

Attachment 1 to Report 13.719

# **Flood Protection**

# Asset Condition Report 2012/13

**Supplementary Information** 

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# 1. Executive Summary

#### Introduction

This report is an attachment to the Flood Protection Asset Condition report (Council Report reference 13.719) for 2012/13. It contains a summary of the following:

- Flood Protection River Schemes, detailing the operational activities undertaken and key projects;
- Condition rating data and graphs for individual rivers and asset types;
- The annual consent report for the Northern Wairarapa Rivers;
- The Eastern rivers performance statements;
- Committees Resolutions:
- The scheme reserves, scheme rate changes and the annual works programme budget.

The complete annual report detailing the specific scheme information is located in Hummingbird document #1237322.

## 2. Works Programmes

There were no significant flood events during the last year and this allowed for the maintenance work to be completed within budget and with no requirement to draw on the flood damage reserves.

Key achievements to note were:

#### • Eastern Rivers

- In the Wairarapa, rock groynes were used to strengthen existing vegetative edge protection in erosion prone areas.
- 3000 tonnes of rock was used along the Northern Wairarapa rivers and 1550 tonnes of boulder for the Lower Wairarapa Valley Development Scheme.
- 11,000 willows poles were planted in the Northern Wairarapa Rivers.
   10,000 willow poles and 10,000 natives plants in Lower Wairarapa Valley Development Scheme works.
- An additional section of the Tauanui River stop bank was upgraded.
- The lack of floods has assisted the establishment of vegetative buffers and has reduced the amount of consented in-stream machine work required.

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 Gravel extraction continues to contribute to river management objectives by removing high beaches and reducing the need for instream machine works.

#### • Western Rivers

- The Boulcott Stopbank was completed, one year ahead of programme.
- 2,536 tonnes of rock was used along the Hutt River to top up existing rock lines and groynes.
- Rejuvenation of the Hutt River willow lines has continued, with 1,002 willows planted during the year. Native planting has continued and 2,500 native trees were planted on the Hutt River berms.
- Planting of 3,588 willow poles and stakes occurred in the Otaki River with 5,000 native spp. planted by the Otaki River Friends Group.
- 675 tonnes of rock rip rap was used for maintenance of rock lines and groynes along the Otaki River.

# 3. Condition Ratings

The development of the condition rating process has continued over the last year with the focus on consistency and techniques of recording. The condition rating is applied to each asset which is graded from 1 to 5, where: 1 is very good condition requiring no maintenance to a 5 rating, denoting the asset requires upgrade, replacement or be written off.

There has been an increase on the number of assets recording 4 and 5 ratings. This is a result of consistency improvements to the assessment methods and not a change in the physical condition or the likelihood of failure. This resulted in lower ratings for asset types, in particular stop banks and floodgates. The number of assets with 4 and 5 rating has increased from 4.7% to 14% as shown in **Figure 1** below.

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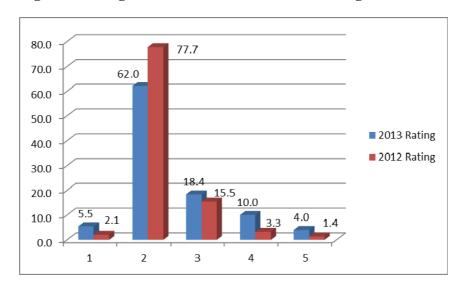


Figure 1 Changes from the 2012 to the 2013 ratings:

#### Comment on assets with condition ratings of 4 or 5

The following details a summary of the changes to assets which were rated either a 4 or 5:

• There are no critical assets that require immediate action and those that require improvements are scheduled to commence in 2013/14 or are included in works programmes.

Stop banks account for 22.5 % of the combined condition ratings.

The stop banks with condition rating 4 have increased from last year. These stop banks are predominantly located in the northern Wairarapa Rivers and the Otaki River. The conditions of these stopbanks do not meet current standards. In the Wairarapa there is vegetation growth along a number of reaches of the stop banks. These items have been identified and are part of the overall review and development of the Upper Wairarapa Valley Flood Plain Management Plan and for the Otaki river are included in the long term capital improvement plan.

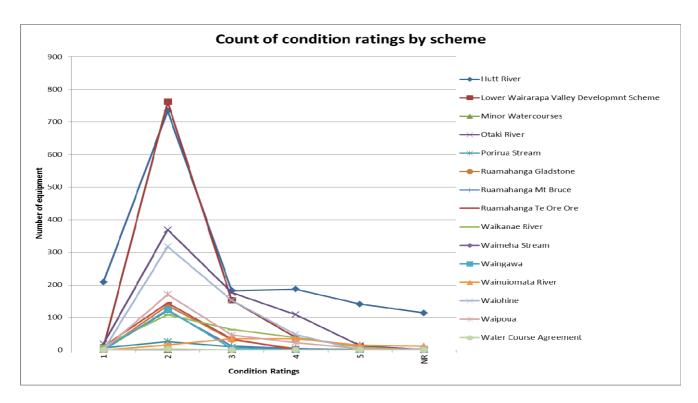
Stopbanks with a 5 rating are either scheduled for work to commence in 2013/14 or are redundant, i.e. upgrade completed.

- **Floodgates accounts for 2.5%** of the combined rating and improvements have been identified within the works programmes.
- Willows account for 44% of the combined condition ratings and are low criticality assets. Willow replacement in the river buffer zones is included in the work programmes, based on priority.
- **Debris fences account for 18 %** of the combined condition ratings and are low criticality assets. There has been a change in approach to river management where alternative such as rock groynes are preferred.
- The remaining 10% of assets (rock groynes, rock lines, demolition lines and weirs) and are low critical assets.

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The following tables and graphs summarise the range of assets and their condition ratings across river schemes, and the data on critical assets such as stop banks and floodgates and how they profile across the schemes as a percentage of the total asset per scheme.

Figure 2 All Condition Ratings by scheme

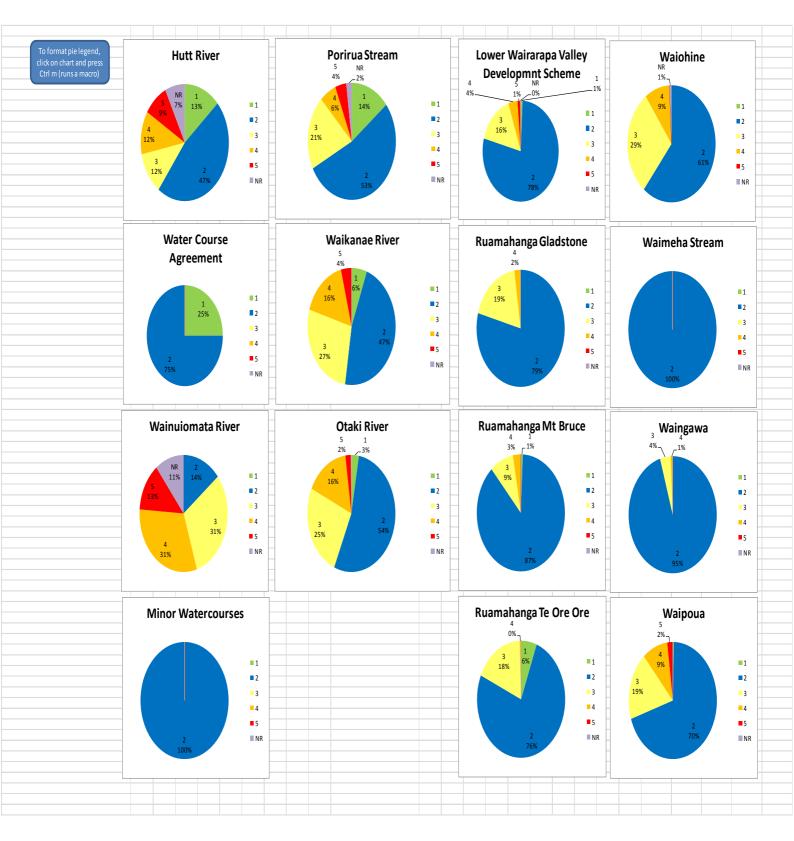


**Table 1 All Condition Ratings by Scheme** 

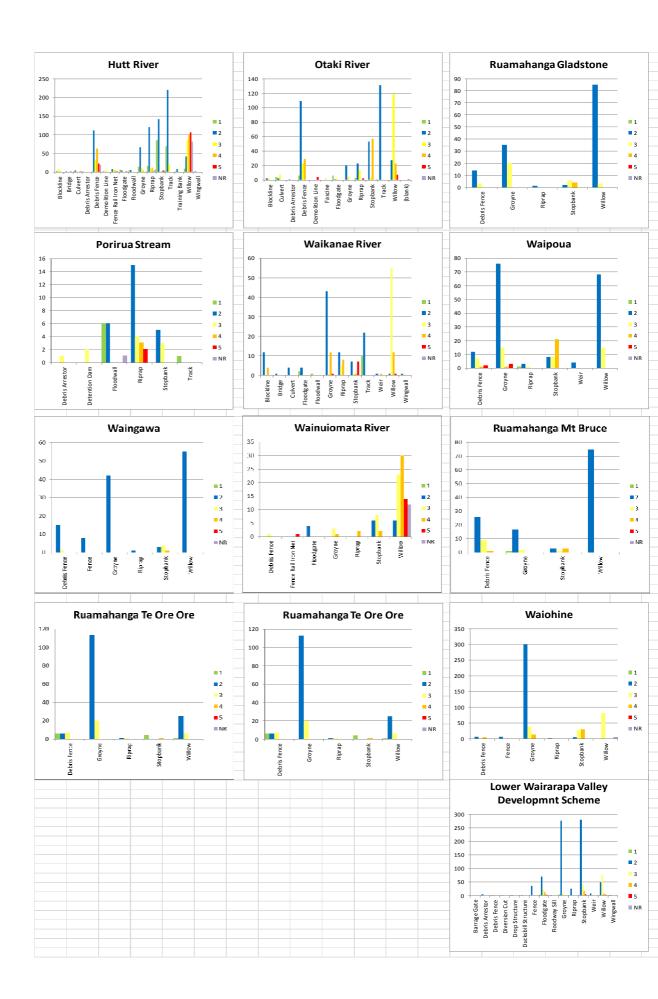
	Conditio	on Ratin	g <b>2012/</b> 1	L <b>3</b>			
Scheme	1	2	2	4	5	Not rated	Grand Total
Hutt River	209	734	182	187	141	114	1567
Lower Wairarapa Valley D	8	762	153	38	11	2	974
Minor Watercourses		1					1
Otaki River	19	369	176	109	14	1	688
Porirua Stream	7	26	10	3	2	1	49
Ruamahanga Gladstone		137	32	4			173
Ruamahanga Mt Bruce	1	121	12	4			138
Ruamahanga Te Ore Ore	11	145	34	1			191
Waikanae River	13	108	63	38	9		231
Waimeha Stream		1					1
Waingawa		124	5	1			130
Wainuiomata River		16	35	35	15	12	113
Waiohine		318	153	48		4	523
Waipoua	1	171	46	23	5		246
Water Course Agreement	1	3					4
Grand Total	270	3036	901	491	197	134	5029

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Figure 3 Condition Ratings by scheme (for all asset types) – page 5 Figure 4 Condition ratings across all assets types – page 6



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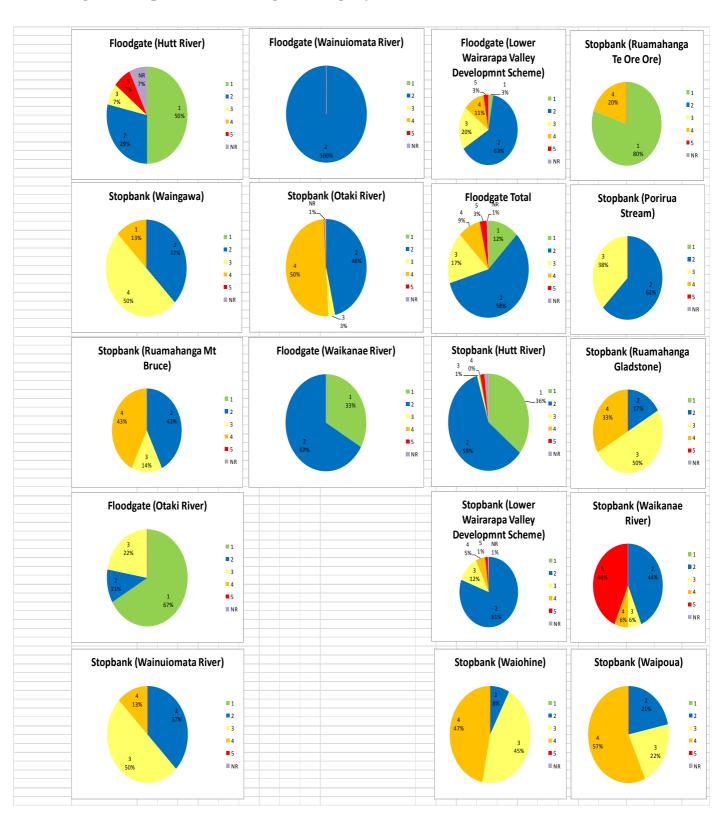
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 $\begin{tabular}{ll} \textbf{Table 2 Condition Ratings for critical assets (stop banks and floodgates) by Scheme \end{tabular}$ 

Asset Type	Scheme	Condition	Condition Rating					
		1	2	3	4	5		
Floodgate	Hutt River	7	4	1		1	13	
	Lower Wairarapa Valley	3	71	22	13	3	112	
	Otaki River	6	1	2			9	
	Waikanae River	2	4				6	
	Wainuiomata River		4				4	
Total		18	84	25	13	4	144	
Stopbank	Hutt River	85	141	2	1	4	233	
	Lower Wairarapa Valley		280	42	18	5	345	
	Otaki River		53	3	57		113	
	Porirua Stream		5	3			8	
	Ruamahanga Gladstone		2	6	4		12	
	Ruamahanga Mt Bruce		3	1	3		7	
	Ruamahanga Te Ore Ore	4			1		5	
	Waikanae River		7	1	1	7	16	
	Waingawa		3	4	1		8	
	Wainuiomata River		6	8	2		16	
	Waiohine		5	29	30		64	
	Waipoua		8	8	21		37	
Total		89	513	107	139	16	864	
Grand Total		107	597	132	152	20	1008	

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Figure 5 Stop bank and flood gate ratings by scheme



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# 4. Consents and Environmental Best Practice (Northern Wairarapa Rivers)

In 2011 GWRC Flood Protection, Department of Conservation, Fish & Game, Forest & Bird, Kahungunu ki Wairarapa, and Rangitāne o Wairarapa produced the *Wairarapa River Management Agreement* which was aimed at ensuring an agreeable approach to river management in coming years. The key matters addressed by the *River Agreement* related to improving environmental best practice and organising a research and monitoring programme which would enable a greater understanding of environmental effects of river management.

The full consent report is located in the following Hummingbird document #1237322

Below are a number of items that have progressed in 2012/2013 in relation to the *River Agreement*.

- The lack of floods enabled an emphasis on the biodiversity aspects of the river schemes and in-stream channel work was significantly minimised in comparison to past years.
- Data collection, fish and re-colonisation surveys improved knowledge of aquatic habitat values, species presence and identifying information gaps.
- A joint project with GWRC, The NZ Walking Access Commission, Department of Conservation and Sustainable Wairarapa Inc assisted with establishing a legal easement across private land at the back end of DOC's Carter Reserve near Gladstone. This easement will provide recreational access to the Ruamahanga River in a reach where there is no public access for a length of nearly 9km.
- The Waiohine/Mangatarere River scheme continued to support native planting projects associated with Mangatarere River restoration work.
- Other Native planting efforts:
  - Ruamahanga River, XS223, left bank. Machine clearance of weed species prior to landowner planting programme.
  - Whangaehu River:300 plants provided to landowner planting programme
  - Kopuaranga: Plants provided to interested scheme members
  - Ruamahanga River, Tirohanga Reserve (Double bridges) working with MDC on native planting programme.
  - Waipoua River: Urban walkway reserve (near QEII Park) working with MDC on native planting programme.

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#### 5. Performance Statements

The annual performance statements for the Wairarapa Advisory Rivers confirmed that the measures were generally met, and where they were not, the items were either minor and were programmed for completion in the next year or part of long term improvements that will be reviewed within the Floodplain Management Planning and Asset Management processes.

The summary of the minor exceedences relate to:

- The timing of the 5 yearly stop bank surveys does not align with the scheduled cross section surveys;
- Minor repairs on stop banks and vegetation growth on a number of stop banks in the Wairarapa. Will be repaired as part of the works programme or are included in a wider strategic review in the development of the Upper Wairarapa Valley Flood Plain Management Plan;
- The programmed review of berm width and stop banks for the Northern Wairarapa was not completed to schedule as it is now incorporated as part of developing the Upper Wairarapa Valley Flood Plain Management Plan. This review will also investigate the condition criteria of the stop banks and compare to the current standards.

The following tables detail the minor exceedences from each of the schemes:

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Scheme	Measure	Performance Criteria	Comment	Achievement
Lower Wairarapa Valley Development Scheme	Stop banks	Flood capacity of major stop banks to be reviewed and compared to design flood capacity	This criteria should line up with the X-sectional survey schedule, every 5 years	5 yearly criteria not satisfied
	Stop banks	As-built stop bank formation levels and dimensions to be restored within three months of minor surface damage being reported, and within one month of major surface damage being reported. Grass cover to be restored within three months of bare patches being reported. Rabbit hole and subsidence damage to be repaired within three months of being reported.	Some stop banks damaged by stock has been repaired by the landowners. Some minor repairs still remaining to be done.  Restoring the formation level of stop bank on Ruamahanga River at Macland Farm has commenced and will be done over the coming few years.	Criteria partially satisfied
	Floodway Sills	As-built sill formation level to be compared to design level.	This criteria should line up with the X-sectional survey schedule, every 10 years	5 yearly criteria not satisfied
Waiohine	Stop banks	No more than 10% of the total stop bank length to have a berm width or less than 20 metres.	A review of March 2011 aerial photography shows that approximately 2.4km out of the 16.4km of total stop bank length have a berm width of less than 20m. This equates to 14.6%. No significant change in stop bank berm width has occurred since 2011. The Waiohine Floodplain Management Plan is currently assessing the options for significant upgrade and/or relocation of stop banks.	Criteria not satisfied.
	Stop banks	As-built stop bank formation levels to be repaired within three months of being reported. Major damage to be repaired within one month of being reported. Grass cover to be repaired within three months of bare patches being reported. Rabbit hole and subsidence to be repaired within one month of being reported. Trees and scrubs on stop banks to be	In some areas trees and scrub on stop banks has been a problem that requires significant maintenance to rectify. The risk of this vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied.

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		removed within three months of being reported.		
	Overall	Obtain Council endorsement of Scheme management approach in internal 5 yearly reviews.	Internal 5 yearly reviews have not taken place. Development of the Waiohine Floodplain Management Plan continues to progress.	Criteria not satisfied
Waingawa	Stop banks	Less than 5% of the stop bank length has a condition rating of 4 or 5.	Total scheme stop bank length: 1,685m  Total stop bank length rated 4: 275m, 16.3%  Total stop bank length rated 5: 0m  The 4-rated stop banks are being investigated along with other related matters within the Upper Wairarapa Valley Floodplain Management Plan.	Criteria not satisfied
	Stop banks	As-built stop bank formation levels and dimensions to be restored within 3 months of minor surface damage being reported, and within 1 month of major surface damage being reported. Grass cover to be restored within 3 months of bare patches being reported. Rabbit hole and subsidence damage to be repaired within 1 month of being reported. Trees and scrub on the stop bank to be removed within 3 months of being reported.	In some areas trees and scrub on stop banks has been a problem that requires significant maintenance to rectify. The risk of this vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied
	Overall	Obtain Council endorsement of Scheme management approach in internal 5 yearly reviews.	Internal 5 yearly reviews have not taken place. Development of the Upper Wairarapa Valley Floodplain Management Plan began in the 2012/2013 year which is in effect a holistic scheme review.	Criteria not satisfied  Next applicable in 2017/2018
Mount Bruce	Stop banks	Less than 20% of stop bank length has a condition rating of 4; and less than 20% of stop bank length has a condition rating of 5	Total scheme stop bank length: 1,905m  Total stop bank length rated 4: 800m, 42%  Total stop bank length rated 5: 0m	Criteria not satisfied

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			The risk of vegetation causing damage to the stop bank is considered to be low.	
	Stop banks	As-built stop bank formation levels and dimensions to be restored within 3 months of minor surface damage being reported, and within 1 month of major surface damage being reported. Grass cover to be restored within 3 months of bare patches being reported. Rabbit hole and subsidence damage to be repaired within 1 month of being reported. Trees and scrub on the stop banks to be removed within 3 months of being reported.	In some areas trees and scrub on stop banks has been a problem that requires significant maintenance to rectify. The risk of this vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied
	Overall	Obtain Council endorsement of Scheme management approach in internal 5 yearly reviews	A complete review of the Scheme was completed in 2002, however due to the complexity, resources and financial requirements; the 5 yearly review was not actioned. Development of the Upper Wairarapa Valley Floodplain Management Plan began in the 2012/2013 year which is in effect a holistic scheme review.	Criteria not satisfied
Te Ore Ore	Stop banks	Less than 20% of stop bank length has a condition rating of 4; and less than 20% of stop bank length has a condition rating of 5	Total scheme stop bank length: 2,770m  Total stop bank length rated 4: 825m, 29.8%  Total stop bank length rated 5: 0m  The risk of vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied
	Stop banks	As-built stop bank formation levels and dimensions to be restored within 3 months of minor surface damage being reported, and within 1 month of major surface damage being reported. Grass cover to be restored within 3 months of bare patches being reported. Rabbit hole and subsidence damage to be repaired	In some areas trees and scrub on stop banks has been a problem that requires significant maintenance to rectify. The risk of this vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied

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		within 1 month of being reported. Trees and scrub on the stop banks to be removed within 3 months of being reported.		
	Overall	Obtain Council endorsement of Scheme management approach in internal 5 yearly reviews.	A complete review of the Scheme was completed in 2002, however due to the complexity, resources and financial requirements; the 5 yearly review was not actioned. Development of the Upper Wairarapa Valley Floodplain Management Plan began in the 2012/2013 year which is in effect a holistic scheme review.	Criteria not satisfied
Gladstone	Stop banks	As-built stop bank formation levels and dimensions to be restored within 3 months of minor surface damage being reported, and within 1 month of major surface damage being reported. Grass cover to be restored within 3 months of bare patches being reported. Rabbit hole and subsidence damage to be repaired within 1 month of being reported. Trees and scrub on the stop banks to be removed within 3 months of being reported.	In some areas trees and scrub on stop banks has been a problem that requires significant maintenance to rectify. The risk of this vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied
	Overall	Obtain Council endorsement of Scheme management approach in internal 5 yearly reviews.	A complete review of the Scheme was completed in 2002, however due to the complexity, resources and financial requirements; the 5 yearly review was not actioned. Development of the Upper Wairarapa Valley Floodplain Management Plan began in the 2012/2013 year which is in effect a holistic scheme review.	Criteria not satisfied
Waipoua	Financial	Average flood damage expenditure not to exceed 15% of the total Scheme expenditure over a 5 year	Total flood damage expenditure from 2008/09 to 2012/13: \$104,893	Criteria not satisfied
		period.	Total Scheme expenditure from 2008/09 to	Next applicable in

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		2012/13: \$523,382  Average proportion flood damage expenditure to total expenditure: 20%	2017/2018
Stop banks	As-built stop bank formation levels and dimensions to be restored within 3 months of minor surface damage being reported, and within 1 month of major surface damage being reported. Grass cover to be restored within 3 months of bare patches being reported. Rabbit hole and subsidence damage to be repaired within 1 month of being reported. Trees and scrub on the stop bank to be removed within 3 months of being reported.	In some areas trees and scrub on stop banks has been a problem that requires significant maintenance to rectify. The risk of this vegetation causing damage to the stop bank is considered to be low.	Criteria not satisfied
Overall	Obtain Council endorsement of Scheme management approach in internal 5 yearly reviews	5 yearly reviews of the Scheme have not been undertaken due to the complexity of issues, staff resources and financial requirements.  Development of the Upper Wairarapa Valley Floodplain Management Plan began in the 2012/2013 year which is in effect a holistic scheme review.	Criteria not satisfied  Next applicable in 2017/2018

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## 6. Scheme Resolution.

The following table detailed the Scheme resolutions passed at the Wairarapa Advisory and Friends of the Otaki and Waikanae Commitees.

Scheme	Resolution
Lower Wairarapa Valley Developme	The Lower Wairarapa Valley Development Scheme (LWVDS) Advisory Committee confirms that:
Scheme (LWVDS) Advisory Committee	1. The LWVDS Annual Report and Financial Statement be accepted.
	2. The LWVDS assets have been maintained to the satisfaction of the Committee.
	S Barton/T Sutherland
	The Lower Wairarapa Valley Development Scheme (LWVDS) Advisory Committee recommends to the Environmental Wellbeing Committee that:
	3. The proposed LWVDS 2013/14 works programme be adopted at an estimated cost of \$1,730,419
	4. The LWVDS rates for the year 2013/14 are increased by 3%.
	5. The LWVDS raise a loan of \$787,000 through the Greater Wellington Regional Council to fund the 2013/14 financial year development works programme.
	G Vollebreght / S Barton
Waiohine River Floodpla	
Management Planning Advisor Committee	1. Scheme Annual Report and Financial Statement be accepted.
	J Bicknell / B Vines
	2. Waiohine River scheme has been maintained to the satisfaction of the Advisory Committee.
	R Craig / C Engel
	That the Waiohine River Floodplain Management Planning Advisory Committee recommends to the Environmental Wellbeing Committee that the:

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	3.	Proposed 2013/14 works programme be approved at an estimated cost of \$353,600
		B Slater / J Bicknell
	4.	Scheme rates for the year 2013/14 be increased by 3%.
		B Knowles / Cr V Napier
Waingawa River management Advisory	That the	Waingawa River management Advisory Committee confirms that the:
Committee	1.	Scheme Annual report and Financial Statement be accepted
	2.	Waingawa River scheme has been maintained to the satisfaction of the Committee
	B Camer	on/G Tulloch
	That the	Waingawa River Management Advisory Committee recommends to the Environmental Wellbeing Committee that the:
	3.	Proposed 2013/14 works programme be approved at an estimated cost of \$179,900
		G Tulloch/B Cameron
	4.	Scheme rates for the year 2013/14 be increased by 3%
		R Cottle/B Cameron
		Against: G Tulloch
		For: Majority-Carried
Upper Ruamahanga River - Mt Bruce	That the	Upper Ruamahanga River - Mt Bruce Management Advisory Committee confirms the:
Management Advisory Committee	1.	Scheme Annual Report and Financial Statement be accepted
	2.	Upper Ruamahanga River Mt Bruce Scheme has been maintained to the satisfaction of the Committee
		Gillian Churcher/Mike Wyeth
	That the	Waingawa River Management Advisory Committee recommends to the Environmental Wellbeing Committee that the:
	3.	Proposed 2013/14 works programme be approved at an estimated cost of \$123,900
	4.	Scheme rates for the year 2013/14 be increased by 3%

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		Gillian Churcher/Mike Wyeth
Upper Ruamahanga River Te Ore Ore	That the I	Jpper Ruamahanga River Te Ore Ore Management Advisory Committee confirms that the:
Management Advisory Committee	1.	Scheme Annual Report and Financial Statements be accepted
	2.	Upper Ruamahanga River Te Ore Ore Scheme has been maintained to the satisfaction of the Committee
	J Percy/G	5 Daniell
	That the Uthat the:	Jpper Ruamahanga River Te Ore Ore Management Advisory Committee recommends to the Environmental Wellbeing Committee
	3.	Proposed 2013/14 works programme be approved at an estimated cost of \$151,000
	4.	Scheme rates for the year 20113/14 be increased by 3%
		J Percy/G Daniell
Upper Ruamahanga River Gladstone	That the I	Jpper Ruamahanga River Gladstone Management Advisory Committee confirms that the:
Management Advisory Committee	1.	Scheme Annual report and Financial Statements be accepted
		G McGregor/R Ashby
	2.	Upper Ruamahanga River Gladstone Scheme has been maintained to the satisfaction of the Committee
		M Williams/K Wells
	That the l that the:	Jpper Ruamahanga River Gladstone Management Advisory Committee recommends to the Environmental Wellbeing Committee
	3.	Proposed 2013/14 works programme be approved at an estimated cost of \$155,000
		K Wells/J Booth
	4.	Scheme rates for the year 2013/14 be increased by 3%
		K Wells/G McGregor
	<u> </u>	

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Waipoua River Advisory Committee	The Waipoua River Advisory Committee confirms that:			
	1. The Scheme Annual Report and Financial Statement be accepted			
	2. The Waipoua River scheme has been maintained to the satisfaction of the Committee			
	I Wyeth / T Wyeth			
	The Waipoua River Advisory Committee recommends to the Environmental Wellbeing Committee that:			
	3. The proposed 2013/14 works programme be approved at an estimated cost of \$108,500			
	4. The scheme rates for the year 2013/14 be increased by 3%			
	T Wyeth / I Wyeth			
Taueru and Whangaehu Advisory Committees	There were no annual meetings scheduled in 2013.			
Kopuaranga River	The Kopuaranga River Advisory Committee confirms that:			
	1. The Scheme Annual Report and Financial Statement be accepted			
	2. The Kopuaranga River scheme has been maintained to the satisfaction of the Committee			
	P Palmer / N Cameron			
	The Kopuaranga River Advisory Committee recommends to the Environmental Wellbeing Committee that:			
	3. The proposed 2013/14 works programme be approved at an estimated cost of \$23,346			
	G McLachlan / H Dickens			
	4. The scheme rates for the year 2013/14 be increased by 8% for 1 year			
	G McLachlan / H Dickens			
Friends of the Waikanae River	The Friends of the Waikanae River confirms that:			
	The reach of the Waikanae River from the State Highway bridge to the Estuary actively managed by Greater Wellington Flood Protection Department has been maintained to the satisfaction of the meeting"			

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Friends of the Otaki River	The Friends of the Otaki River confirms that:				
	The reach of the Otaki River actively managed by Greater Wellington Flood Plan Department has been maintained to the satisfaction of the Committee'				
	Moved M Lutz/A Jones				

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## 7. Financial Details

The following table details the financial position at 30 June 2013, the rates increases and the estimated budget for works programmes 2013/14

	2012/13			2013/14	
Scheme	Scheme Reserve	Major Flood Investment Reserves	Total Reserves	Rate (%) Increases 2013/14	Estimated Works Programme 2013/14
Lower Valley	\$1,862,786	\$986,230	\$2,849,016	3	\$1,730,419
Waiohine	\$589,031	\$32,527	\$621,558	3	\$ 353,600
Mount Bruce	\$80,034	\$7,373	\$87,407	3	\$123,900
Te Ore Ore	\$192,919	\$7,373	\$200,292	3	\$151,000
Gladstone	\$76,568	\$7,373	\$83,941	3	\$155,000
Waingawa	\$100,257	\$21,686	\$123,111	3	\$179,900
Waipoua	\$94,807	\$21,686	\$116,493	3	\$108,500
Kopuaranga	-\$44,593	\$0	-\$44,593	8	\$23,346
Upper Mangatarere	\$29,358	\$0	\$29,358	0	0
Taueru	\$10,351	\$0	\$10,351	3	\$5500
Whangaehu	\$10,123	\$0	\$10,123	3	\$6,979
Total Eastern Schemes	\$3,000,4641	\$1,084,248	\$4,0845,889		\$2,484,544
Western Rivers	\$2,407,831	\$1,084,246	\$3,492,077	3	\$3,381,500
GW Flood Contingency Reserve	\$1,334,636		\$1,334,636		
GW Major Flood Investment		\$2,168,492	\$2,168,492		
Drainage Schemes	\$340,737		\$340,737	6	\$282,000
Total Flood Protection	\$7,084,845	\$4,336,986	\$11,421,831		\$6,148,044

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