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Water Balance Model For Ruataniwha Basin

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**Environmental Management Group
Technical Report**

Environmental Monitoring Section

Water Balance Model For Ruataniwha Basin

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EXECUTIVE SUMMARY

A water balance model is important for Ruataniwha basin to quantify recharge and for water resources management. It is also an essential step for groundwater modelling of the basin.
Different components of water balance in the area, including rainfall, rivers' inflow and rivers' outflow, were considered. Rainfall data was obtained from different rain-gauges in the basin. Rivers outflow records were available at Waipawa and Tukituki rivers just outside basin boundary. Records of rivers inflow into the basin were available for different time periods. Groundwater abstraction and surface water takes were computed based on two different approaches. The first approach was based on extrapolation of metered wells data and surface water takes data to those un-metered wells and takes. The second approach was based on computing actual crop water demand in the area. The results of both approaches were closed to 20 million m^3 per year.

Results of this study have revealed that net rainfall in the area (actual precipitation minus evapotranspiration) is about 465 million m^3 per year. Therefore, the current groundwater abstraction is marginal compared to net groundwater recharge from rainfall (about 3.3%). However, the allocated groundwater abstraction is about 6 % of the total rainfall and about 10% of the net rainfall-groundwater recharge.
Results have also raised the need for integrated water resources management. Although the current abstraction is small compared to water balance components it can still have an adverse impact on environment in Ruataniwha. Different streams' reaches and springs dry up, especially in summer peak demand, as a result of pumping. A better spatial distribution of groundwater wells and pumping from deeper aquifers may alleviate this problem. In addition, maximum abstraction rate should be reduced in sensitive areas like streams and springs tributaries.

The results of this study will be used in a groundwater flow model.

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1.0 INTRODUCTION

Estimation of groundwater recharge is necessary for groundwater management, planning and sustainable development. Quantification of water input into a basin is important for abstraction management, water allocation, and for a better understanding of groundwater-surface water interaction.
Depending on the area of study, different factors may affect the amount of groundwater recharge. These factors include: precipitation amount and intensity, soil type, topography, land-cover (vegetations), interaction between surface and groundwater and available groundwater storage.

Different methods of recharge estimation can be found in the literature, but no particular method gives an accurate quantification of recharge amount. Selection and application of recharge estimation method depends on the area of study and availability of data.

One of the recharge estimation methods is the use of lysimeters. Lysimeters can be used to measure the drainage through soils and to estimate groundwater recharge. The problems with lysimeters are that they are shallow and usually applied in small areas. In addition, the flow measured using lysimeters is not accurate. Because the have limited extension, lysimeters underestimate groundwater recharge (Benson et al., 2001).

Isotopes tracers can be used to determine the age of water, and consequently, to estimate groundwater recharge rate. This method has been widely used in arid and semi-arid areas (Le Gal La Salle et. al. 2001). Coupling mathematical modelling with isotopes analysis can give an estimation of recharge. The isotopes method was applied in western Australia (Sharma and Hughes 1985) to quantify recharge. This method, in addition to its high cost, does not give a direct estimation of recharge but an indication to origin of water and recharge rate. In addition, some difficulties may be encountered in interpreting the results of isotopes analysis.

Another method of recharge estimation is the Cumulative Rainfall Departure method (CRD). Baalousha (2005) has used CRD method to quantify groundwater recharge from rainfall. This method depends on the investigating groundwater level fluctuations in shallow phreatic aquifers as a result of rainfall. As it only considers rainfall, CRD method can be applied on areas where rainfall is the only source of groundwater recharge. So it cannot be applied in areas with surface-groundwater interaction.

Chloride Mass Balance (CMB) approach can be used for groundwater recharge estimation. CMB method depends on the conservation of mass between chloride input from atmosphere and chloride flux in the subsurface soil. This method has been applied on several studies for quantification of groundwater recharge (Housten 2007, Bazuhair and Wood 1996, Sami and Hughes 1996, Ting et. al. 1998). Data required for CMB is total chloride input from precipitation and pore water chloride concentration.
Although CMB method is easy to implement but it has some drawbacks. Geea et. al. (2005) have found that CMB method produces unreliable data if recharge exceeds a few millimetres because of soil water extracts. Results of CMB method can vary from site to another because of variation in chloride input.

Water balance models have widely been used for estimation of groundwater recharge. The idea of water balance is simple. It depends on mass balance principle; input and output into the area of study. Water balance approach has been applied on different areas around the world to quantify groundwater recharge (Wright and Xu 2000, Szilagyi et. al. 2003, Batelaan and De Smedt 2007)

Results of water balance models are highly dependent on the accuracy of input data. Because of high data requirements of this method, it is not recommended to use it when the available data is limited.

In this study, the water balance model was used to estimate the groundwater recharge in Ruataniwha Basin, New Zealand. Because the basin is closed, there is no lateral groundwater flow into or out of the basin. There is also enough data on rainfall, rivers inflow and outflow, it is ideal to apply water balance approach in this case.

2.0 THE STUDY AREA

The study area is Ruataniwha Basin, which is located in Hawke's Bay Region, New Zealand. Figure 1 shows the area of study. Ruataniwha Basin is located in the southwest of Hawke's Bay Region, about 70 Km south west of Napier City. It is one of the most important sources of water supply for agricultural, domestic and industrial use in Hawke's Bay Region. Ruataniwha surface catchment is bounded by Manawatu Region in the south, by foothills of the Ruahine Range in the west, Turiri range and Raukawa Range in the east and Argyll range in the north. The total area of the surface catchment is 1472 km^2, whereas the basin area is about 800 km^2.

Basin geology is composed mainly of sequences of alluvial gravel from Quaternary period with intermittent clay layers of different thicknesses. Two main gravel layers occur in the basin: Young Gravel at the top and Salisbury Gravel underneath. The Young Gravel is unconsolidated and contains clay, silt and volcanic ash of late Quaternary (Francis, 2001). This layer occurs close to the surface and it is more permeable than Salisbury layer underneath. The Salisbury gravel is composed of slightly to poorly consolidated gravel, ignimbrite and clay of Lower Quaternary (Francis, 2001). Thickness of gravel layers varies from a few meters at the west to tens of meters in the middle of the basin. Therefore, the basin is very heterogonous.

Three main rivers and streams traverse the basin from west to east; Waipawa River in the north, Tukituki River in the middle, and Makaretu stream in the south (see Figure 1). Tukituki River and Makaretu Stream confluence just before leaving the Basin, forming one river. Waipawa River and Tukituki River confluence out of the Basin, a few kilometres to the east of Waipawa and Waipukurau towns, into one river.

In the last few years, agricultural activities have been widely extended in the basin, which posed high stresses on water resources in the basin. Consent data from Hawke's Bay Regional Council suggested that the irrigated areas in Ruataniwha Basin have increased from 260 hectare to 2200 hectare in the period between 1985 to 1995 (Dravid and Cameron, 1997). The total irrigation land was estimated at 4569 hectare in 2003 (Hawke's Bay Regional Council, 2003). These stresses on water resources results in drought of some rivers at peak water consumption (summer period).

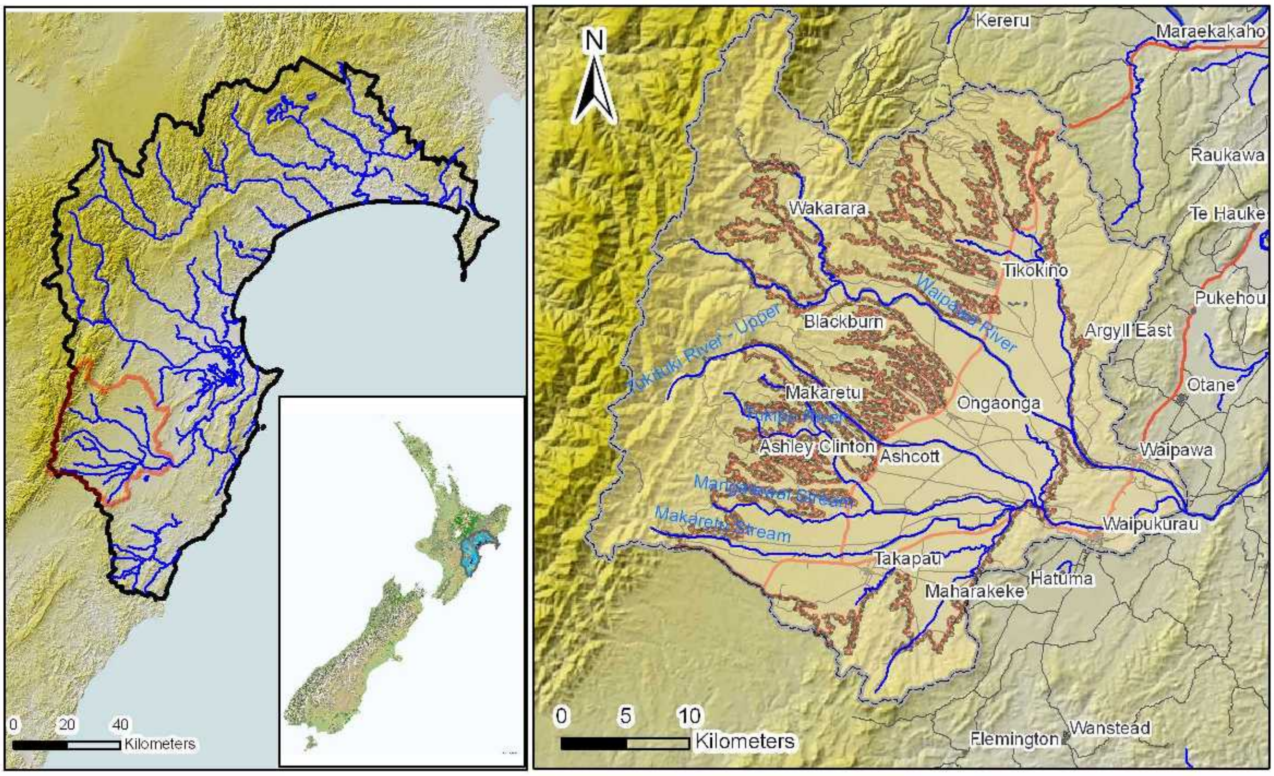

Figure 1: Study area (New Zealand map, Hawke's Bay region, left frame and Ruataniwha Basin, right frame).

3.0 METHODOLOGY

Water Balance approach is based on conservation of mass principle; that is, input minus output is equal to change of storage. The general principle of water balance approach can be expressed by the following equation:

$\text{Input}-\text{Output}=\Delta S$ Equation (1)

Where Input is the sum of all input components into the system in a period of time (normally one hydrological year), output is the sum of all output components out of the system over the same period, ΔS is the change in storage over the same period of time.
Input components can be:
R_{in}: River inflow to the basin
R: Rainfall
I_{rr}: Irrigation return flow
$L_{in:}$ Lateral groundwater inflow
and outflow components are:
R_{out}: river outflow
P: groundwater pumping (abstraction)
S_{in}: Surface water intake
E_{vp}: Evapotranspiration
L_{out}: Lateral groundwater outflow
Equation one cane be written in terms of all components as:

$R_{in}+R+L_{in}+I_{rr}-R_{out}-P-E_{vp}-L_{out}=\Delta S$ Equation (2)

Figure 2 shows a schematic chart of a general water balance approach for the area of study. The dashed rectangle represent the whole basin (surface and groundwater) with different components of inflow and outflow. The problem, which usually encounters with water balance model, is the availability and accuracy of data. Fortunately the basin in this study is closed; there is no interaction between the basin and other basins or sea. Some components, namely groundwater lateral inflow and outflow do not exist. Thus, Equation (2) can be rewritten in the following form:

$$R_{in}+R+I_{rr}-R_{out}-P-E_{vp}=\Delta S \qquad \text{Equation (3)}$$

All data needed for water balance model is available in the Council database. There are good records of outflow out of the basin, and reasonably good data for rivers inflow into the system upstream. Records of rainfall are available at different rain-gauging sites in the area. Rainfall records are available over the period from 1970 till present, whereas river inflow and out-flow data is available for the period from 1989 till present.

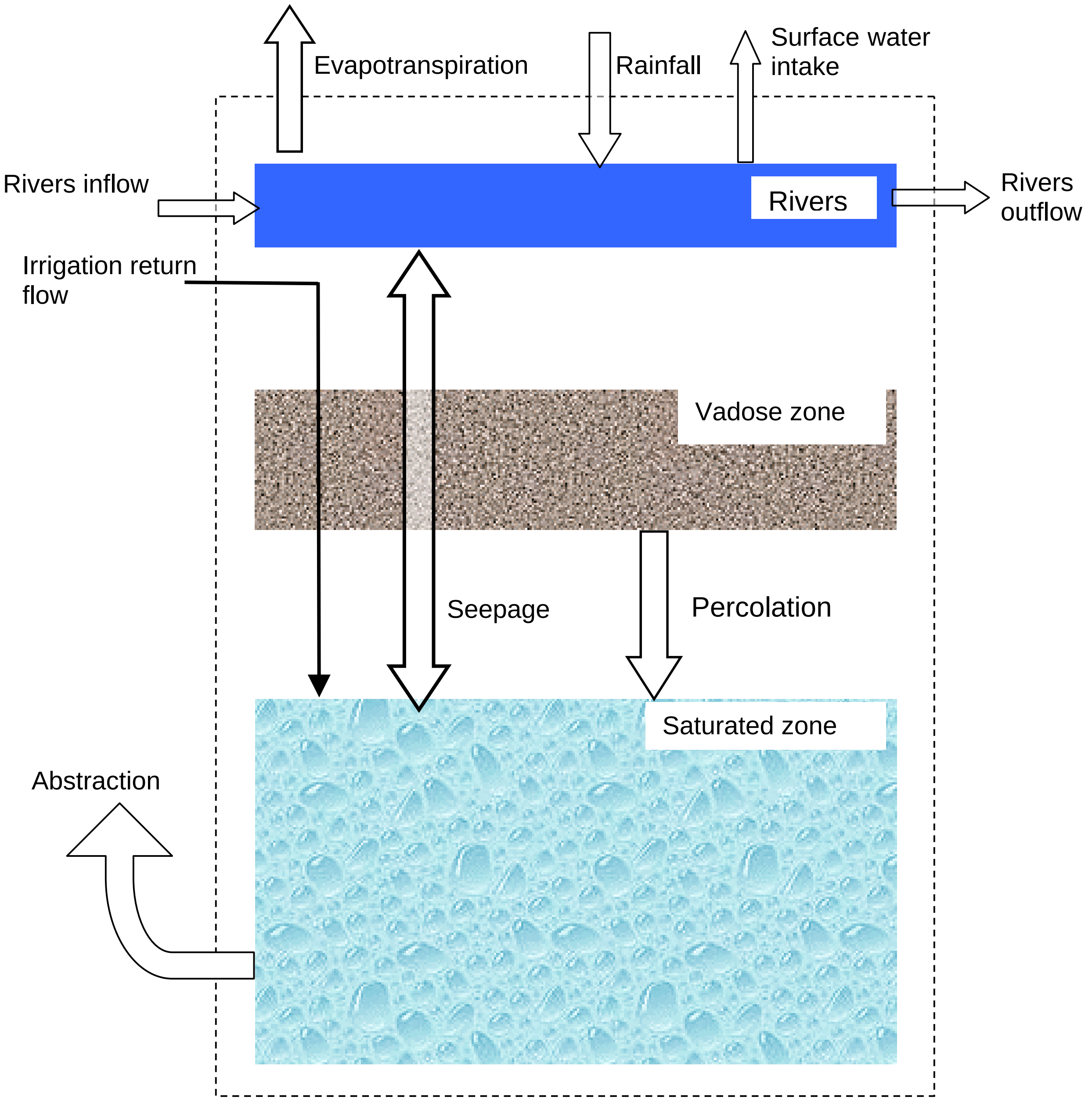

Figure 2: schematic chart of water balance model.

4.0 INPUT COMPONENTS

Input components into the basin include surface water inflow (rivers) , rainfall and irrigation return flow. Each component is presented and analysed in the following sections.

4.1 Rivers Inflow

As mentioned above, two main rivers traversing the basin: Waipawa and Tukituki. Some smaller streams feed into these rivers (Figure 3). Two gauges: Waipawa River at RDS and Tukituki River at Tapairu Road record the average daily outflow of Waipawa and Tukituki rivers, respectively. Flow records since 1989 are available at Council's database. Rivers inflow upstream has not been continuously recorded. Discrete measurements of inflow into the basin were recorded at three points as shown in Figure 3. These points are: Waipawa River D/S Makaroro, Tukituki river at Folgers, and Makaretu stream at Pagetts road. Correlation between continuous downstream records and discrete upstream records was used to bridge the gaps in flow records upstream.

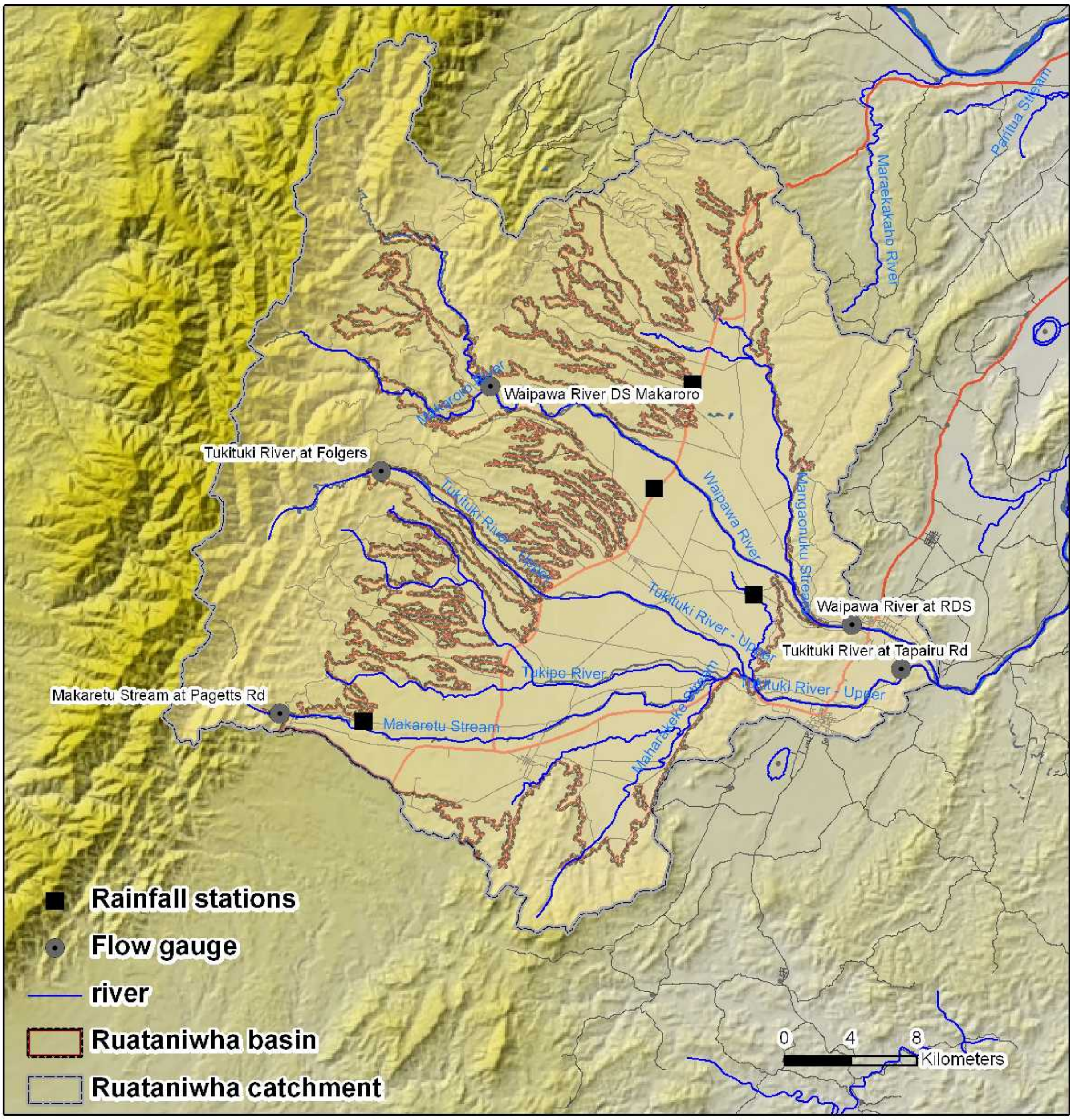

Figure 3: River flow gauges up- and downstream of Ruataniwha Basin and rainfall site.

Results of volume calculations of inflow into the basin are shown in Table 1. As shown in Figure 3, there are some other small streams contributing to the inflow into the basin. The flow of these streams, however, have not been recorded and this is why they are not included in this study. Neglecting flow of these streams will lead to more conservative results of groundwater recharge (underestimate).

Table 1: Annual volumes of rivers' inflow into the basin (cubic meters).

Year	Waipawa River	Tukituki River	Makaretu Stream
1996	307805028	142515770	44051821
1997	287320967	151092264	47120232
1998	182389634	96828659	27820371
1999	246798760	125984338	38189927
2000	291466963	144052652	44597523
2001	266452430	119111914	35745412
2002	322389176	153382732	47934464
2003	357138131	152896646	47761923
2004	228413877	168445881	53274331
2005	307328095	182822238	58405279
2006	346283696	178129507	56736897
Average	**297605188.4**	**146398726.2**	**45446859.67**
Min.	**182389634**	**96828659**	**27820371**
Max.	**426174405**	**199544266**	**64335087**

Based on inflow measurements, the annual average total rivers-inflow into the basin from Waipawa River, Tukituki River, and Makaretu Stream is 489 million m^3 .

4.2 **Rainfall**

Rainfall varies across the basin from 900 mm/year to more than 1300 mm/year. There is a number of rainfall stations in the basin, as shown in Figure 3. Daily rainfall is being measured at these stations since 1996 till present. Rainfall records over that period are available at Hawke's Bay Regional Council database. Average annual rainfall records are shown in Table 2.

Table 2: average annual rainfall records in Ruataniwha Basin.

Year	Rain at different station [meter]				Average [meter]	Average volume [million m^3]
	Brinkswey Chesterman	Parkhill	Punanui	Tikokino		
1996	0.9020	1.2870	0.9430	1.1350	1.0711	840.7743
1997	1.0220	1.5310	1.0150	1.1760	1.1680	916.8800
1998	0.5980	0.9050	0.6030	0.7790	0.7112	558.2920
1999	1.0140	1.2250	0.9460	1.1550	1.0769	845.3273
2000	0.9470	1.3450	0.9530	1.0910	1.0809	848.4673
2001	0.8970	1.1780	0.8940	1.0470	0.9945	780.6629
2002	0.9850	1.4700	0.9445	1.0380	1.1084	870.0744
2003	1.0060	1.2980	0.9950	1.0710	1.0961	860.4189
2004	1.0960	1.4510	1.0320	1.1700	1.1764	923.4740
2005	1.0350	1.4400	0.8690	1.1370	1.1126	873.4106
2006	1.0915	1.5435	1.1240	1.3556	1.2807	1005.3103
2007	0.7755	1.001	0.778	0.9409	1.0711	840.7743

The annual mean value of rainfall over the period from 1996 to 2006 at the above-mentioned stations is 847.55 million m^3.

4.3 Irrigation-Return Flow

Irrigation-return flow is that portion of irrigation water that the crop does not take and percolates down into the aquifer. Depending on the method of irrigation, soil type and amount of water applied to crops, irrigation return flow varies.

There are no exact figures on irrigation return flow in the area of study. Based on knowledge of irrigation methods, crop type in the area, it is assumed that irrigation return flow is 20% of irrigation water.

The current total irrigation water is about 18 million m^3. Therefore, irrigation return flow is 3.6 million m^3. A previous study in 1999 (Hawke's Bay Regional Council, 1999) has estimated irrigation return flow at 3.0 million m^3 per year.

5.0 OUTFLOW COMPONENTS

Outflows from the basin include rivers outflow at the eastern edge of the basin (Figure 3), groundwater abstraction, surface water intake and evapotranspiration. These components are explained in the following sections.

5.1 Rivers outflow

Table 3 shows the annual average river outflow from the basin at Waipawa River and Tukituki River (Figure 3)

Table 3: Annual volumes of rivers' outflow from the basin (cubic meters)

Year	Waipawa	Tukituki
1996	493589000	469566000
1997	453440000	501850000
1998	247778000	298689000
1999	374613000	407848000
2000	482696000	475320000
2001	425801000	385447000
2002	522708000	517473000
2003	591342000	508606000
2004	336783000	566642000
2005	492962000	620646000
2006	571211000	603073000

Based on data shown in Table 3, the average total annual river's outflow is 950.6 million m^3

5.2 Groundwater abstraction and surface water takes

Some records of groundwater abstraction and surface water intake are available at Council. Only part of groundwater consented-wells are metered, the majority are not.

Two approaches have been used to estimate total water intake and groundwater abstraction in the basin. The first approach is by using extrapolation based on metered wells' data and metered surface water takes. The other approach is based on crop water demand and types of crops in the area.

5.2.1 Extrapolation approach

Some wells in the area are metered and read regularly. In addition, some surface water takes are metered. Records of metered-wells are shown in Appendix A. Based on these records, groundwater abstraction in metered wells has increased from less than one million m^3 in 1996 to about 9 million m^3 in 2006 (Figure 4).

Similarly, the current surface water consumption based on metered takes is about 2.0 million m^3. Based on these records, the ratio of actual abstraction volume to the maximum consented volume is about 31%. This ratio was used to extrapolate the actual abstraction in all non-metered groundwater wells and surface water takes.

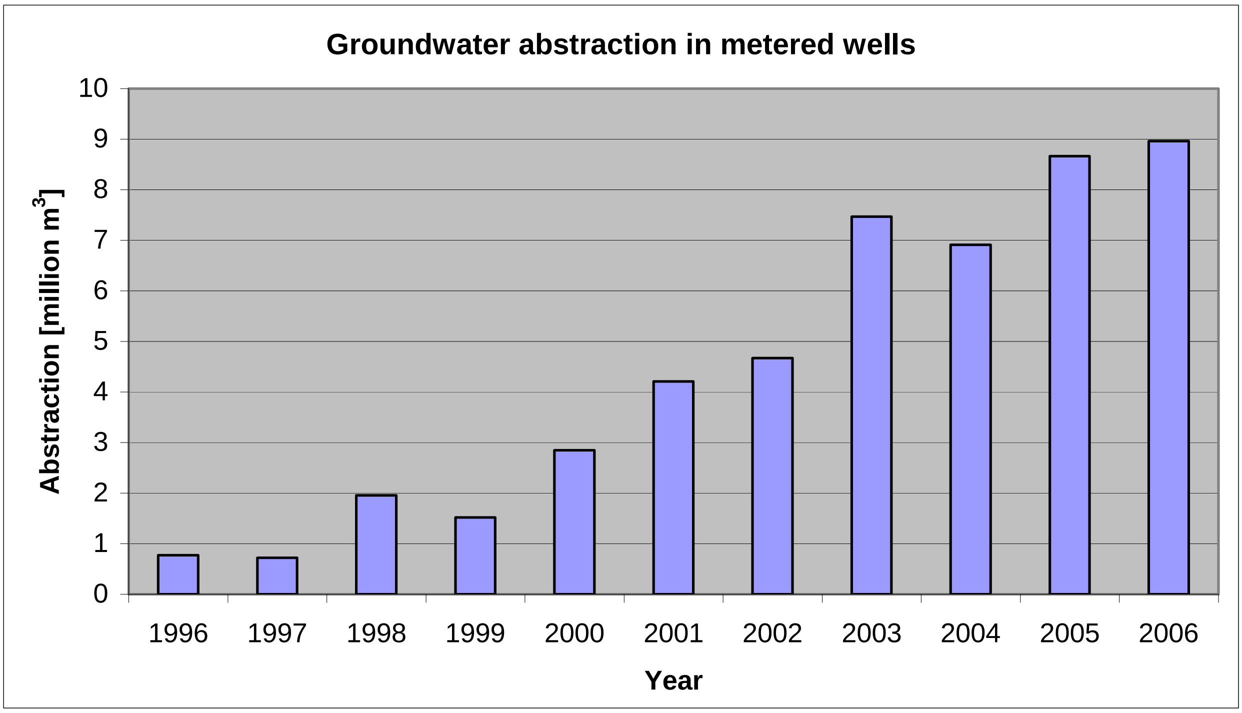

Figure 4: Trend in groundwater abstraction based on metered wells only.

The results of extrapolation reveal that the total current annual abstraction is about 20 million m^3. Table 4 shows the trend in total abstraction and surface water takes of different water uses from 1996 till 2006.

Table 4: Trend in groundwater abstraction and surface water take [million m^3]

Year	Agricultural metered	Agricultural non-metered	Domestic	Industry	Surface water metered	Surface water non-metered	Total Abstraction
1996	0.770295	0.48552892					**1.25582392**
1997	0.720275	0.45400054					**1.17427554**
1998	1.953593	1.23138006					**3.18497306**
1999	1.52152	0.95903773					**2.48055773**
2000	2.846878	1.79443149					**4.64130949**
2001	4.208716	2.65281917	0.150306	0.958871			**7.97071217**
2002	4.668921	2.94289354	0.141099	1.034402			**8.78731554**
2003	7.466204	4.70606454	0.162096	0.886924			**13.2212885**
2004	6.913732	4.35783284	0.151328	0.857776	2.027382	2	**16.3080513**
2005	8.662985	5.46041422	0.153403	1.213848	2.027382	2	**19.5180327**
2006	8.962701	5.64932988	0.152399	0.91503	2.027382	2.525067	**20.231909**

5.2.2 Crop water demand

This approach was used to compute the actual abstraction and to check the validity of extrapolation approach. There are different types of crops in the area, but the majority of irrigated land is pasture. Other types of crops in the basin are apple, onion, potatoes and wheat. Based on current land use map, soil map, and land slope map, the total irrigable land in the basin was computed. It was found that the total irrigable land is about 37000 hectare. Water demand for different crop type for two different rainfall areas is shown in Table 5. The total irrigated land was estimated in 2003 at 4500 hectare (Hawke's Bay regional Council, 2003). The current irrigated land in the basin is estimated at 6000 hectare.

Crop demand in the area of study depends on available soil water (i.e. soil type) and rainfall amount. In Ruataniwha basin two areas of different rainfall amount are considered: Makaretu and Ongaonga.

Table 5: crop water requirements for two different rainfall areas in the basin.

Crop type	Crop demand (m^3/year/ha)	
	Makaretu	Ongaonga
Sweet corn	2100	2600
Wheat	2100-1900	2400
Potatoes	2700	3000
Pasture	2300	3200
Onion	2800	3100
Apple	3000	3500

Based on Table 4, the average crop water demand is 2700 m^3/year. To be on the conservative side, it was assumed the crop water demand is 3000 m^3/year/ha on average. Given a total irrigated area of about 6000 hectare, the total crop water requirement is 18 million m^3 per year. Adding to this amount the domestic and industrial water demand, the total will be more than 19 million m3/year, which is very close to the result from extrapolation approach..

6.0 WATER BALANCE AND GROUNDWATER ABSTRACTION

According to Equation (3), water balance is:

$$R_{in} + R + I_{rr} - R_{out} - P - E_{vp} = \Delta S$$

Assuming steady state conditions, the right hand side of the equation can be dropped. Thus, Equation (3) can be re-written as:

$$R_{in} + R - R_{out} - E_{vp} = 0 \qquad \text{Equation (4)}$$

Steady state conditions were considered for different reasons. First, to see the natural water balance pre-development of the basin without any human interference. Second, because groundwater abstraction is a negligible portion of the total balance components.

Groundwater and surface water use in the basin is currently estimated at 20 million m^3 (refer to section 5.2). This amount is less than 1.5% of the total inflow into the basin (rivers inflow and rainfall). Based on groundwater level monitoring, there is no significant trend in groundwater level over the last decade but only seasonal fluctuations. This promotes the assumptions of no change in storage.

The only unknown in the above equation is evapotranspiration. Substituting of rainfall volume, rivers inflow and rivers outflow in Equation (4) yields that evapotranspiration equals 386.34 million m^3 per year.

The total input into the basin (rainfall and river inflow) is 1336.94 million m^3. The net rainfall in the basin is given by:

Net rainfall= total rainfall-evapotranspiration-surface runoff Equation (5)

And by neglecting runoff inside the basin because it is flat and the amount is negligible compared to other components, then Equation (5) can be written as:

Net rainfall recharge= total rainfall-evapotranspiration Equation (6)

=847.55 – 386.34 = 461.21 million m^3 per year.

It is important to mention here that this net rainfall recharge does not include seepage from rivers. The ratio of net recharge to the total rainfall is high (54%) this is because the runoff inside the basin was neglected.

Murray (2002) has computed groundwater recharge from rainfall based on Lincoln Environmental water management study (Lincoln Environment, 2002). He found that the rainfall recharge is 14.3 m^3/s in average. This rate is equivalent to 450 million m^3 per year, which is very close to the results obtained in this study.

Total actual annual groundwater abstraction from the basin is 15.67 million m^3, based on 2007 (Table 4). This amount is 3.40% of the annual rainfall average recharge; however, the allocated amount of groundwater abstraction is bigger. Based on metered data, the actual groundwater abstraction is about 31% of the allocated volume. As a result, the allocated volume is 50.55 million m^3 per year. This is equal to 10.96% of rainfall recharge.

7.0 CONCLUSION

Water balance model is important to understand the total water budget in Ruataniwha Basin and for better water resources management. This study investigates different water balance components in Ruataniwha basin. Main water balance data like rainfall and river outflow can be considered reliable. River inflow data are less reliable but on the conservative side. Some minor streams flowing into the basin were not considered in this study because of their minor flow rate. So the total surface inflow into the basin is probably a bit greater.

Outcome of this study suggests in terms of quantity there is a plenty of water in the basin; however, ecology and environment in the area are sensitive to any abstraction or water take.

The main factors for water resources management are: basic human needs, ecological and the environmental needs and other needs (i.e. industry). To consider all these factors, integrated water resources management is needed. The strong interaction between surface and groundwater in the area makes integrated water resources management very essential.

Current groundwater abstraction in the basin is still minor but it has an influence on environment. Different reaches along rivers and stream in the area dries up, especially during the period of peak summer demand. In addition, some springs do not flow at peak time. The main challenge is to distribute pumping in a way that minimizes adverse impact on environment. Abstraction from deep aquifers and away from streams and rivers probably would likely reduce the impact on the environment.

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9.0 APPENDIX A: GROUNDWATER ABSTRACTION RECORDS

Table A1: records of groundwater abstraction in metered wells [m^3/month].

	Well	1402	1426	1482	1518	1532	1762	1826	1880	1881	2041	2043
	well-type[1]	Ir		Ir	Ir	Ir	P	Ir	Ir	Ir	Ir	Ir
2001	January	16148		0	6013	0	23380	0	27709	21929	18416	15720
	February	15013		0	3716	0	14470	0	9178	8125	10667	5231
	March	0		0	947	0	13011	0	16788	7639	1625	5281
	April	0		0	1863	0	14000	0	5960	5781	5813	2726
	May	0		0	0	0	8445	0	0	0	0	136
	June	0		0	0	0	9796	0	0	0	0	644
	July	0		0	0	0	8906	0	0	270	0	135
	August	0		0	0	0	11077	0	0	0	0	1185
	September	133		0	268	0	8545	0	3467	5434	0	3140
	October	4182		0	0	0	13357	0	6906	5689	7116	3882
	November	2617		0	3615	0	10212	0	4828	3975	4607	2473
	December	1318		0	9327	0	15107	0	8254	5333	7209	5276
2002	January	4511		0	6399	0	11822	0	14509	10140	8484	8000
	February	7366		0	8810	0	11505	0	16200	13540	5003	9630
	March	2975		0	6218	0	11366	0	8999	5576	524	4123
	April	12430		0	1963	0	12298	0	2649	2267	3411	1773
	May	0		0	0	0	12214	0	0	0	0	0
	June	0		0	0	0	8793	0	0	0	0	441
	July	0		0	0	0	7341	0	0	0	0	441
	August	0		0	0	0	9959	0	0	0	0	441
	September	0		0	0	0	10881	0	3176	2440	12635	441
	October	12381		0	0	0	12393	0	12531	10267	17860	7663
	November	5497		0	6210	0	17402	0	10210	5739	14461	5770
	December	5005		0	0	0	15125	0	28766	23556	13611	12472
2003	January	6506		0	7022	0	18977	0	11670	10468	23219	14913
	February	0		0	13398	0	27796	0	46800	36772	25299	14564
	March	4000		0	0	0	15975	0	18164	15076	9763	8992
	April	0		0	0	0	10778	0	3341	2335	0	1159
	May	0		0	0	0	13259	0	0	0	0	0
	June	0		0	0	0	10534	0	0	0	0	92
	July	0		0	0	0	8844	0	0	0	0	92
	August	0		0	0	0	8713	0	0	1443	0	92
	September	0		0	0	0	11866	0	4623	2233	0	1483
	October	0		0	0	0	9772	0	11965	9158	1314	7553
	November	0		0	10261	0	12611	0	27257	19978	13637	11678
	December	6229		0	7720	0	12971	0	23882	12195	7369	12095
2004	January	9201		0	8047	0	19602	30668	37866	34467	20179	20091
	February	414		0	0	0	12191	0	14015	3555	0	1850
	March	3482		0	0	0	10439	0	16404	12927	0	8279
	April	0		0	0	0	11389	0	17341	10027	9752	8754
	May	0		0	0	0	12857	0	13911	7468	0	5835
	June	0		0	0	0	9007	0	2	0	0	5
	July	0		0	0	0	12788	0	0	0	0	980
	August	0		0	0	0	8345	0	0	0	0	980

[1] P means public supply, Ir means irrigation well, and In means industrial well.

	September	0		0	0	0	9097	0	8919	5748	0	980
	October	0		0	0	0	13229	0	3067	2064	24413	1020
	November	3341		0	2401	0	15155	0	18793	10064	12338	6440
	December	9495		0	3058	0	17229	0	16802	10915	0	8192
2005	**January**	10835		0	11445	0	14682	34902	39498	32331	22646	18984
	February	7453		0	9753	0	23624	1179	38450	28275	16693	19787
	March	1852		0	14134	0	14652	2237	6837	8637	19984	6849
	April	0		0	0	0	9085	0	0	0	0	0
	May	0		0	0	0	11163	0	0	0	0	0
	June	0		0	0	0	10065	0	0	0	0	0
	July	0		0	0	0	10868	0	0	0	0	0
	August	0		0	0	12721	9072	0	0	0	0	0
	September	0		0	0	0	11184	0	22944	11030	0	4380
	October	0		0	0	0	12633	1953	2763	4203	14	2032
	November	4498		0	0	0	15457	1737	17279	12799	12878	8281
	December	630		0	2087	6690	10918	334	40496	26869	6402	20929
2006	**January**	0		0	11340	27800	18240	10877	40179	22685	29862	16994
	February	0		0	1662	16860	18894	4802	34773	18829	23217	15165
	March	0		0	10025	4880	14232	14507	24094	19529	22605	14242
	April	0		0	0	0	9347	0	0	0	0	6
	May	0		0	0	0	10472	0	0	0	0	0
	June	0		0	0	0	8076	0	0	0	0	0
	July	0		0	0	0	9096	0	0	0	0	0
	August	0		0	0	0	8999	0	0	0	0	0
	September	0		0	0	0	11841	1854	7433	5189	0	4140
	October	0		0	0	0	11208	2812	13435	8655	7515	5206
	November	0		0	0	8680	17060	2812	19351	9611	2560	7854
	December	0		0	0	14480	14934	7450	44652	32804	25914	21523
2007	**January**	257043	43205	192175	6412	22890	97034	5551	48224	38878	21046	24423
	February	342840	4537	163067	14537	29910	84084	5187	46456	36375	26223	20891
	March	166210	10656	159021	9350	31200	85801	9976	32091	22556	21925	15548
	April	34600	9198	33594	2181	4670	63781	0	4532	3542		2386
	May		24656	23086	23086		72577		3758	3358		1108
	June											
	July											
	August											
	September											
	October											
	November			19630							21614	
	December										25372	

	Well	2160	2220	2242	2246	2278	2277	2543	2933	3104	3130	3204
	well-type	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir		P	Ir
2001	January	15041	39400	18003	7616	18651	1639	0			1044	0
	February	17096	39710	11624	8110	14092	662	0	35160		998	0
	March	10069	19180	8525	1673	8612	2670	0	26230		727	0
	April	2868	6640	7183	0	2136	800	0	5180		nodata	0
	May	151	470	10	0	3405	280	0	0		527	0
	June	210	440	64	0	0	11	0	0		674	0
	July	275	480	98	0	2544	9	0	0		738	0
	August	373	880	116	0	1400	799	0	0		741	0
	September	4667	9900	360	2019	777	420	0	0		986	0
	October	2214	4200	360	891	1612	275	0	6760		860	0
	November	8485	830	3962	10736	7839	4545	0	5470		499	0
	December	10911	5580	4153	5544	11331	10673	0	6310		868	0
2002	January	4111	9253	5082	19830	16058	7036	0	20080		1692	0
	February	4753	8387	7151	25646	10122	7391	0	3610		790	0
	March	8843	2810	6789	4376	14670	5916	0	9590		1091	0
	April	2190	1270	1345	5795	6873	5753	0	5670		604	0
	May	180	0	289	929	0	1587	0	0		528	0
	June	765	0	145	285	0	0	0	3610		553	0
	July	765	0	0	103	0	0	0	3610		377	0
	August	765	0	48	3312	0	0	0	3610		375	0
	September	765	16680	772	5311	1256	0	0	3610		596	0
	October	9784	17610	2800	6838	7771	nodata	0	19290		537	0
	November	8011	16490	6478	20851	15199	10628	0	18170		752	0
	December	9796	24820	5294	12200	11892	11549	0	19340		919	0
2003	January	20318	40547	9823	30008	22172	18151	0	45201	1435	1412	0
	February	18065	22873	12952	27402	29592	33819	0	29241	777	1024	43359
	March	2296	21410	5679	11579	8714	13789	0	20598	35	505	0
	April	907	590	1246	0	0	4768	0	30	23256	781	0
	May	0	0	19	0	3803	0	0	0		585	0
	June	235	0	26	8446	110	0	0	0		660	0
	July	235	0	126	2	25	0	0	0		740	0
	August	235	909	36	4880	623	0	0	620		1088	0
	September	1918	6542	4409	9950	1613	22	0	8230		968	0
	October	4015	21810	4163	6692	4457	5646	0	16920		431	0
	November	7879	38380	9103	19944	13687	12680	0	46060		736	0
	December	8279	31640	6631	28514	16544	16921	0	23520		884	0
2004	January	4499	33860	13916	10350	16207	20417	0	37230	17398	1335	38652
	February	8012	400	70	121	3969	1655	0	0	7142	622	49120
	March	8133	9520	4793	2360	14171	13248	0	9780	3352	525	15788
	April	4606	14600	8524	729	6505	10650	0	13590	106	509	0
	May	2662	6490	98	3824	949	3862	0	9110	368	298	0
	June	307	240	15	1086	0	0	0	0	766	340	0
	July	2904	0	47	15	448	0	0	0	1529	321	0
	August	2904	0	50	46	634	0	0	0	2055	263	0
	September	2904	19839	3618	151	0	5125	0	23400	2085	424	0
	October	2739	4750	2365	14	11728	739	0	4010	922	484	0
	November	13083	29860	8104	11215	16554	27079	0	22410		541	0
	December	11891	31570	7594	26128	10872	10872	0	35290		796	0

2005	**January**	26613	54450	16696	45483	33371	35945	10508	52250	7540	1362	0
	February	33328	46170	19188	57914	33081	36829	21947	40470	7000	563	0
	March	12714	19420	11169	15960	17446	21744	21288	29990	1534	710	0
	April	0	0	28	0	0	0	0	0	1900	343	0
	May	0	0	17	0	0	0	0	0	902	382	0
	June	0	0	10	0	0	0	0	0	176	417	0
	July	0	0	0	0	0	0	0	0	0	431	0
	August	0	0	0	0	0	0	0	13750	0	456	0
	September	5949	29900	2411	12978	15888	1730	0	9460	27000	497	0
	October	2627	4150	1132	2869	4606	5393	0	4120	28020	462	0
	November	7863	24950	5883	11016	11704	12128	0	21480	16000	665	0
	December	15550	31650	13891	37895	22861	20296	0	19740	34860	855	0
2006	**January**	26858	57810	20413	57467	35738	37356	0	53200	57730	57730	0
	February	23426	40970	9799	no data	24659	16192	0	33960	40400	40400	0
	March	3297	30070	16085	no data	21780	21858	0	25550	43530	43530	0
	April	39	2100	84	no data	0		0	3000	19900	0	0
	May	0	0	41	no data	0	0	0	0	14610	0	0
	June	0	0	0	no data	0	0	0	0	6970	0	0
	July	0	0	0	no data	0	0	0	0	19750	0	0
	August	0	0	56	no data	0	0	0	0	8190	0	0
	September	5297	22020	2889	581	491	2303	0	19150		19900	0
	October	9279	10420	3651	2564	7848	9209	0	14890		21580	0
	November	6581	21160	4086	3205	11771	11512	0	22200		19750	0
	December	8901	51420	10796	5769	17657	20722	0	50680		11720	0
2007	**January**	29596	85430	18395	3947	13815	9810	0		49010		22130
	February	24425	61330	17858	8013	28781	24525	0		49640		24426
	March	21925	36840	13156	7673	26269	22852	0		49610		
	April	360	4320	2635	342	2511	1671	0		44750		
	May	1256	15970	45	9327	2721	7835	0		16150		
	June			3719	1720	2820	2327	0		22950		
	July			354						9890		
	August			126						17150		
	September			381						19240		
	October									24620		
	November									29740		
	December									22250		

	Well	3722	3774	3852	3854	3870	3882	4049	4110	4122	4128	4163
	well-type	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir
2001	January	111539	254747	41872	80615	138384	6750	57983	2731	62070	3140	nodata
	February	60573	131895	35540	32435	101663	1610	nodata	19734	29567	2152	nodata
	March	38163	85663	28394	21630	53741	2797	nodata	13495	2568	2247	nodata
	April	42731	91151	0	16443	82260	2797	57372	998	35288	189	nodata
	May	0	0	0	2833	0	2797	0	998	0	nodata	nodata
	June	5136	0	0	0	0	2797	0	998	0	72	nodata
	July	0	0	0	0	0	2797	0	998	0	nodata	nodata
	August	0	0	0	0	0	2797	0	998	0	nodata	nodata
	September	0	0	23547	4370	0	2797	0	998	0	1390	nodata
	October	26683	60583	0	29857	0	2890	0	998	6869	1139	nodata
	November	3368	7178	12	26340	0	7940	40576	998	1889	nodata	nodata
	December	16732	74370	0	28713	30599	2540	14964	20235	6355	2425	nodata
2002	January	19660	46172	18619	40871	102498	2910	20645	23962	49817	682	nodata
	February	25383	47056	4898	14738	53760	5250	41252	12701	16645	779	nodata
	March	21626	41812	14	23307	120583	7530	24482	21107	30584	1645	nodata
	April	91803	170241	12	44840	57422	0	22724	1725	40342	nodata	nodata
	May	0	0	4266	482	0	0	0	1725	0	nodata	nodata
	June	0	0	4266	395	0	1530	0	1725	0	1645	nodata
	July	0	0	4266	0	0	0	0	1725	0	1500	nodata
	August	0	0	4266	1396	0	0	0	1725	0	nodata	nodata
	September	0	0	3695	14099	0	0	0	1725	0	408	nodata
	October	30264	92722	32557	53794	23162	5560	34100	1725	5806	1091	nodata
	November	78268	159026	20488	55328	132669	11530	35014	1725	66167	1443	nodata
	December	18596	32716	16134	67103	57051	23385	nodata	4788	30208	1639	nodata
2003	January	115560	245860	55237	111966	134493	19585	79796	12573	51708	3376	nodata
	February	107093	225157	75434	83581	125258	20580	59695	13052	59249	4145	nodata
	March	54690	136116	13989	44559	52570	12780	0	13466	16533	1578	nodata
	April	0	25214	0	nodata	0	6500	0	20792	2412	967	nodata
	May	0	0	0	nodata	0	0	0	0	0	0	nodata
	June	0	0	0	nodata	0	0	0	0	0	0	nodata
	July	0	0	0	nodata	0	0	0	0	0	0	nodata
	August	0	0	0	nodata	0	0	0	0	0	0	nodata
	September	0	0	0	nodata	0	0	0	0	0	0	nodata
	October	0	0	0	nodata	0	5010	11090	14255	0	289	nodata
	November	37497	70317	0	nodata	95098	20230	51510	35101	57307	846	nodata
	December	157472	347803	11145	nodata	115833	37620	31805	5542	43007	1298	nodata
2004	January	112034	223293	32372	48912	116126	7830	43513	41229	44729	1307	nodata
	February	0	0	0	69623	4232	0	2530	59926	6938	647	nodata
	March	0	83739	0	50425	20278	20860	8454	61153	2201	983	nodata
	April	0	0	3865	38346	0	8251	13319	3404	55082	nodata	nodata
	May	0	0	0	3597	0	8251	0	0	9230	375	nodata
	June	0	0	0	491	0	8251	0	0	0	0	nodata
	July	0	0	0	604	0	8251	0	0	0	0	nodata
	August	0	0	0	1083	0	8251	0	0	0	0	nodata
	September	0	0	0	51983	0	8251	0	0	0	0	nodata
	October	6022	6022	0	22812	32862	8251	0	0	6542	1089	nodata
	November	98191	279358	0	165723	99568	8251	0	786	37638	2711	nodata
	December	98955	205536	10112	103400	84098	8251	59421	63786	53503	272	nodata

2005	**January**	170935	361756	32218	161420	137725	44680	53830	38434	62085	1481	28994
	February	140325	305442	53054	134148	118799	36690	25824	0	39482	2697	36988
	March	80590	169018	0	60413	65313	29610	31856	0	46298	536	314
	April	0	0	0	30296	0	9070	0	0	0	0	314
	May	0	0	0	28334	0	0	0	0	0	0	314
	June	0	0	0	306	0	0	0	0	0	0	314
	July	0	0	0	306	0	0	0	0	0	0	314
	August	0	0	0	306	12949	0	0	0	0	0	314
	September	0	0	0	26508	0	0	0	0	0	0	314
	October	0	0	0	28671	0	0	0	0	0	147	314
	November	50	0	10816	73640	51247	10480	19716	0	13273	1621	14506
	December	130660	5128	30473	26793	64942	10390	41882	0	23170	2049	18868
2006	**January**	135590	162820	44948	158906	119180	26090	78910	0	54589	1912	59310
	February	85800	120970	35989	144321	94186	29890	55024	0	38008	1513	38121
	March	84760	111080	0	67923	91981	28660	54450	0	42865	1621	28932
	April	0	0	0	0	0	0	0	0	0	333	440
	May	0	0	0	0	0	0	0	0	0	1	0
	June	0	0	0	0	0	0	0	0	0	0	0
	July	0	0	0	0	0	0	0	0	0	0	0
	August	0	0	0	0	0	0	0	0	0	1	0
	September	0	0	0	18359	0	0	1436	0	0	891	0
	October	0	0	21033	4381	8608	190	no data	0	14869	791	0
	November	64860	113950	2642	36209	66166	13000	39721	0	24058	1484	28636
	December	58607	144640	32845	99900	83744	15940	67121	0	54425	2020	70181
2007	**January**	160783	96260	2090	92567	132468	8370	76683		20667	1706	
	February	174150	168690	26504	116962	103905	21160	67924		17955	2430	
	March	73950	92260	43881	79317	105165	19780	49534		17073	2120	
	April	18770	15830	18353	17499	19812	7180	9681		2674	0	
	May					20039	17310	3655		23086	1283	
	June						2050	65209			103	
	July							42464			0	
	August										1	
	September										0	
	October										301	
	November									10672	2940	
	December											

	Well	4295	4418	4489	4593	4604	4654	4656	4672	4685	4761	4820
	well-type	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir	Ir
2001	January	39255	0	nodata	0	0	0	0	0	0	0	0
	February	12329	0	nodata	0	0	0	0	0	0	0	0
	March	22606	0	nodata	0	0	0	0	0	0	0	0
	April	4841	0	nodata	0	0	0	0	0	0	0	0
	May	461	0	nodata	0	0	0	0	0	0	0	0
	June	461	0	nodata	0	0	0	0	0	0	0	0
	July	461	0	nodata	0	0	0	0	0	0	0	0
	August	461	0	nodata	0	0	0	0	0	0	0	0
	September	461	0	nodata	0	0	0	0	0	0	0	0
	October	461	0	nodata	0	0	0	0	0	0	0	0
	November	461	0	nodata	0	0	0	0	0	0	0	0
	December	nodata	0	nodata	0	0	0	0	0	0	0	0
2002	January	nodata	0	nodata	0	0	0	0	0	0	0	0
	February	nodata	0	nodata	0	0	0	0	0	0	0	0
	March	3054	0	nodata	0	0	0	0	0	0	0	0
	April	1533	0	nodata	0	0	0	0	0	0	0	0
	May	0	0	nodata	0	0	0	0	0	0	0	0
	June	20	0	nodata	0	0	0	0	0	0	0	0
	July	20	0	nodata	0	0	0	0	0	0	0	0
	August	0	0	nodata	0	0	0	0	0	0	0	0
	September	0	0	nodata	0	0	0	0	0	0	0	0
	October	30	0	nodata	0	0	0	0	0	5948	0	0
	November	13922	0	nodata	0	0	0	0	0	8135	0	0
	December	3830	0	nodata	0	0	3344	31402	87251	0	0	0
2003	January	23602	26580	nodata	29290	26768	29869	23486	214471	0	60822	0
	February	7127	5486	nodata	92187	39264	25493	23741	172706	0	67679	0
	March	nodata	4148	nodata	42029	12863	9166	10406	0	1772	0	0
	April	41169	0	nodata	0	0	35	0	33232	0	0	0
	May	0	nodata	nodata	0	0	0	0	0	0	0	0
	June	0	nodata	nodata	0	0	0	0	0	0	0	0
	July	0	nodata	nodata	0	0	0	0	0	0	0	0
	August	0	nodata	nodata	0	0	0	0	0	0	0	0
	September	0	nodata	nodata	0	0	0	0	59	0	0	0
	October	108	nodata	nodata	31205	0	0	0	0	0	3732	0
	November	9448	nodata	nodata	116665	2060	5869	6297	5937	0	49242	15699
	December	24966	nodata	nodata	49250	28552	13171	8118	88446	0	39723	6735
2004	January	5872	nodata	nodata	97245	26112	854	8503	0	0	61074	13337
	February	0	nodata	nodata	35	0	0	0	0	0	0	0
	March	6644	nodata	nodata	42239	1	48	0	0	0	13869	0
	April	4338	nodata	nodata	103364	2634	6576	12442	124747	0	4474	0
	May	2735	nodata	nodata	0	6502	24329	0	49050	0	0	0
	June	0	nodata	nodata	0	0	0	0	0	15550	0	0
	July	0	nodata	nodata	0	0	0	0	0	nodata	0	0
	August	0	nodata	nodata	0	0	0	0	0	nodata	0	0
	September	1350	nodata	nodata	0	0	0	0	0	nodata	0	0
	October	7111	nodata	nodata	48358	9559	3819	1533	0	nodata	0	0
	November	10733	nodata	nodata	52681	16922	8683	6268	55259	nodata	40237	0
	December	6369	nodata	nodata	75930	21482	11219	13190	100255	18621	40237	6700

2005	**January**	7814	nodata	nodata	95766	37481	17549	39185	119510	6224	50511	19987
	February	11022	nodata	nodata	76183	36481	23308	34365	154792	nodata	76780	11998
	March	6709	nodata	nodata	69589	10804	16999	28000	100455	nodata	48382	9354
	April	0	nodata	nodata	0	0	0	0	4342	nodata	0	0
	May	0	nodata	nodata	0	0	0	0	0	7495	0	0
	June	322	nodata	nodata	0	0	0	0	0	nodata	0	0
	July	322	nodata	nodata	0	0	0	0	0	nodata	0	0
	August	322	nodata	nodata	0	0	0	0	0	nodata	0	0
	September	322	nodata	nodata	52282	16	1	0	50639	nodata	0	0
	October	322	nodata	nodata	0	93	1	0	3169	nodata	0	0
	November	322	nodata	nodata	26949	11942	12049	9806	103940	nodata	36128	0
	December	322	nodata	nodata	75026	23136	19192	20374	70320	nodata	48130	10471
2006	**January**	1766	no data	19918	116348	5785	4801	23759	153750	0	114816	30021
	February	2598	no data	14653	56896	25607	17857	27490	50890	0	64613	12458
	March	2598	no data	0	103490	25607	17857	26623	91430	155	74719	9154
	April	2598	no data	0	0	0	0	12326	35250	0	150	0
	May	2598	no data	0	0	0	0	0	0	0	0	0
	June	0	no data	0	0	0	0	0	0	0	0	0
	July	0	no data	0	0	0	0	0	0	0	0	0
	August	0	no data	0	0	0	0	0	0	0	0	0
	September	810	no data	0	0	0	0	0	12800	0	2455	0
	October	16583	no data	0	1144	12362	19572	0	33897	0	0	0
	November	10709	no data	0	57146	1369	891	13410	30981	0	47557	0
	December	18708	no data	27624	39907	34144	24670	30152	82437	0	81457	23444
2007	**January**	36450	1108	12970	114320	26678	47013	37894	60985	5673	101670	8413
	February	25005	1	4374	93954	31328	49351	27149	103340	2325	87987	17543
	March	12495	1982		62223	27880	54449	30794	152160	1399	57093	11571
	April	11700	1678		17216	36089	69770	30014	38170	7553	4717	12399
	May	7800			30653			35414	36490	665	8258	15596
	June	12221			52026			23611	141080		63740	6726
	July										59810	
	August											
	September											
	October											
	November											
	December											

	Well	4830	4882	4913	5167	5211	5435	1485	3594	5167	5497	5586
	well-type	Ir	Ir	Ir	Ir	Ir		Ir	Ir	Ir		
2001	January	0	0									
	February	0	0									
	March	0	0									
	April	0	0									
	May	0	0									
	June	0	0									
	July	0	0									
	August	0	0									
	September	0	0									
	October	0	0									
	November	0	0									
	December	0	0									
2002	January	0	0									
	February	0	0									
	March	0	0									
	April	0	0									
	May	0	0									
	June	0	0									
	July	0	0									
	August	0	0									
	September	0	0									
	October	0	0									
	November	0	0									
	December	0	0									
2003	January	0	0									
	February	0	0									
	March	0	0									
	April	0	0									
	May	0	0									
	June	0	0									
	July	0	0									
	August	0	0									
	September	0	0									
	October	0	0									
	November	0	0									
	December	365620	nodata									
2004	January	102180	58290									
	February	44300	0									
	March	37220	90470									
	April	23300	11891									
	May	28770	0									
	June	0	0									
	July	0	0									
	August	0	0									
	September	0	0									
	October	12180	0									
	November	102090	104654									
	December	61440	75296									

2005	**January**	117620	116329		0	746		0	9906	0		
	February	162240	20750		0	1491		0	7283	0		
	March	21200	0		0	1167		26380	4639	0		
	April	0	0		0	123		4034	0	0		
	May	3410	0		0	0		0	0	0		
	June	0	0		0	0		0	0	0		
	July	0	0		0	0		0	0	0		
	August	0	0		0	0		0	1048	0		
	September	0	0		0	0		0	1363	0		
	October	0	0		0	0		0	0	0		
	November	124180	0		1174	461		12414	5308	1174		
	December	124380	77120		35386	1736		4134	8316	35386		
2006	**January**	124260	70700	0				26380	9906			
	February	79170	80000	0				4034	7283			
	March	92150	81200	0				12414	4639			
	April	0	0	0				4134	1048			
	May	0	0	0					1363			
	June	0	0	0					0			
	July	0	0	0					5308			
	August	0	0	0					8316			
	September	21750	0	0								
	October	9310	0	0								
	November	36520	48000	0								
	December	83580	49200	0								
2007	**January**	85640	75100		19165			16228	12997			18623
	February	101980	135000		21421		9223	25591	12978			70251
	March	98330	29300		15020		32989	19158	13428			55708
	April	4460			11967			23325	8804			30594
	May	38080						14305	11250			47774
	June	103990						8980	4799			10195
	July							4996	0			0
	August							10617	1417			41745
	September								3427			
	October								4544			
	November										18221	
	December											

	Well	6715	6716	6720	6721	6723	6724	1452
	well-type	In	In	In	In	In	In	Ir
2001	January	1560	1441	24410	51343	6386	976	35282
	February	987	1239	21614	46976	9749	1506	18940
	March	2823	1567	35241	79308	373	90	16716
	April	1315	1123	19540	42183	14792	2139	6899
	May	1885	1375	26730	58658	10719	1580	1181
	June	2061	1030	17644	38476	14343	2096	62
	July	1987	1158	19448	42637	5932	927	948
	August	854	994	9594	20459	19878	3057	1413
	September	113	282	8053	17613	3783	574	12883
	October	701	1108	14263	30664	11758	1818	3486
	November	1647	1554	20532	44406	31603	4713	7255
	December	807	1359	19799	43415	22932	3171	2875
2002	January	12120	1394	30412	68485	81	74	12000
	February	11870	1021	23547	52356	245	41	13572
	March	12070	1259	28002	62008	0	0	11394
	April	14500	1385	26391	60624	7215	987	5632
	May	18030	1316	20602	52710	19571	2674	750
	June	12750	926	10588	21935	31006	4232	2663
	July	8900	889	8068	16498	35398	4941	2663
	August	11780	954	19198	41552	10021	1384	2663
	September	0	29	4042	8565	0	0	2663
	October	2260	342	14536	31948	0	0	9422
	November	7740	1719	29108	62888	2424	341	18322
	December	3429	1311	26898	61445	2994	373	19915
2003	January	12596	1051	28937	71444	20181	2048	33879
	February	12933	59	30818	65173	5662	34	40903
	March	8991	600	28965	62081	10691	1457	34087
	April	2986	178	16356	35085	24327	3102	6083
	May	12808	1972	29824	59521	21767	2522	1445
	June	8783	63	22706	61100	801	123	391
	July	nodata	nodata	nodata	nodata	nodata	nodata	391
	August	nodata	nodata	nodata	nodata	nodata	nodata	391
	September	nodata	nodata	nodata	nodata	nodata	nodata	4258
	October	0	0	8605	18831	16108	2097	12879
	November	7793	1144	12288	26924	15473	2278	37431
	December	7244	2172	23123	49015	23040	3044	23649
2004	January	6971	2102	16453	33945	35934	4920	45081
	February	1030	1645	14489	31076	22072	2883	14471
	March	11721	2257	22508	2811	46073	5086	14685
	April	14672	2861	16491	38356	46682	4476	22352
	May	7600	1556	10172	21272	22032	2729	1681
	June	16363	1763	12091	25710	34411	4194	1321
	July	10027	1413	9635	20440	22696	2828	4684
	August	1747	1488	7280	15869	12395	1473	4684
	September	0	1061	2202	4590	3269	417	4684
	October	0	1360	9919	22335	2587	321	4525
	November	3566	1528	14249	29777	9544	1219	31674
	December	7159	1915	29347	40291	14654	1768	17358

2005	**January**	13965	1990	32000	60059	6520	645	44283
	February	15130	2020	35068	64379	1517	174	53463
	March	8754	2083	32522	72694	0	0	2553
	April	2813	1383	7420	16718	24647	2852	3555
	May	2169	1756	13977	31271	9427	1046	3555
	June	13939	2028	19369	43248	12632	1430	3555
	July	12262	1725	18652	41653	1087	122	3555
	August	2984	613	5509	11720	3835	439	3555
	September	2986	2000	990	1974	203067	4374	10202
	October	0	1416	87675	37783	45132	5217	2103
	November	8349	1388	0	0	49668	5954	18364
	December	9343	2837	0	0	77232	8217	29250
2006	**January**	8246	2888	10895	28714	36461	4137	46899
	February	10124	2945	28716	50051	7728	897	34123
	March	9808	3129	22583	57524	17184	2006	17429
	April	5827	2719	5264	24653	49688	5550	1892
	May	4236	3468	5141	13926	53299	5885	695
	June	12274	2889	19873	33783	9023	923	695
	July	2385	3923	5626	9202	62149	6467	695
	August	0	2281	9304	20235	521	60	695
	September	0	578	0	5884	7012	736	15886
	October	0	2281	4099	6976	15364	1544	12538
	November	2235	2332	22533	38896	2570	237	24632
	December	5555	3211	31545	61733	13890	1209	32374
2007	**January**							46104
	February							45268
	March							31427
	April							766
	May							10331
	June							
	July							
	August							
	September							
	October							
	November							
	December							