Lake Rotomanu, New Plymouth.

(B) HOW DO TARANAKI LAKES COMPARE WITH OTHER REGIONS?

Comparison of lake data between regions in New Zealand is difficult because lake monitoring is undertaken for different reasons. Monitoring may be carried out because a lake is of a high value or quality, of the largest size, at high risk of nutrient enrichment, or eutrophication, or of high use and public interest[44]. There is no representativeness across current regional monitoring programmes, so results can only be compared with caution.

Table 4.17 shows the number of New Zealand lakes according to their nutrient status compared to Lake Rotorangi. This shows that Lake Rotorangi has a similar nutrient status to 16% of lakes monitored across New Zealand.

Trends in nutrient status in lakes have also been examined. Across New Zealand 13 (19%) are declining, 34 (48%) are showing no change and 23 (33%) are showing improved water quality. Like Lake Rotorangi, the nutrient status of most monitored New Zealand lakes is not changing, although more monitored lakes are improving than declining.

(C) HOW DOES TARANAKI BATHING WATER QUALITY COMPARE NATIONALLY?

The suitability of Taranaki's freshwater sites for swimming can be compared with the national data provided by the Ministry for the Environment[45]. Figure 4.20 shows that Taranaki freshwater bathing sites were suitable for contact recreation a greater proportion of the time than the national average, i.e. more samples were under the Alert threshold. For three out of the four years that national data is available, Taranaki swimming spots were more likely to be suitable for bathing than the national average.

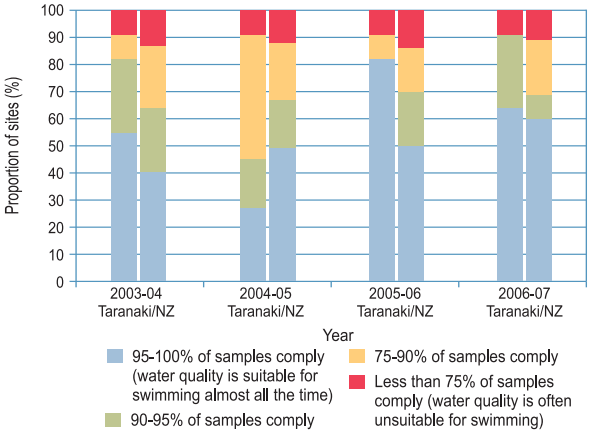

Figure 4.20: Proportion of sites in various categories of compliance with water quality guidelines for swimming in Taranaki and New Zealand from 2003-04 to 2006-07.

4.2 SURFACE WATER QUANTITY AND FLOWS

4.2.1 WHAT IS THE CURRENT STATE OF TARANAKI RIVERS?

Since the 2003 *State of the Environment Report* the region has experienced some of the biggest floods and lowest flows on record, with floods for the Waitōtara region in 2004 and the May 2007 'flash flood' event in the area from Ōākura around to Egmont Village. During the summer of 2007-08 the region recorded extremely low rainfall totals, with some of the streams recording their lowest flow on record. Two of the streams recorded a low flow return period of a '1 in 80 year' event, meaning that that probability of such a low flow occurring in any one year was 1.2%.

(A) INDICATORS AND GUIDELINES

There are several key measures of river or stream flow that are used as indicators of surface water quantity: the mean, or average flow, the median flow which is the flow that occurs 50% of the time, and the mean annual low flow, or MALF, which is an average of the lowest flow that the river reached each year (usually during summer).

National guidelines for ecological flows, i.e. flows that should be retained in rivers and streams to safeguard ecological values, are in the process of being developed[46]. The Taranaki Regional Council has adopted a guideline for ecological flows in the *Regional Fresh Water Plan*. This guideline requires levels of water to remain in rivers and streams that will retain two thirds of the amount of instream habitat that

Table 4.17: Trophic status of Lake Rotorangi compared with lakes in New Zealand.

State	☹ More impacted <<<<< 😐 >>>>>>>>> more pristine ☺					
	Hyper-trophic	Super-trophic	Eutrophic	Meso-trophic	Oligo-trophic	Micro-trophic
Lake Rotorangi				yes		
All NZ	18 (13%)	13 (10%)	44 (33%)	21 (16%)	25 (19%)	13 (10%)

National data from Opus, 2006.

44 Opus, 2006. *Snapshot of Lake Water Quality in New Zealand.* Prepared by Opus International Consultants for the Ministry for the Environment.
45 Ministry for the Environment. 2007. *Environment New Zealand 2007.*
46 Ministry for the Environment. 2008. *Proposed National Environmental Standard on Ecological Flows and Water Levels Discussion Document.*

Gauging the flow of the Mangaoraka Stream.

would be found at the mean annual low flow (or MALF), i.e. the average lowest summer level. This formula was developed to predict when instream conditions become limiting for a range of aquatic species[47]. Compliance with this guideline is used as an indicator of surface water quantity in Taranaki.

Indicators of the level of pressure on the rivers and streams include the quantity of water allocated for different uses and the number of consents issued for water abstraction. There are 224 parent catchments in Taranaki, 45 of these have consented water abstractions.

(B) FLOW CHARACTERISTICS

River flows in Taranaki are typically high in the winter with low flows occurring in the summer. Rivers draining the mountain typically rise rapidly from high rainfall events, and they recede at a steady rate once the rain has stopped. Generally mean or average river flows are much higher than the median flows.

The Egmont National Park is critical for maintaining flows in ring plain streams and rivers during prolonged dry periods. During low flow periods, Egmont National Park is the source of approximately 80% of water in ring plain streams. In some rivers, such as the Stony (Hangatahua) River, the flow at the coast is almost all (95%) derived from the park. In contrast, for other rivers such as the Kāpuni, the park's contribution is somewhat lower (57%), but this is still reasonably high.

The other significant feature of ring plain streams and rivers is the stability of their low flows. In general, stream flows recede, or drop, predictably once low flow conditions prevail, but flows in some streams continue to go down faster than others. In most summers, ring plain streams recede to approximately 50% of their median flow levels, but once they reach these levels, they tend to take a relatively long time to drop much lower. Even during a 10-year drought, levels typically recede to only 35-40% of median flows.

Rivers draining the mountain also generally have high base flows, due to the water storage on the mountain from ice and springs located high in the catchment. In comparison, the streams draining the hill country

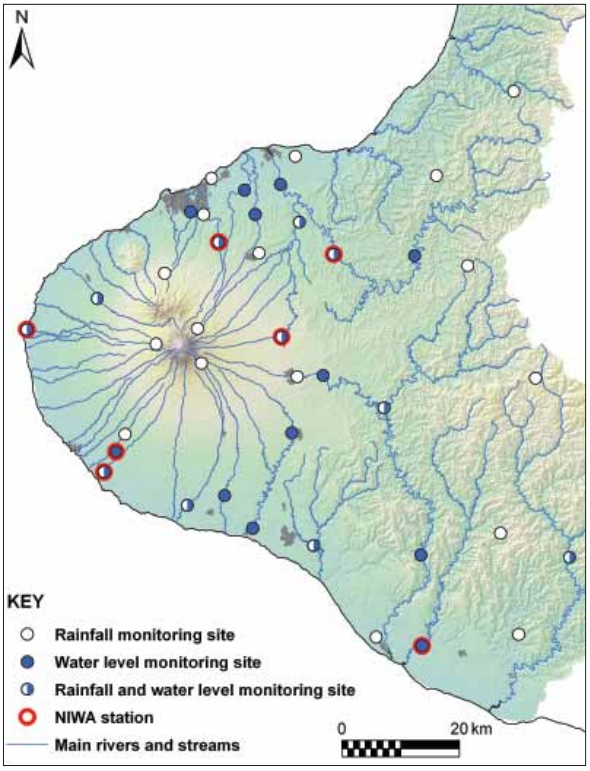

Figure 4.21: Location of monitoring stations in Taranaki.

have reasonably low base flows, as there is less storage of water in the ground reservoirs.

Hillcountry rivers do not have the same flash-flood type events as the ring plain streams do. They tend to rise and fall quite uniformly and take a lot longer to reach their peak flows. This is due to the rivers taking longer to respond to rainfall levels. Hillcountry catchments do not usually receive rainfall events as intense as ring plain streams, and surface flows are slowed down by vegetation.

During summer or when there is an absence of rainfall, the rivers from the hill country tend to recede quite quickly to their low flows, and continue to decrease at a higher rate than the ring plain streams do, and they also take longer to recover to normal flows once rainfall occurs.

The Council operates a network of 35 monitoring stations which continuously collect data on rainfall, stream flow and water levels. This is complemented by a further five stations operated by NIWA. Two stations are shared by the Council and NIWA. All monitoring stations are shown in Figure 4.21. This system provides valuable information on floods as well as water availability during droughts.

The Council also undertakes stream flow measurements for many waterways in the region for state of the environment and pasture irrigation monitoring, particularly during low flow periods.

Regular monitoring enables the Council to gather valuable information about the region's surface water resources. This information is used to assess the low flow behaviour of rivers and streams, assess the likely impacts of current and future abstractions and to develop appropriate water management policies.

47 Jowett, I. 1993. *Report on Minimum Flow Requirements for Instream Habitat in Taranaki Rivers.* NZ Freshwater Miscellaneous Report No. 75. NIWA, Christchurch.

Table 4.18 shows that data on water levels in streams have been gathered for a long time for certain sites. For example, almost 40 years of data have been gathered for the Punehu Stream. The mean annual low flow relates to the size of the catchment – the larger catchments obviously having a larger flow. The maximum flow ever recorded was 2.4 million litres per second in the Waitara River.

The mean annual low flows for the past 20 years were analysed to see if there were any statistically significant trends over that time. Fourteen of the 27 sites showed significant temporal changes and 13 showed no statistically significant trend. There were five significant increases and one decrease (which was Waingongoro River at Eltham Rd) in MALF. In terms of median levels, seven sites showed statistically significant increases and one showed a measurable decrease (the Waitara River at Bertrand Rd). Three streams showed statistically significant increases in both MALF and median - the Punehu Stream, Waitara River at Tarata and Kaupokonui Stream ($p<0.05$). These trends are illustrated in Figure 4.22.

Table 4.18: Flow data for selected Taranaki river sites.

River/Site	Record Began		Catchment Area		MALF	Min	Max	Mean	Median
			Upstream of Recorder	Total Catchment	(1 day)	Instantaneous			(50% of time)
	From:		(km2)	(km2)	(litres/sec)	(litres/sec)	(litres/sec)	(litres/sec)	(litres/sec)
Kapoaiaia at Lighthouse*	Feb-86		20	23	264	111	40,496	1,109	672
Kapuni at SH45/Normanby Rd	Jun-80		41	44	352	133	379,834	1,810	1,279
Kaupokonui at Glenn Rd	Apr-78		62.6	150	749	322	298,922	3,093	2,001
Mangaehu at Bridge	Jan-78		421	422	2449	1,159	778,077	12,809	6,934
Manganui at Everett Park	Jun-91		200	220	3050	2,347	1,054,374	18,194	8,574
Manganui at SH3 (Midhurst)*	May-72		11.3	220	446	255	82,938	1,507	841
Mangaoraka at Corbett Rd	Apr-75		46.4	63	246	115	668,713	2,033	1,215
Mangatawa at McKays/Pihama*	Dec-85		11.4	11.4	21	5	9,524	203	134
Pātea at Skinner Rd	Feb-78		87.5	1074	783	406	303,782	5,055	3,132
Punehu at Pihama*	Dec-69		29.5	42	269	174	89,854	1,152	663
Stony at Mangatete Bridge	Sep-79		43.6	52	2167	1,489	514,927	6,683	3,417
Tawhiti at Duffys	May-85		54.5	56	171	60	18,923	670	525
Waingongoro at Eltham Rd	Dec-74		46.7	244	437	183	150,727	2,755	1,713
Waingongoro at SH45	Nov-80		202	244	1336	661	287,619	6,935	4,845
Waiongana at SH3a	Apr-80		32.6	98.4	412	253	221,268	2,808	1,437
Waitara at Bertrand Rd	Feb-80		1120	1160	7229	4,400	2,449,757	58,433	29,720
Waitara at Tarata*	Dec-68		725	1160	3358	1,358	1,310,811	34,415	18,128
Waiwhakaiho at Egmont Village (SH3)*	Feb-80		58	77	2104	1,141	559,499	7,771	3,910
Whenuakura at Nicholson Rd*	Mar-83		441	472	1898	53	359,334	10,126	5,285
Closed Sites	From:	To:							
Huatoki at Mill Rd	Jul-81	Nov-90	20.7	25	130	53	33,963	737	547
Maketawa at SH3	Oct-80	Jan-97	18.7	28	864	699	163,528	2,431	1,300
Mangatoki at Hastings Rd	May-83	May-96	20	32	248	181	62,297	1,121	801
Ngātoro at SH3	Jun-75	Jan-97	11.6	38	276	170	162,096	1,249	579
Pātea at Mangamingi	Apr-75	May-84	740	1074	3823	1,841	548,095	24,183	15,573
Timaru at SH45	Mar-80	Jan-94	27	31	420	293	138,723	1,834	1,112

Notes:
* NIWA sites
MALF: Mean (average) annual low flow
Min: Minimum flow recorded over the period of record
Max: Maximum flow recorded over the period of record
Instantaneous: The flow measured at an instant in time by the recorder (every 15 minutes)
Median: The flow recorded 50% of the time.

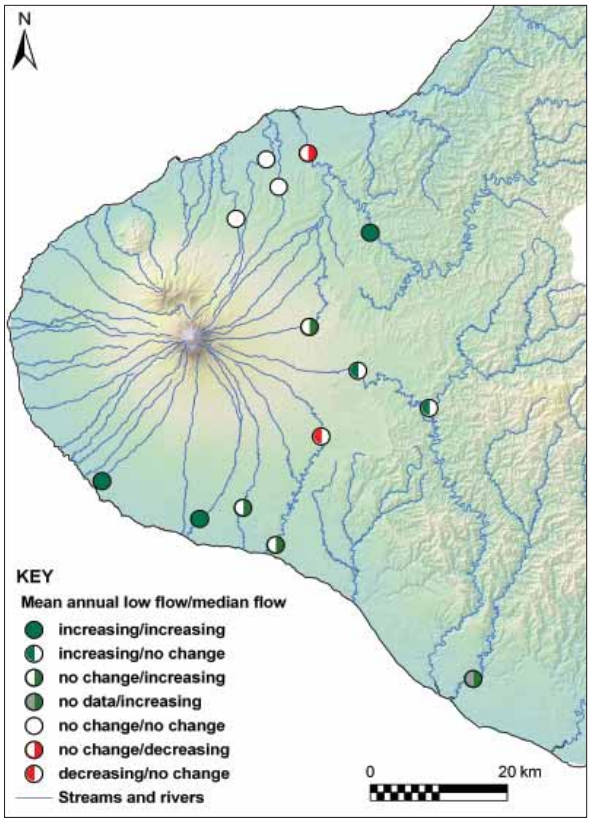

Figure 4.22. Statistically significant trends in water quantity in rivers and streams (p<0.05).

Trends in water levels are most likely symptomatic of climate variability. Flows in rivers are a product of rainfall, run-off from land as well as water abstractions. At the Kaupokonui an irrigator did surrender his consent in the early 2000s, which may explain why the MALF and median have increased. Decreases for Waitara at Bertrand Rd could possibly be due to water abstractions for Methanex and the Motukawa hydroscheme, and the decreases for the Waingongoro River at Eltham Rd could possibly be linked to South Taranaki District Council's water takes at the bushline and Finnerty Road. However, it is most likely that these trends are linked to cyclic weather patterns.

Boom spray pasture irrigation near Manaia.

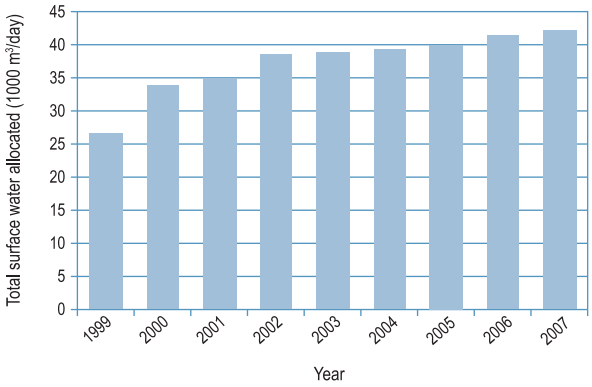

Figure 4.23: Taranaki total consented surface water takes allocation from 1999 to 2007.

(C) SURFACE WATER ALLOCATION

It is estimated that in Taranaki 54,300 m^3 (cubic metres) per day is abstracted as a permitted activity, primarily for domestic and farm water supplies[48]. This is equivalent to 22 Olympic-sized swimming pools per day. Small takes are permitted under the *Regional Fresh Water Plan*. Larger takes require consent from the Regional Council. The consent process determines the maximum volume of water that may be taken, the maximum rate at which it may be taken and usually, the flow level in the stream or river at which water abstraction must cease in order to safeguard environmental values.

As of the end of June 2007, 420,071 m^3 per day had been allocated to resource consent holders to take and use surface water. This does not include consents granted to divert water for hydro-electric power generation or consents used for the purpose of water-cooling because in these cases the abstracted water is largely returned to the river. Together with the permitted use, the total surface water allocation for the region is 474,371 m^3 per day (the equivalent of 194 Olympic-sized swimming pools a day). This is up from 442,526 m^3 per day reported in 2003, an increase of 7%[49].

Every year more consents are being granted to take and use surface water for a variety of uses. Figure 4.23 shows the total water allocation volume from the past 8 years.

Stratford combined cycle power station.

48 Taranaki Regional Council, 1998. *Taranaki Dairy Industry and Evaluation of Stock, Dairy Shed and Domestic Water Consumption.*
49 Taranaki Regional Council, 2003. *Taranaki – Our Place, Our Future. Report on the State of the Environment of the Taranaki Region, 2003*

Table 4.19: Taranaki surface water allocation by use category.

Use Category	2003 Volume allocated (m^3/day)	2003 Percentage of total allocation	2008 Volume allocated (m^3/day)	2008 Percentage of total allocation
Water Supply or Treatment	143,432	32%	152,333	32%
Agriculture - pasture irrigation	92,758	21%	99,022	21%
Petrochemical Processing	65,538	15%	62,239	13%
Dairy Processing/Manufacturing	49,500	11%	30,000	6%
Power Generation - thermal	10,541	2%	23,940	5%
Drystock Farm	1,232	<1%	23,326	5%
Meat and By-Product Processing	10,687	2%	10,790	2%
Hydrocarbon Exploration	4,074	1%	9,229	2%
Horticulture	4,027	1%	2,888	1%
Quarries	3,626	1%	2,652	1%
Recreation/Tourism/Culture	1,128	<1%	1,968	<1%
Distribution or Storage	960	<1%	960	<1%
Swimming Pool	270	<1%	270	<1%
Other	150	<1%	150	<1%
Chemical Processing/Manufacturing	90	<1%	90	<1%
Timber Treatment or Sawmill	78	<1%	78	<1%
Piggery Farm	75	<1%	75	<1%
Poultry Farm	60	<1%	60	<1%
Estimated permitted takes	54,300	12%	54,300	11%
Total consented allocation	388,226	100%	420,071	100%
Total consented allocation and permitted use	442,526		474,371	

What is water used for?

Water is used for a number of consumptive uses. Much of the permitted take is for agriculture such as for farm dairies. The volume consented for the top 10 categories is illustrated in Figure 4.24. This shows that the single largest category is for municipal and rural water supply schemes. This category includes town water supplies, which in turn supply small industrial and domestic users. The municipal and rural water supply schemes have a total allocation of 152,333 m^3 per day (1,763 litres per second) or 32% of all allocated water use (Table 4.19). This is the same percentage of total surface water allocation as reported in the 2003 *State of the Environment Report.*

Water supplies are critical for many industrial and domestic uses.

The category of water use with the greatest increase since 2003 has been for thermal power generation, which is used for gas processing and steam supply. Water allocation for this use has increased from 13,399 m^3 to 23,940 m^3 per day, a 79% increase. The amount of water allocated for dairy processing/manufacturing has decreased since 2003 from 49,500 m^3 per day to 30,000 m^3 per day, a decrease of 19,500 m^3 per day or 40%.

Irrigation is not new in Taranaki and it is generally needed only during the summer months. Some areas, particularly the sandy soils bordering

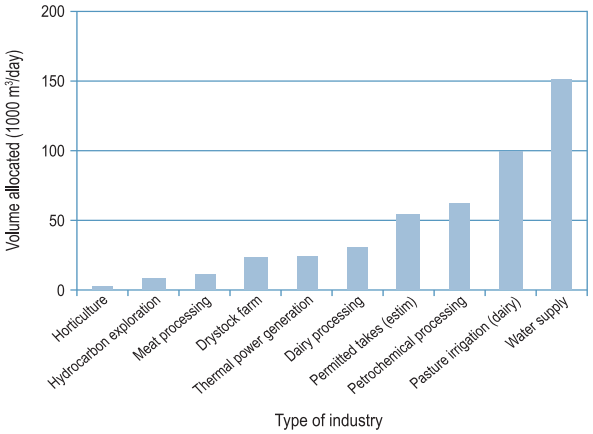

Figure 4.24: Volume of water allocated through consents.

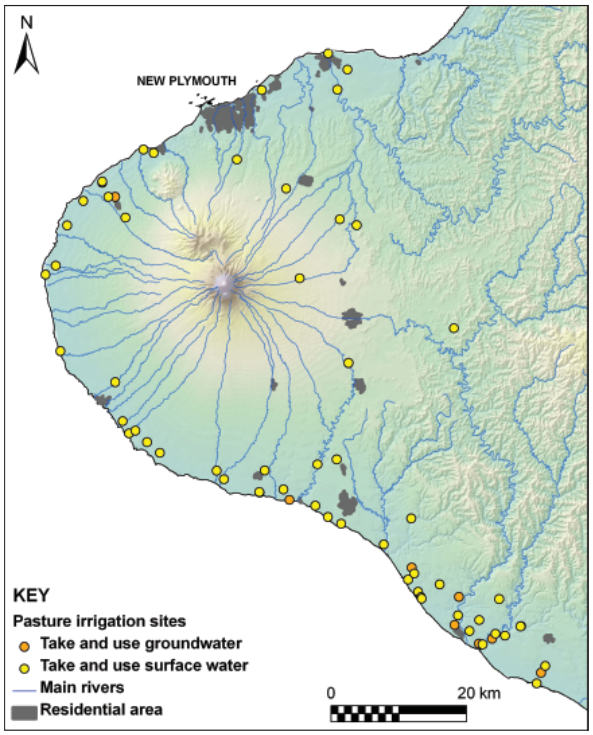

Figure 4.25: Location of consents held for pasture irrigation.

coastal areas and in the south of the region, can experience significant dry periods. Interest in irrigation has increased in recent years, particularly after relatively dry summers in 2000, 2001, 2003 and 2008. The location of these irrigation sites is shown in Figure 4.25. The volume of water allocated for pasture irrigation has increased by more than 6,000 m3/day, a 7 % increase.

In a sense, hydroelectric power generation can be considered a non-consumptive use, as water is returned to the river, although there can be significant environmental effects on the river reach between the point where the water is abstracted and where the water is returned to the river. The flow regime can also be impacted below the abstraction site.

Taranaki has four significant hydroelectric power generation schemes: Pātea, which uses water from Lake Rotorangi; Opunake, which diverts water from the Waiaua Stream; Mangorei, which diverts water from the Waiwhakaiho River; and Motukawa, which diverts water from the Manganui and returns it to the Waitara River.

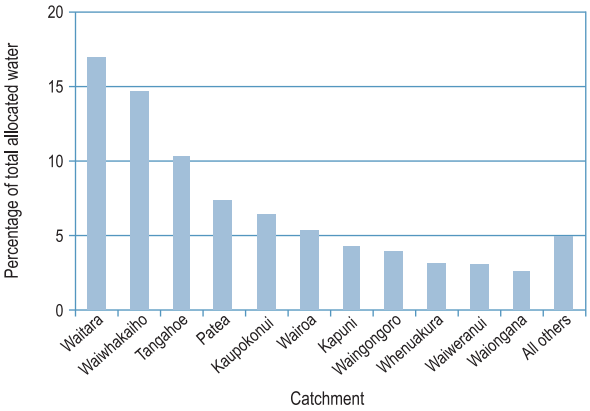

Figure 4.26: Taranaki surface water allocation by catchment.

The combined throughput of these hydroelectric power schemes is in the order of 10,000,000 m^3 per day or 116,000 litres per second. However, this is a maximum and can only occur when sufficient water is available. Nevertheless, this is a much greater volume than all the other consumptive water surface water uses combined, which account for just 4% of the total water use when hydrogeneration is included. Residual flows are required below each of the hydropower abstractions and monitoring is carried out by the Council to ensure compliance with these requirements.

Water allocation by catchment

Taranaki receives frequent and plentiful rainfall. This, together with the generally stable nature of river flows during drier periods (described earlier in this chapter), mean that for most of the time, there are no significant water use pressures on Taranaki's many rivers and streams. A useful measure of water use pressure is to compare the amount of water allocated for use with either the median flow or average or mean annual low flow (MALF).

The majority of the water used in Taranaki is taken from several of the larger catchments. Figure 4.26 shows the 11 top catchments with the highest levels of water allocation. The five catchments with the largest volume use, Waitara, Waiwhakaiho, Tāngahoe, Pātea and Kaupokonui, account for 55% of the entire consented surface water allocation. Five percent of the total amount of water allocated is from other smaller catchments. This proportion has increased from that reported in 2003

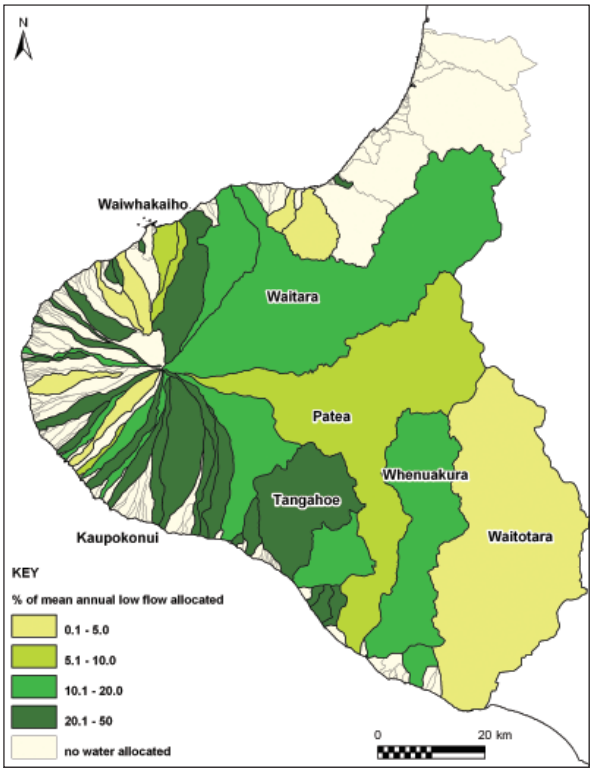

Figure 4.27: Proportion of MALF allocated from Taranaki rivers and streams.

due to increased demand for water from small streams that were formerly not abstracted from.

Over most of the region (i.e. the largest 25 catchments) water allocation is only a small proportion – one or 2% of median flows. Some smaller catchments have higher allocations but these represent a relatively small proportion of the total surface water resources of the region. Taken overall, water allocation in Taranaki is only 4.6% of the total median flow. The proportion is higher when compared with MALF, but overall, total water allocation is still reasonably low at 12.9% of MALF.

Some catchments however have a higher proportion of their summer low flow allocated in accordance with the *Regional Fresh Water Plan*. Figure 4.27 illustrates the proportion of the MALF allocated from all the catchments in Taranaki. This shows that 24 catchments, or 10% have more than 20% of their MALF allocated (also see Table 4.20). Recent national guidelines for water allocation have proposed water allocation limits of 30% of MALF in rivers and streams where limits have not been set by regional plans[50]. In Taranaki, 19 catchments, or 8%, have more than 30% of MALF allocated.

An arguably more relevant indicator of the impact of water allocation is the flow at which abstraction must cease in order to protect ecological values.

Table 4.20 show the levels of water allocation compared to the median flow and MALF, the flow that abstraction must cease at, and whether this complies with the 2/3 habitat guideline set in the *Regional Freshwater Plan*. The table includes catchments with the highest level of water allocation. This shows that the Wairoa Stream, the Manganui River (a tributary of the Waitara River) and the Tawhiti Stream (a tributary of the Tāngahoe River) have the highest proportions of their median and mean annual low flows allocated, and do not meet the guideline.

The Tawhiti Stream and Manganui River both have longstanding water abstractions, for the Fonterra Whareroa's milk processing site and for the generation of electricity by Trust Power respectively. These abstractions provide other benefits to the community and have been assessed against other criteria in the *Regional Freshwater Plan*. Through decisions involving the community, restrictions on use or other mitigation measures have been put in place to enable environmental effects to be minimised.

Table 4.20: Consented surface water allocation compared with mean annual low flows at selected sites (l/s).

River site	Natural median flow[1]	Natural MALF[2]	Consented water allocation above recorder sites (No. of consents)	% of median flow allocated	% of MALF allocated	Flow at which abstraction must cease (l/s)	Complies with 2/3 habitat guideline[3]
Wairoa at Coast	150	128	265[4] (2)	176.7	207.0	50	No
Manganui at Everett Park	11513	3956	5801[5] (10)	50.4	146.6	400	No
Tawhiti at Duffy's Farm	784	380	426[6] (4)	54.3	112.1	50	No
Inaha at Coast	1220	240	130[7] (4)	10.7	54.2	200	Yes
Kāpuni at SH45	1507	525	228 (5)	15.1	43.4	-	Yes
Pātea at Skinner Rd	3200	851	331 (8)	10.3	38.9	-	Yes
Waiokura at Coast	487	175	65 (3)	13.3	37.1	122	Yes
Punehu at SH45	663	269	79 (2)	11.9	29.4	230	Yes
Ngātoro at SH3	691	339	76 (3)	11.0	22.4	-	Yes
Waingongoro at SH45	5037	1528	252 (9)	5.0	16.5	-	Yes
Kapoaiaia at Lighthouse	706	298	46 (2)	6.5	15.4	285	Yes
Waingongoro at Eltham Rd	1792	516	77 (3)	4.3	14.9	-	Yes
Mangatoki at Hastings Rd	801	237	29 (2)	3.6	12.2	-	Yes
Waitara at Bertrand Rd	29995	7504	611 (13)	2.0	8.1	4600	Yes
Whenuakura at Nicholson Rd	5285	1898	151 (4)	2.9	8.0	1945	Yes
Waiongana at SH3a	1443	418	6 (2)	0.4	1.4	-	Yes
Kaupokonui at Glenn Rd	2001	749	0 (1)[8]	0.0	0.0	-	Yes
Waiwhakaiho at Egmont Village	3910	2104	0 (0)	0.0	0.0	-	Yes

Notes:
1 Corrected to include consented water allocation.
2 Corrected to include consented water allocation.
3 A rate of abstraction that retains at least two-thirds of the aquatic habitat in the river at the mean annual low flow (MALF) of the river.
4 Fully allocated at the coast, however a residual flow of 50 l/s has to be provided downstream of take.
5 Includes water diverted to the Motukawa Power Scheme as this water is not returned to the Manganui River.
6 Fully allocated, however a residual flow of 50 l/s has to be provided downstream of Fonterra's take.
7 Fully allocated, however residual flow requirements have been provided to reduce or cease abstracting when flows in the stream fall.
8 Only one consent and that is an in and out system at Fonterra's Lactose Plant, so no water actually taken.

50 Ministry for the Environment. 2008. *Proposed National Environmental Standard on Ecological Flows and Water Levels Discussion Document.*

The small Wairoa and Inaha streams are also under some heavy pressures for water abstraction for pasture irrigation. Residual flows, i.e. flows at which water abstraction must cease, have been set for each of these catchments in order to safeguard environmental values.

Water demand has decreased in a number of catchments. This includes the Kaupokonui above its confluence with the Mangawhero, the Waiwhakaiho above Mangorei Power Scheme, Ngātoro, Waiongana, the lower Waingongoro at Eltham and the Waitara. However, water allocations have increased in the Whenuakura, Kapoaiaia, Waingongoro, Inaha, Punehu, Wairoa and Waiokura catchments, largely through increased abstractions for pasture irrigation. The Council has identified a number of catchments which are now fully allocated[51], but overall water allocation is not a major issue in the region.

4.2.2 HOW IS WATER QUANTITY MANAGED?

(A) REGIONAL FRESH WATER PLAN

The *Regional Fresh Water Plan for Taranaki*, made operative in 2001, establishes a policy framework for managing water use and allocation. The key elements of the policy framework are:

- the taking and use of up to 50 m^3 of water per day is permitted without a resource consent provided certain conditions to safeguard the environment can be met. This is to allow for reasonable farm and domestic water uses;
- the taking and use of water from all of the Stony (Hangatahua) River catchment and parts of the Maketawa and Manganui rivers is prohibited except for minor takes for stock watering and domestic uses. These provisions aim to protect high value rivers in the region;
- the taking and use of water above existing levels from the Kāpuni, Kaupokonui, Mangorei, Pātea, Waiongana, Waingongoro and Waiwhakaiho rivers, is to be strictly limited as far as possible, and assessed on a case-by-case basis according to policies in the plan. This recognises the high natural and recreational values of these rivers;
- a guideline for assessing proposals for the taking and use of surface water that seeks to retain at least two-thirds of the habitat of the river at its mean (average) annual low flow;
- criteria for the assessment of resource consent applications for the taking and use of water that allow variations of the guideline according the natural, ecological and amenity values of the waterbody, the relationship of tangata whenua with the waterbody, hydrological characteristics and the reasonably foreseeable future needs for water; and
- policies to guide decision making to take into account the likely benefits of the water use, mitigation measures including minimum flows or flow regimes, maintenance of fish passage and riparian planting and the degree of community or regional benefit, as distinct from individual or private benefit.

(B) RESOURCE CONSENT MANAGEMENT

The Taranaki Regional Council is responsible for granting resource consents for the taking and use of water. These consents are generally required before surface water may be abstracted for irrigation, drinking water supply, industrial and manufacturing works and other activities. Consents are assessed on a case-by-case basis according to the policies, guidelines and criteria in the *Regional Fresh Water Plan.* There are 150 current surface water take consents and 52 consents to divert and use surface water. Smaller volumes of water can be allocated through permitted activity rules provided certain conditions are met.

Conditions on consents may specify the volumes of water that can be abstracted, the rate at which it can be abstracted, minimum flow requirements beyond which abstraction must cease and other circumstances under which water can be abstracted. Consent monitoring (regular inspections and abstraction data collection) ensures ongoing compliance with these measures.

In the 2006-07 monitoring period, the Council had 59 tailored monitoring programmes for water takes. These were associated with municipal and rural water supply schemes, pasture irrigation, stock and domestic takes, horticultural, golf clubs and power generation schemes.

The total number of resource consents held for pasture irrigation has been steadily increasing since 1995 as shown in Figure 4.28. Monitoring of these consents showed a good level of compliance with allocated abstractions, maintenance of minimum residual flows and provision of abstraction records. During the 2006-07 monitoring year for example, six out of 40 consent holders exceeded their consented water allocations, but these were isolated events and did not result in any significant adverse effects[52].

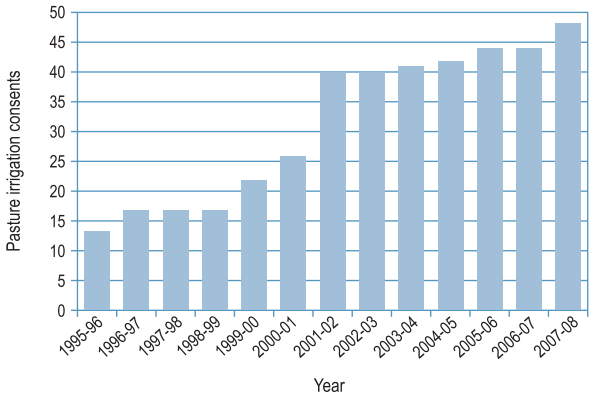

Figure 4.28: Cumulative number of pasture irrigation consents held.

(C) STANDARD OPERATING PROCEDURES

In 2000, the Council adopted standard operating procedures for floods[53] and water shortages[54]. The Council's hydrological monitoring is a critical part of both flood, and water shortage management procedures. The standard operating procedure for floods sets out the procedures the Council is to follow to avoid or reduce the risk to life and property. The standard operating procedure for water shortages allows the Council to take steps to reduce environmental and other effects during water shortages or droughts. In extreme situations, the Council may issue a water shortage direction under section 329 of the RMA to restrict water use. The Council has been close to issuing a water shortage direction on two occasions, during the 2002-03 and 2007-08 summers.

51 Taranaki Regional Council.2005. *A Guide to Surface Water Availability and Allocation in Taranaki.*
52 Taranaki Regional Council. 2008. *Pasture Irrigation Compliance Monitoring Annual Report 2006-07.* Technical Report 2007-55.
53 Taranaki Regional Council, 2000. *Flood Event Standard Operating Procedure.*
54 Taranaki Regional Council, 2000. *Water Shortage Event Standard Operating Procedure.*

Ella Burrows saving water.

MP'S SPOUSE FINDS LEAKS IN THE HOUSE

Every single drop of water is important during times of drought – and if you don't believe it, just ask Hāwera woman Ella Borrows.

It was all buckets to the taps for Ella, wife of local MP Chester Borrows, as she joined many residents heeding the South Taranaki District Council's call for water conservation during the summer drought of 2007-08.

She had buckets in the shower, in the laundry tub and under every tap in the house, catching grey water for re-use in the garden or on the car. And she took a good, hard look at her household's water habits.

"I was absolutely stunned by how much water I wasted," Ella said. "A leaky tap here, an extra minute or two in the shower, rinsing the dishes before putting them in the dishwasher – not to mention all that water going out from a full machine load of washing.

"I found I saved an average of 35 litres a week – and considering I'm at home alone most of the time, that was a shock for me. I did a project with a school class and we worked out average savings if my street had 80 houses, with an average of three people per house who saved on average 70 litres a week – 5,600 litres a week.

"Suddenly it did matter and 'every little bit' did help."

Although the water conservation effort could be tiresome, Ella said she was also spurred on by thoughts of people across the Tasman facing years of drought.

Although the drought here was nothing like those proportions, it did force restrictions on water use throughout the region, most notably in southern areas.

Partial water restrictions were introduced in November but in January, the South Taranaki District Council banned the use of all hoses, sprinklers and irrigation systems – urban, rural, commercial and industrial. The bans continued until early April.

The Taranaki Regional Council also had to take action, issuing infringement notices when the Mangawheroiti Stream ran dry below the intake weir.

Elsewhere, the Stratford District Council also imposed water restrictions and hired two local plumbing companies to fix residents' leaking taps.

Because of low flows in the Pātea River, the Stratford District Council was also forced to draw water from Konini Stream, a contingency permitted under its resource consent issued by the Taranaki Regional Council.

New Plymouth District also felt the drought's bite, though restrictions were limited to the Ōkato area, while a water conservation notice was issued for Inglewood. There were no restrictions in the New Plymouth urban area.

Supplies to the Ōkato Water Treatment Plant were restricted due to low flows in the Mangatete Stream. Under its resource consent, the New Plymouth District Council limited the volume of the water take to the minimum amount necessary to maintain the health of people and animals.

Region-wide, and as Ella's response of indicates, the restrictions brought out the best in many people.

Announcing the lifting of restrictions in April, South Taranaki District Council group manager of engineering services Neil McCann noted the fantastic response of some residents.

"I know a lot of people have changed the way they've used water this summer because of the drought and water restrictions," he said.

"I hope some of these behaviours will become common practice. Water is a precious resource, with demand rising every year it is vital we manage our resources in a positive way without impacting negatively on our environment."

(D) INFORMATION, EDUCATION AND ADVICE

The Council operates a network of 35 monitoring stations that continuously record rainfall, wind, water level, water temperature and soil moisture and temperature. Much of this data is available for the public on the Council's website, www.trc.govt.nz. The data is updated at 30-minute intervals, so the public can find out the current state of the rivers and the weather situation in and around the region easily.

The Council provides water users and applicants for resource consents with information and advice on water allocation and the effects of water use. The Council may also give advice on water conservation, water harvesting and the efficient use of water to avoid or minimise adverse environmental effects.

In 2005, the Council published guidelines to inform water users or those planning to take and/or use water about how much and where in the region water is available[51].

Table 4.21 Summary of progress: implementing regional objectives and policies on water allocation and use.

Issue	What do we want to achieve?	What are we doing about it?	Where are we at?
• Adverse effects of the taking, use, damming and diversion of water.	• Sustainable management of quantities, levels and flows of surface water. • Avoidance or mitigation of adverse effects of the taking, use, damming and diversion of surface water.	• Implementing the *Regional Fresh Water Plan.* • Adopting a habitat-based guideline to guide decisions on sustainable management and avoidance of the adverse effects of water use. • Issuing and monitoring resource consents for water abstraction and use. • Maintaining hydrological monitoring systems. • Providing information and advice on sustainable and efficient water use. • Establishing procedure for water shortage events.	• *Regional Fresh Water Plan* operative in October 2001. • Flow guideline of two-thirds habitat at MALF applied having regard to policies in the *Regional Fresh Water Plan.* • 202 resource consents for water use issued and monitored. • 35 hydrological sites maintained. • Standard operating procedures for flood flows and water shortage events adopted. • Information and advice provided. • A guide to surface water availability and allocation in Taranaki published in 2005.

(E) RESOURCE INVESTIGATIONS

Although the Council has developed a guide to surface water availability and allocation, this information needs to be updated constantly as new consents are granted or better monitoring data is obtained. Therefore, the Council anticipates undertaking further resource investigation work in this area, to better refine the water balance/budgeting used in order to better understand the surface water resource and to be able to provide up-to-date water availability information. This will involve a mixture of obtaining better information on river flows.

The Council has undertaken an evaluation of surface water availability for pasture irrigation purposes[55]. This complemented work to investigate current and potential irrigation development and to provide information relevant to the management of water resources in the region[56]. That report highlighted potential demand for water resources, particularly in southern and coastal areas of Taranaki, and provided information on irrigation methods and efficiencies. It also recognised areas where pressures for water for irrigation were likely to come from.

(F) SUMMARY OF PROGRESS

Progress implementing regional objectives and policies on surface water allocation and use is reported in Table 4.21.

4.2.3 HOW DOES OUR WATER QUANTITY COMPARE TO OTHER REGIONS?

If all the water consents were added together, the total allocation of water in New Zealand (in 2006) was 676 m^3 per second[57]. Canterbury and Otago regions account for almost three-quarters of the total allocation, with the amount of water allocated in Taranaki contributing just 0.08% of this. In New Zealand over 60% of all water allocated is from surface water, whereas in Taranaki 95% of total water allocated is from surface water.

The use of water resources in Taranaki differs significantly from the pattern of water use for New Zealand as a whole (Figure 4.29), with a much greater proportion of Taranaki's allocated water going to water supply and industrial uses than in New Zealand generally, but a smaller proportion going to irrigation.

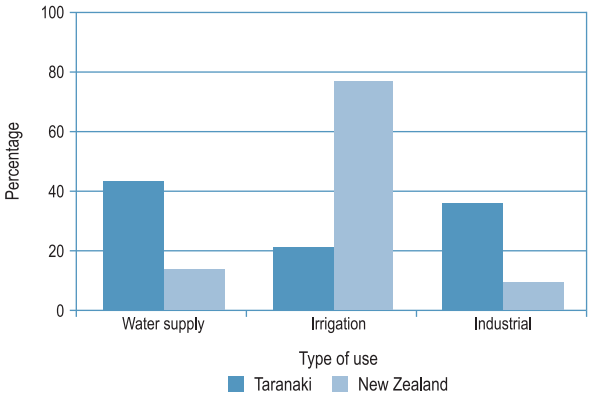

Figure 4.29: Comparison of water allocation –New Zealand and Taranaki.

The major pressures on surface water throughout New Zealand are for pasture irrigation, which accounts for 77% of all surface water allocated[58]. In Taranaki, pasture irrigation accounts for 21% of all water use. Irrigation is particularly significant in the Nelson/Marlborough and in east coast regions of Hawke's Bay, Canterbury and Otago, where prolonged dry periods occur regularly.

Figure 4.30 shows the allocation of the catchments as a percentage of the MALF throughout New Zealand[58].

55 Taranaki Regional Council, July 2003. *A Preliminary Evaluation of Surface Water Availability and Demand for Pasture Irrigation Purposes in Taranaki.*
56 Rout, R, April 2003. *Optimisation of Farm Irrigation.* Report prepared for Taranaki Regional Council by Lincoln Environmental.
57 Ministry for the Environment. 2007. *Environment 2007.*
58 Aqualinc Research Limited, 2006. *Snapshot of Water Allocation in New Zealand.* Prepared for the Ministry for the Environment.