

## WAIPARA RIVER WORKING PARTY

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- Natural History/Scientific Values; Ecological  
Values/Biodiversity; Cultural Values

### **Summary**

This paper addresses three management issues as follows:

- Natural History / Scientific Values
- Ecological Values / Biodiversity
- Cultural Values

The Waipara River contains a number of historically and scientifically important sites. The sedimentary rocks, particularly in the upper reaches of the river, contain significant amounts of information on the geological history of New Zealand. A number of these sites are identified as being of international scientific importance. The paper identifies the values of these sites and their vulnerability in terms of human activities. The report considers whether the current level of protection is adequate and the relevant legislation should greater protection be required.

Secondly, the paper identifies the variety of life forms and ecosystems that the river supports and whether further information on these values should be provided.

Lastly, the paper considers the values that Tāngata Whenua place on the resources in the Waipara River and significance of the river in Ngāi Tahu's history.

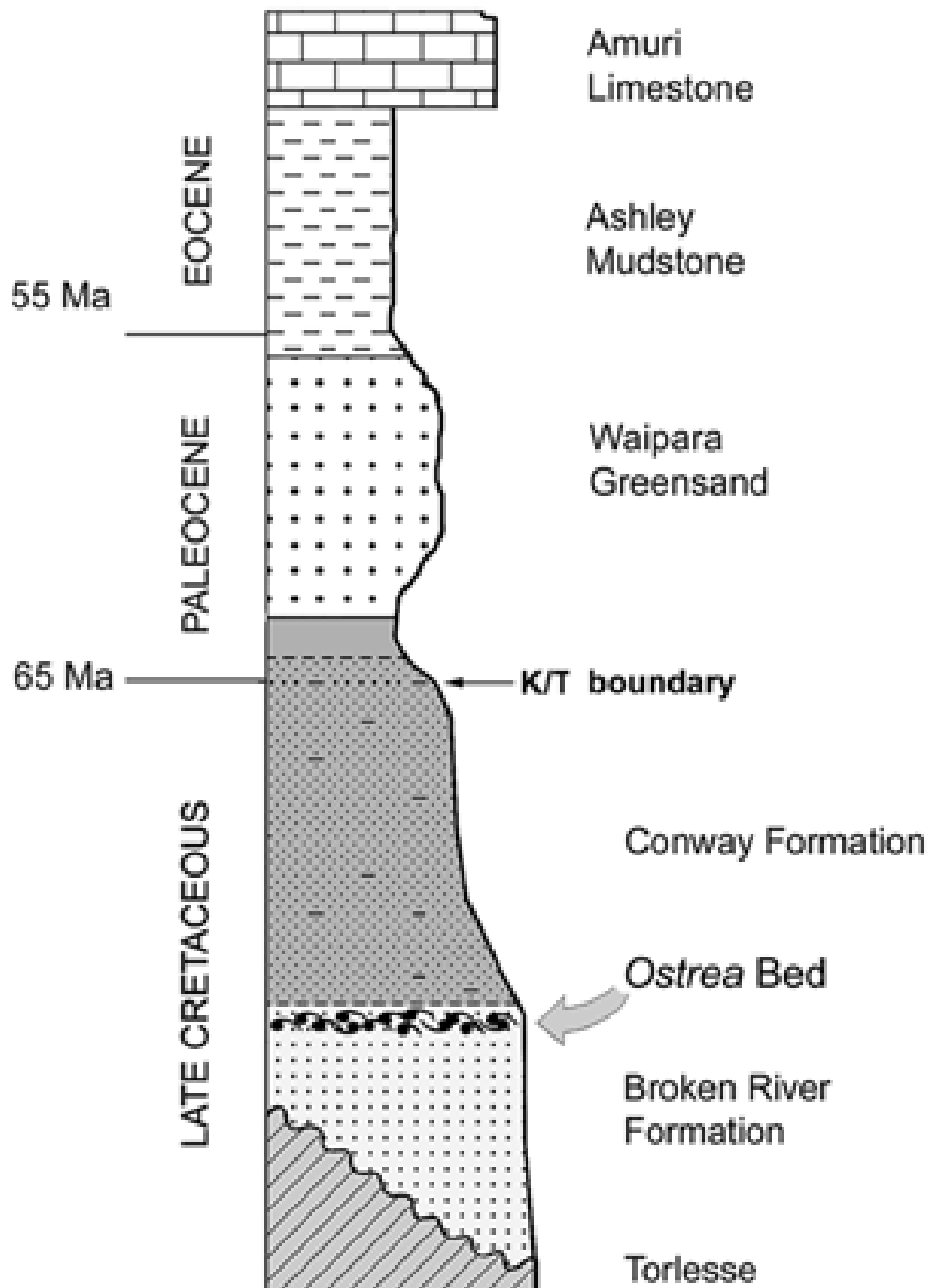
## 1 INTRODUCTION

- 1.1 This report looks at three management issues within the Waipara River. Firstly the paper addresses the natural history and scientific values within the river. The Waipara River is known to contain a number of historically and scientifically important sites. Some of these internationally significant sites are vulnerable to human activities such as fossicking and the use of motorised vehicles in the river. The report identifies the values of these sites and considers whether the current level of protection is adequate.
- 1.2 Secondly, the paper identifies the ecological and biodiversity values present in the river. Whilst there is a significant amount of information available on these values, it is considered that further ecological surveying of the river could provide a more complete and current picture of the values in the river.
- 1.3 The paper goes on to consider cultural values, and in particular those cultural values held by Māori. Māori have long had a connection with the Waipara River. This is reflected in both legislation and in the number of archaeological features recorded along the river.

## 2 NATURAL HISTORY/SCIENTIFIC VALUES

- 2.1 The Waipara River contains a number of historically and scientifically important sites, particularly in the upper reaches of the river where the sedimentary rocks contain significant amounts of information on the history of New Zealand.
- 2.2 The Waipara region has experienced a number of geological processes and this can be seen and studied through the rocks that are exposed in the area. Many millions of years ago the entire Waipara area (together with much of the South Island) lay under the ocean. Tectonic activity has resulted in the rocks being uplifted over many millions of years to form the landscape that we know today. Over time, the Waipara River has cut its way down through the many different layers of rock exposing them and allowing access to the information contained in them.
- 2.3 The most geologically rich areas in the Waipara River are upstream of White Gorge. In that area, several rock formations crop out (Fig. 1), each with its own suite of fossils. These rock units form the cover sequence that was deposited on the older Torlesse basement after Zelandia (the New Zealand continent) broke away from Gondwana. At the bottom of the pile is the Broken River Formation, comprising mostly sandstones with thin coal seams and topped by the *Ostrea* Bed. This unit is not well exposed in the Waipara River. Next is the Conway Formation, which is famous for its marine reptile fossils, mostly contained in large nearly spherical concretions. Some of these concretions contain the bones of plesiosaurs and mosasaurs. Of historical significance is the fact that it was in the Waipara River that the first fossil bones to be discovered in New Zealand were found in 1859.
- 2.4 A plesiosaur was a type of carnivorous marine reptile that grew up to 12 metres in length. Specimens from the Waipara are mostly of elamosaurid plesiosaurs that are characterised by having exceedingly long necks with small heads. Mosasaurs were giant marine lizards up to 15 metres in length with a long head with numerous teeth, stout necks and long, slim bodies and tails. Both of these marine reptiles are extinct.
- 2.5 The next rock unit, the Loburn Mudstone is poorly exposed and has so far yielded very few fossils. It is overlain by the Waipara Greensand, which in recent years has been the source of numerous significant fossils. Among these are the teeth of about 17 species

of shark, many of which are now extinct although some are still around today. Several specimens of a very early penguin, *Waimanu*, which was first discovered in the 1980s and dubbed the “Waipara bird”, came from the greensand. More recent discoveries have allowed the characters of this ancient bird to be elucidated. The greensand is also the source of several other fossils, including the enigmatic *Waiparaconus*, once thought to be a sort of stalked barnacle, but now believed to be a relative of corals.



(Fig. 1) Rock units in the Waipara River upstream of White Gorge

- 2.6 The Waipara greensand is overlain by Ashley Mudstone, which is not well exposed so has not provided many fossils. It, in turn, is overlain by the Amuri Limestone, a thick sequence of calcareous (limey) rocks in which several distinct units can be recognised. The presence of limestone also indicates that the land once formed part of the seabed as limestone is a calcareous rock formed when marine shellfish and other animals of

calcite structure die. The limestone is rich in fossilised shells and skeletal debris from the organisms that inhabited the warm, marine waters that were present at that time. These include marine invertebrates such as molluscs, brachiopods, bryozoans and many others. There are also a variety of trace fossils, mostly burrows, in some units.

- 2.7 Upstream of Laidmore Road the boundary between the Cretaceous and Tertiary periods (K-T boundary) can be viewed. The K–T boundary is a geological signature, usually a thin band, dated to (65.5 ± 0.3) million years ago. The boundary marks the end of the Mesozoic era and the beginning of the Cenozoic era and is associated with the Cretaceous–Tertiary extinction event, a mass extinction that included the end of the dinosaurs. The site on the Waipara River is one of a few places in the world where the K-T boundary is exposed.
- 2.8 In general terms, non-avian dinosaur fossils are only found below the K–T boundary, indicating that non-avian dinosaurs became extinct immediately before, or during the event. Scientists theorize that the K–T extinctions were caused by one or more catastrophic events, such as massive asteroid impacts (like the Chicxulub impact), or increased volcanic activity. Other researchers believe the extinction was more gradual, resulting from slower changes in sea level or climate.
- 2.9 The historical importance of these sites is recognised in the New Zealand Geopreservation Inventory. The Geopreservation Inventory aims to list the best examples of the wide diversity of natural and physical features and processes that characterise each part of New Zealand and document their complex geological / geomorphological history. For each site the inventory gives: an outline of the site’s significance; brief geological, landform and locality descriptions; an assessment of the site’s importance and vulnerability to human activity; the site’s known reserve status; published references and contacts.
- 2.10 The Geopreservation Inventory includes five sites in the Waipara River. These sites are also recognised in the Hurunui District Plan as Significant Natural Areas as follows:

Site	Map	Name	Description	Importance	Vulnerability
G30	3	Double Corner shellbeds	Diverse waiuan molluscs of Miocene origin in riverbanks and hillside	C	3
G31	3	Euscalpellum locality	Unique occurrence of abundant “barnacle” stalks of international interest	A	3
G34	3,6	Waipara River Cretaceous-Palaeocene sequence	One of the most complete and well exposed sequences in New Zealand	A	3
G35	3	Waipara River Cretaceous “saurian beds”	The most prolific late cretaceous marine reptile locality in New Zealand	A	2
G36	3	Waipara River plio-pleistocene land molluscs	Unique pre-hawera land molluscs		
G40	2,4	Greenwood	Best of very few late		

		formation Pliocene fauna	Pliocene shallow- water faunal localities in North Canterbury	C	3
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2.11 The Geopreservation Inventory classifies the importance and vulnerability of each site as shown in the table above. The Classification code assessments for these follow:

Importance:

A = site of international scientific importance

B = site of national scientific, educational or aesthetic importance

C = site of regional scientific, educational or aesthetic importance

Vulnerability:

1 = highly vulnerable to complete destruction or major modification by humans [i.e. small and/or fragile, could be destroyed by geological hammer]

2 = moderately vulnerable to modification by humans [i.e. could be destroyed by a bulldozer]

3 = unlikely to be damaged by humans [i.e. large or robust, not destroyed by either of the above]

4 = could be improved by human activity [e.g. weed spraying on or around the feature]

2.12 As such, three of the sites are identified as being of international scientific importance with the vulnerability of one of these sites being moderately vulnerable to modification by humans.

2.13 Given the international significance of these sites the Working Party may want to consider whether the current level of protection of these sites is sufficient.

2.14 As noted above, these sites are identified in the Hurunui District Plan as Significant Natural Areas. Section A7 of the District Plan sets out rules and standards for the protection of Significant Natural Areas. Rule A7.2.2 of the District Plan states that, *'No feature, tree, or vegetation in an areas listed in the Schedule of Significant Natural Areas shall be damaged, removed or destroyed, except for exotic vegetation.* This means that any person wishing to remove, damage or destroy any of the geological features requires resource consent to do so.

2.15 There are a couple of issues associated with this requirement. Firstly the District Plan rule would seem to be ineffective. These Significant Natural Areas are generally readily accessible to scientists, amateur collectors and the public in general who over the years have collected numerous fossils without applying for resource consent to do so. This may be because people are unaware that a resource consent is required and also that enforcement of the rule is difficult. The provision of some form of education or information for the public could be beneficial in this respect. The Working Party may wish to consider this when discussing the signage requirements for the river.

2.16 Secondly, another flaw with identifying specific sites in the District Plan is that there is still a large amount of research being undertaken in the river and there could be significant geological information that is yet to be discovered.

2.17 If the Working Party was of the view that greater protection of these sites was appropriate, the three principle pieces of legislation that are used to establish reserves

and covenants that protect various aspects of New Zealand's earth science heritage are:

- 2.18 The **Reserves Act 1977** provides 'for the preservation and management for the benefit and enjoyment of the public, areas of New Zealand possessing ... natural, scenic,...geological, scientific, educational .... features of value; ensuring ... the preservation of representative samples of all classes of natural ecosystems and landscape which in their aggregate originally gave New Zealand its own recognisable character.'
- 2.19 The **National Parks Act 1980** provides "for the preservation in perpetuity ... areas of New Zealand that contain scenery of such distinctive value, ... and natural features so beautiful, unique or scientifically important that their preservation is in the national interest".
- 2.20 The **Queen Elizabeth II National Trust Act 1977** encourages and promotes the provision, protection and enhancement of open space for the benefit and enjoyment of the people of New Zealand. Open space includes any area "... that serves to preserve ... landscape of aesthetic, ... scenic or scientific .. interest or value."
- 2.21 In considering what level of protection is appropriate for the geological features in the Waipara River, the Working Party needs to bear in mind that many of the geologically significant sites may be located on parts of the river that are subject to AMF rights and as such may come under private ownership. In addition, if a greater level of protection was imposed, then this may restrict or even prohibit scientists and amateur enthusiasts from further exploration of the area. This level of protection would potentially limit any further information on New Zealand's natural history being discovered or exposed.
- 2.22 In considering what level of protection would be appropriate, the Working Party needs to consider what the main threats to these sites are. The main threats in the Waipara River would appear to be from fossicking and visitor and vehicle damage.
- 2.23 With respect to fossicking, rare fossils and natural artefacts may be vulnerable to over-collecting by scientists, rock hunters and the general public. Some specimens should be deposited in museums where they can be studied in detail and interpreted in displays for the public's benefit, but in many instances they are best left in the rocks so information about their settings can also be obtained.
- 2.24 Fossil sites and many smaller scale features can not withstand the impact of human activities. Many of the fossilised beds are located on the banks and under the bed of the Waipara River. As such, they are particularly vulnerable to crushing and damage from motorised vehicles in these areas. The Working Party may like to consider whether a ban on vehicles in the more geologically sensitive areas is appropriate.
- 2.25 However, in terms of access, many of the discoveries in the river have been made by interested amateurs who generally treat the area with respect. If vehicles were to be banned from the river, access through private property might be difficult to obtain and would be subject to the permission of the owner of the land.

## RECOMMENDATION ONE

THAT MOTOR VEHICLES ARE BANNED FROM THE WAIPARA RIVER IN THE AREA BETWEEN WHITE GORGE AND DOCTORS GORGE.

### 3 ECOLOGICAL VALUES / BIODIVERSITY

- 3.1 The Waipara River and its tributaries support a variety of life forms and ecosystems, including terrestrial plants and animals, birds, aquatic plants, aquatic macroinvertebrates, and fish.
- 3.2 Indigenous vegetation is limited along the Waipara River and its lower tributaries (Weka Creek, Omihi Stream), although three threatened species are present: *Isolepis basilaris* (in serious decline, in the upper catchment), *Muehlenbeckia astonii* (nationally vulnerable, in the lower catchment), and *Myosurus minimum* (nationally endangered, in the lower catchment).
- 3.3 In general, the banks and berms of watercourses have been invaded extensively by exotic vegetation. This includes introduced grasses and other low vegetation, shrubs (gorse, broom), and trees (predominantly willows). Many of the dominant plants are spread very effectively by flowing water. Land management practices have the predominant impact on terrestrial vegetation in the river corridor although water resources management and river works also have an impact.
- 3.4 Terrestrial animals such as possums, cats, mustelids, rodents and livestock are rarely referred to in discussions of river management, and there is negligible information on the numbers of terrestrial animals, feral or domestic, in the riparian corridor and deg of the Waipara River. There appears to be no information to indicate that the Waipara River provides significant habitat for native fauna having conservation value.
- 3.5 With respect to birds, an assessment by O'Donnell (2000) ranked the Waipara River mouth as being of national to international significance for threatened species. The significance of the river mouth on bird habitat has previously been discussed in terms of Working Paper 3. While there have been a number of bird surveys at the river mouth and lower Waipara River, there would appear to be less information on the middle and upper reaches of the river.
- 3.6 A report prepared for Environment Canterbury by Mosley in 2003, notes that aquatic plants, together with plant material falling into the channel from riparian vegetation, provide the basis of the aquatic food chain. No survey or research results regarding aquatic plant life are available for the Waipara River.
- 3.7 With respect to aquatic macro-invertebrates, Environment Canterbury has undertaken a number of surveys of the river and notes that the species found in the Waipara River are characteristic of Canterbury braided rivers. Mosley (2203) notes that the invertebrate community and habitat are graded as generally only poor to fair, with a tendency for the upstream sampling stations to receive higher gradings. Research in Canterbury braided rivers indicates that aquatic macro-invertebrate densities are closely related to the occurrence of flows able to disturb the bed and the duration of low flows during which aquatic fauna can re-establish.
- 3.8 A survey of 17 sites in the Waipara River undertaken by Richardson and Jowett (1994) identified eight native species, plus brown trout in the river. The native species included: upland bully, bluegill bully, torrentfish, shortfin eel, longfin eel, common bully, black flounder and common river galaxias. More recent surveys have also found a lamprey and koaro. Of the native species, long finned eels are in gradual decline nationally.
- 3.9 Overall the Waipara River does not appear to be a distinctive or significant habitat for indigenous fish species as the species present are typical of those in other Canterbury gravel-bedded rivers.

- 3.10 The Department of Conservation undertakes ecological surveys of two rivers within Canterbury every year. The Waipara River has not previously been surveyed by DOC and as such all the information available to date has been provided from reports prepared for Environment Canterbury and individual research undertaken by university students. As such, it would be useful if the river was surveyed in terms of providing a complete and current picture of the ecological values in the river.
- 3.11 In terms of ecosystems, the limestone in the Waipara River has unique ecosystems due to the calcium rich, high pH environment. The micro habitats in the limestone have led to the evolution of limestone obligate species.
- 3.12 Many of these species found in limestone around Canterbury are nationally rare and threatened with extinction. More than 20% of Canterbury's threatened flora occurs in limestone ecosystems.
- 3.13 Many of these limestone ecosystems have been found to be highly modified and few retain outstanding values of regional significance. Few of these sites have protection within public conservation lands. A small number of freehold sites have protective covenants.
- 3.14 The Mount Brown limestone has been found to be home to a very rare limestone gentian (variety of mountain plant) *Gentianella calcis subsp. Waipara*. The population numbers are significant and DOC is monitoring the population to assess the impacts of weed invasion.
- 3.15 DOC is currently reviewing the Canterbury Conservation Management Plan (CMS). A section on Canterbury Limestone has been included in the initial consultation draft. The CMS is a 10 year regional strategy that provides an overview of conservation issues and gives direction for the management of public conservation land and waters, and species for which DOC has responsibility.
- 3.16 DOC is currently consulting on the document and is keen to see communities take ownership of limestone areas. The Working Party may wish to consider making comment on the initial draft and submitting to the consultation document, which should be expected out sometime early next year.

## RECOMMENDATION TWO

THAT THE WORKING PARTY RECOMMENDS THAT THE DEPARTMENT OF CONSERVATION UNDERTAKE AN ECOLOGICAL SURVEY OF WAIPARA RIVER WITHIN THE NEXT YEAR.

## 4 CULTURAL VALUES

- 4.1 Firstly it is important to understand what is meant by cultural values. There are a number of definitions and understandings of what is meant by cultural values. In general terms, cultural values are considered to be 'commonly held values by a society'.
- 4.2 In New Zealand there are a number of common values that we hold as a society. For example nearly all New Zealanders value the ability to have access to rivers and the coast for recreational activities.

- 4.3 In New Zealand we also have specific cultural values relating to those held by Māori. These cultural values have been passed down through generations. The cultural values of Māori and the cultural values of New Zealanders in general are not necessarily inconsistent although there needs to be some consideration of how different value sets can coexist without conflict arising.
- 4.4 The cultural values of Māori should be considered when developing a strategy for the Waipara River as Māori have long had a connection to the river. This is reflected in the statutory acknowledgement to Ngāi Tahu in the Ngāi Tahu deed of settlement. Historically, a number of iwi (tribe) and hapū (sub tribe) have occupied the river, travelled across it as part of trading routes, and used the river for mahinga kai (food gathering).
- 4.5 Māori iwi and hapū that have a historical affiliation to the river include Ngāti Wairangi, Ngāti Māmoē, Ngāi Tahu, and Ngāti Kurī. All these groups now make up what is known as Ngāi Tahu Whānui (all those who affiliate to Ngāi Tahu).
- 4.6 There are a number of urupā (burial sites), waahi tapu (places of particular significance to local Māori that hold an element of sacredness due to a certain event), waahi taonga (culturally, spiritually, physically and historically significant items) and mahinga kai areas. Many of these sites are protected by their secret location although some sites have been identified in the District Plan.
- 4.7 The following sites are identified in the District Plan in Appendix A8.2 – Schedule of recorded archaeological features.

**Features of special value to iwi**

No.	Map	NZAA	Description
A2	2	N34/1	Pa with middens, pre-historic / Maori site
A5	2	N34/2	Midden(s), oven(s) & pit(s), pre-historic / Maori site
A37	2	N34/6	Pit(s), pre-historic / Maori site
A22	2	N34/10	Oven(s) / middens(s), pre-historic / Maori site
A23	2	N34/11	Oven(s) / middens(s), pre-historic / Maori site

- 4.8 Te Tiriti o Waitangi (Treaty of Waitangi) also recognises the importance of the different cultural values coexisting together. Te Tiriti was an agreement between the Crown and Māori to share the land and it is inferred that through this there would be a sharing of cultures.
- 4.9 Under the Ngāi Tahu Deed of Settlement (the deed) a statutory acknowledgement for the Waipara River was given. This means that the Council must forward all relevant resource consents to Ngāi Tahu and that the Historic Places Trust or the Environment Court must have regard for the statutory acknowledgement, to empower officials to enter into a deed of recognition and to give Ngāi Tahu Whānui proof of their long affiliation with the river.
- 4.10 The statutory acknowledgement does not affect any exercise of power under a statute, regulation or bylaw and the acknowledgement does not affect any decisions or recommendations made under a statute, regulation or bylaw. For example if someone who identified as Ngāi Tahu was found to be dumping rubbish in the river bed they would be fined or prosecuted in the same manner as someone who did not identify.

4.11 It also does not affect the lawful rights of any person not party to the deed, i.e. it does not affect AMF rights.

4.12 The deed sets out the cultural affiliation that Ngāi Tahu have with the Waipara River. It states that:

*“The river and associated coastline was a significant mahinga kai, with kai moana [sea food], particularly paua, being taken at the mouth. The tūpuna had considerable knowledge of whakapapa [genealogy], traditional trails and turanga waka [places for gathering food and taonga], ways in which to use the resources of the river, the relationship of people with the river and their dependence on it and tikanga [customs] for the proper and sustainable utilisation of resources. All of these values remain important to Ngāi Tahu today.”*

4.13 The values listed in the deed of settlement are not that different from the values that have been identified as being important through the Working Party process. It is worth noting that while the values are the same the practices can vary slightly as traditionally Māori had different ways of doing things.

4.14 Māori were known to be quite spiritual and believed that all elements of the natural environment have a mauri (life force). This is noted in the deed:

*“The mauri of the Waipara River represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāi Tahu Whānui with the river.”*

4.15 It is therefore important that the Working Party consider the values that Tāngata Whenua place on the resources in the Waipara River and that the significance of the river in Ngāi Tahu’s history is respected.

### RECOMMENDATION THREE

THAT THE WORKING PARTY RECOGNISES THE VALUES THAT TĀNGATA WHENUA PLACE ON THE RESOURCES IN THE WAIPARA RIVER AND THE SIGNIFICANCE OF THE RIVER IN NGĀI TAHU’S HISTORY IS RESPECTED.