

**IN THE MATTER** of the Resource Management Act 1991

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**IN THE MATTER** of submissions and further submissions by Rangitata Diversion Race Management Limited on the proposed Canterbury Land & Water Regional Plan

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**SUPPLEMENTARY STATEMENT OF EVIDENCE OF RICHARD TREVOR DE JOUX (HEARING 3)**

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1. At the hearing on 4<sup>th</sup> June, commissioner van Voorthuysen requested that an analysis of the impact on RDRML of the proposed pLWRP flow regimes based on days of partial or full restriction be carried out.
2. I have carried out an analysis using the data provided by Boraman Consultants Limited. That data consists of a daily time series for the period 1967 to 2011, and has been analysed to determine the number of days when RDRML could either fully take, partly take, or not take water from the South Ashburton River.
3. The modelling analyses the number of days of restrictions under the existing regime ("Status Quo") and compares these to changes under the pLWRP regime with no ADC reduction in take upstream of RDRML intake ("No ADC Cutback"), with only a 544 l/s cutback in ADC take ("Part ADC cutback"), and with a 900 l/s cutback in ADC take ("ADC cutback"). The reasoning for using the 544 l/s reduction is to retain consistency with the modelling carried out by Horrell for the S42A report.
4. Annual summaries of restriction days for each scenario are provided as tables 1 to 4 of this evidence. These tables show the average number of days when the RDRML abstraction was either fully restricted ("Total"), partly restricted ("Partial") or unrestricted ("Nil"). The two columns on the right show the maximum number of consecutive days each year when there was either a total or partial restriction. Note that within any year there will be a number of occurrences of consecutive days of restriction. The last two columns of the table only show the maximum number of consecutive total or partial days per year.
5. Table 5 provides a summary of the restriction days under each scenario. If the proposed LWRP regime is adopted without any concurrent reduction in ADC abstraction upstream of the RDRML intake, then the average days of total restriction increases from 17 to 28 days and the days when the full abstraction can be taken reduces from 78 days (36% full reliability) to 68 days (32% full reliability).
6. If the proposed LWRP regime is adopted with a concurrent reduction in ADC abstraction upstream of the RDRML intake of only 544 l/s then the average days of total restriction increases from 17 to 20 days and the days when the full abstraction can be taken reduces from 78 days to 74 days (35% full reliability).

7. If the proposed LWRP regime is adopted with a concurrent reduction in ADC abstraction upstream of the RDRML intake of the full 900 l/s then the average days of total restriction remains at 17 and the days when the full abstraction can be taken remains at 78 days. The reliability to RDRML remains unchanged with this option.

**Table 5: Summary of restriction days – 1967 to 2011 inclusive**

Regime	Days of restriction			Consecutive days	
	Total	Partial	Nil	Total	Partial
Status Quo	17	117	78	11	57
LWRP No ADC cutback	28	116	68	16	52
LWRP Part ADC cutback	20	118	74	13	54
LWRP ADC cutback	17	117	78	11	57

### Comments on changed analysis

8. The analysis shows that there is a reduction in average irrigation season full reliability of 4% if the pLWRP regime is adopted without any reduction in upstream ADC abstraction. There is a 1% reduction in average irrigation season reliability if ADC reduce their upstream abstraction by only 544 l/s. A reduction of 900 l/s in ADC take upstream of RDRML maintains the existing reliability.
9. These average numbers are slightly less than the average values of 7% and 1% shown in table 2 of my evidence in chief, which attempted to show that the use of averages was somewhat misleading as there can be periods (monthly or seasonal) where the actual change in reliability is greater or less than the average.

Richard de Joux  
11 June 2013

**Table 1: Monthly RDRML Abstraction – Current Regime**

RDRML Restrictions - Current Regime					
Season	Days of restriction			Consecutive days	
	Total	Partial	Nil	Total	Partial
67/68	0	103	110	0	30
68/69	1	99	112	1	60
69/70	6	186	20	6	89
70/71	48	109	55	15	39
71/72	40	104	68	20	39
72/73	83	73	56	30	25
73/74	39	121	52	37	46
74/75	44	70	98	36	26
75/76	0	117	95	0	73
76/77	2	89	121	2	60
77/78	62	131	19	31	46
78/79	24	98	90	25	35
79/80	0	74	138	0	27
80/81	0	119	93	0	75
81/82	22	131	59	15	42
82/83	0	142	70	0	100
83/84	0	65	147	0	37
84/85	24	118	70	15	76
85/86	0	118	94	0	35
86/87	0	72	140	0	25
87/88	85	77	50	43	31
88/89	19	112	81	17	27
89/90	80	104	28	80	35
90/91	2	147	63	2	67
91/92	25	134	53	25	93
92/93	0	123	89	0	43
93/94	11	107	94	6	39
94/95	20	95	97	20	67
95/96	0	56	156	0	14
96/97	1	96	115	1	17
97/98	8	167	37	7	68
98/99	3	157	52	2	61
99/00	0	114	98	0	29
00/01	52	88	72	30	68
01/02	0	133	79	0	107
02/03	0	155	57	0	66
03/04	1	154	57	1	46
04/05	0	129	83	0	66
05/06	34	171	7	20	144
06/07	0	97	115	0	91
07/08	21	158	33	12	101
08/09	0	142	70	0	54
09/10	0	146	66	0	93
10/11	0	147	65	0	81
Average	17	117	78	11	57

**Table 2: Monthly RDRML Abstraction – pLWRP No ADC cutback**

RDRML Restrictions - LWRP No ADC Cutback					
Season	Days of restriction			Consecutive days	
	Total	Partial	Nil	Total	Partial
67/68	0	117	96	0	30
68/69	15	94	103	8	55
69/70	15	180	17	12	46
70/71	68	93	51	27	43
71/72	58	100	54	22	40
72/73	97	64	51	47	25
73/74	47	123	42	37	49
74/75	44	83	85	36	46
75/76	29	99	84	18	36
76/77	2	102	108	2	65
77/78	84	114	14	31	58
78/79	26	100	86	25	36
79/80	0	83	129	0	36
80/81	0	124	88	0	76
81/82	59	107	46	17	30
82/83	0	144	68	0	100
83/84	0	78	134	0	40
84/85	47	98	67	27	59
85/86	0	144	68	0	36
86/87	0	87	125	0	25
87/88	85	87	40	43	37
88/89	27	114	71	21	42
89/90	80	111	21	80	51
90/91	20	146	46	8	60
91/92	60	106	46	30	49
92/93	0	131	81	0	100
93/94	11	119	82	6	40
94/95	25	98	89	20	32
95/96	0	72	140	0	27
96/97	1	110	101	1	21
97/98	11	174	27	7	68
98/99	20	143	49	5	51
99/00	2	124	86	2	29
00/01	65	84	63	31	56
01/02	7	138	67	5	59
02/03	11	165	36	11	96
03/04	17	152	43	17	56
04/05	7	137	68	7	77
05/06	84	123	5	26	68
06/07	19	86	107	16	72
07/08	53	130	29	30	79
08/09	5	154	53	5	48
09/10	33	133	46	8	45
10/11	0	154	58	0	81
Average	28	116	68	16	52

**Table 3: Monthly RDRML Abstraction – pLWRP With ADC cutback 544 I/S**

RDRML Restrictions - LWRP with Part ADC cutback					
Season	Days of restriction			Consecutive days	
	Total	Partial	Nil	Total	Partial
67/68	0	110	103	0	30
68/69	4	98	110	2	59
69/70	7	186	19	7	90
70/71	57	102	53	19	43
71/72	45	104	63	20	39
72/73	91	68	53	41	25
73/74	40	126	46	37	48
74/75	44	73	95	36	26
75/76	15	107	90	5	50
76/77	2	90	120	2	60
77/78	73	120	19	31	43
78/79	24	99	89	25	35
79/80	0	78	134	0	29
80/81	0	120	92	0	76
81/82	33	127	52	15	42
82/83	0	142	70	0	100
83/84	0	71	141	0	37
84/85	35	108	69	15	68
85/86	0	124	88	0	35
86/87	0	77	135	0	25
87/88	85	80	47	43	31
88/89	20	112	80	18	27
89/90	80	105	27	80	35
90/91	4	151	57	2	45
91/92	30	131	51	26	71
92/93	0	126	86	0	80
93/94	11	114	87	6	40
94/95	20	98	94	20	67
95/96	0	61	151	0	14
96/97	1	101	110	1	18
97/98	8	173	31	7	68
98/99	7	153	52	4	61
99/00	0	119	93	0	29
00/01	59	84	69	31	63
01/02	0	136	76	0	148
02/03	5	160	47	5	67
03/04	9	151	52	9	40
04/05	0	135	77	0	71
05/06	54	151	7	24	71
06/07	1	99	112	1	85
07/08	27	153	32	14	101
08/09	2	145	65	2	47
09/10	5	152	55	3	53
10/11	0	150	62	0	81
Average	20	118	74	13	54

**Table 4: Monthly RDRML Abstraction – pLWRP With ADC cutback**

RDRML Restrictions - LWRP with ADC 900 l/s cutback					
Season	Days of restriction			Consecutive days	
	Total	Partial	Nil	Total	Partial
67/68	0	103	110	0	22
68/69	1	99	112	1	60
69/70	6	186	20	6	89
70/71	48	109	55	15	39
71/72	40	104	68	20	39
72/73	83	73	56	30	25
73/74	39	121	52	37	46
74/75	44	70	98	36	26
75/76	0	117	95	0	73
76/77	2	89	121	2	60
77/78	62	131	19	31	46
78/79	24	98	90	25	35
79/80	0	74	138	0	27
80/81	0	119	93	0	75
81/82	22	131	59	15	42
82/83	0	142	70	0	100
83/84	0	65	147	0	37
84/85	24	118	70	15	76
85/86	0	118	94	0	35
86/87	0	72	140	0	25
87/88	85	77	50	43	28
88/89	19	112	81	17	27
89/90	80	104	28	80	35
90/91	2	147	63	2	67
91/92	25	134	53	25	93
92/93	0	123	89	0	43
93/94	11	107	94	6	39
94/95	20	95	97	20	67
95/96	0	56	156	0	14
96/97	1	96	115	1	17
97/98	8	167	37	7	68
98/99	3	157	52	2	61
99/00	0	114	98	0	28
00/01	52	88	72	30	68
01/02	0	133	79	0	148
02/03	0	155	57	0	66
03/04	1	154	57	1	46
04/05	0	129	83	0	66
05/06	34	171	7	20	144
06/07	0	97	115	0	91
07/08	21	158	33	12	101
08/09	0	142	70	0	54
09/10	0	146	66	0	93
10/11	0	147	65	0	81
Average	17	117	78	11	57