[ID 2]

HAWKE'S BAY
REGIONAL COUNCIL

Heretaunga Aquifer

Summary of Values

For Proposed Plan Change 7: Hawke's Bay Regional Resource Management Plan

(Outstanding Water Bodies Plan Change)

August 2020
HBRC Publication Number: 5482

159 Dalton Street . Napier 4110
Private Bag 6006 Napier 4142
Telephone (06) 835 9200
Fax (06) 835 3601
Regional Freephone (06) 0800 108 838

Heretaunga Aquifer- Summary of Values

For Proposed Plan Change 7: Hawke's Bay Regional Resource Management Plan (Outstanding Water Bodies Plan Change)

HBRC Publication Number: 5482

Author:
Belinda Harper, Senior Planner

Reviewed by:
Gavin Ide, Principal Advisor Strategic Planning

Contents

APPENDICES

Purpose of Report

1. This report is a compilation of information previously documented on the values associated with the Heretaunga Aquifer during preparation of Proposed Plan Change 7 prior to its notification on 31 August 2019. It is one of a series of similar reports compiled for each of the respective proposed outstanding water bodies (OWB) identified in Plan Change 7.

2. The approach used by Hawke's Bay Regional Council to identify OWB in Hawke's Bay followed a process that began with a high level review documenting the values associated with 130 water bodies across the region. A short explanation is provided at the beginning of each section which discusses the relevant phase and whether the Heretaunga Aquifer was considered during that part of the process.

3. Not all OWB identified in Proposed Plan Change 7 were considered during each phase of the process. For clarity, an index table (Table 1) has been included in this report which sets out the relevant phases, report names, values and page numbers for the Heretaunga Aquifer.

4. No new research or further information was commissioned for the purposes of compiling this report.

5. For further information on the Outstanding Water Body Identification Methodology and each of these phases, see the Plan Change 7 Section 32 Evaluation Report[1].

6. **Table 1: Heretaunga Aquifer index**

Phase	Included (yes/no)	Report name /date	Page number(s) in associated report
High Level Review (Phase 1 & Phase 2)	Yes	Summary of Cultural Values Associated with Water Bodies in Hawke's Bay (March 2018)	13, 14
		Summary of the Recreation, Landscape and Ecology Values Associated with Water Bodies in Hawke's Bay (March 2018)	NA
Secondary Assessments (Phase 3)	Yes	Secondary assessment - Heretaunga Aquifer	All of report
Local Expert Panel (Phase 4)	Yes	Outstanding Water Bodies in Hawke's Bay - Report of the Expert Panel (April 2019)	2, 11, 15 - 17
Final Evaluation (Phase 5)	Yes	Outstanding Water Bodies Plan Change - selecting a list of outstanding water bodies in Hawke's Bay (May 2019)	68, 79 - 85, 92, 96

Plan Change 7 Overview

7. Hawke's Bay Regional Council has prepared an amendment to the Hawke's Bay Regional Resource Management Plan (RRMP) to include a list of the region's outstanding water bodies, together with a framework which prescribes a high level of protection for these water bodies in future plan making. That change to the RRMP is referred to as 'Proposed Plan Change 7' or the 'Outstanding Water Bodies Plan Change.'

8. The water bodies identified in the Outstanding Water Bodies Plan Change have been proposed as the 'best of the best' within the region, featuring an exceptional cultural, spiritual, recreation, natural character, landscape, geology, or ecology value which is remarkable in Hawke's Bay.

9. Since commencing this OWB plan change project in early 2017, a significant amount of work has been undertaken to build a clearer picture of water bodies within the region and their potential for being classed as outstanding.

10. The Outstanding Water Bodies Plan Change amends the RPS to reflect NPSFM provisions which require the protection of the significant values of outstanding water bodies. This special protection does not lesson the importance of, or value associated with other water bodies, which are managed through other parts of the Regional Resource Management Plan or Council work programme.

11. Further information about the background and purpose of proposed Plan Change 7 is online at www.hbrc.govt.nz (search #owb).

[1] https://www.hbrc.govt.nz/assets/Document-Library/Outstanding-Water-Bodies/1.-Other-supporting-information/Section-32-Evaluation-Report.pdf

Phase One & Phase Two: High Level Review & Summary of Values

12. In June 2017, the Council embarked on a high level review documenting the cultural, spiritual, recreation, landscape, geological, natural character and ecology values associated with 130 water bodies across the region.

13. Phase 1 involved a thorough review of over ninety documents being completed. Those documents included Deeds of Treaty Settlements, statutory acknowledgements for Treaty settlements, customary uses reports, Waitangi Tribunal reports, and other documents produced in a national and regional context between 1979 and 2018.

14. This work built a clear picture of values associated with a wide range of water bodies across the region and their potential for being classified as outstanding, prior to short listing. This work culminated in a literature review summarising key values associated with 130 of the region's water bodies, set out in the following tables:

    - Table C1: Cultural Values Table – Summary of Cultural Values Associated with Water Bodies in Hawke's Bay.
    - Table R2: Recreation, landscape, Ecology Values Table – Summary of the Recreation, Landscape and Ecology Values Associated with Water Bodies in Hawke's Bay.

15. Table C1 included all water bodies identified by name in reviewed documents, with a high level summary of the associated 'cultural and spiritual values'. This work was sent out to all Treaty settlement entities in Hawke's Bay in December 2017 for input prior to completion.

16. Table R2 included all water bodies identified by name in reviewed documents, with a high level summary of their recreation, landscape, geology and ecology values, and associated ratings assigned in these documents.

17. Appendix 1 sets out the relevant extracts from Table C1 for the Heretaunga Aquifer. No information regarding the Heretaunga Aquifer was found for inclusion in Table R2.

Phase Three: Refine List & Secondary Assessments

18. In 2018, the high level review findings for 130 water bodies, and their associated values, were reported to the Council's Regional Planning Committee (RPC). The RPC selected a shortlist of 22 candidate OWB to proceed forward a more detailed secondary assessment to see if any contained values that were clearly superior to other water bodies in Hawke's Bay.

19. Appendix 2 contains the secondary assessment for the Heretaunga Aquifer.

Phase Four: Engagement & Local Expert Panel Process

20. Phase 4 involved wider input from the public, iwi authorities, key stakeholders and territorial local authorities. Feedback from this process featured requests for an additional 20 water bodies to be identified as OWB

21. In December 2018, Council staff contracted a local expert panel to evaluate, categorise and identify outstanding characteristics, for all value sets, from the list of 22 candidate OWB and the additional 20 water bodies put forward during engagement.

22. The local expert panel was appointed via nominations by key stakeholders, iwi authorities and city and district councils, and comprised six members[2] with good knowledge of the Hawke's Bay region.

23. The recommendations made by the panel were based on existing information, their local knowledge, and a set of assessment criteria they developed at their first meeting. The assessment criteria used by the panel to identify outstanding features is set out at the beginning of each subsection for each value set.

24. The expert panel found the Heretaunga Aquifer to have outstanding landscape, ecology and cultural and spiritual values. Their findings are set out in Appendix 3.

[2] Morry Black (Mauri Protection Agency), Matt Brady (DOC), John Cheyne (Te Taiao Environment), Andrew Curtis (Water Strategies Limited), Bernie Kelly (kayaking rep), Tom Winlove (Fish& Game Hawke's Bay)

Phase Five: Final Evaluation & Overview

25. Phase Five saw a final evaluation carried out to assist the Council's Regional Planning Committee to select a list of outstanding water bodies in Hawke's Bay, for inclusion in Proposed Plan Change 7.

26. This work summarised the key values of 42 water bodies nominated during Phases 3 and 4, and informed by
    - The secondary assessments
    - local expert panel findings
    - the values summary reports, and
    - stakeholder engagement.

27. The summary was presented by value-type, based on the work to date and in a format consistent with the direction given by Council.

28. Appendix 4 sets out the relevant extracts from the final evaluation for the Heretaunga Aquifer.

Appendix 1: Tables C1 and R2 - Heretaunga Aquifer

Note: Appendix 1 contains extracts only - for further information please refer to the full reports.

HAWKE'S BAY
REGIONAL COUNCIL

Summary of cultural values associated with water bodies in Hawke's Bay

HBRC Report No. SD18-01
Plan Number 4978

Strategic Development Group

ISSN 2324-4186 (PRINT)
ISSN 2324-4194 (ONLINE)

159 Dalton Street . Napier 4110
Private Bag 6006 Napier 4142
Telephone (06) 835 9200
Fax (06) 835 3601
Regional Freephone (06) 0800 108 838

Summary of cultural values associated with water bodies in Hawke's Bay

HBRC Report No. SD18-01
Plan Number 4978

14 March 2018

.....

Prepared By:
Belinda Harper, Senior Planner

Referencing

When referencing in another report any of the values contained in this document, the author of that report must include the following text as a footnote to the referenced material:

> "There are numerous water bodies in the Hawke's Bay region where two or more iwi groups have agreed, shared interests and/or contested overlapping claims. By referring to these values it is not intended to imply any exclusive rights over a particular water body for one or more iwi group, nor does it confirm the validity of the claims of any group(s) over that water body. This information is being referred to solely for the purpose of identifying the important cultural and spiritual values identified by iwi groups in the region".

Strategic Development Group
ISSN 2324-4186 (PRINT)
ISSN 2324-4194 (ONLINE)

Waterbody / Region / Catchment	Treaty settlement entity	Commentary	Key values
		Key DOS = Deed of settlements, SA = statutory acknowledgements, TSL = Treaty settlement legislation, CUR = customary usage reports, WTR = Waitangi tribunal reports, OTHER = any other relevant documents No = waterbody not referred in document N/A = No such document exists. **NOTE 1:** The 'Key Values' column sets out a pool of eight key values, identified by the tāngata whenua representatives on the Council's Regional Planning Committee, which broadly reflect the most significant cultural values associated with water bodies. The relevant key values for each water body is listed in this column. See commentary column for further explanation about the identified key value for each waterbody. **NOTE 2:** The HBRC is aware there are numerous areas, including waterbodies, where two or more iwi groups have agreed, shared interests and/or contested overlapping claims within the HBRC region. The information presented in The Table is not intended to imply any exclusive rights over particular waterbodies for one or more iwi groups, nor does it confirm the validity of the claims of any group over that waterbody. The information is solely for the purpose of recording important cultural	Note: key values as follows: Wāhi Tapu, Wāhi taonga Wai Tapu Acknowledged in korero tuku iho, pepeha, whakatauki, waiata Mahinga kai, Pa tuna Pa, kāinga Tauranga waka Rohe Boundary Battle site
Heretaunga Aquifer Karamu & Tutaekuri & Ngaruroro & Ahuriri TANK	Heretaunga Tamatea	The Heretaunga Aquifer is part of Heretaunga Tamatea's traditional rohe.	Wāhi Tapu, Wāhi taonga
Heretaunga Aquifer Karamu & Tutaekuri & Ngaruroro & Ahuriri TANK	Ngāti Kahungunu Iwi Incorporated	**Hastings District Plan (Section 12.1 – Heretaunga Plains Unconfined Aquifer Resource Management Unit) (2003)** Water quality and quantity is important to local iwi. Clean water is important in relation to the provision of mahinga kai and in maintaining the life force of water which incorporates physical and spiritual values. **Updating Evidence of Ngahiwi Tomoana on behalf of Ngati Kahungunu Iwi Incorporated for Wai 262 Claim (2006)** The aquifer has long been regarded as a taonga of Ngati Kahungunu. **The Stage 1 Report on the National Freshwater and Geothermal Resources Claim, 2012, (Wai 2358)** The Heretaunga Aquifer was known by Ngāti Kahungunu as the Heretaunga Ararau Haukūnui, being a large water resource, represented in the many rivers, creeks, the small tributaries fed by underground springs, springs of water, swampy ground, swimming holes, rock pools and quick sands. These areas supported an abundant supply of fish and water fowl, a primary food resource. The area was particularly large and famous being recorded in the whakatauki that represents Ngāti Kahungunu pride: Heretaunga ararau, Heretaunga haukūnui, Heretaunga hāro te kāhu, Heretaunga takoto noa. In this play on words, Heretaunga ararau stands for both the myriad of waterways through the great swaps and the myriad of hapū that they linked together on the shore. Haukūnui describes the waters as a system of repo or swamps, awa or rivers and puna or springs, the life giving waters from deep within the earth. Hāro te kāhu sees the whole through the eyes of the soaring hawk, the plains standing solitary below, takoto noa, needing no other embellishment. The evidence of the aquifer, for Ngāti Kahungunu's ancestors, was the numerous punawai or springs around the 'shoreline' of the former repo or swaps. These were on the more elevated spots where the many hapū maintained their kāinga or villages. The extraordinary clean water from the springs, and from the streams that flowed from them, was the elixir of life for the hapu, feeding and cleansing body, soul and mind, and as important for ritual as it is for bodily needs. **NKII vs HBRC, Environment Court Decision, 2015**	Wāhi Tapu, Wāhi taonga Acknowledged in korero tuku iho, pepeha, whakatauki, waiata Pa, kāinga

Waterbody / Region / Catchment	Treaty settlement entity	Commentary	Key values
		In describing the Heretaunga Muriwaihou (Heretaunga aquifer system) evidence from Te Hira Huata provided at the Waitangi Tribunal hearing of WAI 2358 was quoted “The extraordinary clean water from the springs, and from the streams that flowed from them, was the elixir of life for the hapu, feeding and cleansing body, soul and mind, and as important for ritual as it is for bodily needs”. Of great cultural relevance is how Heretaunga Muriwaihou (Heretaunga aquifer system) is embedded in Ngāti Kahungunu’s whakatauki (proverb): Heretaunga Hauukunui - Heretaunga of the life giving dews or waters; Heretaunga Arm au - Heretaunga of Arcadian pathways; Heretaunga Haro Te Kahu - Heretaunga the beauty of which only can be appreciated by the eyes of a hawk in full flight; Heretaunga Takoto Noa- Heretaunga from whence the Chiefs have departed and only the servants remain.	
		Comments on HBRC’s Draft Change 5, NKII (Aug 2012) The Heretaunga Plains Aquifer is an outstanding water body because of its significant contribution to the Hastings and Central Hawke’s Bay economy.	
		Submission from NKII on HBRC’s Proposed Change 5, NKII (Nov 2012) The Heretaunga aquifer system is the manawa or beating heart of the Hastings economy, supplying water of exceptional quality for domestic, industrial and agricultural use, for most uses or purposes, it requires no treatment. Protection of the aquifer from contamination is paramount if our economy is to remain competitive. The water quality of the Heretaunga Aquifer is exceptional. Treatment as a result of ‘natural water quality’ hasn’t happened in a thousand years. The Heretaunga Plains aquifer system is one of the region's outstanding freshwater bodies.	
		Submission from Te Taiwhenua o Heretaunga on Proposed Plan Change 5 to the RPS (2012) Identify and provide for the Heretaunga aquifer system as an outstanding water body of national and regional significance Water quality in the Heretaunga aquifer, particularly the deeper layers, is of exceptional quality.	
		Hapu Management Plan - Mana Ake - Nga Hapu o Heretaunga, 2015 We are Kaitiaki of the Heretaunga aquifer resource as it is central to the mana and mauri of our marae hapu.	

Appendix 2: Secondary Assessment - Heretaunga Aquifer

HAWKE'S BAY
REGIONAL COUNCIL

Outstanding Water Bodies Plan Change

Candidate List of Outstanding Water Bodies in Hawke's Bay – Secondary Assessments for:

Heretaunga Aquifer, Karamu Stream, Lake Whakakī , Lake Whatumā, Lake Waikaremoana, Lake Tūtira (including Aropaoanui River + Papakiri Stream), Lake Waikareiti, Lower Ngaruroro River (below Whanawhana), Mangahauanga Stream, Makirikiri River, Porangahau River, Ruakituri River, Ruataniwha Aquifer, Taruarau River , Te Whanganui a Orotū (Ahuriri Estuary), Tukituki River, Tutaekuri River, Upper Mohaka River, Upper Ngaruroro River (above Whanawhana), Waipawa River, Waipunga River, Wairoa River.

June 2018
HBRC Report Number: RM19-252
Publication Number: 5417

Strategic Development Group

ISSN 2324-4186 (PRINT)
ISSN 2324-4194 (ONLINE)

159 Dalton Street . Napier 4110
Private Bag 6006 Napier 4142
Telephone (06) 835 9200
Fax (06) 835 3601
Regional Freephone (06) 0800 108 838

Outstanding Water Bodies Plan Change

Candidate List of Outstanding Water Bodies in Hawke's Bay – Secondary Assessments for:

Heretaunga Aquifer, Karamu River, Lake Whakakī , Lake Whatumā, Lake Waikaremoana, Lake Tūtira (including Aropaoanui River + Papakiri Stream), Lake Waikareiti, Lower Ngaruroro River (below Whanawhana), Mangahauanga Stream, Makirikiri River, Porangahau River, Ruakituri River, Ruataniwha Aquifer, Taruarau River , Te Whanganui a Orotū (Ahuriri Estuary), Tukituki River, Tutaekuri River, Upper Mohaka River, Upper Ngaruroro River (above Whanawhana), Waipawa River, Waipunga River, Wairoa River.

June 2018
HBRC Report Number: RM19-252
Publication Number: 5417

Prepared by:

Belinda Harper, Senior Planner

Kurt Ridling, Senior Planner (Untracked Limited)

Reviewed by:

Gavin Ide: Manager Policy and Planning

Ceri Edmonds: Senior Planner

Heretaunga Aquifer

Key Values
Cultural
Ecology
Natural characteristics

Table 1: List of documents reviewed

Year	Name	Author
1997	Heretaunga Plains Groundwater Study	HBRC, Crown Research Institute, NIWA, Landcare Research New Zealand
2003	Hastings District Plan (Section 12.1 – Heretaunga Plains Unconfined Aquifer Resource Management Unit)	Hastings District Council
2006	Updating Evidence of Ngahiwi Tomoana on behalf of Ngāti Kahungunu Iwi Incorporated for Wai 262 Claim	Ngahiwi Tomoana (Ngāti Kahungunu Iwi Incorporated)
2009	A Review of Current Groundwater Management in Hawke's Bay and Recommendations for Protection of Groundwater Ecosystems	NIWA
2012	Comments from Ngāti Kahungunu Iwi Incorporated on HBRC's Draft Change 5	Ngāti Kahungunu Iwi Incorporated
2012	Submission from Ngāti Kahungunu Iwi Incorporated on HBRC's Proposed Change 5	Ngāti Kahungunu Iwi Incorporated

2012	Submission from Te Taiwhenua o Heretaunga on Proposed Plan Change 5 to the RPS	Te Taiwhenua o Heretaunga
2012	The Stage 1 Report on the National Freshwater and Geothermal Resources Claim, Wai 2358	Waitangi Tribunal
2014	Statement of Evidence by Stephen Swabey ENV-2013-WLG-000050	Hawke's Bay Regional Council
2015	Decision [2015] NZEnvC50 - ENV-2013-WLG-000050	Environment Court
2015	Groundwater level changes in the Heretaunga and Heretaunga Basins from 1994 – 2014	Hawke's Bay Regional Council
2015	Hapū Management Plan - Mana Ake - Nga Hapū o Heretaunga	Te Taiwhenua o Heretaunga
2015	Heretaunga Plains Groundwater Management and Investigations	Hawke's Bay Regional Council
2016	Groundwater Quality State of Environment: State and Trends	Hawke's Bay Regional Council
2016	Spatial Oxygen-Flow Models for Streams of the Heretaunga Plains	Hawke's Bay Regional Council
2016	Heretaunga Tamatea deed of settlement + documents schedule	Heretaunga Tamatea and the Crown
2017	Modelling Effects of Increased Groundwater Allocation on Stream Flows in the Heretaunga Plains	Hawke's Bay Regional Council
2018	Aquifers	Hawke's Bay Regional Council
2018	Cultural Values Table	Hawke's Bay Regional Council

Discussion

Purpose of report

1. The purpose of this report is to assist the RPC members to determine whether any of the values of the Heretaunga aquifer are outstanding for the purposes of the National Policy Statement for Freshwater Management (NPSFM).
2. This report presents the summarised findings of the values attributed to the Heretaunga aquifer in those documents referred to in Table 1, above. In accordance with decisions made by the RPC in June 2017, economic and consumptive use values have not been discussed in detail in this report.
3. The report will focus on the cultural values associated with the aquifer system, its groundwater ecosystem and its natural characteristics, not its productive qualities.

Overview

4. The Heretaunga aquifer is a major aquifer system underlying most of the Heretaunga Plains. The aquifer system is a significant resource for Hawke's Bay, with 161 million m^3 of water consented for domestic, municipal, industrial, horticultural and agricultural use, annually. Up until recent years, it has provided untreated drinking water to the cities of Napier and Hastings.
5. The Heretaunga aquifer system is mostly an alluvial system that infills a fault-bound depression that is around 900 metres deep or more. The aquifer system, including peripheral valley aquifers, covers an area of approximately 510 km^2. Travel time of water through the aquifer system varies considerably taking up to 7 years in some parts, to decades and hundreds of years in others.
6. Three major surface water bodies, being the Ngaruroro, Tutaekurī and Tukituki rivers, and numerous other smaller rivers and streams flow over and beside the Heretaunga Plains. There is a strong hydraulic connection between the Heretaunga aquifer and these surface water bodies. The vast majority of recharge to the Heretaunga aquifer system is via recharge from the Ngaruroro River.
7. The Heretaunga aquifer is a living ecosystem which is home to various unseen ecological communities. The aquifer ecosystems itself, as well those surface water ecosystems connected to the aquifer, have intrinsic value, are biologically diverse, and provide important ecosystem functions, such as water purification and flood control.

Location

8. The Heretaunga Plains comprise an area of around 300 km^2 on the east coast of the North Island. The aquifer system underlies most of the Heretaunga Plains, from Napier and the Hawke's Bay coast in the northeast, to Maraekakaho, Roys Hill and Taradale in the west, and Bridge Pa, Pakipaki and Pukahu in the south.

9. Figures 1 and 2 below show the general extent of the Heretaunga Plains aquifer system and the key waterways which flow over the Heretaunga plains, including their typical summer patterns.

Figure 1: Heretaunga plains aquifer system – general extent

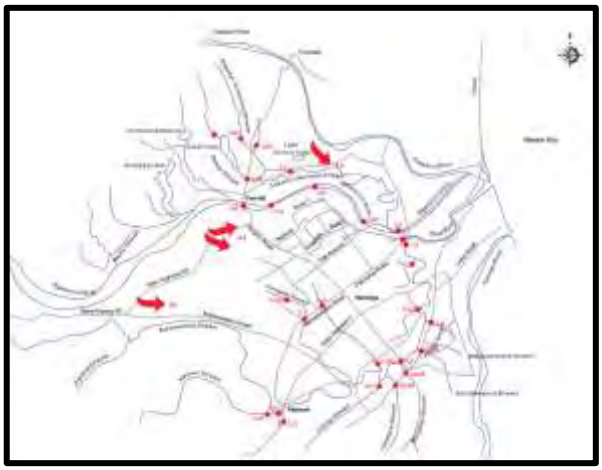


Figure 2: Heretaunga aquifer system -rivers and streams

*Cultural values **

10. The Heretaunga aquifer has long been regarded as a taonga of Ngāti Kahungunu and is part of Heretaunga Tamatea's traditional rohe.

11. The Heretaunga aquifer was known by Ngāti Kahungunu as the Heretaunga Ararau Haukūnui, being a large water resource, represented in the many rivers, creeks, and small tributaries fed by underground springs, springs of water, swampy ground, swimming holes, rock pools and quick sands. These areas supported an abundant supply of fish and water fowl, and was a primary food resource.

12. The importance of the aquifer is reflected in the whakatauki that represents Ngāti Kahungunu pride: Heretaunga ararau; Heretaunga haukūnui; Heretaunga hāro te kāhu; Heretaunga takoto noa.

13. In this play on words, Heretaunga ararau stands for both the myriad of waterways through the great swamps and the myriad of hapū that they linked together on the shore. Haukūnui describes the waters as a system of repo or swamps, awa or rivers and puna or springs, the life giving waters from deep within the earth. Hāro te kāhu sees the whole through the eyes of the soaring hawk, the plains standing solitary below, takoto noa, needing no other embellishment.

14. Ngāti Kahungunu has made various submissions to the regional council outlining the importance of the aquifer, not just from a traditional cultural perspective, but from a contemporary economic viewpoint.

15. Attachment 1 contains a more detailed explanation of the cultural values associated with the Heretaunga aquifer.

Aquifer characteristics

16. The Heretaunga aquifer system, including peripheral valley aquifers, is around 510 km^2 in size and consists of gravels, sands, silts, clays and shells deposited as a result of river and marine processes over the last 250,000 years. Its productive aquifers are generally within the non-marine river gravel deposits with the

* The HBRC and authors of this report are aware there are numerous areas, including waterbodies, where two or more iwi groups have agreed, shared interests and/or contested overlapping claims within the Hawke's Bay region. The information presented in this report is not intended to imply any exclusive rights over particular waterbodies for one or more iwi groups, nor does it confirm the validity of the claims of any group(s) over that waterbody. The information is solely for the purpose of recording important cultural and spiritual values identified by iwi groups in the region as sourced from existing published documents.

deposition of finer marine sediments forming the confining layers. The aquifer system is relatively unconfined west from around Flaxmere becoming progressively confined to the east by a wedge of marine sediments.

17. The Heretaunga aquifer system comprises a number of aquifers, including:

    - The Ngaruroro-Tutaekuri aquifer system (main aquifer under the Heretaunga Plains – approx. 300 km^2)
    - The Tukituki aquifer system (eastern coastal margin of the plains)
    - The Moteo Valley aquifer system (are formally occupied by the Tutaekuri River)
    - The Valley aquifer systems (before the Ngaruroro and Tutaekuri rivers cross)
    - The peripheral limestone aquifer system (hills on the southern and western margin of the plains).

18. The Heretaunga aquifer system is primarily recharged by the Ngaruroro River at the western margin of the Heretaunga Plains. A major recharge zone occurs between Roys Hill and Fernhill, with a minor recharge zone occurring from Maraekakaho to Roys Hill. Surface water infiltrates into the unconfined aquifer, and then downward and horizontally through the subsurface to recharge deeper confined aquifers.

19. The Tutaekuri and the Tukituki rivers recharge the relatively shallow aquifer systems in the northern and southeastern parts of the Heretaunga Plains. None of the aquifer systems have been identified as being completely isolated.

20. The groundwater derived from the Ngaruroro River flows quickly through the unconfined sector of the aquifer towards the coast with groundwater in the confined section moving as little as 2 metres per day.

21. A cross section of the Heretaunga Aquifer is contained in Attachment 2.

Recreation values

22. There are no recreational values associated with the Heretaunga aquifer itself, however the aquifer system does provide an important supporting function to recreational activities undertaken on rivers and streams hydraulically connected to the aquifer system.

Ecology values

23. Aquifers are living ecosystems which are dependent on the subterranean presence of water. Aquifer ecosystems provide a diversity of habitats, such as sand, gravel, fractured rock and karst systems that are home to various unseen ecological communities. Attachment 3 contains a diagram of a naturally functioning groundwater ecosystem.

24. These ecosystems include all of the life present in the physical space of the aquifer system, from microorganisms, such as bacteria, fungi and archaea, to primitive invertebrate animals (protozoa, nematoda stygofauna and troglofauna) and advanced invertebrates. These communities interact with each other and their non-living environment and perform natural ecological processes in the absence of light.

25. Groundwater life is rarely seen. This is because access is difficult and bores are usually designed to exclude all but water. This means there is limited understanding of aquifer ecosystems. Despite this, literature suggests that most aquifers support significant biodiversity with complex life persisting to substantial depths.

26. The different components of the Heretaunga aquifer's ecosystem are discussed in more detail below.

Microorganisms

27. Microscopic organisms are commonly known as microorganisms or microbes and are an important part of an aquifers ecosystem. The microbial communities generally have significant biodiversity and can adapt to living in nutrient-poor and anaerobic conditions found in deep and/or confined aquifer systems. Because of this, some microbial communities found in aquifers grow slowly and have a low tolerance to rapid changes.

Stygofauna and troglofauna

28. Subterranean life is divided into two classes of animals, stygofauna and troglofauna. Stygofauna refers to all aquatic fauna in a groundwater environment, and troglofauna are associated with caves and spaces above the water table, but still part of the aquifer system. There are no known cave or karst systems associated with the Heretaunga aquifer system so it in unknown if troglofauna are present in this aquifer system.

29. Stygofauna are aquatic animals which live in groundwater. They have adapted to life underground (i.e. no body pigments, no or very small eyes, elongated bodies, elongated antennae), survive on a limited food supply and are extremely energy efficient. Stygofauna feed on plankton, bacteria and plants found in streams and are thought to live longer than other terrestrial species

30. Stygofauna are important for several reasons. They are intrinsically significant as individual species, particularly where they have a restricted geographical range. These species are known as short-range endemics, which provide insights into evolutionary processes. Stygofauna also cycle nutrients within groundwater systems, and assist with keeping the finer pore spaces in the aquifer open, by ingesting and digesting bacteria, allowing water to flow through these tiny spaces.

31. While few studies have been undertaken looking into aquifer ecosystems in New Zealand, it is believed that New Zealand's stygofauna is widespread and diverse, with high endemism. This is largely because New Zealand's geological past has led to long term separation of habitats and populations, which drives high diversity particularly when many species are confined to very restricted geographical ranges.

32. In isolated aquifers and geological units stygofauna have no opportunity to migrate to another location which results in high diversity. In the Heretaunga aquifer system, none of the aquifers appear to be totally isolated, which suggests stygofauna species distributions, including any short range endemics, will be relatively widespread through the whole aquifer system.

Karst and spring systems

33. Studies indicate that major karst and spring systems associated with underground aquifers generally provide a very large habitat for complex, interconnected interstices ideal for the bacteria and invertebrates.

34. Notable examples, include the major karst systems under Mounts Owens and Arthur in Tasman, which are the longest and deepest cave systems in the southern hemisphere, and the Te Waikoropupū Springs which are the largest and clearest freshwater springs in New Zealand. Both areas have significant hydro-geological features which provide for extremely high and unique biodiversity values in these areas.

35. While, a number of rivers, streams and springs are hydraulically connected to the Heretaunga aquifer system, there are no known large freshwater 'blue' springs, such as the Te Waikoropupū Springs, or major karst systems in this area.

Water age

36. Groundwater generally moves from a recharge area to a discharge area. The course taken by water moving through the aquifer is called a flow path and varies depending on the thickness and the spatial extent of the aquifer system. The age and flow path of groundwater plays an important ecological role in supporting the aquifer's ecosystem.

37. Groundwater gets older along a flow path, with groundwater quality varying with depth. In most aquifer systems, groundwater flows faster horizontally than vertically. This means groundwater typically flows more rapidly through the upper parts of an aquifer, and groundwater gets older with depth.

38. Rates of groundwater movement in the deeper Heretaunga Plains aquifer vary significantly, and can take decades to hundreds of years from the input point in the west of the aquifer to the eastern part of the aquifer system. Conversely, the groundwater flows through the unconfined section of the aquifer system can be fast moving and in the order of hundreds of metres per day towards the coast.

Groundwater dependant ecosystems (rivers, streams, wetlands and springs)

39. Groundwater dependant ecosystems are those ecosystems which need inputs of groundwater to maintain their current structure and functions and can include rivers, streams, wetlands and springs.

40. Three major rivers flow across the Heretaunga Plains, being the Lower Tukituki River, the Tutaekuri River and the Ngaruroro River. Other surface water bodies known to be hydraulically connected to the Heretaunga aquifer system and the three major rivers, include low land streams such as the Raupare Stream, Awanui Stream, Karewarewa Stream, Karamū River and Irongate streams, Mangateretere Stream and Tutaekuri-Waimate Stream.

41. There is clear interaction between the groundwater and surface water bodies which flow over the Heretaunga Plains, with a number of streams being spring dominated and fed from groundwater. The

majority of groundwater leaving the Heretaunga Plains aquifer system returns to spring-fed streams and rivers in the lower plains

42. The water quality and quantity and the ecology of the Heretaunga aquifer system is important to the ecological health of those surface water bodies with strong hydraulic connections to the aquifer system. i.e. poor aquifer health, or decreased water quantity, may impact on water levels or water quality in highly connected surface water bodies.

Water Quality

43. Groundwater quality in aquifers across New Zealand varies. It depends on a range of factors such as nearby land uses, the soil composition above the water table, the geology of the aquifer and the groundwater residence time.

44. Hawke's Bay Regional Council regularly monitors the quality of groundwater in the Heretaunga aquifer at twenty two sites. The primary aim of this monitoring is to ensure the groundwater meets health and aesthetic based standards, as opposed to protecting the biodiversity values of the aquifer ecosystems.

45. The water quality of the Heretaunga aquifer system with regard to 'health and aesthetics' and 'ecosystem health' is discussed further below.

Water quality – health and aesthetics

46. The quality of groundwater in the Heretaunga aquifer system is measured against the New Zealand Drinking Water Standards to ensure the water is suitable for human consumption.

47. Overall, most monitoring sites comply with the New Zealand Drinking Water Standards (DWSNZ) for the key chemical water quality parameters[1]. The exceptions are elevated concentrations of iron, manganese, ammoniacal-nitrogen, hardness and phosphorus which occur in the deeper parts of the aquifer system (deeper than 50 metres) and are thought to be naturally occurring. Microbiological non-compliance was found for *E.coli* at 20% of the monitoring sites, in the 5-year monitoring period between 2009 and 2014.

48. In 2018, elevated concentrations of arsenic were found in groundwater samples from several private bores drawing water from the Heretaunga aquifer. The elevated arsenic levels are naturally occurring and local to specific bores and do not occur consistently throughout the Heretaunga aquifer system.

49. Each of the water quality parameters measured as part of HBRC's programme are summarised in more detail in Table 2, below. This data has been obtained directly from the 5 yearly State of the Environment Report 2009 – 2014.

Table 2: Water Quality – Heretaunga aquifer (2009 – 2014)

Water quality parameter	Compliance /non-compliance with DWSNZ guidelines
pH	Groundwater at all sites falls within the optimum guideline pH range of 7 to 8
Total Dissolved Solids (TDS)	The TDS concentrations at all sites are below the guideline value of 1000 mg/L.
Total Hardness	87% of the sites have total hardness levels below the guideline value of 200 mg/L.
Iron and Manganese	Ninety one percent of sites comply with the maximum accepted value for manganese, and fifty seven percent of sites comply with the aesthetic guideline value for manganese[2]. The two sites which exceed the maximum accepted values for manganese are located in deeper parts of the aquifer system and the elevated concentrations are thought to be naturally occurring. Eighty seven percent of the sites comply with the guideline value for iron. Two Monitoring bores exceed the aesthetic guideline value, with concentrations thought to be natural occurring. Elevated iron and manganese levels are a characteristic of aquifer systems where reducing (oxygen-poor) conditions exist naturally. The combined effects of reducing conditions and

[1] HBRC does not monitor for all chemical water quality parameters in the NZDWS.

[2] Aesthetic determinant = manganese concentrations at a level which can adversely affect the water's taste, odour, colour, clarity or general appearance.

	a long residence time of the groundwater in the aquifer encourage dissolution of iron and manganese present in aquifer materials. Monitoring indicates that the confined aquifer system mostly has mean residence times of approximately 36 years, with the deep aquifer systems having mean residence time of greater the ninety years
Nitrate-Nitrogen	All sites comply with the short-term and long-term maximum accepted value in the DWSNZ.
Ammoniacal-N	96% of monitoring sites on the Heretaunga Plains aquifer system comply with the DWSNZ aesthetic guideline value of 1.5 mg/L. One deep bore exceeded the guideline value, which is thought to be naturally occurring.
Phosphorus (Soluble Reactive Phosphorus - SRP)	Phosphorus levels at sites are generally less than 0.05 mg/L. However, several monitoring bores in the deeper parts of the aquifer system have elevated phosphorus, which is likely to be related to long residence times, which has enabled enough time for phosphorus to leach from minerals in the aquifer matrix.
Sulphate	All sites have sulphate levels below guideline levels of 200 mg/L.
Sodium and Chloride	All sites have sodium and chloride levels below aesthetic guideline levels for sodium and chloride.
Microbiological Indicator (*E. coli*)	Seventy percent of monitoring sites complied with the DWSNZ level. Twenty percent of monitoring bore had 1 cfu/100 mL in the 5-year period of monitoring, with two bores having more than one detection (six and four detections, respectively).

Water quality – ecosystem health

50. The geology of an aquifer has a significant effect on the natural water chemistry within an aquifer system. This means the 'natural water quality' within each aquifer system varies. For example, if dominant rock types present in the aquifer has soluble materials, such as limestone, the groundwater will have higher concentrations of ions, than in aquifers with less soluble materials such as insoluble quartz pebbles. Additionally, the chemical makeup of groundwater with longer residence time will be completely different to that of water with low residence time.

51. Over a period of time the fauna and microbial communities living in an aquifer become highly adapted to its living space and its natural water quality. This means the 'optimal' state of water quality required to protect each aquifer system is different, and might not necessarily correlate with the New Zealand Drinking Water Standards. For example, the water quality parameters for ecosystems with aquifers with brackish water will be completely different to that of freshwater aquifers.

52. To date, no monitoring or investigations have taken place looking into the standard of water quality required to protect the biodiversity value of the ecosystems living the Heretaunga aquifer system.

Values Summary

Overarching Value	Sub-value	Description	Outstanding Yes/no	Comments
Cultural	TBC	TBC	TBC	TBC
Recreational	TBC	TBC	TBC	TBC
Ecological	TBC	TBC	TBC	TBC
Landscape	TBC	TBC	TBC	TBC
Natural Character	TBC	TBC	TBC	TBC

Attachment 1

Heretaunga Aquifer - Cultural Values Report

Key Cultural Values
Spiritual Values

Table 1: List of documents reviewed

Year	Name	Author
2004	Lightless, not lifeless: New Zealand's subterranean biodiversity	NIWA
2012	Initial comments on HBRC's Draft Change 5, NKII	Ngāti Kahungunu Iwi Incorporated
2012	Submission from NKII on HBRC's Proposed Change 5, NKII	Ngāti Kahungunu Iwi Incorporated
2012	Submission from Te Taiwhenua o Heretaunga on Proposed Plan Change 5 to the RPS	Te Taiwhenua o Heretaunga
2015	Heretaunga Plains Groundwater Management and Investigations	Hawke's Bay Regional Council
2016	Groundwater Quality State of Environment: State and Trends	Hawke's Bay Regional Council
2016	Heretaunga Tamatea Deed of Settlement Documents	Heretaunga Tamatea and the Crown
2018	Cultural Values Table	Hawke's Bay Regional Council

*1. Introduction**

Purpose

The purpose of this report is to assist the RPC members to determine whether any of the cultural values associated with the Heretaunga aquifer are outstanding for the purposes of the National Policy Statement for Freshwater Management (NPSFM).

This report presents the summarised findings of the cultural values attributed to the Heretaunga aquifer in those documents referred to in Table 1, above.

* The HBRC and authors of this report are aware there are numerous areas, including waterbodies, where two or more iwi groups have agreed, shared interests and/or contested overlapping claims within the Hawke's Bay region. The information presented in this report is not intended to imply any exclusive rights over particular waterbodies for one or more iwi groups, nor does it confirm the validity of the claims of any group(s) over that waterbody. The information is solely for the purpose of recording important cultural and spiritual values identified by iwi groups in the region as sourced from existing published documents.

The report summarises the cultural values associated with the Heretaunga aquifer into a series of categories. It is recognised that isolating the values into categories can be problematic from a Māori worldview and many of the values are part of a narrative that doesn't fit neatly into categories. However, the intention is not to take a reductionist or isolated approach to cultural values but to try and gain an appreciation of their significance and the level of detail available to progress a plan change. In preparing the reports, it became obvious that all water bodies are part of a wider cultural landscape that weaves people and the environment into a rich history of cultural and spiritual association.

Ultimately, the Regional Planning Committee will need to decide what the appropriate threshold is for outstanding cultural values. Any objectives, policies or rules that are proposed to support outstanding waterbodies will be subject to scrutiny and potential challenges by those who may be affected by a plan change.

Importance

The Heretaunga aquifer has long been regarded as a taonga of Ngāti Kahungunu and is part of Heretaunga Tamatea's traditional rohe - one of six large natural groups negotiating the settlement of Ngāti Kahungunu Treaty of Waitangi claims.

The importance of the aquifer is reflected in the whakatauki that represents Ngāti Kahungunu pride:

Heretaunga ararau

Heretaunga haukūnui

Heretaunga hāro te kāhu

Heretaunga takoto noa

In this play on words, Heretaunga ararau stands for both the myriad of waterways through the great swamps and the myriad of hapū that they linked together on the shore. Haukūnui describes the waters as a system of repo or swamps, awa or rivers and puna or springs, the life giving waters from deep within the earth. Hāro te kāhu sees the whole through the eyes of the soaring hawk, the plains standing solitary below, takoto noa, needing no other embellishment.

The Heretaunga aquifer was known by Ngāti Kahungunu as the Heretaunga Ararau Haukūnui, being a large water resource, represented in the many rivers, creeks, the small tributaries fed by underground springs, springs of water, swampy ground, swimming holes, rock pools and quick sands. These areas supported an abundant supply of fish and water fowl, a primary food resource.

In describing the Heretaunga Muriwaihou (Heretaunga aquifer system) evidence from Te Hira Huata provided at the Waitangi Tribunal hearing of WAI 2358 was quoted "The extraordinary clean water from the springs, and from the streams that flowed from them, was the elixir of life for the hapū, feeding and cleansing body, soul and mind, and as important for ritual as it is for bodily needs".

Ngāti Kahungunu has made various submissions to the regional council and central government outlining the importance of the aquifer, not just from a traditional cultural perspective, but from a contemporary viewpoint. For example, the submission from NKII on HBRC's Proposed Change 5:

The Heretaunga aquifer system is the manawa or beating heart of the Hastings economy, supplying water of exceptional quality for domestic, industrial and agricultural use, for most uses or purposes, it requires no treatment. Protection of the aquifer from contamination is paramount if our economy is to remain competitive.

The Hapū Management Plan: Mana Ake - Nga Hapū o Heretaunga prepared by Te Taiwhenua o Heretaunga outlines specific issues and policies around contemporary management of the aquifer resource as follows:

We are Kaitiaki of the Heretaunga aquifer resource as it is central to the mana and mauri of our marae hapū.

- *Support and advance rangatiratanga in respect of the Heretaunga aquifer resource under Article 2, Treaty of Waitangi.*
- *That we are kaitiaki of the Heretaunga aquifer resource as it is central to the mana and mauri of our marae hapū and this is not dependent upon title to the surface of land.*
- *Protection of the aquifer resource is paramount and mining, exploratory and/or actual drilling, fracking, industrial development or use, experimental use, or other use that puts the resource at risk, is not supported.*

- *Require that existing water takes are monitored and proposed future takes are not permitted without consultation with hapū, due diligence and robust scientific evidence on risk to the aquifer resource is made to affected parties and nga hapū o Heretaunga.*
- *Hapū reserve the right to manage the Heretaunga aquifer resource in partnership with authorities.*

TANK Group

The TANK Group has been working since 2012 on land and water management issues for the Tutaekurī, Ahuriri, Ngaruroro and Karamū catchments. Its purpose is to recommend limits and measures for a workable plan change. TANK's collaborative membership includes more than 30 groups, representing Tāngata Whenua, primary sector, councils and environmentalists.

The TANK group has been progressing a cultural values framework, identifying values and attributes to characterise water quality.

2. Archaeology

Archaeological sites across the Heretaunga Plains are shown below. Please note, many pits and terraces are not labelled for easier viewing.

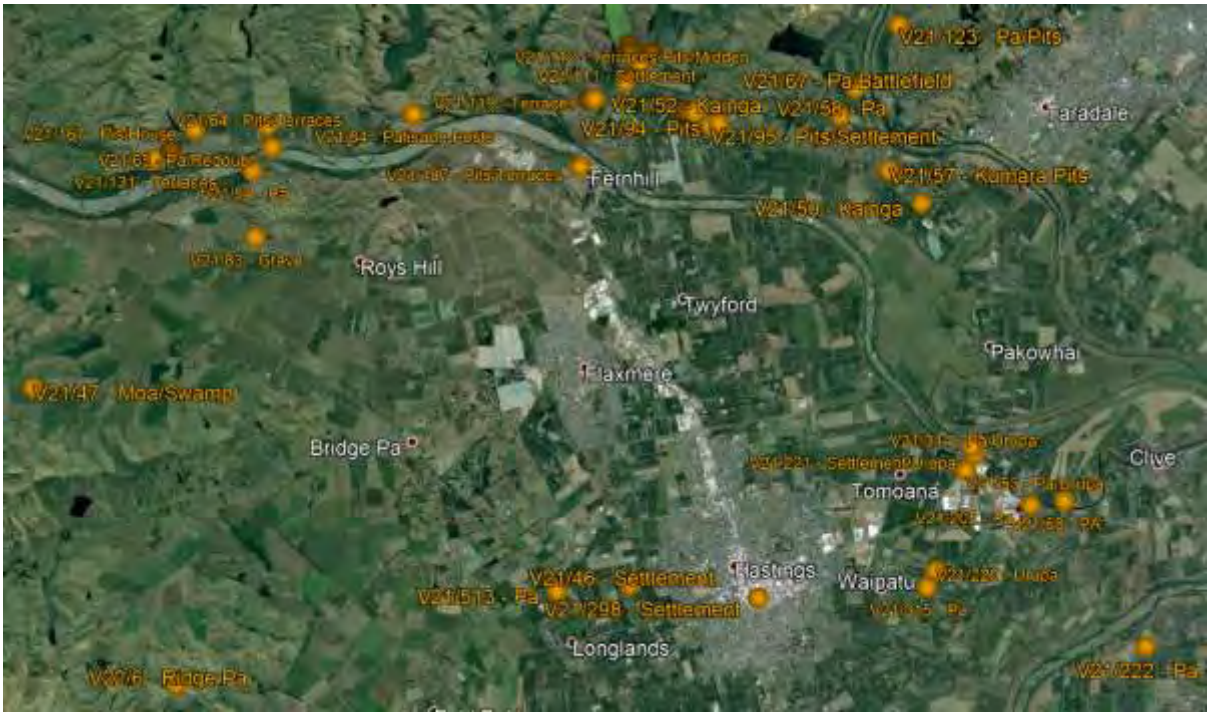


Figure 1: Archaeological Sites across the Heretaunga Plains – north of Hastings

Figure 2: Archaeological Sites across the Heretaunga Plains – south of Hastings

3. Statutory Acknowledgement Area of Interest

Figure 3: Heretaunga Tamatea Area of Interest

4. Resource Management Plans

The following tables list any relevant resource management plans developed by iwi/hapū, the regional council or territorial authorities. The tables include any specific provisions that apply to the Heretaunga aquifer. They do not include all of the general policies or rules that may apply. Water quality and water quantity provisions have been included as it is recognised that these aspects can significantly impact on cultural values.

Iwi and Hapū Resource Management Plans
Kahungunu ki Uta, Kahungunu ki Tai: Marine & Freshwater Fisheries Strategic Plan
Mana Ake - An Expression of Kaitiakitanga, Te Taiwhenua o Heretaunga

Regional Resource Management Plan
Schedule 4: Known Productive Aquifer Systems in the Hawke's Bay Region
Schedule 5: Heretaunga Plains Contaminated Vulnerability based on specifically modified DRASTIC factors for confined aquifers
Schedule 5a: Heretaunga Plains Unconfined Aquifer
Schedule 6: Ground Water Management Zones
Schedule 6b: Catchments sensitive to animal effluent discharges

Regional Coastal Environment Plan
Schedule O: Known Productive Aquifer Systems in Hawke's Bay Coastal Environment

Hastings District Plan
Appendix 59: Heretaunga Unconfined Aquifer

Attachment 2: Cross Section through Heretaunga Aquifer

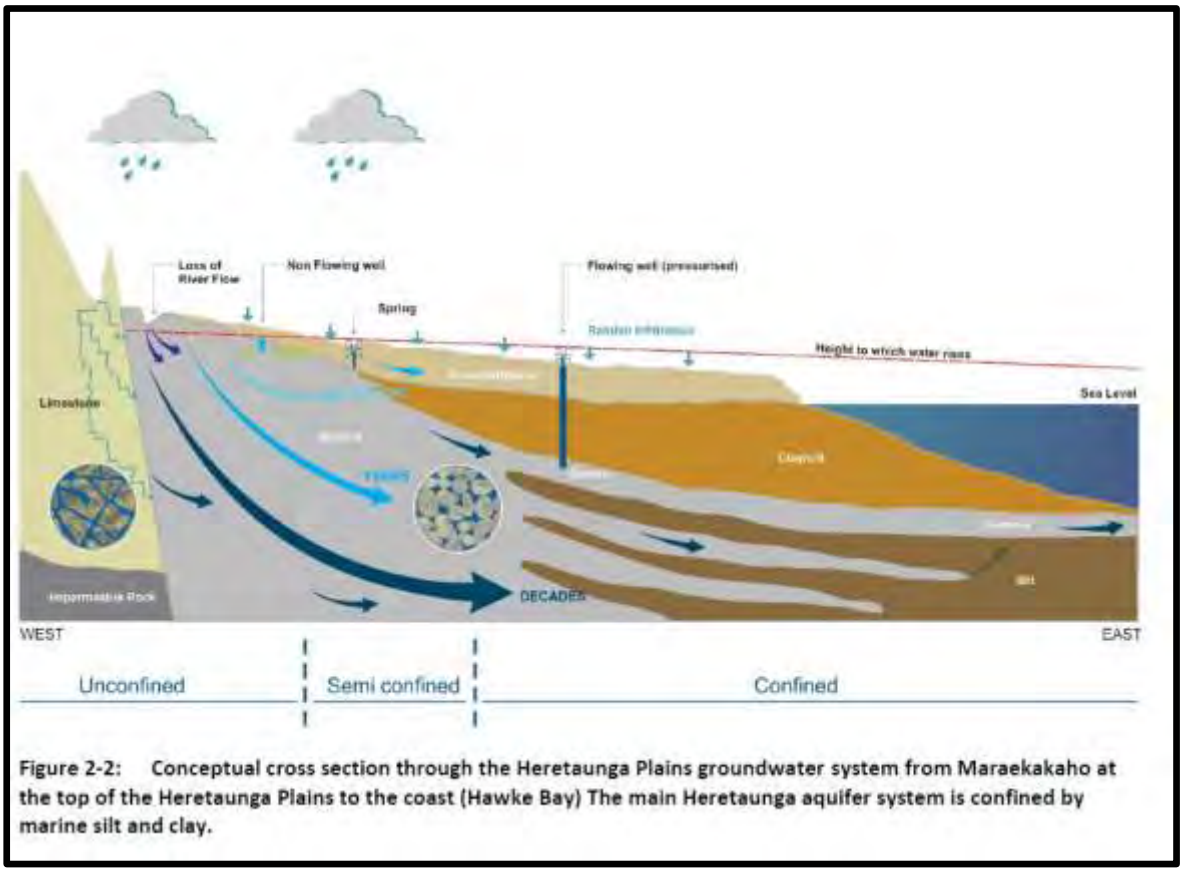


Figure 2-2: Conceptual cross section through the Heretaunga Plains groundwater system from Maraekakaho at the top of the Heretaunga Plains to the coast (Hawke Bay) The main Heretaunga aquifer system is confined by marine silt and clay.

Figure 1: Cross section thorough the Heretaunga aquifer system

Attachment 3: Typical Groundwater Ecosystem

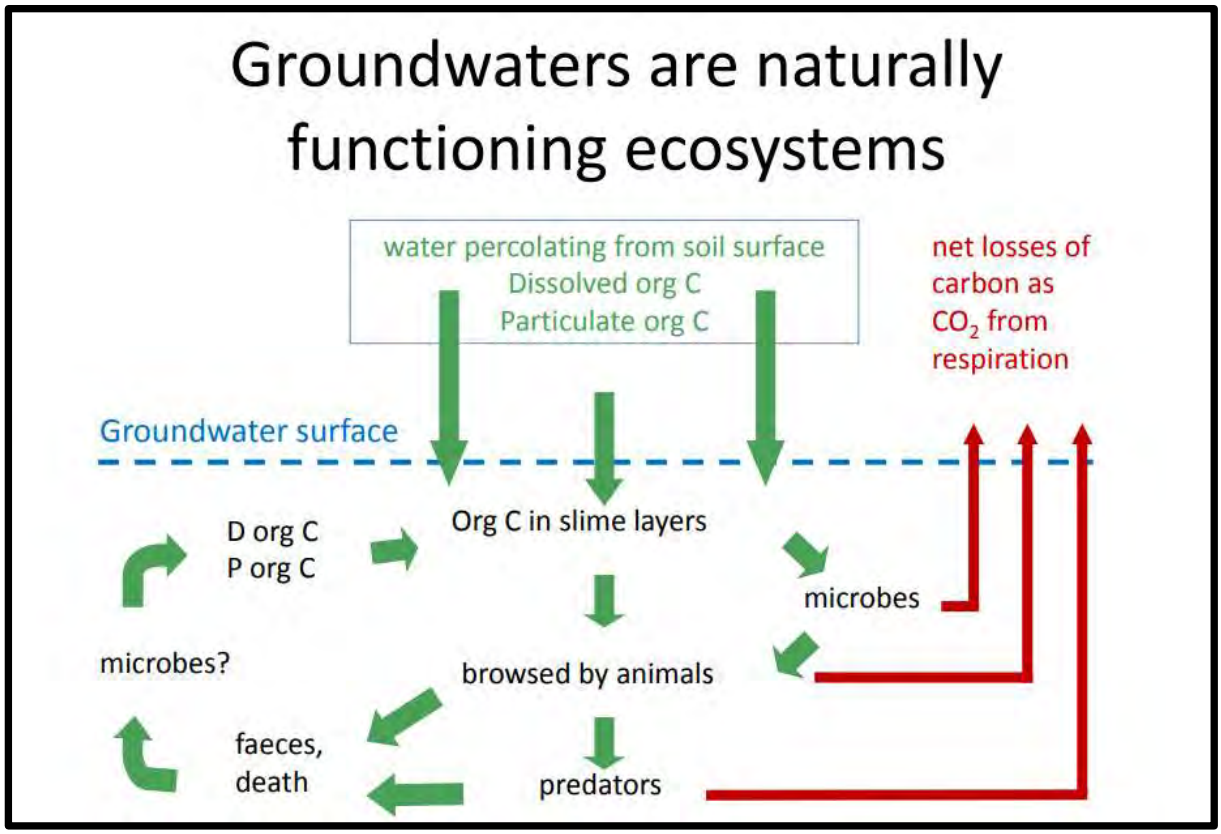
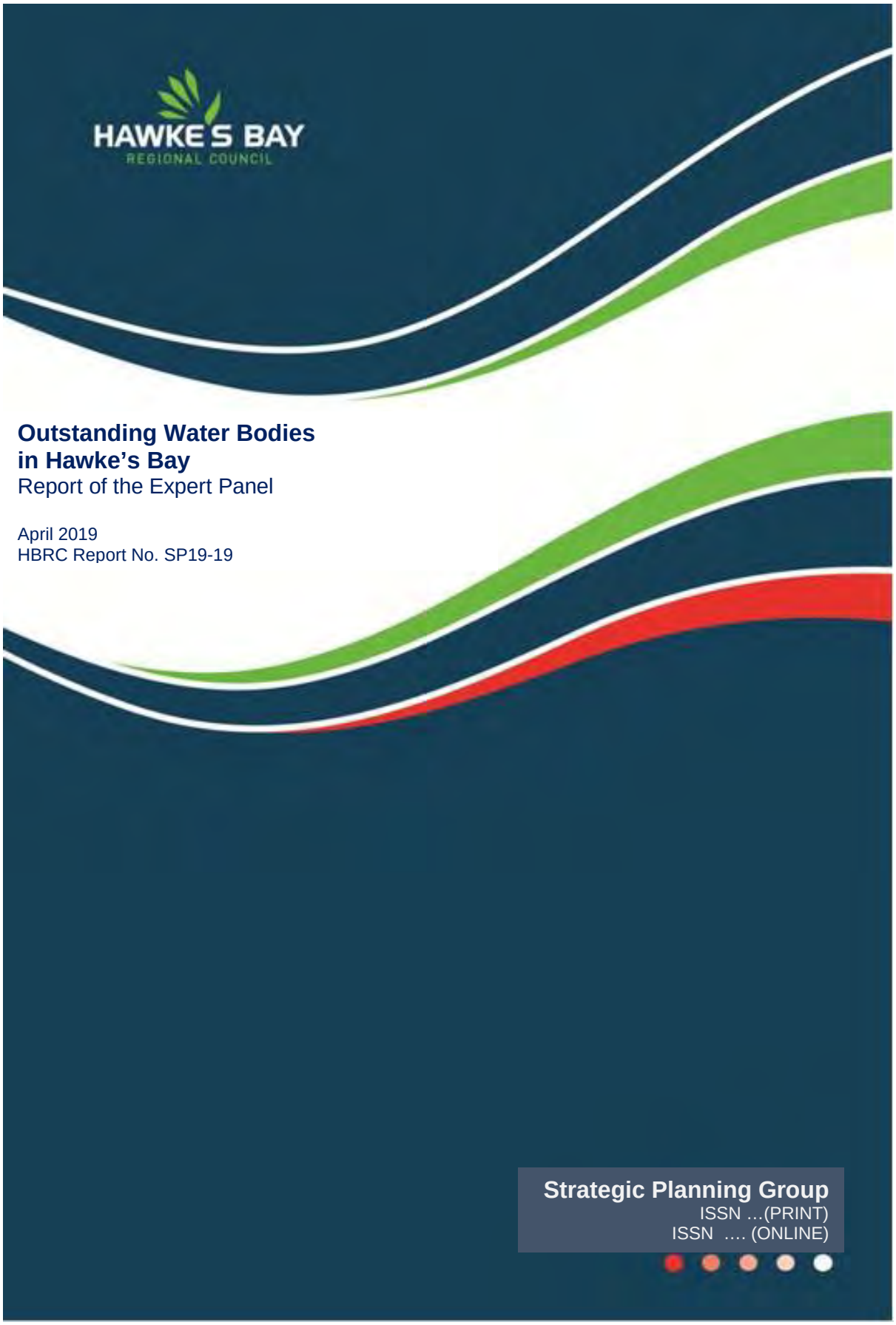


Figure 1: Typical groundwater ecosystem

Appendix 3: Expert Panel Findings - Heretaunga Aquifer

Note: Appendix 3 contains extracts only - for further information please refer to the full report of the expert panel



HAWKE'S BAY
REGIONAL COUNCIL

159 Dalton Street . Napier 4110
Private Bag 6006 Napier 4142
Telephone (06) 835 9200
Fax (06) 835 3601
Regional Freephone (06) 0800 108 838

Outstanding Water Bodies in Hawke's Bay

Report of the Expert Panel

April 2019
HBRC Report No. SP19-19

Prepared by:

Morry Black, Mauri Protection Agency
Matthew Brady, Department of Conservation
John Cheyne, Wetland Works
Andrew Curtis, Water Strategies Ltd
Bernie Kelly, Hawke's Bay Canoe Club
Tom Winlove, Hawke's Bay Fish and Game Council

For Strategic Planning Group
Hawke's Bay Regional Council

ISSN …(PRINT)
ISSN …. (ONLINE)

Outcome 2: OWB Assessment Criteria

The Panel considered the criteria for what makes the selected values regionally 'Outstanding'. The Gisborne District Council OWB criteria provided a useful framework but needed both simplification and some additional criteria.

Both quantitative and qualitative (descriptive) measures were selected and are set out below in Table 4. 'Outstanding' values could also be variable, for example, customary values can be dependent on the season or time of year.

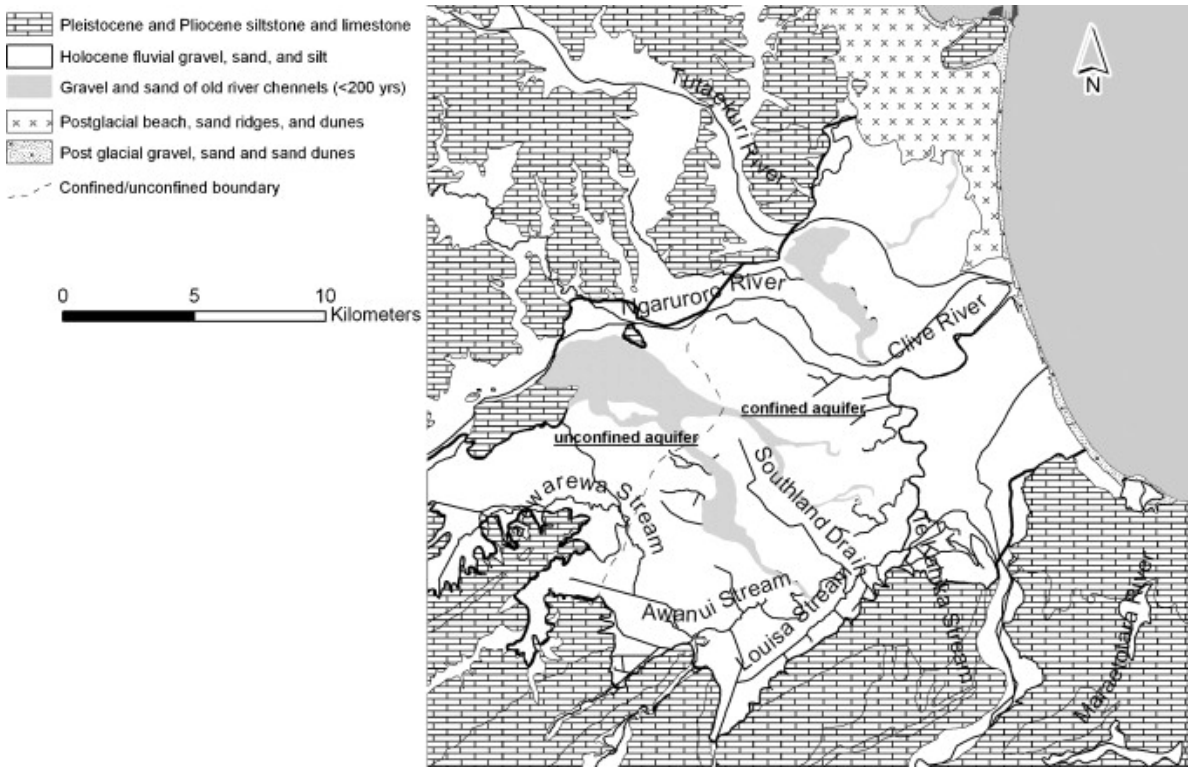
TABLE 4: CRITERIA FOR ASSESSING 'OUTSTANDING' VALUES

'OUTSTANDING' VALUE	CRITERIA	INDICATOR
Ecology	Threatened Species	4 or more threatened species
	% of Population	• >2% of a national population of a native species • >15% of a regional population of a native species
	Ecological Distinctiveness	Presence of a unique or distinctive characteristic/ habitat or species at the regional level
	Ecological Function	Presence of a critical or outstanding: • Breeding site • Ecosystem component • Assemblage • Kohanga ika/ nursery • Fish passage/ fish spawning
Landscape	A water body that contains a unique hydrological, geological or culturally significant feature A water body that is widely recognised at the regional level for its scenic values	
Natural Character	A water body that is highly natural with little or no human modification, including to the flow, bed and riparian margins, water quality, flora and fauna, within a largely indigenous landscape	
Amenity/ Recreation	A recreational experience that is exceptional in or on the water An exceptional location for angling or customary food gathering A unique historical or heritage site	
Cultural & Spiritual	Preliminary and high level comments only are provided using the following framework: For understanding and assessing the outstanding values, attributes and uses of water bodies from a cultural and spiritual perspective, the following concepts have been applied:	

	Wairuatanga Mauri Mana Tapu Taonga tuku iho *Rangatiratanga* Mana whenua – mana moana Kaitiakitanga Mahinga kai (as a place, action or practice) *Whakapapa* O te whenua O te wai O te tangata Ki uta ki tai *Matauranga Maori* Tikanga Maori knowledge systems Traditional uses and values Origins of cultural knowledge *Cultural Natural Character* Spiritual condition Mana o te wai Connectivity between ground and surface water Cleansing properties as water passes through the whenua Spring / aquifer sources – water recharge systems SPECIAL NOTE: Tangata whenua will provide locally relevant assessments through separate input to the process (Refer to Appendix 4: Maori cultural and spiritual values, and see Diagram 1).

Heretaunga Aquifer

Aerial view over Heretaunga Aquifer



Geology: Heretaunga Aquifer

HERETAUNGA AQUIFER: DESCRIPTION OF OUTSTANDING VALUES

SUMMARY

TYPE	NAME	OUTSTANDING VALUE				
		ECOLOGY	LANDSCAPE	NATURAL CHARACTER	AMENITY & RECREATION	CULTURAL & SPIRITUAL
Aquifer	HERETAUNGA AQUIFER					

ECOLOGY

Description	Notes	Reference
Ecological Function: Critical for ecosystems on Heretaunga Plains. The aquifer receives and supplies water for many of the rivers and springs on the plains. Integrally tied to hydrological processes.		HBRC 2018

LANDSCAPE

Description	Notes	Reference
Hydrological features of the aquifer, including scale, are regionally unique		HBRC 2018

CULTURAL & SPIRITUAL

Description	Notes	Reference
Long regarded as a taonga of Ngāti Kahungunu and is within Heretaunga - Tamatea's traditional rohe		HBRC 2018

Wairuatanga: Mauri, Mana, Tapu, Taonga tuku iho *Rangatiratanga:* Mana Whenua - Mana Moana, Kaitiakitanga, Mahinga kai (place/action/practice) *Whakapapa:* Relationships founded on the integrity of the resource being maintained	Different strands and layers of whakapapa depending on context; Atuatanga and different realms / responsibiliti es;	Dravid and Brown; Heretaunga Ararau Haukunui (Te Hira Huata); He Toa Takitini Evidence and DoS; Ngaruroro Values
Matauranga Maori: Tikanga Maori, unique knowledge systems and origins		&Assessment Report NKII evidence PC5
Cultural Natural Character: Connectivity, hydraulic connection, springflows - punawai, natural cleansing, ecosystem services Mana o te Wai - Life essence, spiritual integrity, spiritual health, life-supporting capacity,		WAI 262 WAI 595 TANK PC 5

Appendix 4: Final Evaluation - Heretaunga Aquifer

Note: Appendix 4 contains extracts only - for further information please refer to the full report

HAWKE'S BAY
REGIONAL COUNCIL

Outstanding Water Bodies Plan Change

Selecting a list of outstanding water bodies in Hawke's Bay

HBRC Report Number: SD19-18
Publication Number: 5400

159 Dalton Street . Napier 4110
Private Bag 6006 Napier 4142
Telephone (06) 835 9200
Fax (06) 835 3601
Regional Freephone (06) 0800 108 838

Outstanding Water Bodies Plan Change

Selecting a list of outstanding water bodies in Hawke's Bay

HBRC Report Number: SD19-18
Publication Number: 5400

Prepared by:
Belinda Harper, Senior Planner
Dale Meredith, Senior Planner

Reviewed by:
Ceri Edmonds: Policy and Planning
Dale Meredith: Senior Planner
Tom Skerman: Group Manager Strategic Planning

Heretaunga Aquifer & Ruataniwha Aquifer System

The following section discusses the key features associated with the Ruataniwha or Heretaunga aquifer systems, with the exception of their cultural and spiritual values which are discussed in the cultural and spiritual values section of this report.

The information discussed in this section has been sourced from literature reviewed during the secondary assessment phase of this plan change. This section simply restates the information contained in literature. It does not attempt to re-assess the features of the aquifer systems and determine their importance. Staff do not have the expertise to do this.

Stygofauna

Stygofauna are aquatic animals which live in groundwater. They provide important ecosystem functions and have intrinsic value themselves.

Literature suggests that New Zealand's stygofauna is widespread and diverse. Due to New Zealand's geological past, stygofauna is also thought to be highly endemic as a result of the long term separation of habitats and populations.

To date, there have been no collections or investigations into the communities of stygofauna in the Ruataniwha or Heretaunga aquifer systems. However, literature indicates short-range endemics are likely to be present throughout both aquifer systems.

Natural state

The term natural character is used to describe the naturalness of environments, with generally the highest degree of natural character (the greatest naturalness) occurring where there is least modification.

No studies to date have looked into the natural character associated with the Heretaunga and Ruataniwha aquifer systems. However, given that millions of cubic metres of water are extracted from the aquifers annually, and large areas of intensified land uses exist over both aquifer systems, staff think it is unlikely that either aquifer system will be in a highly natural state.

Aquifer size

Aquifer sizes are difficult to compare without a methodology and clearly defined scope, which states exactly what parts of the aquifer system are being measured and compared, and why the size of an aquifer makes it outstanding. For example, is it the size of the aquifer system, the composition of the aquifer system, the number or size of the groundwater dependant surface water bodies or their associated recreation uses, which make its size superior to other aquifer systems?

Aquifer systems are made up of a number of different interconnected layers. They are complex and hard to delineate. Further, aquifer systems sizes vary depending on what part of the aquifer system is being discussed and mapped. For example, the Heretaunga aquifer system has been broadly delineated as comprising of four principal aquifer systems[3].

Information reviewed during the secondary assessments assigned various sizes to the aquifer systems. For example, HBRC's website states the size of the Heretaunga and Ruataniwha aquifer systems are 460 km2 and 800 km2, respectively, with other publications placing the size of the Heretaunga at 510 km2 and Ruataniwha aquifer 260 km2.

Water quality - health and aesthetics

Water quality for the purposes of drinking is a consumptive use value. As discussed in earlier in the report, consumptive and economic use values are not within the scope of Plan Change 7. Drinking water will be considered during future catchment based plan changes.

Notwithstanding, the Council regularly monitors the water quality of the Heretaunga and Ruataniwha aquifer systems. Overall, most monitoring sites in the Heretaunga and Ruataniwha aquifer systems comply with the New Zealand drinking water standards (DWSNZ) for the key chemical water quality parameters. There are several exceptions which are referred to in the secondary assessments.

Water quality - aquifer ecosystem

To date, no monitoring or investigations have taken place looking into the standard of water quality required to protect the biodiversity value of the Heretaunga and Ruataniwha aquifer ecosystems. As such, it is unknown whether the aquifer's water quality is optimal for their ecosystems to thrive.

It cannot be assumed that just because the water quality within the aquifer systems generally complies with the NZDWS that it is suited to the aquifer's ecosystem. For example, some ecosystems have an extremely low tolerance and may be sensitive to small chemical changes. This means despite water quality meeting drinking water standards, a slight change to the water chemistry but still within the NZDWS, may have a detrimental effect on sensitive parts of the ecosystem.

Additionally, the 'optimum' water quality for an aquifers ecosystem may not correlate at all with the NZDWS which has been developed to ensure water is safe for drinking, not for the requirements of the aquifers ecosystem which will differ throughout New Zealand.

Groundwater age

Travel time of water through the aquifer varies. In deeper parts it can take decades to hundreds of years. Whereas in the unconfined section of the aquifer system water can be fast moving and in the order of hundreds of metres per day towards the coast.

Literature does not identify an optimal age for groundwater.

Hydrogeology & interaction with surface water bodies

The hydrological characteristics of aquifer systems are difficult to compare without a methodology and clearly defined scope, which states what parts of an aquifer system are being assessed and why the hydrogeology features of an aquifer system make it outstanding. For example, is it the composition of the aquifer system which makes its hydrogeological features superior, or the number of connected surface water bodies, the volume of water or the length of the surface water bodies, or their associated recreation uses and ecology?

While, the Ruataniwha and Heretaunga aquifers are large systems which have a strong hydraulic connection with the surface water bodies that flow across them as discussed, they are complex and hard to delineate, with some parts of the aquifer system having a more direct 'hydrologic connection 'with surface water bodies than others.

The local expert panel found the Heretaunga aquifer system to be outstanding for its landscape features, specifically noting the hydrological features of the aquifer are regionally unique. The local expert panel's report is attached in Appendix 6.

The local expert panel's report does not discuss the Ruataniwha aquifer system on a standalone basis, however when discussing the Tukituki River, the report notes that the Ruataniwha Aquifer is a distinctive hydrological feature that is integral to the Tukituki River.

Cultural and Spiritual values

Heretaunga Aquifer

The Heretaunga Aquifer is a taonga of Ngāti Kahungunu and is part of Heretaunga Tamatea's traditional rohe. The importance of the aquifer is reflected in the whakatauki that represents Ngāti Kahungunu pride:

> *Heretaunga ararau; Heretaunga haukūnui*; *Heretaunga hāro te kāhu*; *Heretaunga takoto noa.*
>
> *(Heretaunga of arcadian pathways; Heretaunga of life-giving dew; Heretaunga the beauty of which can only be appreciated by the eyes of a hawk in full flight; Heretaunga from whence the chiefs have departed and only we the servants remain[4]).*

The Heretaunga Aquifer was known by Ngāti Kahungunu as the Heretaunga Ararau Haukūnui, being a large water resource, represented in the many rivers, creeks, the small tributaries fed by underground springs, springs of water, swampy ground, swimming holes, rock pools and quick sands. These areas supported an abundant supply of fish and water fowl, a primary food resource.

[3] Dravid 1997

[4] https://maungakorero.wordpress.com/2014/01/19/issue-24-kahuranaki/

Information reviewed indicates the water body contains the following key values:

- Wāhi Tapu, Wāhi taonga
- Pa, kāinga
- Acknowledged in korero tuku iho, pepeha, whakatauki, waiata.

The local expert panel found the Heretaunga Aquifer system to have known outstanding cultural and spiritual values, specifically noting Wairuatanga, Rangatiratanga, Whakapapa, Mātauranga Māori and Cultural Natural Character.

Some of the cultural values of the Heretaunga Aquifer were discussed during a tour of Ōtātara pā led by members of Ngāti Pārau, including whakatauki.