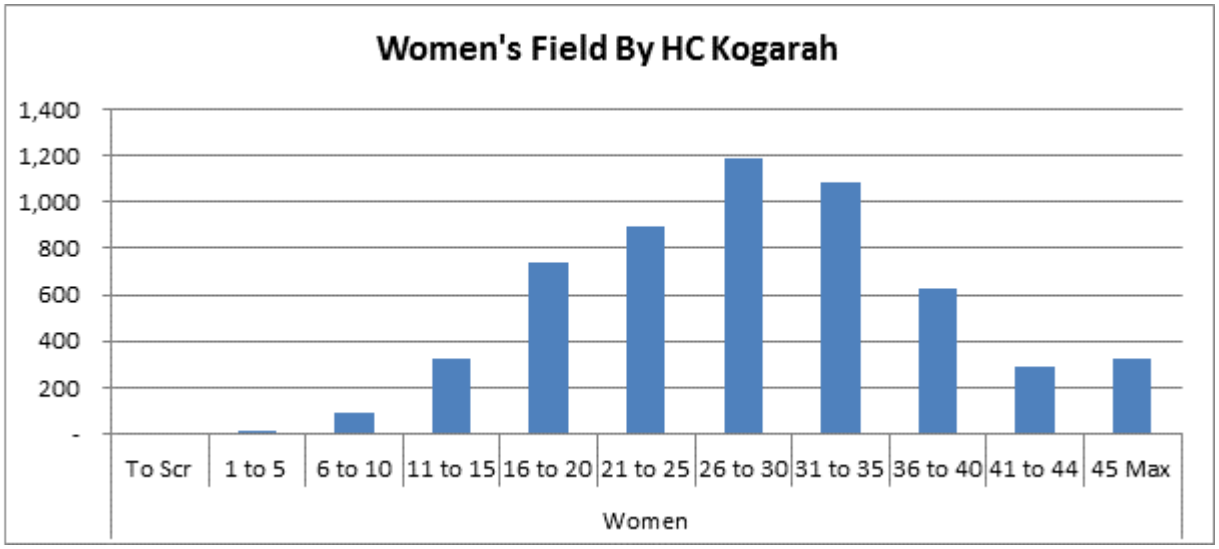
Appendix 19 – Kogarah – Phase 2

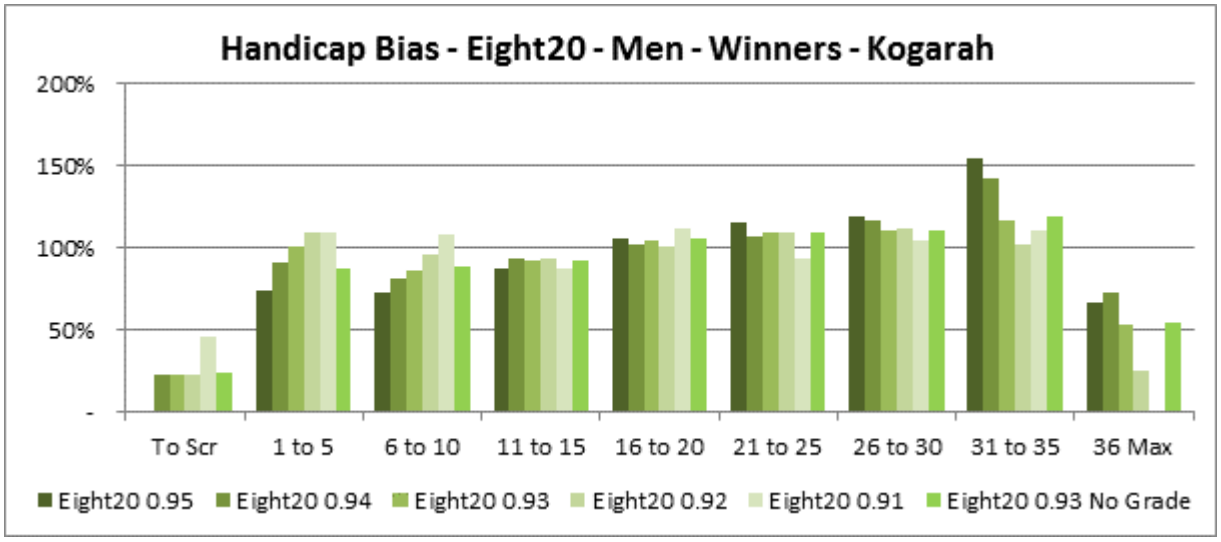
Kogarah	Men	Women	Total
Players in Database	3,058	336	3,394
Members	1,044	174	1,218
Visitors	2,014	162	2,176
Members who have Played 21 Rounds	967	154	1,121
Members with Last Round In Old System	172	43	215
Members with Last Round in Current System	872	131	1,003
Earliest Round	10/12/2007	25/1/2008	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			239
Number of Home Competitions	619	375	994
Number of Rounds of Golf	96,831	8,796	105,627
Number of Rounds at Home	96,831	8,796	105,627
Number of Rounds at Home Old	76,006	6,315	82,321
Number of Rounds at Home Current	20,825	2,481	23,306
Num Rnds Members at Home	88,887	8,234	97,121
Num Rnds Members at Home Old	69,187	5,846	75,033
Num Rnds Members at Home Cur	19,700	2,388	22,088
Num Rnds After Eliminations	67,153	6,594	73,747
Num Rnds After Eliminations Old	46,328	4,113	50,441
Num Rnds After Eliminations Cur	20,825	2,481	23,306

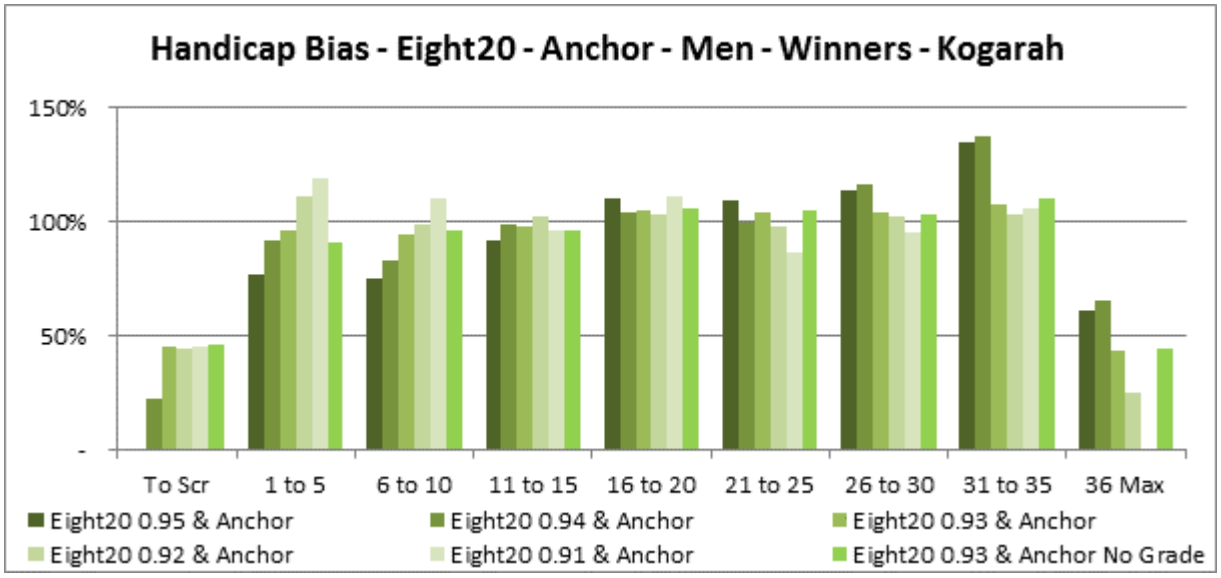


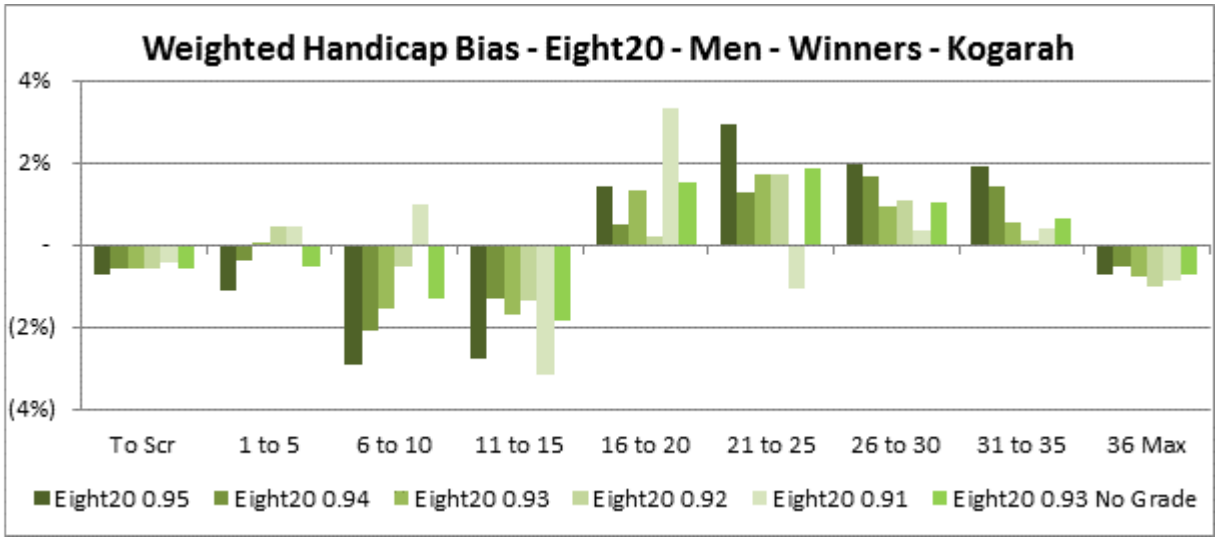

Field Size Kogarah
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
101 - 300
Men
Women

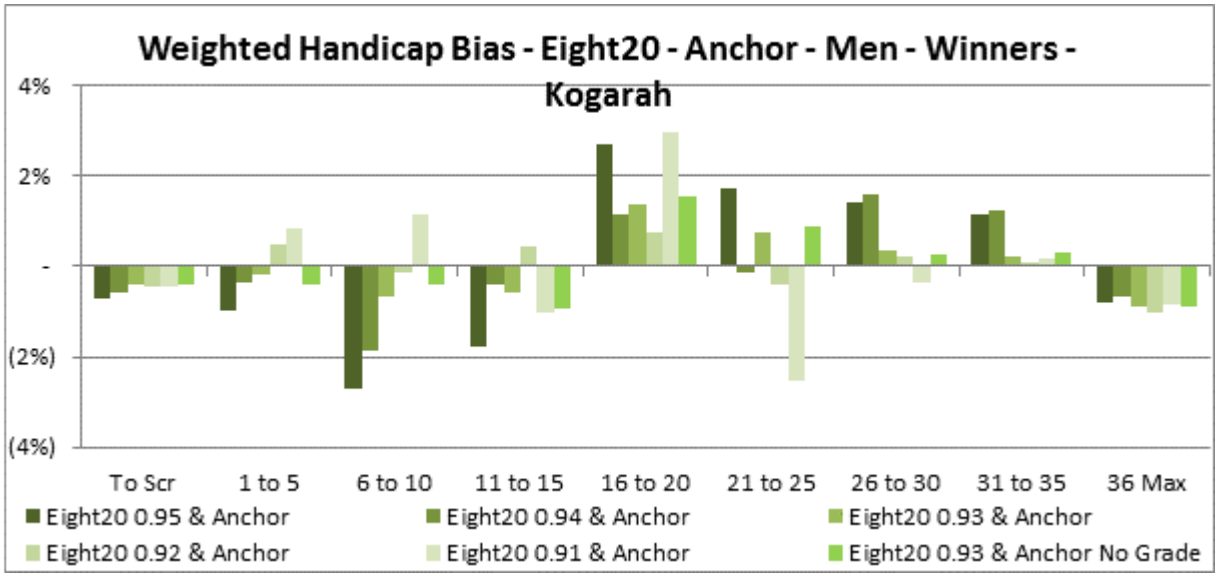

Men's Field By HC Kogarah
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

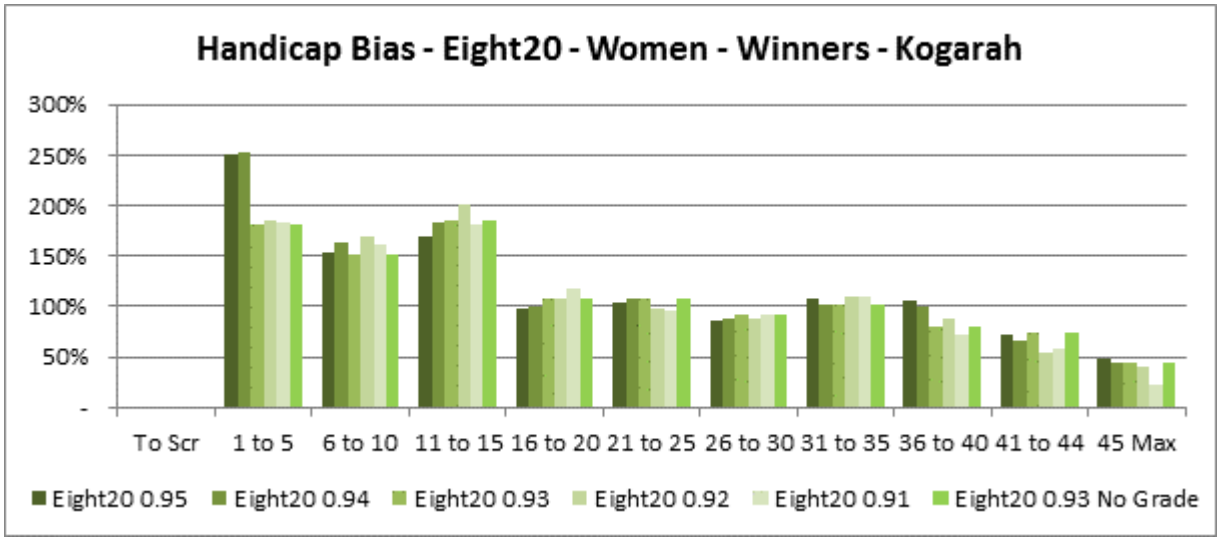

Women's Field By HC Kogarah
1,400
1,200
1,000
800
600
400
200
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

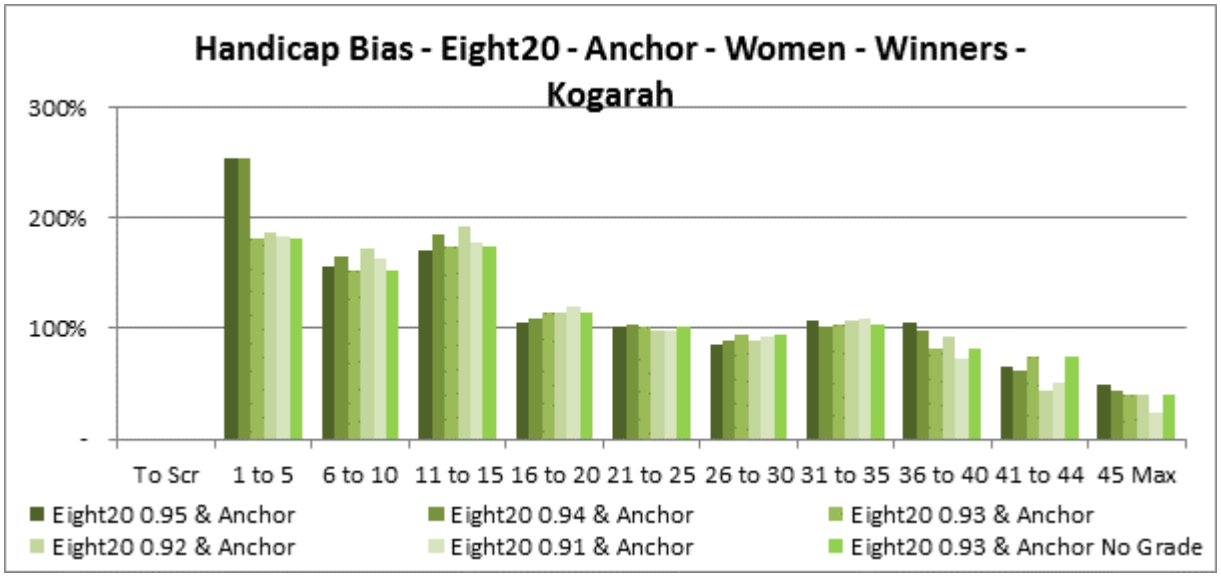

Handicap Bias - Eight20 - Men - Winners - Kogarah
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

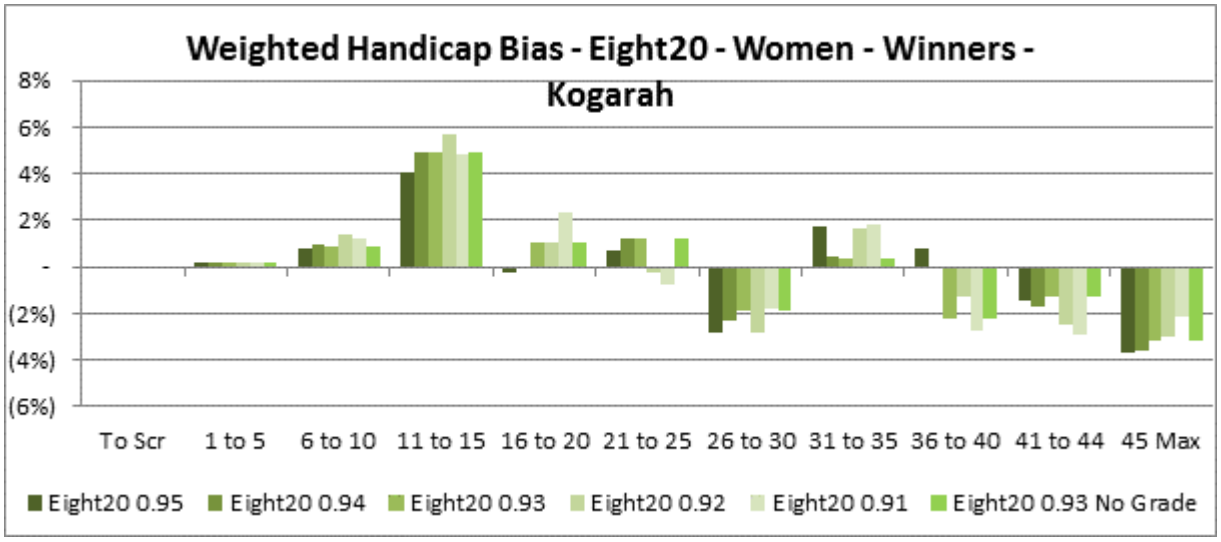

Handicap Bias - Eight20 - Anchor - Men - Winners - Kogarah
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

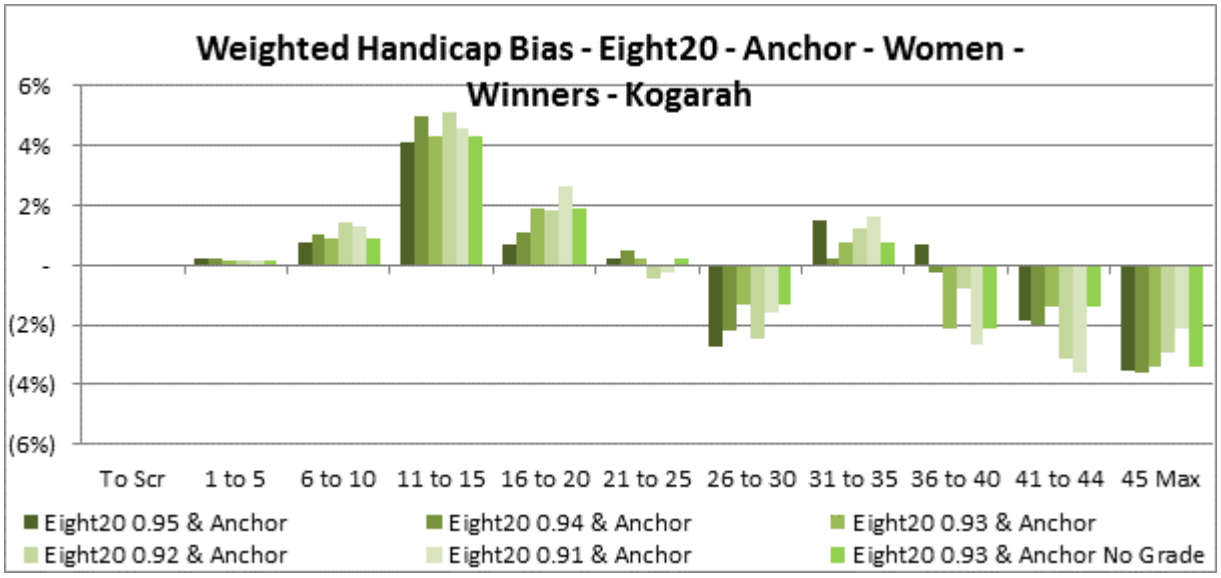

Weighted Handicap Bias - Eight20 - Men - Winners - Kogarah
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

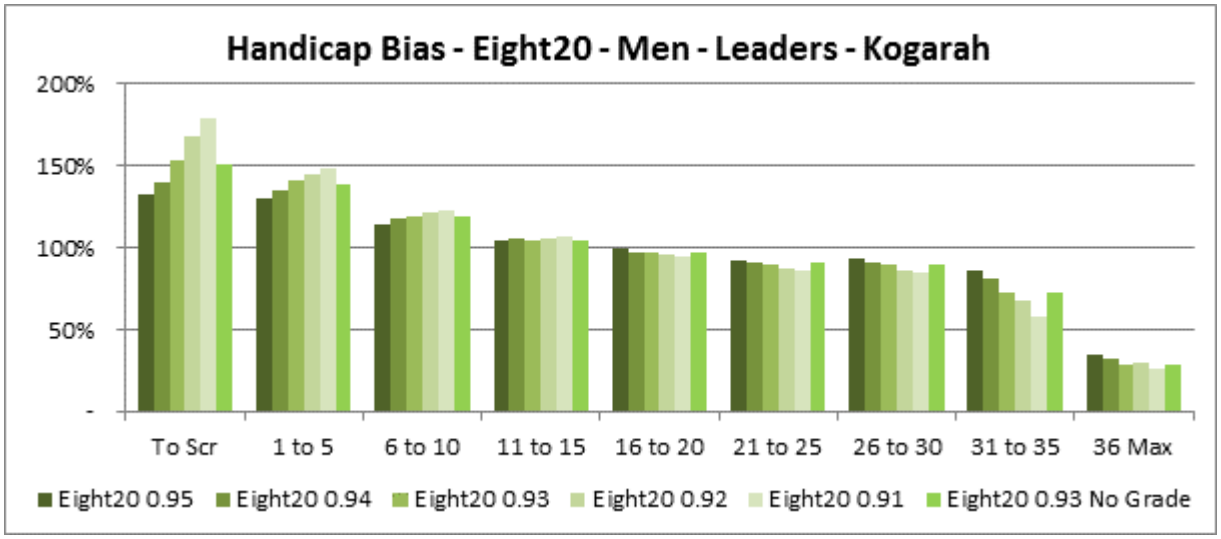

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Kogarah
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

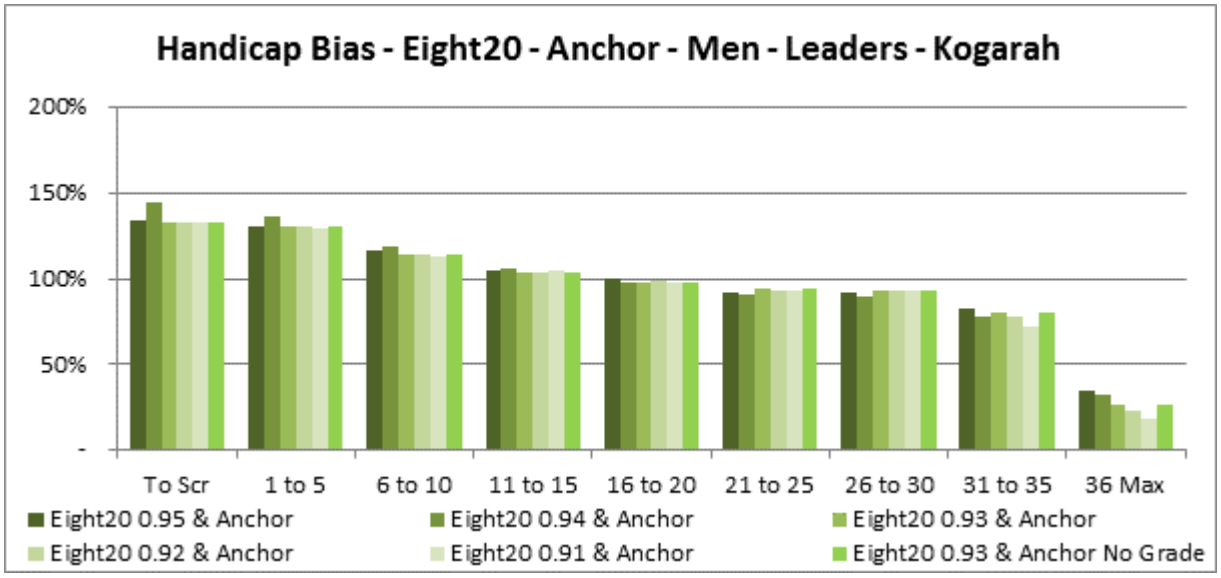

Handicap Bias - Eight20 - Women - Winners - Kogarah
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

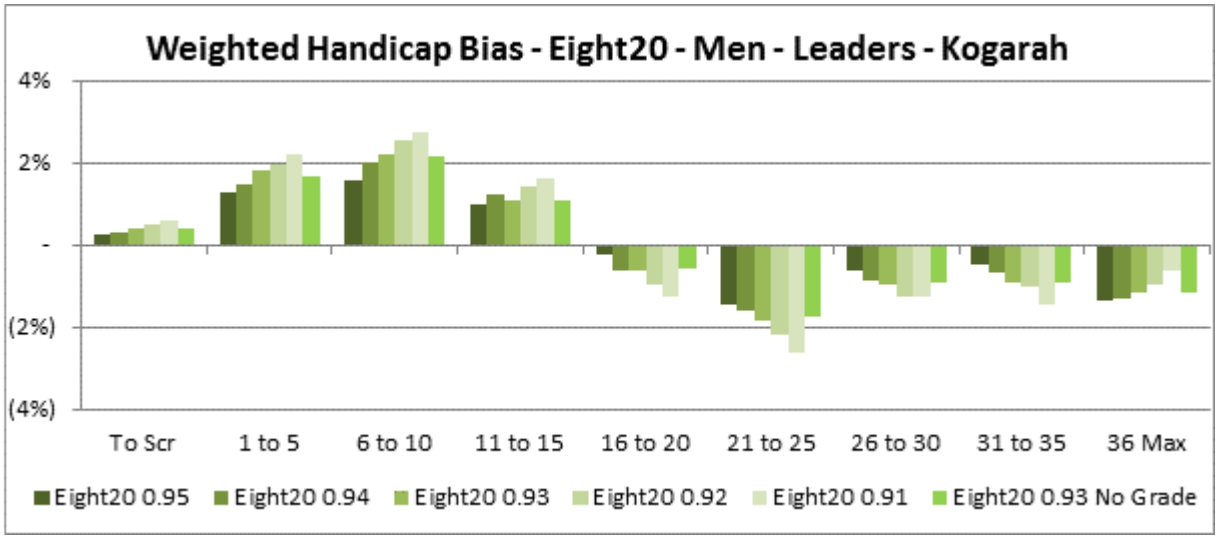

Handicap Bias - Eight20 - Anchor - Women - Winners - Kogarah
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

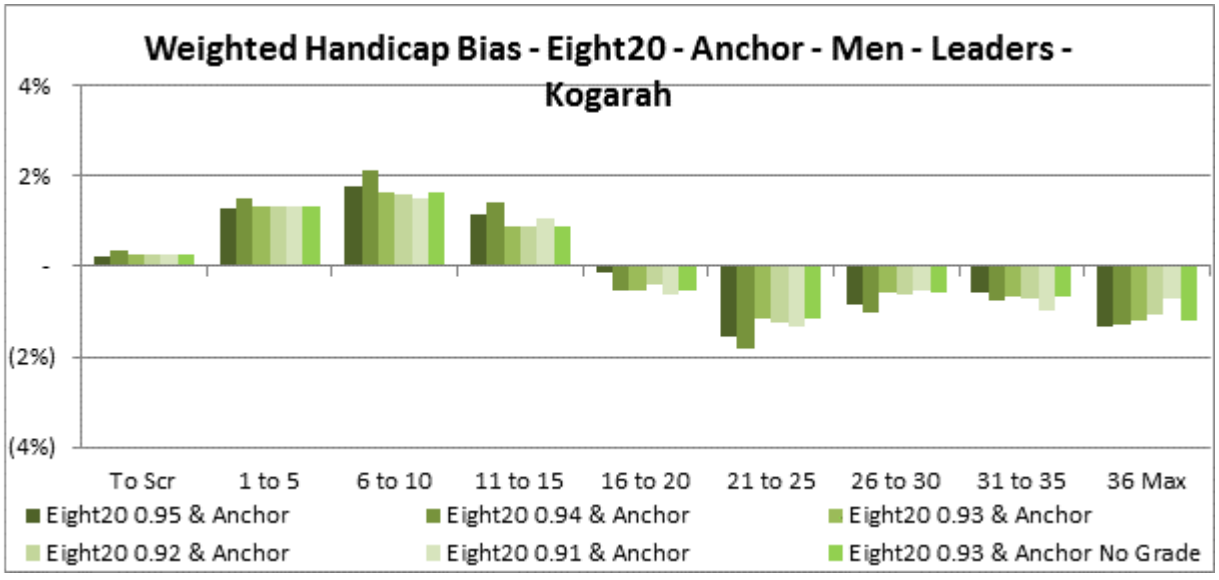

Weighted Handicap Bias - Eight20 - Women - Winners - Kogarah
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

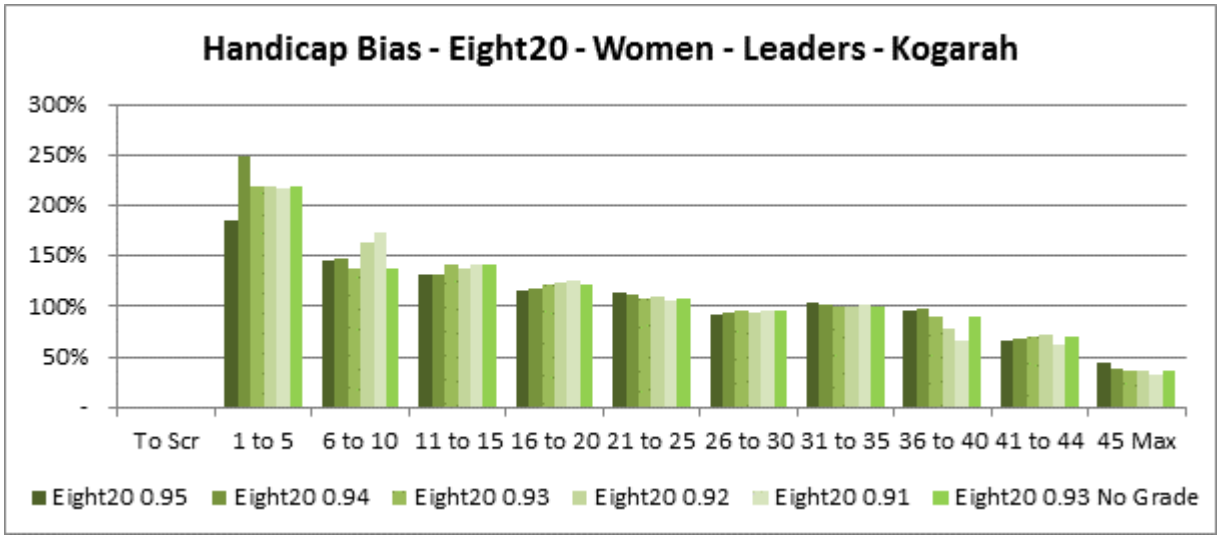

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Kogarah
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

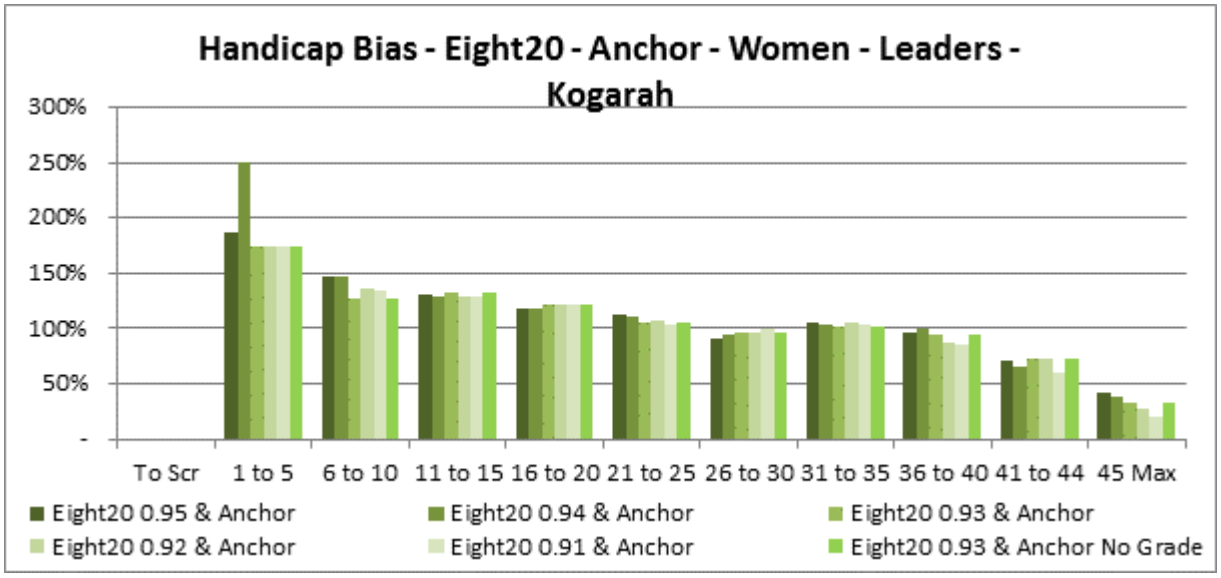

Handicap Bias - Eight20 - Men - Leaders - Kogarah
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

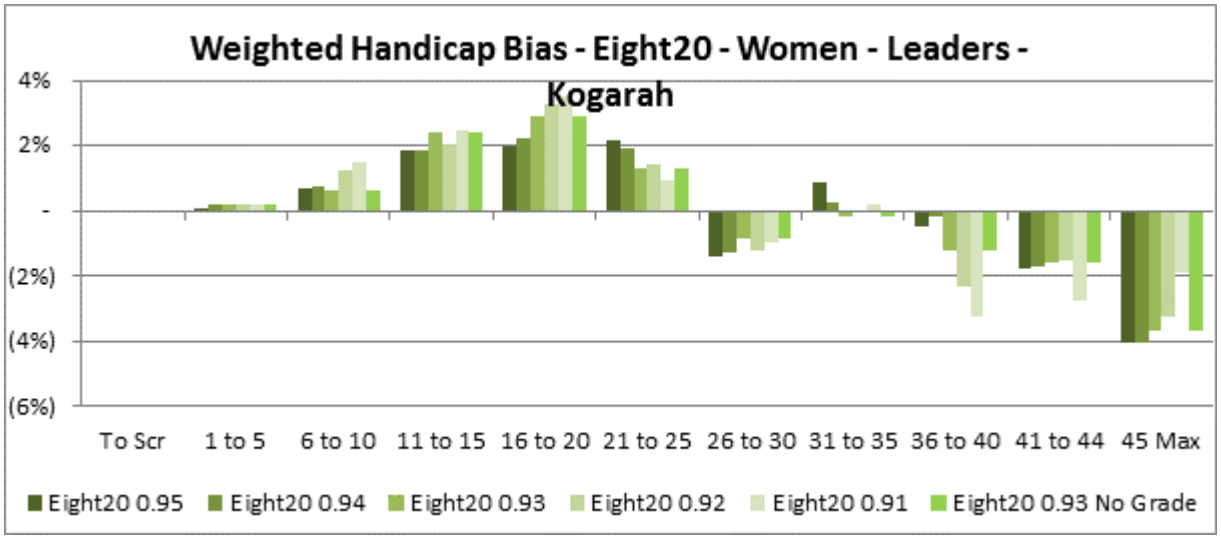

Handicap Bias - Eight20 - Anchor - Men - Leaders - Kogarah
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

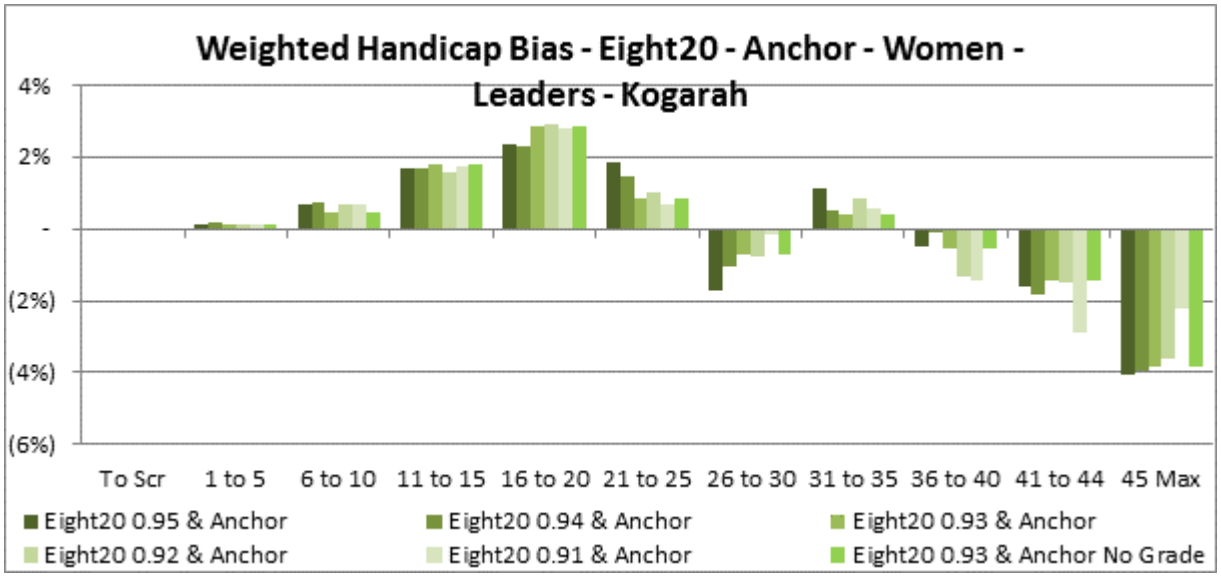

Weighted Handicap Bias - Eight20 - Men - Leaders - Kogarah
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Kogarah
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Kogarah
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Kogarah
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Kogarah
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

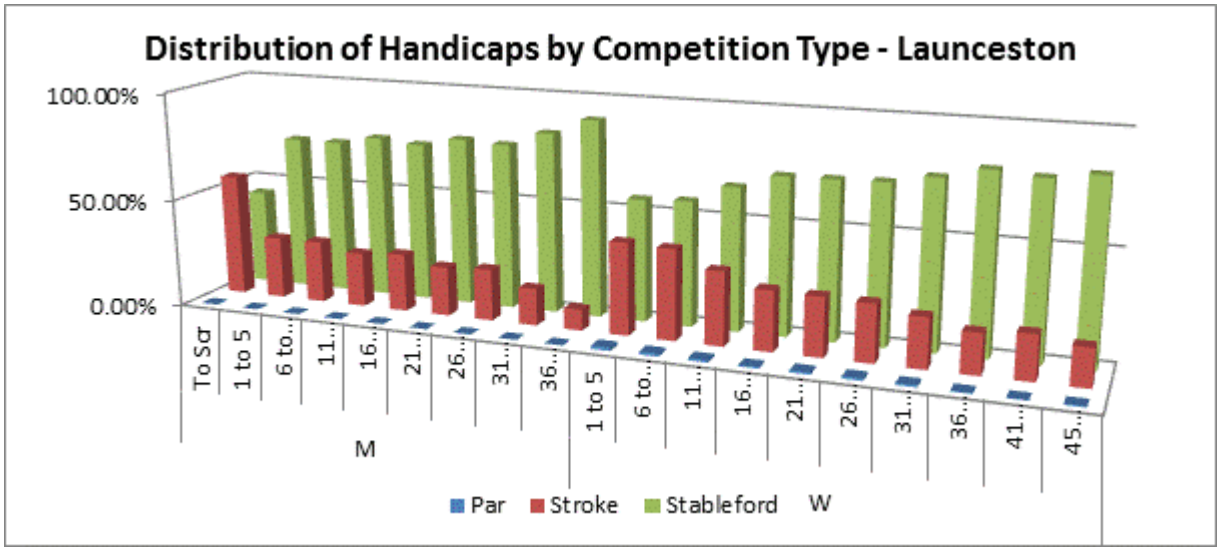


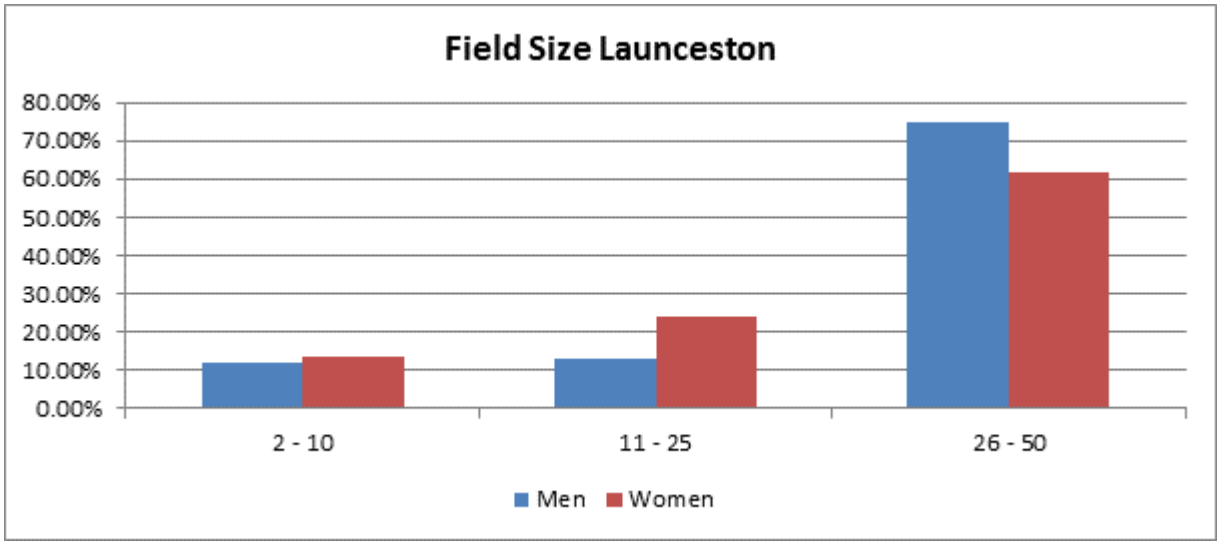
Phase 2 -Kogarah					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	40.9	21.4	-29.3	21.1
	Eight20 0.94	26.3	13.0	-36.3	22.0
	Eight20 0.93	15.3	12.3	-39.0	21.8
	Eight20 0.92	5.7	9.9	-41.3	25.1
	Eight20 0.91	-2.0	17.6	-41.2	24.2
	Eight20 0.93 No Grade	19.0	13.0	-39.0	21.8
	Eight20 0.95 & Anchor	29.7	18.0	-31.9	21.0
	Eight20 0.94 & Anchor	19.5	11.1	-39.4	22.2
	Eight20 0.93 & Anchor	4.5	7.5	-38.7	20.8
	Eight20 0.92 & Anchor	-6.2	5.5	-42.4	24.3
	Eight20 0.91 & Anchor	-13.7	15.6	-43.3	24.5
	Eight20 0.93 & Anchor No Grade	5.7	8.3	-38.7	20.8
Leaders	Eight20 0.95	-30.8	11.0	-33.1	18.6
	Eight20 0.94	-35.5	13.0	-33.6	18.2
	Eight20 0.93	-39.6	14.3	-36.2	18.5
	Eight20 0.92	-43.7	16.6	-38.6	19.6
	Eight20 0.91	-47.1	18.7	-40.4	21.0
	Eight20 0.93 No Grade	-38.3	13.8	-36.2	18.5
	Eight20 0.95 & Anchor	-33.3	12.0	-32.7	19.0
	Eight20 0.94 & Anchor	-38.0	14.1	-32.9	17.7
	Eight20 0.93 & Anchor	-30.3	10.6	-31.9	17.4
	Eight20 0.92 & Anchor	-29.9	10.5	-32.7	17.7
	Eight20 0.91 & Anchor	-28.6	10.7	-31.7	16.7

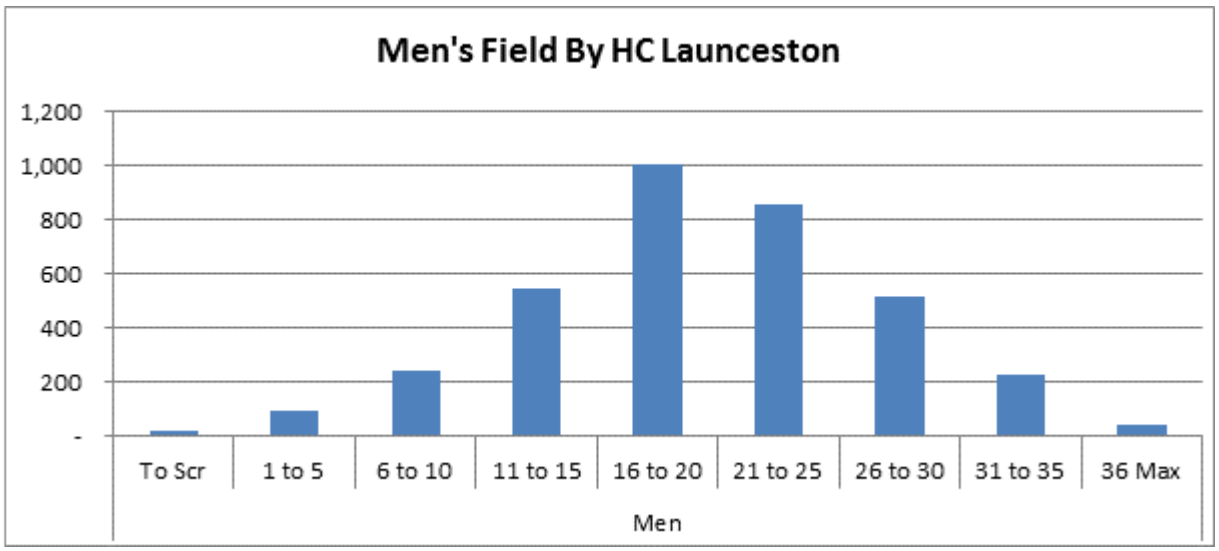
	Eight20 0.93 & Anchor No Grade	-30.3	10.6	-31.9	17.4

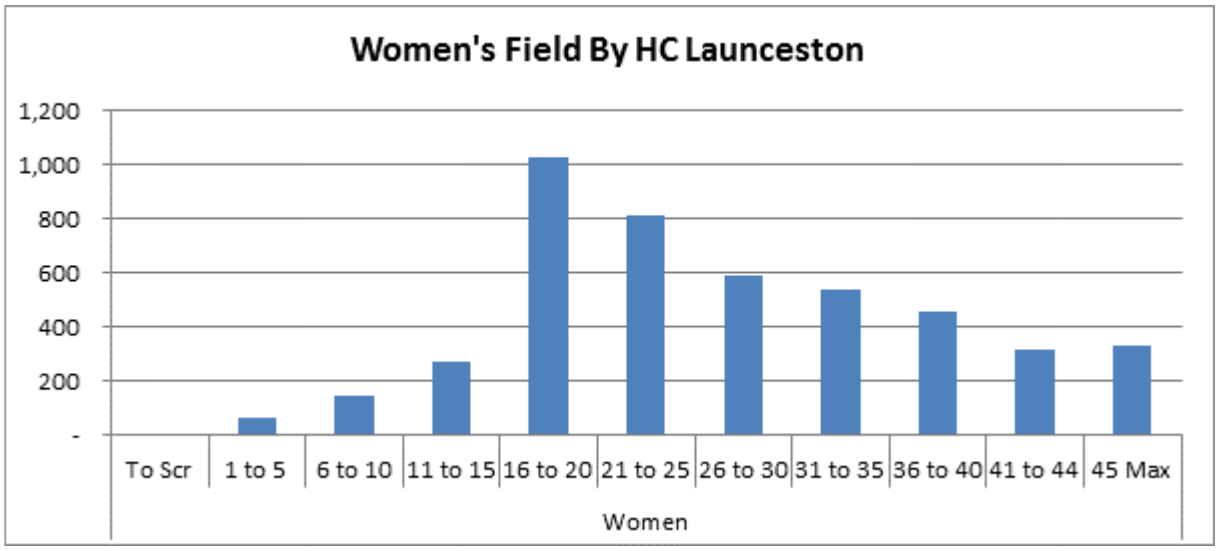
Appendix 20 – Launceston – Phase 2

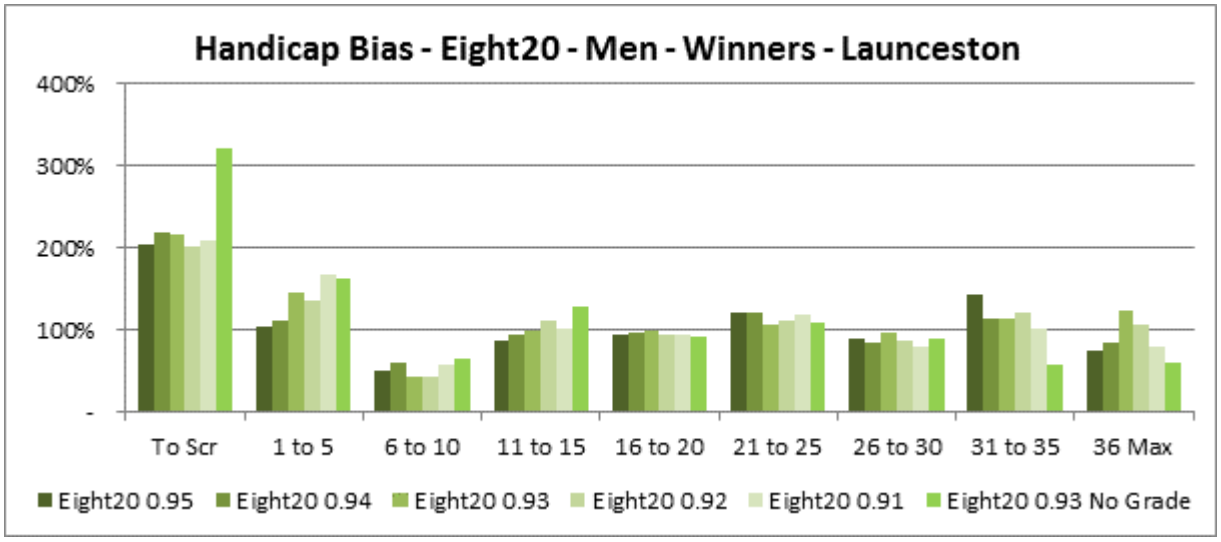
Launceston	Men	Women	Total
Players in Database	1,042	185	1,227
Members	498	114	612
Visitors	544	71	615
Members who have Played 21 Rounds	448	104	552
Members with Last Round In Old System	131	24	155
Members with Last Round in Current System	367	90	457
Earliest Round	8/12/2007	22/1/2008	
Latest Round	29/11/2010	29/11/2010	
Number of Visiting Clubs			150
Number of Home Competitions	465	416	881
Number of Rounds of Golf	8,333	6,890	15,223
Number of Rounds at Home	8,333	6,890	15,223
Number of Rounds at Home Old	7,145	5,451	12,596
Number of Rounds at Home Current	1,188	1,439	2,627
Num Rnds Members at Home	7,714	6,701	14,415
Num Rnds Members at Home Old	6,557	5,270	11,827
Num Rnds Members at Home Cur	1,157	1,431	2,588
Num Rnds After Eliminations	3,952	4,941	8,893
Num Rnds After Eliminations Old	2,764	3,502	6,266
Num Rnds After Eliminations Cur	1,188	1,439	2,627

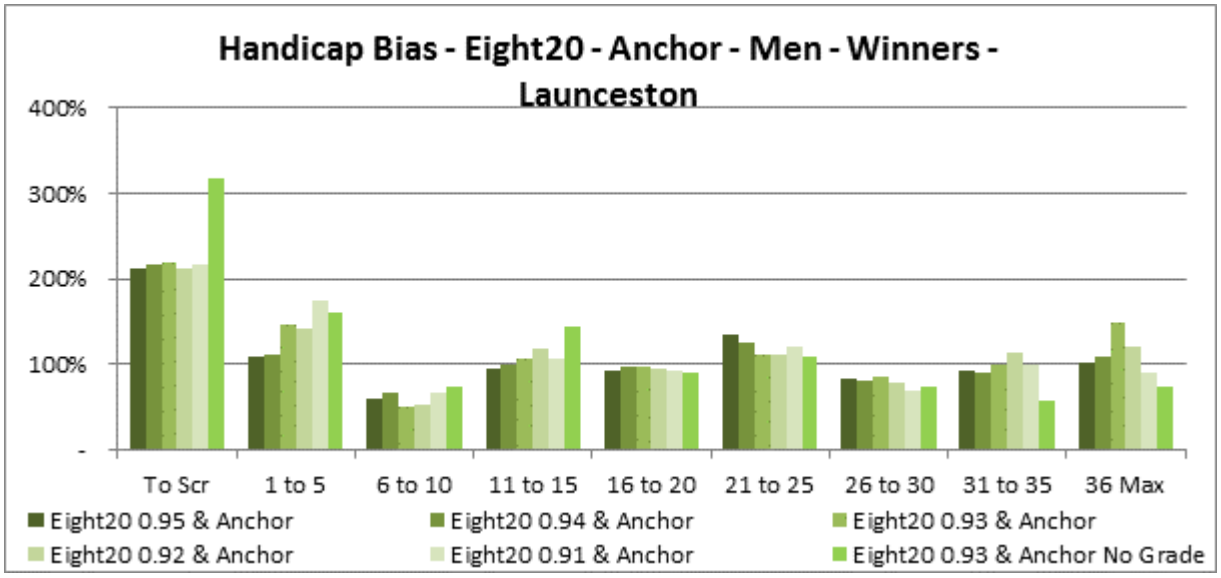


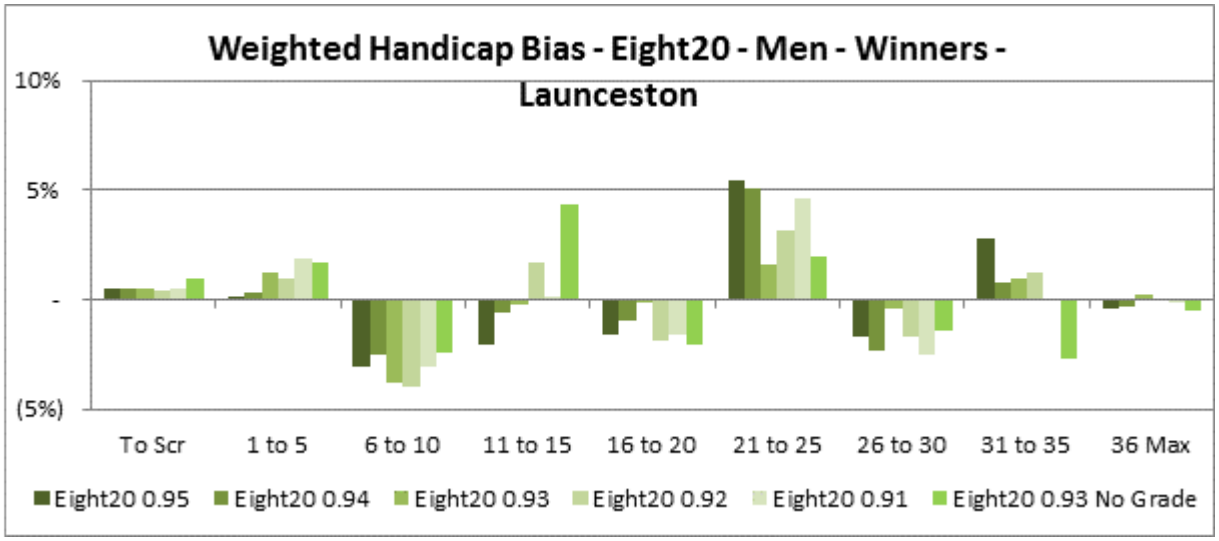

Field Size Launceston
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
2 - 10
11 - 25
26 - 50
Men
Women

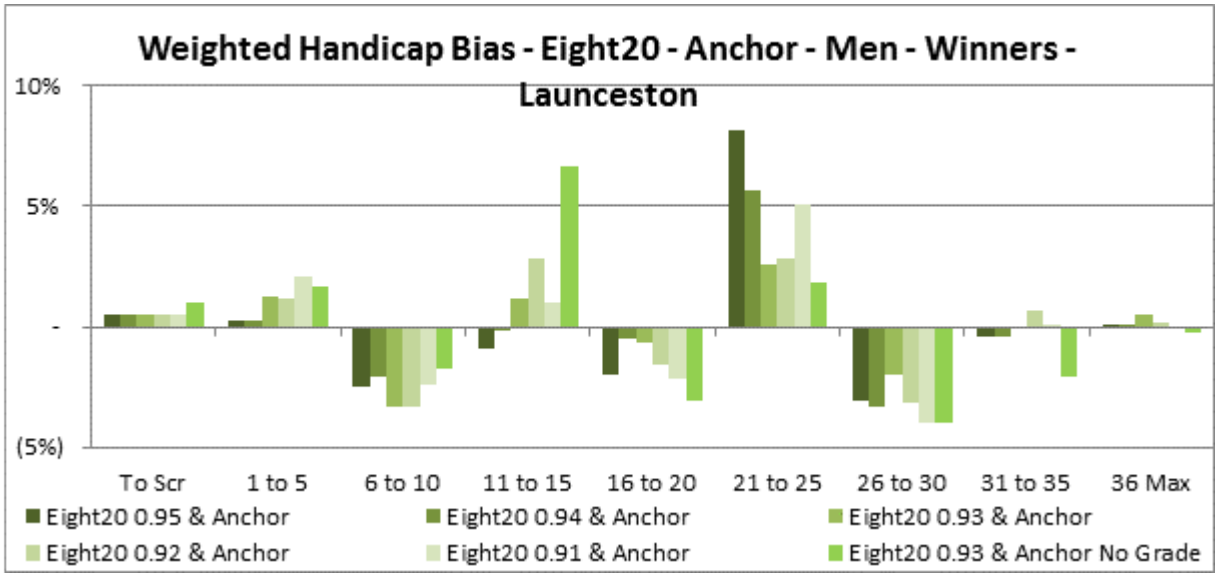

Men's Field By HC Launceston
1,200
1,000
800
600
400
200
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

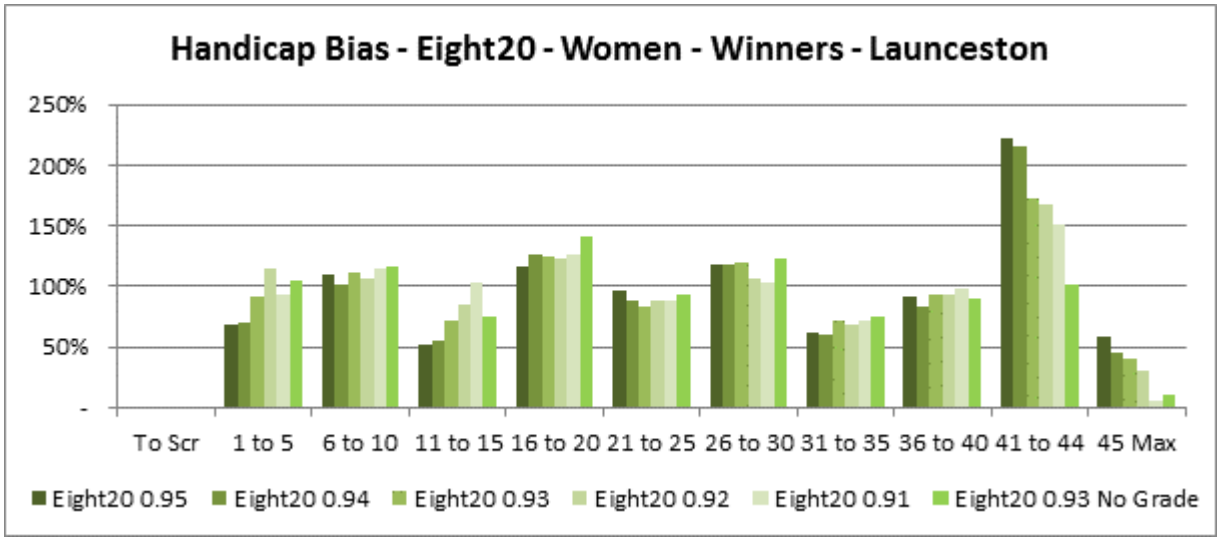

Women's Field By HC Launceston
1,200
1,000
800
600
400
200
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

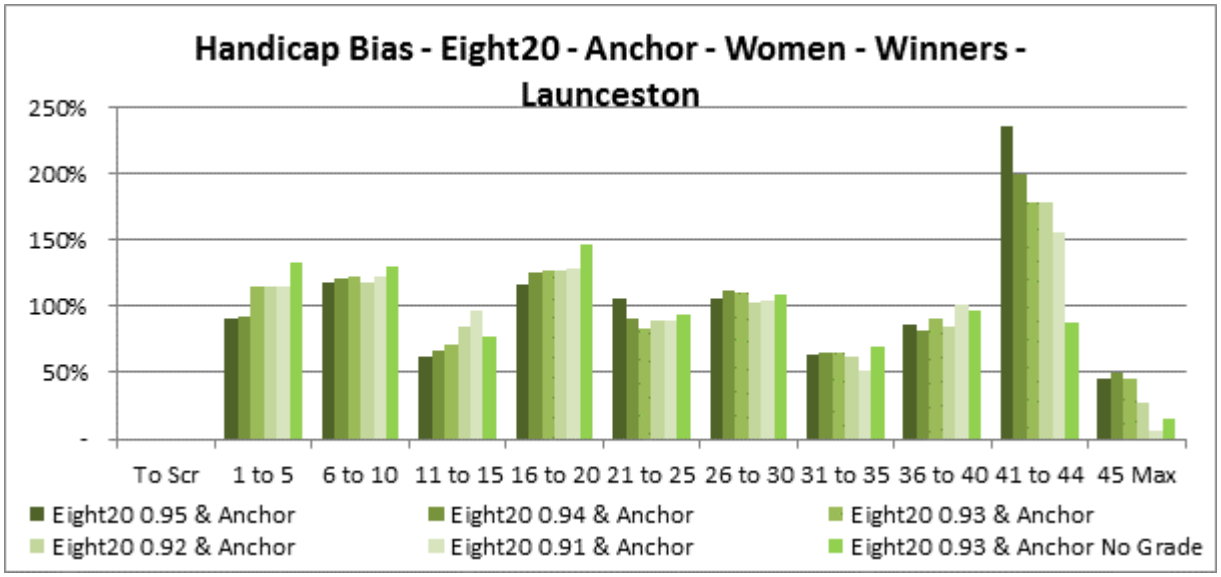

Handicap Bias - Eight20 - Men - Winners - Launceston
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

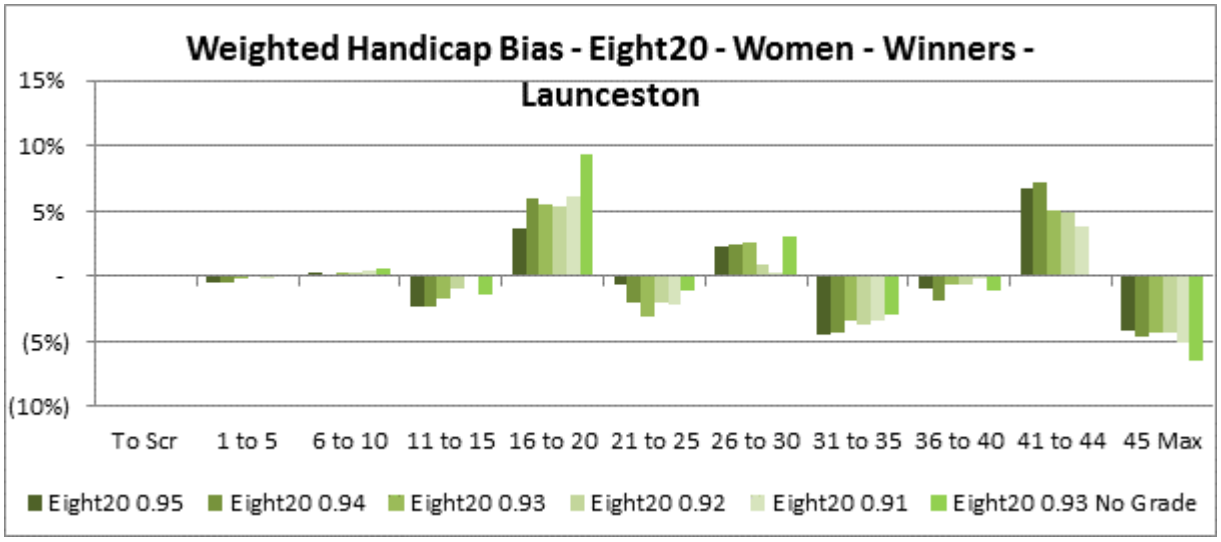

Handicap Bias - Eight20 - Anchor - Men - Winners - Launceston
400%
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

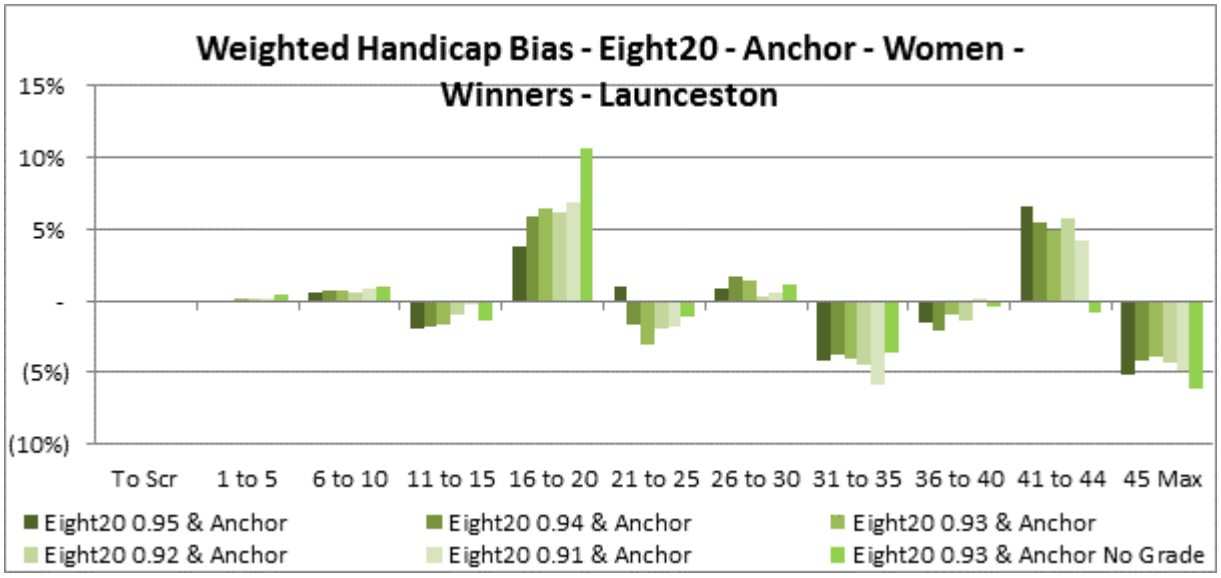

Weighted Handicap Bias - Eight20 - Men - Winners - Launceston
10%
5%
-
(5%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

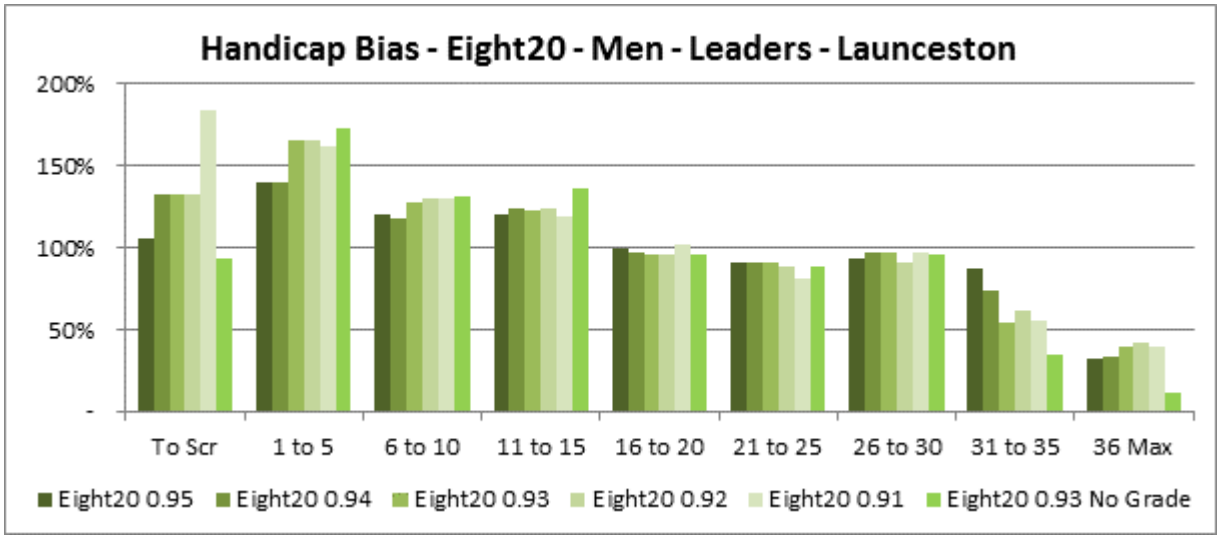

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Launceston
10%
5%
-
(5%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

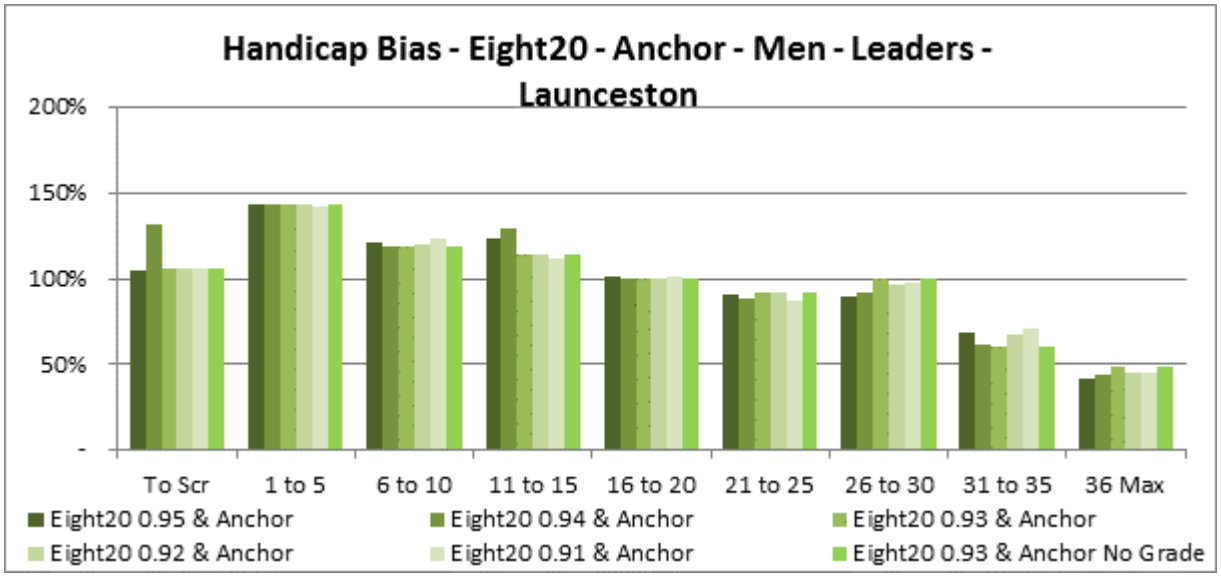

Handicap Bias - Eight20 - Women - Winners - Launceston
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

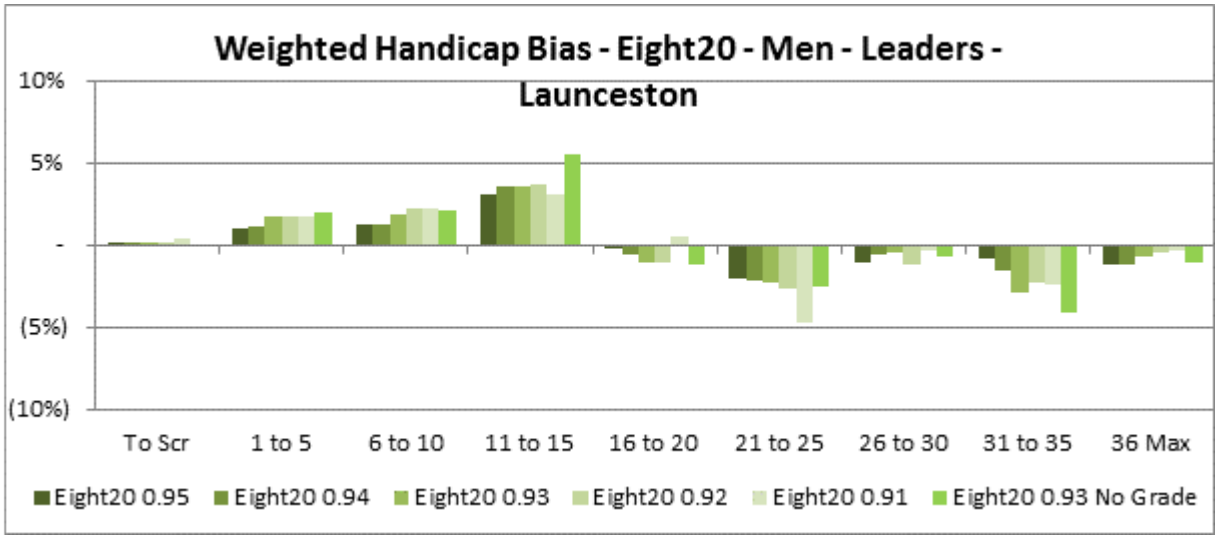

Handicap Bias - Eight20 - Anchor - Women - Winners - Launceston
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

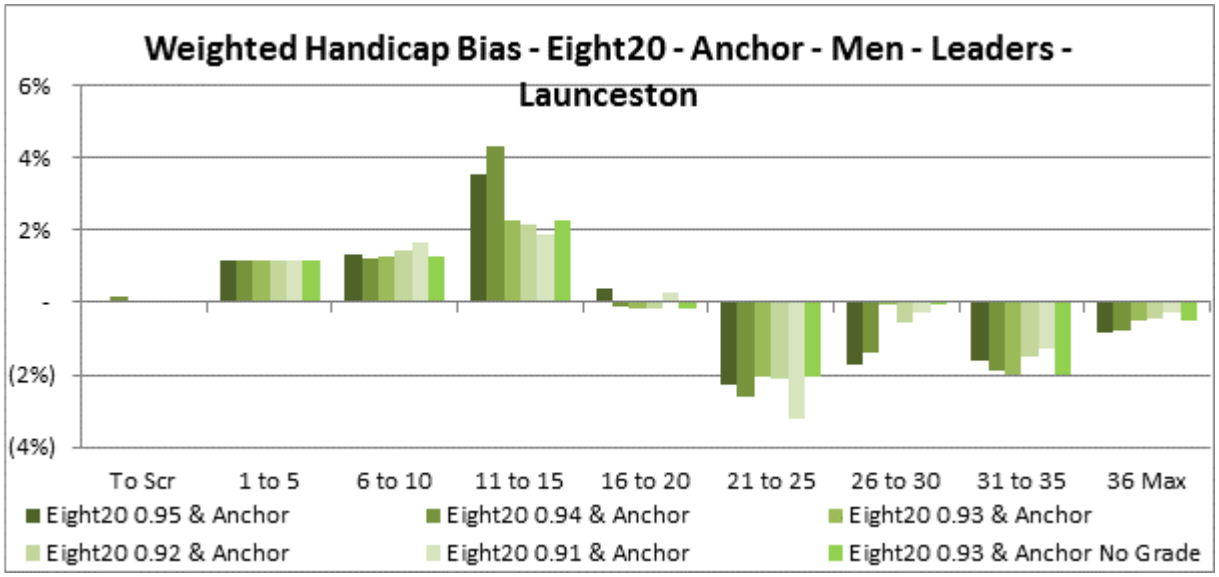

Weighted Handicap Bias - Eight20 - Women - Winners - Launceston
15%
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

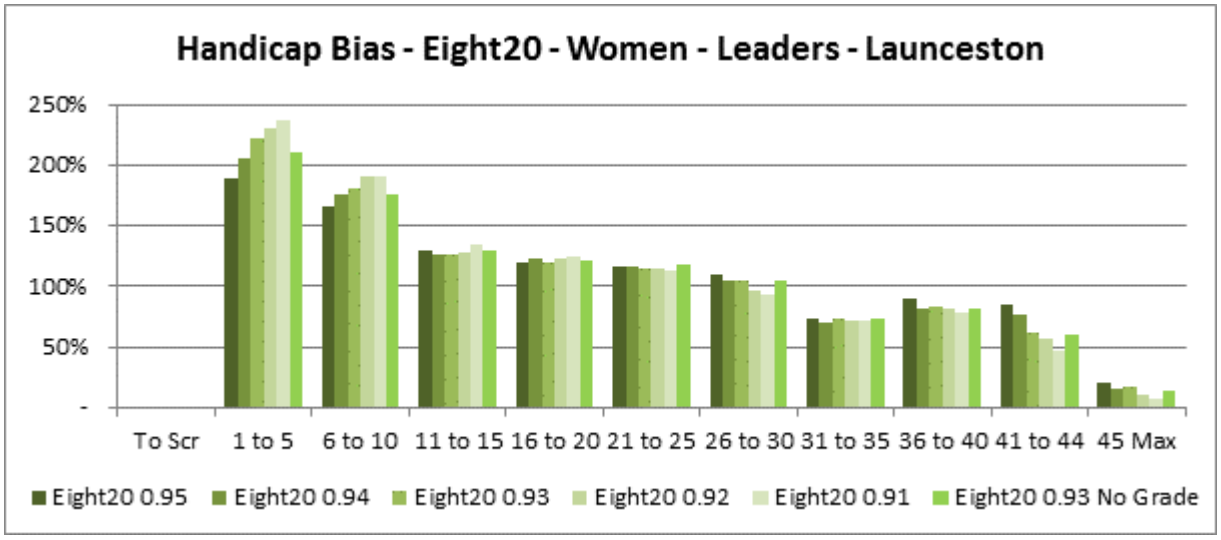

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Launceston
15%
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

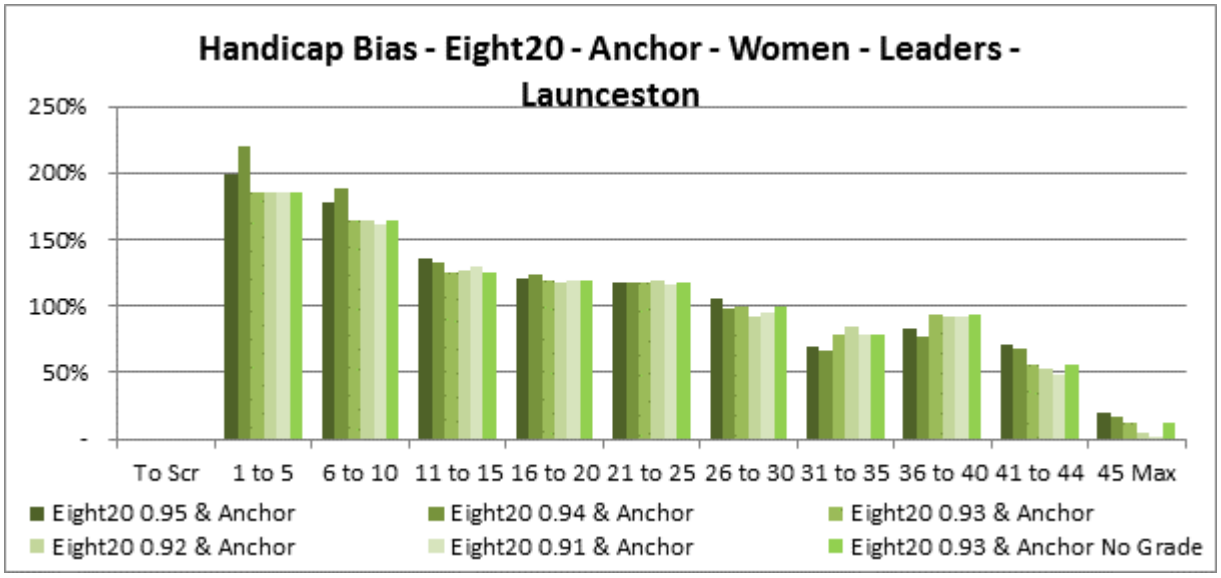

Handicap Bias - Eight20 - Men - Leaders - Launceston
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

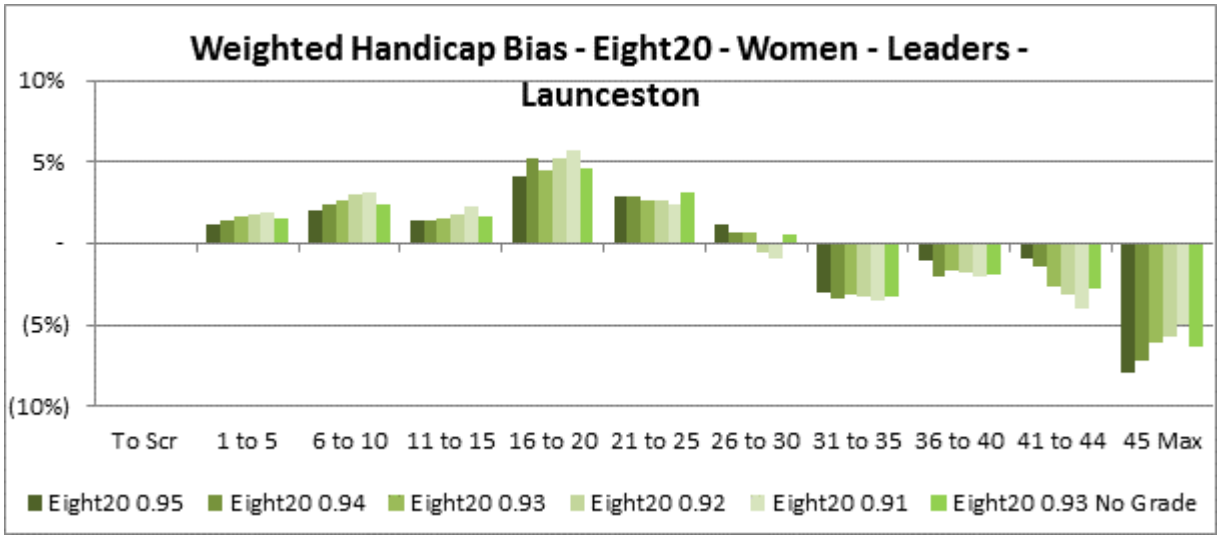

Handicap Bias - Eight20 - Anchor - Men - Leaders - Launceston
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

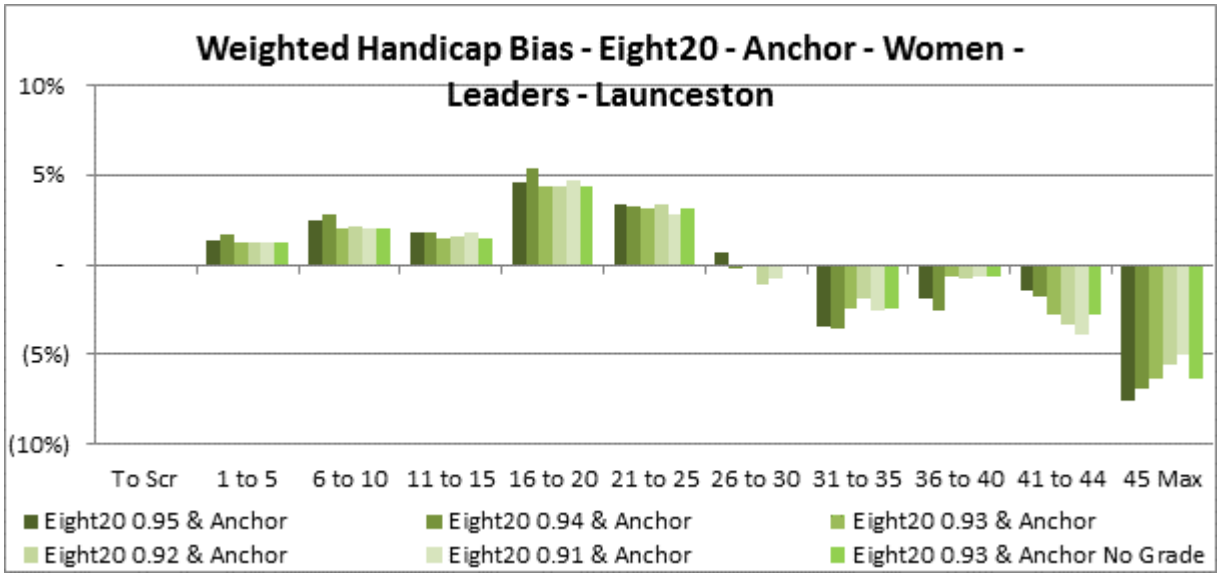

Weighted Handicap Bias - Eight20 - Men - Leaders - Launceston
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Launceston
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Launceston
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Launceston
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

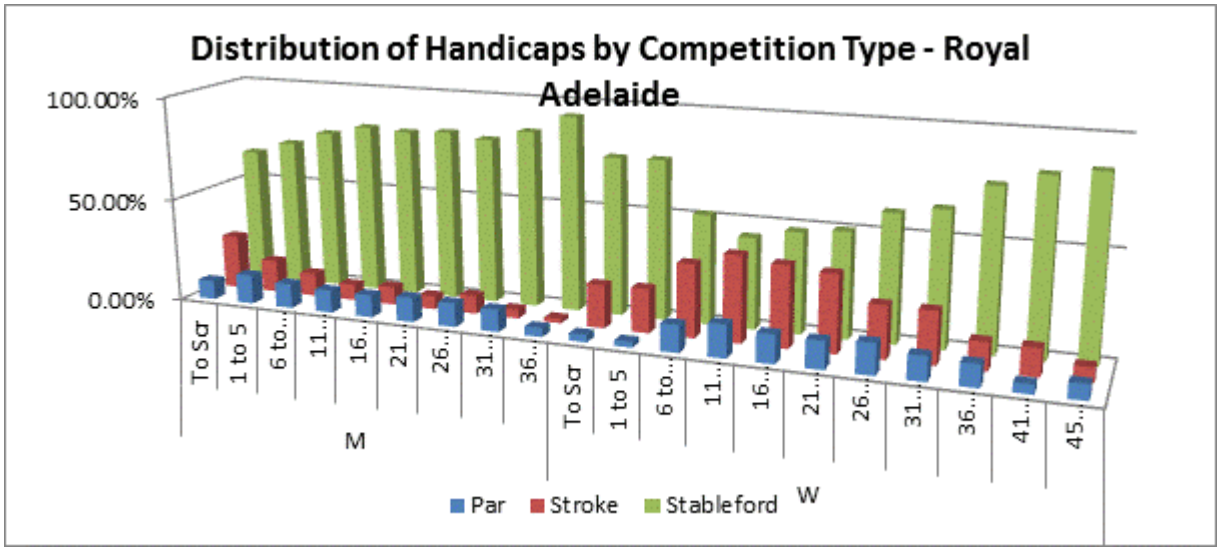

Weighted Handicap Bias - Eight20 - Women - Leaders - Launceston
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

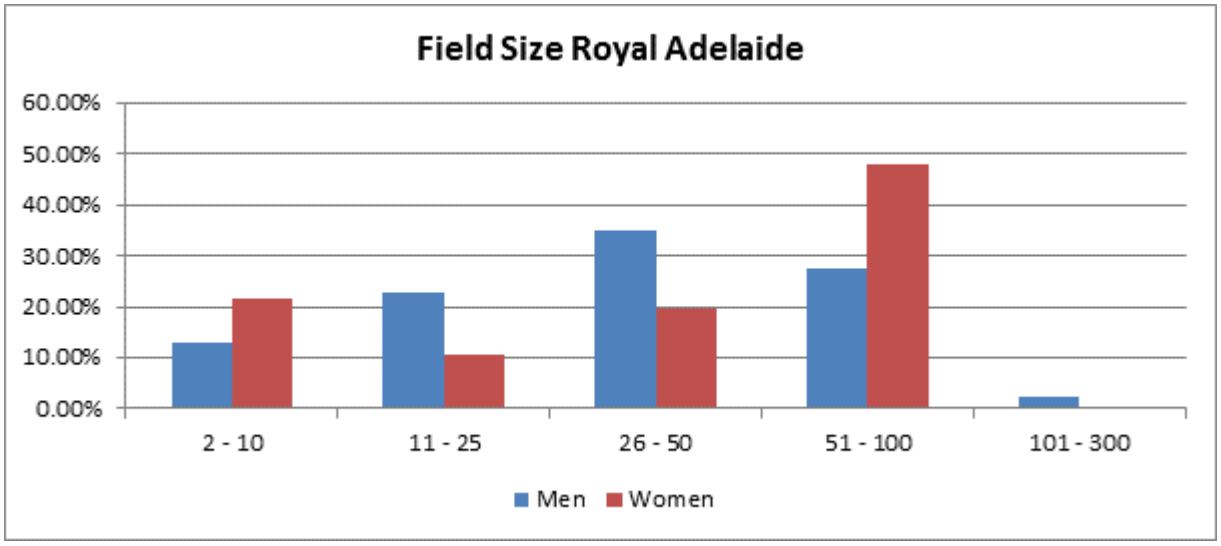


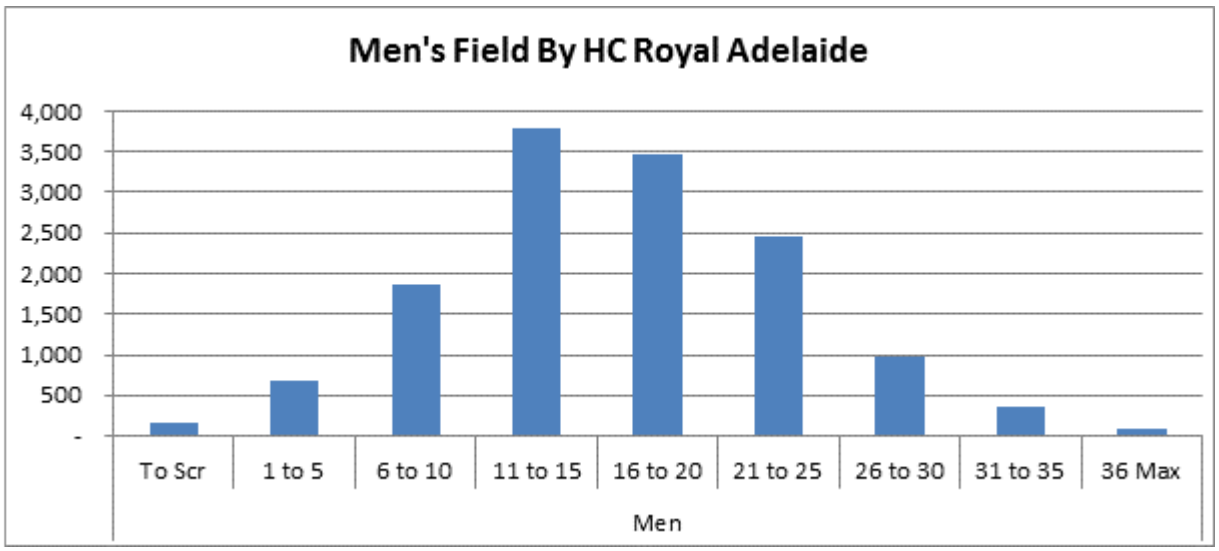
Phase 2 - Launceston					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	24.3	26.6	-0.9	33.0
	Eight20 0.94	7.0	22.3	-5.4	38.3
	Eight20 0.93	11.3	15.9	-9.8	32.4
	Eight20 0.92	9.1	21.6	-14.1	30.4
	Eight20 0.91	-3.8	23.4	-22.7	31.0
	Eight20 0.93 No Grade	-32.7	24.2	-42.3	39.1
	Eight20 0.95 & Anchor	6.7	33.0	-11.2	33.2
	Eight20 0.94 & Anchor	-0.8	24.6	-13.5	33.1
	Eight20 0.93 & Anchor	0.0	17.8	-14.0	33.6
	Eight20 0.92 & Anchor	-3.9	22.7	-16.8	34.1
	Eight20 0.91 & Anchor	-12.4	26.8	-25.3	35.5
	Eight20 0.93 & Anchor No Grade	-42.7	32.6	-48.1	41.2
Leaders	Eight20 0.95	-34.1	15.7	-63.3	33.0
	Eight20 0.94	-37.4	17.6	-68.0	33.8
	Eight20 0.93	-46.3	20.8	-67.2	31.0
	Eight20 0.92	-46.5	21.4	-71.0	32.4
	Eight20 0.91	-47.6	24.2	-75.2	34.1
	Eight20 0.93 No Grade	-59.8	28.5	-68.7	32.3
	Eight20 0.95 & Anchor	-39.3	18.4	-69.6	34.5
	Eight20 0.94 & Anchor	-41.4	20.7	-73.5	35.3
	Eight20 0.93 & Anchor	-30.8	14.4	-61.8	30.2
	Eight20 0.92 & Anchor	-30.2	13.9	-61.3	29.5
	Eight20 0.91 & Anchor	-29.3	15.7	-61.7	29.5
	Eight20 0.93 & Anchor No Grade	-30.8	14.4	-61.8	30.2

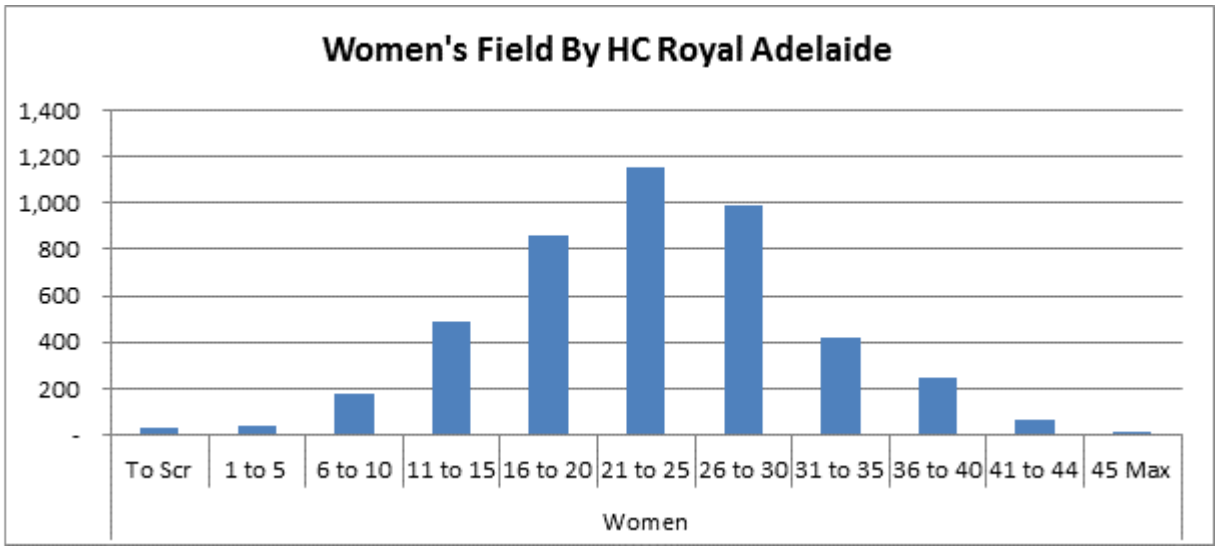
Appendix 21 – Royal Adelaide – Phase 2

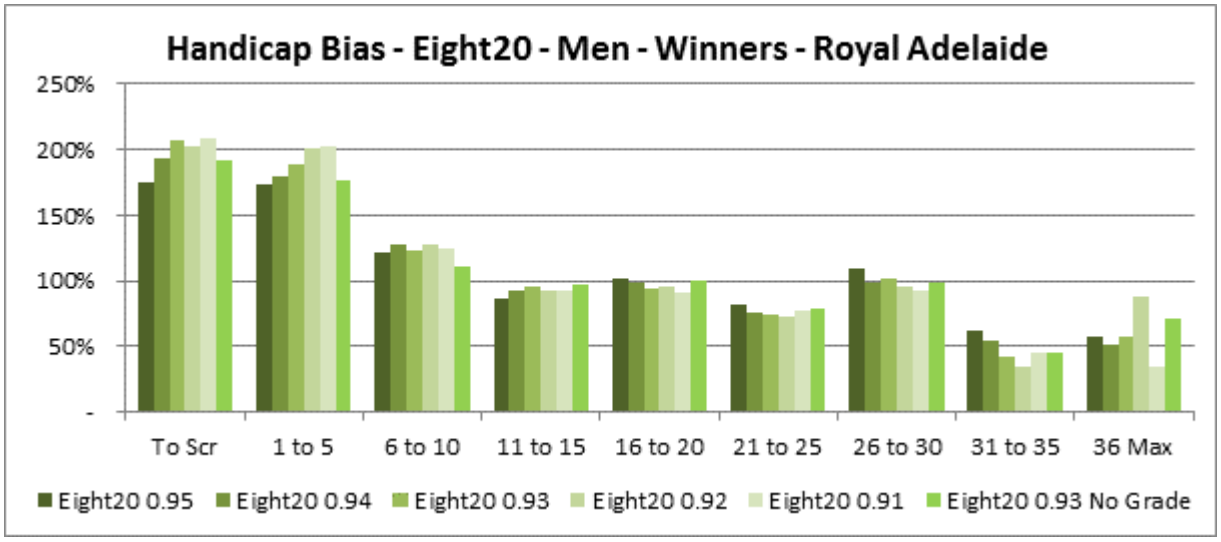
Royal Adelaide	Men	Women	Total
Players in Database	1,388	462	1,850
Members	588	338	926
Visitors	800	124	924
Members who have Played 21 Rounds	545	325	870
Members with Last Round In Old System	137	68	205
Members with Last Round in Current System	451	270	721
Earliest Round	8/12/2007	2/1/2008	
Latest Round	30/11/2010	29/11/2010	
Number of Visiting Clubs			146
Number of Home Competitions	849	415	1,264
Number of Rounds of Golf	22,640	6,989	29,629
Number of Rounds at Home	22,640	6,989	29,629
Number of Rounds at Home Old	16,702	4,708	21,410
Number of Rounds at Home Current	5,938	2,281	8,219
Num Rnds Members at Home	21,050	6,862	27,912
Num Rnds Members at Home Old	15,629	4,616	20,245
Num Rnds Members at Home Cur	5,421	2,246	7,667
Num Rnds After Eliminations	17,283	5,690	22,973
Num Rnds After Eliminations Old	11,345	3,409	14,754
Num Rnds After Eliminations Cur	5,938	2,281	8,219

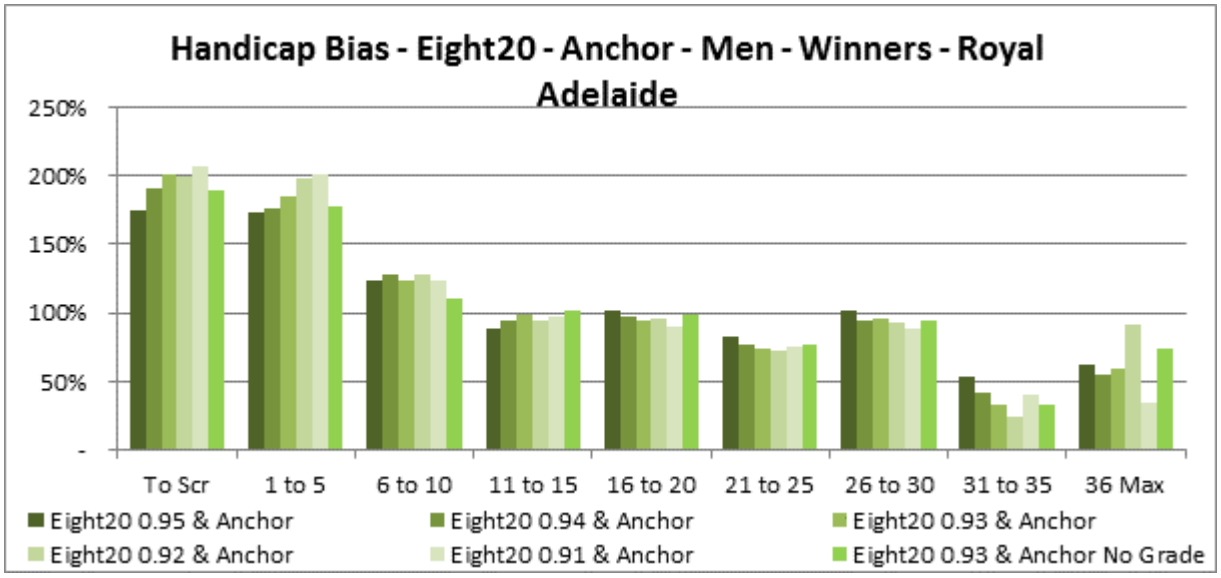


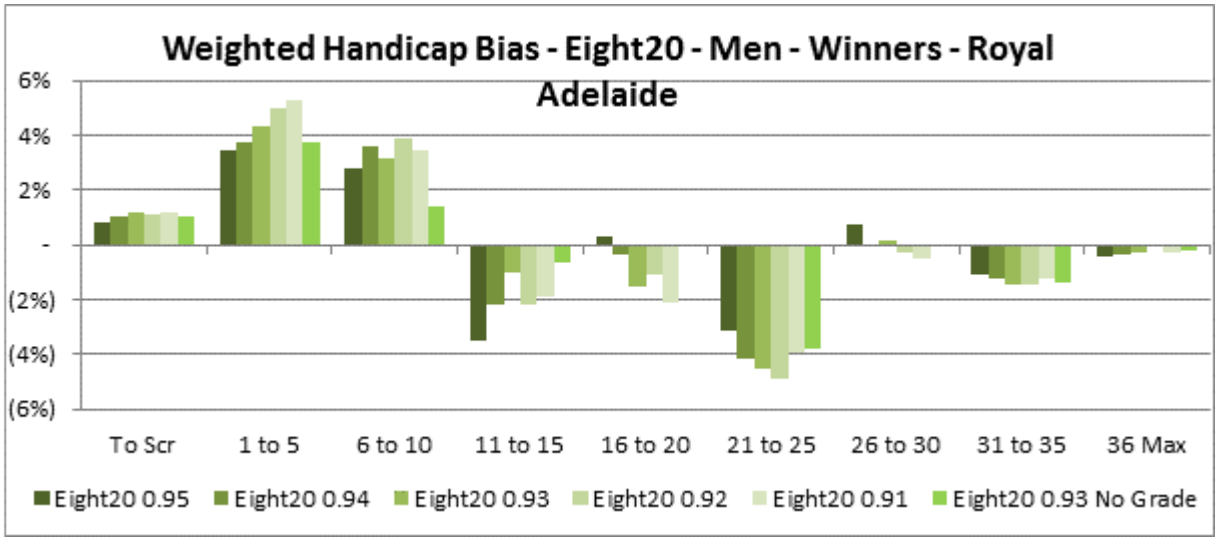

Field Size Royal Adelaide
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
101 - 300
Men
Women

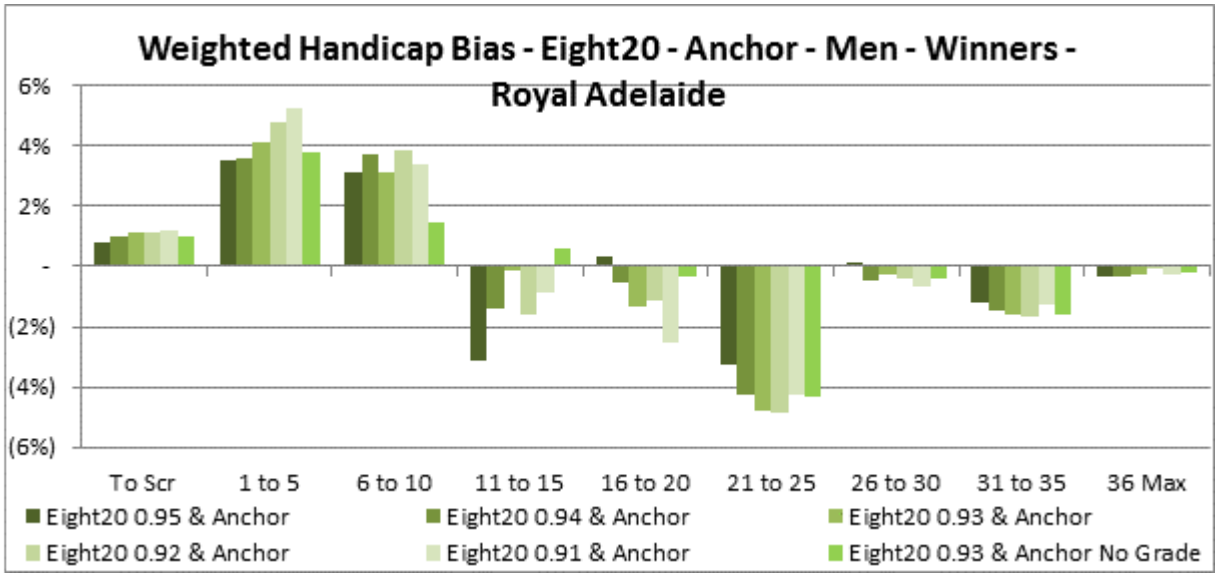

Men's Field By HC Royal Adelaide
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

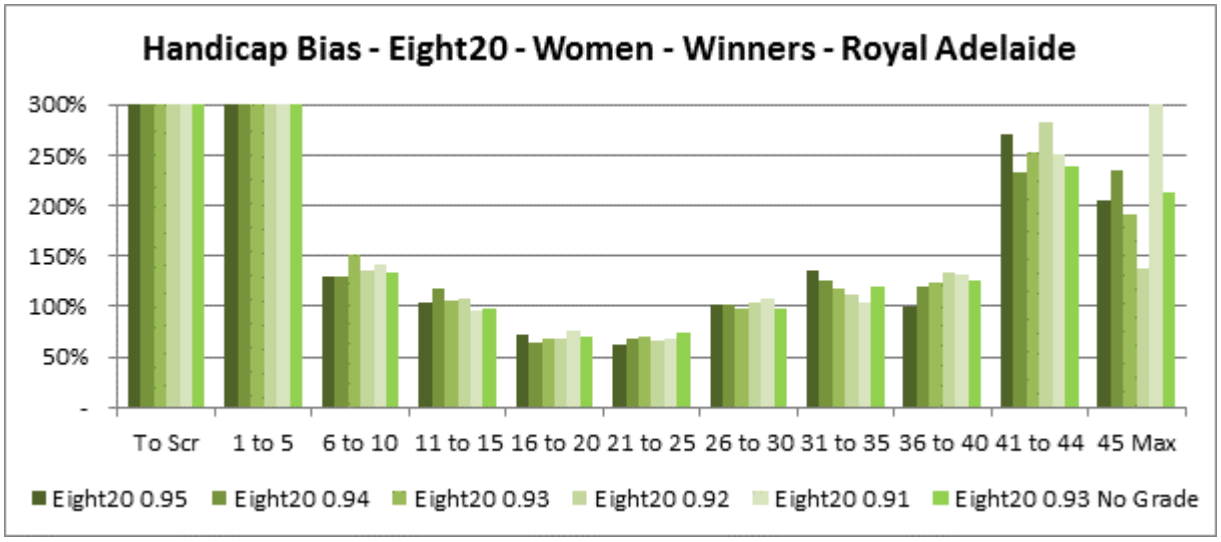

Women's Field By HC Royal Adelaide
1,400
1,200
1,000
800
600
400
200
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

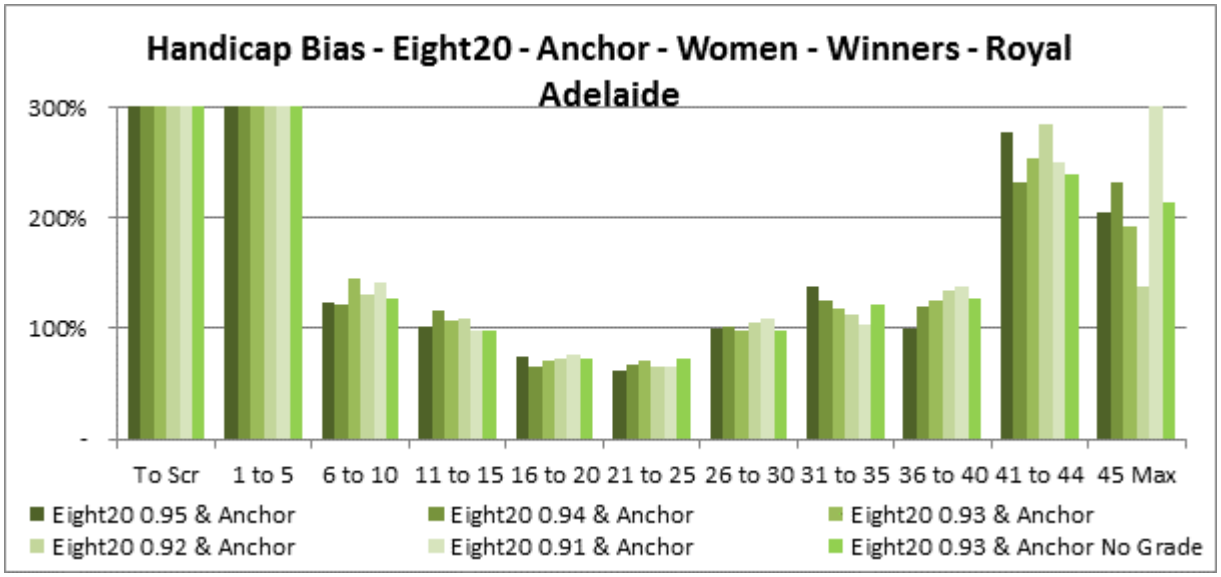

Handicap Bias - Eight20 - Men - Winners - Royal Adelaide
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

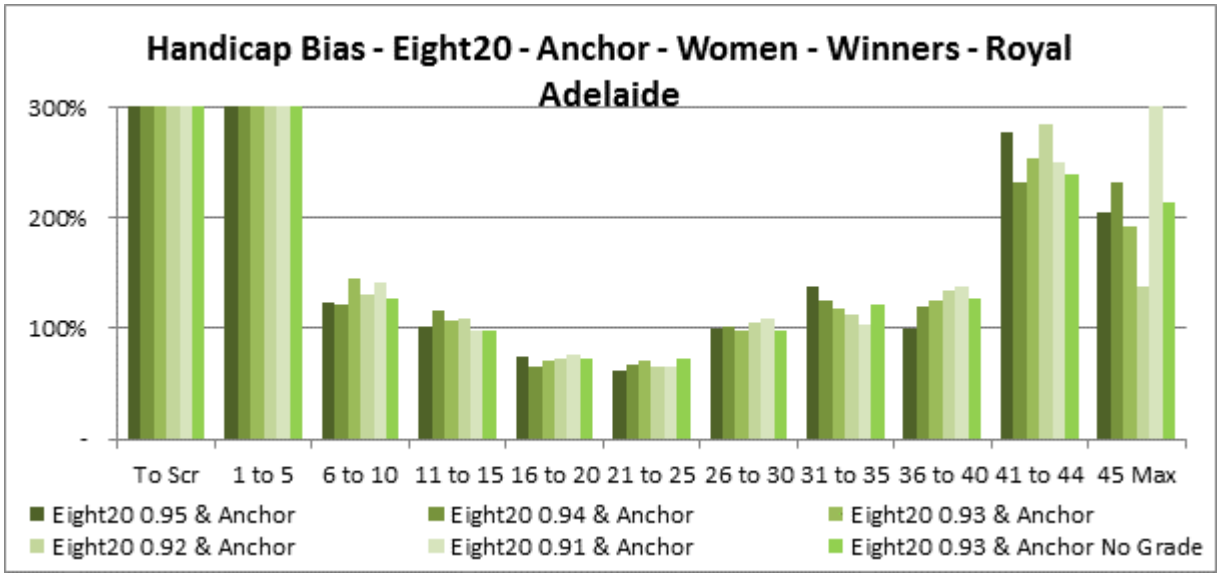

Handicap Bias - Eight20 - Anchor - Men - Winners - Royal Adelaide
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

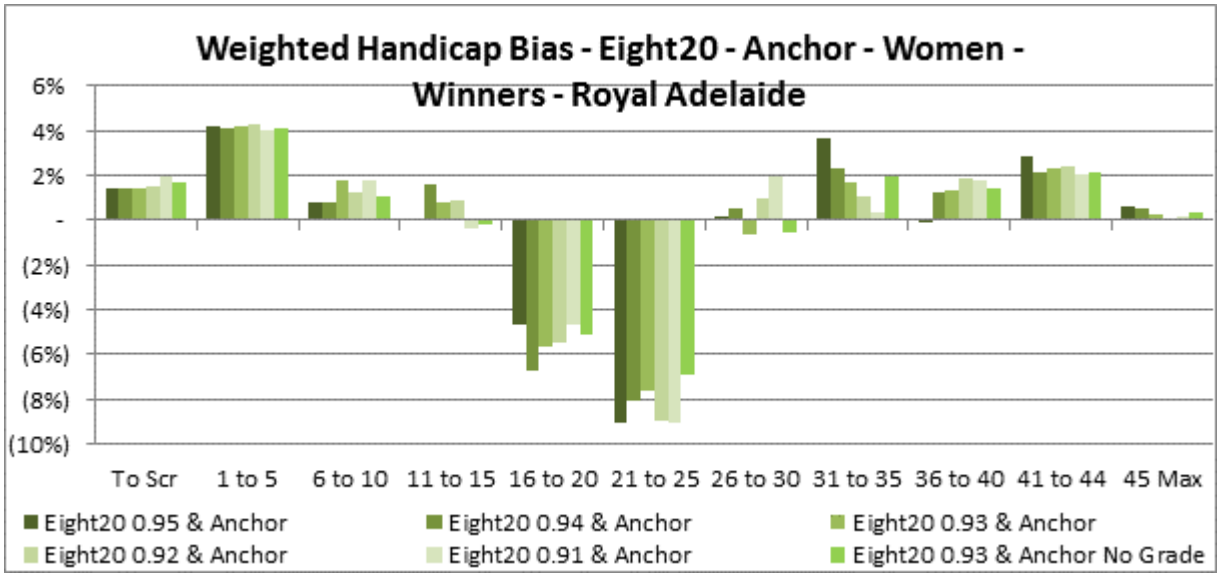

Weighted Handicap Bias - Eight20 - Men - Winners - Royal Adelaide
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

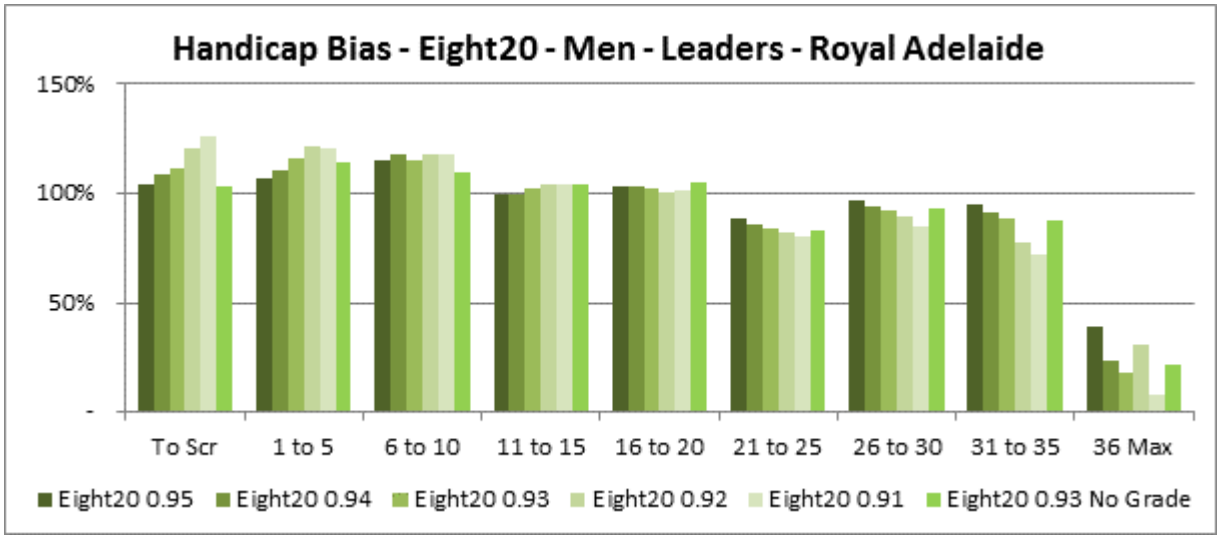

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Royal Adelaide
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

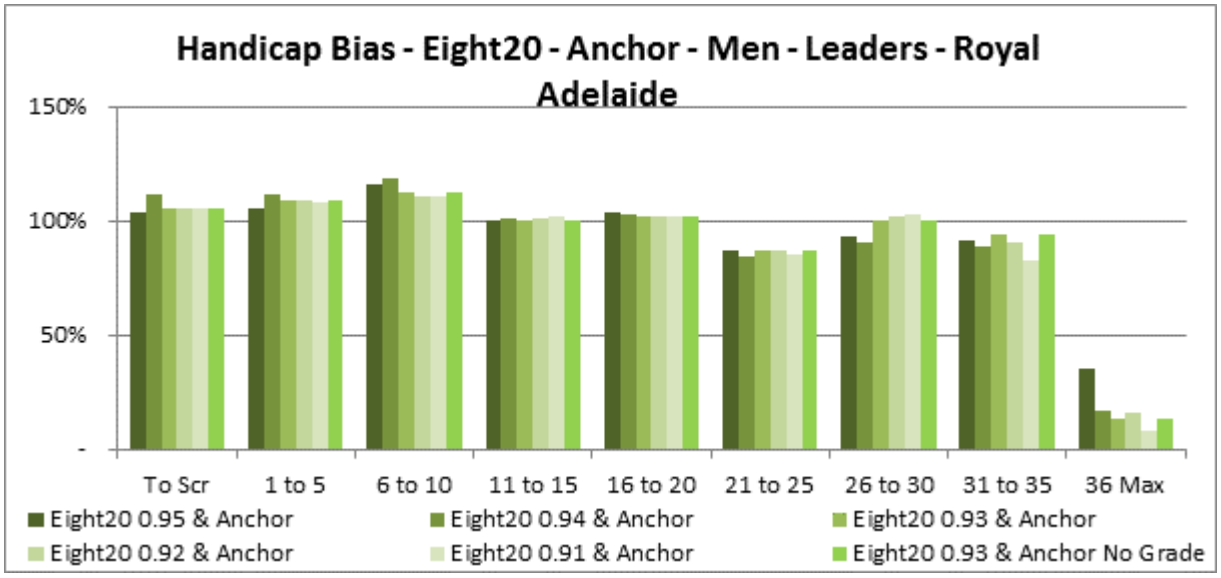

Handicap Bias - Eight20 - Women - Winners - Royal Adelaide
300%
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

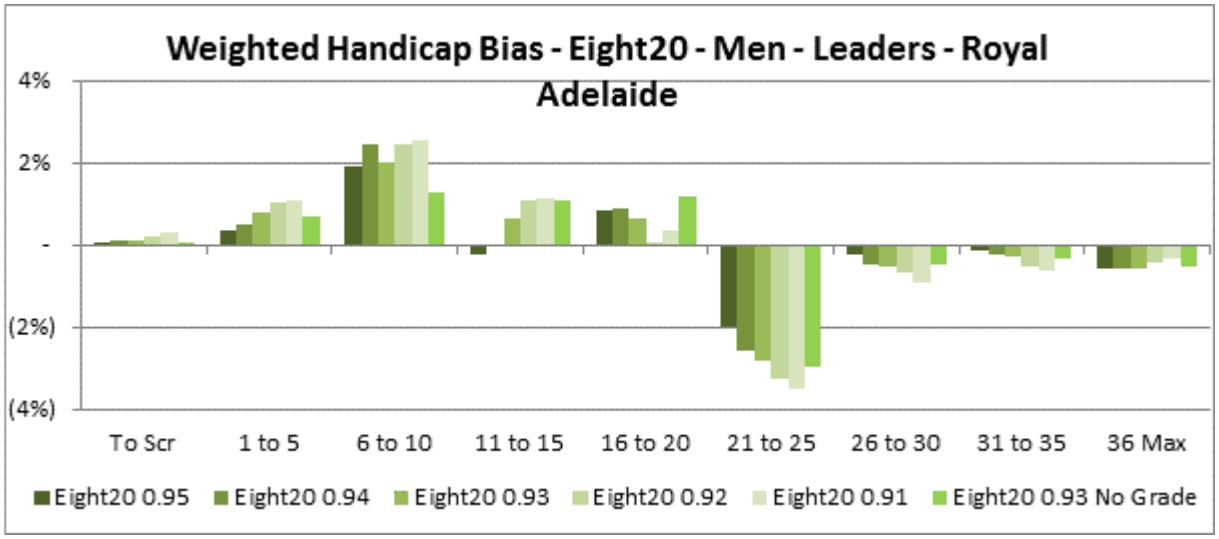

Handicap Bias - Eight20 - Anchor - Women - Winners - Royal Adelaide
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

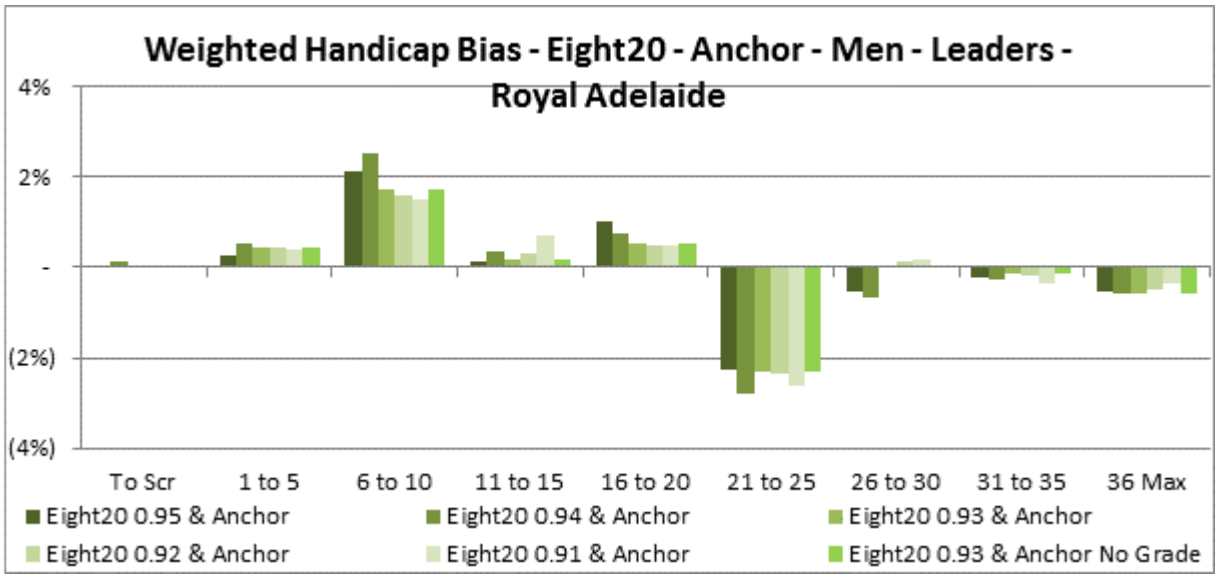

Handicap Bias - Eight20 - Anchor - Women - Winners - Royal Adelaide
300%
200%
100%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

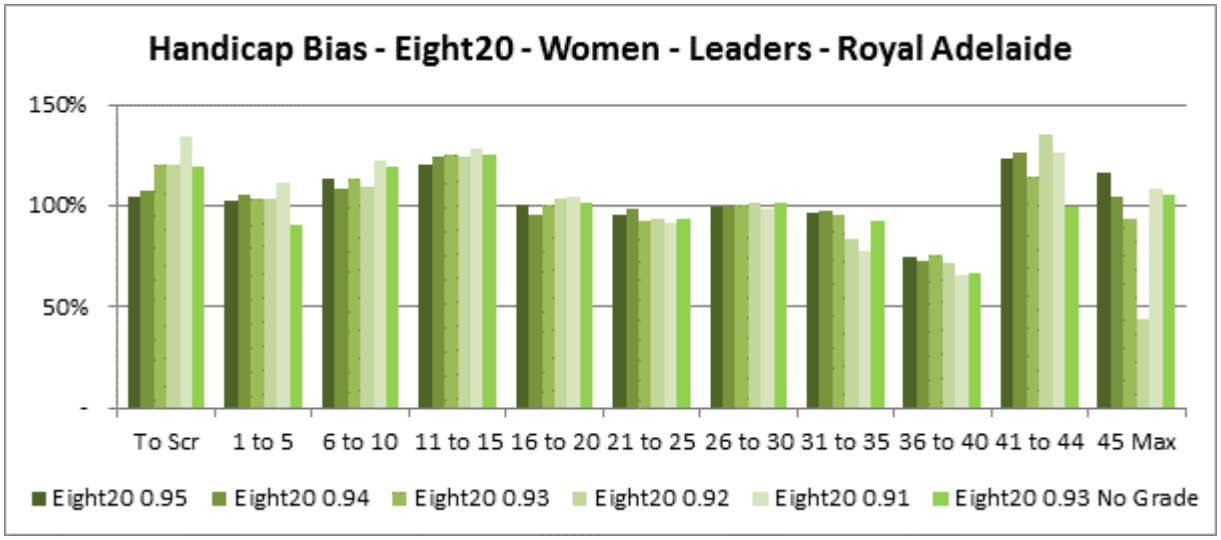

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Royal Adelaide
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

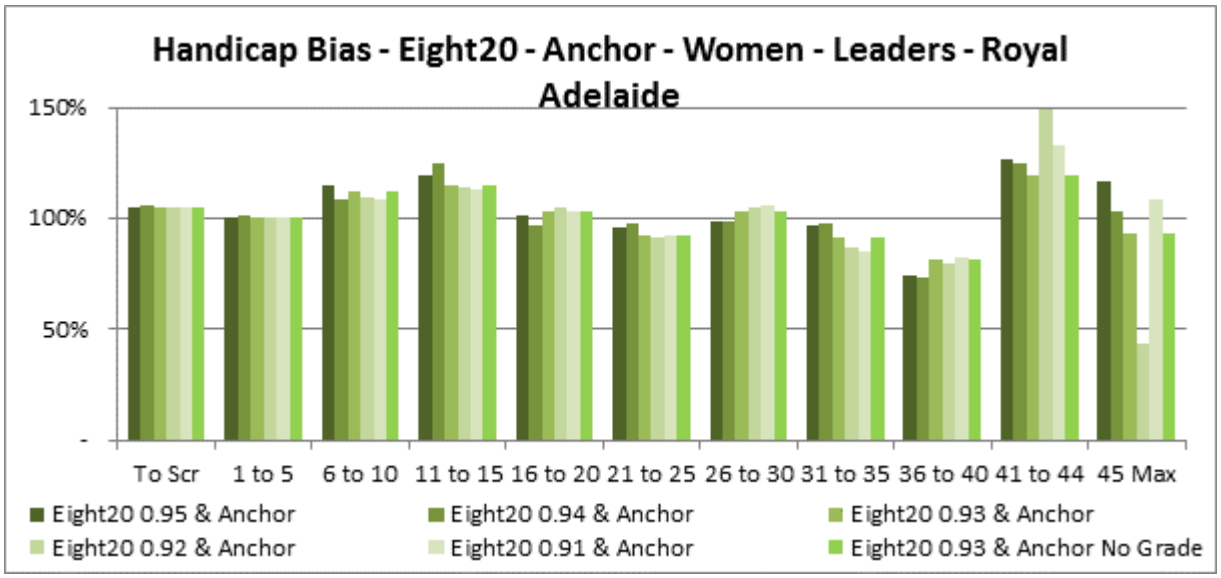

Handicap Bias - Eight20 - Men - Leaders - Royal Adelaide
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

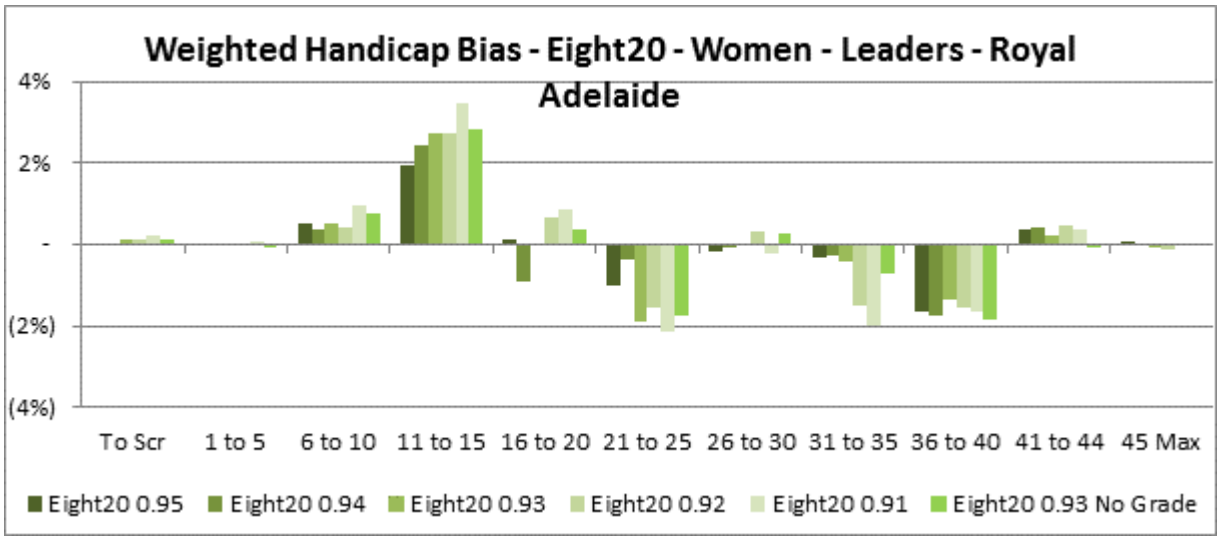

Handicap Bias - Eight20 - Anchor - Men - Leaders - Royal Adelaide
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

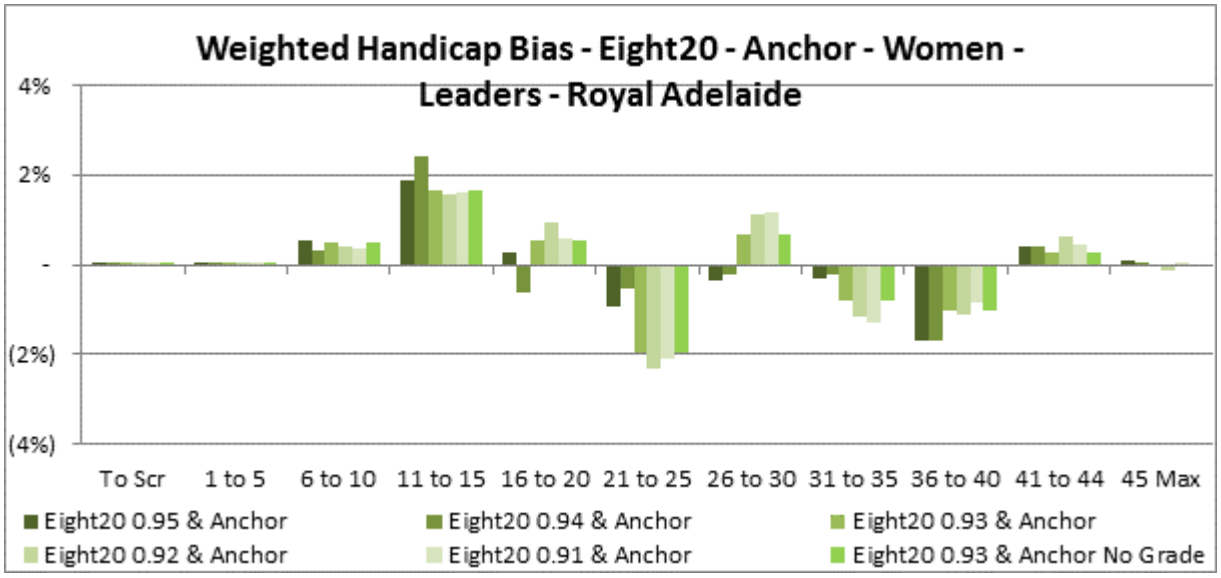

Weighted Handicap Bias - Eight20 - Men - Leaders - Royal Adelaide
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Royal Adelaide
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Royal Adelaide
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Royal Adelaide
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

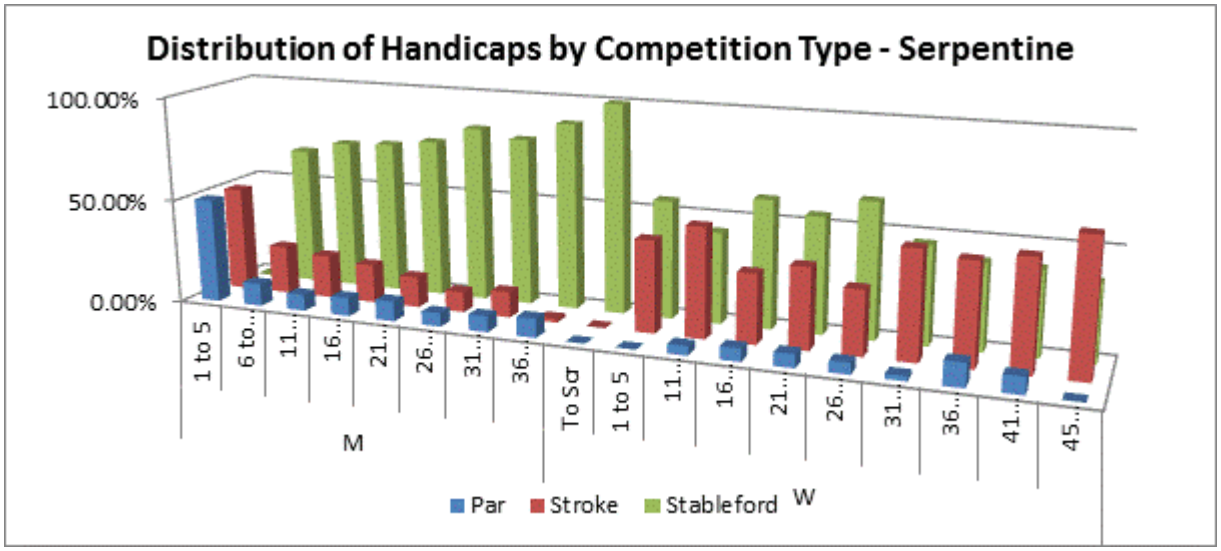

Weighted Handicap Bias - Eight20 - Women - Leaders - Royal Adelaide
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

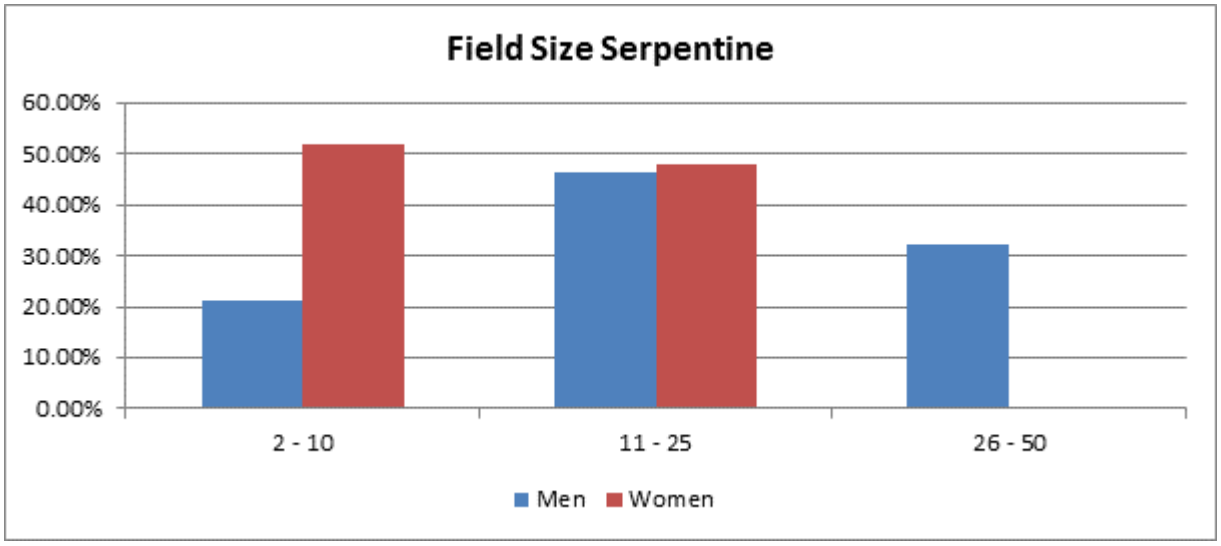


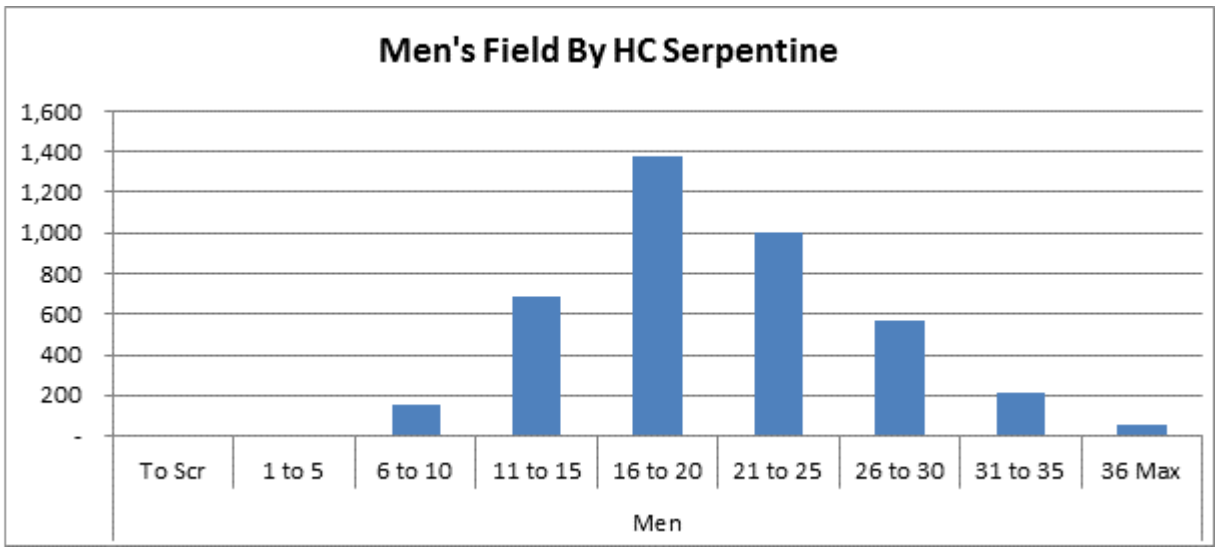
Phase 2 -Royal Adelaide				
	Men		Women	
Method	Tilt M	Level M	Tilt MW	Level W
Eight20 0.95	-37.2	23.7	-0.1	38.6
Eight20 0.94	-49.8	25.4	-1.9	38.3
Eight20 0.93	-54.8	26.6	-7.4	35.7
Eight20 0.92	-58.7	30.2	-6.2	38.0
Eight20 0.91	-58.8	28.9	-9.6	35.8
Eight20 0.93 No Grade	-44.0	20.6	-4.6	33.0
Eight20 0.95 & Anchor	-41.0	23.6	-0.1	38.3
Eight20 0.94 & Anchor	-52.6	25.1	-2.2	38.0
Eight20 0.93 & Anchor	-57.1	26.4	-7.0	35.4
Eight20 0.92 & Anchor	-59.9	29.6	-5.7	38.1
Eight20 0.91 & Anchor	-61.4	29.2	-7.6	37.2
Eight20 0.93 & Anchor No Grade	-49.1	22.1	-4.1	32.6
Eight20 0.95	-16.6	10.6	-8.6	9.0
Eight20 0.94	-22.1	13.3	-8.6	10.1
Eight20 0.93	-24.3	13.3	-10.9	11.5
Eight20 0.92	-29.6	15.7	-13.0	12.4
Eight20 0.91	-32.1	16.9	-17.9	15.8
Eight20 0.93 No Grade	-21.5	13.3	-13.7	12.4
Eight20 0.95 & Anchor	-19.3	11.9	-8.7	9.0
Eight20 0.94 & Anchor	-24.7	14.1	-8.7	9.9
Eight20 0.93 & Anchor	-17.0	10.7	-7.6	9.6
Eight20 0.92 & Anchor	-16.1	10.5	-7.3	11.4
Eight20 0.91 & Anchor	-16.6	11.4	-6.6	10.7
Eight20 0.93 & Anchor No Grade	-17.0	10.7	-7.6	9.6

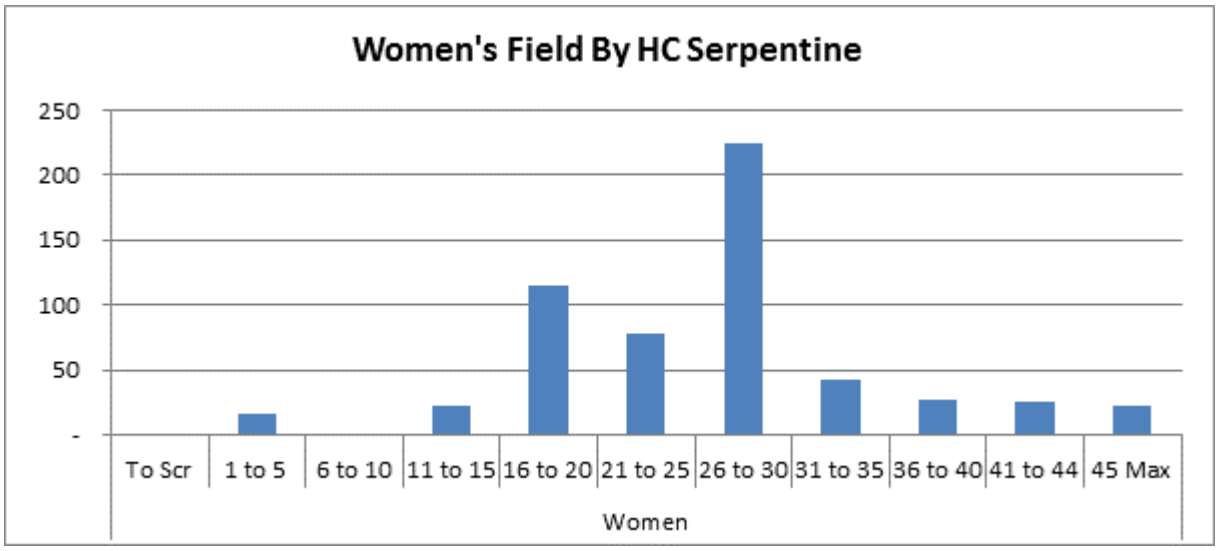
Appendix 22 – Serpentine – Phase 2

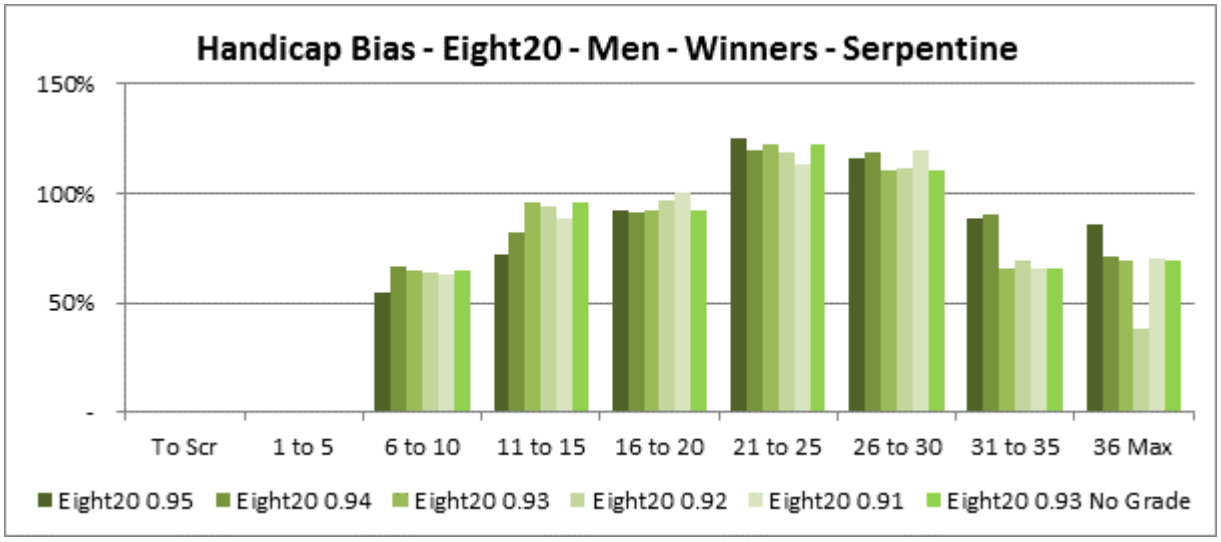
Serpentine	Men	Women	Total
Players in Database	249	135	384
Members	127	34	161
Visitors	122	101	223
Members who have Played 21 Rounds	78	27	105
Members with Last Round In Old System	88	17	105
Members with Last Round in Current System	39	17	56
Earliest Round	30/12/2007	29/12/2007	
Latest Round	31/10/2010	31/10/2010	
Number of Visiting Clubs			52
Number of Home Competitions	434	205	639
Number of Rounds of Golf	7,742	1,150	8,892
Number of Rounds at Home	7,742	1,150	8,892
Number of Rounds at Home Old	5,994	829	6,823
Number of Rounds at Home Current	1,748	321	2,069
Num Rnds Members at Home	7,432	1,020	8,452
Num Rnds Members at Home Old	5,788	730	6,518
Num Rnds Members at Home Cur	1,644	290	1,934
Num Rnds After Eliminations	4,989	755	5,744
Num Rnds After Eliminations Old	3,241	434	3,675
Num Rnds After Eliminations Cur	1,748	321	2,069

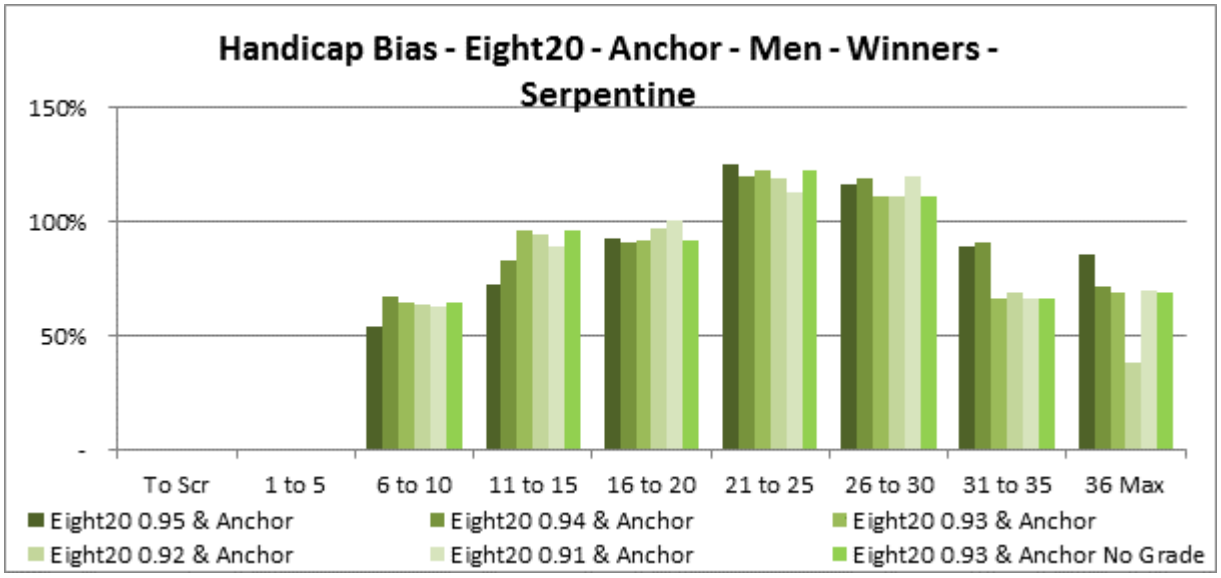


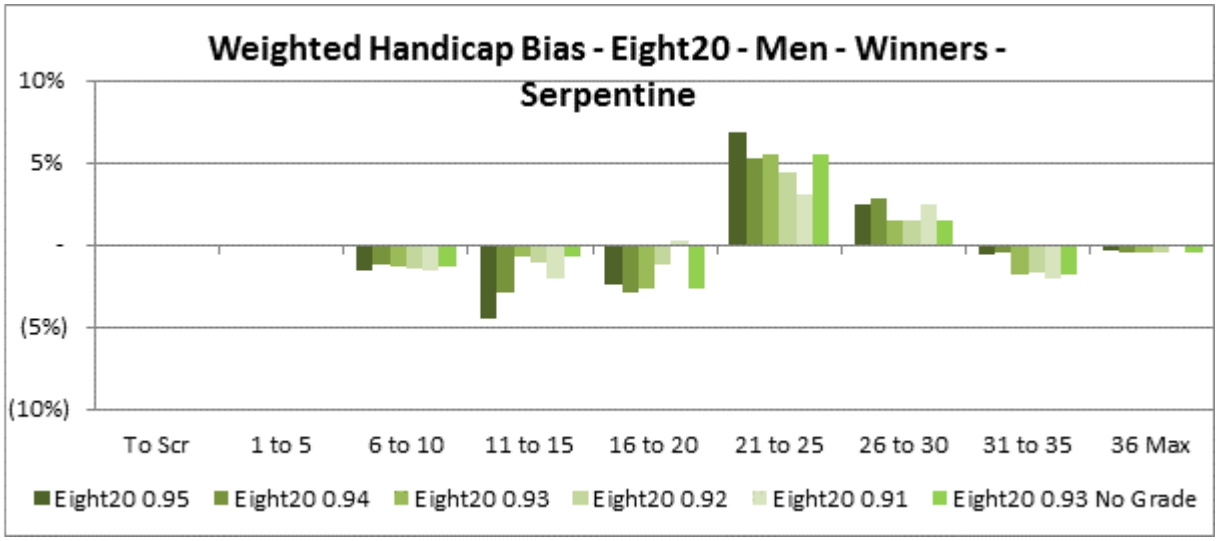

Field Size Serpentine
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
2 - 10
11 - 25
26 - 50
Men
Women

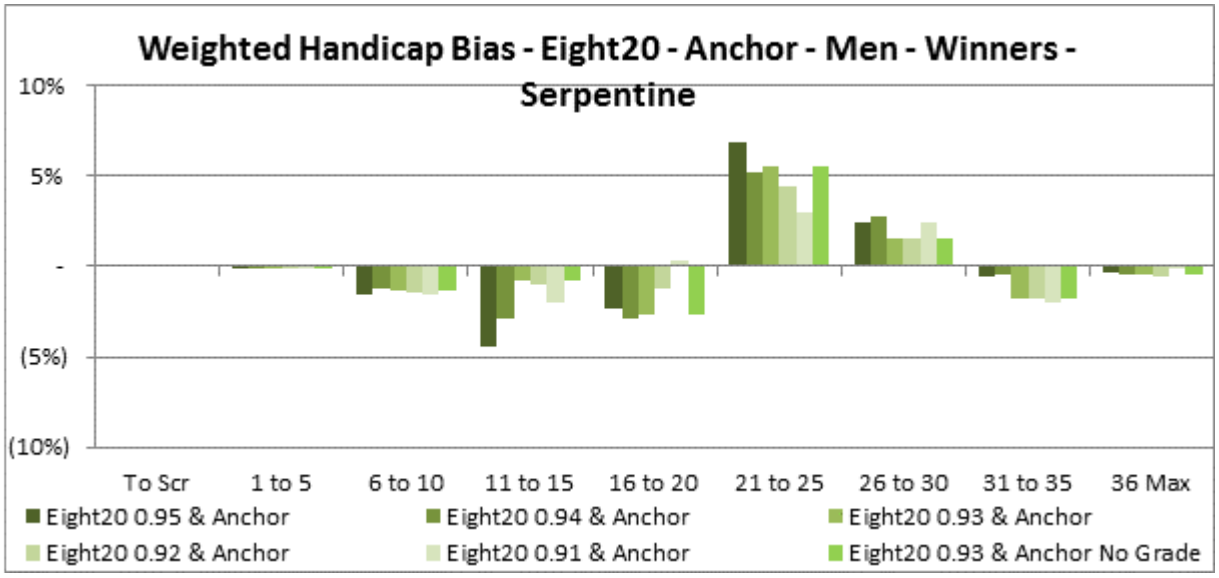

Men's Field By HC Serpentine
1,600
1,400
1,200
1,000
800
600
400
200
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

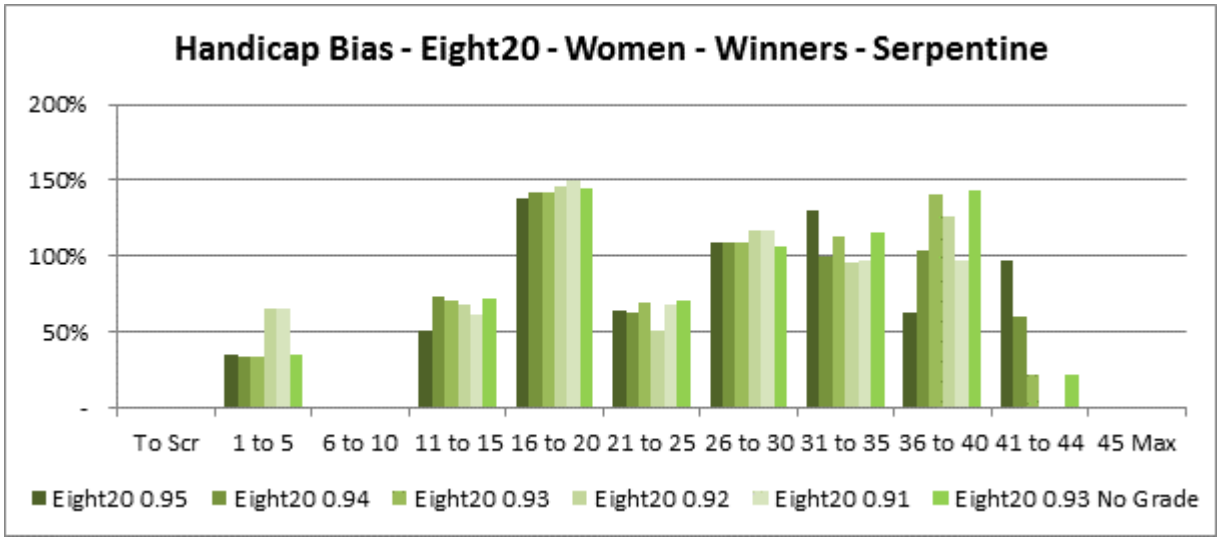

Women's Field By HC Serpentine
250
200
150
100
50
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

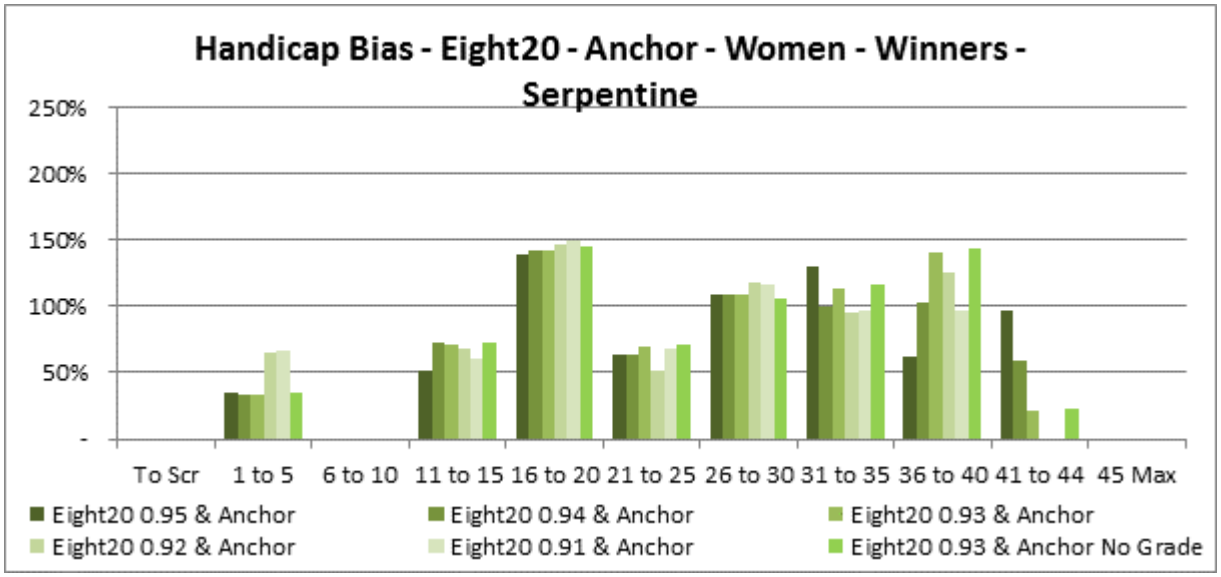

Handicap Bias - Eight20 - Men - Winners - Serpentine
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

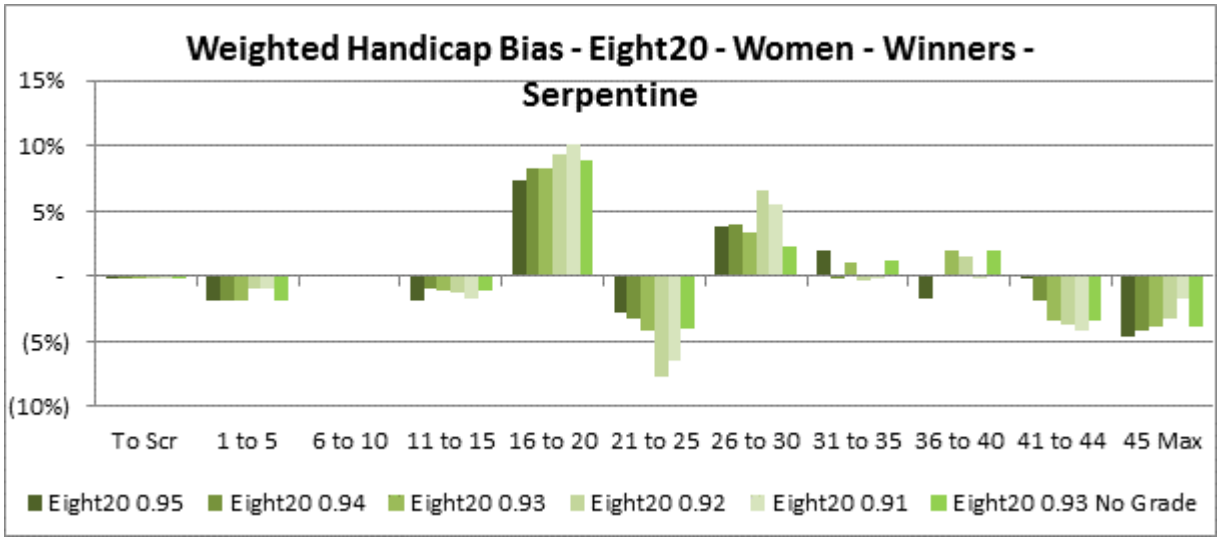

Handicap Bias - Eight20 - Anchor - Men - Winners - Serpentine
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

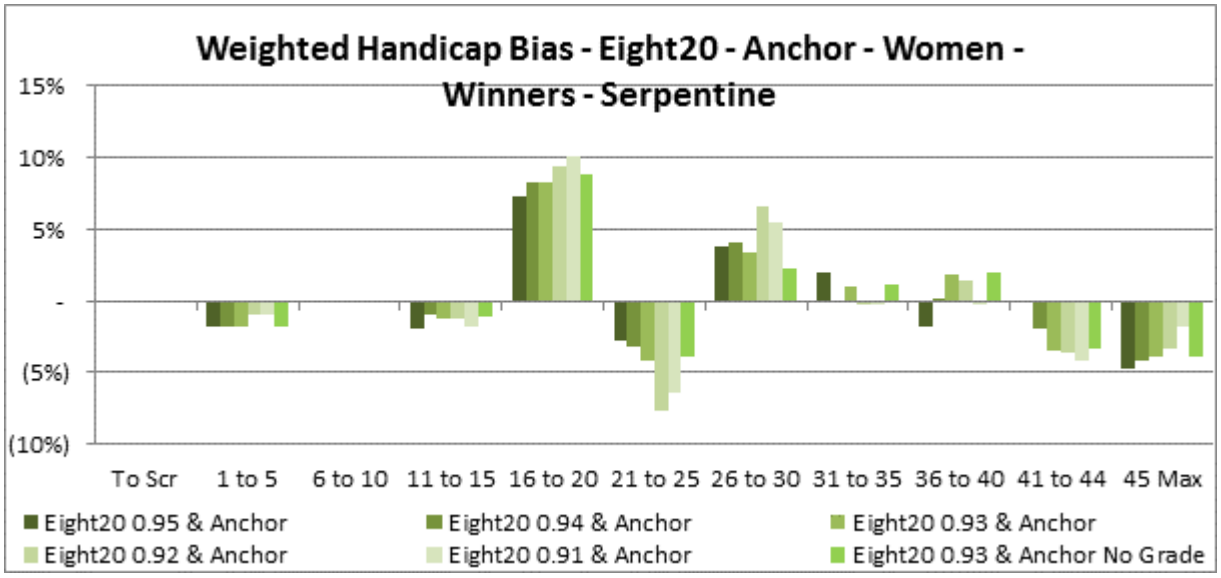

Weighted Handicap Bias - Eight20 - Men - Winners - Serpentine
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

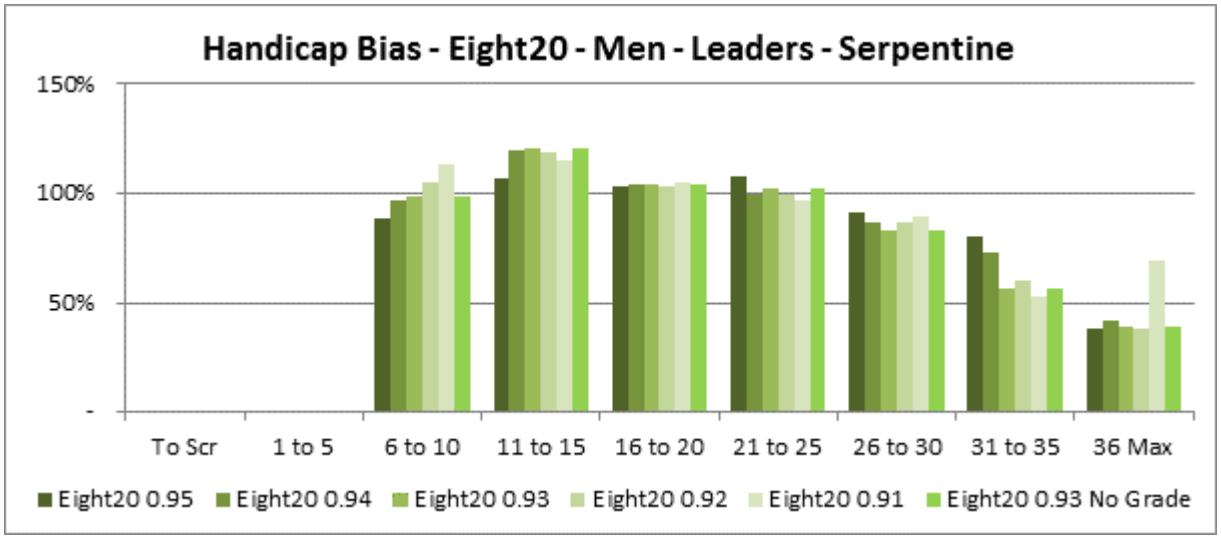

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Serpentine
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

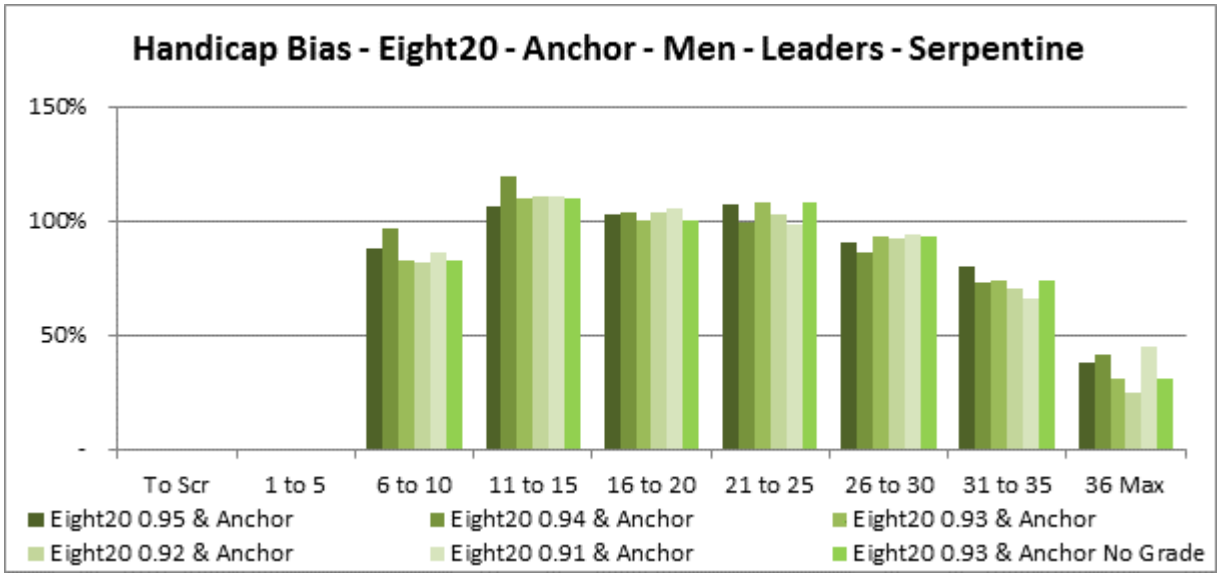

Handicap Bias - Eight20 - Women - Winners - Serpentine
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

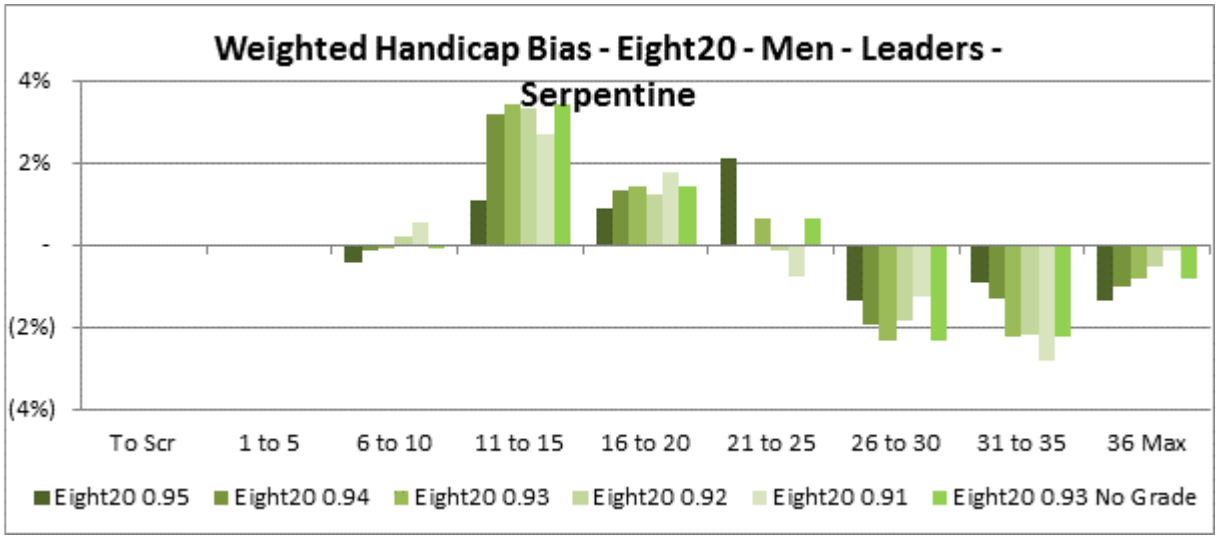

Handicap Bias - Eight20 - Anchor - Women - Winners - Serpentine
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

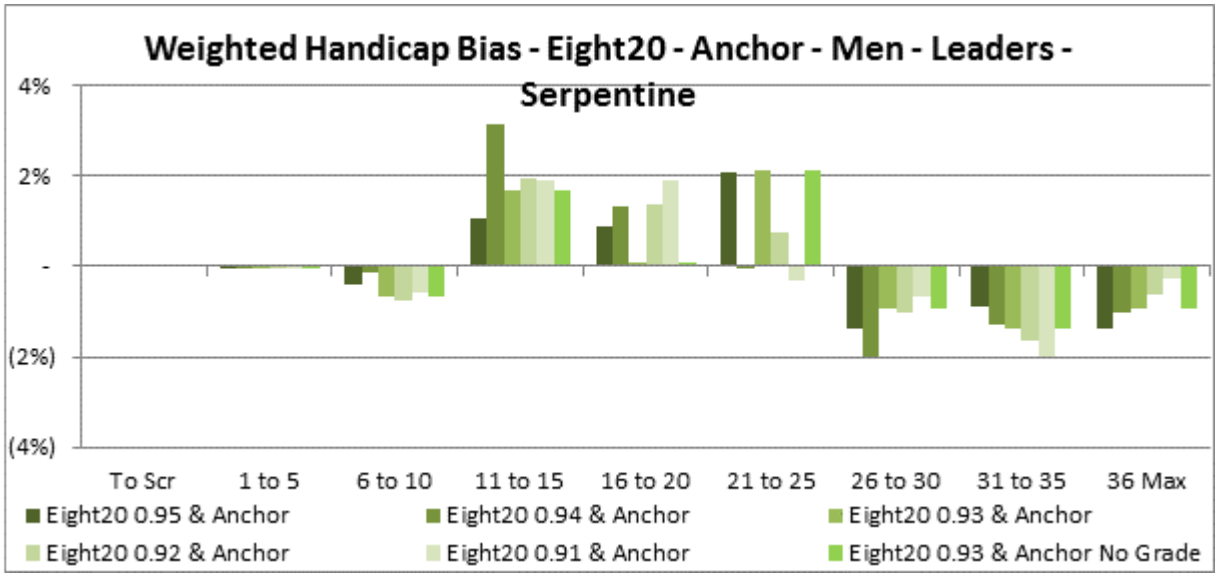

Weighted Handicap Bias - Eight20 - Women - Winners - Serpentine
15%
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

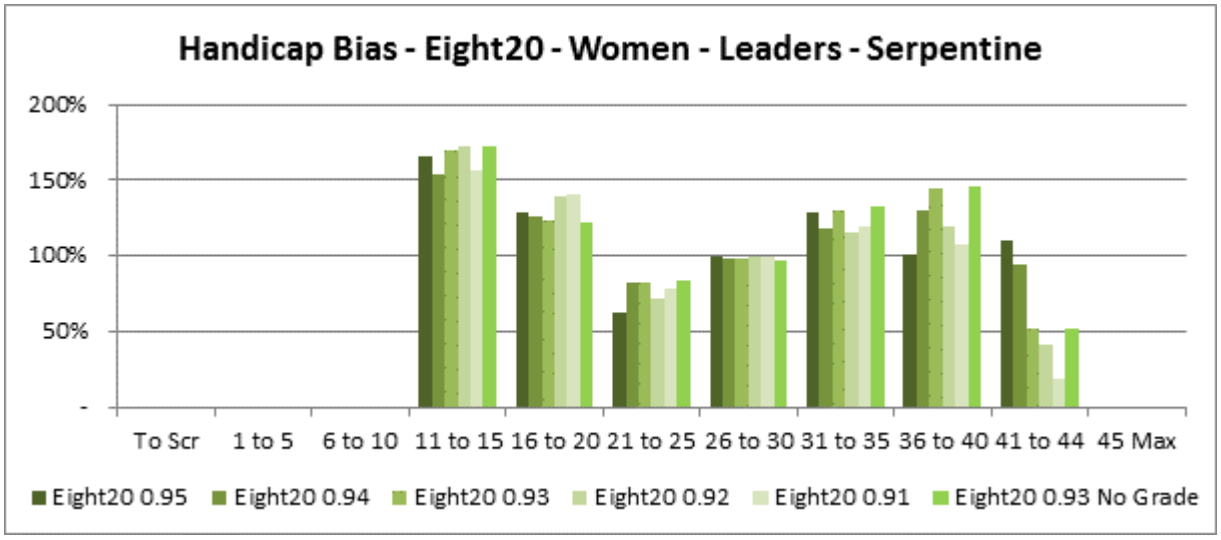

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Serpentine
15%
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

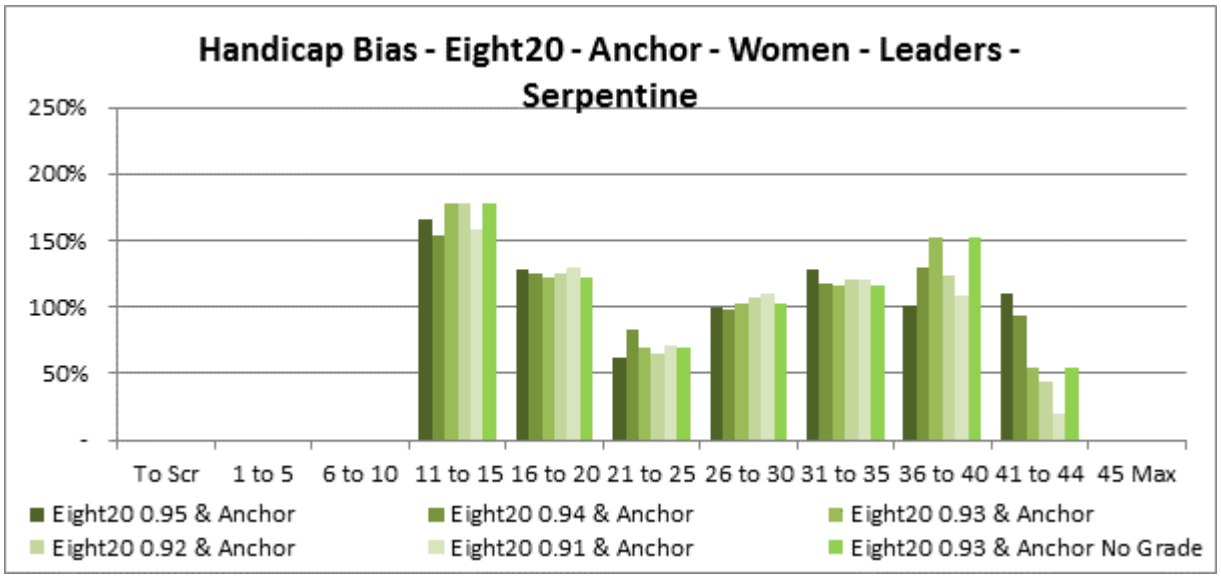

Handicap Bias - Eight20 - Men - Leaders - Serpentine
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

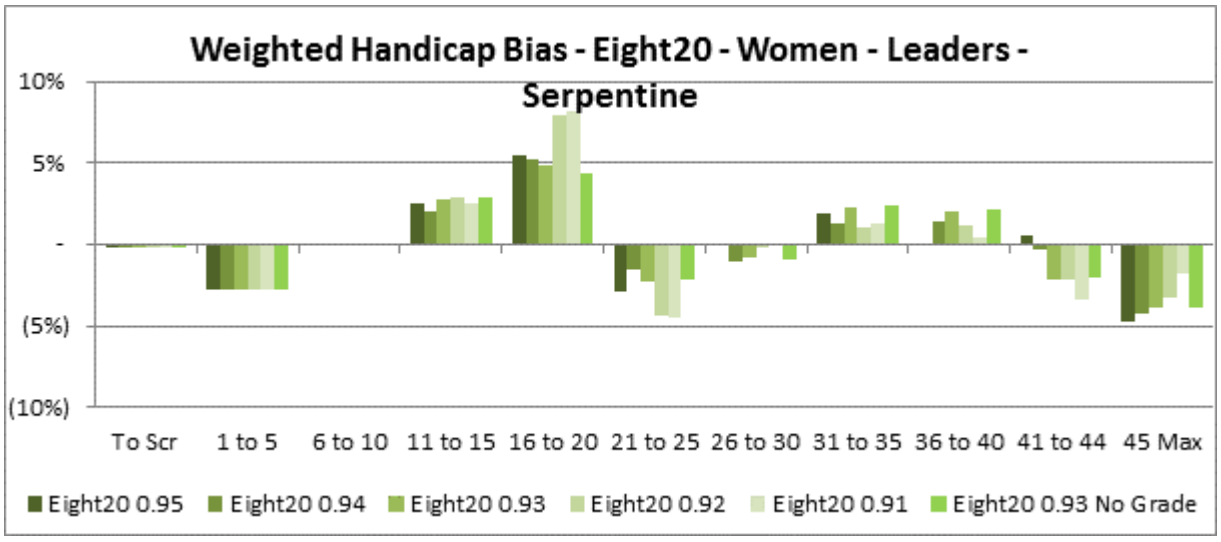

Handicap Bias - Eight20 - Anchor - Men - Leaders - Serpentine
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

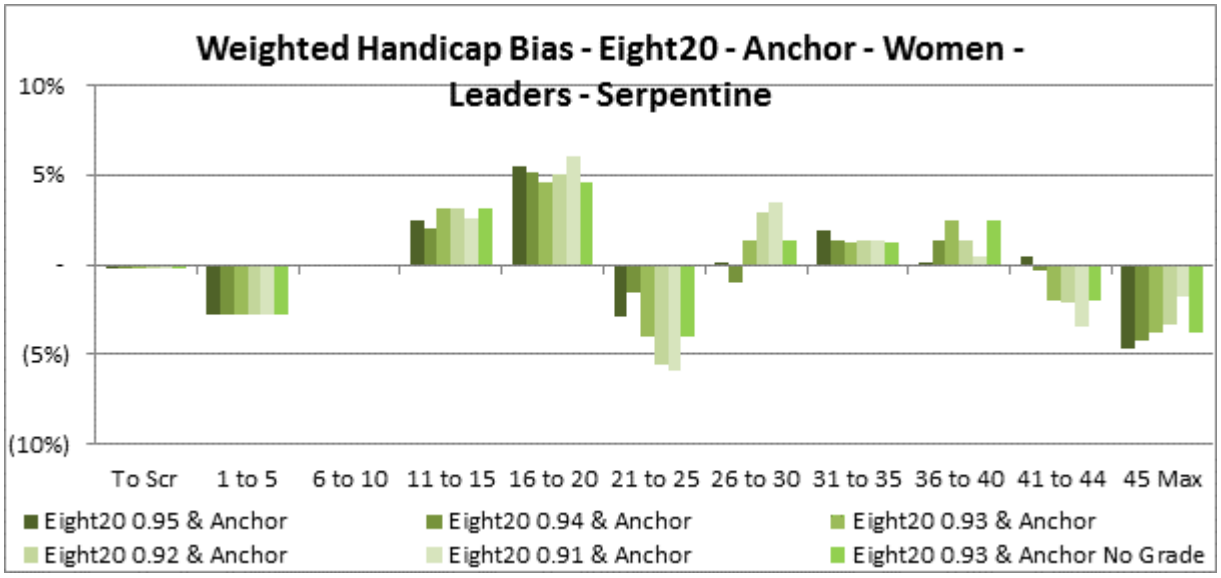

Weighted Handicap Bias - Eight20 - Men - Leaders - Serpentine
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Serpentine
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Serpentine
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Serpentine
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

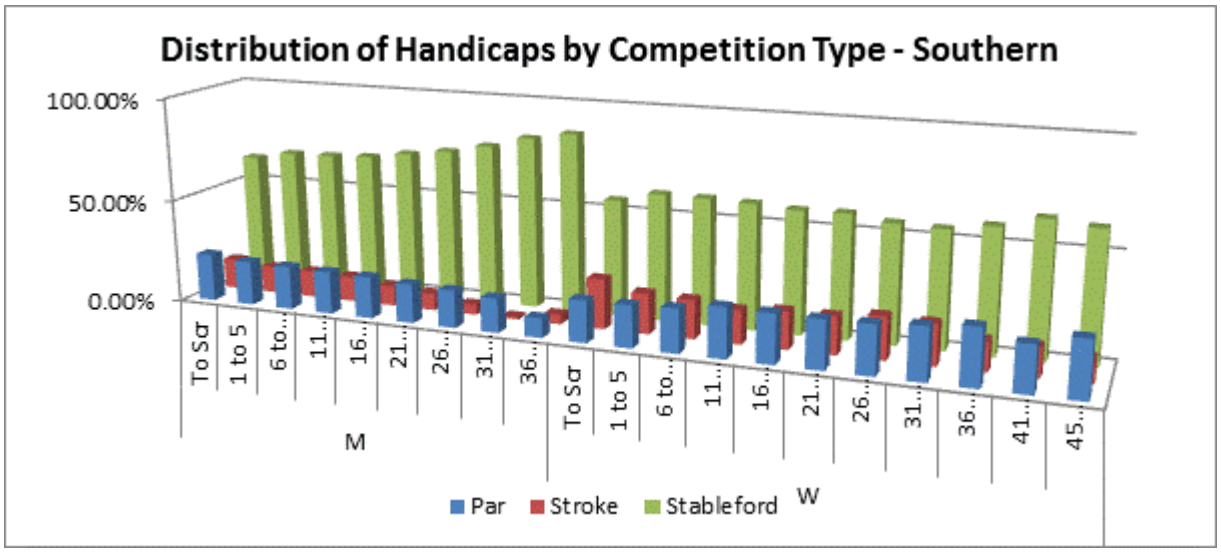

Weighted Handicap Bias - Eight20 - Women - Leaders - Serpentine
10%
5%
-
(5%)
(10%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

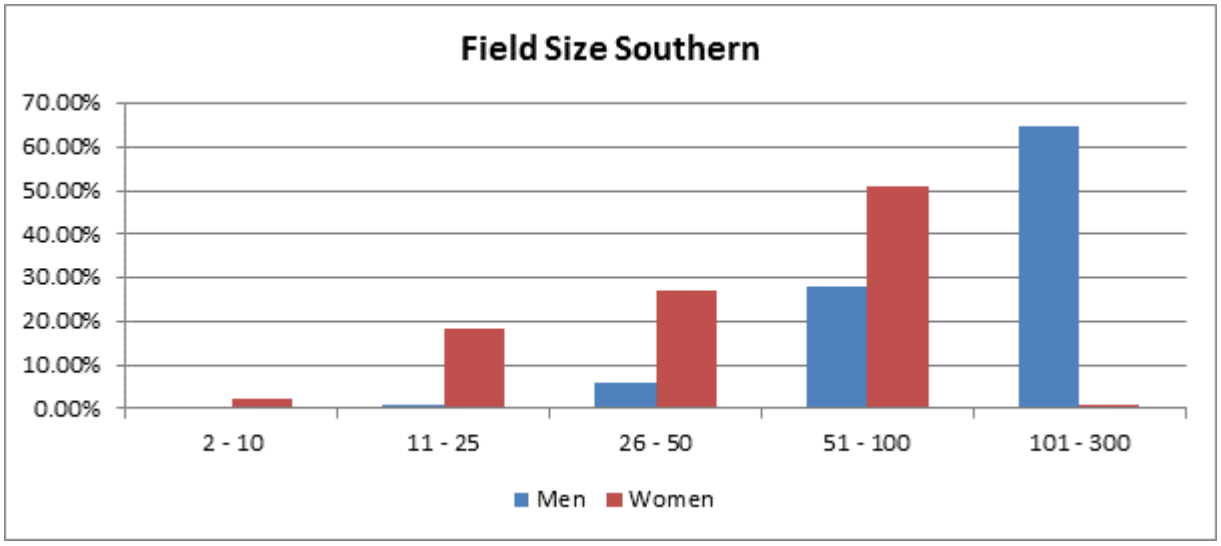


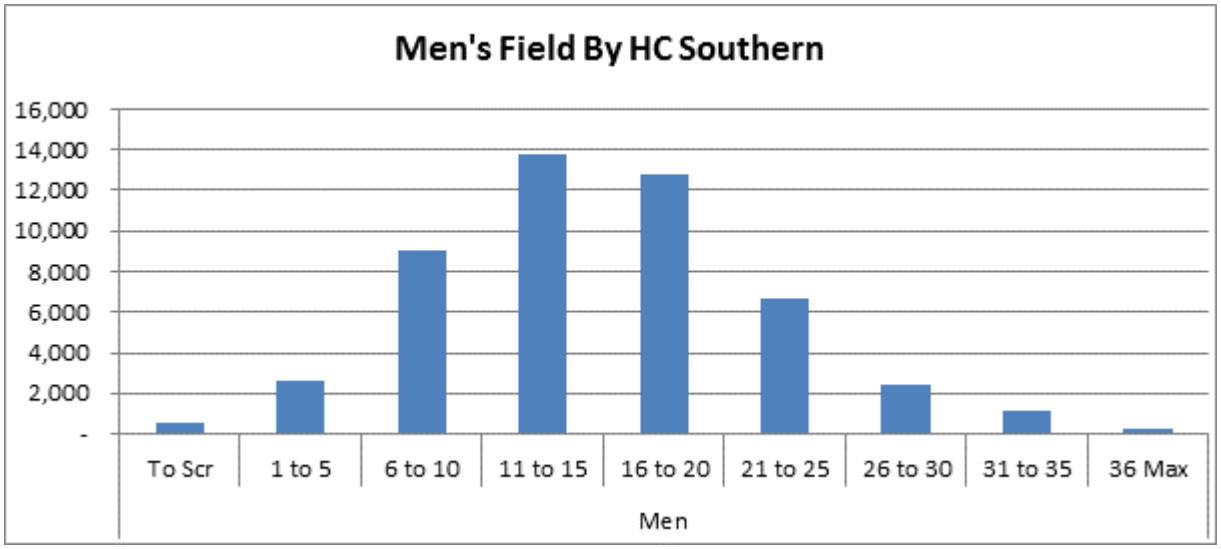
Phase 2 -Serpentine					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	27.8	32.0	-15.4	33.5
	Eight20 0.94	21.5	26.0	-19.9	34.6
	Eight20 0.93	8.7	24.0	-17.6	36.4
	Eight20 0.92	7.2	19.4	-20.7	46.9
	Eight20 0.91	11.1	18.0	-20.7	44.5
	Eight20 0.93 No Grade	8.7	24.0	-18.6	36.7
	Eight20 0.95 & Anchor	27.9	31.9	-15.4	33.5
	Eight20 0.94 & Anchor	21.6	25.9	-19.9	34.6
	Eight20 0.93 & Anchor	8.7	24.0	-17.6	36.4
	Eight20 0.92 & Anchor	7.2	19.4	-20.7	46.9
	Eight20 0.91 & Anchor	11.1	18.0	-20.7	44.5
	Eight20 0.93 & Anchor No Grade	8.7	24.0	-18.6	36.7
Leaders	Eight20 0.95	-14.9	11.7	-14.4	28.0
	Eight20 0.94	-24.7	15.2	-12.3	25.1
	Eight20 0.93	-28.7	17.8	-14.4	27.0
	Eight20 0.92	-26.8	16.3	-19.4	34.0
	Eight20 0.91	-26.6	16.1	-17.8	34.2
	Eight20 0.93 No Grade	-28.7	17.8	-13.7	26.6
	Eight20 0.95 & Anchor	-14.8	11.8	-14.4	28.0
	Eight20 0.94 & Anchor	-24.7	15.2	-12.3	25.1
	Eight20 0.93 & Anchor	-12.9	12.0	-13.4	28.8
	Eight20 0.92 & Anchor	-15.1	11.7	-13.0	31.8
	Eight20 0.91 & Anchor	-15.4	12.4	-12.5	33.8
	Eight20 0.93 & Anchor No Grade	-12.9	12.0	-13.4	28.8

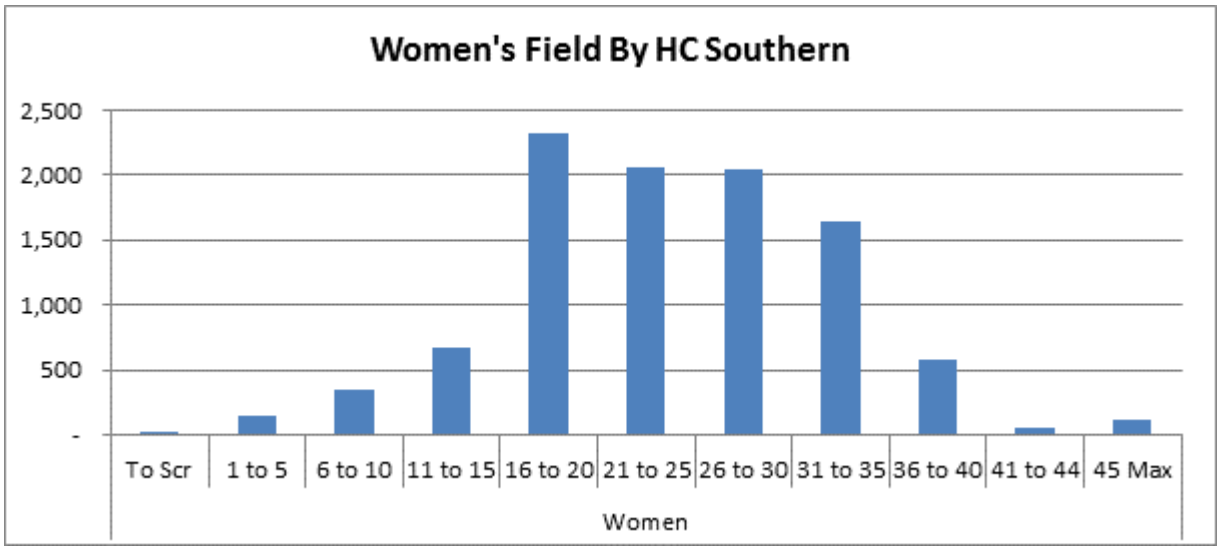
Appendix 23 – Southern – Phase 2

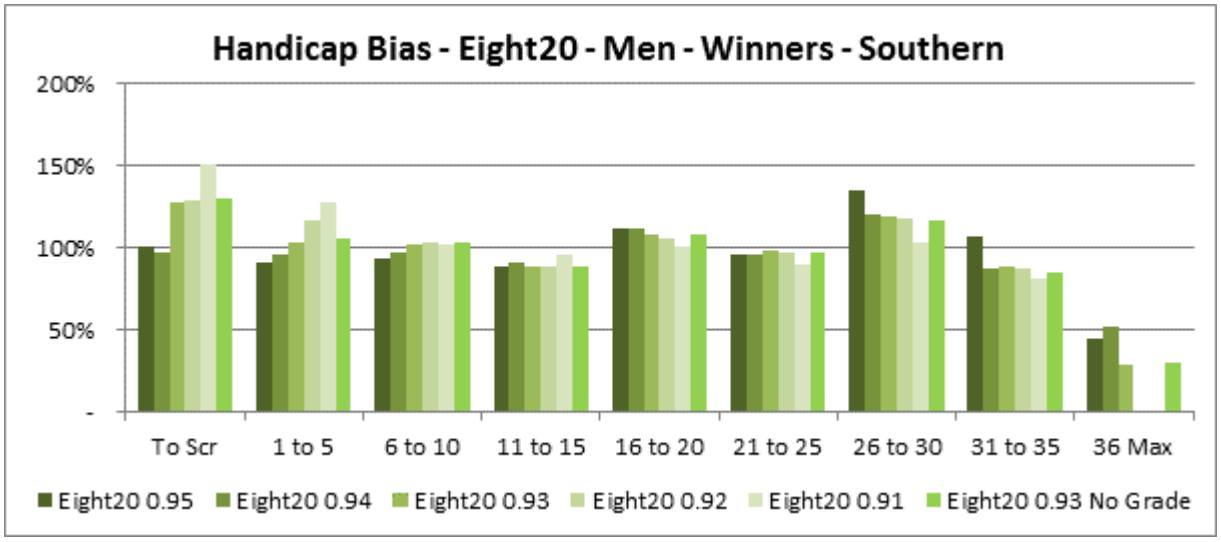
Southern	Men	Women	Total
Players in Database	1,924	335	2,259
Members	1,031	249	1,280
Visitors	893	86	979
Members who have Played 21 Rounds	961	234	1,195
Members with Last Round In Old System	205	48	253
Members with Last Round in Current System	826	201	1,027
Earliest Round	1/12/2007	27/12/2007	
Latest Round	29/11/2010	28/11/2010	
Number of Visiting Clubs			224
Number of Home Competitions	735	432	1,167
Number of Rounds of Golf	76,726	15,686	92,412
Number of Rounds at Home	4,370	6,158	10,528
Number of Rounds at Home Old	3,639	4,716	8,355
Number of Rounds at Home Current	731	1,442	2,173
Num Rnds Members at Home	4,201	5,779	9,980
Num Rnds Members at Home Old	3,484	4,410	7,894
Num Rnds Members at Home Cur	717	1,369	2,086
Num Rnds After Eliminations	54,176	11,384	65,560
Num Rnds After Eliminations Old	37,202	7,215	44,417
Num Rnds After Eliminations Cur	16,974	4,169	21,143

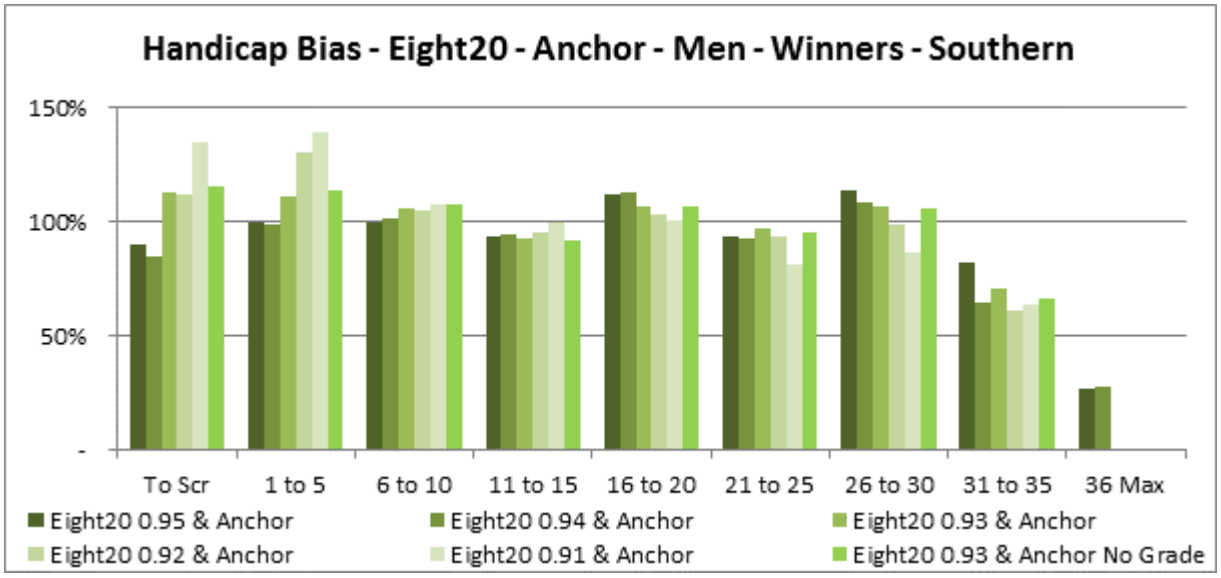


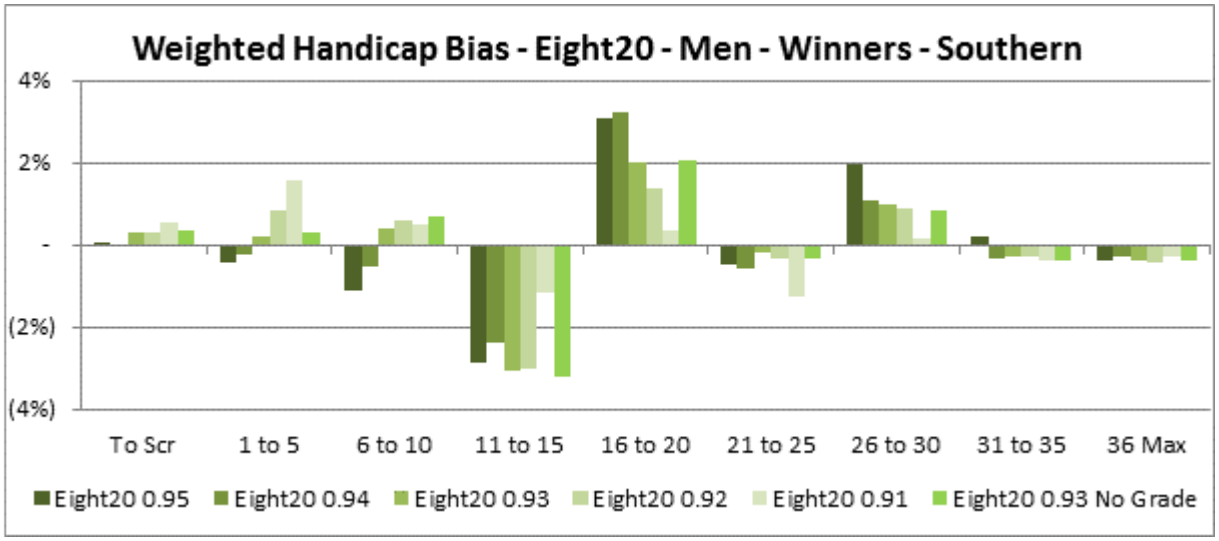

Field Size Southern
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
101 - 300
Men
Women

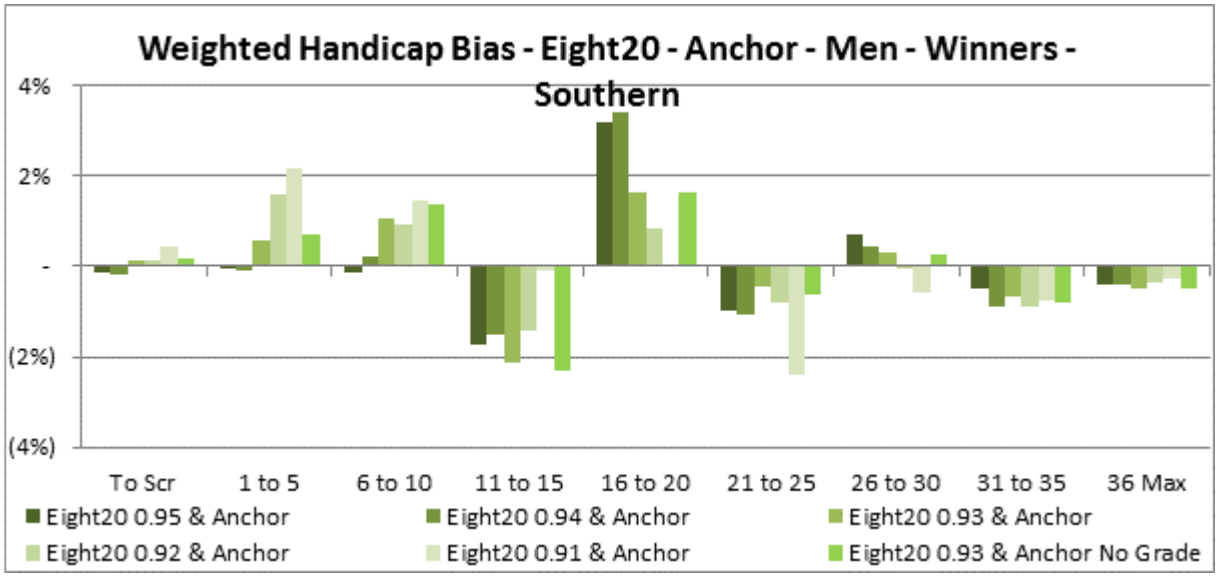

Men's Field By HC Southern
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

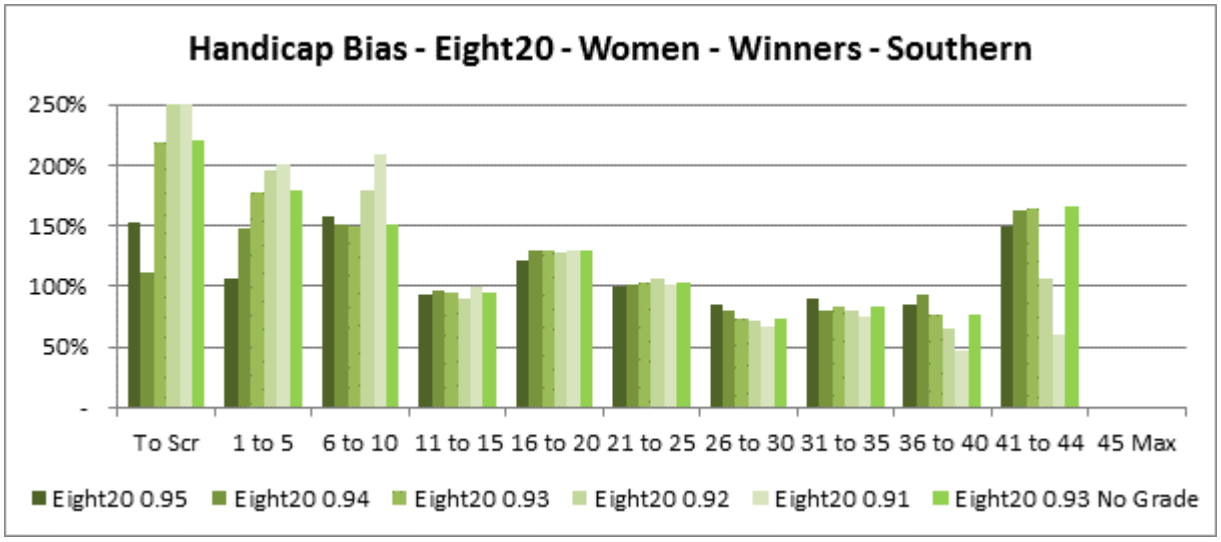

Women's Field By HC Southern
2,500
2,000
1,500
1,000
500
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

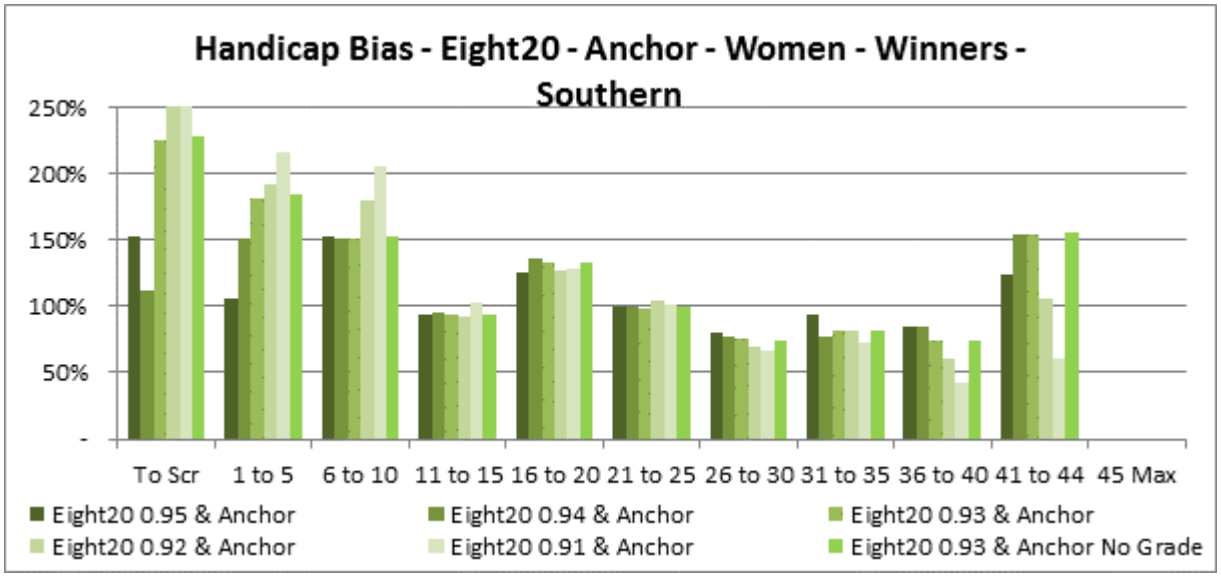

Handicap Bias - Eight20 - Men - Winners - Southern
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

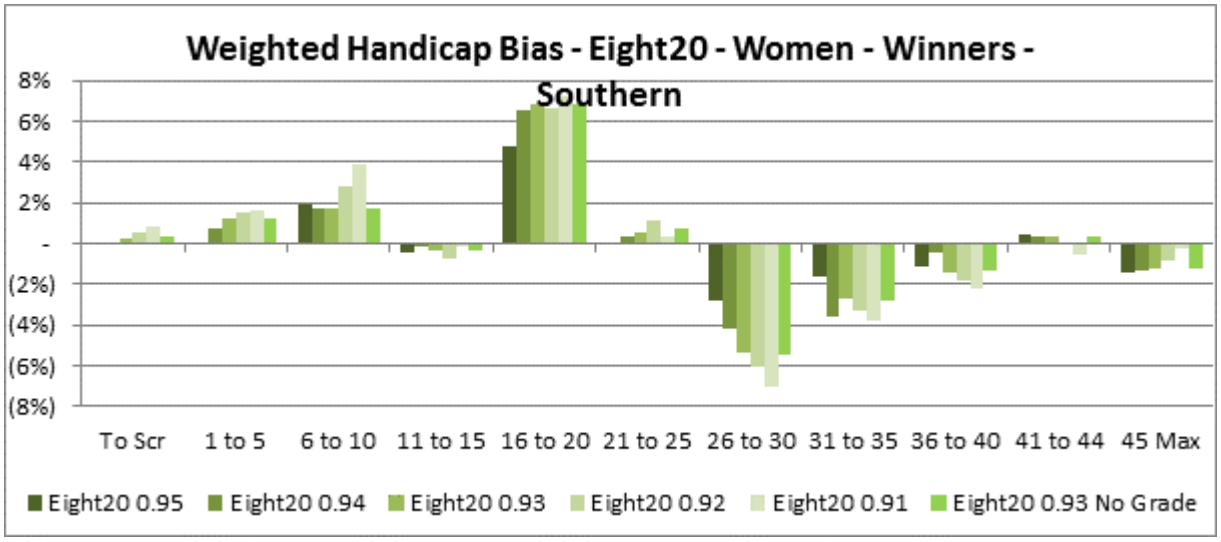

Handicap Bias - Eight20 - Anchor - Men - Winners - Southern
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

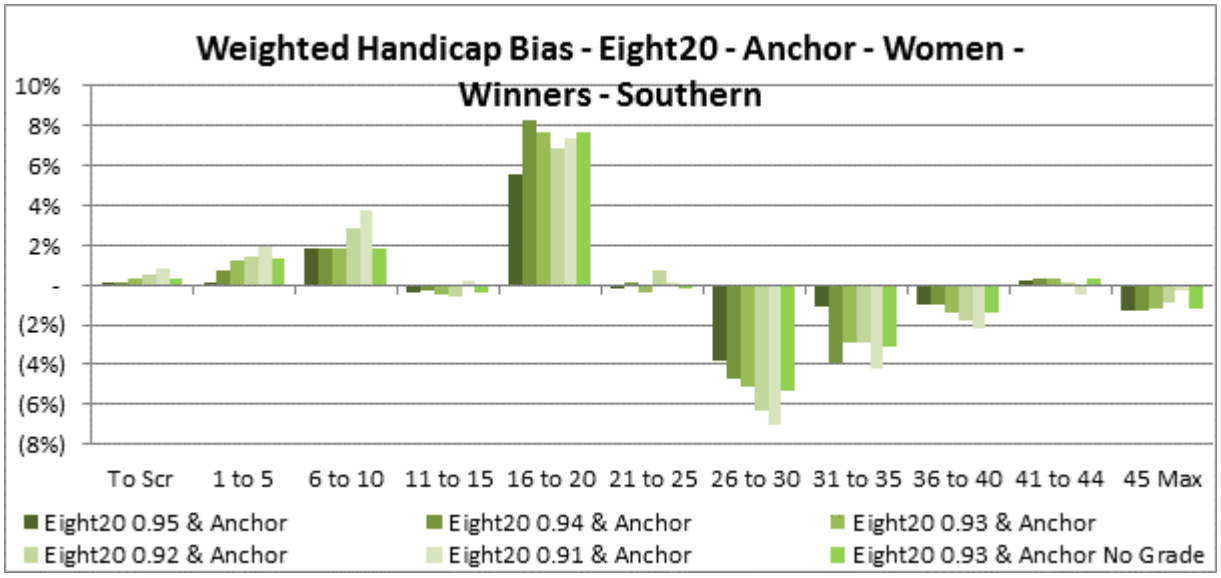

Weighted Handicap Bias - Eight20 - Men - Winners - Southern
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

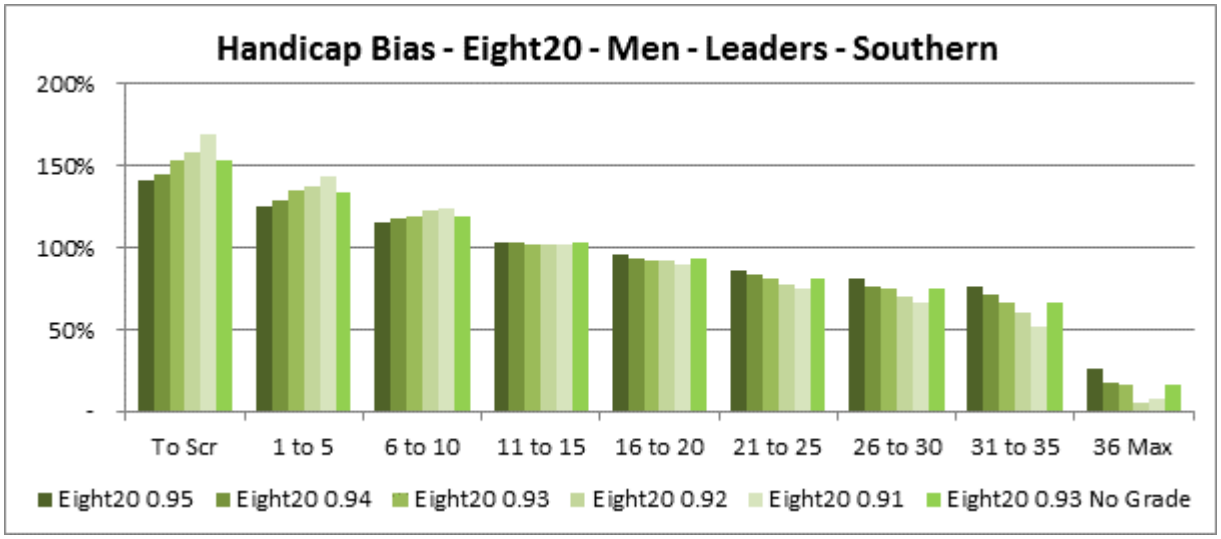

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Southern
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

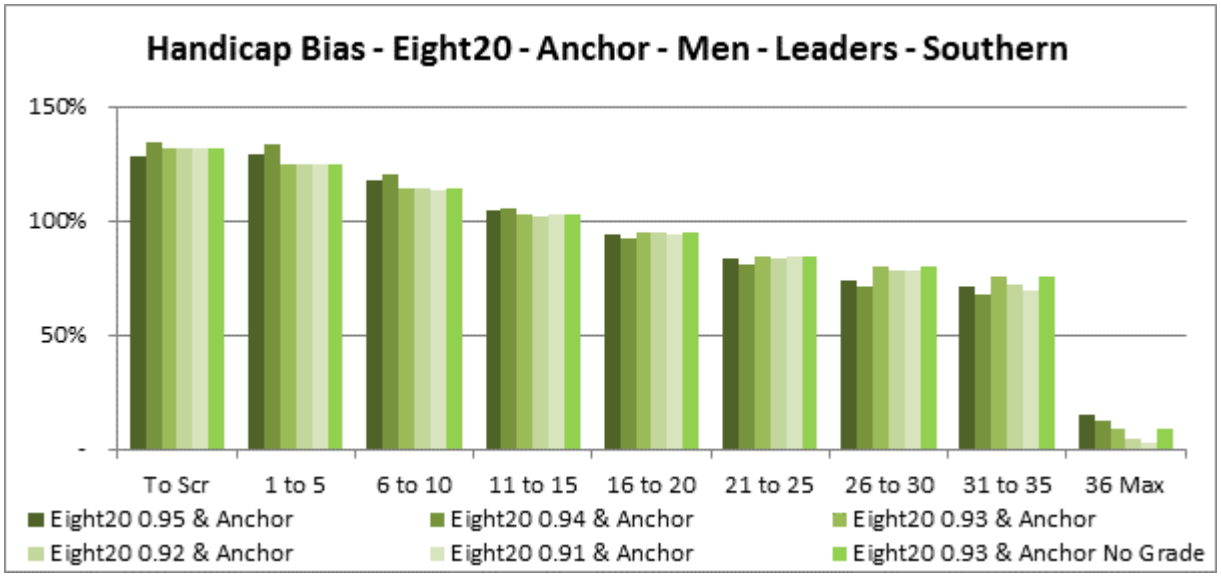

Handicap Bias - Eight20 - Women - Winners - Southern
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

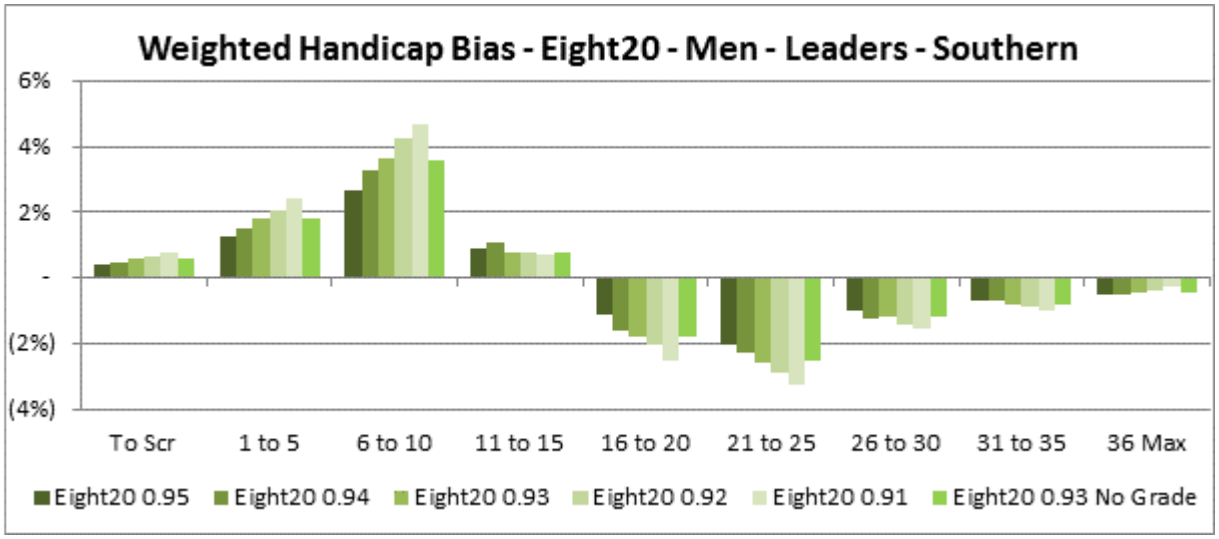

Handicap Bias - Eight20 - Anchor - Women - Winners - Southern
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

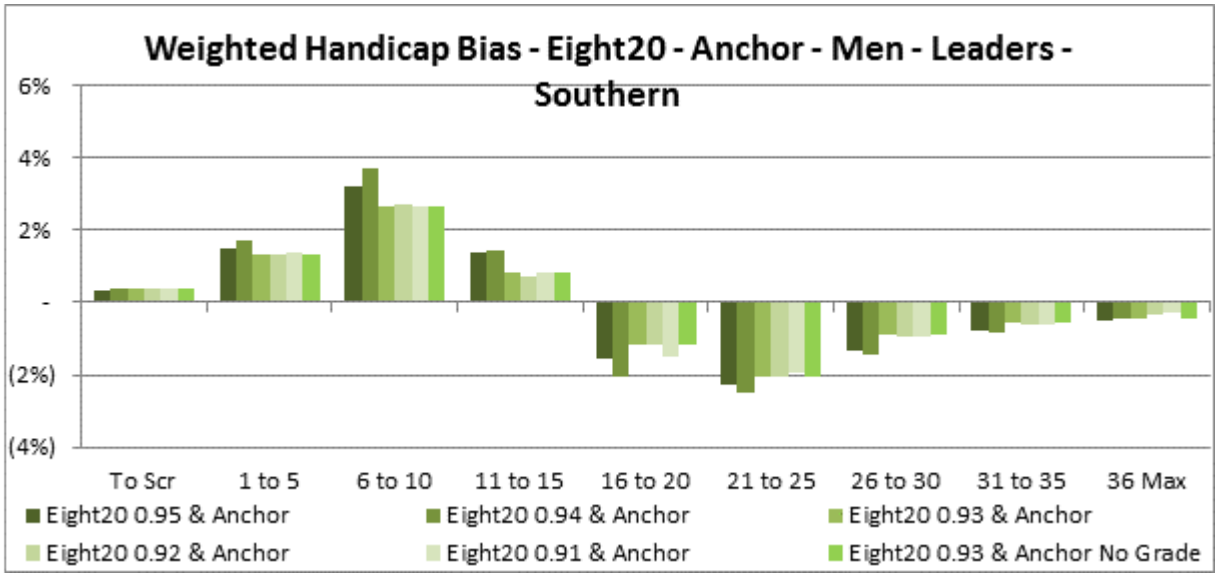

Weighted Handicap Bias - Eight20 - Women - Winners - Southern
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

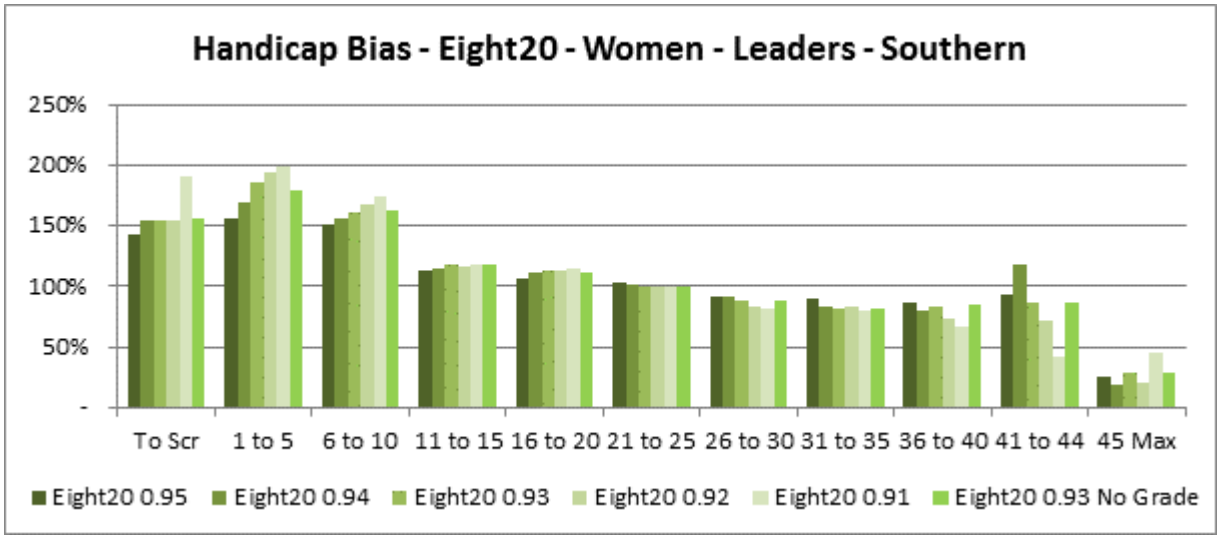

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Southern
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

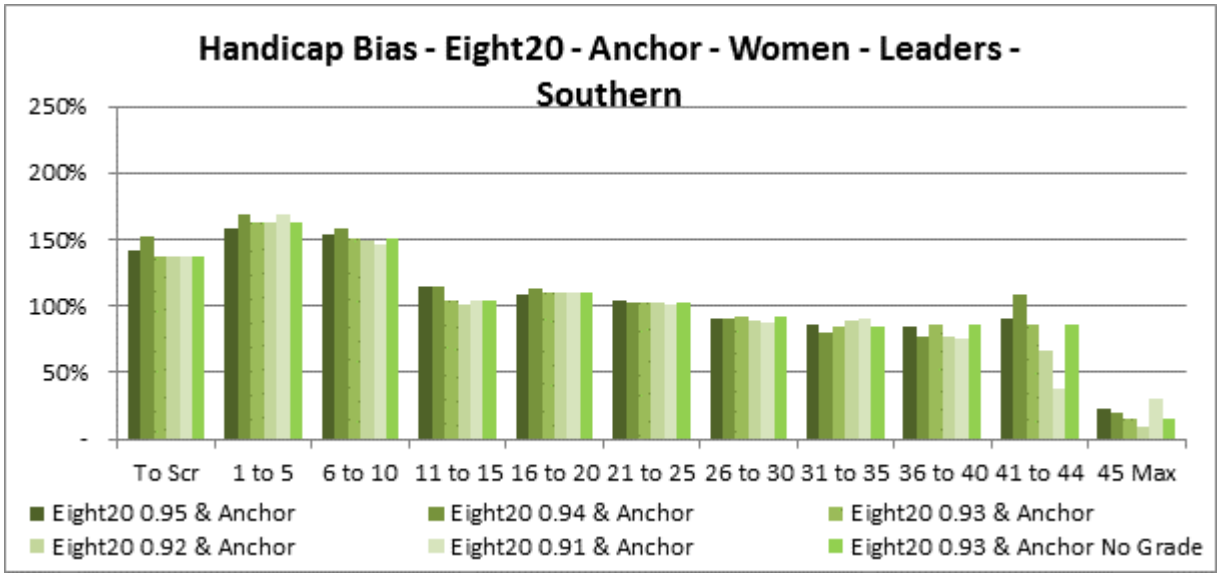

Handicap Bias - Eight20 - Men - Leaders - Southern
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

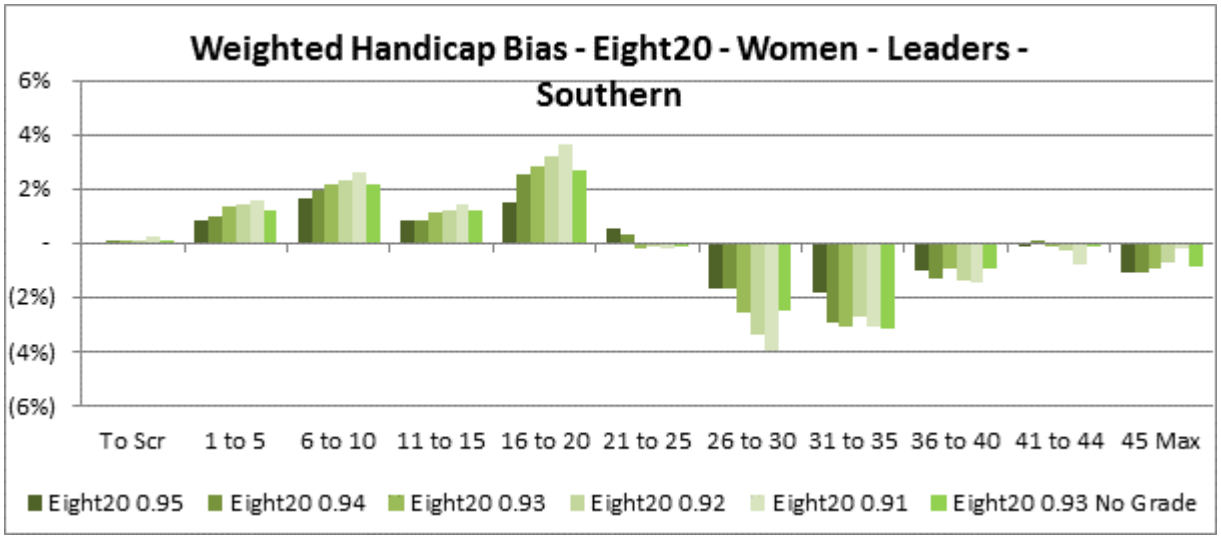

Handicap Bias - Eight20 - Anchor - Men - Leaders - Southern
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

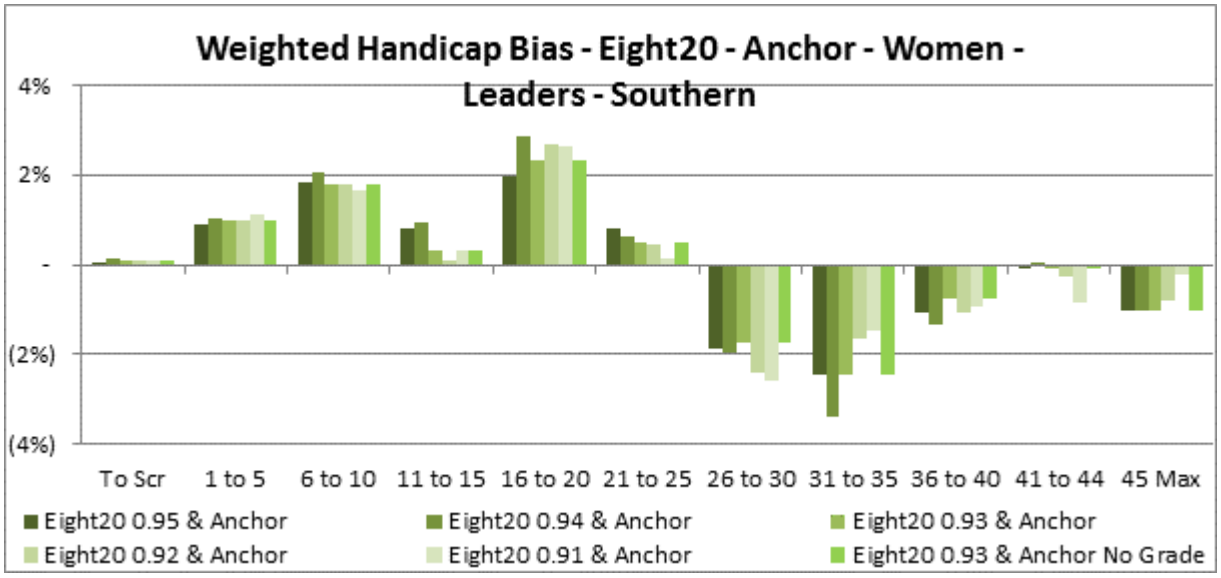

Weighted Handicap Bias - Eight20 - Men - Leaders - Southern
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Southern
6%
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Southern
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Anchor - Women - Leaders - Southern
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Weighted Handicap Bias - Eight20 - Women - Leaders - Southern
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

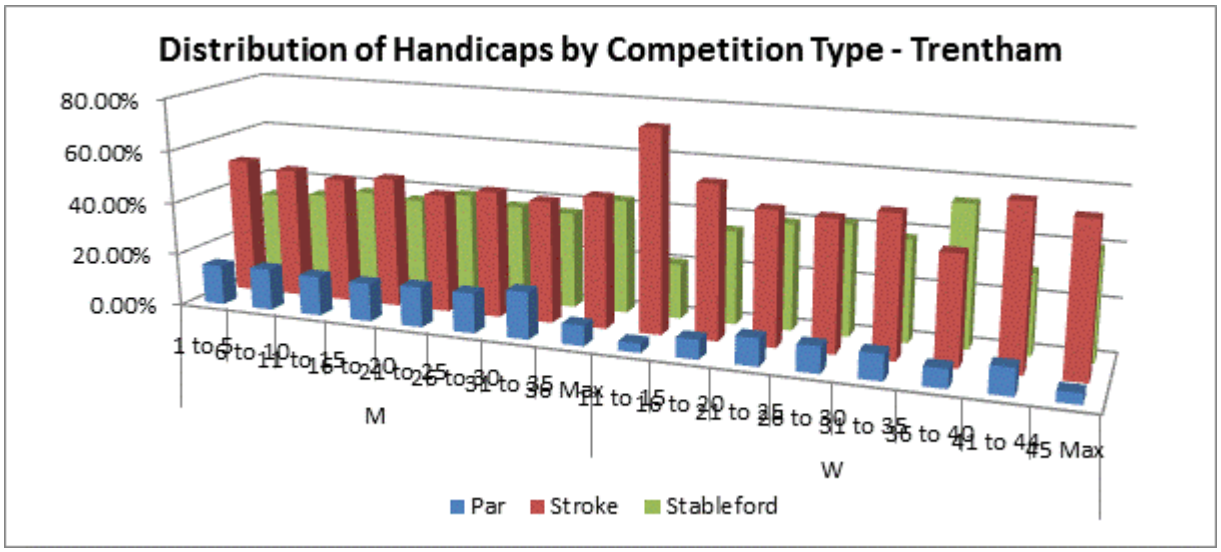


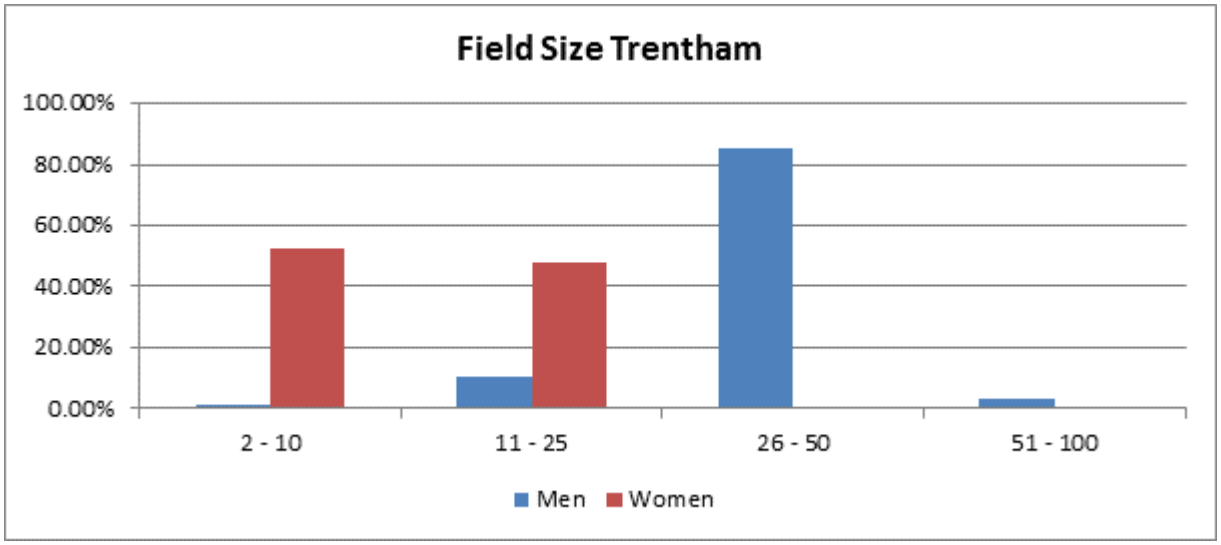
Phase 2 -Southern					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	14.8	17.0	-22.9	20.3
	Eight20 0.94	6.1	15.1	-29.5	27.9
	Eight20 0.93	0.1	13.6	-33.8	30.2
	Eight20 0.92	-5.0	12.9	-40.4	32.8
	Eight20 0.91	-16.8	8.9	-49.3	37.2
	Eight20 0.93 No Grade	-2.9	14.3	-34.4	30.6
	Eight20 0.95 & Anchor	-0.3	13.7	-23.5	23.1
	Eight20 0.94 & Anchor	-4.0	14.3	-33.6	33.6
	Eight20 0.93 & Anchor	-10.2	11.0	-35.2	32.1
	Eight20 0.92 & Anchor	-18.0	9.9	-40.6	33.2
	Eight20 0.91 & Anchor	-30.0	13.1	-51.0	37.9
	Eight20 0.93 & Anchor No Grade	-12.8	12.1	-35.8	32.4
Leaders	Eight20 0.95	-33.0	14.5	-23.5	12.2
	Eight20 0.94	-38.2	17.5	-28.6	16.3
	Eight20 0.93	-41.4	19.2	-30.8	18.3
	Eight20 0.92	-46.4	22.0	-33.2	20.1
	Eight20 0.91	-51.5	24.9	-36.5	22.8
	Eight20 0.93 No Grade	-41.1	19.0	-30.3	18.0
	Eight20 0.95 & Anchor	-38.1	17.6	-25.9	14.5
	Eight20 0.94 & Anchor	-42.4	20.2	-30.4	18.2
	Eight20 0.93 & Anchor	-31.5	14.4	-24.6	14.4
	Eight20 0.92 & Anchor	-31.4	14.5	-24.1	14.8
	Eight20 0.91 & Anchor	-31.3	14.7	-23.6	14.7

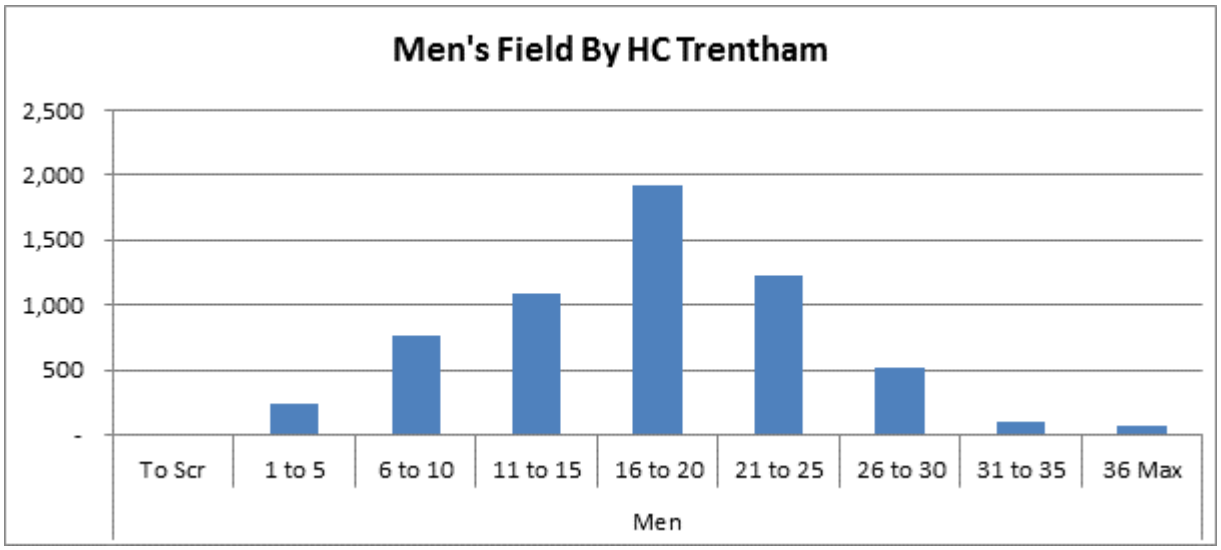
	Eight20 0.93 & Anchor No Grade	-31.5	14.4	-24.6	14.4

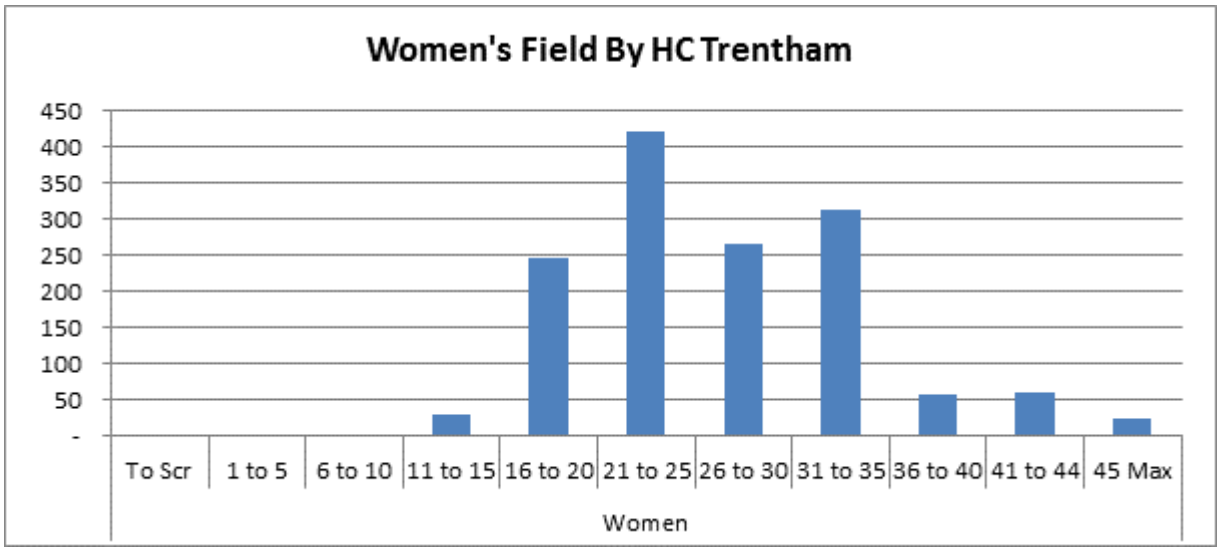
Appendix 24 – Trentham – Phase 2

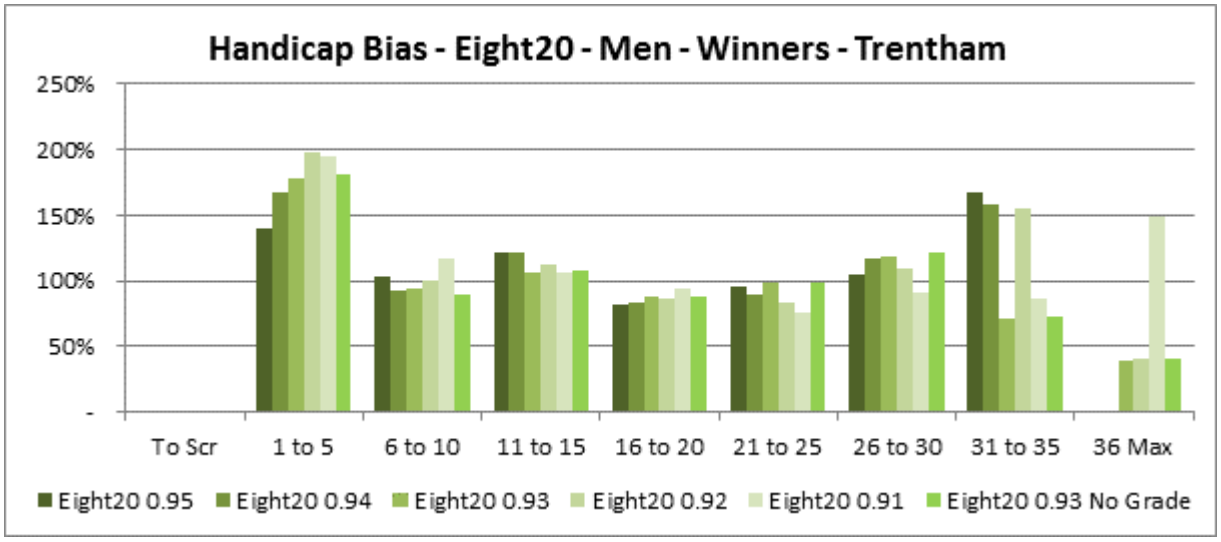
Trentham	Men	Women	Total
Players in Database	741	337	1,078
Members	208	52	260
Visitors	533	285	818
Members who have Played 21 Rounds	188	44	232
Members with Last Round In Old System	52	18	70
Members with Last Round in Current System	156	34	190
Earliest Round	27/12/2007	6/12/2007	
Latest Round	29/11/2010	25/11/2010	
Number of Visiting Clubs			137
Number of Home Competitions	276	290	566
Number of Rounds of Golf	10,552	2,516	13,068
Number of Rounds at Home	7,174	2,516	9,690
Number of Rounds at Home Old	5,626	1,887	7,513
Number of Rounds at Home Current	1,548	629	2,177
Num Rnds Members at Home	6,323	2,163	8,486
Num Rnds Members at Home Old	4,912	1,631	6,543
Num Rnds Members at Home Cur	1,411	532	1,943
Num Rnds After Eliminations	7,480	1,817	9,297
Num Rnds After Eliminations Old	5,221	1,188	6,409
Num Rnds After Eliminations Cur	2,259	629	2,888

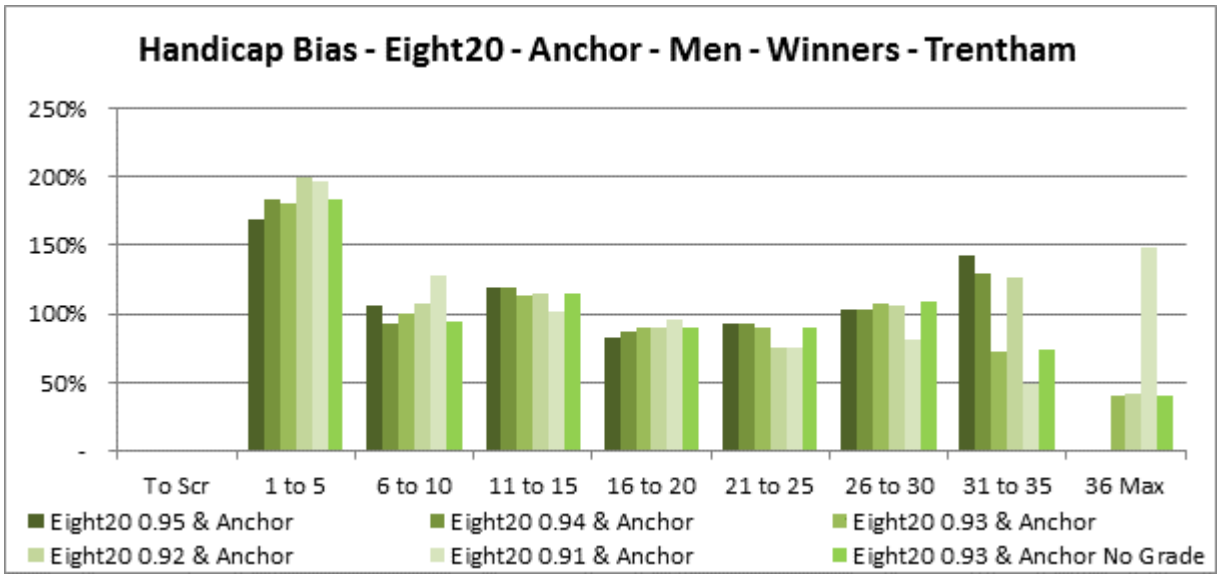


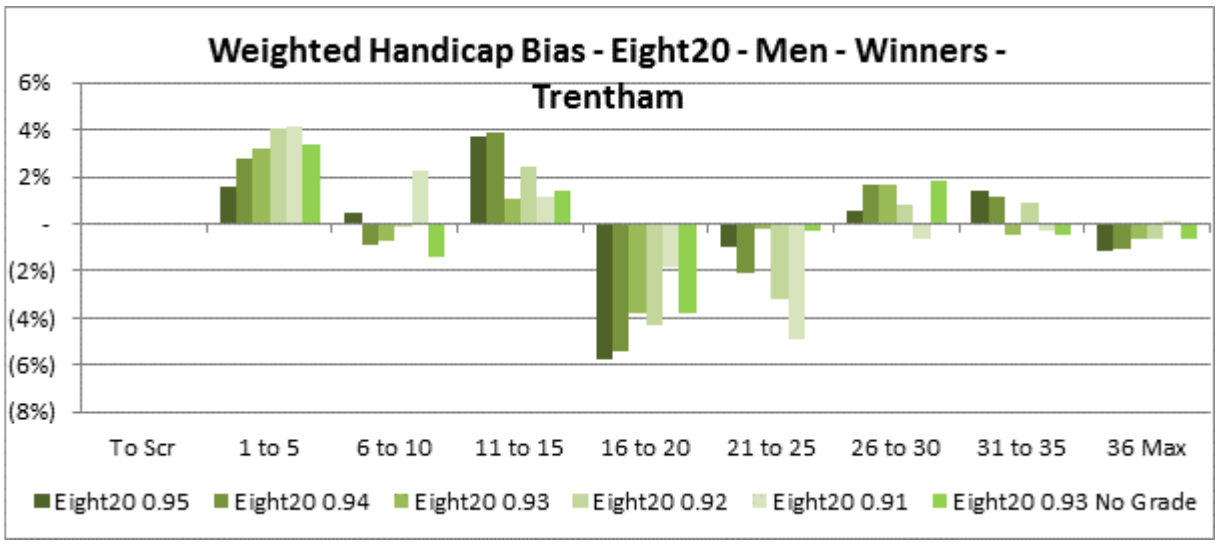

Field Size Trentham
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
2 - 10
11 - 25
26 - 50
51 - 100
Men
Women

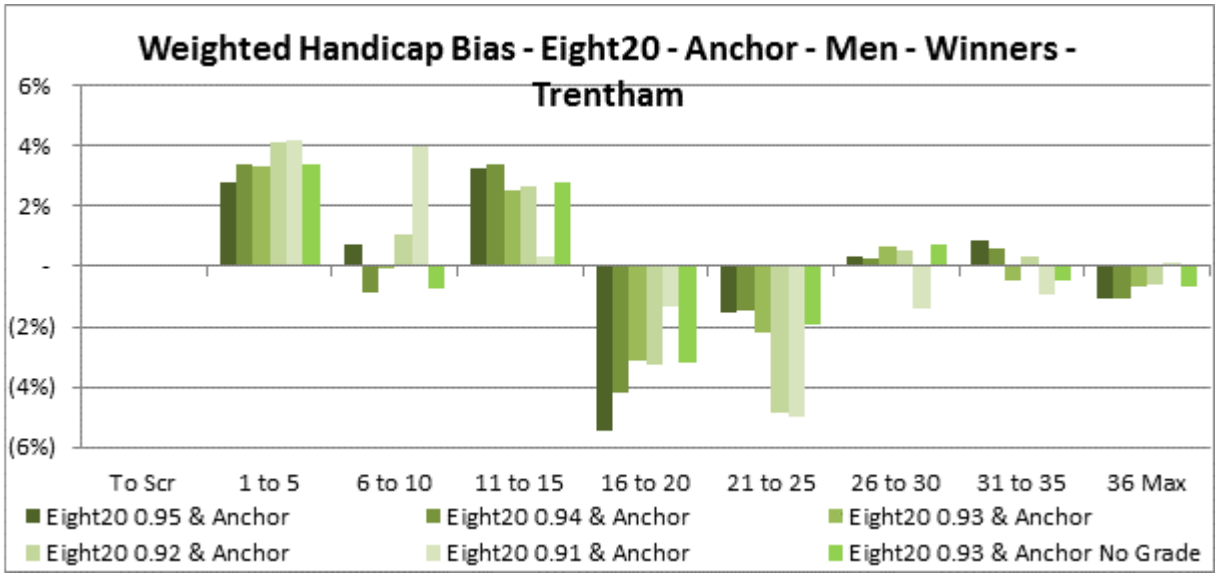

Men's Field By HC Trentham
2,500
2,000
1,500
1,000
500
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Men

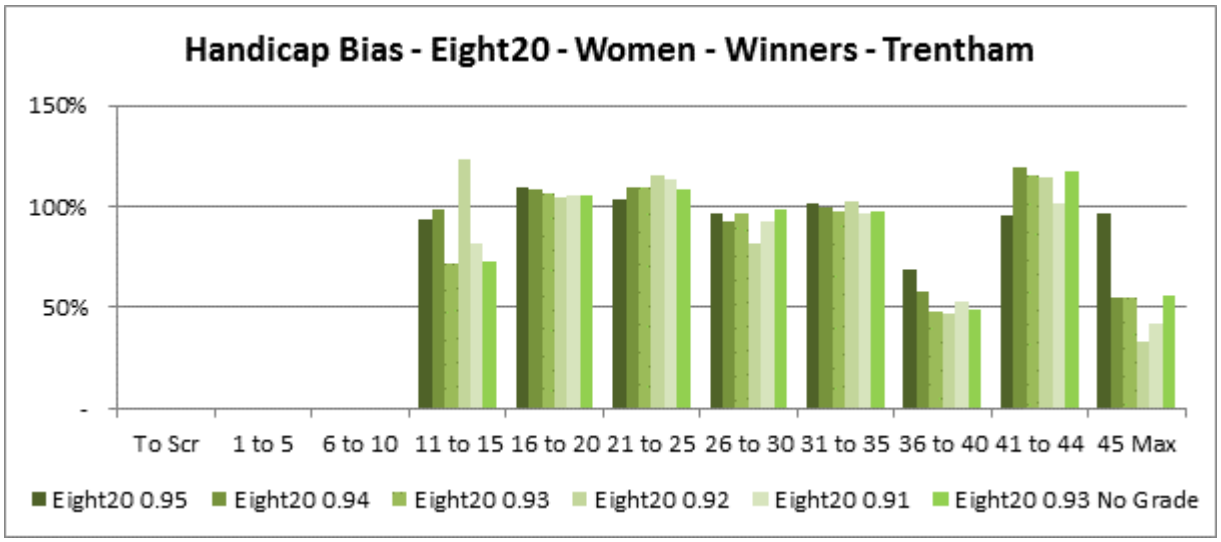

Women's Field By HC Trentham
450
400
350
300
250
200
150
100
50
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Women

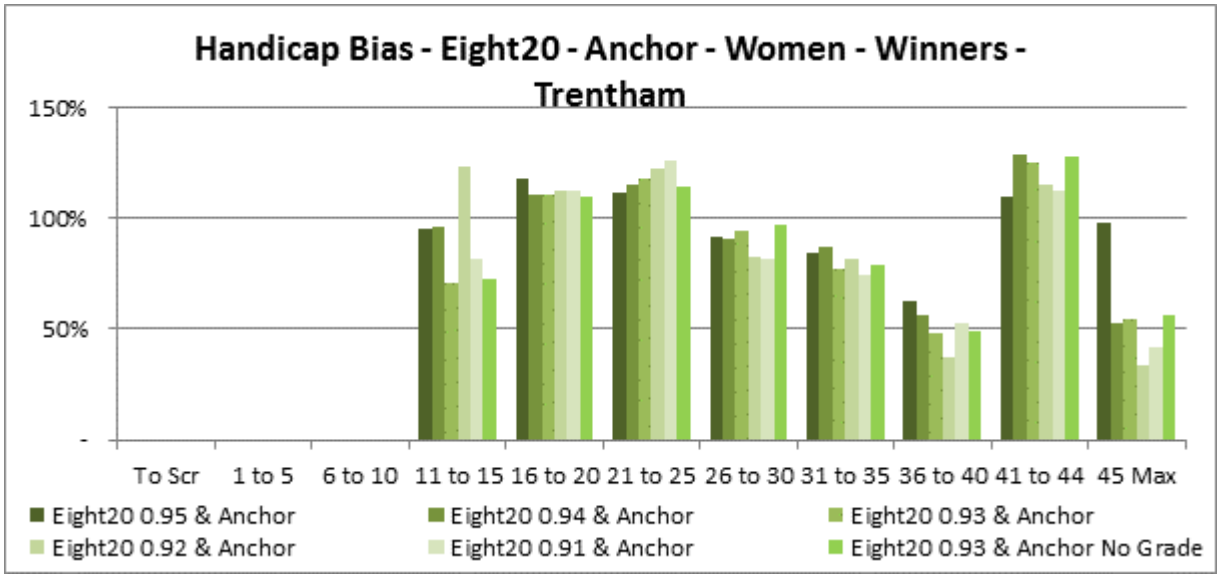

Handicap Bias - Eight20 - Men - Winners - Trentham
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

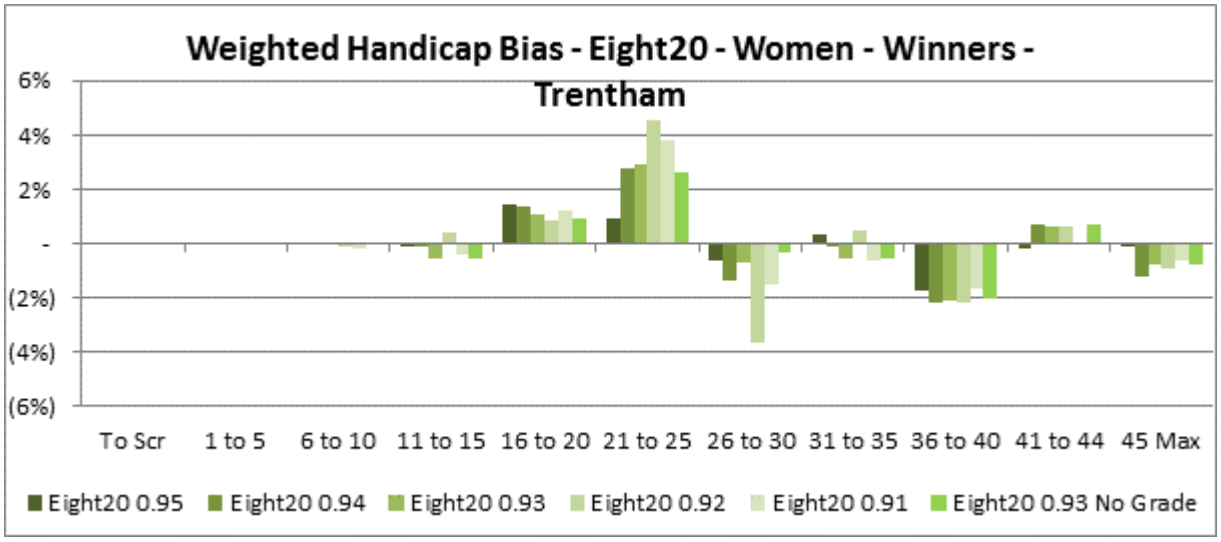

Handicap Bias - Eight20 - Anchor - Men - Winners - Trentham
250%
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

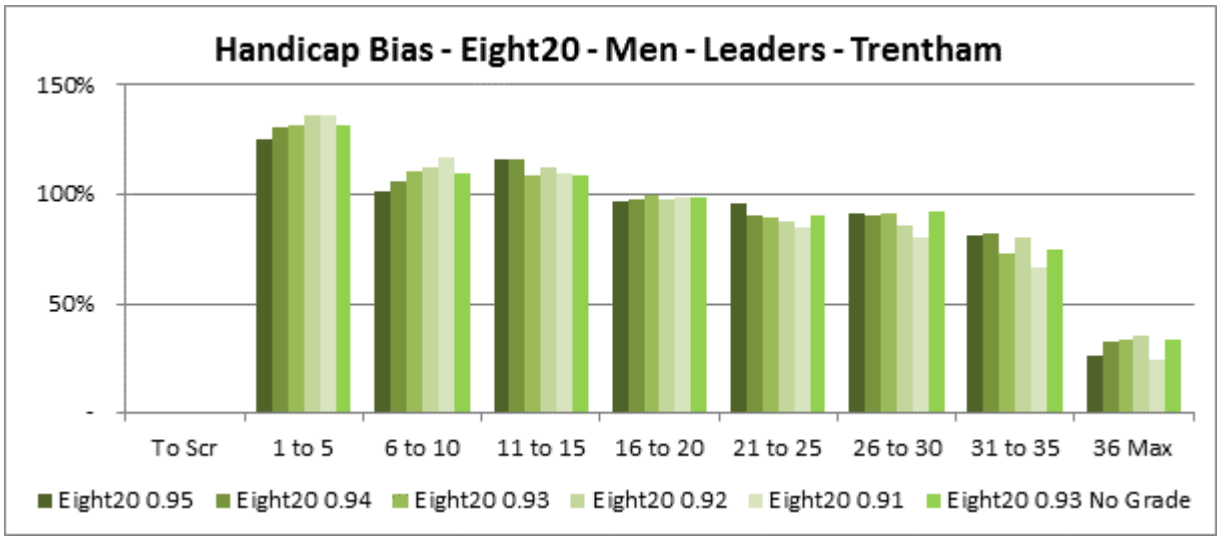

Weighted Handicap Bias - Eight20 - Men - Winners - Trentham
6%
4%
2%
-
(2%)
(4%)
(6%)
(8%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

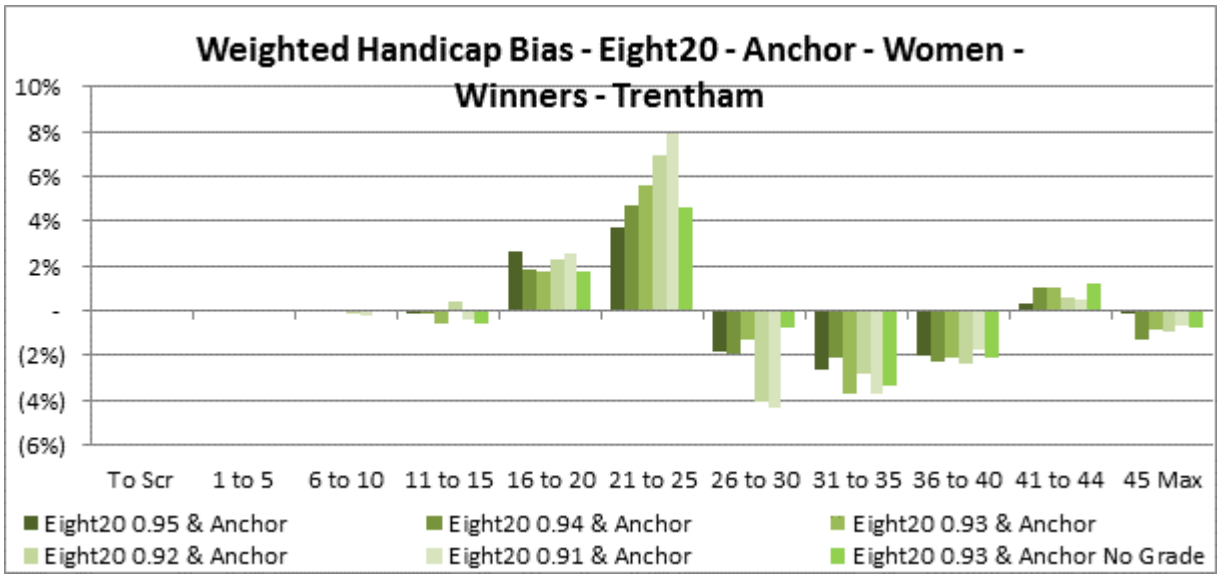

Weighted Handicap Bias - Eight20 - Anchor - Men - Winners - Trentham
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

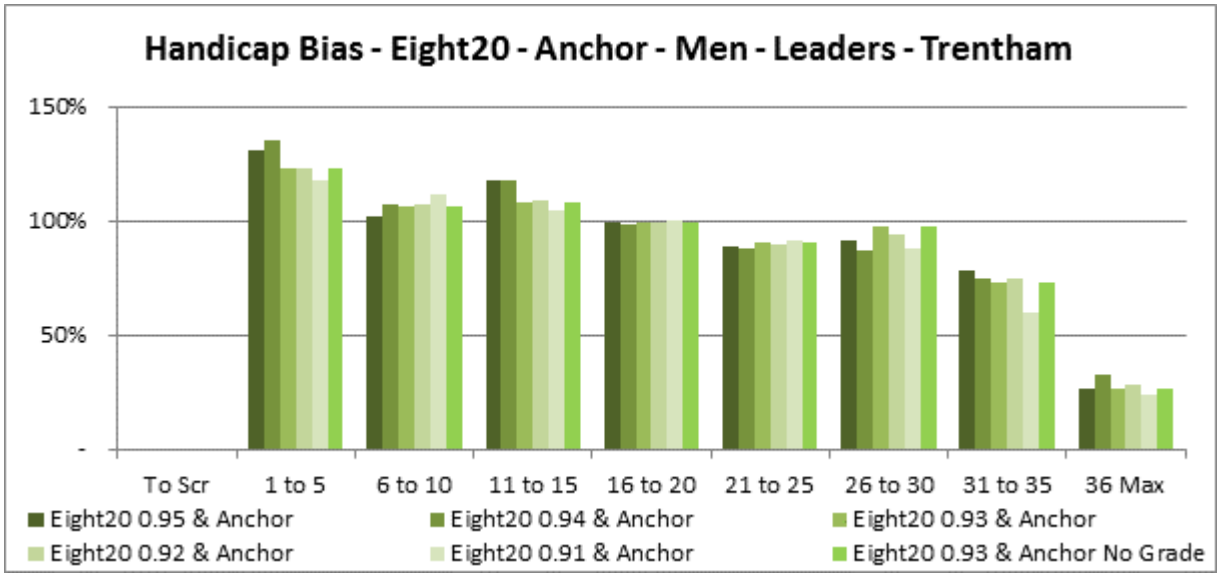

Handicap Bias - Eight20 - Women - Winners - Trentham
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

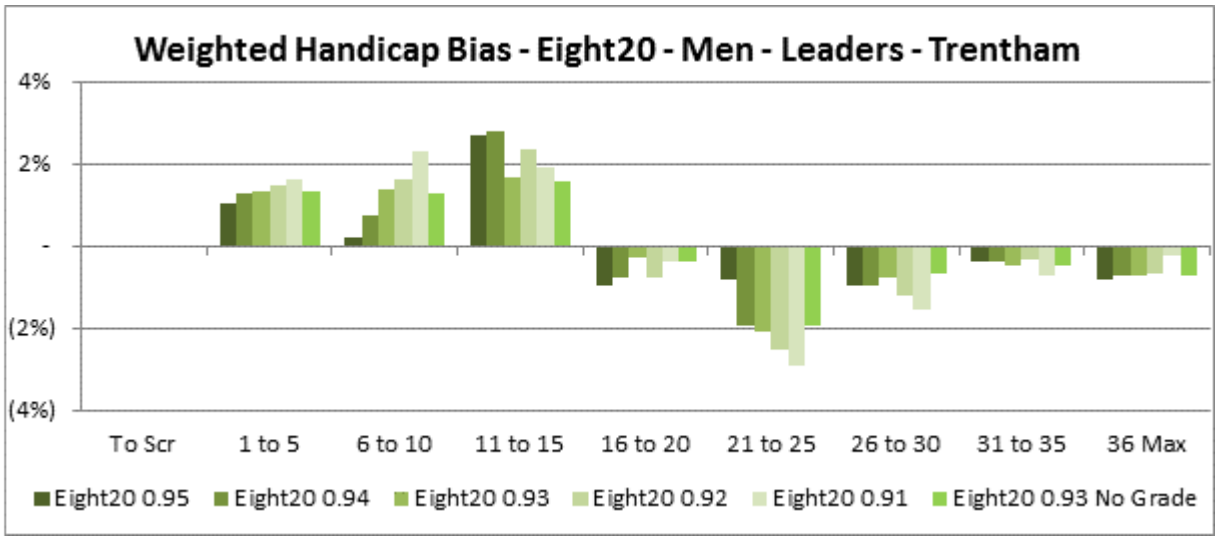

Handicap Bias - Eight20 - Anchor - Women - Winners - Trentham
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

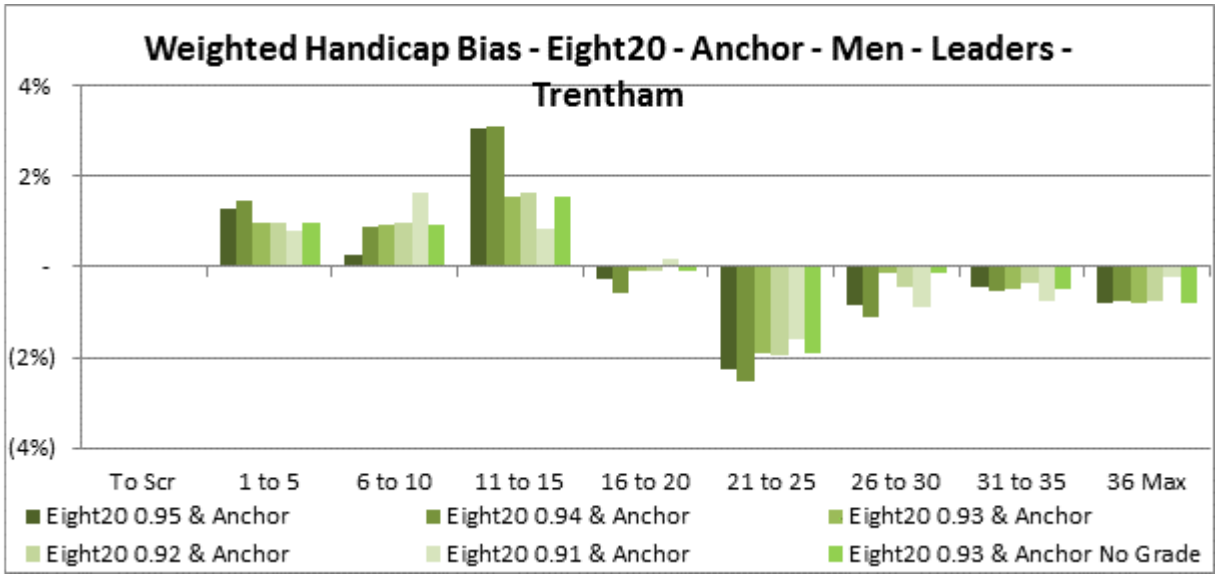

Weighted Handicap Bias - Eight20 - Women - Winners - Trentham
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

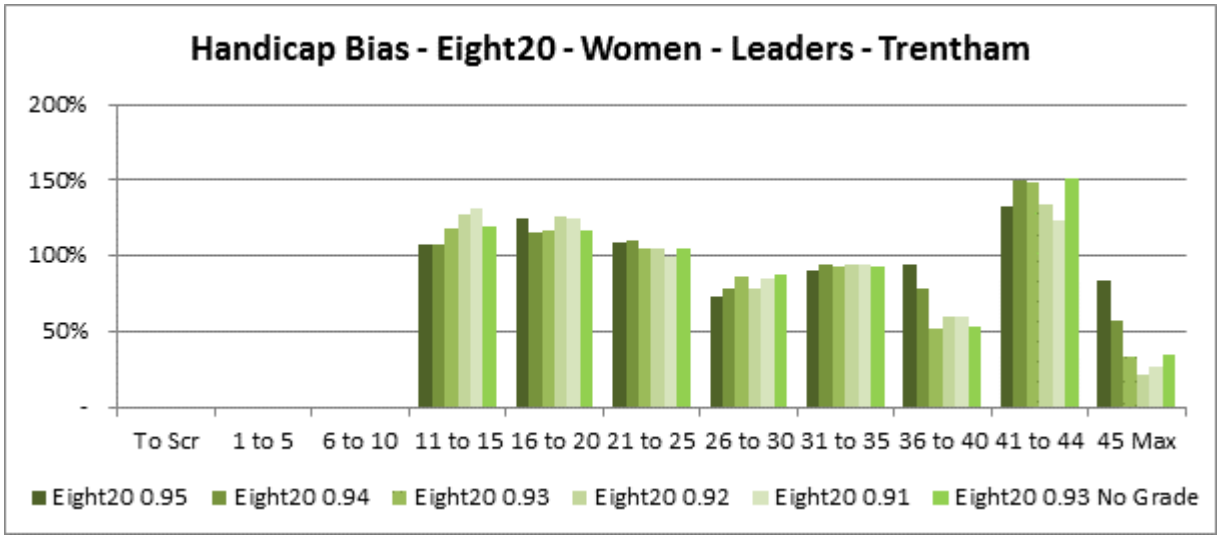

Handicap Bias - Eight20 - Men - Leaders - Trentham
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

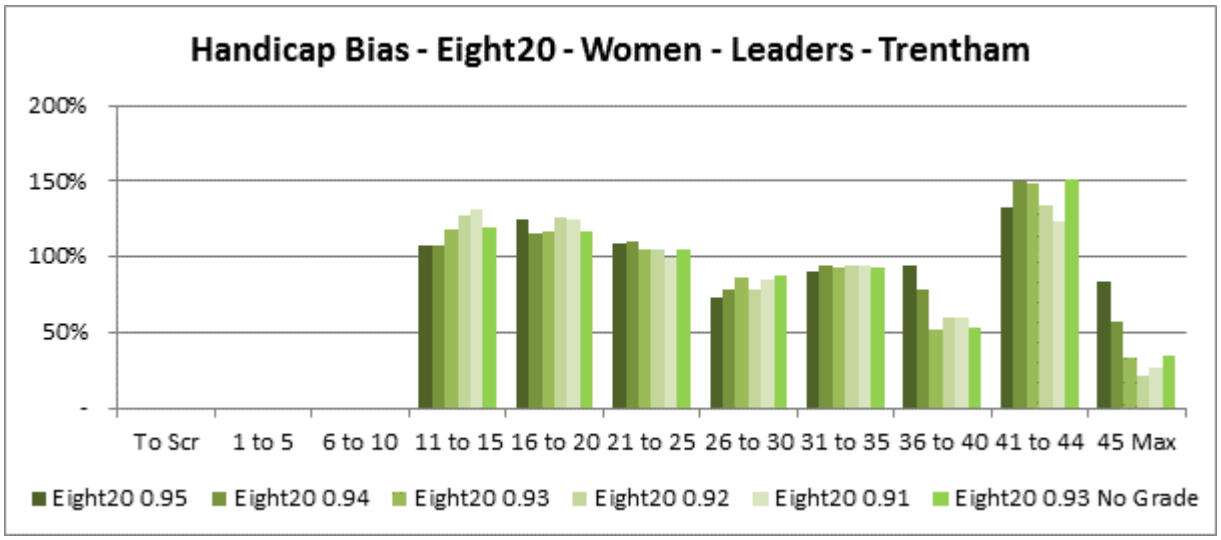

Weighted Handicap Bias - Eight20 - Anchor - Women - Winners - Trentham
10%
8%
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

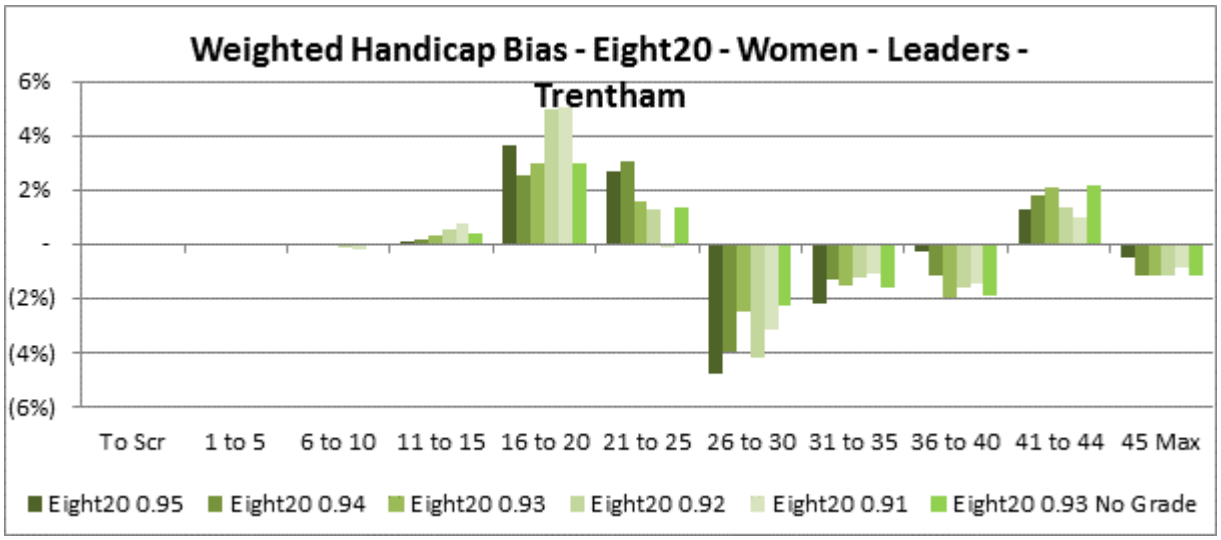

Handicap Bias - Eight20 - Anchor - Men - Leaders - Trentham
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade

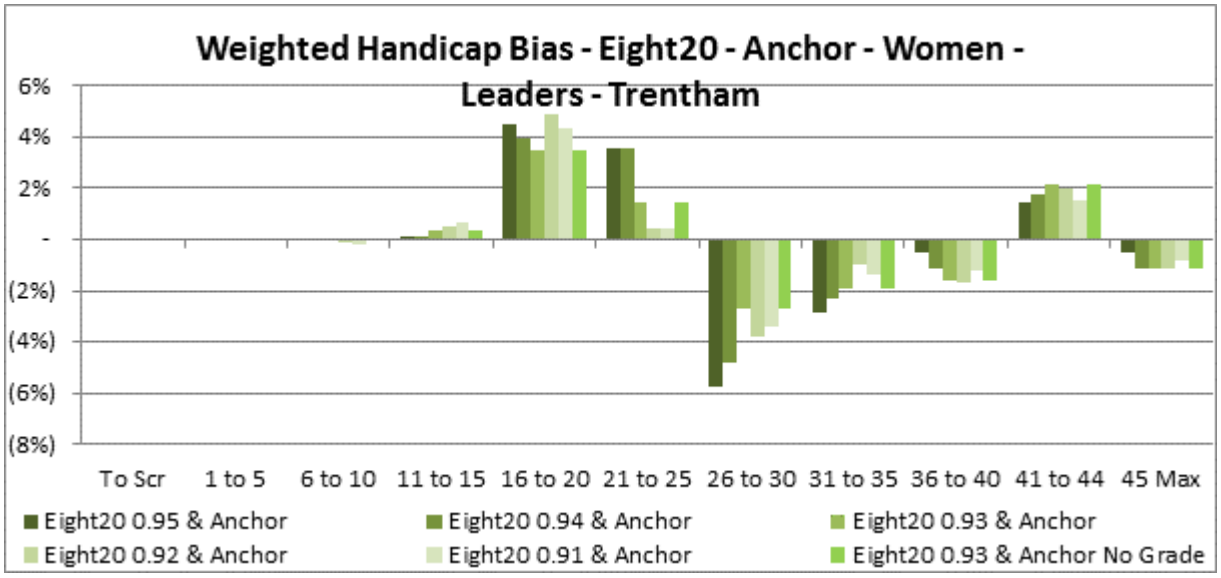

Weighted Handicap Bias - Eight20 - Men - Leaders - Trentham
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Weighted Handicap Bias - Eight20 - Anchor - Men - Leaders - Trentham
4%
2%
-
(2%)
(4%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 Max
Eight20 0.95 & Anchor
Eight20 0.94 & Anchor
Eight20 0.93 & Anchor
Eight20 0.92 & Anchor
Eight20 0.91 & Anchor
Eight20 0.93 & Anchor No Grade


Handicap Bias - Eight20 - Women - Leaders - Trentham
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade


Handicap Bias - Eight20 - Women - Leaders - Trentham
200%
150%
100%
50%
-
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade

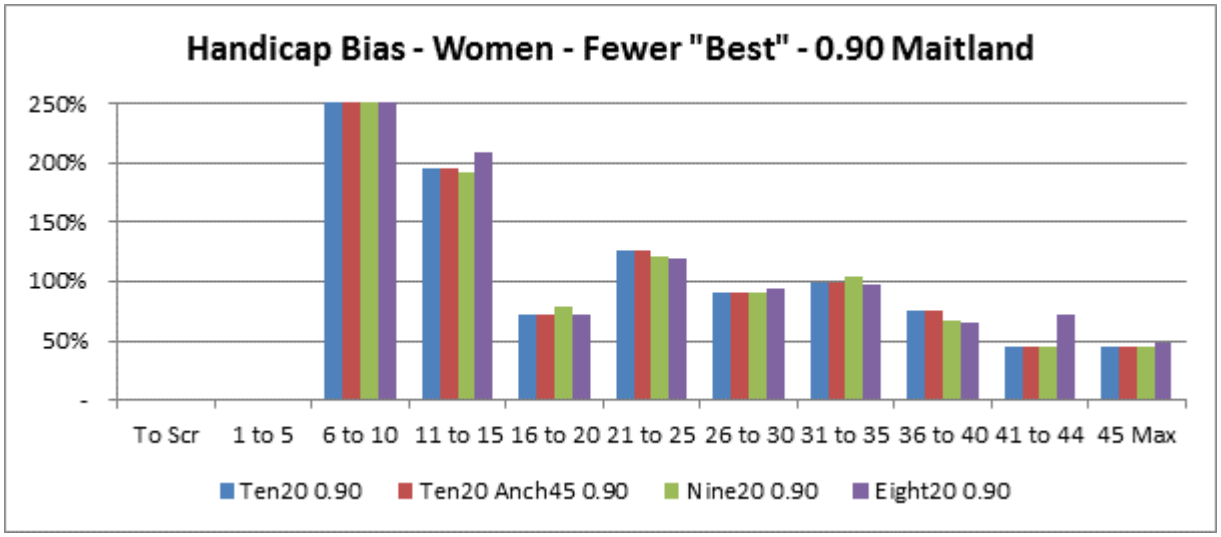

Weighted Handicap Bias - Eight20 - Women - Leaders - Trentham
6%
4%
2%
-
(2%)
(4%)
(6%)
To Scr
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
45 Max
Eight20 0.95
Eight20 0.94
Eight20 0.93
Eight20 0.92
Eight20 0.91
Eight20 0.93 No Grade



Phase 2 -Trentham					
		Men		Women	
	Method	Tilt M	Level M	Tilt MW	Level W
Winners	Eight20 0.95	-16.1	26.0	-6.8	8.0
	Eight20 0.94	-16.6	27.9	-11.5	13.5
	Eight20 0.93	-17.2	19.4	-8.4	12.7
	Eight20 0.92	-26.4	25.8	-11.6	20.4
	Eight20 0.91	-41.0	25.5	-9.6	14.9
	Eight20 0.93 No Grade	-15.6	20.4	-7.6	11.7
	Eight20 0.95 & Anchor	-26.4	25.8	-13.2	18.8
	Eight20 0.94 & Anchor	-25.5	23.7	-15.1	20.4
	Eight20 0.93 & Anchor	-29.0	20.3	-13.9	23.8
	Eight20 0.92 & Anchor	-37.3	27.4	-19.9	29.1
	Eight20 0.91 & Anchor	-51.7	28.2	-17.3	32.5
	Eight20 0.93 & Anchor No Grade	-26.6	20.9	-12.2	20.6
Leaders	Eight20 0.95	-22.4	12.1	-10.2	22.3
	Eight20 0.94	-26.5	14.1	-10.3	19.7
	Eight20 0.93	-27.2	12.3	-11.3	17.2
	Eight20 0.92	-31.0	15.5	-15.4	22.5
	Eight20 0.91	-34.1	17.1	-14.3	20.3
	Eight20 0.93 No Grade	-26.1	11.7	-10.9	16.7
	Eight20 0.95 & Anchor	-26.7	14.9	-13.1	27.6
	Eight20 0.94 & Anchor	-30.8	16.3	-14.3	24.9
	Eight20 0.93 & Anchor	-21.8	10.4	-11.7	18.4
	Eight20 0.92 & Anchor	-22.3	10.8	-12.8	21.8
	Eight20 0.91 & Anchor	-21.7	10.0	-11.8	19.4
	Eight20 0.93 & Anchor No Grade	-21.8	10.4	-11.7	18.4

Appendix 25 – Understanding the Paradoxes

Consider the following example:



How can the 41 to 44 group have a greater Handicap Bias at Eight20 than at Nine20? After all, the Handicaps must be no greater than they were, and thus the stableford equivalent scores no better, yet they appear to perform better?

The actual handicaps and scores for Player A and Player B in the one competition that mattered were as follows:

	Handicap			Stableford Equivalent Score			Rank		
	Ten20	Nine20	Eight20	Ten20	Nine20	Eight20	Ten20	Nine20	Eight20
Player A	38	38	38	36	36	36	2	2	1
Player B	45	45	44	37	37	36	1	1	1

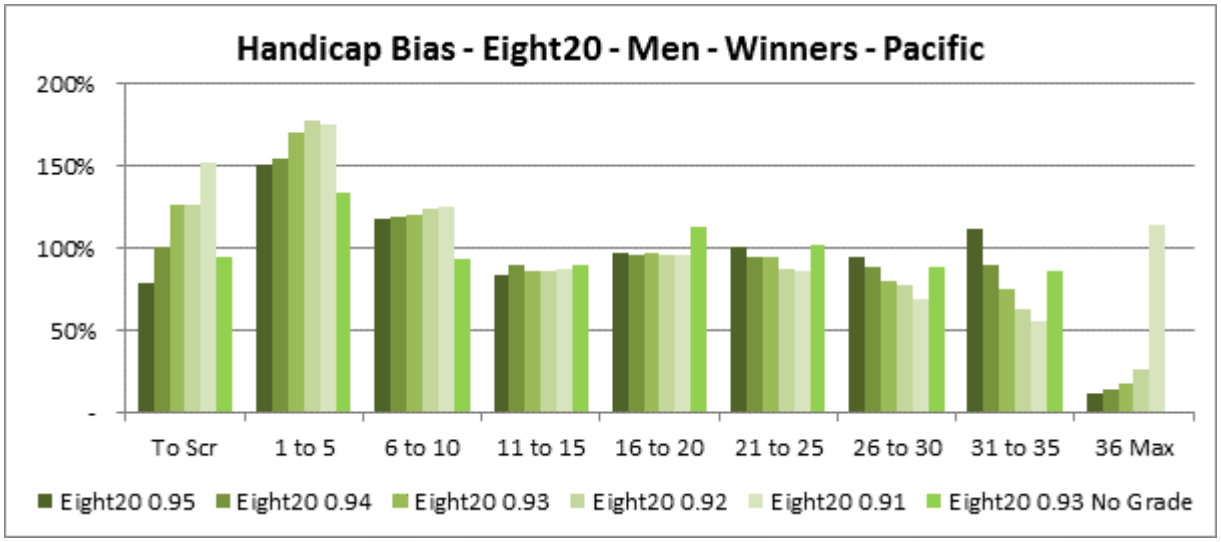
Although we are considering the 41 to 45 group, Player A was playing off a simulated 38, due to the 0.90 BFE. Player B was a max 45 handicapper, in both the Ten20 and Nine20, but dropped to 44 for the Eight20. You can see how it was this movement in an unrelated handicap range that allowed the Player A in the 41-45 range to add one to the number of wins.

There were only two winners in this category to start with, so increasing to three sent the Bias from 44% to 72%.

Why does the bias not increase by exactly 50% from 44% to 66%? Because there is a slight difference in the number of winners at Eight20 (181) compared to Nine20 (197), and this impacts the percentages. 2/197 compared to 3/181 is exactly the same ratio as 44% to 72%.

As always, when dealing with the considerably smaller numbers at the extremes of the handicap ranges, not too much weight should be placed on the results which tend to be “lumpy”.

Here's another example, this time from Phase 2.

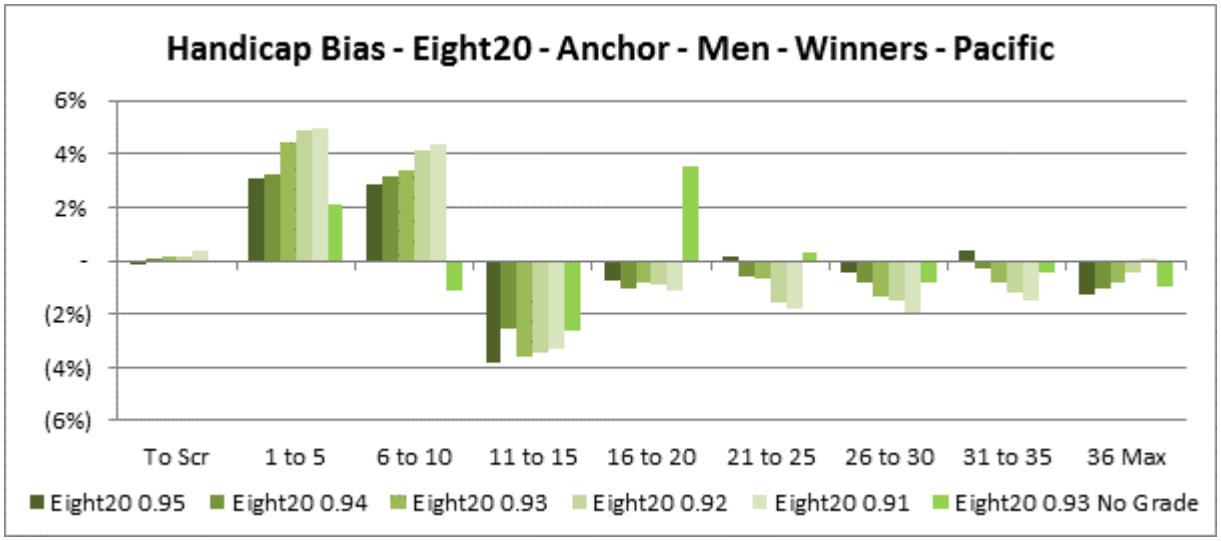


How can the 36 Max bars rise as the BFE rises?

Well the big rise from 0.92 to 0.91 was because the number of Max 36 Winners rose from one to two, as other grades had their scores reduced a tad.

But the rises from 0.95 through 0.94, 0.93 to 0.92 were because, although there was only one winner in the 36 Max group, the number of competitors in the Max 36 group reduced as the BFE rose and a number dropped off the Max 36 figure.

Of course when the ranges are weighted, the differences are seen to be insignificant:



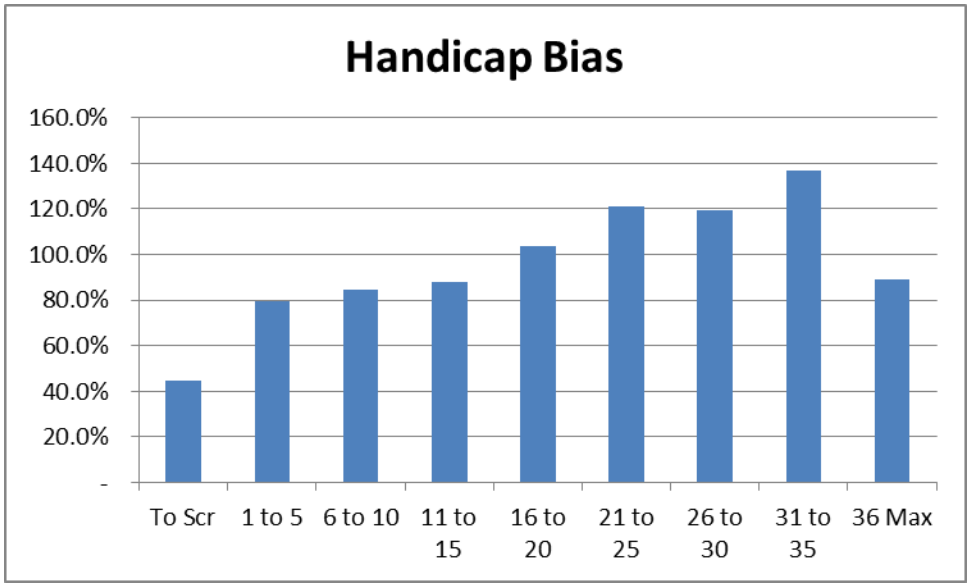
Appendix 26 – Further Explanation of Tilt and Level

The handicap Bias, Weighted Handicap Bias, Tilt Index and Level Index are defined briefly in the Methodology section. What follows is a worked example of the calculation of each of these.

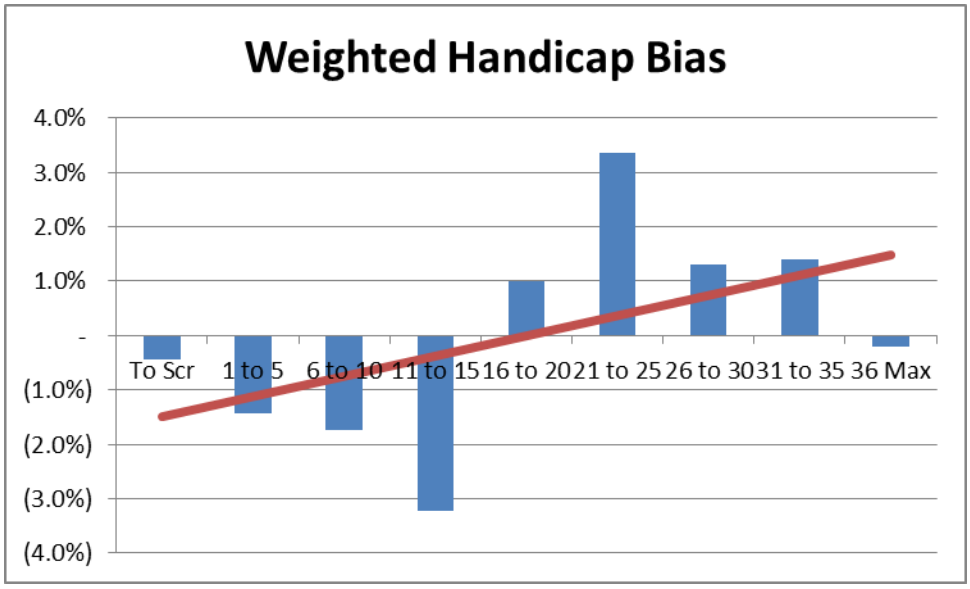
Consider a set of data such as this:

Derivation of Handicap Bias and Weighted Handicap Bias								
Group Number	Handicap Group	Rounds	Rounds % of Total	Winners	Winners % of Total	Handicap Bias	Weighted Handicap Bias	Winners % - Rounds %
A	B	C	D	E	F	G	H	I
1	To Scr	182	0.8%	4	0.4%	44.4%	(0.5%)	(0.5%)
2	1 to 5	1,577	7.0%	62	5.6%	79.5%	(1.4%)	(1.4%)
3	6 to 10	2,533	11.3%	106	9.5%	84.6%	(1.7%)	(1.7%)
4	11 to 15	5,923	26.4%	257	23.2%	87.7%	(3.2%)	(3.2%)
5	16 to 20	5,883	26.2%	302	27.2%	103.8%	1.0%	1.0%
6	21 to 25	3,573	15.9%	214	19.3%	121.1%	3.4%	3.4%
7	26 to 30	1,508	6.7%	89	8.0%	119.3%	1.3%	1.3%
8	31 to 35	858	3.8%	58	5.2%	136.7%	1.4%	1.4%
9	36 Max	408	1.8%	18	1.6%	89.2%	(0.2%)	(0.2%)
	Total	22,445	100.0%	1,110	100.0%		0.0%	0.0%
Handicap Bias G is F / D				Weighted Handicap Bias H is (G-100%)*D				
Winners % - Rounds % I gives the same result as Weighted Handicap Bias H								

From this the Handicap Bias can be plotted:

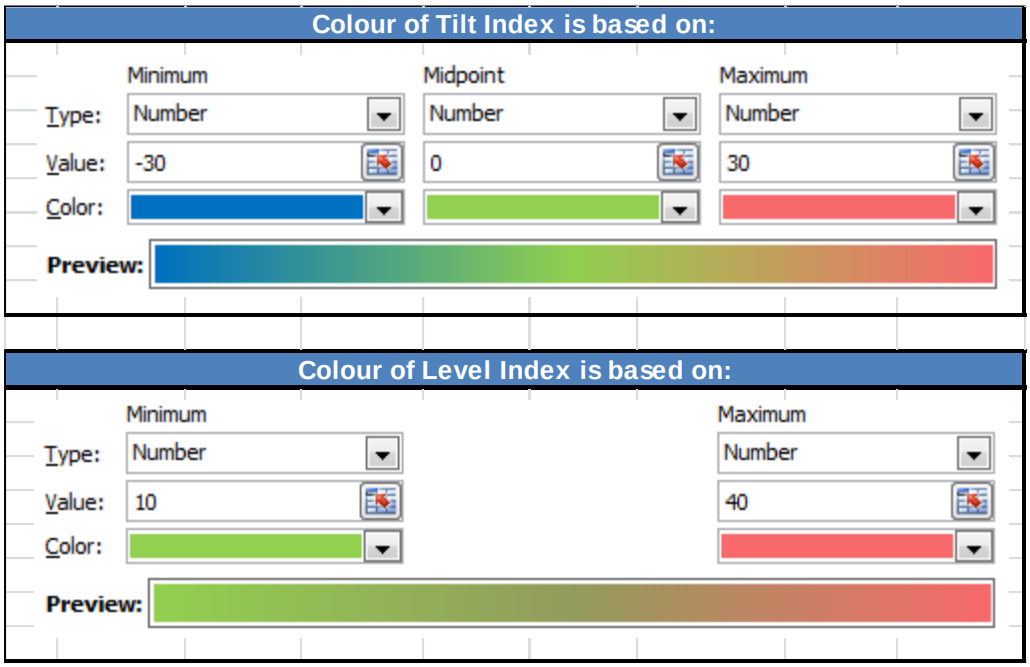


As can the Weighted Handicap Bias:



The red line is line of best fit. The Tilt Index is derived from its gradient.

Gradient of line of best fit	0.0037	**Tilt Index**	**37.0**
Standard deviation of Weighted Bias	0.01992	**Level Index**	**19.9**



Appendix 27 – Why does New South Wales have a different pattern of competition?

Club	Eight20 0.95 Anch	Eight20 0.94 Anch	Eight20 0.93 Anch	Eight20 0.92 Anch	Eight20 0.91 Anch	Eight20 0.93 No Grade Anch
	Winners + Anchor					
Belmont	8	1	-9	-18	-30	-9
Brisbane	-7	-16	-20	-29	-37	-40
Carnarvon	-5	-12	-16	-31	-42	-16
Cumberland	28	17	3	-8	-16	4
Kooyonga	-15	-19	-29	-38	-48	-30
Lake Karrinyup	4	-7	-10	-17	-20	-11
Lakelands	18	9	3	-11	-15	5
Maitland	20	10	0	-5	-14	-1
Narrabri	27	9	-2	-6	-7	-2
New South Wales	99	89	86	80	68	-8
Pacific	-37	-47	-50	-56	-61	-22
Royal Canberra	-2	-10	-16	-27	-35	7
Tea Tree Gully	28	22	9	7	11	9
The Lakes	-31	-41	-48	-53	-53	-16
Victoria	-37	-39	-45	-49	-53	-78

One answer may be found in the “No Grade” column. Here it is seen to have a Tilt very much in line with the other clubs.

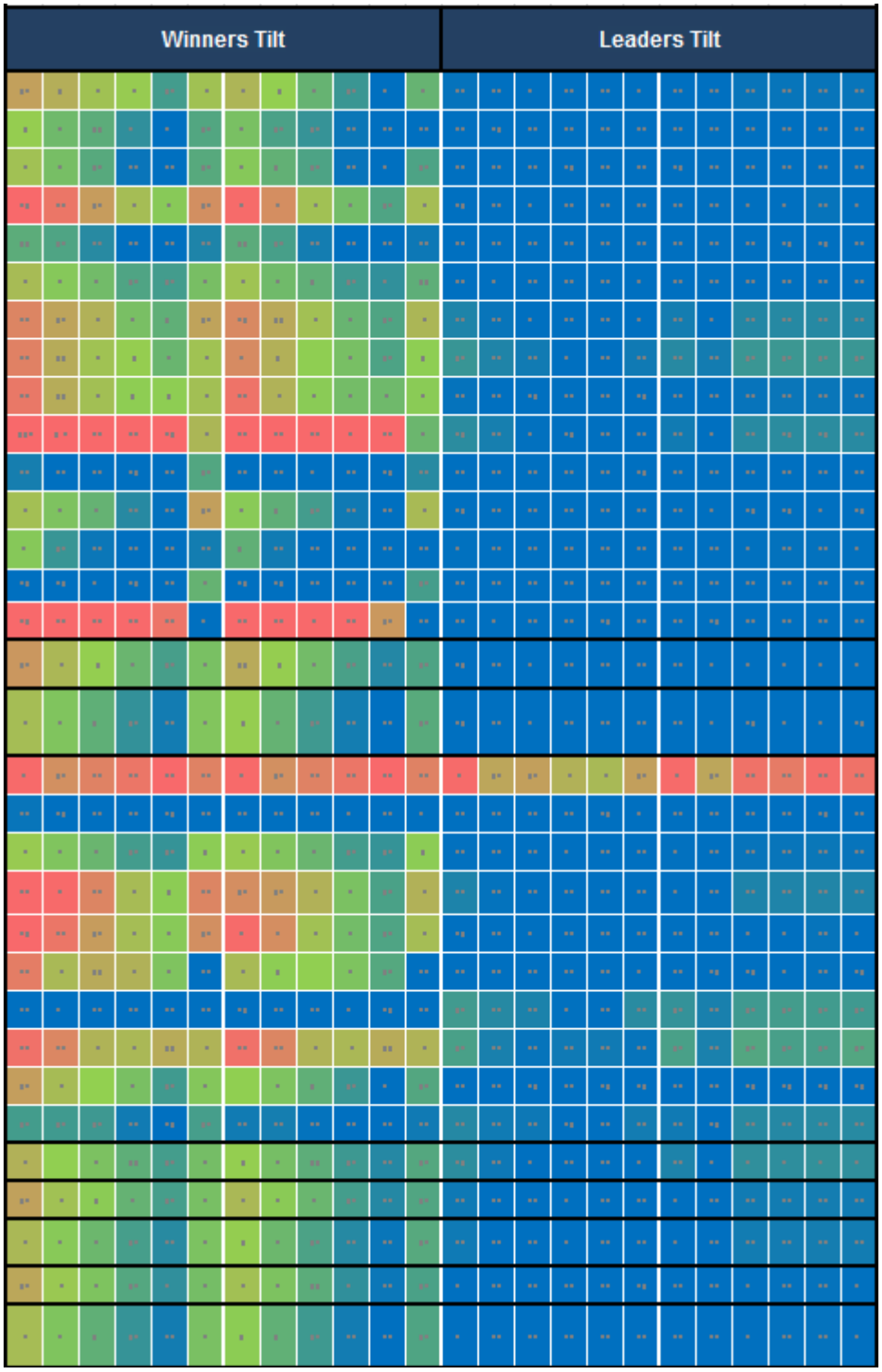
New South Wales has separate competitions with Golden Tees, in which the entrants are the higher markers. Naturally the higher markers win these competitions, and boost their Bias.

If all the competitions on the same day (same gender) were combined, one gets the “No Grade” result.

Other clubs also skilfully use a grading system to achieve results in line with their objectives.

Appendix 28 – Why is the Leader Bias so different to the Winner Bias?

Clearly the Leaders Tilt is much more slanted in favour of the Low markers, whereas the Winners Tilt is more balanced. Why is it so? (The values in the following chart are illegible in order to emphasise the pattern.)



Consider this short table, taken from the New South Wales Club:

New South Wales - Men Eight20 0.93 & Anchor			
Description	**To Scr**	**36 Max**	**Total**
Field (Rounds)	508	214	23,990
Percent	2.1%	0.9%	
Winners	15	11	667
Percent	2.2%	1.6%	
Bias Winners	106.2%	184.9%	
Leaders	157	16	5,591
Percent	2.8%	0.3%	23.3%
Bias Leaders	132.6%	32.1%	

In the table, the two extremes of the handicap range are considered, the scratch and better range, and the maximum handicap 36 range.

They both represent a small proportion of the field, namely 2.1% and 0.9% respectively.

But in terms of Winners, the highest markers represent 1.6% if the winners, whereas the lowest markers represent 2.2%. The high markers “outperform” and have a handicap bias of 184.9%. The low markers perform well, with a bias of 106.2%.

But when it comes to being in the top 20% of the field, the “Leaders”, the low markers have increased their representation from the 15 winners to 157 participants out of the 5,591 leaders’ pool; the high markers have only increased from 11 to 16. So the low markers have a very strong positive bias of 132.6%, the high markers have a very low 32.1%.

It appears that the low markers are far more likely to be in the leaders’ pool than the high markers.

Yes indeed the high marker, who has his one in a hundred fabulous round, can win on the day producing a strong outperforming bias, but his fellow high marker competitors are not likely to also pull out a one in a hundred performance.

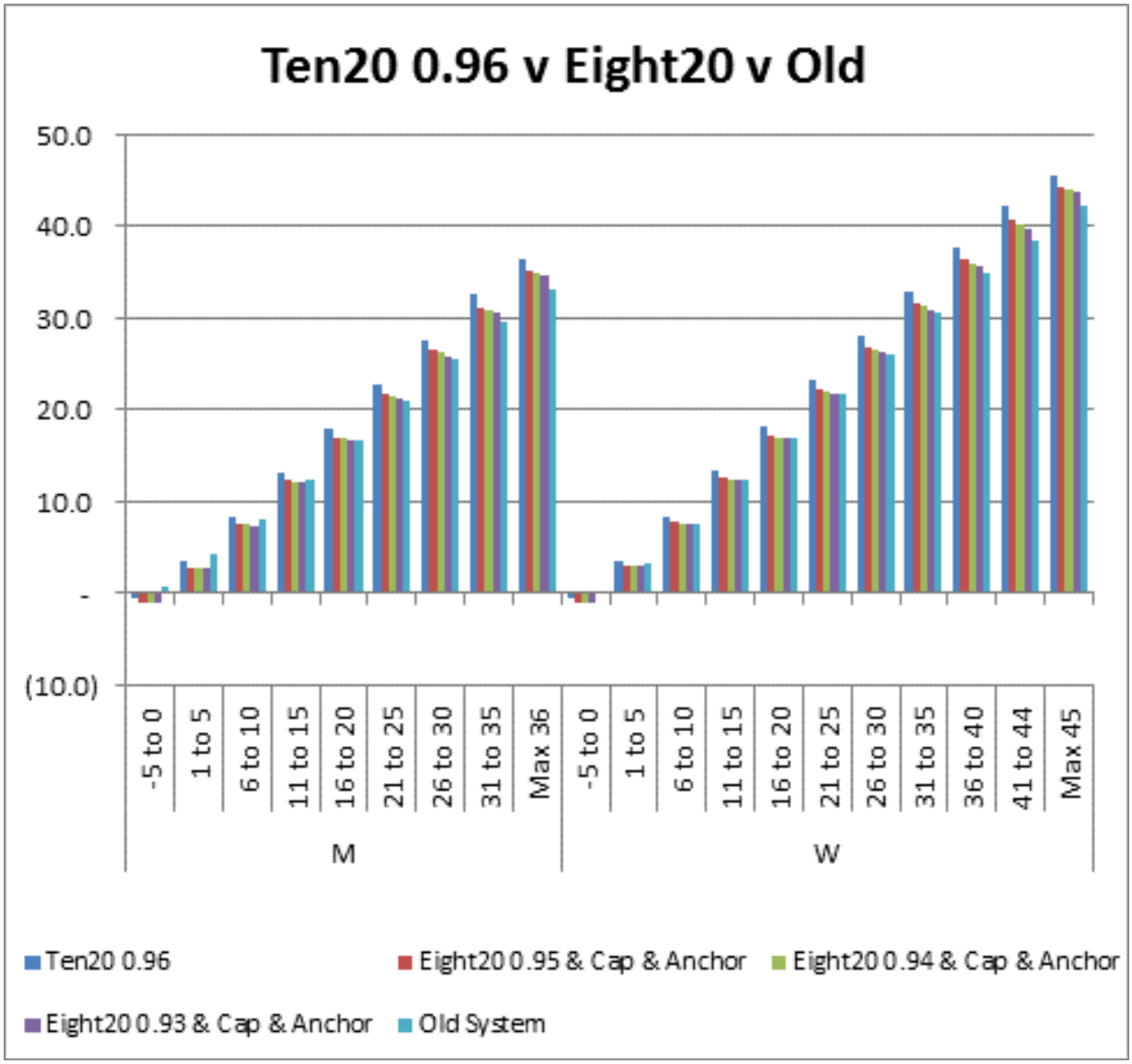
On the other hand, the low marker, who we know is more consistent and more likely to play at or near his handicap, finds many of his low marker fellow competitors are also in the Leaders pool with him, and thus, as a group, they have the very strong 132.6% favourable bias.

Appendix 29 – Impact of Eight20 & Anchor on Handicaps

This result is from the Individual data base with 1,000,000 rounds. Golfers with fewer than 20 rounds over the period, which is 2/01/2008 to 30/11/2010, have been excluded.

The comparison is between what the handicap would have been on each method over this period.

Ten20 0.96 v Eight20 v Old									
Handicap Range - Based on Ten20 0.96	Ten20 0.96	Eight20 0.95 & Cap & Anchor	Eight20 0.94 & Cap & Anchor	Eight20 0.93 & Cap & Anchor	Old System	Diff-er-ence	Diff-er-ence	Diff-er-ence	Diff-er-ence
	1	2	3	4	5	2 - 1	3 - 1	4 - 1	5 - 1
M	**18.0**	**17.1**	**16.9**	**16.7**	**16.7**	**(0.9)**	**(1.1)**	**(1.3)**	**(1.3)**
-5 to 0	(0.5)	(1.0)	(1.0)	(1.0)	0.9	(0.5)	(0.5)	(0.5)	1.4
1 to 5	3.5	2.9	2.9	2.8	4.2	(0.6)	(0.6)	(0.6)	0.7
6 to 10	8.2	7.6	7.5	7.4	8.1	(0.7)	(0.7)	(0.8)	(0.1)
11 to 15	13.1	12.3	12.2	12.0	12.5	(0.8)	(0.9)	(1.0)	(0.6)
16 to 20	17.9	17.0	16.8	16.7	16.7	(0.9)	(1.1)	(1.3)	(1.2)
21 to 25	22.8	21.8	21.5	21.3	21.0	(1.0)	(1.3)	(1.5)	(1.7)
26 to 30	27.6	26.4	26.2	25.9	25.5	(1.2)	(1.5)	(1.7)	(2.2)
31 to 35	32.6	31.1	30.8	30.5	29.6	(1.5)	(1.8)	(2.1)	(3.0)
Max 36	36.3	35.0	34.8	34.6	33.0	(1.3)	(1.5)	(1.7)	(3.3)
W	**27.6**	**26.5**	**26.2**	**26.0**	**25.2**	**(1.1)**	**(1.4)**	**(1.6)**	**(2.4)**
-5 to 0	(0.6)	(1.1)	(1.0)	(1.0)	0.2	(0.4)	(0.4)	(0.4)	0.8
1 to 5	3.6	3.0	3.0	3.0	3.4	(0.6)	(0.6)	(0.6)	(0.2)
6 to 10	8.4	7.7	7.7	7.6	7.7	(0.7)	(0.8)	(0.8)	(0.7)
11 to 15	13.4	12.6	12.5	12.4	12.4	(0.8)	(0.9)	(1.0)	(1.0)
16 to 20	18.1	17.2	17.0	16.9	16.8	(0.9)	(1.1)	(1.2)	(1.3)
21 to 25	23.2	22.2	22.0	21.8	21.6	(1.0)	(1.2)	(1.4)	(1.6)
26 to 30	27.9	26.8	26.5	26.3	26.0	(1.1)	(1.4)	(1.7)	(2.0)
31 to 35	32.8	31.6	31.2	30.9	30.5	(1.3)	(1.6)	(1.9)	(2.3)
36 to 40	37.7	36.3	35.9	35.5	34.8	(1.4)	(1.8)	(2.2)	(2.9)
41 to 44	42.3	40.6	40.2	39.8	38.5	(1.7)	(2.1)	(2.6)	(3.8)
Max 45	45.3	44.2	44.0	43.8	42.3	(1.1)	(1.3)	(1.6)	(3.0)
Grand Total	**19.7**	**18.8**	**18.6**	**18.4**	**18.2**	**(1.0)**	**(1.1)**	**(1.3)**	**(1.6)**


Ten20 0.96 v Eight20 v Old
50.0
40.0
30.0
20.0
10.0
-
(10.0)
-5 to 0
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
Max 36
M
-5 to 0
1 to 5
6 to 10
11 to 15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 to 44
Max 45
W
Ten20 0.96
Eight20 0.95 & Cap & Anchor
Eight20 0.94 & Cap & Anchor
Eight20 0.93 & Cap & Anchor
Old System

The Anchor impacts 4% of rounds.

Impact of Anchor on Rounds of Golf		
Handicap Range	No Impact	Impact
M	96.0%	4.0%
-5 to 0	100.0%	-
1 to 5	99.7%	0.3%
6 to 10	99.3%	0.7%
11 to 15	98.2%	1.8%
16 to 20	96.5%	3.5%
21 to 25	94.4%	5.6%
26 to 30	91.8%	8.2%
31 to 35	88.0%	12.0%
Max 36	87.4%	12.6%
W	95.2%	4.8%
-5 to 0	100.0%	-
1 to 5	99.8%	0.2%
6 to 10	99.8%	0.2%
11 to 15	98.1%	1.9%
16 to 20	97.5%	2.5%
21 to 25	97.7%	2.3%
26 to 30	95.5%	4.5%
31 to 35	92.8%	7.2%
36 to 40	91.7%	8.3%
41 to 44	88.4%	11.6%
Max 45	91.9%	8.1%
Grand Total	95.8%	4.2%

13.8% of men and 15.6% of women would have had at least one round anchored over the three years period.

Impact on Competitors - One or More Rounds Impacted		
	No Impact	Impact
M	86.20%	13.80%
W	84.44%	15.56%
Grand Total	85.84%	14.16%

The average number of rounds impacted per player is 2.1, but that included the majority with no rounds impacted. Of those with one or more impacted rounds, the average number of rounds impacted is 14.9. The highest number of rounds impacted was 150 out of 404 rounds.

Appendix 30 – About the Author

GA commissioned a statistician with significant experience in developing practical solutions to conduct the data analysis. Michael Maher also has long-term peak-Level management and board experience with major Australian and international companies. Michael comes into this with a fresh outlook and without any industry baggage. Michael plays regular club competition golf in Sydney. His current professional focus is FX trading using automated algorithms.