Water Allocation Plan for the Mangatarere Catchment

January 2004

FOR FURTHER INFORMATION

Greater Wellington –
The Regional Council
Masterton
P O Box 41
T 06 378 2484
F 06 378 2146
W www.gw.govt.nz

Report Summary

Introduction

Greater Wellington has prepared a Water Allocation Plan for the Mangatarere Catchment. The Mangatarere catchment, northwest of Carterton (Figure 1) is an important water resource for the Region and includes the Mangatarere Stream and its four tributaries. It provides water for farming activities, contributes to the Carterton District water supply, is significant as a trout spawning habitat, and supports a number of indigenous fish species. It also provides recreational enjoyment, primarily in the form of fishing. In addition, it plays an important part in the dilution of the Carterton District Council sewage discharge.

Studies have revealed that flows in the Mangatarere may be compromising the life supporting capacity of the catchment under both natural conditions and when water takes are being taken. This plan has been prepared to ensure the careful use of water in the catchment whilst also providing for the ecology, recreation and other values associated with the streams in the catchment.

Overview of the Process for Planning Water Allocation

The overall process for planning the management of the water resource within the catchment is shown in Figure 2. As seen, work has been ongoing since 1997 and has culminated in the preparation of this document. There have been 2 stages of public consultation up to this point, detailed below.

This plan will support the statutory process for a plan change to the *Regional Freshwater Plan for the Wellington Region* (RFP), scheduled to begin later in 2004. The proposed restrictions set out in this plan will be incorporated into the RFP to provide a higher level of protection of instream values than at present.

Consultation

Initial consultation was undertaken in 2001 to determine who values the Mangatarere and why. As part of more recent consultation in October 2003, local residents, consent holders and key organisations were sent a copy of the Draft Water Allocation Plan for the Mangatarere Catchment.

Comments were received from local residents and consent holders/farmers, the Department of Conservation, Fish and Game, Carterton District Council, Federated Farmers, Rangitaane O Wairarapa, Forest and Bird and Wairarapa District Health Board. This feedback, which was on the whole supportive, has helped shape this final plan.

Key organisations and the community will have a third opportunity to get involved, during the subsequent plan change notification process, where they can make formal submissions if they wish.

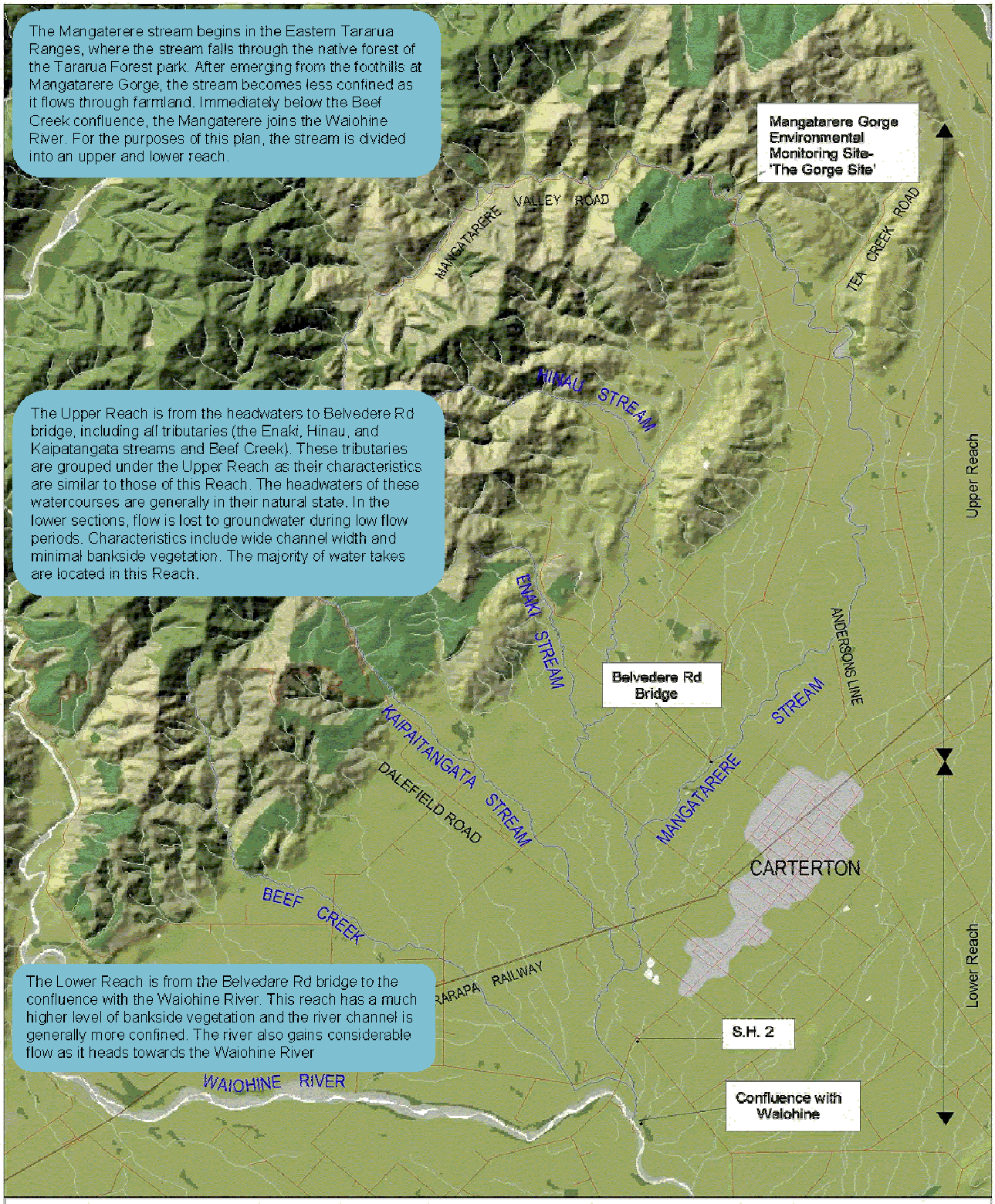
The Mangaterere stream begins in the Eastern Tararua Ranges, where the stream falls through the native forest of the Tararua Forest park. After emerging from the foothills at Mangatarere Gorge, the stream becomes less confined as it flows through farmland. Immediately below the Beef Creek confluence, the Mangaterere joins the Waiohine River. For the purposes of this plan, the stream is divided into an upper and lower reach.
Mangatarere Gorge Environmental Monitoring Site- 'The Gorge Site'
MANGATARERE VALLEY ROAD
TEA CREEK ROAD
HINAU STREAM
The Upper Reach is from the headwaters to Belvedere Rd bridge, including all tributaries (the Enaki, Hinau, and Kaipatangata streams and Beef Creek). These tributaries are grouped under the Upper Reach as their characteristics are similar to those of this Reach. The headwaters of these watercourses are generally in their natural state. In the lower sections, flow is lost to groundwater during low flow periods. Characteristics include wide channel width and minimal bankside vegetation. The majority of water takes are located in this Reach.
Upper Reach
ENAKI STREAM
ANDERSONS LINE
Belvedere Rd Bridge
KAIPAITANGATA STREAM
DALEFIELD ROAD
MANGATARERE STREAM
CARTERTON
BEEF CREEK
The Lower Reach is from the Belvedare Rd bridge to the confluence with the Waiohine River. This reach has a much higher level of bankside vegetation and the river channel is generally more confined. The river also gains considerable flow as it heads towards the Waiohine River
RARAPA RAILWAY
Lower Reach
S.H. 2
WAIOHINE RIVER
Confluence with Waiohine
Mangatarere Catchment
Figure 1
Topographic and Cadastral Information is copyright LINZ
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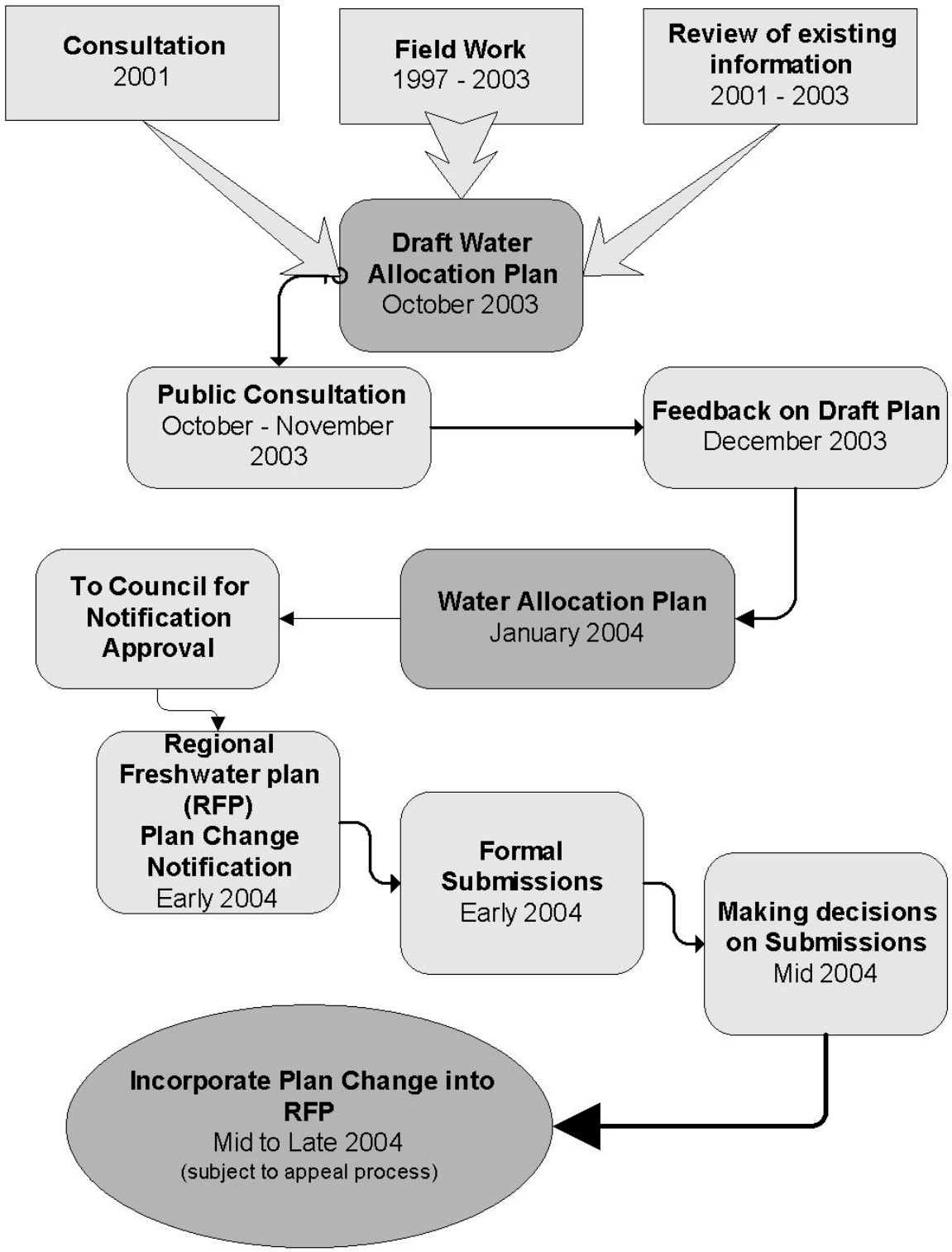
Figure 2.Overview of the Process for Planning Water Allocation



Determining a Flow Regime

The development of the plan has followed a process set out by the Ministry for the Environment[1], which ensures that the flows set, can sustain the instream values identified as significant for the Mangatarere catchment. This has been completed in four steps, the first and last of which involve consultation:

Step 1 **Identification of all 'in' and 'out-of-stream' values of the catchment, by undertaking consultation with the community and reviewing the existing laws and plans relating to the catchment. The main steer comes from the *Regional Freshwater Plan for the Wellington Region* 1999:**

Regional Freshwater Plan

- Establishing Minimum Flows And Approaches To Water Allocation
- Avoiding Effects On Trout Habitat/Managing Water Quality For Trout Fishery/Spawning
- Enhancing Water Quality For Aquatic Ecosystem Purposes

Initial Consultation Undertaken During 2001

- Ecological Values – habitats for trout and native fish, existing flora and fauna
- Recreational Values – primarily trout fishing but some swimming
- Maori Values – water quality and quantity, habitat for indigenous flora/fauna
- Out-of-Stream Values– Carrington water race, public water supply, direct takes

Step 2 **Assessment of what instream values are to be sustained, based on the relative significance of the values identified. This process determines the Instream Management Objective, that is, what the stream should be managed for.**

The Regional Freshwater Plan indicates trout habitat and fishing/spawning, to be important for the Mangatarere Stream, Beef Creek and the Kaipaitangata Stream. This compliments feedback from consultation undertaken in 2001. Furthermore, enhancement of water quality, also provided for in the Regional Freshwater Plan for the Mangatarere Stream, links in with many of the consultation responses.

Work undertaken by Greater Wellington in 2002 indicated that adult brown trout had the highest flow requirements overall in the Mangatarere catchment, in terms of greater water velocities and depth. As a consequence of this, by managing the catchment to support the trout habitat, other species of fish and aquatic invertebrates can be provided for. In addition to this, by enhancing the water quality of the stream, other concerns (highlighted through the consultation process) can be addressed.

[1] *Flow Guidelines for Instream Values*, MfE 1998

Therefore the Instream Management Objective for the Mangatarere catchment is:

The enhancement of water quality and maintenance of water quantity, to support trout habitat and fishing/spawning and aquatic ecosystems

Step 3 **Drafting of proposed flow regime options that are consistent with the Instream Management Objective for the Upper Reach (above Belvedere Road and including all 4 tributaries) and the Lower Reach (below Belvedere Road to the Waiohine River) (Figure 1).**

For this, information collected through water quality, hydrological and instream habitat requirement studies was considered along with existing and requested allocation levels. Critical factors for sustaining the Instream Management Objective (such as minimum flow) were identified.

In summary, these studies indicated that existing allocation in the Upper Reach may be too high to sustain instream habitat requirements, whilst the Lower Reach could potentially support further allocation without compromising those requirements. The proposed options reflected these findings.

Step 4 **Consultation with key organisations, consent holders, and local residents to get feedback on the proposed IMO, the preferred flow regime options, and any other feedback on the draft plan, to help shape the final plan.**

A total of 60 copies of the draft plan were sent out in October 2003. Overall, most comments were supportive of the IMO.

The preferred options that emerged were those that involved a stepdown approach, where an additional trigger flow is used in addition to a minimum flow. Therefore, the proposed flow regime for each reach is as follows (See Flow Regime Summary table):

- The Upper Reach uses a trigger flow whereby takes are restricted to 50% when the stream falls below 160 l/s, and are then suspended completely when the flow falls below 125 l/s.

- The Lower Reach uses a trigger flow whereby all takes are restricted to 50% when the stream falls below 125 l/s, and then suspended completely when the flow falls below 90 l/s.

For both reaches, no further water allocation above the existing consented level is proposed. The majority of feedback favoured this approach.

The proposed minimum flows are likely to increase the present level of restriction on water takes. This is in order to provide a higher degree of protection of the instream habitat, in light of the over allocation of the Upper Reach, and its impact on the life supporting capacity of this Reach.

Flow Regime Summary		
Reach	**Minimum Flow at Which All Takes Will Be Restricted to 50%**	**Minimum Flow at Which All Takes Will Cease**
Upper Reach	160 l/s	125 l/s
Lower Reach	125 l/s	90 l/s
Core Allocation - to be set at the existing quantity of consented water allocation		

Riparian Enhancement

Other measures in addition to water allocation policies can be used to help achieve the Instream Management Objective for the catchment. A trial study of riparian rehabilitation is currently taking place on one of the tributaries within the catchment, the Enaki Stream.

Greater Wellington is considering requiring riparian enhancement as part of conditions for resource consents for water takes. There are also several non-regulatory measures that can be considered, including the promotion of good practice principles relating to water conservation.

Contents

PART 1 - THE PLAN

PART 1 – THE PLAN

1. Introduction

The Mangatarere catchment (Figure 1) is an important water resource for the Region. It comprises the Mangatarere Stream and 4 tributaries (the Hinau, Enaki and Kaipaitangata Streams and Beef Creek). It provides water for farming activities, contributes to the Carterton District water supply, is significant as a trout spawning habitat, and supports a number of indigenous fish species. It also provides recreational enjoyment, primarily in the form of fishing. In addition, it plays an important part in the dilution of the Carterton District Council sewage discharge.

In an effort to meet the needs of multiple users whilst protecting the life supporting capacity of the Mangatarere, Greater Wellington Regional Council has prepared this Water Allocation Plan for the Mangatarere Catchment.

1.1 Overview of the Process for Planning Water Allocation

The overall process for planning the management of the water resource within the catchment is shown in Figure 2. As can be seen, work has been ongoing since 1997 and has culminated in the preparation of this document. There have been 2 stages of public consultation up to this point, detailed below.

This plan will support the statutory process for a plan change notification to the *Regional Freshwater Plan for the Wellington Region* (RFP), scheduled to begin later in 2004. The proposed restrictions set out in this plan will be incorporated into the RFP to provide a higher level of protection of instream values than at present.

1.2 Consultation

Initial consultation was undertaken in 2001 to determine who values the Mangatarere and why. As part of more recent consultation in October 2003, local residents, consent holders and key organisations were sent a copy of the Draft Water Allocation Plan for the Mangatarere Catchment. A public meeting was also held.

Comments were received from local residents and consent holders/farmers, the Department of Conservation, Fish and Game, Carterton District Council, Federated Farmers, Rangitaane O Wairarapa, Forest and Bird and Wairarapa District Health Board. This feedback, which was on the whole supportive, has helped shape this final plan and is summarised in Section 3.3.

1.3 What are Water Allocation Plans

Water Allocation Plans (WAPs) are a tool used by Regional Councils to ensure the management of water resources takes into consideration the needs of *all users and values* of a river/stream. It tells us how much water can be taken *out* of a stream, and how much must be left *in*, for instream values, such as ecology or recreation.

They provide vital frameworks for managing the taking and use of water from rivers and enable councils to address the cumulative environmental effects of water takes and use.

1.4 Why does the Mangatarere Catchment need a WAP

Under the Resource Management Act 1991 (RMA), Greater Wellington is charged with the responsibility of controlling the taking, use, damming and diversion of water, and the control of the quantity and flow of water, for the Greater Wellington Region[2]. The RFP provides specific guidance for certain water bodies including the Mangatarere catchment to *establish desirable minimum flows and approaches to water allocation*[3]. Therefore, Greater Wellington has been investigating the Mangatarere catchment over the last 7 years, in preparation of this Water Allocation Plan.

Analysis of the available information has revealed that flows in the Mangatarere may be compromising the life-supporting capacity of the catchment under both natural conditions and when water takes are being taken. On occasion, the stream and its tributaries dry up in some sections (Figure 3). It is during these periods that conflict can occur between the demands that resource users place on the catchment and the requirements that are essential to maintain instream values.

As more landowners may wish to abstract water for irrigation or other consumptive uses, or to renew existing resource consents, it becomes crucial for Greater Wellington to determine a flow regime which ensures instream values are provided for, as far as practicable.

Figure 3 Anderson's Line, March 2003

[2] Section 30 of the RMA
[3] Method 8.5.5 of the *Regional Freshwater Plan for the Wellington Region*

1.5 Report Structure

Part 1 – The Water Allocation Plan	Part 2–Supporting Information
Section 2 outlines the process for setting a flow regime and explains what is meant by instream and out-of-stream values. **Section 3** assesses stream values for the Mangatarere through the statutory framework and consultation (2001 and 2003), and determines the Instream Management Objective (IMO). **Section 4** sets out the proposed flow regime for the Mangatarere which ensures the IMO is sustained – this involves minimum flows, core allocation and supplementary allocation. **Section 5** outlines additional ways to sustain the IMO besides flow setting, including riparian enhancement.	**Section A** provides further detail on the statutory framework for the Mangatarere. **Section B** contains a summary of feedback received from consultation in 2001. **Section C** contains the flow regime options that were put forward for consideration in the draft plan in October 2003. **Sections D to G** provide more detailed technical information on water quality and ecology, low flow hydrology, low flow modelling and current allocation. **Sections H and I** provides a glossary and reference section. Please refer to Section H for the explanation of any terms.

1.6 Areas for Further Work

Revision of the plan will be considered as we gain a more comprehensive understanding of the following issues:

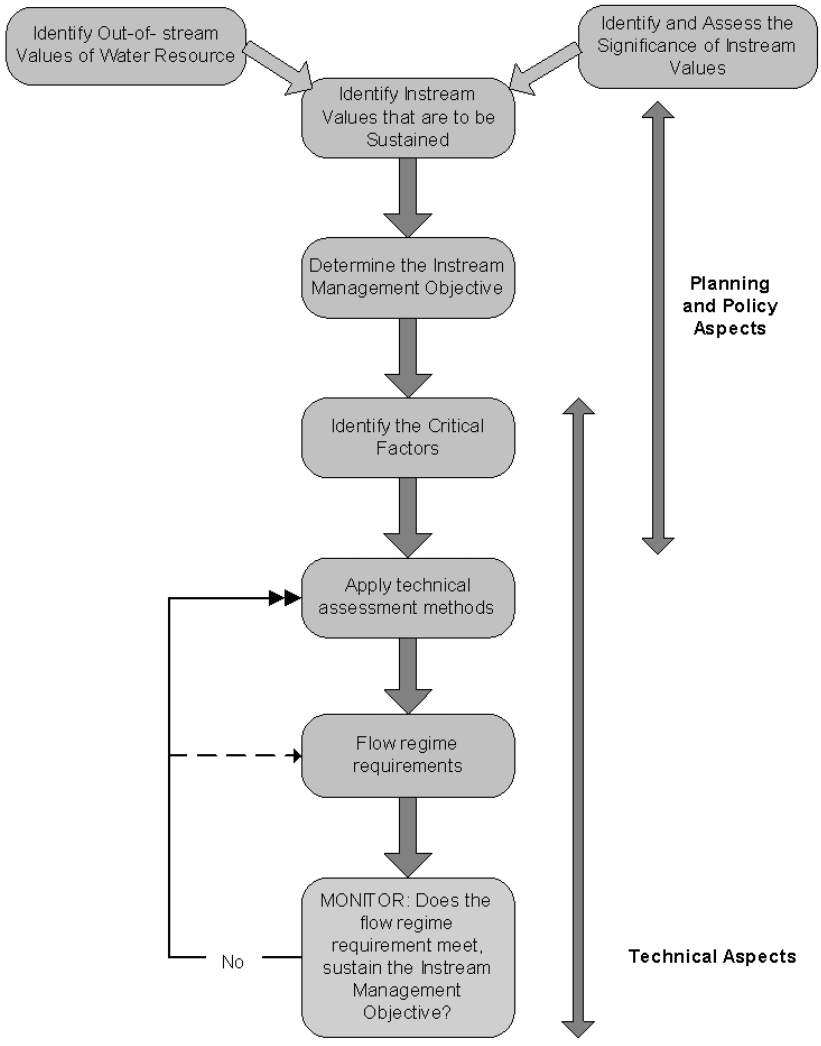
- The impact on the Mangatarere catchment from losses to groundwater;
- The habitat values of the catchment, as surveys undertaken so far have been restricted in nature;
- The implications of climate change for the catchment;
- The use of integrated catchment management studies, as suggested in recent consultation;
- The use of alternative ways to allocate water, as they are developed, also suggested in recent consultation;
- The use of transferable water permits; and
- The application of other appropriate technical tools as they become available.

2. Process For Setting the Flow Regime

2.1 Introduction

This plan has adopted the process set out by the Ministry for the Environment (MfE) (Figure 4), to ensure the flows set can sustain the instream values that are significant for the Mangatarere. Stream values are explained in Section 2.2. Section 2.3 provides a summary of the steps taken in this plan to set the proposed flow regime for the Mangatarere, using the process recommended by MfE.

Figure 4: MfE Process for Setting Flow Regime[4]



[4] as recommended in *Flow Guidelines for Instream Values*, MfE, 1998

2.2 Instream and Out-of-Stream Values

Instream values are values identified *in* a river system and can be grouped into 4 broad categories: ecology, landscape, recreation, and Maori. There can be significant overlap between these values.

Ecological values refer to the value of all vegetation and fauna that may be present within a stream. The main aspects to this are habitat, fish passage and breeding areas. Landscape values are more difficult to define but can include natural character and aesthetic values. Recreational values relate to angling, swimming, kayaking, tubing and jet boating whilst Maori values include mahinga kai, mauri and waahi tapu. Instream values are expanded upon in Part 2 Section A.1.1.

Out-of-stream values are associated with the use of water *outside of* the river system, frequently associated with an economic value. A resource consent to take, dam, divert or discharge into water will have an economic benefit for a particular property. This is especially the case for abstractions for irrigation.[5]

Section 3 will identify which of the above values are relevant for the Mangatarere catchment.

2.3 Process Adopted for Setting the Flow Regime

Step 1 identifies all stream values (both in and out-of-stream). There are 2 main elements to this; an assessment of the statutory framework for the Mangatarere and consultation with the community. **Step 2** assesses what instream values are to be sustained, based on the relative significance of the values identified. This process determines the Instream Management Objective (IMO), that is, the objective which promotes the sustainable management of an instream value or values.	Section 3
Once the IMO has been determined, the flow regime options can be proposed - **Step 3**. The information collected through water quality, hydrological and instream habitat requirement studies is considered along with existing/requested allocation levels. Critical factors for sustaining the IMO (such as minimum flow) are identified.	Section 4
Step 4 involves consultation with key organisations and the community to identify the preferred option for each reach, and any other feedback to help shape the final plan.	Section 3
Other measures beyond water allocation can be used to achieve the IMO such as riparian enhancement.	Section 5

[5] A resource consent is not required for an individual's reasonable domestic needs, animal drinking water needs and for fire fighting purposes – RFP Section 9.6.2

3. Stream Values and the Instream Management Objective

3.1 Identification of Stream Values

There are 2 main components to identifying stream values:

- An assessment of the statutory framework for the Mangatarere catchment; and
- Consultation with the community and key organisations

3.2 Statutory Framework

Reference should be made to the RMA and other statutory provisions such as national policy statements, regional policy statements and regional plans. Part II of the RMA gives water managers a list of matters which must be considered when planning and allocating water. This enables us to appreciate the potential range of values to be sustained. (These have been described briefly in Section 2.2 - See Part 2 Section A.1.1 for further detail).

There are no relevant national policy statements or national standards that relate to freshwater management at the moment. The *Regional Policy Statement for the Wellington Region* (RPS) provides an overview on water allocation for the region, and advises developing and applying flow regimes based on instream habitat requirements (See Part 2 Section A.2.1 for further detail).

The main steer for the Mangatarere catchment comes from the *Regional Freshwater Plan for the Wellington Region* (RFP). There are several policies in the RFP that give specific guidance for the management of the water resource in the Mangatarere catchment (further detail in Part 2 Section A.2.2), which are[6]:

- Establishing Minimum Flows And Approaches To Water Allocation (Mangatarere catchment)
- Avoiding Effects On Trout Habitat/Managing Water Quality For Trout Fishery/Spawning (Mangatarere Stream, Beef Creek and Kaipaitangata Stream[7])
- Enhancing Water Quality For Aquatic Ecosystem Purposes (Mangatarere Stream[8])

The first policy is one of the main reasons for preparing this plan. The remaining two should be carried through to the IMO in Section 3.4.

[6] There is no specific guidance within the RFP relating to the Hinau or Enaki Streams.
[7] This applies downstream of the water supply dam. Water upstream of the dam is to be managed for water supply purposes (Policy 5.2.5 of the RFP). This refers to managing water in the Kaipaitangata headwaters, which is not affected by water allocation as there are no takes in this area (and as Section 4 outlines, no further abstraction will be considered for the Upper Reach). This area is safeguarded for water supply purposes in the Carterton District Plan.
[8] from the confluence with the Waiohine to north of Andersons Line

3.3 Consultation

It is important to include the community in freshwater resource management processes.[9] This will ensure that identified instream values are considered, and that the purpose of the IMO is well understood by interested parties.[10]

3.3.1 Consultation 2001

Initial consultation was undertaken in 2001[11], to determine who values the Mangatarere and why. From this consultation, it is clear that the stream is valued for the following reasons (See Part 2 Section B for a more detailed summary):

- Ecological Values – habitats for trout and native fish, existing flora and fauna
- Recreational Values – primarily trout fishing but some swimming
- Maori Values – water quality and quantity, habitat for indigenous flora and fauna
- Out-of-Stream Values – Carrington water race, public water supply and direct irrigation takes

In addition, most responses recommended riparian enhancement and encouragement of efficient water use and storage.

3.3.2 Consultation 2003

As part of more recent consultation in October 2003, local residents, consent holders and key organisations were sent a copy of the Draft Water Allocation Plan for the Mangatarere Catchment. Approximately 60 copies were sent out and a public meeting was held.

Comments were received from local residents and consent holders/farmers, the Department of Conservation, Fish and Game, Carterton District Council, Federated Farmers, Rangitaane O Wairarapa, Forest and Bird and Wairarapa District Health Board.

Most comments were supportive of the proposed Instream Management Objective and thought the plan covered the main values of the catchment. There was overall support for riparian enhancement, including the use of native plants, and the promotion of good practice principles. There was also support for metering of takes and for comprehensive catchment management.

The preferred flow regime for each reach emerged as those which involved a stepdown approach, where an additional trigger flow is used in addition to the minimum flow (discussed further in Section 4).

Other feedback included details provided on the operation and importance of the Carrington water race, and concern over whether the proposed restrictions would impact on the micro-hydro electric systems in use in the area.

One respondent was concerned that the restrictions would effect farming operations quite harshly and should not be imposed. However there were also comments suggesting higher

[9] Policy 4.2.31 of the *Regional Freshwater Plan for the Wellington Region*
[10] *Flow Guidelines for Instream Values* MfE, 1998.
[11] Consultation was also carried out in 1996, which sought views on both water allocation and river control works; many of the issues raised regarding water allocation are as for the 2001 survey. River control issues have been considered separately under a proposed future river management scheme for the Mangatarere.

restrictions should be imposed by reducing existing allocation or by not renewing expired consents, to provide greater protection of instream values.

There was also concern over the large take from the Kaipaitangata and barriers to fish passage along this stream. And some concern that the IMO was biased towards trout in place of native fish.

(Comments were also received in relation to gravel extraction and flooding issues, which were referred onto Greater Wellington Operations Department.)

This feedback has been very useful in helping to shape the final plan.

3.4 What is the Instream Management Objective?

The next step in the process is to identify what instream values are to be sustained, based on the relative significance of the values identified thus far. This determines the IMO, that is, the objective that promotes the sustainable management and/or enhancement of an instream value, or values.

Table 1 summarises the process that was employed to determine the IMO, and follows onto the next step in the process, the Flow Regime, detailed in Section 4. The table lists all instream values identified and determines which of these should be sustained and carried through to the IMO. (Out-of-stream values are also listed but it is not appropriate to carry these through to the IMO).

It can be seen that the values that emerged from the 2001 consultation process are similar to those identified in the RFP. The RFP indicates trout habitat and fishing/spawning to be important for the Mangatarere and Kaipaitangata streams and Beef Creek. This ties in with feedback from consultation in 2001. Furthermore, enhancement of water quality, also provided for in RFP guidance for the Mangatarere stream, is consistent with many of the consultation responses.

Work undertaken by Greater Wellington in 2002 indicated that adult brown trout had the highest flow requirements overall in the Mangatarere catchment, in terms of greater water velocities and depth. As a consequence of this, by managing the catchment to support the trout habitat, other species of fish and aquatic invertebrates can be provided for. In addition to this, by enhancing the water quality of the stream, other concerns (highlighted through the 2001 consultation process) can be addressed.

Table 1 outlines how concerns raised during the 2001 consultation, not directly incorporated into the IMO, can be addressed. For example, the Department of Conservation's concern regarding the significant ecological values of the headwaters is indirectly part of the IMO as the Upper Reach flow regime (described in Section 4) includes a cessation on all new abstractions in the Upper Reach, including the headwaters. (It is noted there are no current takes in this area). Furthermore, measures outlined in Section 5 should help address many of the responses concerning riparian enhancement and water conservation.

The consultation process and statutory framework also highlighted water quantity, as well as quality, to be significant and this has also been incorporated into the IMO.

Therefore the IMO for the Mangatarere catchment is:

The enhancement of water quality and maintenance of water quantity, to support trout habitat and fishing/spawning and aquatic ecosystems.

An important part of the consultation process in October 2003, was to ensure the community and key organisations considered the proposed IMO appropriate for the catchment. As mentioned in Section 3.3, feedback was largely supportive of the proposed IMO.

[The IMO encompasses most of the policies relating to the Mangatarere catchment contained within the RFP, except policy relating to water supply for the Kaipaitangata stream. However, there are no takes in this area and through the proposed Upper Reach flow regime, no new abstraction is allowed. Furthermore, this area is safeguarded for water supply purposes in the Carterton District Plan.]

Table 1: Process Summary - Setting the Flow Regime for the Mangatarere Catchment[12]

Source		All Instream Values	Instream Values To Be Sustained	Instream Management Objective	The Flow Regime (Section 4)		
					Critical Factors	**Appropriate Technical Tool**	**Flow Regime[13]**
Statutory Framework	RPS	1. Ecological - Instream habitat requirements to be considered when flow setting	Incorporated into 2 and 3	Enhancement of water quality and quantity to support trout habitat and fishing/spawning and aquatic ecosystems	Minimum Flow (for Water Quality + Habitat) + Flow Variability	Hydrological, instream habitat requirement (IFIM and WAIORA) and water quality studies	Proposed flow regimes outlined in Section 4
	RFP	2. Ecological -Trout Habitat (Avoiding Adverse Effects And Managing Water Quality For Fishery/Spawning)	Trout habitat and fishing/spawning				
	RFP	3. Ecological - Aquatic Ecosystem (Enhancement of Water Quality)	Aquatic ecosystem				
Consultation 2001		4. Ecological – significant ecological values and habitats for native fish in the headwaters	Indirectly incorporated into IMO as Upper Reach Options include a cessation on new abstractions, including the headwaters				
		5. Ecological – habitat requirements of fish and macroinvertebrates	Incorporated into 2 above				
		6. Maori – water quality, quantity and instream habitat of indigenous flora and fauna	Incorporated into 3 above + quantity carried through to IMO				
		7. Maori – mixing of water from other catchments, concern over sewage discharge, landfill leachate	Mixing is addressed via the resource consent process when assessing applications, as are sewage discharges and landfill leachate				
		8. Recreational – primarily trout fishing and some swimming/picnicing	Fishing incorporated into 2 above. Swimming indirectly incorporated as the IMO will enhance existing water quality, ensure dilution of discharges and is likely to provide adequate levels for paddling.				
		All Out-of-Stream Values	**Out-of-Stream Values To Be Sustained**				
		9-11. Direct Takes, Take for Carrington Water Race and Take for Public Water Supply	Assessed via resource consent process taking account of allocation levels set in Section 4				

12 Using process set out in *Flow Guidelines for Instream Values* Mfe, 1998

13 In addition to flow regime setting, riparian enhancement may also help sustain instream values – see Section 5

4. The Flow Regime

4.1 Summary

This section proposes a flow regime for both the Upper and Lower Reaches of the Mangatarere catchment.

It assesses the IMO (identified in Section 3) against information collected on the catchment, through water quality, hydrological and instream habitat requirement studies. It also assesses the IMO against out-of-stream uses. In so doing, it uses the most appropriate technical tools at this time to set the flow regimes and explains why various aspects of the flow regimes have been set.

In summary, studies found that the existing level of water allocation in the Upper Reach may be too high to support the IMO, whilst the Lower Reach could potentially support further allocation.

As mentioned in Section 3.3, several flow regime options were put forward for consideration in the draft plan in October 2003 (the original set of proposed options are contained within Part 2 Section C). Feedback from consultation indicated the preferred flow regime for each reach were those including an additional trigger flow (stepdown), in addition to a minimum flow, as shown in Table 2. These options have been carried through in this final plan as the preferred options.

Table 2 Proposed Flow Regimes

Reach	Minimum Flow at Which All Takes Will Be Restricted to 50%	Minimum Flow at Which All Takes Will Cease
Upper Reach	160 l/s	125 l/s
Lower Reach	125 l/s	90 l/s

1. Core Allocation to be set at the existing quantity of consented water allocation for both reaches
2. Supplementary Allocation to be set at 1200 l/s at the Gorge Site
3. All minimum flows are based on the flow at the Belvedere Rd bridge
4. For the Upper Reach, no reallocation of water will be permitted if existing allocations are partially or fully surrendered
5. Any groundwater takes likely to have an effect on surface water in the Upper Reach will be subject to the above provisions

4.2 Minimum Flows, Allocation Levels and Flow Variability

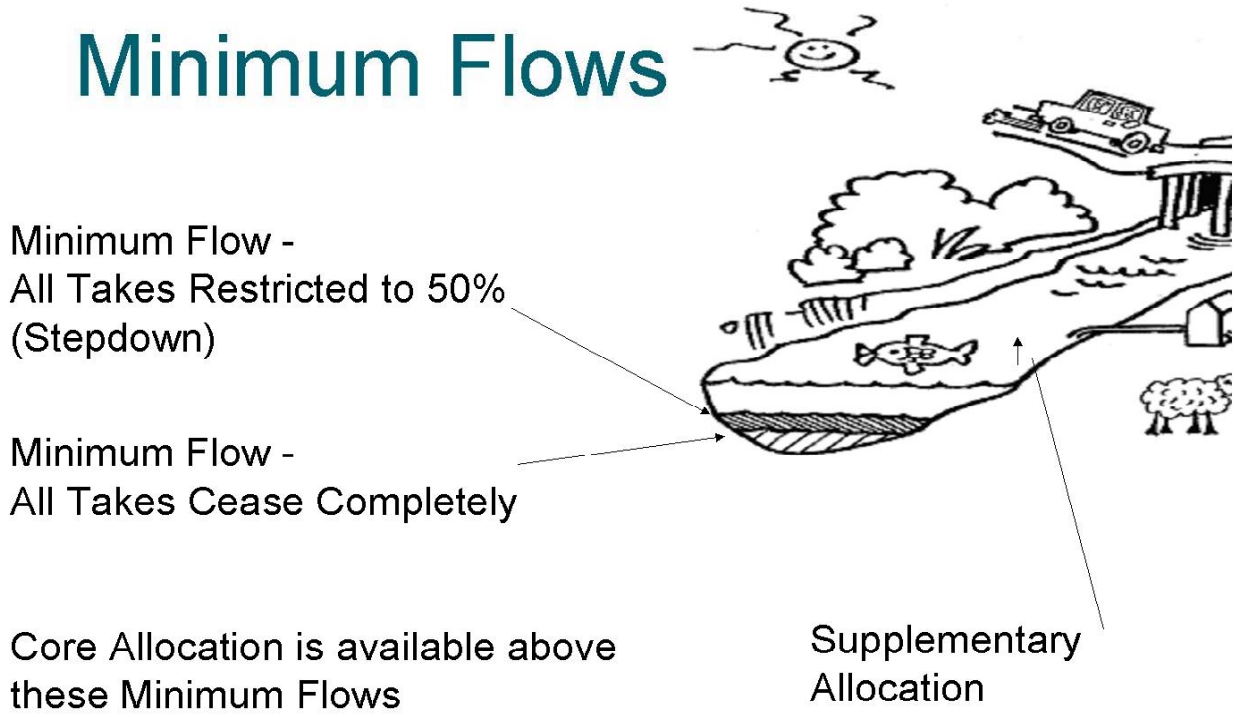
The three main components of a flow regime are Minimum Flows, Allocation Levels and Flow Variability (Figure 5).

A **minimum flow** is a flow level set to protect specific values in a river. Restrictions (for example, 50%) or complete cessations on water use, may be required at certain minimum flows, so that as far as practicable, instream values are sustained. Minimum flow is further described in Part 2 Section A.2.2.

Allocation levels are used to manage the degree of water use in rivers. A **core allocation** is the amount of water which is allocated from a stream when the flow is above the minimum flow. This core allocation aims to provide certainty for resource users and ensures some flow variability is maintained. **Flow Variability** is the natural pattern of flow over the year.

In addition to core allocation, **supplementary allocation** can be applied. This is where water can be harvested at higher flows (during times of high rainfall) when the core allocation is fully taken. The above management controls enable us to address the cumulative environmental effects of water take and use. They also help ensure the water supply is reliable and access to it equitable.[14]

Figure 5 Minimum Flows and Allocation Levels



[14] Quality Planning Website, 2003 *Planning for Water Allocation* (www.qp.org.nz, 16/09/03)

4.3 Reach Based Approach

The reach is a useful scale to manage water allocation for streams such as the Mangatarere. Analysis of information collected shows there are different pressures on the water resource in what are two distinct areas of the catchment. Therefore, the catchment has been divided into an Upper and Lower Reach, as noted on Figure 1:

Upper Reach The Mangatarere Stream from the headwaters to Belvedere Rd bridge including all 4 tributaries	All 4 tributaries are grouped within the Upper Reach because their characteristics are similar to the section of the Mangatarere Stream in this Reach. These characteristics include the headwaters being in their natural state, whereas in the lower parts, flow is lost to groundwater during low flow periods. The Mangatarere Stream has a wide channel width between the Gorge and Belvedere Rd bridge with minimal bankside vegetation. The majority of water takes are located in this Reach.
Lower Reach The Mangatarere Stream from Belvedere Rd bridge to the Waiohine confluence	The Lower Reach has a much higher level of bankside vegetation and the river channel is generally more confined. The river also gains considerable flow as it heads towards the Waiohine River.

4.4 Baseline Site For Setting Minimum Flows And Allocation Levels

Flow in the Mangatarere stream is continuously monitored by Greater Wellington at the Mangatarere Gorge Environmental Monitoring Site (Figure 1), referred to throughout as the 'Gorge Site'. However, this plan proposes to set minimum flows at the Belvedere Rd bridge gauging site (Figure 1). This is more appropriate than using the Gorge Site, as the stresses on the water resource are largely in the Belvedere Rd bridge area of the catchment. The Gorge Site will be used as an indicator site to trigger regular manual monitoring of the flow at Belvedere Rd bridge.

Therefore all references to minimum flows relate to the flow in the Mangatarere Stream at the Belvedere Road bridge.

4.5 Summary Of Information Collected

Analysis of the available information has revealed that the life-supporting capacity of the Mangatarere is being compromised under natural conditions and, when water takes are being taken. Three main attributes were considered: water quality, water quantity and instream habitat [Part 2 contains more detailed information on Water Quality and Ecology (Section D), Low Flow Hydrology (Section E) and Low Flow Modelling (Section F)]:[15]

The *water quality* in the Mangatarere Stream has declined in general since monitoring commenced in 1997 (Part 2 Section D). Although this may not be directly attributable to water takes from the catchment, they will exacerbate any water quality problems during low flow periods, by decreasing

[15] Full copies of the following reports (all Greater Wellington, 2002-2003) can be obtained from Greater Wellington Regional Council: *Instream Habitat Assessment for the Mangatarere River*, *Mangatarere Low Flow Hydrology*, *WAIORA Report for the Mangatarere River*, *WAIORA Verses IFIM for the Mangatarere River* and *Water Quality and Ecosystem Health of the Mangatarere River).*

the flow. This leads to increased water temperature and decreased oxygen levels, which may adversely affect aquatic life.

Water quantity assessment[16](Part 2 Section E) revealed that:

- There is a significant decrease in flow during low flow periods between the Gorge Site and Anderson's Line. Investigations completed in April 2003 showed the stream dried up during very low flow periods around Andersons Line (Figure 3). Anecdotal evidence of all 4 tributaries show that these watercourses can also dry up during low flow conditions; and

- There is a large increase in flow between Dalefield Rd and SH2.

Overall, the stream increases in flow as it travels towards the confluence with the Waiohine.

4.5.1 IFIM and WAIORA

A number of models are available that can be used to establish minimum flows to support the IMO. Two of the models used to investigate the *instream habitat* of the Mangatarere were IFIM and WAIORA (See Part 2 Section F).

IFIM (Instream Flow Incremental Methodology) is a computer based model that quantifies the amount of habitat[17] with different flow levels in a river, by predicting water depths and velocities at different flows. It is nationally recognised as a robust method of determining instream habitat requirements.

WAIORA (Water Allocation Impacts on River Attributes)[18] is a computer package that can assist resource managers to predict the impact of changes in flow on river ecology. It is still in its development stage. However, it has potential to become a valuable tool in tracking changes in instream habitat requirements based on various abstraction levels, and incorporates more environmental variables in making its assessment.

As IFIM is not generally considered suitable for small streams, it is useful to be able to compare values derived from both models, and therefore both were used in investigating instream habitat. Similar values were found using both models.

IFIM was however chosen as the appropriate tool for determining flow regime options for the Mangatarere, as WAIORA is still in its early stages.[19] In addition, IFIM is based on fish and aquatic invertebrate habitat and as identified in Section 3, the IMO relates to trout habitat and aquatic ecosystem.

In summary, both IFIM and WAIORA showed the Upper Reach has the highest minimum flow requirements for instream habitat. The existing allocation level in this Reach may be too high, whilst

[16] carried out over the last 10-15 years but most recently during April 2003
[17] can be fish, food producing or aquatic insect habitat
[18] also Maori word for health/fountain
[19] Furthermore, consultation showed Wellington Fish and Game Council had concerns over the use of WAIORA.

the Lower Reach could potentially support further allocation without compromising those requirements.

4.5.2 The 2/3's Rule

IFIM does not define a minimum flow in litres per second, or the amount of habitat loss that is acceptable. It only provides information on changes in habitat at different flows.

To determine a suitable minimum flow, a decision must *first* be made regarding the minimum amount of habitat that must be maintained, or the maximum amount of habitat loss that is acceptable. Rules of thumb frequently used to do this include 'retaining 2/3s of the habitat (whether it be for fish, insects or food producing habitat) at MALF (Mean Annual Low Flow)', or alternatively, 30% of the WUA (Weighted Useable Area)[20].

To the best of current knowledge, the 'retaining 2/3s of the food producing habitat at MALF' rule has been adopted in this plan to satisfy the principal issues relating to water allocation in the catchment. However, there is some concern over its use[21]. Whilst we acknowledge it is an arbitrary value, there is no methodology available at the moment to select an alternative proportion of MALF.

As mentioned in Section 1.6, revision of the WAP may be considered, as other studies become available. Such studies currently taking place, involving the Mangatarere, include the WAIORA study, the MfE Low Flow Study and the Massey University Low Flow Study. The outcome of this work may provide more opportunity to consider whether an alternative to the 2/3s rule is appropriate[22].

4.6 Core Allocation for the Upper Reach

The existing quantity of water allocated from the Upper Reach is 278.6 l/s, 175.6 l/s of which is from the Mangatarere Stream alone.[23] A total of 353.6 l/s has been applied for from the Upper Reach[24], 262.6 l/s of this being from the Mangatarere Stream alone, 200 l/s of which is for the Carrington water race. See Part 2 Section G for further detail on current and requested allocation.

The Mean Annual Low Flow[25] (MALF) in the Mangatarere stream at the Gorge Site (upstream of all abstractions) is 168 l/s.

Given the high level of existing allocation, no increased allocation will be considered when the existing consent applications are being processed. Hence at present, the **core allocation for the**

[20] These rules of thumb are discussed in Jowett, 1993.
[21] *Flow Guidelines for Instream Values*, MfE 1998, Section 12.3.3
[22] It has been suggested that for smaller rivers, the minimum flow be based on a minimum amount of habitat equivalent to that exceeded by 85% of the national survey rivers at their mean annual low flow, rather than using the 2/3s rule. However, although the Mangatarere Stream is a small stream, this guideline was not used for this plan.
[23] All existing consents except those for the Kaipaitangata stream have expired and replacement consent applications have been lodged, but remain on hold until the proposed Plan Change process is complete.
[24] The Doull abstraction was not included as part of this assessment as that take is essentially covered by the Carrington water race take.
[25] The Mean Annual Low Flow is the average of the lowest flows recorded each year between 1977 and 1995.

Upper Reach will be set at the level of existing allocation, which is 278.6 l/s[26]. This value relates to approximately 200% of the 1 in 10 year low flow.

Core allocation is generally set for most rivers at approximately 30-50% of the 1 in 10 year low flow, which clearly indicates the Upper Reach is over-allocated. Therefore no increased abstraction is considered sustainable. Further work on the Mangatarere in the coming years may provide opportunity to consider changing this value.

The minimum flows proposed in the next section provide a greater level of protection of instream values than at present. Therefore, although over allocated, the proposed minimum flows will protect the IMO, and improve upon the current situation.

In the future, if consents are fully or partially surrendered in the Upper Reach, no reallocation of that resource will occur.

For the tributaries of the Mangatarere catchment[27] the same principle of water allocation will apply. That is, the core allocation equates to the existing allocation[28]. In addition to this, the core allocation will be reduced if consents are partially or fully surrendered. The reason for this is that all these tributaries lose flow as they travel across the plains towards the Mangatarere Stream. All these watercourses can dry up under summer low flow conditions. Hence no increased allocation or reallocation of water abstractions is considered sustainable.

4.7 Minimum Flow for the Upper Reach

IFIM and WAIORA instream habitat assessment studies showed that the life-supporting capacity of the Upper Reach is compromised under natural conditions, and this is exacerbated by the large cumulative take from the catchment.

Minimum flows have been derived from IFIM studies. As mentioned in Section 4.4, all minimum flows are set at the Belvedere Rd Bridge as it is considered to be a more appropriate site, taking account of all abstractions upstream of this site[29].

Using IFIM, based on retaining 2/3s of the food producing habitat at MALF, a **minimum flow of 125 l/s**[30] **has been determined for the Upper Reach**. No abstraction of water in the Upper Reach will be allowed when the flow at Belvedere Rd bridge falls below this level. Part 2 Section F contains further detail on how this figure has been derived.

When the flow at the Belvedere Road Bridge is 125 l/s, the corresponding flow at the Gorge site is 250 l/s. At present, under existing consent conditions, takes cease when the flow at the Gorge site

[26] As at 30th September 2001, when all existing consents expired
[27] which are classified in the Upper Reach for the purposes of this plan
[28] As at 30th September 2001, when all existing consents expired
[29] including the Carrington water race
[30] This figure has been rounded up from 122 l/s as determined using IFIM, See Part 2 Section F.

falls below 150 l/. Therefore, with the proposed minimum flow of 125 l/s, there will be an increased level of protection of instream values of 100 l/s.[31]

The minimum flow of 125 l/s is considered to be consistent with the IMO as identified in Section 3. It will provide a higher level of protection than is currently the case.

The two largest abstractions in the Upper Reach include the public water supply from the Kaipaitangata stream and the Carrington water race from the Mangatarere. The Carterton District Council water supply requires water to be taken from the Kaipaitangata Stream on a daily basis. A new resource consent has recently been processed and granted for this take, hence the proposed minimum flow does not apply to this particular case. This consent is for a short term[32] and recognises the need to restore flows within this stream, at the end of its term.

The Carterton District Council also takes water for the Carrington water race. The resource consent application for this activity is currently being processed and will need to comply with the proposed minimum flows.

4.8 Flow Regime for the Upper Reach

The flow regime for the Upper Reach requires a 50% restriction when the flow falls below 160 l/s, and requires all takes to cease when the flow falls below 125 l/s (Table 3):

Table 3 Flow Regime for the Upper Reach	
Minimum flow at which all takes will be restricted to 50%	**Minimum flow at which all takes will cease**
160 l/s	125 l/s
Core Allocation - to be set at the existing quantity of consented water allocation	

As mentioned already, feedback indicated the option including this stepdown approach was favoured (See Part 2 Section C for the original set of options put forward for consideration).

4.9 Core Allocation for the Lower Reach

The existing level of allocation in the Lower Reach is 39.75 l/s [33] and no increase has been applied for. (See Part 2 Section G for further detail). The MALF at SH2 is approximately 430 l/s[34].

Hence water takes in this reach represent a small percentage of that flow, contrasting to the situation in the Upper Reach. This is in part due to the gains from groundwater inflow and a lesser degree of water allocation in this reach.

[31] Although it is acknowledged this is dependent on the level of the take for the Carrington Water Race.
[32] 10 years (water supply consents are generally for 20 years in this region)
[33] All consents expired in 2001 and replacement applications remain on hold until the proposed Plan Change process is complete.
[34] This is based on the average of 9 (low flow) spot gaugings from February 01 to April 03, and therefore may have a large margin of error.

Core allocation in this reach will be set at the level of existing allocation, which is 39.75 l/s[35]. The figure of 39.75 l/s relates to approximately 40% of the 1 in 10 year low flow.

An additional allocation of 50 l/s in the Lower Reach was put forward for consideration in recent consultation (See Part 2 Section C). As well as being reflected in the majority of feedback, Greater Wellington considers a cautious approach is more appropriate at this stage until more is known about the effects of over allocation on the catchment.

4.10 Minimum Flow for the Lower Reach

Analysis of the lower reach using IFIM[36] equates to a minimum flow at SH2 of 380 l/s. The minimum flow of 125 l/s at the Belvedere Road bridge proposed for the Upper Reach corresponds to a level of 450 l/s at SH2.

Therefore, either more water could be allocated from the Lower Reach with the same minimum flow as the Upper Reach (125 l/s), or the same amount of water could be allocated from the Lower Reach as for the Upper Reach (the existing consented level) and the minimum flow at Belvedere Bridge[37] could be reduced from 125 l/s to a lower level such as 90 l/s. These options were put forward for consideration in recent consultation (See Part 2 Section C).

The majority of feedback favoured the flow regime which had a stepdown approach *and* a more cautious approach of not allowing any additional allocation in this reach.

Therefore, the **proposed minimum flow for the Lower Reach is 90 l/s**. No abstraction of water will be allowed when the flow at Belvedere Rd bridge falls below this flow.

This recommended minimum flow is considered to be consistent with the IMO and as stated already, provides a higher level of protection than is currently the case.

It is noted that the flow in the Lower Reach is important in ensuring adequate dilution of the Carterton District Council sewage discharge. The proposed minimum flow will increase rather than reduce existing flow. Therefore, the proposed options will provide at least the same level of dilution as is currently the case or provide an enhanced level.[38]

4.11 Flow Regime for the Lower Reach

The flow regime for the Lower Reach requires a 50% restriction when the flow falls below 125 l/s at Belvedere Rd bridge, and all abstractions are to cease when the flow falls below 90 l/s. No additional allocation will be allowed above the existing consented level (Table 4).

[35] As at 30th September 2001, when all existing consents expired
[36] based on retaining 2/3's of the food producing habitat at MALF
[37] for Lower Reach abstractions only
[38] In addition, this issue is addressed through the resource consent process, as CDC are required to cease discharging in low flow periods during summer.

Table 4 Flow Regime for the Lower Reach	
Minimum flow at which all takes will be restricted to 50%	**Minimum flow at which all takes will cease**
125 l/s	90 l/s
Core Allocation - to be set at the existing quantity of consented water allocation	

4.12 Issues for Implementation of the Proposed Flow Regimes

The minimum flows are likely to increase the present level of restriction on water takes. This is in order to provide a higher degree of protection of the instream habitat, in light of the over allocation of the Upper Reach, and its impact on the life supporting capacity of this Reach. Approximate restrictions on water takes are as follows:

- For the Upper Reach, the proposed additional trigger flow of 160 l/s, will mean takes will be reduced to 50% for approximately 7 days per year prior to cessation. As the minimum flow of 125 l/s will not be triggered as often, complete cessation of takes could occur up to 26 days per year.

- For the Lower Reach, the proposed additional trigger flow of 125 l/s, will mean takes will be reduced to 50% for approximately 33 days per year. As the minimum flow of 90 l/s will not be triggered as often, complete cessation of takes could occur up to 25 days per year.

4.13 Supplementary Allocation

A supplementary allocation level has been set for taking additional water at higher flows in the Mangatarere catchment. The core allocation for both reaches can only be exceeded above this flow.

The supplementary allocation level is recommended to be 1200 l/s at the Gorge Site.

The IFIM studies showed that optimum habitat for trout spawning occurred at a flow level of just under 1200 l/s at the Gorge site and just over 500 l/s at Belvedere Rd bridge. Thus to be consistent with the IMO, additional water should only be allowed to be taken when flows exceed the level for optimum trout spawning habitat.

It is recommended to use the optimum flow level at the Gorge Site because:

- This is the section where trout move upstream to spawn; and

- The Belvedere Rd bridge site requires manual gauging and should therefore be used during low flow conditions only (in contrast to the Gorge site where flows at all levels are continuously monitored).

A **maximum supplementary allocation** was also considered, whereby a ceiling on abstractions would be put in place to avoid regulation of flow, through diversion and moderation of high flows

through supplementary allocation. High flows are an important aspect of flow variability as they cause river bed disturbance which assists in removing existing growth and encourages new growth.[39]

This will be considered as further information becomes available and may be introduced depending on the demand for use of supplementary allocation, in the coming years.

4.14 Monitoring

The final step in the process recommended by MfE (Figure 4) is monitoring the stream to determine whether the flow regime meets and sustains the IMO. Greater Wellington will monitor the Mangatarere catchment at the Gorge Site and at other locations as appropriate over the coming years. This may trigger additional work being undertaken and consequent revision of the Water Allocation Plan.

Under its current resource management charging policy, Greater Wellington requires meters to be placed on all new takes above 20 l/s.

[39] Known as ecological resetting, whereby recolonisation from a zero base occurs

5. Additional Ways to Sustain the Instream Management Objective

5.1 Introduction

During both phases of consultation, many people recommended riparian enhancement of the Mangatarere catchment. This is beyond the scope of water allocation but is nonetheless important, in minimising land use impacts on water quality and other factors.

Riparian enhancement helps avoid, remedy and mitigate some of the adverse effects of rural land uses on aquatic habitat. It does this by intercepting contaminants before they reach rivers, reducing their effects on aquatic habitat if they do reach the water, and restoring or reinstating areas of habitat that have been largely removed by development[40].

Some riparian enhancement has already taken place within the Mangatarere catchment. The mid to lower catchment of the Enaki stream (Figure 1) is affected by lack of shade, stock damage to banks and rural runoff. Sections of this stream are being retired from stock access with permanent fencing, and planted with a mixture of exotic and native vegetation. This is part of a series of pilot programmes in the region. Greater Wellington proposes to move to a more formal programme of riparian enhancement by 2005-06, including streams being worked on through the Take Care Programme.

Riparian enhancement for the Mangatarere is likely to come about from a combination of measures, including regulatory and more informal arrangements. Requiring riparian enhancement as part of consent conditions is considered in Section 5.2, whilst Section 5.3 describes other measures for enhancement.

In addition to riparian enhancement, Section 5.4 outlines good practice principles developed by Greater Wellington, mainly relating to water use, for resource users to adopt.

5.2 Considering Riparian Enhancement as Consent Conditions

Section 104 of the RMA requires consent authorities to consider any application for a resource consent subject to the purpose and principles of Part II of the RMA. The purpose of the RMA is to promote the sustainable management of natural and physical resources. Sustainable management explicitly includes avoiding, remedying, or mitigating any adverse effects of activities on the environment. Section 104 also specifically requires the consent authority to have regard to (among other things) any actual and potential effects on the environment of allowing the activity, and any relevant objectives, policies, rules, or other provisions of a plan or proposed plan.

Some activities and ways in which riparian management can help to mitigate their adverse effects on streams are given in Table 5 below.

[40] *Greater Wellington's Riparian Management Strategy* Greater Wellington Regional Council, June 2003

Table 5 Activities That Can Cause Adverse Effects On Stream Habitat[41]		
Activity	**Some Effects Of The Activity**	**How Riparian Enhancement Can Help Mitigate Them**
Abstractions from rivers and streams	Large abstractions, or a lot of small abstractions, may decrease stream flow, making it easier for instream water temperatures to increase.	Riparian vegetation that shades the stream can slow down or stop the elevation of water temperatures.
Discharge of contaminants to land near streams	Runoff of contaminants to the stream. Nutrients, sediment and disease-causing organisms are the most common contaminants affecting aquatic habitat and water quality in rivers.	Many riparian management techniques will lower the quantities of these contaminants reaching rivers, and can help mitigate their effects if they do reach the water.
Works in the bed of streams, or affecting stream banks	Destruction of pools and riffles and existing vegetation, erosion of stream banks.	Streamside vegetation can create overhang for fish refuge, help maintain a more natural instream environment, and stabilise stream banks.

There are some activities in and near streams that will have effects on aquatic habitat that cannot be avoided. It is clear though, that the RMA envisages that the applicant will mitigate the effects of their activity. Where mitigation can be achieved by riparian management, this can be required by conditions imposed on the consent[42].

Therefore, when assessing resource consent applications for water takes (including renewing existing takes), Greater Wellington can consider requiring riparian enhancement as part of consent conditions alongside any mitigation proposed to reduce any adverse affects of the proposed activity. In addition to streamside planting noted in Table 5, this enhancement could include preventing or restricting stock access and the establishment of riparian grass strips.

5.3 Others Measures for Riparian Enhancement

Other ways of encouraging riparian enhancement could include promoting care groups and individual landowner riparian management initiatives through funding and advice. Environmental education may also be considered, by way of field days, where the benefits of riparian management could be described, in addition to providing advice on efficient water usage.

Greater Wellington is identifying catchments where the greatest benefit to biodiversity can be gained from riparian retirement and planting. These catchments will be eligible for financial assistance. Regardless of whether the Mangatarere is one of these selected catchments, it can still benefit from the advisory service that will be provided.

[41] Taken from *Greater Wellington's Riparian Management Strategy* Greater Wellington Regional Council, June 2003

[42] *Greater Wellington's Riparian Management Strategy* Greater Wellington Regional Council, June 2003

5.4 Good Practice Principles

Greater Wellington has developed good practice principles for resource users to adopt. These practices encourage the use of methods that will have the least possible effect on the environment.

5.4.1 Promote Water Conservation and Efficient Use of Water

During both phases of consultation, many respondents recommended water conservation and the efficient use of water. Greater Wellington will promote this via the following methods:

- Consent Applications - Promoting reductions and appropriate/reasonable volumes of water use at consent renewal stage and for new applicants. As suggested in recent consultation, longer consent terms will be considered where more efficient irrigation systems are proposed.

- Compliance Inspection Advice - Advising consent holders on consent requirements and the most efficient methods of irrigation during compliance visits.

- Consumption Targets - Assessing how much water is required for specific crops at particular locations and allocating water accordingly. Currently the maximum application rate for irrigation purposes is 350 m^3/ha/wk as specified in the RFP. Greater Wellington is currently undertaking research on consumption targets. This includes the possible use of a tool to promote the sustainable use of water based on crop, soil and climate, and is likely to be made available for use this year.

5.4.2 Use of Groundwater Resources over Surface Water Resources

In some areas, the use of groundwater resources is more sustainable than abstracting surface water resources[43]. This is because groundwater is generally a more secure water supply and there are no water restrictions unless there are clearly identified adverse effects on other bores or surface water flow in rivers or streams.

This will be encouraged when providing advice to prospective consent applicants. However, there may be constraints to abstracting groundwater in some instances, due to resource availability and long term sustainability. This issue is further complicated because in this catchment, groundwater is closely linked to stream flow. As mentioned in Section 1.6, further work on understanding the impact on the catchment from losses to groundwater may clarify this issue.

5.4.3 Be Fair and Reasonable in Managing Resources

Greater Wellington will monitor water use in the catchment. If consent holders do not use their resource consent in any continuous 5-year period, Greater Wellington may consider cancelling that particular resource consent and allocating the resource to a new user. It is unfair to restrict the

[43] Policy 6.2.7 of the RFP encourages users to take groundwater as an alternative to surface water resources where the groundwater is of sufficient quality and quantity for the prospective use, and there are no significant environmental, technical, or financial constraints associated with abstracting groundwater.

potential new use of a resource when consent holders "lock up" the resource and do not actively use the water allocation issued under a resource consent.

5.3.4 Land Based Disposal Methods to Reduce Point Source Discharges

Point source discharges (discharges directly to the stream i.e. through a pipe) will be discouraged during the resource consent process. Applicants should investigate alternative land disposal methods that will have minimal impact on water quality and instream habitat. (It is recognised that there will be times when disposal to land it is not a feasible option.)