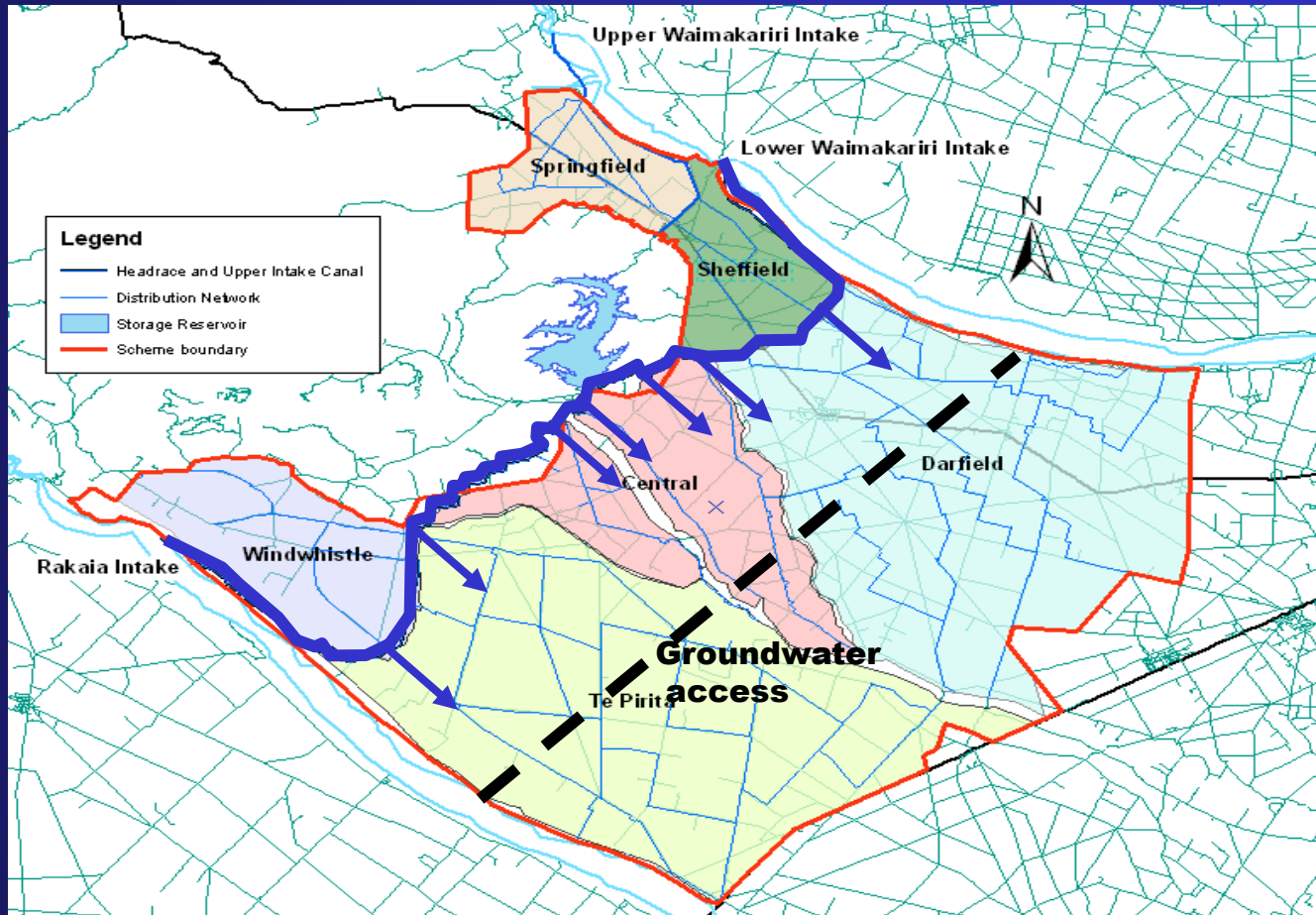




Brief of Evidence – Section 1 Presentation to Hearing Committee

By Cliff Tipler

Revised Scheme Concept



Revised Scheme Reliability

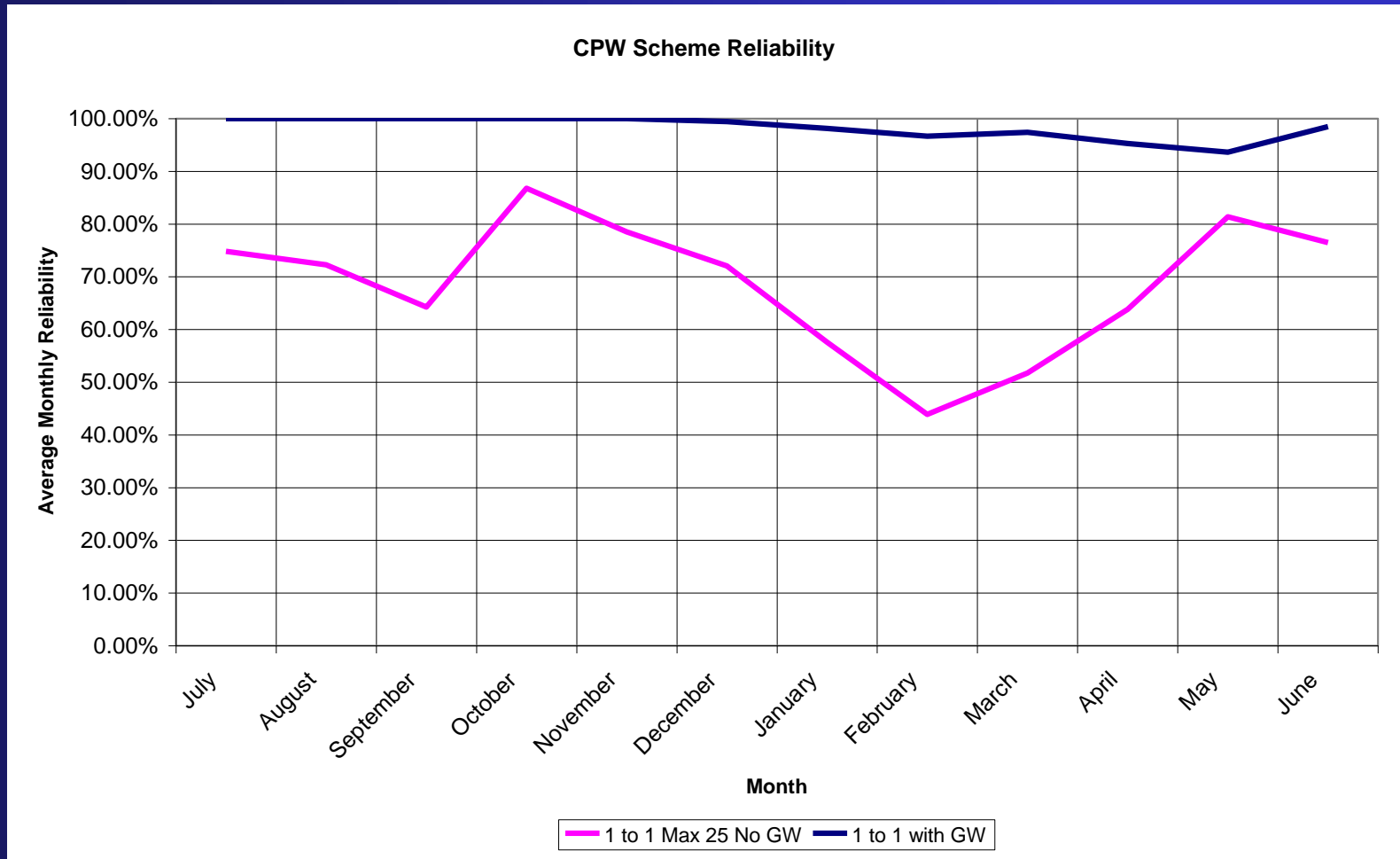
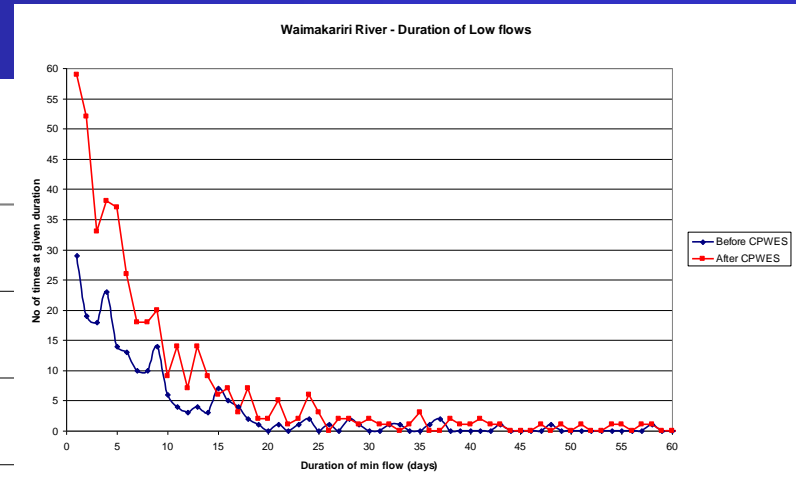
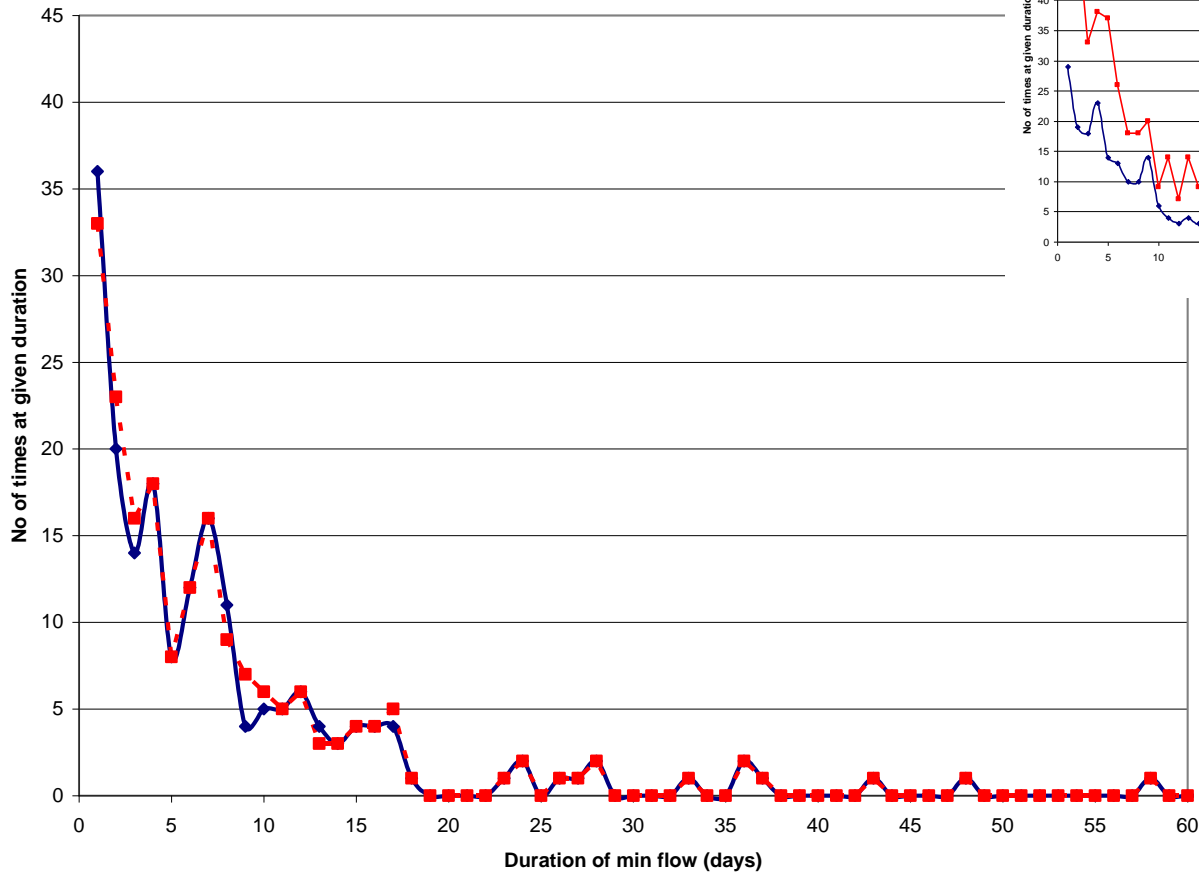


Table 1: Waimakariri Take

	Original Scheme Predicted 20-25-240	Revised Scheme Predicted 30-25-1:1	Revised Scheme Available 30-25-1:1
Mean take (m ³ /s)	9.29	2.40	7.03
25%ile (m ³ /s)	0.00	0.00	0.00
Median take (m ³ /s)	2.25	0.00	0.00
60%ile	9.10	0.00	0.00
70%ile	18.13	1.00	10.89
80%ile	25.00	2.87	24.00
90%ile	25.00	10.31	24.00
Maximum (m ³ /s)	25	25	25
Annual Average Volume (MCM/yr)	288	77	222

Duration and Frequency of Low Flows

Waimakariri River - Duration of Low flows



Duncan – Figure 1

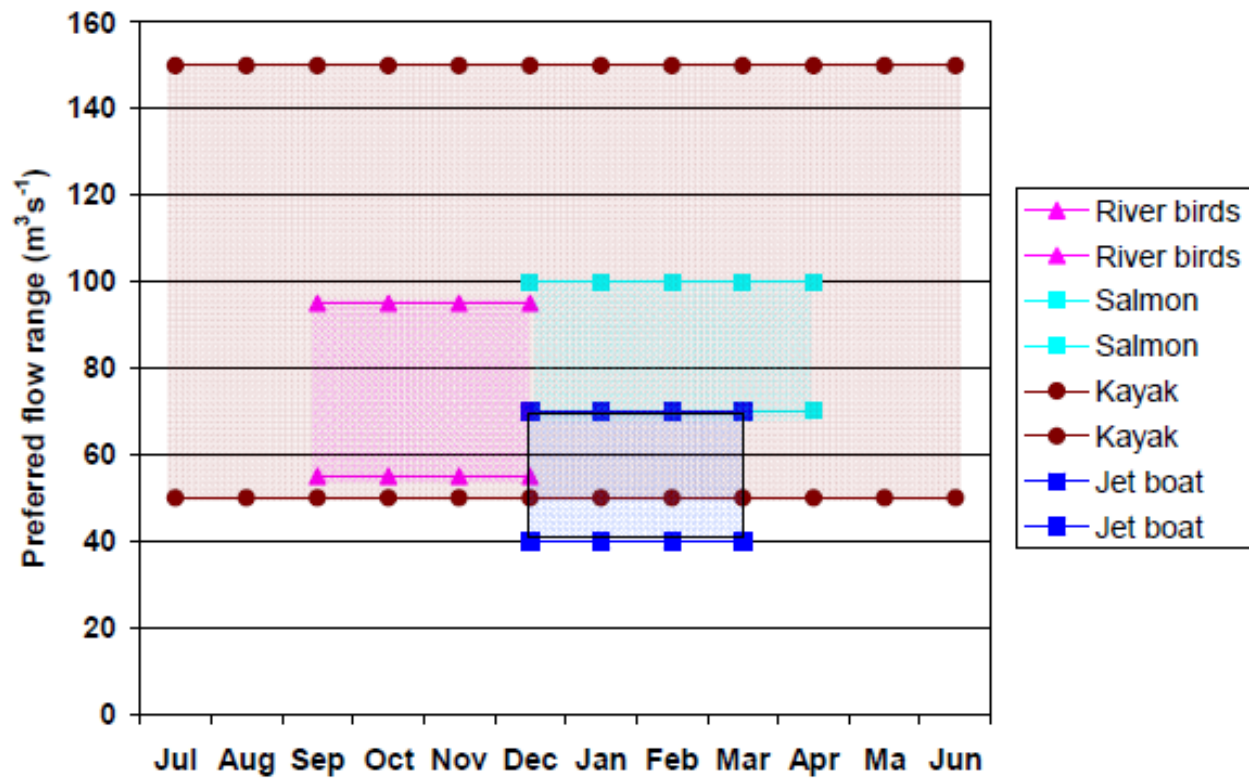


Figure 5

Table 6: The effect of different sized gaps between the A and B Blocks for a B Block allocation of $40 \text{ m}^3\text{s}^{-1}$ on flow statistics (1967-2007) for critical periods for river dwelling birds and salmon angling.

	Naturalised	A Block summer	A summer $40 \text{ m}^3\text{s}^{-1}$ B 0 gap	A summer $40 \text{ m}^3\text{s}^{-1}$ B 7 m^3s^{-1} gap	A summer $40 \text{ m}^3\text{s}^{-1}$ B 17 m^3s^{-1} gap	A summer $40 \text{ m}^3\text{s}^{-1}$ B 27 m^3s^{-1} gap	A summer $40 \text{ m}^3\text{s}^{-1}$ B 37 m^3s^{-1} gap
September - December							
Mean flow	162	145	112	115	118	121	124
Median flow	127	109	69	70	75	81	83
% time at $55-95 \text{ m}^3\text{s}^{-1}$	26.5	31	36	32	54	53	52
December - April							
Mean flow	109	89.7	69	70	75	81	79.1
Median flow	83	61	41	41	40	40	61
% time at $70-100 \text{ m}^3\text{s}^{-1}$	25.9	15.7	15.7	15.7	15.7	15.7	25.9

Status quo - fully allocated

Betterment

Betterment

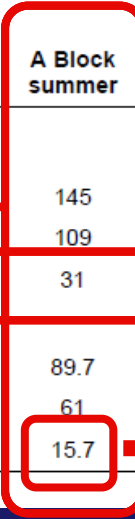


Figure 6

Table 6: The effect of different sized gaps between the A and B Blocks for a B Block allocation of $40 \text{ m}^3\text{s}^{-1}$ on flow statistics (1967-2007) for critical periods for river dwelling birds and salmon angling.

	Naturalised	Current WRRP Provisions		CPW 25 m^3s^{-1} B 1:1	A summer $40 \text{ m}^3\text{s}^{-1}$ B gap	A summer $40 \text{ m}^3\text{s}^{-1}$ B $37 \text{ m}^3\text{s}^{-1}$ gap
		A Block summer	B 0 gap			
September - December						
Mean flow	162	145	112	144		
Median flow	127	100	69	102		
% time at $55-95 \text{ m}^3\text{s}^{-1}$	26.5	31	36	39.9		
December - April						
Mean flow	109	89	69	88.0		
Median flow	83	61	41	53.3		
% time at $70-100 \text{ m}^3\text{s}^{-1}$	25.9	15.7	6.5	17.0		

← Better

← Better

Figure 7 – Predicted take

Table 6: The effect of different sized gaps between the A and B Blocks for a B Block allocation of $40 \text{ m}^3\text{s}^{-1}$ on flow statistics (1967-2007) for critical periods for river dwelling birds and salmon angling.

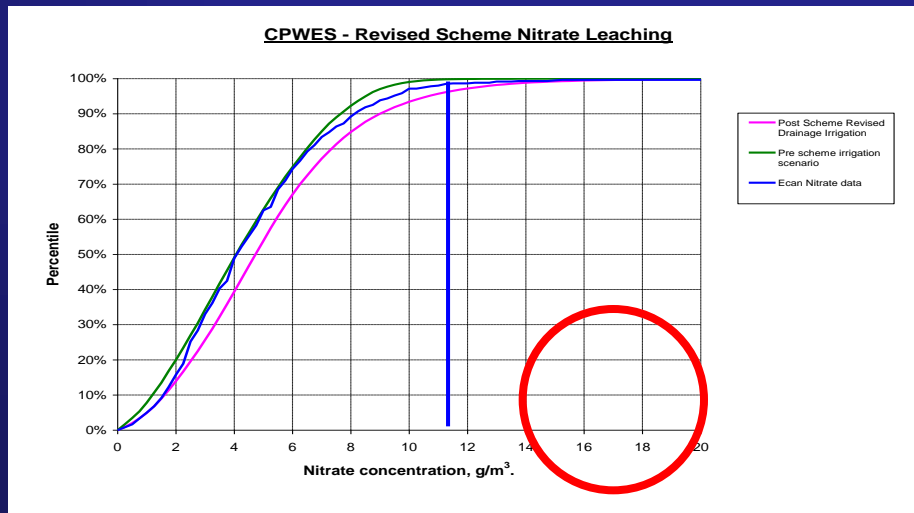
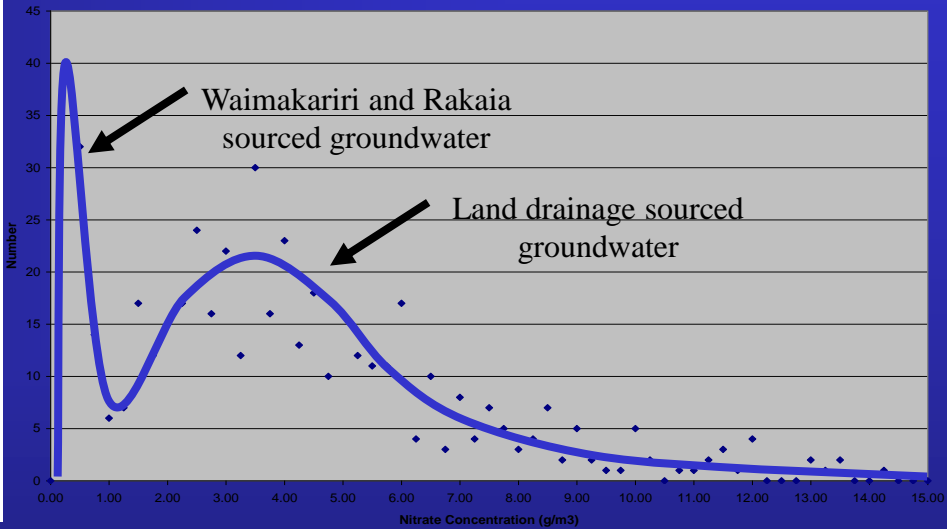
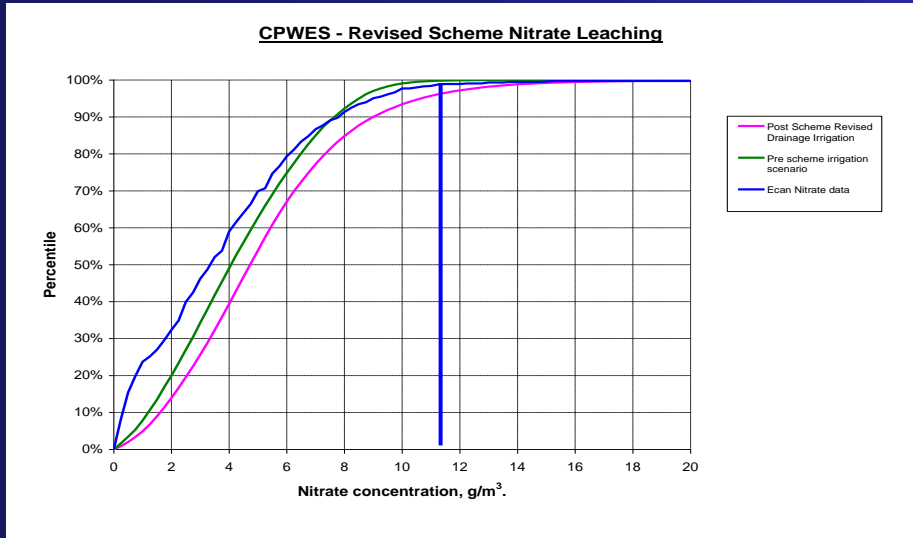
	Naturalised	A Block summer	CPW 25 m^3/s B 1:1	A summer $40 \text{ m}^3\text{s}^{-1}$ B $17 \text{ m}^3\text{s}^{-1}$ gap	ECan 40 m^3/s B 30 gap
September - December					
Mean flow	162	145	144	118	122
Median flow	124	109	102	75	82
% time at $55-95 \text{ m}^3\text{s}^{-1}$	26.5	31	35.0		53
December - April					
Mean flow	109	89.7	88.0	75	78
Median flow	83	61	53.3	57	60
% time at $70-100 \text{ m}^3\text{s}^{-1}$	25.9	15.7	18.4		22

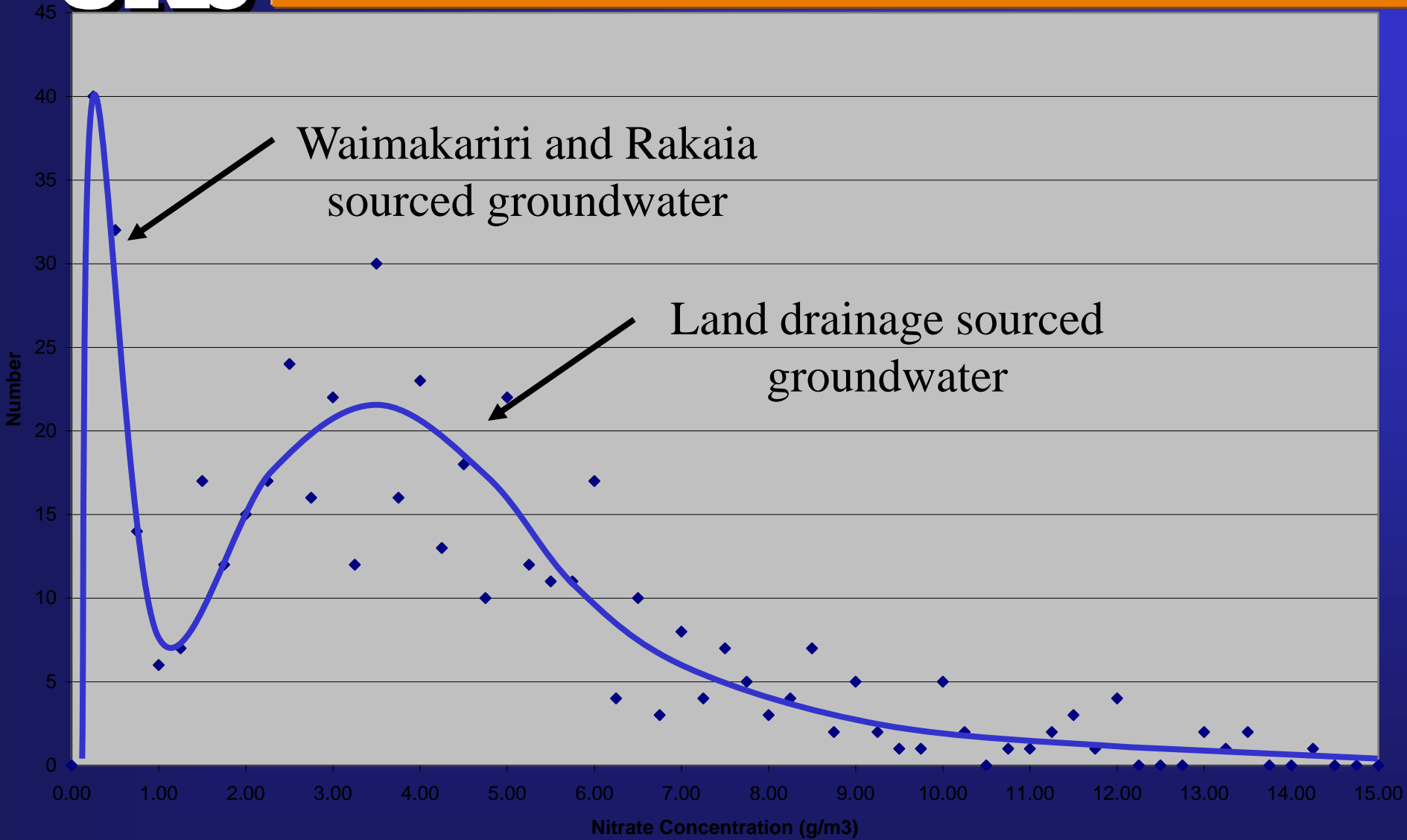
Figure 8 – Available Take

Table 6: The effect of different sized gaps between the A and B Blocks for a B Block allocation of $40 \text{ m}^3\text{s}^{-1}$ on flow statistics (1967-2007) for critical periods for river dwelling birds and salmon angling.

	Naturalised	A Block summer	CPW 25 m^3/s B 1:1	A summer $40 \text{ m}^3\text{s}^{-1}$ B 17 m^3s^{-1} gap	ECan 40 m^3/s B 30 gap
September - December					
Mean flow	162	145	133	118	122
Median flow	127	109	90.4	75	82
% time at $55-95 \text{ m}^3\text{s}^{-1}$	26.5	31	39.9		53
December - April					
Mean flow	109	89.7	84.0	75	78
Median flow	83	61	52.7	57	60
% time at $70-100 \text{ m}^3\text{s}^{-1}$	25.9	15.7	17.0		22

Figures 9 and 10 – Nitrate concentrations





Mass Balance Check on Concentrations

Before CPW

Existing drainage from scheme area:	431 MCM/yr
Existing inflow from upland streams etc:	192 MCM/yr
Total inflow volume	623 MCM/yr
Total existing mass of nitrate leached	2,590,000 kg/yr
Concentration	4.16 g/m ³

After CPW

Post CPW drainage from scheme area:	450 MCM/yr
Existing inflow from upland streams etc:	263 MCM/yr
Total inflow volume	713 MCM/yr
Total existing mass of nitrate leached	3,350,000kg/yr
Concentration	4.70 g/m ³