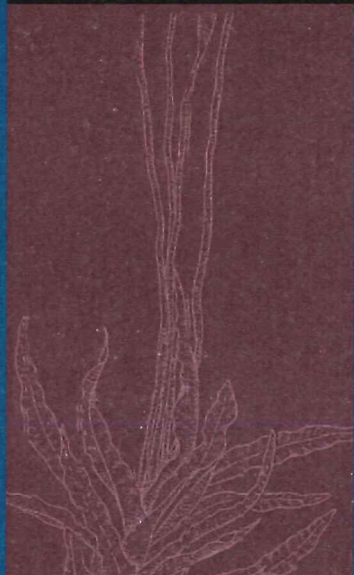




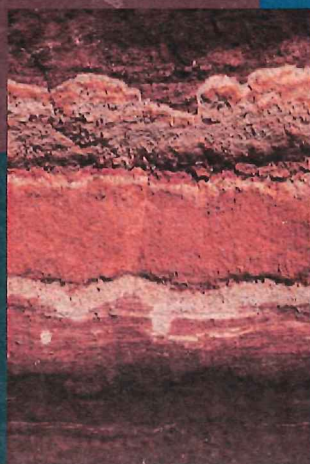
Tiaki Para

A Study of Ngāi Tahu Values and Issues Regarding Waste



Craig Pauling

Jamie Ataria



Landcare Research Science Series No. 39



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Whenua
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*Manaaki Whenua - Landcare Research
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Te Rārangi Take / Contents

Te Whakarāpopototanga / Summary	v
Ngā Mihi / Acknowledgements.....	vii
1. Te Kōrero Whakataki / Introduction	1
2. Tāhuhu Kōrero / Background.....	1
Waste to Resources research programme	2
3. Ngā Take / Objectives.....	3
4. Te Whakaritenga / Methods.....	3
Collaborative approach.....	3
Literature review	3
Ngāi Tahu survey.....	4
5. Ngā Hua / Results.....	6
Literature review	6
Interviews	10
Tiaki Para survey results	11
6. Te Whakamutunga / Discussion and Conclusion	19
7. Te Ara Whakamua / Recommendations.....	20
Pātaka Kupu / Glossary	21
Tohutoro / References	23
Appendix 1. Tiaki Para Survey questionnaire.....	25
Appendix 2. Tiaki Para interview schedule and consent form.....	29
Appendix 3. Tiaki Para Survey information pack.....	31

Te Whakarāpopototanga / Summary

Project and Client

This report was written as partial fulfilment of Objective 2 (Māori Partnerships for Evaluating Sustainability) of the Foundation for Research, Science and Technology programme Waste to Resource (C04X0301) and supported by the Landcare Research Capability Fund (2004–2006). It outlines the results of a study undertaken to understand and document both traditional and contemporary Māori views and values, from a Ngāi Tahu perspective, on the management of human waste and, more specifically, the reuse of municipal biosolids.

The report gives background to the research project, the methodology employed to collect the data, and the findings and results from the study. The discussion focuses on the principal cultural values and issues relating to waste management and their applicability and importance to current and future waste management practice in New Zealand.

Objectives

- Investigate Ngāi Tahu environmental and cultural values within a sustainable waste management framework, using interviews and surveys as well as literature from Ngāi Tahu and other iwi.
- Characterise Ngāi Tahu preferences regarding waste treatment, disposal, and application to land and water.
- Identify Ngāi Tahu specific solutions and recommendations for future management.

Methods

- A literature review of documents and data sources – such as library and Web-based searches, tribal and personal archives, as well as relevant legal and resource-management-related databases – was undertaken to collate information on traditional beliefs and practices and contemporary issues and perspectives relating to waste and waste management, primarily of Ngāi Tahu, although information pertaining to other iwi was included where available.
- A postal survey was developed to gather Ngāi Tahu specific knowledge and perspectives on traditional beliefs and practices, contemporary issues and perspectives, and potential solutions and alternatives. Three hundred randomly selected tribal members over 18 years of age and registered with the Ngāi Tahu Whakapapa Unit were sent a questionnaire to complete and return. The survey was also sent to 218 people from the Kaupapa Taiao Natural Resource Management Contacts Database, who had different levels of knowledge and experience of resource management issues.
- Interviews were open to all members of Ngāi Tahu. To invite participation a letter was sent to all 18 Ngāi Tahu Papatipu Rūnanga and an article published in the tribal newsletter *Te Pānui Rūnaka*. Rūnanga and individuals who responded to these communications, along with other individuals and rūnanga with known waste management experience, were interviewed. All interviewees were given information sheets prior to their interview, allowed time to discuss and ask questions about the study, and asked to sign consent forms that included choosing the method of recording the interview. Interviews followed an outline of questions, similar to the survey questions, but allowed for discussion on points that were important to the interviewee(s). All interviews were recorded using audio equipment, with the interviews being transcribed and the original recordings held in the tribal archive. All participants were acknowledged with koha (gifts). A total of three individual interviews and five rūnanga group interviews, involving a total of 22 people, were carried out.
- The information gathered from the literature review, interviews and surveys was then analysed to understand major themes, values and issues and these are reported on.

Results

- The key findings of this research reinforce the commonly held concerns by Māori about the direct disposal of wastes to water while also uncovering a diverse range of traditional practices and beliefs, contemporary issues and experiences, and pragmatic alternatives and solutions that challenge current waste management practice.

Conclusions

- A key conclusion relates to the prevailing traditional principle of 'waste separation' and the debate about the reuse and recycling of human wastes.
- Most important, however, is the critical role that Māori see themselves having in developing waste management practices in New Zealand that appropriately reflect the cultural importance placed on maintaining separation between waste streams and the food chain – which is ultimately concerned with human health and well-being.

Recommendations

1. That more research is undertaken both to understand cultural preferences and to design and test solutions for these, particularly around decentralised and individualised sewage systems, that either reuse, use less, or use no water, 'up the pipe' solutions, including greywater separation, and land-based and non-food-related treatment and disposal mediums and systems, including 'quaternary' systems (conventional tertiary systems with an added layer of land-based treatment, including wetlands).
2. That iwi and hapū develop clear policies in relation to waste management issues and include these in their own iwi management plans. These should focus on and be specific to different waste types including: blackwater/human waste, stormwater, greywater, point and non-point agricultural wastes, solid domestic waste, industrial, biological and hazardous wastes – including hospital, crematorium and factory discharges. This should also include an inventory of waste-related consents in the particular takiwā and the time frames when they are coming up for next review to enable a proactive stance to be taken with councils.
3. That design and engineering professionals responsible for the design, development and construction of waste treatment systems take an active interest in understanding and working with iwi and hapū and the alternatives and research being advocated in 1 above.
4. That councils work to involve iwi and hapū in developing regional and district policy as well as resource consents for both new, and in particular, existing systems. This could include assistance with the inventory suggested in 2 above and a dedicated programme of working on these into the future. This could also involve collaborative programmes with leading waste researchers, iwi/hapū and design/engineering professionals to come up with and test alternative solutions.

Ngā Mihi / Acknowledgements

*Tāku hei piripiri, tāku hei mokimoki, tāku hei tawhiri, tāku kati taramea.
E koa ngā mauku o te motu, ka mate a Maruwehea.*

Where the scented ferns abound, the god of stinks is overcome¹

Tēnā rawa atu koutou i ruka i ō tātou tini aitua,
e hikahika mai nā i ruka i kā marae maha puta noa i te motu.
Moe mai, okioki mai. Kei te mihi atu, kei te taki atu.
Rātou ki a rātou, tātou ki a tātou.
Tēnā koutou, tēnā koutou, tēnā koutou katoa.

We would like to acknowledge all those individuals and organisations that gave their time, knowledge and support to the survey, interviews and hui, and all those who were involved in seeing this report to completion.

Nō reira, ngā mihi nunui ki a koutou.

¹ 'Maruwehea was the origin and personification of offensive smells. To overcome the effects of Maruwehea, hapū would plant their umu teretere (landfill) with different types of scented ferns and moss' (Whakataukī, meaning and explanation from Te Wai Puanga 1993, pp. 33–34).

1. Te Kōrero Whakataki / Introduction

For many years Ngāi Tahu, along with several other iwi, has consistently voiced a largely misunderstood and often lone concern for the way waste is managed in New Zealand (Waitangi Tribunal 1977, 1978, 1981, 1985, 1987; Kapea 1994; Puketapu 1997; Leith 2001; Te Taumutu Rūnanga 2003). Much of the concern has focused around the treatment and disposal of human effluent, especially where it is discharged to water, and of the need to protect significant cultural values such as mahinga kai and wāhi tapu. The importance of water and waterways to Māori underpins a broad support for alternative waste management strategies that involve land application. Despite these concerns being widely acknowledged and dealt with through a number of high profile legal disputes, Māori concerns have continued to grow. Many Māori believe that little is being done to understand Māori concerns and that there is a widespread lack of support for changing the current waste management paradigm in favour of more sustainable and alternative solutions that include some form of land treatment or that result in reduced use and degradation of water, and consequently valued mahinga kai resources (Douglas 1984; Patrick 1987; Collow 1990; Tau et al. 1990; Kapea 1994; Kāi Tahu Ki Otago 1995; Goodall 1997; Ihaka et al. 2000; Leith 2001; Te Rūnanga o Ngāi Tahu 2001; Awatere 2003; Te Taumutu Rūnanga 2003).

Tiaki Para is a unique research project that examined existing literature (key texts and policies) on traditional and contemporary views and cultural practices of Māori and waste management. The research has, for the first time, undertaken an extensive survey (postal and interviews) of the views, values and opinions of members of one iwi grouping (Ngāi Tahu) relating to these issues and current waste management practices. This collaborative research study was instigated by Te Rūnanga o Ngāi Tahu, Manaaki Whenua Landcare Research and Scion as part of the Foundation for Research, Science and Technology programme Waste to Resource (W2R). Unique methodological approaches are described from which key cultural values, practices and issues are identified and where these can influence and should influence current and future management practice for human waste in New Zealand.

2. Tāhuhu Kōrero / Background

Māori cultural practices about the treatment and disposal of human effluent and other waste practices accompanied the early migrations of Māori to Aotearoa me Te Waipounamu and were subsequently adapted for life here. However, post-colonisation almost all of the traditional practices pertaining to management of waste were supplanted by 'modern technology', practices and ethics that continue to dominate waste management in New Zealand today. It has only been in the past 20 years that a 'mainstream' awareness of Māori concerns relating to the management of human effluent and other wastes has developed – often in response to legal proceedings taken by Māori against both central government and local territorial authorities. The Waitangi Tribunal first gave Māori an opportunity to challenge some of the practices they had long had concerns with, and this has continued until the present, being a major issue dealt with by iwi and hapū under the Resource Management Act 1991 (RMA).

The majority of early Waitangi Tribunal claims, including Wai 3 on the proposed sewage discharge at Welcome Bay (1977), Wai 4 on the Kaituna River Claim (1978) and Wai 6 on the Motunui-Waitara Claim (1981) were concerned with sewage schemes proposed by local and central government agencies to discharge human effluent into waterways. These claims highlighted widespread concerns Māori had about the implications that these discharges might have on the health of mahinga kai resources and the people that depended on these natural resources for spiritual and physical sustenance. Māori opposition to similar schemes continued under the RMA, where iwi and hapū around the country argued for alternative treatment and disposal options, including the discharge of effluent to land, which were largely designed to protect their mahinga kai values and interests.

These cases were successful in achieving changes to sewage schemes and set a precedent that was followed at a number of locations around the country while also gaining support from the wider community and effecting philosophical shifts of the councils involved (Ministry for the Environment (MfE) 2002). However, little work has been done nationally to better understand the basis of Māori concerns and even less effort has been expended to involve or incorporate Māori issues and knowledge into management in any meaningful way. This is against a backdrop of growing concerns and interest in waste management amongst Māori – particularly where new technologies and issues arise that challenge long-held cultural values, practices and beliefs, best highlighted by the Living Earth Biosolids case in 1998 (see pp. 19–20 for a fuller description).

The New Zealand Waste Strategy, developed by the Ministry for the Environment in 2002, clearly demonstrated the need for more research into Māori cultural values and issues in relation to waste management. The strategy outlined a number of challenges for the way waste is dealt with in New Zealand and in particular included targets to significantly reduce the amount of organic wastes, including biosolids (treated sewage or sewage sludge that is derived from a sewage treatment plant), going to landfill. This strategy proposed and advocated new and novel solutions for recycling and reusing these materials, including biosolids composting, without however having a body of research that has investigated the implications of such solutions on environmental, economic, social, and in particular, cultural values. Moreover, the strategy is self-evident of this, stating: 'The Living Earth Company is also addressing Maori [sic] concerns about using human wastes on land for growing food. The debate goes on, and illustrates the complex issues that will arise as we separate our waste streams' (MfE 2002, p. 24).

The need for robust debate around the cultural implications of any strategy for waste management, especially human waste management, is critical. The release of the *Guidelines for the safe application of biosolids to land in New Zealand* (NZWWA 2003) is an example of a lost opportunity to incorporate Māori cultural values in a document that has been developed to 'identify the risks associated with biosolids use and promote best practice for minimising such risks'. Further, it is likely that this guideline document will be incorporated into the future development of national environmental standards for the application of biosolids to land under the RMA and so represents a substantial loss to get values and issues recognised early in this process.

Waste to Resources research programme

The absence of any significant Māori involvement in research, management and policy development relating to waste management in New Zealand was a key feature that Scion and Manaaki Whenua (Landcare Research) wanted to address during the development of the national research programme called Waste to Resource. The programme aimed to explore a range of waste management options and solutions to find the ones that were the most economically feasible, environmentally sound, and culturally and socially acceptable. The approach included examining the risks and benefits of new and emerging technologies, initiating research and technology transfer partnerships with Māori, and developing a more informed decision-making process with regards to sustainable waste management. The programme was subsequently funded by the Foundation for Research, Science and Technology for 6 years and included work across four key objective areas including a major cultural objective (Māori Partnerships for Evaluating Sustainability).

The Māori Partnerships for Evaluating Sustainability objective aimed to identify and investigate traditional beliefs and practices, contemporary views, values, issues and preferences and methods for increasing input of Māori values into waste management. It was through a unique collaborative partnership between Te Rūnanga o Ngāi Tahu, Manaaki Whenua and Scion that the Tiaki Para research study, described in this report, was developed and implemented.

3. Ngā Take / Objectives

To provide the first detailed account of traditional and contemporary Māori views and values, from a Ngāi Tahu perspective, on human waste and the land application of municipal biosolids, by:

- Investigating Ngāi Tahu environmental and cultural values within a sustainable waste management framework using interviews and surveys as well as literature from Ngāi Tahu and other iwi
- Characterising Ngāi Tahu preferences regarding waste treatment, disposal and application to land and water
- Identifying Ngāi Tahu specific solutions and recommendations for future management

4. Te Whakaritenga / Methods

Collaborative approach

During the concept development stage of the Waste to Resource programme, Manaaki Whenua and Scion identified that, in order to achieve the milestone in the cultural objective within W2R, participatory action research methods (Allen et al. 2002a, b) would be required to engage effectively with key iwi partners so that iwi-held knowledge, expertise, views and willingness to be involved could be accessed. However, iwi capacity to become involved is often a significant barrier.

Ngāi Tahu has a longstanding relationship with Manaaki Whenua at both the level of collaborative projects and personal relationships between staff and tribal members. This level of familiarity and the proactive stance that Ngāi Tahu has adopted on environmental kaupapa (issues) initiated an approach in 2004 to the Kaupapa Taiao Unit of Te Rūnanga o Ngāi Tahu. At that first meeting, Ngāi Tahu clearly indicated their interest in the research because it strongly aligned to a number of priorities for the iwi. However, there was a preference expressed for one of their 'own' actually undertaking the research because of the benefits they felt this would have for the work. With this in mind, Manaaki Whenua investigated options to resource a collaborative venture and subsequently secured internal NSOF (Non-Specific Output Funding) funding to support a Ngāi Tahu researcher to become involved in the programme.

Representatives of Ngāi Tahu and Manaaki Whenua developed a job description, which included objectives for what became the Tiaki Para study, and liaison duties between the two organisations. Using the network within Ngāi Tahu a candidate for this position was identified and approached and this led to a secondment position being accepted by an existing Ngāi Tahu staff member. The Ngāi Tahu researcher was then formally welcomed to Manaaki Whenua and subsequently supported to undertake the Tiaki Para research study.

The process outlined above was underpinned by a robust dialogue process from which positive outcomes for all parties could be negotiated. The Ngāi Tahu researcher was a crucial part to this research because he was able to utilise and incorporate his previous work on Ngāi Tahu policy and research, knowledge of Māori waste/natural resource management issues, and networks within the tribe to gain access to information that would have otherwise been difficult to obtain or understand from an outsider's perspective. This led to the naming of the study and the joint development of the actual research methodology employed within the study, which is outlined in the subsections below.

Literature review

A review of different data sources such as library and Web-based searches, Ngāi Tahu tribal and

personal archives, as well as relevant legal and resource-management-related databases was undertaken to source any information on Māori traditional beliefs and practices and contemporary issues and perspectives relating to waste and waste management. A list of modern and historical key words (Māori and English) was developed by searching relevant English and Māori terms using the *Te Reo Tupu Māori Dictionary* (Wordstream Corporation 1998) and then developing a range of search possibilities. These were then used to search current databases and historical texts, manuscripts and te reo Māori resources.

Using existing knowledge of the topic, key texts and the information sources listed above were identified and obtained. Supplementary sources included Māori environmental management literature, research documents, reports and articles as well as potential resource consent submissions, cultural impact reports, hearing evidence, and iwi policy documents and management plans. The review primarily focused on information pertaining to Ngāi Tahu views, but also looked at written material and records sourced from, or written about, other iwi groups.

Ngāi Tahu survey

4.1.1 Postal survey

Another important source of Ngāi Tahu specific information came directly from the people themselves. Survey and interview forms were developed that focused solely on understanding Ngāi Tahu specific knowledge and perspectives on traditional beliefs and practices, contemporary issues and perspectives, and potential solutions and alternatives.

Critical to this process was a phase of information sharing and consultation with tribal members. The expansive geographical spread of the Ngāi Tahu takiwā necessitated this to be carried out through a number of avenues, including a joint letter sent to the 18 Papatipu Rūnanga of Ngāi Tahu, articles in the monthly tribal newsletter *Te Pānui Rūnaka*, and kanohi ki te kanohi (face to face) interactions. Underpinning these approaches was a comprehensive but succinct information document that gave a background and rationale for the research project, the process involved, and an invitation to the recipients to take part through an interview or the survey.

The interview and survey questionnaire was developed in conjunction with social science staff from both Te Rūnanga o Ngāi Tahu and Manaaki Whenua. Firstly, Annabel Ahuriri-Driscoll was consulted about the design and implementation of the Ngāi Tahu Mō Tātou Tribal Census Survey (Ngāi Tahu Development 2004) from which a draft questionnaire was created. This allowed consistency in the way certain questions and the use of response scales were formulated. Secondly, Chrys Horn was consulted to give comment on the draft questionnaire, and provided feedback on the ordering and wording of questions, from which a final questionnaire was developed.

The questionnaire consisted of five parts:

1. General statistical information, such as age, gender, iwi, hapū and rūnanga affiliations, involvement with these organisations, and their normal place of residence
2. Experience with contemporary waste management issues, e.g. resource consents
3. Traditional knowledge held
4. Waste management issues and values
5. Waste management preferences, focusing on treatment, disposal and reuse options for human effluent, including land-based applications

Te Rūnanga o Ngāi Tahu has a whakapapa (genealogy based) membership database, which contains the details of approximately 37,000 tribal members living both within and outside the tribal territory. The information held in the database facilitates regular tribal communications including a monthly newsletter, quarterly magazines, as well as surveys and postal voting forms. A mail-return survey sent to the tribal members was chosen as the most appropriate way to recruit participants and gather data within the study.

A defined survey target population was isolated from the database by working in conjunction with Te Rūnanga o Ngāi Tahu whakapapa staff. This identified just over 22,000 people enrolled with

Te Rūnanga o Ngāi Tahu, aged 18 years and over, with a current known address, and living within New Zealand. This sample was chosen to understand the recent experiences of those who may have had some involvement with a waste management issue within their whānau or hapū, and in a locality that was relevant to the laws and cultural realities of New Zealand.

Using a random number generator, 300 participants were selected from the Te Rūnanga o Ngāi Tahu membership database. The aim of this process was to select a representative sample. The participants were sent an information pack that included a questionnaire, research information sheet, and a covering letter by the researcher (Appendices 1–3). The same packs were also sent to 218 people from the Kaupapa Taiao Natural Resource Management Contacts Database who were known to have some knowledge and experience of resource management issues through their involvement in tribal environmental hui and policy development.

The covering letter and research information sheet clearly stated:

- The goals of the study
- That participation in the study was voluntary
- That consent to participate could be withdrawn at any time without reason

4.1.2 Recorded interviews

Interviews were open to all members of Ngāi Tahu who were notified through the initial letter sent to Papatipu Rūnanga and the article in *Te Pānui Rūnaka*. Six rūnanga and three individuals responded positively to these communications and times were made to meet with and visit them to organise formal interviews. In addition individuals and rūnanga groups were identified and approached for interviews due to their involvement with relevant waste management issues at a hapū and tribal level. A total of three individual interviews and five rūnanga group interviews, involving 22 people, were conducted.

Interviewees were given information sheets prior to their interview, allowed time to discuss and ask questions about the study, and asked to sign consent forms that included choosing the method of recording the interview. Interviews followed an outline of questions, similar to the survey questions, but allowed for discussion on points that were important to the interviewee(s). A copy of the interview outline and consent form is included in Appendix 2. All interviews were recorded using audio equipment, with the interviews being transcribed and the original recordings held in the tribal archive. All participants were acknowledged with koha (gifts), a traditional process for acknowledging each participant's time, contribution and knowledge, which were presented at the end of the interview.

Using a grounded theory approach the information gathered from the literature review, interviews and surveys was analysed to understand and generate major themes, values and issues (Martin & Turner 1986; Allan 2003). From the data collected, the key points were marked with a series of codes, which were extracted from the text. The codes were grouped into demographic (age, gender, place of residence, living situation, Papatipu Rūnanga affiliation); waste management experience (contemporary and traditional knowledge/experience); waste issues (range and importance, waste types of most concern); and management options (preference for current and future treatment and disposal options, post-disposal land use, factors most likely to positively affect treatment and disposal preferences). The results will also be used to inform tribal, local and national policy development in the waste management area as well as being a valuable archival resource of contemporary and historical Ngāi Tahu views and knowledge on this kaupapa. An article is also being planned in the quarterly Ngāi Tahu magazine *Te Karaka*, which will provide feedback to tribal members and the wider community, while conference papers and peer-reviewed articles are planned to generate information transfer amongst the scientific and waste management community. This research also complements hui based on management scenarios and cultural feedback on biosolids treatment and disposal, potable water, and waste water management in Christchurch City, Little River and Kaikōura – which are other components of the wider W2R programme and future research.

5. Ngā Hua / Results

Literature review

The literature review revealed a dearth of recorded information pertaining to traditional practices and beliefs. Similarly there was considerable variation in the level of detail reported. However, the information that was found describes a range of diverse traditional practices and beliefs, as well as wide body of contemporary experience and perspectives, relating to waste management.

The main sources of traditional information came largely from texts written by early historians, explorers or missionaries, such as Elsdon Best and Herries Beattie. Only one major contemporary text, 'Te Whakaari o Takitimu' (Te Wai-Puanga 1993), was found that focused solely on Māori waste management issues and practices, covering both traditional knowledge and contemporary issues. The disperse nature of the information within texts also made locating the relevant information difficult. This paucity of information may be largely due to the nature of the subject material, which would have been a far less august topic to research to early ethnographers and the academic community than other facets of Māori society. Therefore, it is evident that the significance of traditional practices regarding waste management was not appreciated at the time but that it has indeed come to have much greater relevance now.

5.1.1 Kupu Māori (Māori terms)

The literature review discovered a range of both traditional and contemporary kupu or words, phrases, traditions and waiata mentioning waste-related issues, many of which are no longer in common use. A selection of these terms is given below (Table 1).

Table 1. Māori waste-related terminology from the *Te Reo Tupu Māori Dictionary*

English term(s)	Māori term(s)
Waste / To waste	Moumou / Maumau / None / Tootooaa (tōtōa) / Hapa
Rot / Waste away	Horo / Ngongo
Rubbish/Refuse	Para / Parahanga / Ota / Nganga / Kapurangi – (biodegradable)
Food scraps	Paraparahanga / Parakai / Taawhao (Tāwhao)
Landfill/Tip/Midden	Tuakau / Putunga Paru / Umu Aanganga / Umu Teretere
Contaminate	Tāhawahawa
Sanitation	Rerenga Parukore
Septic tank	Kura Paru
Toilet	Wharepaku
Latrine	Paepae Hamuti / Paepae Tiko / Whare-paepae / Paepae Tutae
Cliff-side long drop	Heketua
Urinal	Mianga
Urine/Urinate	Mimi
Faeces	Tutae / Tae / Hamuti / Tiko / Paru / Paranga / Parapara / Hawa / Taa / Kurakura / Roke / Weta / Koraha / Papii
Excrete/Defecate	Tiko / Koraha
Dung	Parakaeto
Smell	Hawahawa / Haunga
Residue	Hoenga

5.1.2 The Paepae

The most interesting term identified through the literature review relates to a word used for the latrine or toilet – *paepae*. This term refers to the actual plank that was sat on and is explained below:

In every pa or village stood the paepae (latrine)... The paepae was placed on the side of a lagoon or creek usually and was common to all. The board to sit on was carved and would accommodate several at once as no shame was felt over nature's actions. A pou-pou or handgrip (whose name he forgot) stood before each sitter to be grasped if required. The place was called whare-paepae, or paepae-tiko, or paepae-tutae (Beattie & Anderson 1994, p. 226).

This differs considerably from both the modern usage of the word paepae and the modern word for toilet – *wharepaku* (literally meaning short house). The term paepae is now more commonly used to refer to the speakers' bench, used during pōwhiri, at marae. The move from using communal latrines to private 'whare' or toilets also demonstrates a major social change for Māori in the way personal human waste was managed, as is evidenced in the following:

A fort or village...had public latrines, called in olden times paepae...Since European influences began to be felt latrines or water closets have been called whare-nohoanga or whare-hamuti (Beattie & Anderson 1994, p. 473).

Best's (1927) records of the paepae are similar, but also mention the different forms paepae took and where they were situated:

The mianga or latrine of a pa was, if possible, situated at some steep place or cliff brow...It consisted merely of a beam attached horizontally to two posts, on which beam persons squatted with their backs to the stockade (p. 66).

The latrines (paepae hamuti) of fortified places were sometimes situated outside the defences. These would be used by the people at all times except when the place was awhitia (embraced, i.e., surrounded) by enemies. When a place was so surrounded the folk sometimes used a paepae koroahu which consisted of a tunnel like hole of shaft sunk inside the pa and perhaps leading out to a cliff or steep bluff. Or the paepae was constructed half way down such a sloping shaft. The natives were, in former times, extremely particular concerning sanitary arrangements (p. 98).

There was also a latrine provided in a pa, usually called the paepae whakairo, or paepae hamuti, also paepae o Whaitiri, etc., with which were concerned some important ceremonies of initiation. A tree projecting out over an out of the way corner of the fortification, or over the edge of the cliff on which the fort stood, was often selected or used as the latrine (p. 142).

Buck (1987) also discussed the paepae and supports Best's suggestion of the care taken in managing the paepae. He notes that they were located carefully 'so that the excreta would fall clear of the occupied parts [of a pā or kāinga, and that they were]...protected by supernatural guardians who would punish with death anyone interfering with the legitimate purposes of the institution' (p. 142).

5.1.3 Traditional practices

The extensive range of words perhaps underlies the degree to which waste management was an important part of traditional Māori society. Historically Māori communities were heavily reliant on healthy natural resources to maintain community well-being and resilience – particularly areas that were central to food and resource harvesting. From this historical dependence and close association with the environment arose a complex system for codifying the environment that was based on growing understanding of a community's local ecosystems and a growing need for sustainable practices – especially in areas that supported sizable communities. From these key environmental ethics also developed a range of processes to modify human behaviour and activity towards the environment, including rāhui, tapu and noa (Marsden & Henare 1992; Mead 2003). These processes were rigidly enforced with respect to human, food and material waste products and evidence suggests that each waste product was dealt with separately and subject to a specific process that depended on the source of the waste (e.g. shellfish middens, human waste, wood shavings from carvings). Evidence of this is given in the following excerpt from Best's work on Māori agriculture (1976):

One striking peculiarity, however, should not be omitted, in which too, I think, they differed from all (other) agricultural races, - their national non-usage of all and every kind of manure; unless, indeed, their fresh annual layers of dry gravel in their kumara plantations may be classed under this head. But their whole inner-man revolted at such a thing: and when the early missionaries first used such substances in their kitchen gardens it was brought against them as a charge of high opprobrium. And even in their own potato planting in after years they would not use anything of the kind, although they saw in the gardens of the missionaries the beneficial effects arising from the use of manure; and, as the potato loves a virgin, or a strongly manured, soil, the Maoris chose rather to prepare fresh ground every year...rather than to use the abominated manure (pp. 135–136).

Firth (1972) provides further evidence of the strict attention Māori paid to dealing with waste stating:

Every village also had its proper sanitary arrangements, in the form of a common latrine near the edge of a cliff or in some retired spot on the outskirts. Cleanliness in such matters was carefully attended to in olden days, as early voyagers have noted. Cook, in fact, contrasted the Maori village favourably with the towns of Southern Europe in this respect (pp. 93–94).

As Firth suggests above, Captain James Cook (in Hawkesworth 1773) praised the waste management practices of Māori in Poverty Bay, stating:

Every house, or every little cluster of three or four houses, was furnished with a privy, so that the ground was everywhere clean. The offals of their food, and other litter, were also piled up in regular dunghills, which probably they made use of at a proper time for manure. In this decent article of civil economy they were beforehand with one of the most considerable nations of Europe, for I am credibly informed, that, till the year 1760, there was no such thing as a privy in Madrid, the metropolis of Spain, though it is plentifully supplied with water. Before that time it was the universal practice to throw the ordure out of the windows, during the night, into the street (pp. 312–313).

Examples of actual practices involved in dealing with wastes and the associated beliefs surrounding particular customs and practices were consistent in the literature. In particular there are many references in relation to the careful and disciplined disposal of human and other biological materials, including hair and nails (Ihaka et al. 2000; Tau et al. 1990; Beattie & Anderson 1994; Beattie & Tikao 1990; Awatere 2003) Also outlined are practices associated with disposing of different food scraps and domestic items as well as related practices regarding the disposal of the dead and other customs involving separation, recycling and reuse. Te Wai-Puanga (1993) states:

Waste management in Pa (fortified) and kainga (unfortified living sites) of Rongomaiwahine/Ngaati Kahungunu was organised so the waste associated with specific activities was handled and disposed of through a complex set of rules. These practices required separate disposal mechanisms and methods for each article. For instance, bodily material was considered and treated separately from the waste associated with food preparation, unconsumed leftovers, mimi and tutae. There was no mixing of mimi and tutae with food scraps, hair or fingernails...Te marere o te toto o whare aitu (menstrual blood) was considered to be extremely hazardous to other people. The material was highly tapu and its disposal was a separate and private matter for women. Amongst some hapu, bone, shell and stone flakes seemed to have been stored together where they could be located for conservation and reuse eg, as needles. Heretaunga pa and the Castle point area are examples of industrial pa where this practice occurred. Shells were also laid on tracks for marking purposes in the same way as cats eyes are used to indicate lanes on modern highways...One of the names for a site containing shells and bone was Te Umu-aanganga. Umu teretere was used to describe green or decomposing waste (p. 73).

In addition to the strictly material health and environmental benefits that these practices sought to maintain, other information exists on the associated belief systems such as the tapu and noa system and their associated management practices which were employed to protect and influence spiritual well-being. Teone Taare Tikao, a renowned Ngāi Tahu leader of 19th century, gave the following account to Herries Beattie of some of the dangers associated with human waste in the past:

Some tohungas were wicked men and destroyed wantonly by makutu (sorcery)...He would watch and take the tohunga's tokotoko (staff) unknown to him and would perhaps rub it in the excrement of that particular man and replace the staff. The tohunga would dirty his hand and angrily curse and say a makutu (imprecation) against the man whose excretion had defiled his stick. Thus he would makutu (bewitch) himself unknowingly, and he had not the power to undo his own curse (Beattie & Tikao 1990, pp. 75–76).

Mead (1998) also discusses the potential dangers of human body wastes for people, outlining that 'excreta was tapu and for health reasons this waste product of the human body needed to be kept as far away as possible from where the villagers cooked their food, ate, talked and slept' (p. 4).

5.1.4 Contemporary views and issues

The literature regarding contemporary experiences and issues in relation to waste management was expansive, and too numerous to be given in much detail here. The literature ranged from specific policy written by iwi or submissions and evidence given in relation to a particular sewage scheme, Waitangi Tribunal claim, resource consent or court proceedings. The majority of examples focus on the protection of mahinga kai values for specific waterways and also serve to demonstrate the commonly held view amongst Māori that the discharge of waste to water is unacceptable and why alternative options, including disposal to land, are willing to be considered by Māori (Waitangi Tribunal 1977, 1978, 1981, 1985, 1987; Douglas 1984; Patrick 1987; Collow 1990; Tau et al. 1990; Kāi Tahu Ki Otago 1995; Goodall 1997; Ihaka et al. 2000; Te Rūnanga o Ngāi Tahu 2001; Awatere 2003; Te Taumutu Rūnanga 2003).

The following excerpt by Jeff Murray of Te Kawerau a Maki (in Kapea 1994) summarises the common view and experience amongst iwi in relation to sewage disposal and management within New Zealand:

Kawerau consider that every waterway has its own mauri (life essence) and that different waters should not be mixed. The mauri of water used to carry waste is seen to have been destroyed and the water maintains its 'toilet bowl' quality even after it has been technically treated. When waste water is put directly into waterways the mauri of the waterway is harmed and possibly destroyed. Therefore, wastewater should not be put into water which is used for food gathering or other purposes. The way in which wastewater can be dealt with in a modern context is to pass it through or across land. In Maori cosmology the land is considered to be the deity Papatuanuku. One of the roles of Papatuanuku is to cleanse. By passing wastewater through or over land its mauri is restored and as it mixes with natural waterways the mauri of the receiving water is not impaired...The construction of the Mangere Treatment Plant destroyed Kawerau's immediate access to fish and shellfish. Kawerau are unsure of the technical quality of the water put into Manukau, however...from a cultural point of view the harbour had the status of a toilet bowl. It should be remembered that at the time the treatment plant was built harvesting food from local sources was central to the Kawerau economy. The significance of these food sources was added to by high levels of unemployment. Shellfish harvesting has continued in the harbour in areas away from the treatment plant. Kawerau have also had to live with the stench that at times comes from the Mangere plant. Therefore, Kawerau involvement with wastewater management has been largely negative.

Aaron Leith of Te Rūnanga o Ngāi Tahu gives similar sentiments in a paper given to the 2001 New Zealand Land Treatment Collective Conference:

Te Rūnanga o Ngāi Tahu's tribal policy opposes the direct discharge of wastewater, including effluent, to waterways. Discharges to land are generally encouraged....Agencies need to be aware that although discharges to water may be within acceptable biological or physical water quality standards, it may not be acceptable from a cultural perspective...It is not a question of the water being within national or international health standards – if water contains wastewater...then the mahinga kai that particular waterway sustains cannot be harvested and eaten.

These issues were again raised in a Cultural Impact Assessment Report for Te Taumutu Rūnanga by Dyanna Jolly on the Rolleston Sewage Upgrade in 2003:

For tangata whenua, water is an essential ingredient of life both physically and spiritually. It is a cultural taonga left by the ancestors for the life sustaining use of their descendants, and thus the descendants have the responsibility to protect it. While the land is able to filter, cleanse and replenish itself when given enough time, the impact on water from contaminants is much more permanent. It is for this reason that sewage must not be directly disposed to water without being treated appropriately by the whenua/land. For Te Taumutu Rūnanga, dilution of pollution through disposal to water is unacceptable...Maintaining the integrity of kai is another cultural value that influences assessments of proposals for sewerage schemes. All human sewage must be kept separate from food preparation, harvesting and processing. This value applies even if the sewage is treated and appears 'clean'. For example, disposal of sewage directly to water is inappropriate, as water is a source of mahinga kai.

The issue of separation between the human food chain and human waste streams was a consistent theme of the literature, as highlighted in the examples above, and was most fully explored within a major Environment Court appeal involving Māori cultural values and the reuse of biosolids, known as the 'Wellington Biosolids Case' or the 'Living Earth Case'.

This appeal was brought by Te Rūnanganui o Taranaki Whānui ki te Upoko o te Ika a Māui Incorporated in 1998 against the Wellington Regional Council, the Wellington City Council and the Living Earth Joint Venture Company over a consent granted by the councils to Living Earth to use municipal biosolids to create compost destined for public retail sale and use amongst the community. Of major concern to Te Rūnanganui was 'the possibility of Maori having to face the prospect of human blood (Toto), body parts and/or remains being used indirectly in the production of food-vegetables and the like for human consumption, especially where the consumer may be unaware of the items purchased' (Puketapu 1997, p. 5). Te Rūnanganui were supported in the appeal by evidence from Sidney (Hirini) Moko Mead (1998) of Ngāti Awa who articulated the concern stating:

The rules of tapu advise Maori to separate the clothes one wears from cloths associated with food such as table cloths and tea-towels. Babies' napkins and cloths associated with menstruation are kept away from food utensils. By extension these rules apply to the separation of sewage which include some human body parts, blood and human materials from mortuaries and hospitals.... This very tapu mixture needs to be separated from the food we eat not only because of its spiritual attributes but also for health reasons. The institution of tapu operates for the well being of people.... Break the rules and immediately people are unsettled in the minds, are fearful of their well being because some very basic beliefs are being transgressed. Blood is tapu. Any part of a deceased person is tapu. Placenta and any part of the afterbirth is tapu. Menstruation blood is tapu. A body part of a living person is tapu. Excreta is tapu... There is no problem with the return of excreta or body parts to Papatūānuku... What is abhorrent is the idea of associating biosolids with the food chain.

While the above comments are consistent with the majority of the literature, the case also featured evidence from Māori that supported the use of biosolids for compost, based on cultural grounds also evident in the literature. In his evidence Morris Te Whiti Love argued:

The land is seen as the medium by which tapu is made noa and so rendered useable again... The proposal to compost the untreated sewage sludge follows the tikanga to render the tapu sludge noa and therefore usable. To complete the process to whakanoa association of the compost with earth is required so that the material would fall into a cycle of fallowing to become earth or papatūānuku. This composting proposal is a close approximation to the natural process and produces a product with which appropriate handling is no longer culturally offensive. I would recommend that if the compost were to be used for food production it should be mixed with active soil and fallowed. If that is not acceptable to Maori they should simply avoid using it (Daya-Winterbottom 1998, 3BRMB, p. 11).

With the support of this latter 'pragmatic view of Māori tikanga' (Gould & Daya-Winterbottom 1999, p. 343) and unrefuted scientific evidence 'that the compost produced from biosolid sludge will contain no significant human material at all' (Gould & Daya-Winterbottom 1999, p. 342) the appeal was dismissed.

This case has highlighted how traditional Māori beliefs and values can be interpreted in different ways and of the difficulty Māori face in defending traditional practices, beliefs and values, particularly in the face of empirical scientific evidence. Such issues continue to create tension and dilemma in resource management process decision making.

Interviews

The interviews conducted within the study reinforced much of the information identified through the literature review process. This included knowledge of traditional practices, including waste separation and the use of paepae, and numerous stories of frustration with local councils regarding seeking better treatment and disposal of sewage. In particular, the interviews highlighted the struggles in dealing with the management of municipal wastewater in the 1980s, and even up to the mid-1990s when the discharge of raw sewage into waterways was a common feature in New Zealand, as was

evidenced in the following statement:

One of the maybe longer term consents has been the effluent ponds round at the beach...some years ago we had a meeting with the council and we pushed to have that changed from being a direct feed out in to...Foveaux Strait or Te Ara a Kewa and we pushed for a trickle down system....As far as I am aware, council have not even honoured the completion of that...so that's an old sore that we still need to keep pressuring them on (Ōraka-Aparima Rūnaka 2005).

The interviews did however unearth a range of experiences in dealing with waste issues at a whānau level, and in particular how it was dealt with in relation to food-gathering activities. The following is an account of experiences and knowledge about digging latrines on the tītī or mutton-bird islands:

I'll never forget...Poua diggin' the hole for the long drop...And he was saying 'you musn't go down into the clay'...that's where it gets dealt with, like, on the top there, you know...and I said, 'well that's a good story, that saves too much work in digging it out!' (laughs) And then just shift it you know, shift the ground. And anyway...I read this article if you go down too far that'll just stay, like it won't, the bacteria aren't down there, they are just on the surface, so ah, god bugger me days the stupid old Maoris that never went to university or any bloody thing – knew that ya put it up there – and here we had a bloody army of guys saying right 'dig it way down there' (laughing) (Awarua Rūnanga 2005).

Other important information gained from the interviews was in relation to preferences for acceptable waste management options. The preferences reinforced traditional values of separation as well as contemporary views for land-based treatment, for example:

...discharge to land, to forestry blocks...the greywater should be separate – 'cause it's got so many chemicals in it (Awarua Rūnanga 2005)

...there are lots of alternatives, but they aren't promoting alternatives such as tax breaks and rates relief for things like composting toilets...and these things could be subsidised or they could make developers pay for them when they develop subdivisions...[these alternatives] can have massive savings in infrastructure over time...We should put it to developers to find on-site alternatives (Te Hapū o Ngāti Wheke 2005)

In one interview it was discovered that the interviewee had actually invented and was selling a greywater separation product that could be either retrofitted to existing homes or built into new homes. The interviewee explained that his system

...saves up to 70% of a household's use by saving the greywater from the laundry, bath and shower, and using it for toilet flushing and garden watering so that high quality drinking water is not wasted...Less water used means less wastewater produced. If people have septic tanks, then the system works even better, it not only fills up slower, but a by-product of the soaps in the greywater helps to keep the septic tank alive (DSII).

These examples highlight the extensive knowledge and experience held amongst Ngāi Tahu tribal members in relation to waste and waste management and the importance of these perspectives for looking at alternatives.

Tiaki Para survey results

5.1.5 Response rate and demographic profile

A total of 82 survey forms were successfully completed from the 518 individuals identified and selected for participation. A further 60 individuals were unable to be contacted as they were either deceased (5) or not at their registered address (55) and so were excluded from the original sample, to give a response rate of 18.1%. A comparison of the respondent's age, gender and geographical location is represented as a percentage of the total survey group and the total number of people registered with the Ngāi Tahu Whakapapa Unit to show the representativeness of the respondent group (Table 2).

The results show a greater percentage of older age groups (50+ years) and small percentage of

younger age groups (39 years and younger) in the both the Tiaki Para sample and respondent groups when compared with the wider Ngāi Tahu population. Of particular note is the high level of response from both the 18–19 and 70+ years' age groups, when compared with the wider sampling frame. Moreover, all older age groups (50+ years) of the respondent group showed higher levels of survey returns compared with the greater sample group. This was supported by a higher average age (50.2 years) and median age (50 years) for the respondent group and supports previous research on surveys that showed that older people are more likely to respond to a survey compared with younger people (Dillman 1978, 1998).

A greater percentage of males responded to the survey compared with females (Table 2), although there were more males in the sample.

Table 2. Age distribution, gender ratio, place of residence and living situation of survey respondents

Age group	% of respondents <i>n</i> = 82	% of sample <i>n</i> = 518	% of sampling frame <i>n</i> = 22,100
18–19 years	2.4	1.0	1.4
20–29 years	9.8	14.0	24.6
30–39 years	9.8	18.0	20.9
40–49 years	22.0	23.0	21.8
50–59 years	24.4	20.0	14.1
60–69 years	17.1	14.0	9.1
70+ years	12.2	9.0	8.2
Missing data	2.4	1.0	0.0
Average age	50.2 years	47.4 years	42.8 years
Median age	50 years	47 years	41 years
Gender	% of respondents	% of sample	
Male	63.4	51.9	
Female	36.6	46.7	
Missing data	n/a	1.4	
Location	% of respondents	% of sample	
Te Ika a Māui	29.3	27.0	
Te Tau Ihu	7.3	5.4	
Te Tai Poutini	3.7	4.6	
Waitaha	36.6	32.2	
Arai te Uru	15.9	14.9	
Murihiku	7.3	15.6	
Missing	n/a	0.2	
Rural	35.4		
Urban	62.2		
Both	2.4		

Overall, there was a consistent response from sub-tribal areas within the Ngāi Tahu rohe (Table 2). However, the Murihiku (Southland) group were under-represented in the respondent group, while the Waitaha (Canterbury) group were over-represented. Responses from outside the rohe (Te Ika a Māui – the North Island and Te Tau Ihu – Nelson/Marlborough) were the second most represented group, indicating that interest in waste management issues is not confined solely to those living in their tribal area. The majority of respondents (62.2%) identified themselves as living in an urban area, while a very small number (2.4%) identified as living in both situations.

5.1.6 Iwi, hapū and rūnanga affiliation and involvement

Although the survey was focused solely on the descendants of Ngāi Tahu whānui, a large percentage of respondents (25.6%) did not list any iwi affiliation. Of those that did list their primary iwi affiliation, the overwhelming majority were of Ngāi Tahu or Kāi Tahu (83.6%), followed by Kāti Mamoe / Ngāti Mamoe (4.9%) or Waitaha (4.9%). An even higher level of respondents listed no hapū affiliation (46.3%). However, for those that did, Kāti Irakehu and Kāti Huirapa were the highest mentioned each with 14.9%. This was followed by Kāti Kuri (11.4%), Ngāi Tūāhuriri (6.8%) and Ngāi Te Ruahikihiki (6.8%). There was much greater awareness of rūnanga affiliation amongst the respondents, with only 7.8% recording that they didn't know their rūnanga and 0.9% recording that they belonged to none of the rūnanga listed. Rūnanga affiliation was well spread amongst participants with only one rūnanga not being represented (Hokonui) and Moeraki (10%) and Ōtākou (9%) recording the highest proportion of responses (Fig. 1).

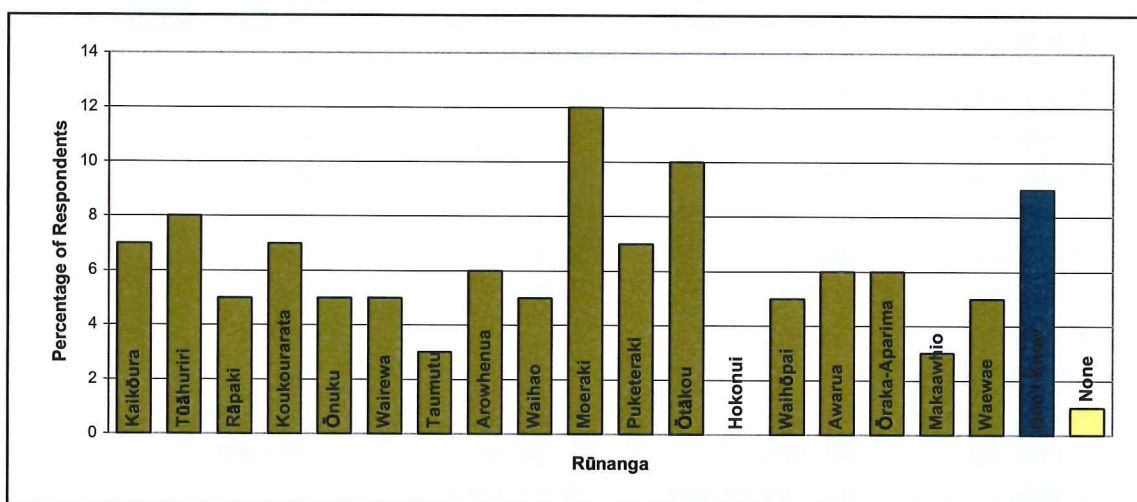


Figure 1. Papatipu Rūnanga affiliation of Tiaki Para survey respondents.

Whether respondents were involved with their rūnanga or not was evenly split. Exactly half (50%) said that they were involved, with just under half (46%) saying they were not, while the remaining 4% of responses were incomplete.

5.1.7 Contemporary experience and traditional knowledge

Two important elements in understanding the cultural values associated with waste management are in relation to the contemporary experience people have had in dealing with waste management issues and whether or not they hold traditional knowledge in relation to the waste management practices of their tīpuna.

Less than half (41%) of the respondents recorded that they had some experience in dealing with waste management issues. Of those that did have some experience, most had considerable experience, with 50% having more than 10 years' experience and only 3% having less than one year's experience. Some 46% of males had some contemporary waste management experience compared with 37% of females. Some 61.8% of respondents with experience were aged 50 years and over (Fig. 2).

All of the respondents who indicated they had some experience gave a comment in relation to the particular details of their experience. Resource consents or work with councils was the most common (18.3%), followed by dealing with sewage treatment/disposal around the home (both 11.7%) and as a tribal/marae representative or trustee (10%). Dealing with marae sewage (6.7%) and the Christchurch estuary sewage discharge consent (6.7%) were also listed.

The amount of respondents having contemporary experience (41%) was closely matched by those holding traditional knowledge in relation to waste management (43%). Similarly, respondents who hold traditional knowledge relating to waste were similar (43% of females compared with 42% of males) even though there were more males (46%) with contemporary experience than females (37%).

(Fig. 3).

As expected a larger amount (65.7%) of those with traditional knowledge were aged 50 years and over. In particular, 70% of those aged 70 and above held traditional knowledge compared with only 31% of those aged between 20 and 39. This serves as a reminder of the importance of involving Ngāi Tahu from this age bracket in dealing with waste management issues.

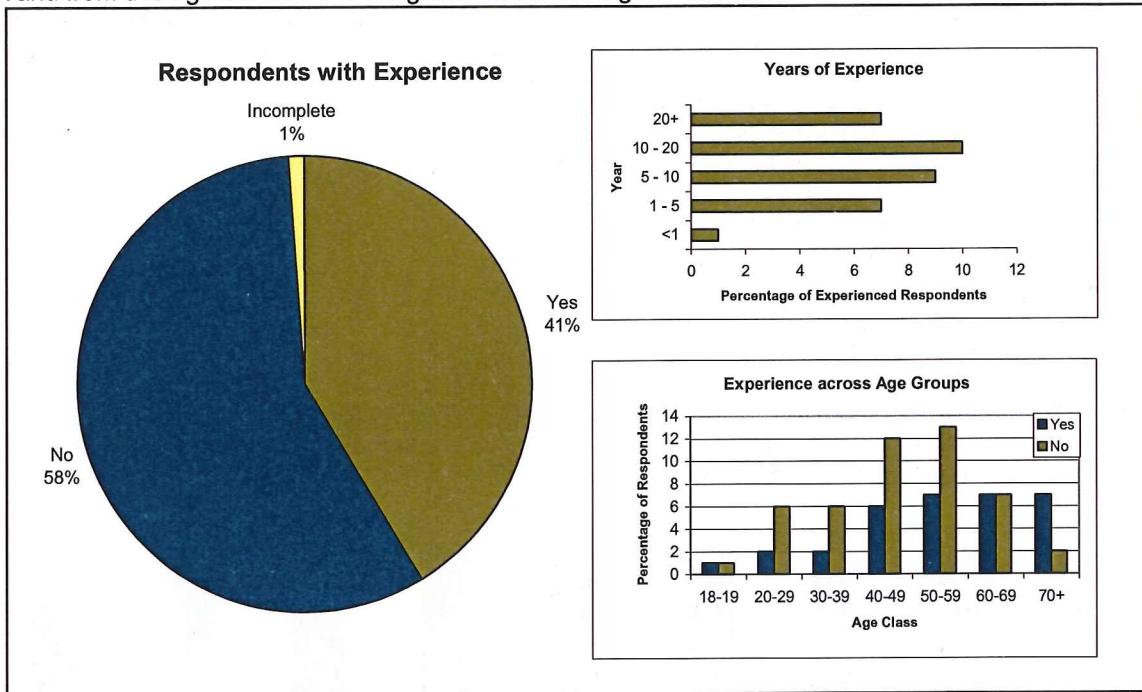


Figure 2. Waste management experience of Tiaki Para survey respondents.

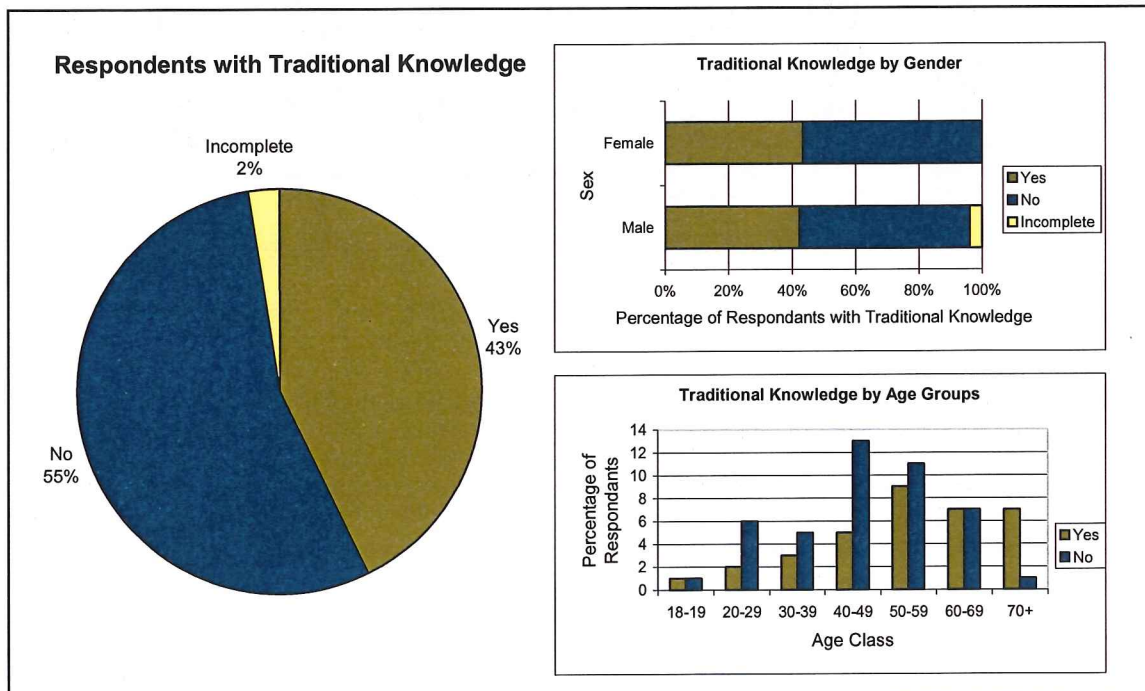


Figure 3. Traditional knowledge of waste practices amongst Tiaki Para survey respondents.

Respondents' comments relating to traditional knowledge covered a broad range of issues and topics (Fig. 3). Dealing with hair and nails, tikanga such as tapu and noa, makutu, or male and female personal hygiene issues, burial and/or use of the land to treat, and waste separation were the most commonly referenced. From these comments two common groupings can be discerned, being either traditional treatment practices (37%) or dealing with specific waste types (36.2%). The separation of wastes, burial and/or using the land, and the use of food scraps for compost on gardens, were the main traditional practices referred to. Burning, recycling and the 'paepae' (traditional toilet system) were also recorded. Specific mention of dealing with hair and nails (14.5%), tutae and mimi (8%), para or food scraps and kaimoana (seafood) dominated the comments in relation to waste types. Many respondents recorded having only general or limited knowledge and most acknowledged that they had learnt these from their poua and/or taua (grandparents).

5.1.8 Major issues and values

Respondents rated environmental pollution or degradation (87%) as the most important issue when dealing with waste management, followed by human health issues (79%), impacts on the abundance of, and access to, mahinga kai (78%), unacceptable/unsuitable treatment and disposal methods (73%) and impact on wāhi tapu/taonga (66%). Overall the level of importance attributed to the issues listed was high, with only a lack of Māori involvement in management of waste occurring below 50% (Fig. 4). Twenty-one comments were received in relation to major issues and values, with the problems surrounding the recognition of traditional or cultural knowledge, education, and costs and funding being major problems identified or commented on.

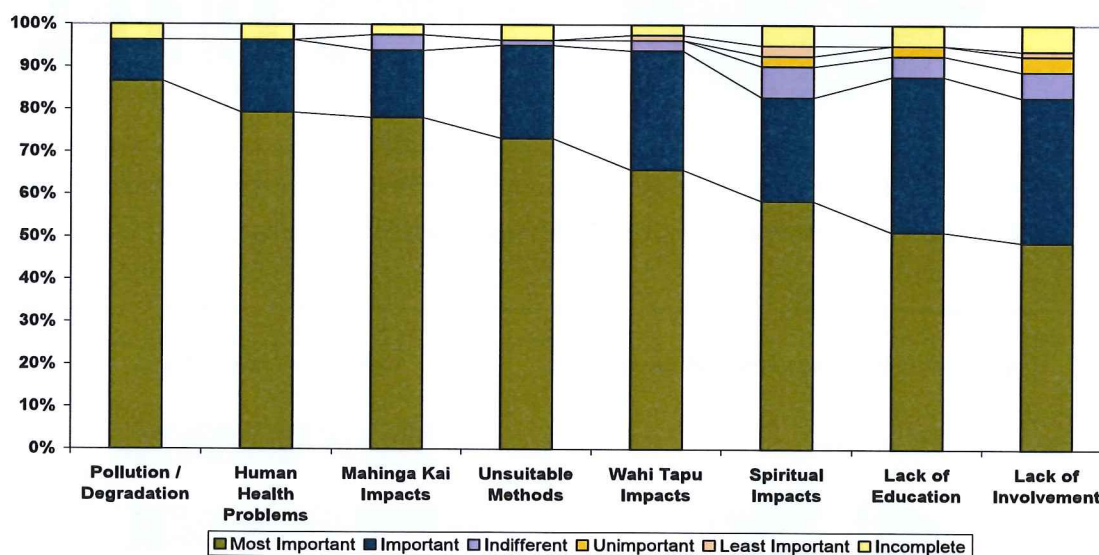


Figure 4. Range and importance of different waste issues to Tiaki Para survey respondents.

Hazardous wastes, such as pesticides, chemicals, radioactive and GMO wastes were rated as the most important waste type or component of waste to deal with to protect cultural values (37.8% of all respondents). This was followed by human effluent (13.4%) and other biological wastes (9.8%). Hazardous wastes were also identified as being of the most concern to people (93%) followed by human effluent (84%), industrial (79%) and biological wastes (72%) (Fig. 5). Interestingly respondents were concerned about all of the waste types, except natural and garden wastes, more than 75% of the time.

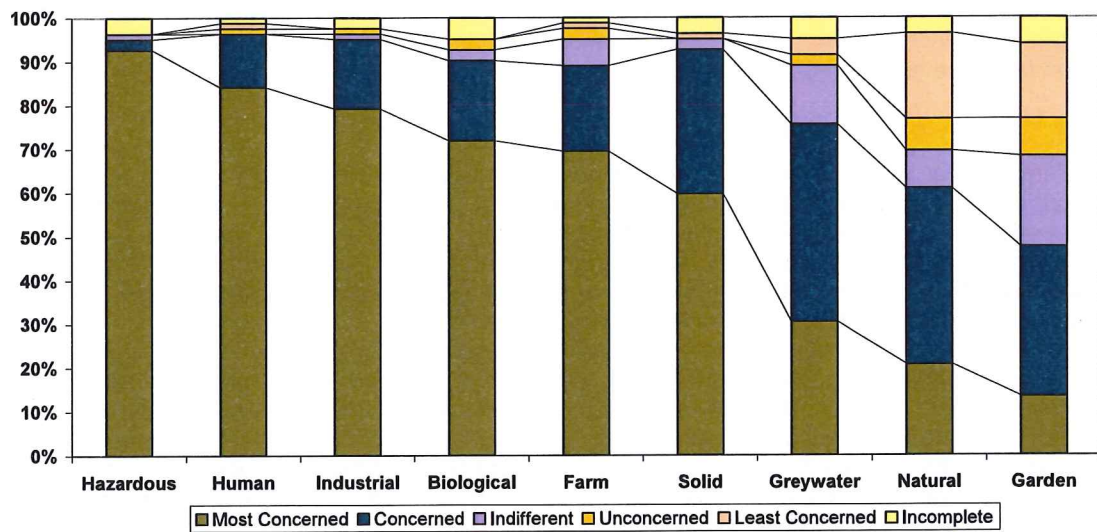


Figure 5. Waste types of most concern to Tiaki Para survey respondents.

5.1.9 Treatment and disposal systems

When asked about treatment and disposal system preferences, there was a difference identified between the treatment and disposal systems people currently use and those they would prefer to use when dealing with human sewage. While the majority of people (63%) were currently using and/or connected to a centralised system (flush toilets connected to a major tertiary treatment plant discharged to water), the respondents indicated that if given a choice they would prefer something different, with individualised systems (long drop, composting toilet, or Oasis/Clearwater system discharged to land) being most favoured. When provided with a choice the preference for centralised systems dropped to only 35% (a net change of -28%), while those preferring individual systems rose from 4% to 28% (a net change of +24%). Furthermore, of those who currently had an individual system only one preferred to change (to a central system) (Fig. 6).

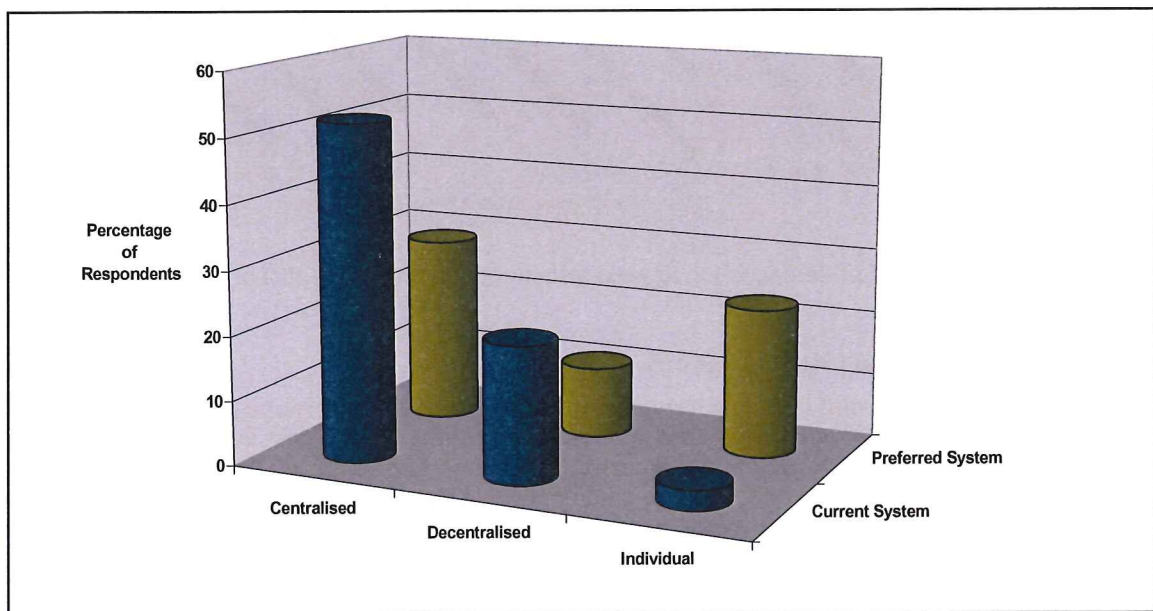


Figure 6. Respondents' preference for current and favoured sewage treatment systems.

A small number of people made comments in relation to this question and suggested further

alternatives to the sewage treatment systems listed. These involved moving towards a centralised system that incorporated some form of land-based treatment and/or disposal method, such as constructed wetlands.

5.1.10 Management options for human effluent

Preferences for sewage treatment and disposal management were interesting as they showed a favouring of alternatives compared with conventional systems (Fig. 7). Not surprisingly, 99% of respondents disapproved of raw effluent being discharged to water. Other options with high levels of disapproval included treated effluent being discharged to freshwater (87%), treated effluent discharged to recreation areas (78%), treated effluent discharged to the marine environment (70%), and treated effluent being applied to food crops (61%).

In contrast, options with the highest levels of approval included waste being used for generating electricity (89%), treated effluent being applied to forestry (58%), treated effluent discharged to wetlands (55%) and treated effluent being used on a non-food crop (49%). There were mixed reactions to the options for the incineration and land-filling of biosolids, as well as to the use of forestry and native forests for sewage application. Incineration had the highest level of indecision with 11% indicating that they didn't know if this option was preferred or not, and with the levels of disapproval (30%) and approval (38%) being evenly spread.

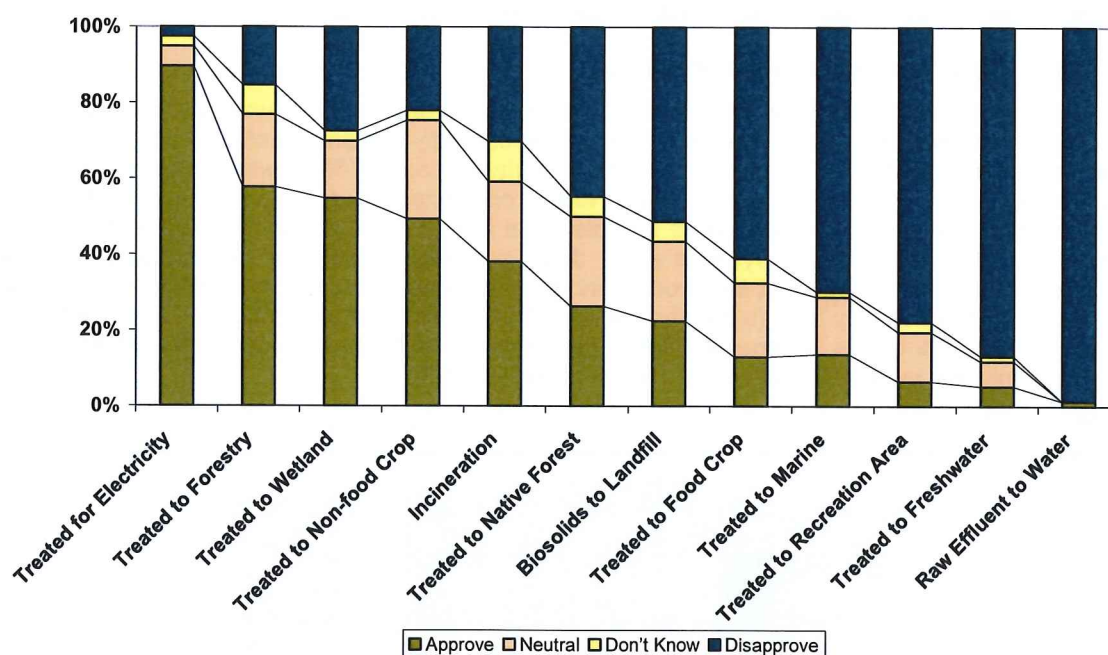


Figure 7. Respondents' preferences for sewage treatment and disposal options.

5.1.11 Post-disposal land use options

This question was included to gain information as to respondent preferences and issues for uses of land following application of human sewage. The purpose here was to gain insight into the range of different management options that could exist for land-based treatment that are more culturally acceptable than others and is based on the commonly held view that Māori tend to favour land-based sewage treatment and disposal options.

The responses highlighted three important management options for future sewage treatment and disposal that may have greater cultural acceptability (Fig. 8). Some 89% of respondents approved of native restoration as an appropriate post-disposal land use or land-based disposal option, followed by 56% approval for harvesting fibre, and 54% who suggested leaving the land to recover.

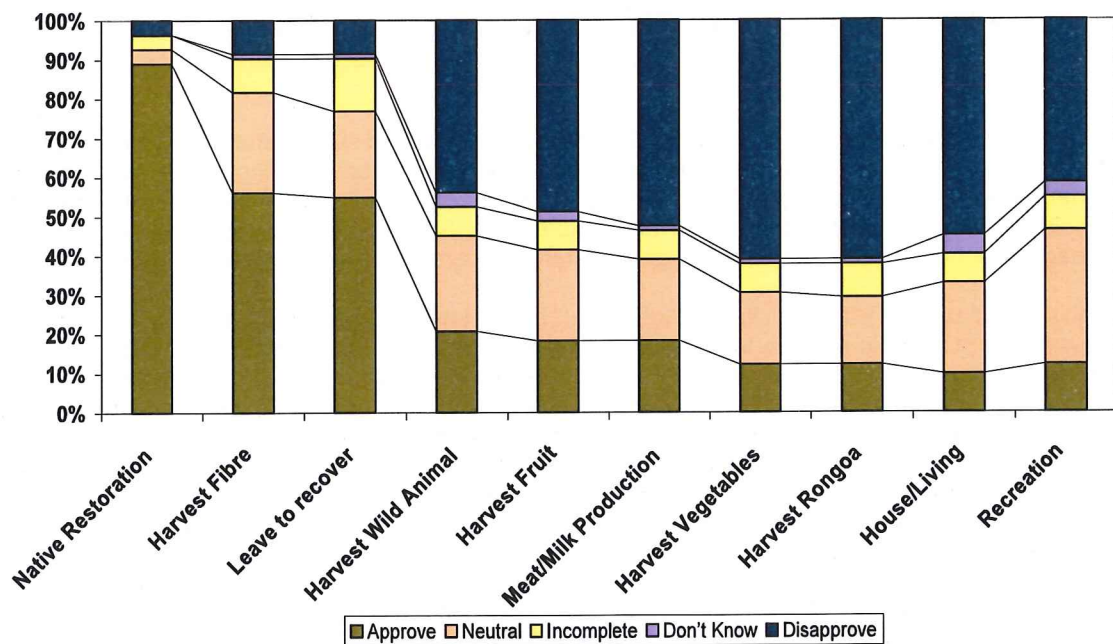


Fig. 8 Respondents' preferences for post-disposal land use.

All of the other options proposed met with widespread disapproval, with harvesting vegetable crops being the most unfavoured (60% disapproved). These unfavoured options involved the growing or gathering of food crops, while recreational uses were also largely unfavoured (41%) presumably because of the potential body contact with waste.

A subsequent question posed to the respondents was included to further clarify the reasons underlying their preference scores in the previous question about acceptable post-disposal land use. It asked whether time, having control of the land area being used, or the fact that the sewage being dealt with was either their own or from their own community, whānau, or marae would make a difference to the way they viewed their preferences. The results were interesting in that 'time' would have the greatest influence, indicating that perhaps time is seen as a 'healer' (Fig. 9).

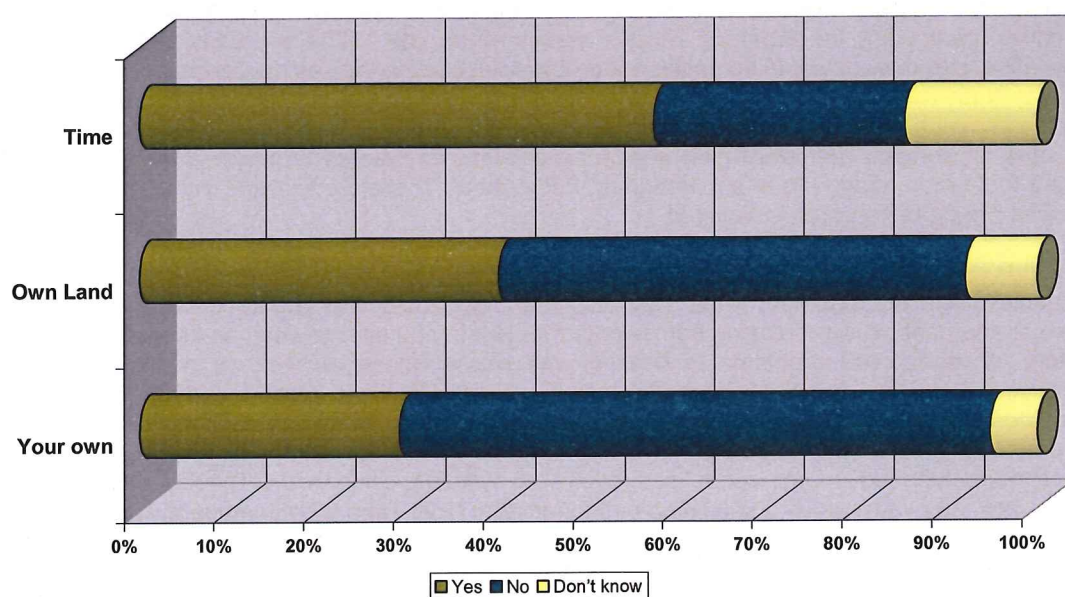


Figure 9. Factors most likely to positively affect treatment and disposal preferences of respondents.

6. Te Whakamutunga / Discussion and Conclusion

The research outlined in this report is the first concerted attempt to survey and document a Ngāi Tahu perspective on traditional and contemporary Māori views and values relating to the management of human waste – and more specifically the reuse of municipal biosolids, including land application. Consistent themes for the key issues and values held by Māori in relation to waste and waste management have been identified through an extensive literature review, interviews and surveys.

Firstly, it is clear that Māori, including Ngāi Tahu, have established cultural traditions and associated customary practices in relation to managing different types of wastes, particularly those associated with the human body. It is also clear that these traditions continue to play a role in contemporary life and have a large influence on the way Māori have consistently responded to and involved themselves in dealing with waste management issues. Cultural beliefs and practices also go some way to explaining the seriousness with which Māori consider waste management issues both traditionally and contemporarily. Best (1927, 1976), Beattie & Anderson (1994), Firth (1972), Buck (1987) and Mead (1998) all give evidence to the meticulous and careful way wastes were dealt with and kept separate from the food chain in pre-European and early contact periods – a practice that featured strongly in Ngāi Tahu tikanga. This Ngāi Tahu view was reinforced by interview and survey data, particularly in relation to the traditional knowledge and contemporary experiences of Ngāi Tahu people as well as the high level of concern held amongst Ngāi Tahu for the majority of waste issues and types. On a national scale the long list of legal cases, typified by the Wellington Biosolids example, provides further evidence supporting the strength of iwi Māori concern regarding the mixing of human waste with the food chain.

Secondly, Māori issues and values associated with waste and waste management are consistent and specific. They focus on maintaining separation between the human food chain and human waste streams, as well as utilising some form of 'natural' treatment system, most often involving land or earth as the treatment medium, including wetlands. Although there is some indication that water was used as a disposal medium in pre-European times, land-based systems were predominant. It must also be considered that during this period Māori had greater control and choice over where waste went and where food was gathered, making it easier to maintain and enforce the separation between the two. Following European contact, Māori systematically lost this control as the settler society grew and waste issues proliferated. The modern abhorrence to the use of water as a treatment or disposal medium has perhaps arisen in response to centralised schemes that resulted in the degradation or complete destruction of food gathering areas, and as a consequence of having little to no involvement of Māori communities or traditional knowledge in coming to these decisions. Again the long list of legal cases, particularly the Waitangi Tribunal claims of the late 1970s and early 1980s, which has greatly influenced current waste management process, testifies to this, as do the interview and survey results for Ngāi Tahu. Further the survey revealed a strong and ongoing concern held by Ngāi Tahu regarding pollution, human health and mahinga kai issues but also identified hazardous wastes as being of most concern, demonstrating a growing concern for wastes that have greater uncertainty attached to them in relation to effect, treatment and control. Therefore for Ngāi Tahu, at least, this is an area where more research is required.

Thirdly, it is apparent that Māori are solutions focused, pragmatic and open to alternative options for sustainable waste management – but they also feel dissatisfied and largely ignored within current waste management decision-making frameworks. For Ngāi Tahu interviewees and survey participants a history of widespread problems in dealing with waste issues as well as a number of clear preferences that offer solutions and alternatives to conventional practice going forward were highlighted. The survey result in relation to current and preferred sewage systems showed a Ngāi Tahu desire to have more individualised systems, including non-water composting toilets or greywater separation, as opposed to large centralised reticulated systems, using water. These preferences were supported by interview results and typified by the fact that Ngāi Tahu tribal members were involved in private enterprises that have invented and commercialised alternative waste disposal systems. Moreover, survey preferences for solid and human waste end-use options favoured pragmatic alternatives including the generation of electricity and the use of timber forests, wetlands and non-food crops as treatment and disposal mediums. Another practical alternative not included in this

survey, but favoured by survey respondents, included using waste or land areas where human wastes had been applied to assist native restoration plantings. Growing fibre crops and merely leaving land to recover were seen as other viable options for such applications. All food-related options, however, met with strong disapproval. These results give clear direction to some real options from a Ngāi Tahu perspective for future waste management along with some real bottom lines that should be taken into account.

Finally, and most importantly, the research has established that waste management has always been a major concern for Māori and that Māori, including Ngāi Tahu, have an important role to play in further developing sustainable waste management practices in New Zealand. This is due to the cultural importance placed on maintaining separation between human waste streams and the food chain. It is therefore critical that greater efforts are made to continue to understand Māori beliefs and practices associated with waste and to develop and test solutions that meaningfully deal with these issues, as they are fundamentally concerned with human health and well-being.

7. Te Ara Whakamua / Recommendations

- That more research is undertaken both to understand cultural preferences and to design and test solutions for these, particularly around:
 - decentralised and individualised sewage systems, that either reuse, use less, or use no water, 'up the pipe' solutions, including greywater separation and recycling; and
 - land-based and non-food-related treatment and disposal mediums and systems, including 'quaternary' systems (conventional tertiary systems with an added layer of land-based treatment, including wetlands).

- That iwi and hapū develop clear policies in relation to waste management issues and include these in their own iwi management plans.

These should focus and be specific to different waste types including: blackwater/human waste, stormwater, greywater, point and non-point agricultural wastes, solid domestic waste, industrial, biological and hazardous wastes – including hospital, crematorium and factory discharges.

This should also include an inventory of waste-related consents in the particular takiwā and the time frames when they are coming up for next review to enable a proactive stance to be taken with councils.

- That design and engineering professionals responsible for the design, development and construction of waste treatment systems take an active interest in understanding and working with iwi and hapū and the alternatives and research being advocated in 1 above.
- That councils work to involve iwi and hapū in developing both regional and district policy as well as resource consents for both new, and in particular, existing systems.

This could include assistance with the inventory suggested in 2 above and a dedicated programme of working on these into the future.

This could also involve collaborative programmes with leading waste researchers, iwi/hapū and design/engineering professionals to come up with and test alternative solutions.

Pātaka Kupu / Glossary

Aotearoa me Te Waipounamu	New Zealand.
Biosolid	A sewage or sewage sludge derived from a sewage treatment plant that has been treated and/or stabilised to the extent that it is able to be safely and beneficially applied to land and does not include products derived from industrial wastewater treatment plants.
Hapū	Sub-tribe.
Iwi	Tribal group – often derived from a principal ancestor or canoe.
Kaimoana	Seafood, shellfish.
Kainga	Home, address, residence, village, habitation, habitat.
Kaupapa	Topic, policy, matter for discussion, plan, scheme, proposal, agenda, subject, programme, theme.
Kaupapa Taiao Unit	The Environmental Unit of Te Rūnanga o Ngāi Tahu.
Koha	Gift, present, offering, donation, contribution.
Mahinga kai	The term generally refers to interests in traditional food and other natural resources and the places where those resources are obtained and embodies the cultural values through lived practice, linking people and resources with the tangible and intangible dimensions of human existence and well-being.
Makutu	Witchcraft, magic, sorcery, spell.
Marae	Courtyard – the open area in front of the wharenuī (ancestral house), where formal greetings and discussions take place. Often also used to include the complex of buildings around the marae).
Mimi	Urine, pee.
Noa	Be free from the extensions of tapu, ordinary, unrestricted.
Pa	Fortified village, stockade, inhabitants of a fortified place, screen, blockade, city (especially a fortified one).
Paepae	Beam, bar, horizontal board, threshold of a house, door sill, orators' bench, speakers of the tangata whenua, horizontal beam of a latrine, open container, dish, open shallow vessel.
Papatipu Rūnanga	Regional assemblies of Te Rūnanga o Ngāi Tahu.
Para	Refuse, rubbish, waste, trash, sediment.
Poua	Old person, grandfather.
Powhiri	Invitation, rituals of encounter, welcome ceremony on a marae.

Rahui	Warning sign that a rāhui is in place, sanctuary, resource reserve.
Rūnanga	A council, tribal council, assembly, board, boardroom.
Takiwā	A tribal district more or less synonymous with 'rohe'. Some iwi have divided their rohe into several takiwā for purposes of representation.
Tapu	Be sacred, prohibited, restricted, set apart, forbidden, under atua protection.
Taua	Old person, grandmother.
Te Rūnanga o Ngāi Tahu	Te Rūnanga o Ngāi Tahu is the organisation that services the Ngāi Tahu tribe's statutory rights and ensures that the benefits of the Settlement grow for the future generations. It was established by the Te Rūnanga o Ngāi Tahu Act 1996.
Tiaki Para	A unique research project that examined existing literature (key texts and policies) on traditional and contemporary views and cultural practices of Māori and waste management.
Tikanga	Correct procedure, custom, habit, lore, method, manner, rule, way, code, meaning, reason, plan, practice, convention.
Tutae	Dung, excrement, faeces.
Wāhi tapu	A site that has been identified by iwi or hapū as a place that is spiritually and culturally important. It may be physically evident in the landscape although this is not always the case.
Waitangi Tribunal	A New Zealand permanent commission of inquiry established by an Act of Parliament in 1975. It is charged with investigating and making recommendations on claims brought by Māori relating to actions or omissions of the Crown, in the period since 1840, that breach the promises made in the Treaty of Waitangi. In 1975 protests about unresolved Treaty of Waitangi grievances had been increasing for some time, and the Tribunal was set up to provide a legal process for the investigation of those grievances. The inquiry process contributes to the resolution of Treaty claims and, in that way, to the reconciliation of outstanding issues between Māori and non-Māori.
Whakapapa	Genealogy, genealogical table, lineage, descent.
Whanau	Extended family, family group, a familiar term of address to a number of people.

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Appendix 1. Tiaki Para Survey questionnaire

Tiaki Para - A Study of Ngāi Tahu Values & Issues regarding Waste SURVEY FORM

GENERAL STATISTICAL INFORMATION

1. Your name? (NB: Only answer if you do not wish to remain anonymous)

2. Your age on your last birthday? 3. Are you? ☐ Female ☐ Male

4. Your iwi and hapū affiliations?

5. Which of the following Papatipu Rūnanga do you affiliate with? (Please tick the boxes that apply to you)

- ☐ Awarua Rūnanga
☐ Kāti Huirapa ki Puketeraki
☐ Ōnuku Rūnanga
☐ Te Hapū o Ngāti Wheke (Rāpaki)
☐ Te Rūnanga o Arowhenua
☐ Te Rūnanga o Koukourarata
☐ Te Rūnanga o Moeraki
☐ Te Rūnanga o Waihao
☐ Waihōpai Rūnaka

- ☐ Hokonui Rūnanga
☐ Te Rūnanga o Ngāti Waewae
☐ Ōraka Aparima Rūnaka
☐ Te Ngāi Tūāhuriri Rūnanga
☐ Kaikōura Rūnanga
☐ Te Rūnanga o Makaawhio
☐ Te Rūnanga o Ōtākou
☐ Te Taumutu Rūnanga
☐ Wairewa Rūnanga

OR

☐ Don't know

☐ None of the above

6. Are you currently actively involved with your rūnanga? ☐ Yes ☐ No

7. Which region do you live in? (Please tick the box that applies to you)

- ☐ Te Ika a Maui/The North Island
☐ Te Tau Ihu/Nelson & Marlborough
☐ Te Tai Poutini / West Coast

- ☐ Waitaha / Canterbury
☐ Arai te Uru / Otago
☐ Murihiku / Southland

8. Do you live in? ☐ A rural area ☐ An urban area

CONTEMPORARY WASTE MANAGEMENT EXPERIENCE

9. Do you have any experience in dealing with waste management or waste water issues for your iwi/hapū/whānau or rūnanga? ☐ Yes (go to question 9.a.) ☐ No (go to question 10)

a. For how many years have you been dealing with these issues? (Please tick the box that applies to you)

☐ Less than 1 year ☐ 1-5 years ☐ 5-10 years ☐ 10-20 years ☐ More than 20 years

b. Please list particular consents, sites and issues dealt with:

TRADITIONAL WASTE MANAGEMENT KNOWLEDGE

10. Do you have any understanding or knowledge of the traditional ways your people dealt with 'waste'? ☐ Yes (go to question 10.a.) ☐ No (go to question 11)
(Including disposal of mimi, tutae, para (food leftovers/scraps), whare, waka, domestic implements & body products, such as hair, nails, etc)

- a. Please explain or list any kupu (words), pūrakau (stories/traditions), kawa/tikanga (practices/methods), beliefs or other references (including people) you have knowledge of in relation to traditional waste management. (If you require extra space feel free to use extra paper and attach to the back of the survey)

WASTE MANAGEMENT ISSUES AND VALUES

11. The following is a list of issues and values that iwi/hapu can have when dealing with waste management problems. Please indicate the level of importance you would give each of these by ticking the appropriate box.

	Most Important 1	2	Neither important nor unimportant 3	4	Least Important 5
Environmental pollution/degradation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human health problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact on mahinga kai (abundance of/access to food)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact on spiritual values (whakapapa, mauri, tapu)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact on wāhi tapu/wāhi taonga (significant sites)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of involvement of iwi/hapū/rūnanga in management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of knowledge or education about waste issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unsuitable/unacceptable treatment/disposal methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- a. Are there any other issues or values that you believe are important when dealing with waste management that are not listed above? Please list these below:

12. The following is a list of different waste types that can be discharged into the environment. Please indicate the level of concern you have for each type by ticking the appropriate box.

	Most Concerned 1	2	Neither concerned nor unconcerned 3	4	Least concerned 5
Biological Wastes (human blood, tissue etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farm Animal Effluent (cows/pigs/chickens)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garden/Organic Waste (eg. leaves/grass/food scraps)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Greywater/Wastewater (bath, shower, washing water)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous Waste (pesticides/chemicals/radioactive/GMOs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human Effluent (sewage, mimi, tutae etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial Waste/Wastewater (paper/pulp/meatworks)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Waste Sources (waterfowl/wild animals/floods)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solid/Domestic Waste (plastics & other household items)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- a. Of the above waste types, which is the most important to deal with to protect your values? (Please write the appropriate waste type in the box)

--

WASTE MANAGEMENT PREFERENCES

13. Below are a number of statements relating to waste management practices. Please indicate your level of agreement with each statement by ticking the appropriate box and providing an explanation.

a. "Most types of waste are currently being managed in a culturally acceptable way in New Zealand"

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6

Comment/please explain:

b. "Reducing, reusing and recycling are important waste management practices"

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6

Comment/please explain:

c. "Water is an appropriate medium for the treatment and disposal of human effluent"

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6

Comment/please explain:

d. "Industrial wastes and wastewater such as factory chemicals and hospital biological wastes should be treated and disposed of separately from domestic/household wastes and wastewater"

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6

Comment/please explain:

14. There are a number of different systems that can be used to hold, treat and dispose of human effluent and wastewater. Below is a summary list of the major systems used in New Zealand. In the left hand column please indicate the system you currently use in your home by ticking the appropriate box. In the right hand column please indicate the type of system you would prefer to use by ticking the appropriate box. (NB: A clearwater system is a self-contained household water treatment system. Tertiary treatment refers to the highest level of treatment currently possible. Secondary and primary refer to lower levels of treatment))

Your Current System	TREATMENT AND DISPOSAL SYSTEMS	Your Preferred System
<input type="checkbox"/>	Centralised/Urban – Exclusive use of flush (water) toilets, linked to a major tertiary treatment plant, includes all greywater and industrial inputs, with final disposal to water. (eg. Christchurch City).	<input type="checkbox"/>
<input type="checkbox"/>	De-centralised/Community – Uses mainly flush toilets, linked to primary/secondary treatment plant or septic tanks, some separation of greywater, with minor industrial inputs and disposal to land.	<input type="checkbox"/>
<input type="checkbox"/>	Individual/Household – Uses long drop, composting toilet or flush toilet linked to clearwater system, minimal or no water used, extensive grey water separation, self contained and disposal to land.	<input type="checkbox"/>
<input type="checkbox"/>	Don't know	<input type="checkbox"/>
<input type="checkbox"/>	Other Please state:	<input type="checkbox"/>

15. Below is a list of management options for disposing of, and/or re-using, human effluent. Please indicate your level of approval for each of the following options by ticking the appropriate box.

(NB: Unless otherwise stated, all options are for tertiary treated effluent, including the resultant wastewater and/or biosolids (or sewage sludge).)

	Strongly Approve 1	Approve 2	Neutral 3	Disapprove 4	Strongly Disapprove 5	Don't Know 6
Raw effluent discharged to water (fresh or marine)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent discharged to fresh water (river/estuary/lake)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent discharged to the marine environment (ocean outfall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent discharged to a natural or human made wetland system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biosolids disposed in a landfill/rubbish dump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent/biosolids applied to an exotic plantation/timber forest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent/biosolids applied to agricultural land for food production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent/biosolids applied to a sports field or other recreational area/land/forest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent/biosolids applied to a non-food garden (eg. flower garden)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent/biosolids applied to a protected native forest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treated effluent/biosolids used to make electricity (via biogas production)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incineration or burning of biosolids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Although land-based options for human effluent are generally favoured by iwi and hapū, there are still a number of issues that arise regarding the post-disposal use of waste disposal sites. Please indicate your level of approval for the following post-disposal land uses by ticking the appropriate box.

(NB: All scenarios assume that tertiary treated biosolids have been applied to the land within the past 12 months)

	Strongly Approve 1	Approve 2	Neutral 3	Disapprove 4	Strongly Disapprove 5	Don't Know 6
Leaving the land to recover and not using	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring native vegetation on the land for non-kai/food purposes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Growing/harvesting vegetables or other plants on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Growing/harvesting fruit from trees on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gathering a plant for rongoa/medicinal uses from the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Growing/harvesting meat/milk from animals on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvesting a wild animal (eg. pigs/deer) from the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Growing/harvesting wood or fibre (eg. harakeke) from a tree or plant on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Undertaking a recreational activity on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building a house and living on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Thinking about the above management options and scenarios (in questions 15 & 16) would your perspectives differ in any way if the wastewater or biosolids were:

- a. Your own ie. from your own household/marae/community & therefore you had full knowledge of what it contained? ☐ Yes ☐ No ☐ Don't Know
- b. Applied to your own land or land you had specifically chosen for this purpose? ☐ Yes ☐ No ☐ Don't Know
- c. Applied & left for a longer time period before any use of the land (eg. 10 or 20 years)? ☐ Yes ☐ No ☐ Don't Know

Comment/please explain:

-- Kua mutu / The end --

Āku mihi nui ki a koe mō tō awhi ki te kaupapa
Thank you very much for your help with our survey

Appendix 2. Tiaki Para interview schedule and consent form

Tiaki Para - A Study of Ngāi Tahu Values & Issues regarding Waste

INTERVIEW EQUIPMENT AND PROCESS CHECKLIST

Date of Interview Venue with

EQUIPMENT

- # **Backgrounder Sheet** (1 per person)
- # **Interview Consent Form** (1 per person)
- # **Interview Form** (x 1)
- # **Spare Paper**
- # **Pens**
- # **Video Camera** (fully charged) **and Tapes** (3 x 60 min)
- # **Dictaphone, Batteries** (2x AA) **and Tapes** (3 x 60 min)
- # **Digital Camera** (fully charged) (optional)
- # **Koha** (petrol/book voucher per person)

Check✓

PROCESS

1. **Mihi / Introduction**
2. **Background Information/Consent Form/Interview Structure**
Presentation and Discussion
3. **Begin Interview**
- Set up/start recording as per interviewee preference
State the Interviewer/date/venue etc
4. **Interviewee Mihi/Mihimihi** (General Statistic Questions)
- Interviewee(s) Name, Age, Iwi/Hapu/Rūnanga, Kainga etc
(Aroha mai for the obvious nature of questions – but important for record)
5. **Contemporary Waste Management Questions/Discussion**
6. **Traditional Waste Management Questions/Discussion**
7. **Waste Management Values/Issues Questions/Discussion**
8. **Waste Management Preference Questions/Discussion**
9. **Final Comments**
10. **Mihi/Thank You & Koha**

Check✓

Consent form for Interview – Tiaki Para: A Study of Ngāi Tahu Values and Issues regarding Waste

I have read the description and aims of the research project supplied to me and have discussed this with my interviewer. I agree to participate in the project and consent to the publication of the results under the terms outlined below.

I agree to allow my oral statements to be: (please tick the appropriate option(s))

- Transcribed (hand written) ☐
 Recorded on audio tape ☐
 Recorded on video tape ☐

Signed Date

This study is being run by Ngāi Tahu Development in conjunction with Manaaki Whenua (Landcare Research) and Forest Research and is aimed at investigating Maori cultural and environmental issues and values in relation to waste management.

We ask you to talk about your knowledge and experience in dealing with waste management issues so that we can identify and advocate more culturally acceptable waste management practices and enhance the involvement of tāngata whenua in waste management decision-making in New Zealand.

We would also like to create an important archival resource for Ngāi Tahu Whānui by recording and storing your in the Ngāi Tahu archive for future reference by Ngāi Tahu tribal members.

We may also wish to use information from your interview for publication purposes but will not publish anything that you wish to remain confidential. Therefore, the transcript from your interview will be sent to you so that you can check, amend or remove information as appropriate before the publication of any results.

If you wish, we can guarantee the anonymity of your information when publishing results. This will be done by simply reporting on results across a number of different interviewees, without referring specifically to any particular interviewee.

However if you agree, we would like to be able acknowledge you as the source of any comments and ideas you have discussed with us. This will be done by stating your name and date next to the particular quote referred to in the publication.

A summary of the results will be published in a future issue of Te Karaka – the Ngāi Tahu magazine which you will receive a copy of. A copy of the final report will also be available on request.

Please note that:

1. You do not have to answer all of our questions.
2. You may stop the interview at any time.
3. You have the right to withdraw from the project at any time including withdrawing the information that you have supplied up until the time the results are published.

Craig Pauling
 Kairangahau Kaupapa Taiao
 Ngāi Tahu Development
 Phone: (03) 371 0188
 Email: Craig.Pauling@ngaitahu.iwi.nz



NGĀI TAHU Development

Kahuru/February 2005



Manaaki Whenua
Landcare Research

Tēnā koe,

TIAKI PARA - A STUDY OF NGĀI TAHU VALUES & ISSUES REGARDING WASTE

This letter is to invite you to be part of a research study being run by Ngāi Tahu Development, in conjunction with Manaaki Whenua (Landcare Research), investigating Māori cultural and environmental issues and values in relation to waste management.

Your name has been randomly selected from the Ngāi Tahu register to participate in the research through an individual postal survey.

This means that we would like you to:

- ✕ **Read the Information Sheet (over the page) that outlines the purpose of the study and details your rights.**
- ✕ **Fill out the enclosed survey form. We ask that you try to return the survey within four weeks.**
- ✕ **Mail the survey back in the freepost envelope enclosed. No stamp is needed.**

Your participation in this survey is entirely voluntary - it is your choice and you do not have to take part in this study. If you do agree to take part, you are free to withdraw at any time, without having to give a reason. You do not have to answer any questions that you do not want to.

An article summarising the preliminary findings of the survey will be included in a future issue of Te Karaika - the Ngāi Tahu magazine, which will be sent to you in the post. Copies of the full findings report can also be sent to you at your request.

Thank you for taking the time to help with this study. Your input is very much appreciated and will help to develop solutions for this important environmental issue - for us and our children after us - mō tātou, ā, mō kā uri ā muri ake nei.

What if you have further questions?

Please feel free to contact me on the details listed below if you would like further information about the study or would like to withdraw from the study.

Āku mihi nui ki a koe

Craig Pauling
Kairangahau Kaupapa Talao
Environmental Research Officer

Level 1, Te Waipounamu House, 158 Hereford Street

PO Box 13-046, Christchurch

Freephone: 0800 KAI TAHU (524 8248) **Direct Dial:** (03) 3710 188

Email: Craig.Pauling@ngaitahu.iwi.nz



Manaaki Whenua
Landcare Research

Tiaki Para – A Study of Ngāi Tahu Values & Issues regarding Waste

What is the study about?

Waste management is a major issue in New Zealand, and it is one that will continue to be so into the future. There is no escaping it! Waste just happens to be a by-product of our everyday lives and something that we need to manage carefully. The way we deal with waste can affect us socially, culturally, and economically as well as having the potential to damage our environment.

An important waste issue facing all communities is the treatment and disposal of human effluent. For many iwi this issue is of particular concern, largely due to the negative impacts it can have on mahinga kai and wāhi tapu values.

For many years, Ngāi Tahu, Ngāi Tahu and Te Rūnanga o Ngāi Tahu, along with other iwi, have called for a halt to the discharging of untreated sewage and other contaminants directly to water and advocated for alternatives such as the disposal of effluent to land. However, very little research has been undertaken to assess the sustainability or effectiveness of such alternatives.

In 2002, the Ministry for the Environment developed the New Zealand Waste Strategy that outlined a number of challenges for the way waste is dealt with in our country. The strategy included targets to significantly reduce the amount of biosolids (see definition below) going to landfill and proposed new and novel solutions for recycling and reusing these materials. Again, however, only limited research has been undertaken to understand the implications of such solutions on social, cultural, environmental and economic values.

This study therefore aims to identify and advocate more culturally acceptable waste management practices and to enhance the involvement of tāngata whenua in waste management decision-making, with particular regard to the land disposal options for biosolids.

*Biosolids is a term used to describe the solid material removed from wastewater (e.g. municipal sewage, pulp and paper mill effluent) during the treatment process. Biosolids are sometimes referred to as 'sewage sludge'.

Who is undertaking this study?

Ngāi Tahu Development, in partnership with Manaaki Whenua (Landcare Research) and Forest Research are undertaking this study as part of a national research programme called Waste 2 Resource.

The Waste 2 Resource Programme is led by Forest Research and Manaaki Whenua and is investigating alternative waste management practices for New Zealand. The research within the programme will be focused on two study sites, Rotorua and Christchurch, as shown in Figure 1. The programme is funded through the Foundation of Research, Science and Technology (FRST)¹.

The research aims to explore waste management options and solutions that are the most economically feasible, environmentally sound, and culturally and socially acceptable. This is being achieved through the four main objectives within the programme, shown in Figure 1.

Craig Pauling (Ngāi Te Rūhikihiki/Ngāi Tahu), Research Officer at Kaupapa Tāiao, Ngāi Tahu Development has been seconded to Manaaki Whenua to identify Ngāi Tahu specific issues and values regarding waste as part of objective 2. A similar secondment is currently being developed between Forest Research and Te Arawa at the Rotorua study site.

The key steps in this study are shown in Figure 2 and include an extensive literature and policy review of Māori waste management issues; interviews and surveys of tribal members and a series of feedback hui on Christchurch-specific waste management scenarios.

Who is being asked to take part?

All Papaitipu Rūnanga are being asked to contribute to the study by nominating those who have knowledge and experience in the area. Willing rūnanga participants will then be interviewed in groups or individually.

For the survey, all individuals aged 18 and over registered with Ngāi Tahu are eligible for selection. Individuals for the survey will be randomly selected for participation from the Ngāi Tahu whakapapa database and then invited to take part in the survey. Approximately 300 participants are needed for the survey. A further 200 participants will be selected from the Kaupapa Tāiao Natural Resource Contact database.

Papaitipu Rūnanga with an interest in the Christchurch area will be invited to take part in the feedback hui later in the year.

¹ FRST is a government agency that provides significant funding for research that benefits the New Zealand public. See www.frst.govt.nz.

Figure 1. Waste 2 Resource Programme Overview

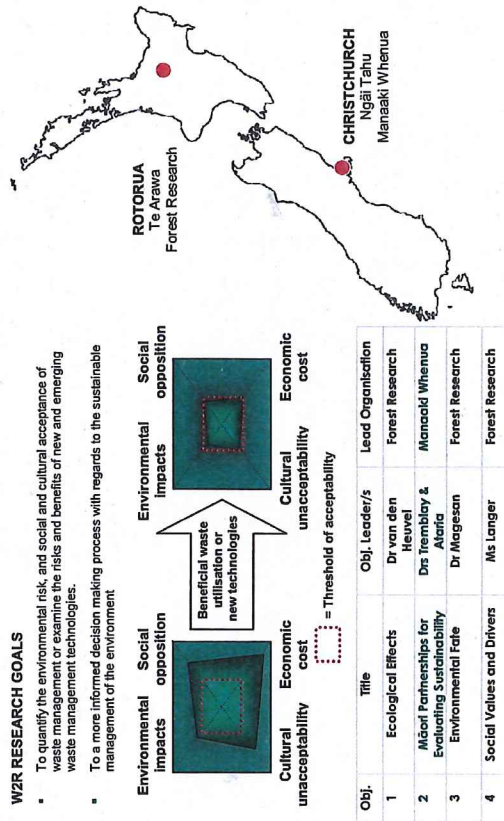
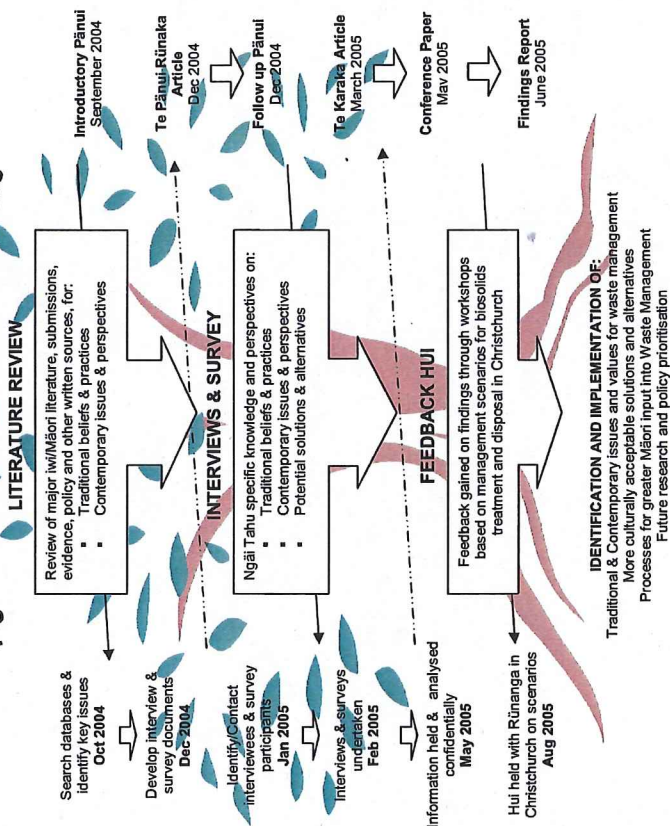


Figure 2. Tiaki Para Research Process



What if you are nominated or selected?

Accompanying this information sheet is a letter informing you that you have been selected for participation in the study. This means that you have the opportunity to participate in the survey or an interview and have been supplied with an individual survey form or further information. Contact details have been made available if you want to answer the survey questions over the phone. In all the survey you will take 20-40 minutes of your time.

What will happen to the information collected?

All information will be stored in a secure, restricted access area at the office of Te Rūnanga o Ngāi Tahu in Christchurch. Completed surveys and records of interviews will be stored in this area for 12 months, after which they will be shifted to the tribal archives and retained as records of historical significance to Ngāi Tahu.

Survey information will remain confidential, unless you choose to provide your name on the survey form. This is again your choice. If you choose not to supply your name, information is made confidential through the use of survey identification numbers allocated at the time of participant selection. All information is stored according to this number rather than your name or address.

In the case of interviews, each participant will be asked to sign a consent form confirming their involvement and outlining their preferences for recording their oral statements and the future use of this information. Interviews will either be transcribed, or recorded on audio or videotape depending on the preference of the interviewee(s). All written information recorded in the course of interviews will be sent to interviewees for confirmation before being used in any reports or publications.

Information from the interviews and survey will then be analysed and compiled into a findings report. A summary of key findings will be used to develop an article for Te Karaka – the Ngāi Tahu Magazine and a conference paper.

No material that could personally identify individual participants will be used in any of the reports from this study, unless specifically requested or approved by participants. The findings report will be made available to participants at their request.

The findings report will form the basis of community feedback hui held in Christchurch in late 2005.

Do you have to take part in this study?

Your participation in this study is entirely voluntary – it is your choice. You do not have to take part if you do not want to. You can also withdraw from the study at anytime without giving a reason. Not participating will not affect your future in any way. You do not have to answer any questions that you do not want to answer.

What are the benefits in taking part?

This is your opportunity to have your say about an important environmental issue that affects Ngāi Tahu, both now and in the future. It is intended that this study will help develop more culturally acceptable and environmentally sound waste management solutions as well as enhancing the role of tāngata whenua in waste management decision-making. Taking part will also create an important information resource for Ngāi Tahu Whānui on both traditional and contemporary knowledge about waste management – something that has not been done before.

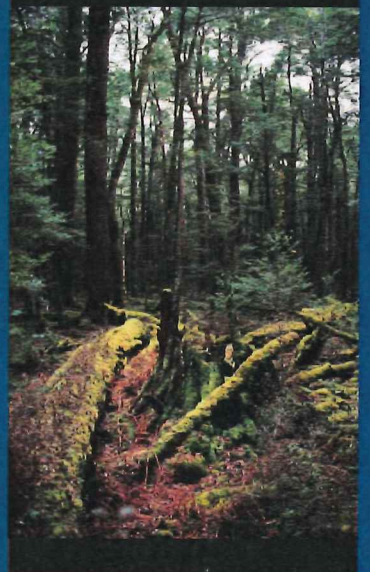
What if you have questions or concerns?

Please feel free to contact Craig Pauling at Kaupapa Tāiao or Manaaki Whenua on the details below if you have any questions or concerns about the study.

We thank you for the time taken to read this information and for your participation in this important study.

Kaupapa Tāiao, Ngāi Tahu Development
Level 1, Te Whānau House,
159 Hoped Street,
PO Box 13-046, Christchurch
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