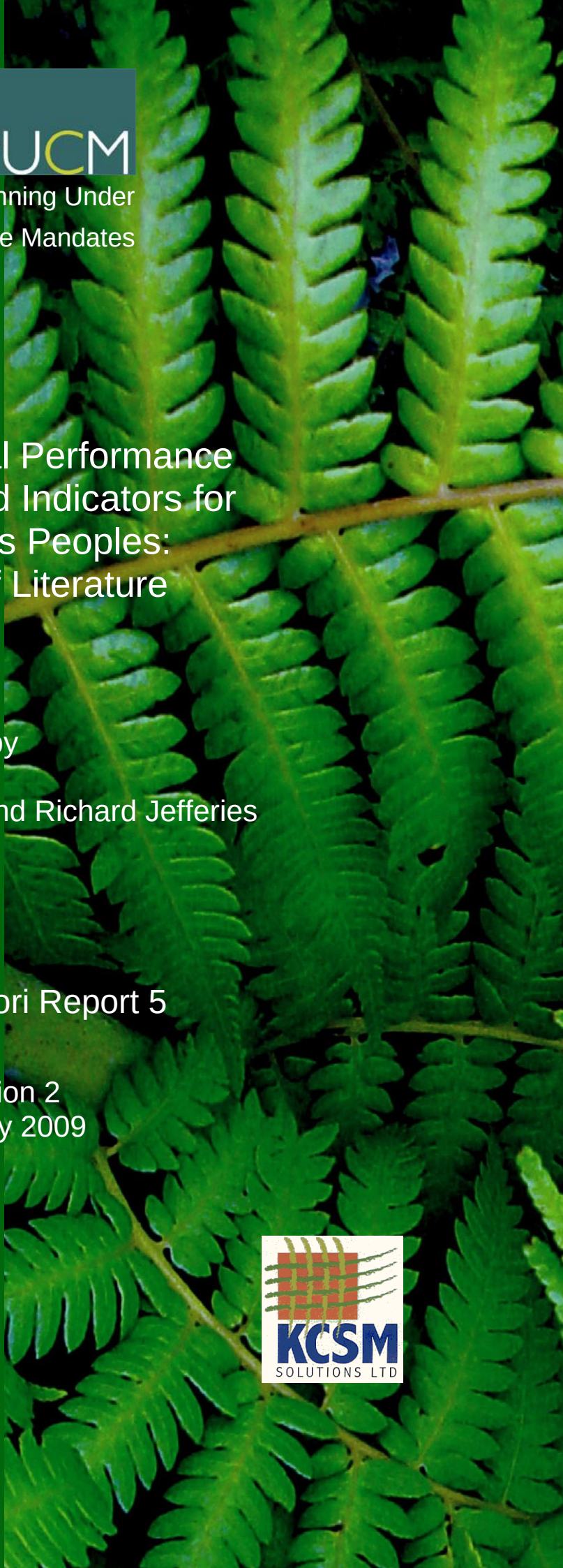

PUCM

Planning Under
Co-operative Mandates

Environmental Performance Outcomes and Indicators for Indigenous Peoples: Review of Literature

by

Nathan Kennedy and Richard Jefferies

PUCM Mäori Report 5

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Author correspondence:
C/- Richard Jefferies
KSCM Solutions Ltd
P. O. Box 64
Opotiki
New Zealand
Ph: +64 07- 315 7080
e-mail: richard@kcsmsolutions.com
nkennedy@ngaatiwhänaunga.maori.nz

FRST-funded Research Program on the Quality of Environmental and Community Planning and Governance in New Zealand

Mihi

E tapu te rangi nā Io te atua
E tapu te rangi ruanuku
Kia rere mai te maramara
Kua piri, kua tau
Kia rere mai te kongakonga
Kua piri, kua tau
Torotika e!

Kei te karanga atu ki a Io, ki a Ranginui, ki a Papatuanuku, kia tū mai anō ngā āhuatanga o te taiao. Kua te tukuna hoki ngā whakaaro ki te wāhi ngaro, ki a rātou mā, nā rātou te whenua i poipoia i te wā i nohotahi ai te tangata me ana uri, arā ngā uri o Rangi rāua ko Papa.
He tīmatanga kōrero tēnei i a mātou e rapu nei e kimi nei i ngā kōrero, otira ngā mātauranga hei āwhina i a mātou, otira i a tātou te hunga e noho kuare ana ki ngā āhuatanga Māori.
Ko te wawata, te tūmanako, kia mārama ake ai tātou, ngāi Māori i ngā tikanga, ngā kaupapa, me ngā kōrero a ngā mātua, tūpuna, kia kaha ake ai tātou ki te tiaki, poipoi, manaaki hoki i te taiao e noho nei tātou.

Nā māua iti nei
Nā
Richard Jefferies
Nathan Kennedy

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Preface

This report on ***Environmental Performance Outcomes and Indicators of Indigenous Peoples: A Literature Review*** was one of two reviews written in 2005. The other was titled *Kaupapa Mäori Framework and Literature Review of Key Principles* (PUCM Mäori Report 4). Both reviews provided a basis for going on to develop a *Kaupapa Mäori Environmental Outcomes and Indicators Framework and Methodology* (PUCM Mäori Report 1). This in turn led to publication of a worksheets-driven method for evaluating not only Mäori provisions in statutory plans, but also the performance of councils, Crown agencies and iwi (tribes) in local government planning in Aotearoa/New Zealand (PUCM Mäori Report 2, *Ngä Mahi: Kaupapa Mäori Outcomes and Indicators Kete [basket]*.

This body of work was carried out through a Mäori research project (2003-2009) led by Richard Jefferies, Director of KCSM Consultancy Solutions Ltd, Opotiki. It took place within a wider research programme on *Planning Under Co-operative Mandates* (PUCM), led by the International Global Change Institute (IGCI), a self-funding research institute within Te Whare Wänanga o Waikato - The Waikato of University - in association with several partners.

PUCM was an on-going research programme funded by the New Zealand Foundation of Research Science and Technology, Public Good Science Fund (FRST-PGSF). Since mid-1995 it sequentially developed and tested methods for evaluating the quality of policies and plans (Phase 1), plan implementation (Phase 2), and environmental outcomes (Phase 3) under the 1991 *Resource Management Act* (RMA) and more recently the 2002 *Local Government Act* (LGA). An important part of this planning and governance research was consideration of the interests of Mäori (the indigenous people of Aotearoa/New Zealand) as Government's Treaty partner.

Following Phase 1 analysis of RMA plan quality, Richard Jefferies of Ngäti Tukorehe and his firm, KCSM Consultancy Solutions Ltd were brought onto the PUCM research programme in 2002 to lead the Mäori component of the research. KCSM staff initially assisted with interpretation of findings relating to plan implementation and Mäori interests. Nathan Kennedy, an environmental officer for Ngäti Whanaunga iwi and with experience working in local government, was employed at the beginning of PUCM Phase 3 to undertake research on Mäori environmental outcomes.

The PUCM Mäori team (Jefferies and Kennedy) has published a series of working papers and reports as a means for making public its research findings, and in an effort to influence change in response to observed issues with plan quality and implementation, and their environmental results, especially as they relate to Mäori. These documents are downloadable from http://www.waikato.ac.nz/igci/pucm.

Located in grey in Figure 0.1 next page is the Phase 3 Mäori Objective with its published reports identified in the lower row of boxes; the one shaded grey being this report.

Neil Ericksen
PUCM Programme Leader; IGCI Associate and former IGCI director
International Global Change Institute (IGCI); The University of Waikato; Hamilton

(28 June 2009)

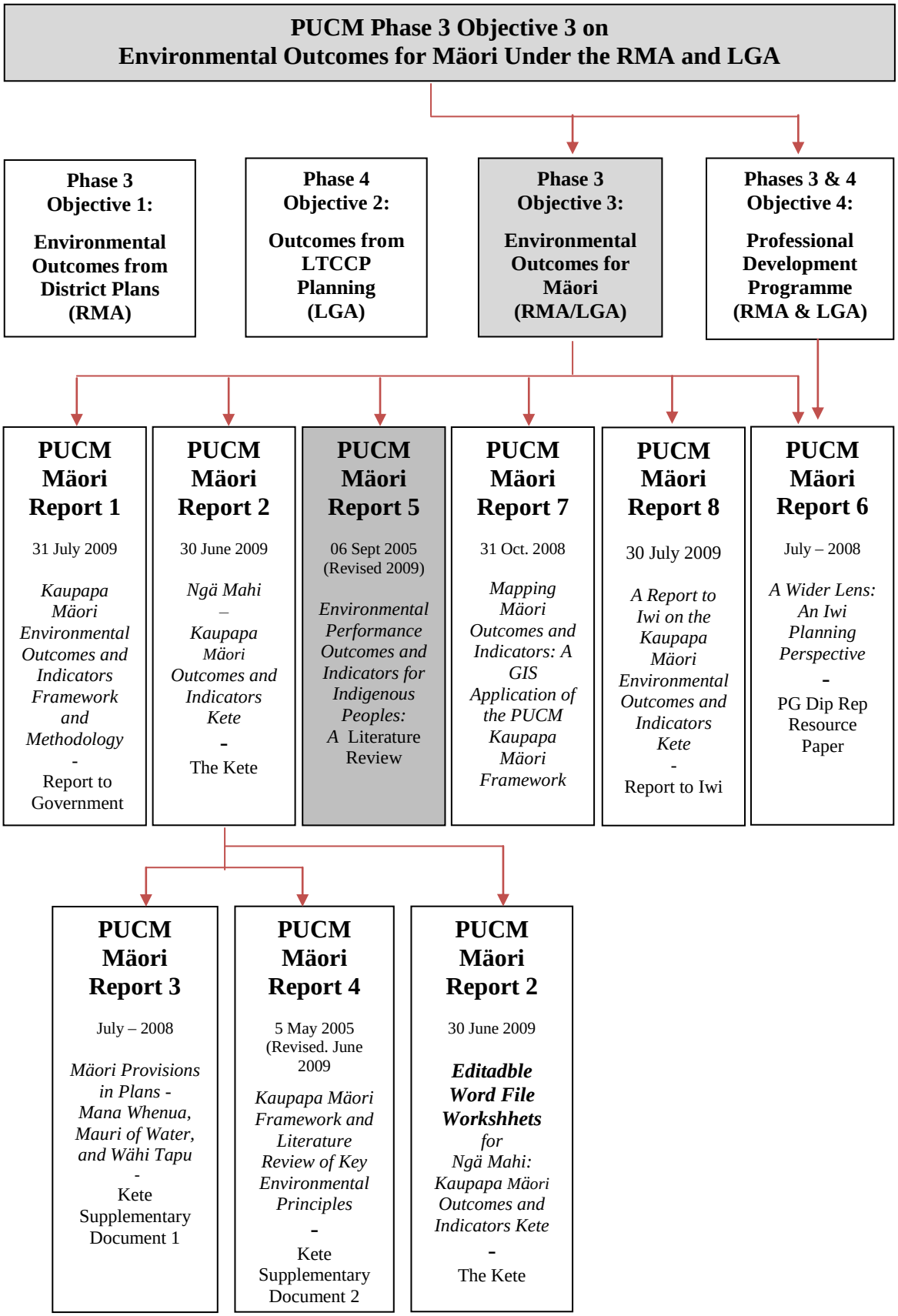


Figure 0.1. Mäori Report 5 in context of the PUCM Research Programme on Planning Under Co-operative Mandates RMA (1991) and LGA (2002)

Acknowledgements

The PUCM Research Programme (Phases 3 and 4) was funded by FRST-PGSF under contract number UOWX0308 with the University of Waikato, and subcontracts to Planning Consultants Ltd (Auckland), KCSM Consultancy Solutions Ltd (Opotiki), Lawrence Cross Chapman and Co. Ltd (Planning and Resource Management Consultants, Thames), and Lincoln University. We appreciate the support of FRST and that of the PUCM team.

Special thanks are due to the many peer reviewers in two tangata whenua working groups who contributed to the Mäori component of the overall PUCM Research Programme, and the Mäori project in particular. The "Mäori experts group" was comprised mostly of Mäori working within councils and Crown agencies. The "Practitioners group" was comprised of iwi environmental officers. The following peer reviewers have participated in these two groups at different times: Hori Parata, David Taipari, Tikitu Tutua-Nathan, Nassah Steed, Antoin Coffin, Reg Profit, Garth Harmsworth, Todd Taiepa, Waaka Vercoe, Beverley Hughes, Vaughan Payne, Rhonda Cooper, Barney Thomas, Nick Tupara, Saul Roberts, and Te Warena Taua.

We also give special thanks to the staff of our partner iwi, Ngäti Awa and Ngäti Maru, for assistance and guidance with both developing and trialling the environmental outcomes and indicators framework and outcomes and indicators kete. And, we thank staff of Matamata-Piako District Council and Environment Bay of Plenty and members of the tribal representatives on the Mana Whenua forum of Matamata-Piako District Council for their assistance and feedback.

We wish to acknowledge members of the wider PUCM team, who have contributed valuable advice throughout the research period, especially: Jan Crawford, Maxine Day, Neil Ericksen, and Lucy Laurian. Also thanks to Katarina Simons, IGCI PhD candidate, for insightful conversations. We give special thanks to Neil Ericksen, PUCM Research Programme leader, who supported our desire to develop a kaupapa Mäori research approach and then encouraged us throughout the research endeavour. We are also grateful for him having reviewed and commented on drafts of this report.

Richard Jefferies and Nathan Kennedy

Introduction

The literature review in this report was the starting point for developing a Mäori research strand (2003-2009) within the *Planning Under Co-operative Mandates* (PUCM) research programme (1995-2009). PUCM was funded by the New Zealand Foundation of Research, Science and Technology (FRST-PGSF), and attempted to test the assumption that implementation of New Zealand's *Resource Management Act* 1991 (RMA) and *Local Government Act* (LGA) is resulting in sustainable management of the environment.

PUCM Phase 1 (1995-1997) developed a method then evaluated the quality of policy statements and plans produced under the RMA and organisational factors that influenced their preparation; Phase 2 (1998-2002) developed a method then evaluated the quality of plan implementation through resource consents; and Phase 3 (2003-2006) developed a method then studied environmental outcomes from plans, including outcomes for Mäori (especially iwi/tribes and hapü/sub-tribes).

Mäori are the indigenous people (i.e., tangata whenua or people of the land) of Aotearoa / New Zealand. Toward the end of Phase 2, KCSM Consultancy Solutions Ltd (Opotiki) joined the PUCM team with the goal of developing a kaupapa Mäori research framework and methodology for examining environmental outcomes for Mäori (see PUCM Mäori Report 1). Kaupapa Mäori research means research for Mäori by Mäori and based on the foundation principles (kaupapa) and values (tikanga) of Mäori.

An early task of the PUCM Mäori team was to review the international literature on environmental outcomes and indicators for indigenous peoples. This was in order to gain an understanding of what had been written on the subject and to become familiar with approaches taken by others that might provide lessons for the development of our proposed kaupapa Mäori outcomes and indicators framework and methodology, which was aimed at local government performance in Aotearoa/New Zealand.

Our draft report on outcomes and indicators for indigenous peoples was made available in mid-2005. Since then, the kaupapa Mäori framework and methodology have been completed (see PUCM Mäori Report 1). The main method is driven by self-guiding worksheets (see PUCM Mäori Report 2). It is our intention to further review the literature since 2005 and up-date this reports by 2011. Another review of literature was carried out in 2004/05 with respect to kaupapa Mäori tikanga (principles and values), titled *Kaupapa Mäori Framework and Literature Review of Key Environmental Principles* (Kennedy and Jefferies, 2005). It is available as PUCM Mäori Report 4, 2009.

This current report is not intended to provide an exhaustive catalogue of writings on environmental performance outcomes and indicators for indigenous peoples, including Mäori. Rather, some of the more obvious and important writings are noted as a ready reference for others interested in this topic. Before detailing the approach we took in carrying out the review, the key terms, outcomes and indicators, are defined.

Outcomes and Indicators for Indigenous Peoples

Recent concern with indigenous outcomes and indicators developed out of wider community outcomes developments. This gained impetus by findings and statements regarding the rights and advantages of indigenous people participating in environmental management by organisations, such as the United Nations, explained further below.

"Outcomes" are statements of environmental results sought by a community. The statement of outcomes and their measurement appears to have developed out of government policy analysis. This has been described as a shift in focus away from process and onto results, from how policies and programmes work to whether they work. Consideration of outcomes and their measurement has expanded through areas such as health, education, and environmental management.

"Indicators" measure progress toward (or away from) outcomes, as well as change-over-time. Discussion in terms of indicators has largely developed since the early 1990s. Indicators, it is said, should be "SMART", that is: Specific (closely related to the theme or outcome it will measure), Measurable (data are available), Achievable (it is possible to reach targets that have been set based on the indicator), Relevant (to those who will use them), and Time-bound (to show trends).

Approach to the Literature Review

Literature was identified using both online and library searches. These included online social sciences, legal, and indigenous bibliographic databases. Additionally, we searched the websites of government agencies and organisations, such as the United Nations, OECD, and World Bank, known indigenous peoples' websites, and also general internet searches using both the Google and Altavista search engines. Enquiries were made to various first nations' organisations for any literature of which they were aware. Citations within material returned and that previously sourced during the PUCM research were noted and a second round of document searching undertaken.

Based on initial findings, the focus of our research into indigenous outcomes and indicators work included several specific areas of enquiry, questions were:

- *Theoretical Models* – Were theoretical models explicitly identified or identifiable as underlying the projects being undertaken?
- *Methodology* – Were approaches to developing outcomes and indicators in projects designed and run by indigenous people based on their own values and methods, and if not were they at least credibly participatory?
- *Indigenous values systems* – Were the underlying values systems of the indigenous groups involved explored? In particular we were interested to find writing on: beliefs regarding kinship between people and the natural environment; and perspectives on time and place.
- *Western and Indigenous values* – Were issues relating to the respective perspectives and authority accorded to indigenous versus colonisers values systems explored?
- *Outcomes and indicators* – What specific outcomes or indicators are reported?
- *Currency and universality* – Was there discussion regarding, or can observations be made regarding, whether outcomes and indicators have limitations in terms of their validity and applicability over time, and to locations other than where they were developed?
- *Implementation* – Were any outcomes and indicators described actually implemented; and implemented outside the specific project in which they were identified / developed?

We identified about 30 pieces of indigenous indicators research, but for only 10 of these could substantial and useful documentation be obtained. There is a substantial amount of literature that includes some discussion of indigenous environmental performance outcomes and/or indicators. Outcomes and indicators are considered together in our

review, although some types of document include primarily one or the other. Some documents reviewed include discussion of both, and it was not considered appropriate to attempt to structure the review along these lines.

Each of the documents that were considered important, in terms of an investigation into environmental performance outcomes and indicators for indigenous peoples, were summarised into the following format (Table 1).

Table 1: Format for organising information from outcomes and indicators documents

Document	**Comments**
Authors	
Link	
Notes	
Methodology	
Indigenous values systems	
Western versus Indigenous values	
Models	
Outcomes described	
Indicators described	
Currency	
Universality	
Implementation	

PART 1

INTERNATIONAL: OUTCOMES AND INDICATORS FOR INDIGENOUS PEOPLES

A review by Mulcock (1996) found only four references to indigenous indicators in the international literature, all on Australian Aboriginal indicators. It is not clear if this was due to a genuine lack of available material or a priority matter, as the author was mainly concerned with examples of relevance to New Zealand policy developments. Nearly a decade later, however, we found relatively little material on environmental performance outcomes and indicators for indigenous peoples, relative to that written for non-indigenous peoples.

The literature reveals some documents closely related to environmental performance outcomes and indicators, such as those discussing tensions between western scientific knowledge (WSK) and traditional ecological knowledge (TEK). There is a wealth of material written on TEK, some of which includes varying amounts of discussion on environmental indicators. The challenge for us was to sift out material dealing substantially with indigenous outcomes and indicators.

More broadly, there is literature on indigenous health, economic, and other types of indicators. It is not necessarily appropriate to categorise indigenous indicators in this manner given the holistic world views of indigenous peoples, and this is discussed in relation to some of the Mäori indicators literature in Part II of this report. However, in the interests of keeping the task manageable, we primarily focused on indigenous environmental performance outcomes and indicators – hereon referred to as EPOI.

We identified approximately 30 pieces of indigenous indicators research, but for only 10 of these could substantial and useful documentation be obtained. Among the findings of our review relating to the EPOI experiences internationally were the following points.

- In recent decades, excluding indigenous peoples from participation in environmental management has been reversed by some post-colonial states. This has resulted from organisations, such as the United Nations, increasing international awareness of indigenous rights and the value of indigenous environmental knowledge, and reinforced by indigenous rights movements around the world.
- Indigenous environmental outcomes and indicators programmes are still largely limited to those undertaken by central or local government agencies, although several Canadian examples involved substantial co-operation between indigenous communities and universities.
- A tendency exists, particularly in agency-driven projects, for indigenous perspectives to be compromised where these are incompatible with prevailing frameworks and models within which outcomes / indicators development is occurring.

In Part I we first discuss international developments relating to EPOI and then tabulate the main documents using the aforementioned format (Table 1).

1.1 International Developments

There has been a reversal in recent decades in the trend by some post-colonial governments of excluding indigenous peoples from participation in environmental management. This has resulted from organisations such as the United Nations increasing international awareness of indigenous rights and the value of indigenous environmental knowledge reinforced by indigenous rights movements around the world.

In this section we consider three important organisations, which have driven the adoption of outcomes and indicators as tools for environmental reporting and management, these are: the United Nations (UN), the World Bank (WB), and the Organisation for Economic Co-operation and Development (OECD). These organisations have, however, taken divergent positions with respect to indigenous outcomes and indicators. Nevertheless, centuries old traditional ecological knowledge (TEK) and indigenous environmental indicators are now being recognised internationally as having the potential to provide valuable insights for purposes of environmental monitoring and management. This is occurring as governments worldwide embark on state of the environment monitoring, in order to assess trends in environmental health, and particularly in the context of sustainable development of resources.

1.1.1 The United Nations

The United Nations has been instrumental in bringing attention to the rights and aspirations of indigenous peoples to participate in environmental resource management. In consequence, there has been international adoption of sustainable development as an overarching national objective following the 1987 report of the World Commission on Environment and Development, *Our Common Future*, commonly called the 'Brundtland Report' (World Commission on Environment and Development, 1987). It advocated the concept of sustainable development as a response to the environmental and economic crisis facing the planet.

The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, June 1992, states in Principle 22 that:

> *Indigenous peoples and their communities and other local communities have a vital role in environmental management and development because of their traditional knowledge and traditional practices. States should recognise and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development* (United Nations Conference on Environment and Development, 1992).

Rio followed immediately after the World Conference of Indigenous Peoples on Territory, Environment and Development in Brazil, 30 May 1992, which resulted in the Kari-Orca Declaration. The Kari-Orca Declaration was a collective call for recognition of, and provision for, indigenous rights and values from a gathering of indigenous peoples from around the world. Kari Orca included 109 statements under headings: Human rights and international law; Land and territories; Biodiversity and conservation; Development strategies, and; Culture, science, and intellectual property (Kari-orca Conference, 1992).

Kari Orca referred to the then draft Universal Declaration of Indigenous Rights, urging governments to adopt this, although it was to be another 15 years before that declaration

was finally ratified by most member countries of the United Nations. It is noteworthy that New Zealand was one of only four countries that voted against adoption of the Declaration on the Rights of Indigenous Peoples (as it was ultimately called), the others being the USA, Australia, and Canada – all being post-colonial governments (UN General Assembly, 2007).

Specific pressure for the recognition of indigenous indicators, as opposed to indigenous values generally, resulted from the work of the United Nations Commission on Sustainable Development (UNCSD). The UNCSD Work Programme on Indicators of Sustainable Development (ISD) was adopted by the Commission at its third session in April 1995. The UNCSD work programme includes as one of its key elements: *(g) Development of highly aggregated indicators, involving experts from the areas of economics, the social sciences and the physical sciences and policy makers as well as incorporating non-governmental organization and indigenous views* (UN CSD, 2000).

At the World Summit on Sustainable Development (26 August - 4 September 2002) the UN Commission on Sustainable Development and the General Assembly on Information for Decision-making recorded a list of "decisions", including:

> *4. At the national level, Governments, taking into account their priorities and respective national circumstances, with the support of the international community, as appropriate, are encouraged to consider to:*
> *(b) Collect and provide access to relevant information for decision-making for sustainable development, including gender-disaggregated data, incorporating indigenous and traditional knowledge into information bases for decision-making, as appropriate;*

Statements such as Kari Orca, the World Summit on Sustainable Development decisions, and the 2004 International Indigenous Forum on Biodiversity to the Seventh Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP7) have no doubt influenced the gradual move by post-colonial governments around the world toward recognition of indigenous ecological knowledge, including indicators.

1.1.2 The World Bank

The World Bank, through its centres (such as the Rural Development Sector) and Environment Department, advocates the use of an environmental assessment framework or model called international Framework for the Evaluation of Sustainable Land Management (FESLM). This is closely related to the pressure-state-response framework (discussed below) for environmental reporting, and has been in development since the early 1990s (Dumanski, 2000).

It is argued that FESLM provides a practical framework that connects all aspects of land use under investigation with the interacting conditions of the natural environment, the economy, and the socio-cultural and political life (Dumanski, 1991). It is intended to serve as a tool for identifying which systems are sustainable and which are not, by producing a checklist of variables and factors. There are five pillars of sustainability in the FESLM framework: productivity, security, protection, viability, and acceptability.

However, subsequent World Bank literature makes no reference to this framework. For example, the World Bank report on Indicators of Environment and Sustainable Development - Theories and Practical Experience describes three frameworks, as follows:

1. *"Project-based framework" (also referred to in the literature as the Input-Output-Outcome-Impact framework), which is used in the monitoring of the effectiveness of projects whose objective it is to improve the state of the environment.*
2. *The framework developed by the Organisation for Economic Co-operation and Development (OECD) for national, regional and international level analyses – the Pressure-State-Response (PSR) framework. (See OECD and Figure 3 below.)*

3. *A "framework based on environmental (or sustainable development) themes". Indicators selected are organized according to Major Areas, Themes and Sub-themes. The principal objective of creating a framework formed by Themes and Sub-themes that conceptualize sustainability is to support policy makers in their decision making at a national level* (Segnestam, 2002). (See Table 2 below.)

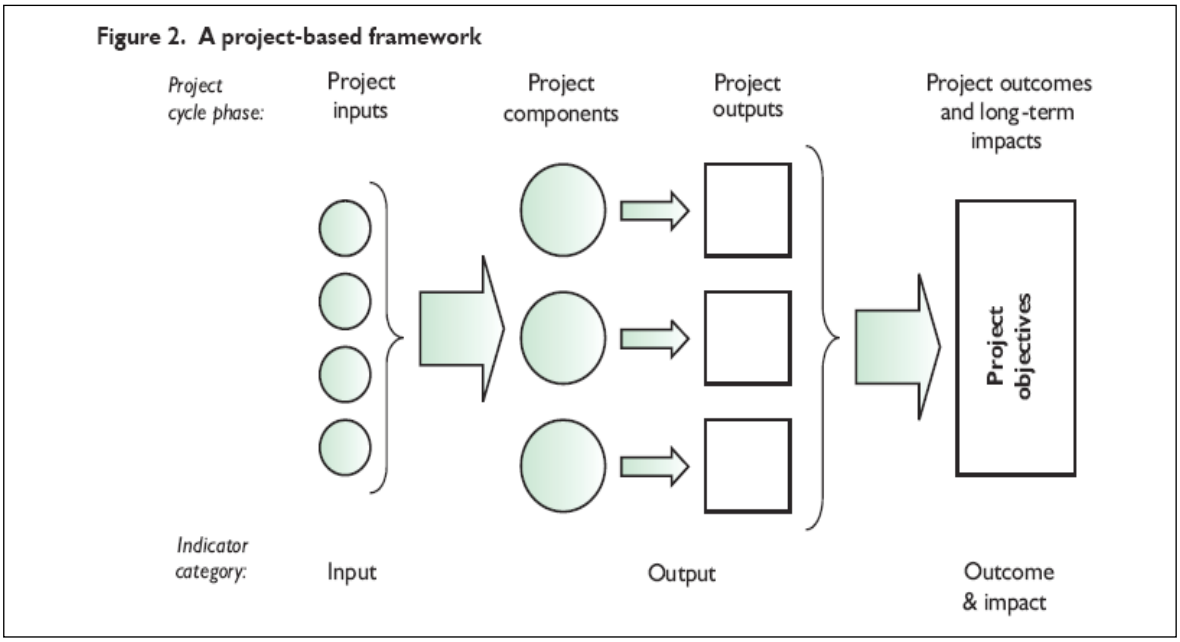


Figure 1.0. Project-Based Framework, proposed by the World Bank as a framework for environmental improvement project evaluation. (*Source*: Segnestam, 2002)

According to the report, a feature of these frameworks is that they enable the user to determine whether all concerns (whether they are impacts and pressures in general or related to specific themes) are being monitored and addressed.

World Bank literature also describes the importance of indices for environmental evaluation. If two or more indicators, alternatively several data, are combined an *index* is created. Indices are said to be commonly used at more aggregated analytical levels, such as at the national or regional level. At these levels it may not be easy to analyze the causal links using individual indicators since the relationships between different indicators become more and more complex the more aggregate the analytical level is.

No material was located that included indigenous environmental indicators, despite recognition of the need for participation by indigenous peoples, such as this one regarding natural resource management in the World Bank's Environment strategy. *Identifying local preferences through direct consultation and incorporating indigenous knowledge are particularly important in cases involving indigenous peoples* (The World Bank, 2001).

Table 1. Major areas, themes, and sub-themes from the UNCSD initiative

Major Areas	*Themes*	*Sub-themes*
Social	Equity	Poverty Gender equality
	Health	Nutrition status Mortality Sanitation Drinking water Healthcare delivery
	Education	Education level Literacy
	Housing	Living conditions
	Security	Crime
	Population	Population change
Environmental	Atmosphere	Climate change Ozone layer depletion Air quality
	Land	Agriculture Forests Desertification Urbanization
	Ocean, seas and coasts	Coastal zone Fisheries
	Fresh-water	Water quantity Water quality
	Biodiversity	Ecosystem Species
Economic	Economic structure	Economic performance Trade Financial status
	Consumption and production patterns	Material consumption Energy use Waste generation and management Transportation
Institutional	Institutional framework	Strategic implementation of sustainable development International cooperation
	Institutional capacity	Information access Communication infrastructure Science and technology Disaster preparedness and response

Source: UNDSD 2001.

1.1.3. The Organisation for Economic Co-operation and Development

In contrast the Organisation for Economic Co-operation and Development (OECD), another leading international organisation in the development and promotion of environmental indicators has been conspicuous in its omission of recognition of the importance of indigenous indicators. Co-ordinated by the OECD Working Group on Environmental Information and Outlooks (WGEIO), its Environmental Performance Reviews Program involves peer reviews of environmental conditions and progress for each member country.

These scrutinise efforts to meet domestic objectives and international commitments and provide recommendations. The first cycle of 32 Reviews (all OECD countries and three non-OECD countries) was completed by 2000. A new cycle began in 2001, described on the OECD website as focusing on accountability, environmental effectiveness, and economic efficiency.

We could not obtain full copies of the reviews completed for OECD member countries (which might include some reference to indigenous peoples), and could find no reference whatsoever in the written summaries of these reviews or on the OECD website to indicators relevant to indigenous peoples. The abstracts for the reviews, such as Canada, the U.S. and Australia, which are publicly available and where one might expect to find references to their indigenous peoples, did not include any.

The OECD has developed and advocates the Pressure–State–Response (PSR) model, widely used in the development of indicators internationally (Figure 3).

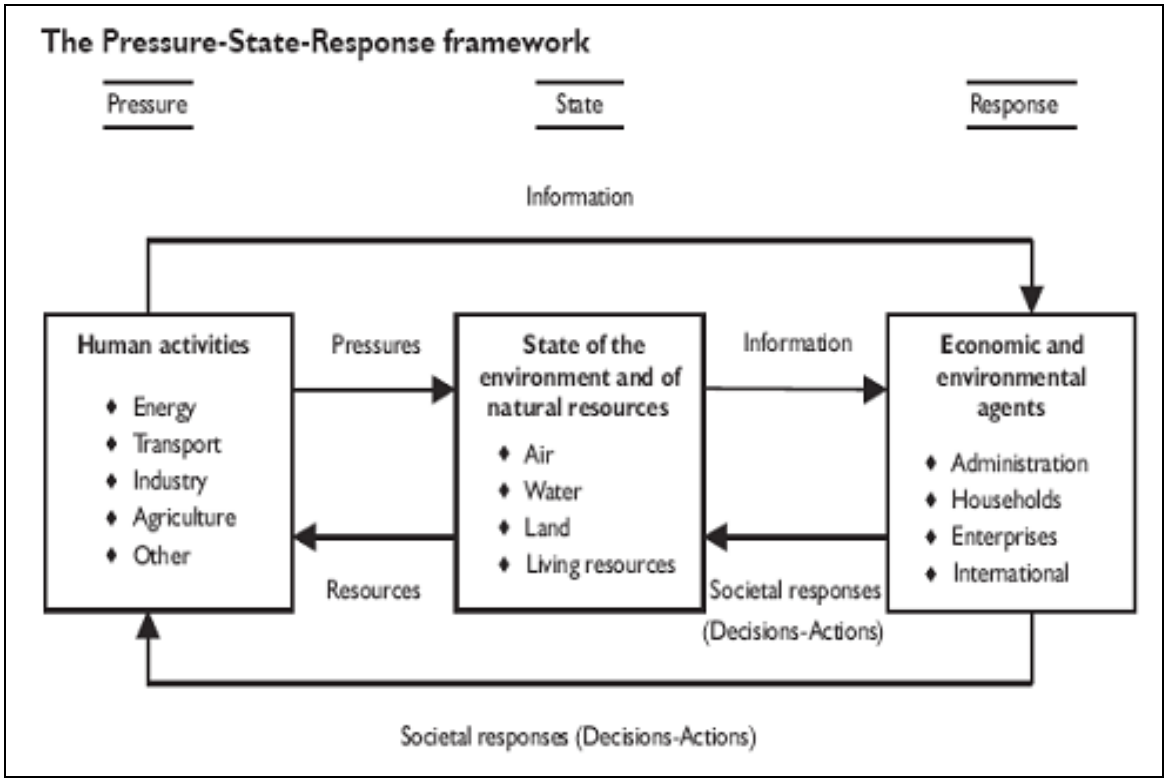


Figure 1.2 Schematic representation of the OECD Pressure State Response (PSR) Model. (*Source*: OECD, 1994)

Perhaps not surprisingly given the organisation's commitment to "democratic government and the market economy", the OECD document *OECD Development Indicators – Development, Measurement, and Use* states that for reasons of analytical soundness an environmental indicator should be:

- theoretically well founded in technical and scientific terms;
- based on international standards and international consensus about its validity;
- able to be linked to economic models, forecasting and information systems.

This would appear to be in conflict with positive UN calls regarding indigenous indicators. Given that the OECD reviews had been completed since the late 1990s, and that the OECD made specific mention of UN conventions, such as Rio and Agenda 21, which recognised the importance of incorporating indigenous perspectives in the development of national indicators, the total absence of references to indigenous indicators is of concern.

The definitive OECD record of environmental indicators is in a report entitled *OECD Key Environmental Indicators 2004*. It includes not a single indigenous indicator. This reveals the extent to which this organisation, and (according to OECD) its constituent governments

recognised at that time the value of indigenous indicators. The report is described by OECD as follows:

> *The present report is one of the products of the OECD programme on environmental indicators. It includes key environmental indicators endorsed by OECD Environment Ministers in May 2001 for public information and communication by OECD. These indicators give a broad overview of environmental issues in OECD countries and are updated every year(OECD, 2004).*

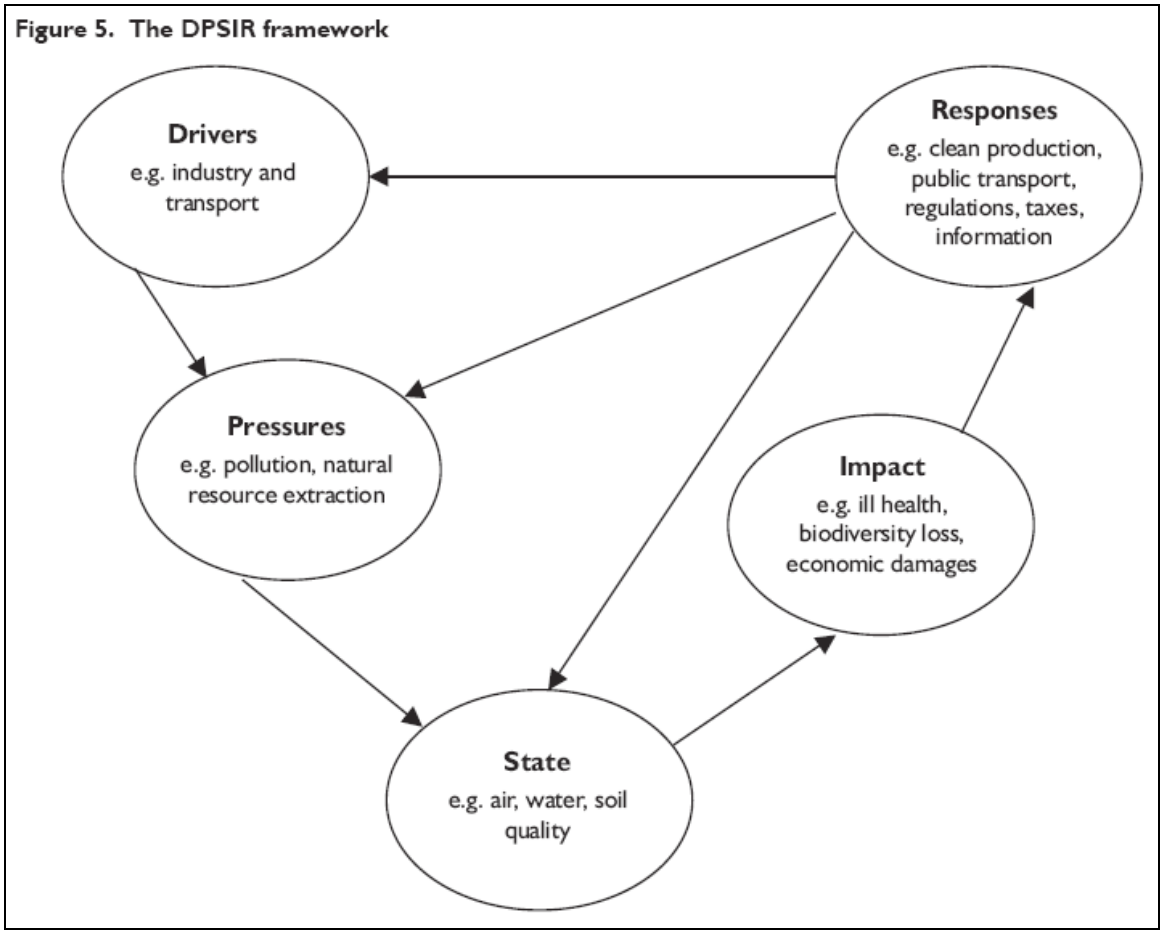


Figure 1.3. The Drivers-Pressures-State-Impact-Response (DPSIR) framework, an extension of the PSR (Pressure-State-Response) model (*Source:* Hauraki Mäori Trust Board, 1999).

The World Bank discussion paper on *Indicators of Environment and Sustainable Development - Theories and Practical Experience* (Segnestam, 2002) cited above makes an highly debateable claim on the use of the PSR framework. It reports that the United Nations Commission on Sustainable Development (UNCSD) used the PSR framework to organize the indicators selected during the international development of indicators for the monitoring of sustainable development, but that the framework turned out to be rarely used by testing countries and was therefore abandoned, and that instead, the indicators selected were organized according to Major Areas, Themes and Sub-themes.

This is not, however, supported by our reading of the international indicators literature, where the PSR model is regularly referred to as being used in many countries.

1.1.4 Summary

The organisations and associated activities discussed above are important to the consideration of indigenous outcomes and indicators for several reasons. The various working groups of the United Nations have been instrumental in promoting indigenous rights and environmental knowledge internationally, thereby forcing governments to acknowledge them.

The resulting conventions, which many states have formally adopted, specifically acknowledge the valuable contribution indigenous peoples can make to environmental management, and establish the grounds on which they must be allowed to participate.

Additionally, these organisations have developed the models or frameworks that have often been adopted internationally for the development and analysis of environmental outcomes and indicators, and, as we will see below, these have been used widely for indigenous outcomes and indicators.

1.2 Documents on Indigenous Outcomes and Indicators

In this section we review published material available internationally on indigenous environmental performance indicators. However, none of the articles included discussion of indigenous outcomes. Rather, our search for indigenous outcomes returned literature relating primarily to socio-economic development, justice, health, and education. The term "outcome" was being used (as with non-indigenous outcomes) largely in relation to policy outcomes. This literature, while interesting, was not considered to be useful for the purposes of informing our kaupapa Mäori outcomes and indicators project.

The small number of documents reviewed is indicative of the scarcity of such literature. Some additional material was found that purports to relate to indigenous environmental performance outcomes and indicators (EPOI), but are neither based on indigenous values systems, nor developed by indigenous peoples. Given that the purpose of this review is to provide an overview of indigenous EPOI, such material is generally excluded.

1. First Nations - Environmental Knowledge and Approaches to Natural Resources (Research Project)

Documents	Methodological Approach (94 pages, including appendices); The Naturalized Knowledge Systems of Indigenous Communities (5 pages A4); Grassroots Indicators for Sustainable Development (4 pages A4)
Authors	Mohawk Council of Akwesasne / Institute for Research on Environment and Economy – University of Ottawa; (Mohawk Council of Akwesasne and Institute for Research on Environment and Economy, 1994) Salli M.K. Benedict Helen Hambly

Links	http://web.idrc.ca/en/ev-26155-201_000200-1-IDRC_ADM_INFO.html http://idrinfo.idrc.ca/archive/reportsintra/pdfs/1996e/112117.htm http://archive.idrc.ca/books/reports/V231/susdev.html
Notes	This project, a joint cooperative project between four communities and the Mohawk Council of Akwesasne (MCA) and the Institute for Research on Environment and Economy, focuses on the environmental knowledge in Canadian Indigenous communities, and particularly on Indigenous environmental indicators and their structure, measurement, and evaluation. The project ran over several years from 1993. There are three documents relating to this project reviewed here: the Methodological Approach report for the project, Grassroots Indicators for Sustainable Developmen;, and The Naturalized Knowledge Systems of Indigenous Communities, the latter 2 articles from the International Development Research Centre Reports (one of the organisations supporting the project) archive. I have not been able to obtain a copy of this second report called First Nations Environmental Knowledge and Approaches to Natural Resources and Results of the First and Second Year of the Pilot Project. The Methodological Approach report summarizes the Problem Statement (Chapter 1) of the project; Goals of the project (Chapter 2); First Nations' Approach to Environment (Chapter 3); Methodology Development itself (Chapter 4); and basic analysis of the approach to Environmental Indicators (Chapter 5). The declared goals of the project are: 1) Organize indigenous community-based research; 2) Document the transfer of knowledge within and between indigenous communities; 3) Determine community-defined environmental indicators; 4) Utilize environmental indicators as tools for the analysis of community needs; and 5) Assist in organizing community-based environmental services. This review will focus on objectives 3 and 4 relating to indicators. Because the final report could not be obtained, this review will be incomplete – but the project it considered of such importance in terms of international indigenous indicator development that the review is included. I will include a substantial account of the methodological approach taken for the project.
Methodology	The project participants recognised that at that time there was no existing methodological blueprint available. The report stresses the importance of this project in being led by the indigenous peoples whose knowledge is being investigated. The authors say the communities must have direct impact on the

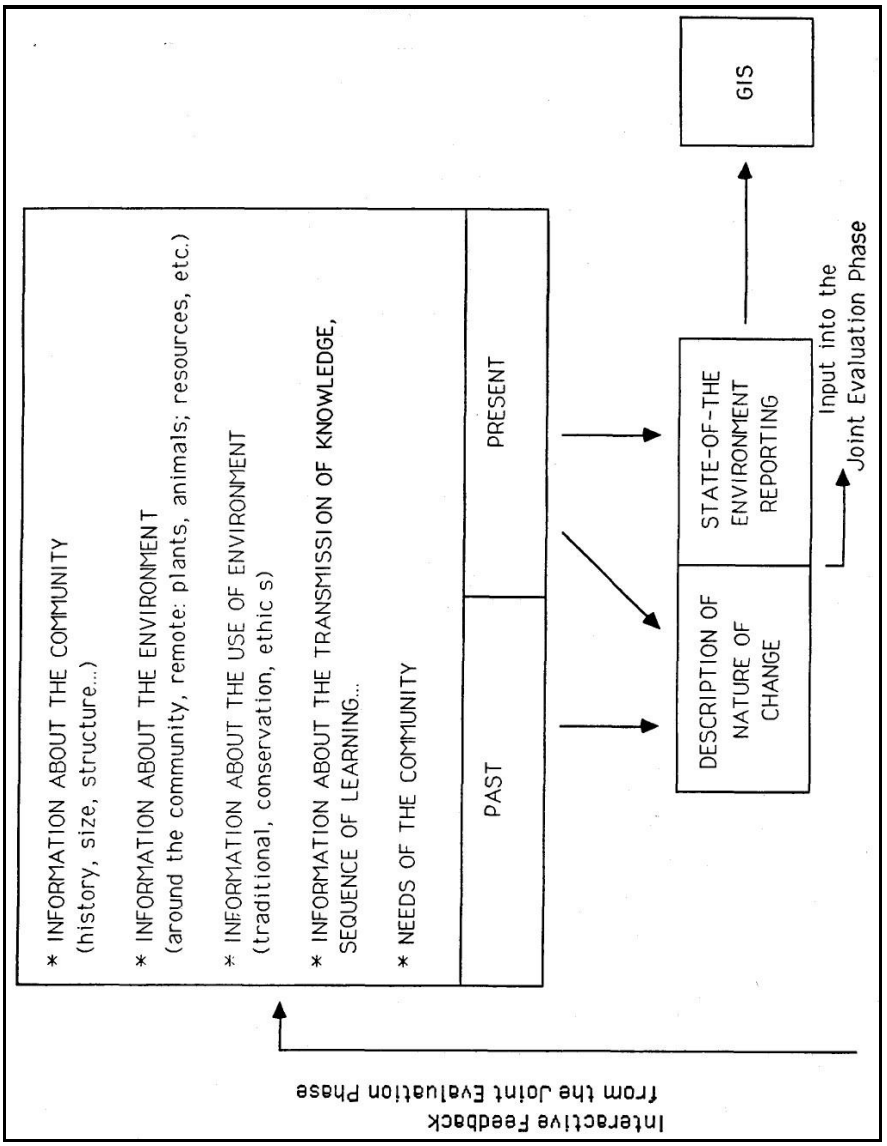
	development of methodology, but as a parallel process with that being developed with an advisory group (another community, university, government agency), in this case the Institute for Research on Environment and Economy (IREE) from the University of Ottawa. In addition, it is acknowledged that the application of the methodology has to be an iterative process, which is continuously discussed with the members of the communities involved. Additionally, the project was led and supervised by Indigenous scientists, political advisers, and managers. Approaches were made in the first instance by the Mohawk Council of Akwesasne, recognising the importance of first contact being by first nation's people. Where interest was shown a trip to the community was made by a chief of the Mohawk community, the environmental director of the Mohawk Council of Akwesasne, and a principal investigator from IREE. At this stage, the potential scope of work was explained to the community chiefs and elders, the impact of the participation in the study was outlined, and the proposal to participate underwent the scrutiny of the community. After discussion, the approached community decided whether or not it would participate in the project. Individual communities were asked what they considered to be an environmental indicator. These indicators were then, in cooperation with the communities, categorized according to the type of indicator (physical, biological, spiritual-perception), the type of environmentally-defined conditions (forest, prairies, mountains, i.e., site or eco-system specific), and the size of the system. (See image below in Indigenous values section.) The political environment in which this project was taking place is recognised, and the impact of colonisation on the participant indigenous communities discussed as follows: *Indigenous people lived as part of the environment - their lifestyle and existence as part of the environment was one and the same. This relationship deteriorated due to the market economy, starting with the redirecting of subsistence hunting and trapping towards a fur-oriented system, and its environmental impacts, i.e., logging, roads, hydro power development, and industrial development. Lifestyle changes have coincided with the introduction of monetary payments to communities and individuals (that can be belatedly classified as the combination of misdirected patronizing good will and guilt).* Those developing the methodology suggested that a general methodology was required, being a set of preconditions required for the methodology design itself. These preconditions have then to be analyzed, the purpose of which is to answer the question(s): is this the relevant scale, is it suitable, and is it useful for the community level of work? It was considered important to have representation from communities of varying sizes, tribal affiliation, geographic and ecological conditions, socio-economic profiles (agricultural communities,

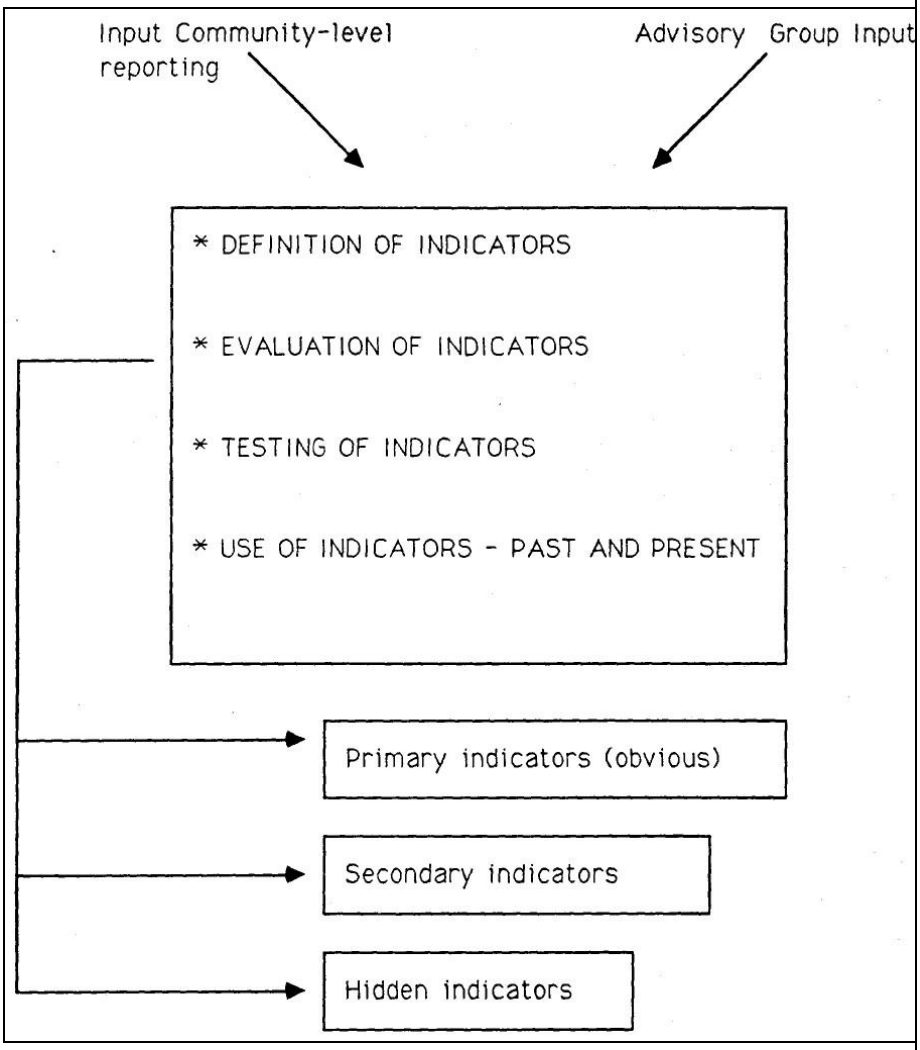
hunter-gatherer communities, etc.), and exposure to different levels and types of outside pressures. All five communities used the same basic strategy, essentially identifying indicators of environmental change, the causes of environmental change, and the means of learning about the environment. The techniques for gathering information included: questionnaires, interviews, and discussions, with attention paid to representing both genders, as well as young and old community members.

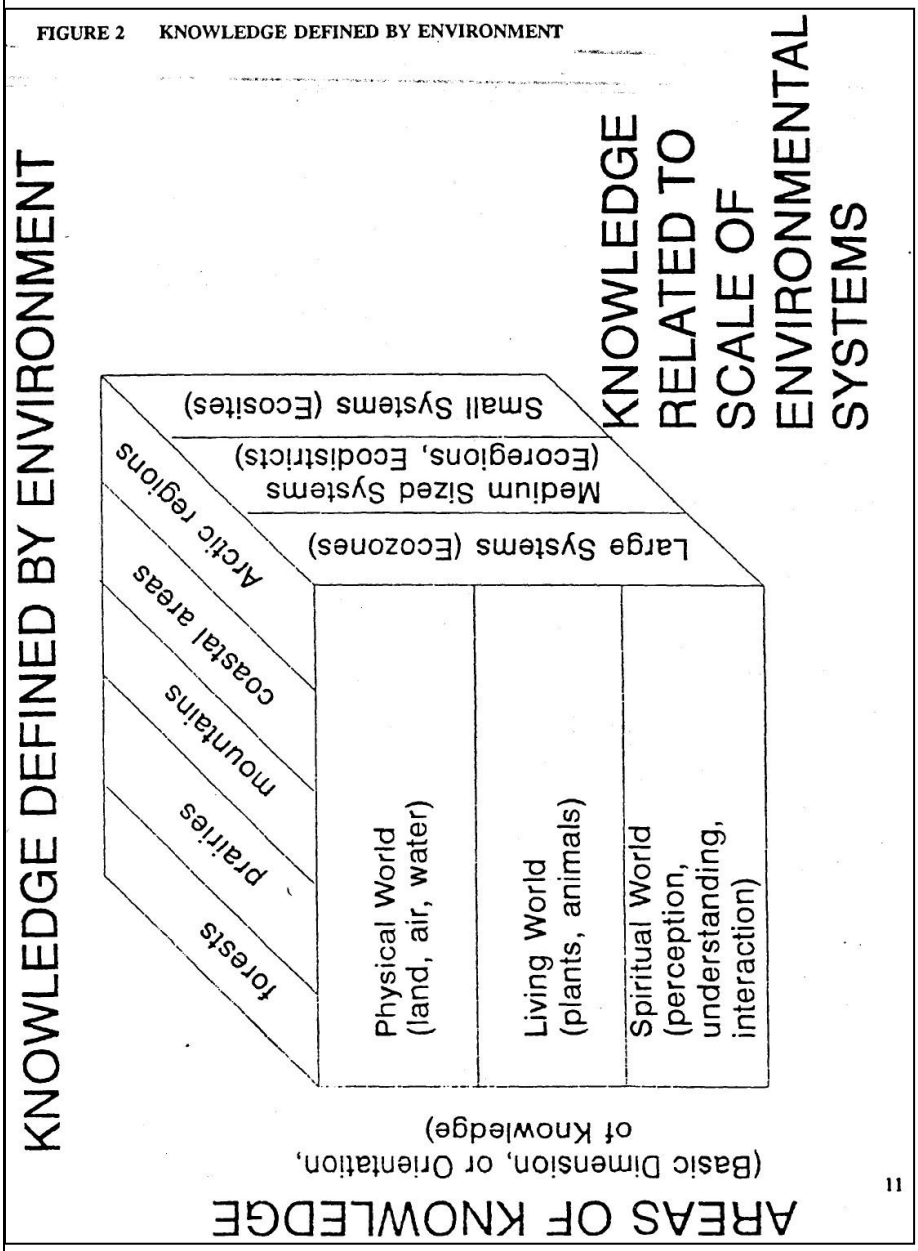
An initial set of indicators was developed according to the following process:

The community representative should collect opinions about the primary, i.e. the most obvious, environmental indicators. This information is used for indicator design (done together with the coordinating community and advisory group). Indicators designed this way will be then evaluated and scrutinized.

This process is then repeated several times and it is expected that, iteratively, the information on primary environmental indicators will be more specific and gradually, community members will be willing to discuss additional indicators.



	Indicators are categorised as primary (obvious) indicators, secondary indicators, and hidden indicators, but there is no further discussion about what these mean. 
Indigenous values systems	There is an introductory section in the report on the First Nations peoples "approach to the environment" which details their world view and values system under the heading 'Main Principles of Teaching". The perspective recorded is one of genealogical connection to all parts of the world, with the earth seen as mother and mankind siblings, consistent with a Mäori world view in New Zealand. This illustration is used to represent the way indigenous knowledge (as relates to environmental indicators) is categorised within this study. The researcher for one of the communities involved in the project observed the importance of place names and traditional stories about places in terms of understanding environments:

	 *The environment has its own language that it reveals to us, and the place names reveal environmental knowledge that was once common," says Tenasco. "It may now be in need of revitalizing. We believe that the Anishnaabeg have a great contribution to make in helping humanity redirect its thinking and understand how to live within what the environment can sustain.*
Western v Indigenous values	The writers explain that Western society can learn very important concepts and approaches [from indigenous ecological knowledge] not only about the environmental science, but also about learning and thinking in general. *The very basic idea of plurality of approaches and plurality of environmental thinking and behaviour can be beneficial. They explain that environmental indicators as seen by Indigenous communities can positively enhance the development of 'western' science dealing with the indicators development (especially measurement methods), and that some approaches and methods of the 'classical' science are relevant and can be useful for communities*

	without harming their independent views and approaches. Indigenous environmental knowledge (also called naturalized or traditional) is described in the report as: *A complex system of knowledge, with its philosophy, methodology and application techniques. It is not a "non-science" in need of "elevation" on the science level. However, certain techniques of so-called western science (GIS, monitoring methods in general) can enhance applicability of the naturalized environmental knowledge. On the other hand, there are many instances where this knowledge system can enrich and enhance western science. This area of work certainly deserves long-term attention.*
Models	Henry Lickers, a biologist and chief investigator overseeing the project for the Mohawk Council of Akwesasne, describes the "research model" as being based on ancient Haudenosaunee and other indigenous principles, which directly involves members of the indigenous communities: *They identify their own environmental priorities, criteria, and indicators, and suggest the methods for utilization of natural resources," says Lickers. "We have great respect for the knowledge that each community holds and great confidence in their abilities to show us their own answers.* Benedict refers to "the principles set forth in the Canadian research model" being applied elsewhere, but these are not defined in the Methodological Approach report as a model. There is no further discussion in terms of models in these documents, however there is discussion about the holistic approach to environmental management of all the first nations peoples, and this is contrasted with the compartmentalized approach of Western managers. While the Pressure-State-Response model is not referred to specifically, the influence of this approach is revealed in the Methodological text, for example here where western and indigenous approaches to indicators are discussed: *Environmental indicators focus on trends in environmental changes, stresses causing them, how the ecosystem and its components are responding to these changes, and societal responses.*
Outcomes described	Environmental outcomes are not included in this report, but there is some discussion of the aspirations of the participant communities in terms of ecological and social/cultural objectives.
Indicators described	The documents considered here were written prior to the completion of this project and identification of indicators. The Methodological Approach report records that the main role of environmental indicators for Indigenous communities seems to be as follows: • illustrating a transfer of knowledge within and between; • communities; describing the level of change within communities; • measuring the ratio of dependency on the environment;

	• measuring dependency on the environment (environmental indicators represent socio-economic and cultural indicators as well); • and helping in identification of the measures needed for community stabilization. The first nation's participants make clear that they do not distinguish environmental indicators from social, economic, or cultural indicators. For example; *Indigenous environmental indicators, besides being also technical and quite specific, include often general well-being factors, some of these factors can be loosely described as spiritual factors, and can be usually interpreted, and that is the major difference, as the socio-economic indicators of Indigenous societies.* *For Indigenous societies, environmental indicators used to be, and to a large degree still are, also socio-economic indicators. Primary Indigenous environmental indicators (moose, caribou, salmon, sturgeon, medicinal plants, etc.) report not only on the level of change of the physical environment surrounding communities; they are often indicative of changes in economic activity and social stability of these communities*. An example is provided of this relationship: *Interestingly, for First Nations people, indicators of environmental decline simultaneously uncover links to social violence and declining health standards. At an IDRC Grassroots Indicators Workshop, held in Ottawa in late 1993, Henry Lickers provided a unique example of such a grassroots indicator: changes in the number of women who preserve food as a measure of domestic and social security. Women preserve fruits, vegetables, meat and fish when they feel assured of social and domestic stability.* Lickers defined domestic stability in terms of lack of domestic violence and addictive behaviour as well as economic well-being. While indicators are not listed, it is identified that two basic types of background information need to be collected: 1) historical and socio-economic information: and 2) physical, geographical and climatological information. Under these headings the following information types are recorded:Maps – Location, Vegetation / Forest, Geology / Surficial, Soil, Fauna Literature - Vegetation / Forest, Resources, Climate, Water, Land Use Data - Water flows, Water levels, Water quality, Relevant climate normals [sic]. Additionally the report notes that the a recent development programme by Forestry Canada divides indicators in the following categories, and notes that these are linked (either directly or indirectly) with the development of Indigenous environmental indicators: 1. *Conserving biodiversity* 2. *Water, air and soil quality* 3. *Productive capacity*

	4. *Contribution to global ecosystem* 5. *Long term wealth* 6. *Competitiveness* 7. *Return from the resources* 8. *Distribution of benefits* 9. *Employment* 10. *Community stability* 11. *Access to nature* 12. *Empowerment of communities* 13. *Cultural and spiritual benefits* 14. *Native rights* The following indicators, descriptions, and analysis of community-related data, is recorded in relation to the development of indicators. These reinforce the indigenous view that environmental indicators can not be separated from social, cultural, and economic considerations; • *Estimate of number of people living predominantly in direct contact with the Community natural environment of the community, types and forms of the direct contact; data estimates for approximately 1970 and 1945 (one and two generations back).* • *Similar information for people with more than half- or quarter- of their time living in direct contact with the natural environment.* • *Overview of elders living in the community and its individual settlements, who have extensive knowledge of natural environment and its descriptive and spiritual characteristics.* • *Methods of teaching young people - specifics of gender, ways and length of teaching, generations involved.* • *Description of environmentally important locations* • *hunting areas, trap lines, fishing grounds, harvesting areas.* • *Description of species for individual environmentally important areas* • *numbers of species - current, known cycles, 'optimal' numbers. What are the indicators of health/disease of species. Observed changes in numbers, health.* • *Description of environmentally important locations related to the time of the year seasonality, stability of the location should categorized (stable, stable with variations, unstable).* • *Period of time of observation the environmentally important area: estimate of observation total (years, generations); estimate of observation length with available information (multi-generational site observation); how many people (groups, structure of these groups) visit the environmentally important areas.*
Currency	These reports do not extend to consideration of the currency of indicators identified, but there is considerable discussion about the

	importance of turning to traditional knowledge as a means of solving contemporary problems. According to Richard David, assistant director of the environmental division at Akwesasne: *... it is important that our people do their own research. We are the only ones who will be able to find solutions that work for us, for long and short-term environmental problems. If we look at the systems our people once practiced, there are clues to fixing the troubled indigenous communities of today.*
Universality	The importance of recognising issues of scale is referred to several times in these documents. As discussed above in the methodology section communities were selected that had diverse geographic, environmental, tribal, and socio-economic (in terms of traditional lifestyles as well as influence of mainstream culture) environments: *Existing environmental indicators, as applied on a national or even on an international level, have been developed for use on a much larger scale and, therefore, cannot be transferred effectively to the level of a typical Indigenous community.* Universality is recognised in the report as one of the key issues in the development of indicators, along with linkage to sustainable development, availability of data, and cost of measurement.
Implementation	The implementation stage is not discussed in the reports cited here.

2. Voices from the Bay': Documenting and Communicating Indigenous Ecological Knowledge from the Hudson Bay Bioregion

Authors	Compiled by Miriam McDonald, Lucassie Arragutainaq, and Zack Novalinga (McDonald, 1997)
Link	http://www.carc.org/pubs/v25no1/voices.htm - for description of project http://www.nuffic.nl/ik-pages/ - for extract from the final report, 3 chapters.

Notes	As a result of concern in both southern and northern Canada about the cumulative impact that several proposed hydroelectric projects would have on the natural environment and the indigenous inhabitants of Hudson and James Bays, the Hudson Bay Traditional Ecological Knowledge and Management Systems (TEKMS) Study was initiated during the winter of 1991. The aim was to inform public policy and environmental decision-making for the Hudson Bay bioregion. Involving 15 Inuit and 13 Cree communities, who are indigenous to the Hudson Bay Bioregion of arctic and sub-arctic Canada, this document details traditional indigenous knowledge, including linkages: *Their holistic view of the environment lends itself to a natural appreciation of linkages -- if a particular phenomenon is observed, then other conditions probably also exist -- among, for example, the seasonal cycles, weather, currents, and sea ice.* The report is largely a series of statements by local people – as reflected in the title. This project does not seek to develop contemporary environmental indicators, but rather records the traditional indigenous knowledge of local peoples. This knowledge includes substantial discussion of traditional indicators, and of traditional versus western knowledge.
Methodology	Thirty communities were invited to participate in the community-led study to document the traditional ecological knowledge of Inuit and Crees living on islands and areas surrounding the Hudson and James Bays. The approach and methodology developed for the study included the active participation and commitment of a number of indigenous communities and individuals living in a large, remote, and sparsely populated bio-geographical region of Canada. Community-based and community-driven, indigenous peoples were actively involved in all aspects of the research process: design, development, compilation, synthesis and the production of results. The combination of active participation and involvement is recorded as resulting in indigenous thinking and knowledge being integral to the study. The process involved: • initial regional meeting of nine coastal and island communities where the indigenous delegates discussed their environmental concerns, selected communities for involvement in the study, and identified the discussion topics for a series of regionally based meetings • six regional, community-based meetings in 1992 and 1993, in which 78 Elders, hunters and women participated shared their knowledge concerning rivers, currents, sea ice, weather, animals, human health: • traditional management, and the effects of development in the coastal, marine and some inland areas of the Hudson Bay bioregion; • IK (indigenous knowledge) recorded on map overlays, audio

	tapes and paper was translated and transcribed into English in the host communities; • Resulting information was organized into general topics and synthesized for review and verification by the same IK holders during a second series of meetings. Second regional workshop. Joint workshop with an equal number of scientists familiar with, or working in, the Hudson Bay area. The implications of the environmental changes for social, cultural and physical systems were discussed.
Indigenous values systems	The report includes numerous statements by indigenous peoples from the Bay putting forward their perspectives. These are based on their own world views, the report being primarily concerned with encapsulating indigenous knowledge in order to influence environmental and government decision making. There is little contextual explanation or over view given regarding the values systems of the participants, rather an assertion as to the validity of traditional wisdom: *The knowledge of our Elders is even more important today ... We cannot, nor should we, be forced to stop using the land today or in the future.... We have always depended on [our Elders] for guidance and, today, it is evident we will still turn towards [them] for [their] wisdom.* The following extract describes the scope of the investigation as relates to indigenous world views: *In May 1994, 12 IK holders from the study presented and discussed their findings on climatic changes, changing current and ice regimes, long-term effects of flow diversions, habitat change and loss, animal population and migration changes, contamination of the Hudson Bay food web, and changing land use patterns. This was done in a joint workshop with an equal number of scientists familiar with or working in the Hudson Bay area. The implications of the environmental changes for social, cultural and physical systems were also discussed.*
Western v Indigenous values	A declared purpose of the report is to advance global knowledge systems by combining traditional ecological knowledge and scientific data for educating and informing people on the dynamics of a particular ecosystem. The report investigates social issues, such as the imposition of western education and employment on indigenous communities, and the potential this has to undermine traditional practices and knowledge: *Traditional ecological knowledge is rooted in a way of life that gives meaning to aboriginal existence. Experience and knowledge handed down from generation to generation provided understanding and guidance to sustain life. Today's Elders try to continue this tradition, but, in their lifetime, they have experienced outsiders taking control of almost every aspect of their lives -- including their children's education, their economy, lands, rivers, and the way they can hunt,*

	trap, and use the animals... *The Elders are the ones that are the scientists and professionals in our land.... [white people] have their experts and our experts are the Elders. We should be comparing the knowledge of those two.*
Models	In the articles obtained (containing 3 chapters from the original text), additional discussion documents relating to the project, and the project website, there was no mention of models.
Outcomes described	There is no explicit mention of "outcomes".
Indicators described	The complete indicators table from the document is included in Appendix B of this PUCM Māori Report 5.
Currency	Several of the writers describe climatic and weather pattern changes, and the way that these have rendered environmental indicators their elders used unreliable. *Even if we try to predict what it is going to be like tomorrow ... the environmental indication isn't what the Elders said it would be. ... In the past, when they said, "it's going to be like this tomorrow" it was. But, our weather and environment are changing so our knowledge isn't true all the time now.* Others spoke of indicators of change: *When I was a young man, the only thing that made the sky look different was natural smog from the south winds. It came from the burning trees way down south. In today's weather, very dirty things are falling from the sky.* *Since the 1940s, weather in northwestern Hudson Bay has become highly variable. There used to be more clear, calm days, winters were colder, and low temperatures persisted longer. By the early 1990s, weather changes were quick, unexpected, and difficult to predict. Blizzards, for example, would occur on clear days in the Chesterfield Inlet area, but on days when environmental indicators suggested a blizzard, it would not materialize.*
Universality	The comments included are recognised as being specific to the experiences of each local community, and the project as a whole is concerned with recording the indigenous knowledge of this geographic area. There is no discussion regarding the wider relevance of these perspectives.
Implementation	The report records that traditional ecological knowledge as an IK (indigenous knowledge) practice is still in use throughout the Hudson Bay bioregion on a daily, seasonal, and year-round basis. Elders, hunters, women and youth acquire and apply it in pursuit of sustainable livelihoods. Youth learn of IK through stories and the sharing of food with Elders on the land and in the communities' primary and secondary schools.

3. Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage

Authors	Australian Department of the Environment (Pearson, 1998).
Link	http://www.deh.gov.au/soe/heritage/heritage-ind.html
Notes	Commissioned by the Australian Department of the Environment as part of a Commonwealth state of the environment reporting programme to develop a comprehensive set of environmental indicators, this report describes a project intended to develop heritage indicators, including indicators relating to indigenous archaeological places, indigenous contemporary places, and to indigenous languages. A set of 43 "key environmental indicators" are developed. The numbers for each category are: 8 general ; 3 natural heritage places; 8 indigenous archaeological places; 6 indigenous contemporary places; 9 indigenous languages; 2 historic places; and 7 heritage objects. However, it is observed in the report that none of these themes is independent of the others. It is reported that: *while the indicators are presented in separate sections, every effort has been made to deal with the environment in a holistic sense, and to recognise the complex inter-relationships that exist.*
Methodology	The report is said to build upon "Australia: State of the Environment 1996" (the State of the Environment Advisory Committee), its associated technical reports, a specialist workshop held in 1997 by Environment Australia, and contact with the range of other projects being undertaken to develop key environmental indicators for other aspects of the environment. In addition, the consultants are reported to have reviewed a wide range of other material and held discussions with many people, but there is no indication of the extent to which indigenous views were included. There is also no indication of indigenous input into the design of the project. It is stated that the 1997 workshop included indigenous participants, who expressed the crucial importance of the values of the custodial communities, and that these discussions and the potential indicators that emerged from them have been important in shaping the development of indicators in this section. However, the contact list of people and organisations that were consulted during the course of the study reveals no identifiably Aboriginal individuals and none of the organisations to which these belong are Aboriginal groups. Similarly, the list of references indicates a reliance on academic and institutional literature. The evaluation of indigenous culture and heritage is divided into three overlapping categories: 1) places, complexes of sites, and cultural landscapes that inform us about the past (places of primarily archaeological significance);

	2) places and complexes of places or cultural landscapes that are part of continuing, living traditions or contemporary cultural practices of indigenous communities, or have special significance to them; 3) the role of Indigenous languages as a critical factor in the maintenance and good health of heritage values, and hence of heritage values of places, which have to be recognised and monitored.
Indigenous values systems	The authors acknowledge throughout the report the importance of incorporating community and indigenous perspectives. For example: *The archaeological record also has special values for the community that may be quite divorced from the scientific research values. These must be respected, and community involvement fostered, with development of culturally appropriate approaches to the identification, investigation and interpretation of indigenous places of archaeological significance.* However, the means or extent of such involvement in this project is uncertain, as discussed above. Rather, the report seems to repeatedly refer to indigenous values and histories as per contemporary writings on, rather than by, Aborigines. For example: *For contemporary Indigenous people archaeological sites have heritage value as a record of their past, and in many cases these places have direct cultural associations with the present. Places that are significant in the ceremonial or religious life may be the subject of important stories and song cycles. Places of this kind are vital in their social meanings, which often carry over many generations. They are expressions of the spiritual links between people and the land, symbolising the vital continuity between different planes of meaning in Aboriginal belief systems, linking the Dreaming with the present (p.18) is from an article by prominent Australian anthropologist Fred Myers.* The importance of indigenous language is also described, and indicators specifically for indigenous languages included. But again the perspective given is that of an outside observer. The majority of information relating to language is from academic studies.
Western v Indigenous values	The report rejects a strict division along scientific versus traditional knowledge lines, instead considering these as complimentary: *In considering this division [the 3 categories shown in Methodology above] we must stress that though it may seem rooted in a division between scientific values and social indigenous values, this is neither the intention nor the basis of the division. We must recognise the many different layers of meaning that can be held or acquired by places. These include the strong social value often given archaeological sites of great antiquity by contemporary local indigenous communities. (p.17).* The writers also acknowledge that: *In the cultural heritage arena the concept of 'scientific credibility' must be extended to ensure that the indicators are also historically and culturally credible.* However, a scientific bias is obvious throughout the report, for

	example: *They [recommendations included in the report] are, however, a scientific basis for longer term planning of environmental monitoring and related activities*... and ... *These reports are advice to Environment Australia and have been peer reviewed to ensure scientific and technical credibility. No such peer review was conducted to ensure cultural acceptability.*
Models	The Pressure, State, Response model is used. This is acknowledged as the OECD PSR model. Also called the condition-pressure-response model in the report.
Outcomes described	None included
Indicators described	The table from the report including 43 indicators, which are categorised according to issue and by pressure, condition, and response, is included in full in Appendix B of this PUCM Māori Report 5
Currency	Whether traditional indicators are still valid is not discussed. This is due to the project being concerned only with the development of contemporary indicators. Temporal issues are considered, however, in relation to monitoring programmes. The writers recognise that different issues dealt with in the indicators have their own particular dynamics, and monitoring programmes to detect change will need to be appropriate to the scale and rate of change likely to be observable in the particular circumstance. The report records that most of the indicators' change could be expected to be detected within a four-five year time span.
Universality	The study identifies indicators that may be appropriately applied at different spatial and temporal levels, and that measurement and reporting should be undertaken accordingly: *Choosing the appropriate spatial and temporal scales for expressing indicators of natural and cultural heritage is critical. If an inappropriate scale is chosen, data from monitoring will fail to reflect adequately the changes in the state of the heritage environment at scales that are meaningful to management and funding agencies, and the indicator data will not prove useful. Indicators generalised to the national level and not able to be analysed at a smaller scale, for example, would prove of little use to State and Territory, local government and community managers and planners, and would not indicate critical regional variations, while reporting at the local level and not allowing for data to be amalgamated to give an overview of changes at the regional, State and national levels would prevent the data being used to make strategic responses at those levels.* The report does not consider issues such as whether indicators developed for one indigenous group will be valid for another, or whether indigenous indicators will apply to non-indigenous

	situations.
Implementation	The report discusses monitoring and issues relating to implementation of these indicators, such as resources required. For example: *The census and analysis should be carried out at least once in each SoE reporting cycle. It may best be undertaken separately for the component parts (natural, indigenous, historic and objects) depending on the extent of the linkages between the various databases involved.* But none of the indicators had, at the time of publication, been implemented.

4. Implementing State Of The Environment Indicators For Knowledge And Condition Of Heritage Places And Objects

Authors	Michael Pearson. (Pearson, 2001)
Link	www.ea.gov.au/soe/techpapers/index.html
Notes	This Australian report details early results of the implementation of eight previously identified indicators for heritage. The development of all these indicators is recorded previously in *Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage* reviewed above. The bulk of the report relates to implementation of heritage indicators that bear no relationship to indigenous issues (museum collections, art galleries, parks and reserves, build European heritage). However, because it is one of the few documents describing the implementation of (amongst others) indigenous indicators it is reviewed here.
Methodology	The implementation described relied largely on the analysis of heritage site and object data collected by a large number of agencies responsible for heritage monitoring. The authors report that data was of varying qualities and completeness, and this in turn had a bearing on the results of implementation; *Finally, in several cases at least, the value of the indicator will only be practically assessed by implementing data gathering in accordance with it. The indicators look reasonable at a theoretical level, and it will only be through their use that their true value will be ascertained...* and *... The problem is with the data source — the government heritage registers — which are not, generally, automatically and consistently reporting losses of places, and are not reporting damage short of loss at all.* There is a section on indigenous heritage places. However, this analysis seems to be confined to data relating to the destruction of indigenous sites. Of the 18 agencies that were the major data sources for the analysis only five are reported to have supplied information relating to indigenous heritage.
Indigenous	While the project related substantially to Aboriginal places and

values systems	objects there is apparent total lack of any input by Aboriginal individuals or groups, either to the development of methodology or the analysis. There is, however, reference to Aboriginal Affairs agencies, which are amongst the data sources identified. These are Crown agencies and their input to the study was restricted to the provision of data for analysis by the "consultant team". There is no indication that any member of the team was Aboriginal or, more importantly, that they provided advice on this basis. The only reference in the document to indigenous views was that New South Wales National Parks and Wildlife Service's figures for 1998/99 show that 116 Consent to Destroy indigenous sites applications were lodged, with 91 Consent to Destroy approvals being given. The report records that all approvals given involved Aboriginal community representatives and in almost all cases, were accompanied by letters of consent from Aboriginal community organisations.
Western versus Indigenous values	There is no discussion regarding western v indigenous values / issues.
Models	No models are discussed
Outcomes described	No outcomes are specifically discussed.
Indicators described	The original indicators implemented, as derived from the Pearson report, are listed. These are followed (in blue) by the recommended modifications or comments resulting from their trial. • Indicator N&CH H.1: The number of heritage places assessed (by sampling) as being in (i) good, (ii) average and (iii) poor condition. • There is a need to rephrase the indicator. The words used in the survey do not match those used in the 1998 indicator, and the scope of the survey went beyond just condition assessment. A suggested rephrased indicator is; 'The proportion of places being in good, fair or poor condition, based on physical condition, integrity, occupation, use and conservation activity' • Indicator N&CH G.3: Number of places destroyed or whose values have been severely diminished. • Deals with the *number* of places, in the case of natural heritage the *area* affected by damaging actions or covered by condition statements is a more useful measure of loss or knowledge of condition. • It would be particularly valuable and more informative to actually evaluate the condition of natural heritage places. Theoretically this would be possible if the condition statements in registers were kept up-to-date, but this does not appear to be a realistic expectation at this stage. • Indicator N&CH G.4: Number of places reserved for conservation purposes where heritage values have been seriously impaired by

	visitor use. • Indicator N&CH N.1: Proportion of natural heritage places with a condition statement, proportion with a recent condition statement, and age distribution of condition statements. • Proven not to be an effective indicator because of poor data quality and reliability. • Deals with the *number* of places, in the case of natural heritage the *area* affected by damaging actions or covered by condition statements is a more useful measure of loss or knowledge of condition. • N&CH O.1: Number of objects/collections adequately catalogued. • The quality of documentation of collections across the heritage collections sector varies widely in terms of scope, specific content and accuracy. Some collections have very limited documentation which is often no more than a few lines in a hand written register, while others have sophisticated, computerised records including images. • Similarly, the quality of quantitative data available across the sample population for Indicator O.1 (similar comments can be made regarding the Indicators O.2, O.3 and O.4) was very variable. • N&CH O.2: The proportion of collections surveyed for preservation treatment by a trained curator/conservator. • Indicator O.2 appears to be a simple enough concept. However, since there is no standard for the conduct of a conservation survey, and conservation surveys may be carried out with a number of different intended outcomes, it is difficult to interpret the scope and depth of assessment carried out. In order to simplify this enquiry it has been assumed that surveys are carried out for preventive conservation planning and for remedial conservation treatments. • It is recommended that Indicator O.2 be replaced by an alternative, which measures conservation and preservation management activity in an organisation: The number or proportion of organisations with a conservation management plan including a collections risk assessment, disaster preparedness plan and an environmental and building survey. • N&CH O.3: The proportion of collections requiring preservation subsequently treated. • It is recommended that Indicator O.3 be replaced by one that focuses on the number of objects treated with respect to certain parameters such as purpose and collection type: The number of items treated for specific purposes or the proportion of items treated for particular collections. • N&CH O.4: The proportion of collections stored in appropriate environmental conditions. Generally, it is acknowledged that the indicators themselves are adequate, but that unless supported by robust and appropriate data they are of limited value.

Currency	There is no discussion relating to currency of the indicators. They are all recently developed and being implemented for the first time.
Universality	These particular indicators are all intended to be applicable at different levels, and are implemented here at a state level, with the results being pooled in order to gain a national picture.
Implementation	The report relates entirely to the implementation of previously developed indicators, although these were refined as a result of implementation. The results from implementation (recorded largely as empirical data) are not of great interest here. However, observations recorded about the indicators and suggestions for their modification are of interest to the PUCM Māori team. Recommendations include the need for better data collection and mechanisms to ensure this, but also that – due to the acknowledged unlikelihood that this will not occur –some otherwise valuable indicators be abandoned: *No quantitative data were provided by any land management agency for the indicator* [G4], *and while the issue remains a concern, the likelihood of addressing it via this indicator seems very slight. It is recommended below that the indicator be absorbed as a specific data set into the revised G.3 indicator.* See Indicators section above for more detail.

5. Habitat Of Dogrib Traditional Territory: Placenames As Indicators Of Biogeographical Knowledge

Authors	Whàehdòô Nàowo Kö Dogrib Treaty 11 Council Research Team. (Legat, 2001)
Link	www.wkss.nt.ca/HTML/08_ProjectsReports/PDF/placenamefinal.pdf
Notes	The declared objectives of the project to which this report relates were to: 1) identify and map habitat; 2) provide the participant communities with baseline data; 3) develop management strategies; 4) monitor the cumulative impact (particularly to the cultural and physical environment) from industrial development; and 5) provide an understanding of similarities and differences between scientific and Dogrib habitat classification systems. It was found that the information suggested that Dogrib traditional place names indicate essential information about the water flow, landscape, and biodiversity of the sites, which provides people with information about the land, waterways and resources, which allow them to survive while participating in the main task of hunting caribou. The writers conclude that: *The knowledge is important to increase our basic understanding of Northern ecosystems, or dè. The knowledge could be very useful in helping to determine which parts of the landscape might be adversely affected by non-renewable resource development, including which*

	habitat is particularly important for people, plants and animals. This knowledge is a valuable environmental tool as well as being extremely important to Dogrib culture.
Methodology	The project was substantially guided by community elders. The Participatory Action Research (PAR) model was used. This meant that Dogrib elders and harvesters, the primary experts with knowledge of dè (the whenua / environment), retained control over the way the research was conducted and the manner in which their knowledge was presented and used. A regional elders committee was set up to oversee the project documenting and using their knowledge. The Community Elders' Committees in each community provided direction on who was interviewed and why. Members of the Dogrib Regional Elders Committee verified information collected and written in the report. A series of activities was undertaken between 1998 and 2000, including: • interviewing 50 elders from 4 communities an average of 4 times each to determine the meaning of place names; • holding 6 workshops with the Dogrib Regional Elders' Committee, tribal language specialists, a linguist, and the research team to discuss conceptual and literal meanings of place names, resulting in approximately 125 one-hour tapes; • interviewing elders to understand the vegetation associated with habitat types; • discussing place names with elders to understand literal and conceptual meaning; • conducting a literature review on indigenous environmental knowledge studies concerned with bio-diversity, habitat, and place names; • gathering non tribal geographic information and other datasets; • undertaking fieldtrips and processing of all data collected from the above activities into databases, Geographic Information System (GIS), etc. • Entering into the GIS, 3,548 sites between June 1997 and February 2001. Of the sites and areas found for which names could be translated, 1,103 were related to bio-geographical knowledge.
Indigenous values systems	The report describes a project based entirely on the collection (in culturally appropriate terms) interpretation, and recording of traditional knowledge. The traditional placenames and names for habitat classification allow the people to predict landscapes and vegetation.
Western versus Indigenoue values	The report records concern among the Dogrib and others that strategies developed from scientific data alone are not sufficient to protect dè (the whenua / environment) from development, that Indigenous knowledge is qualitatively and quantitatively different

	from scientific knowledge, and that documenting knowledge based on long-term observations is essential to provide reliable and extensive baseline data. The report notes the need for more work to know and understand how indigenous knowledge and science can complement each other and work together. The writers cite Julie Cruikshank (1981) regarding the relationship between traditional and scientific knowledge: *... it can be argued that oral tradition and science are each capable of contributing to an overall field of knowledge . Any realistic attempt to combine the two frameworks must begin with attempts to discover terminological and classification systems used by . oral societies . However, simply trying to learn these categories as an adjunct to western science is shortsighted, if not exploitative. The most effective and continuing interdisciplinary programs in the north seem to be in areas where Native communities are very much involved in the projects.*
Models	As indicated earlier, the Participatory Action Research (PAR) model was used. This meant that Dogrib elders and harvesters, the primary experts with knowledge of dè (the whenua / environment), retained control over the way the research was conducted and the manner in which their knowledge was presented and used. There is no description of a model for analysis/representation of the indicators.
Outcomes described	N/A
Indicators described	The research team found most placenames are indicators of bio-geographical knowledge. Other placenames are indicators of things such as past events, or individuals who live in an area, or spiritual sites. The following extract provides an indication of the extent to which traditional knowledge, including indicators are encapsulated in placenames: *Throughout the research period, patterns associated with Tåîchô placenames suggest that names that contain topographic and water flow terms have the primary purpose of describing safe understandable travel routes, whereas the primary purpose of the placenames containing biological terms seem to indicate locations with various resources or biodiversity. Placenames stimulate oral narratives that contain knowledge of socio-political relationships, social behaviour, resources, ancestral use, graves and obstacles while travelling and camping in the area. Often a placename will be mentioned to stimulate the listener's memory, hoping to encourage them to think and act in a certain way.*

Category	Frequency (N=310)	% of Total
Indicators of Probable Crucial Lakes/Rivers Information	114	36.8
Indicators of Probable Landforms	35	11.3
Indicators of Probable Locations of Mammals	31	10.0
Indicators of Probable Vegetation	28	9.0
Indictors of Probable Fish and Fishing Locations	28	9.0
Name very old, meaning difficult to determine	27	8.7
Indicators of Human Habitat	23	7.4
Indicators of Political and Spiritual Sites	19	6.1
Indicators of Probable Bird Sites	5	1.6

There is also discussion of traditional significance of names:

Often a placename will be mentioned to stimulate the listener's memory, hoping to encourage them to think and act in a certain way. For example:

• Tsotì is the older name for Wah Tì (Lac La Martre). Tsotì translates as excrement lake., which stimulates the memory of battles between the Tetsôöt.îî (Chipewyan) and the Tåîchô

• Gots.ôkatì (Mesa Lake) translates as cloudberry lake and indicates resources and biodiversity. It also stimulates the memory of how Edzo, the last great Tåîchô yabati (great leader who thinks of all people), made a peace agreement in the 1800s with the Tetsôöt.îî (Chipewyan).

• Komolada is difficult to translate. Nevertheless, it stimulates the memory of the first priests traveling to Tåîchô territory and how the Tåîchô told the priests their history, thereby establishing a relationship with them.

The following is a list of habitat types described in the report. This can be compared to the Mäori classificatory names for wetlands;

Æehatêê: An area of black dirt associated with plants such as œitsïghoò12, goö13

	Æehtå.èe: A general term for an area of sticky and/or soft mud *Æehtå'èet'oo - An area of sticky mud and mire.* *Æehtå'èk'òò - An area soft mud and mire.* *Dahdègooœò: A bog, swampy land that is considered "floating land".* *Dedlîînî: A place that has never had a forest fire.* *Dègok'eek'ö: An area that has had a forest fire.* *Dègotsoò: A type of swampy, wet ground.* *Goèhœaa: A valley characterized by with a particular predominate shrub or tree and a small stream. There are several types. Goèhœaa are important for such resources as securing wood for fires and smoking meat and fish as well as for using willows to make fishing nets in the past.* *• K'ògoèhœaa- Stream valley with predominately willow.* *• Ts'igoèhœaa .Stream valley with predominately spruce.* *• Kigoèhœaa – Stream valley with predominately birch* *Gok'enîîk'öô: A burned area.* *Æeniîtîî- A place that freezes up.* *Gòlo: A burned forest area.* *Kw'ia: A stand of œedzô (black spruce) on the barrenlands and important for firewood in association with a good campsite. Unlike the habitat known as goèhœaa, the kw'ia is not in a valley.* This lists only a few of the names described, but indicates the significance associated with the names. The writers report that the habitat and vegetation at various sites is mentioned by the elders as important because of cultural significance. A significant amount of the report is dedicated to an analysis of these habitats and their cultural significance. Additionally the writers found that: *Although place names are indicators of bio-geographical knowledge, it is the oral tradition that contains the complete knowledge. Place names that have been handed down from the ancestors through oral narratives are indicators that more is known about a place and its surroundings.* And that: *Place names lead individuals to places where resources should be available, and place names are designed to keep individuals away from potential hazards.*
Currency	The report deals with traditional knowledge collected recently and analysed for monitoring cumulative effects, change, and stability in the future. The elders involved explained what they felt was necessary for the researchers to predict resources if they understood the classification system. The assumption was that traditional knowledge of placenames remains valid, and functions as an

	indicator by providing a baseline against which change can be measured.
Universality	The study is specific to the territories of the participating tribal groups. The writers observe that Dogrib knowledge, and other indigenous knowledge, is extremely valuable to the wider world, and that Dogrib knowledge of their environments is not available anywhere else.
Implementation	The research team reports that: *The knowledge of several places was documented through habitat classification and defining vegetation communities, and the research team has made predictions of what vegetation should be at particular places. Such predictions, along with baseline knowledge of what resources are found at particular sites, will be invaluable in the development of cumulative effects assessment programs.* While the team recognised that they were not able, within the scope of their research, to substantially test whether their predictions made based on the classificatory knowledge provided were widely accurate, they indicated that based on other data collected there is sufficient evidence that predictions can be made and used for monitoring cumulative effects, change, and stability in the future.

6. A Criteria and Indicators Approach to Community Development

Authors	David C. Natcher and Clifford G. Hickey (Natcher, 2002)
Link	http://sfm-1.biology.ualberta.ca/english/pubs/PDF/WP_2002-2.pdf
Notes	This report describes an indicator development programme undertaken by the Little Red River Cree Nation of Alberta (LRRCN) in relation to forestry practices. LRRCN had negotiated treaty settlements that involved forestry rights, which generated concern within the nation because of past environmental degradation resulting from forestry activities as commercial timber harvesting is considered to be in direct conflict with the values and long-term interests of the LRRCN. The research programme was designed to establish a set of local criteria and indicators for sustainable resource management derived directly from broadly-based community perspectives. The article is the only one of those reviewed that investigates the issue of the plurality of values and personal interests nested within indigenous communities, such that even within a community-based context the inclusion of some interests potentially means the exclusion of others. It suggests that indigenous communities have in operation a number of autonomous and independent groups with fundamentally different, but equally valid, objectives and interests on issues ranging from politics to environmental management. The article suggests that: *by*

	failing to account for community pluralism, local management efforts all too often only soften the traditional top-down relationship long inherent in resource management, resulting in the continued subjugation of values and concerns of some community members. The purposes of the programme are described as being to: *1) facilitate an assessment of existing and future resource management practices based upon prevailing cultural, social, ecological and economic criteria;* *2) implement a monitoring and evaluation framework that provides a basis for continuous improvement of management objectives; and* *3) serve as a means of managing conflict by articulating the diversity of values nested within indigenous communities.*
Methodology	The programme leaders (and writers of the report) are both anthropologists with Canadian universities. While there is no indication that they belong to the Cree nation, the article details a substantial relationship that has developed between the Sustainable Forest Management Network (which published the report) and LRRCN. Building on this past research the criteria and indicators research was initiated in May of 2000 and was ongoing. The research involved; *direct observation, interviews were conducted using semi-directed and open-ended questioning techniques to allow for elaboration and free-flow discussion. Research questions for eliciting individual response addressed generally: What is it about this area that you value? What needs to be maintained or protected for you to retain your relationship with the land? And what needs fixing or improved upon for the community to be healthy (socially, culturally, economically, environmentally)? These questions were administered to community members between the ages of 16 and 72, and were asked by a research team comprised of a community and a university researcher.* Methodological biases were acknowledged as factors that limit participation by certain sub-sections of a community. There is a long discussion about efforts to avoid or overcome such biases: *These methods involved making extended visits to seasonal camps, participating in subsistence activities, conducting community focus groups differentiated by age, gender and employment characteristics, accompanying male and female elders on transect or 'bush' walks, individual and group mapping interviews, and the administering of questionnaires by six (3 male and 3 female) community researchers representing each of the three communities.* The writers conclude that through a process of participatory action research, punctuated by a community-driven research design, they feel an accurate documentation of community values has been derived, but observe that eliciting full community participation must remain a continuing research concern. A 'sustainability matrix' was developed where each matrix provides

	management recommendations deemed most appropriate by community members to attain specified or desired outcomes. Each matrix is divided into six levels of management referral, which includes: 1) a **Criterion** representing a priority feature that warrants full consideration in the management process; 2) a **Critical Element** of the environment or a process in the management structure that needs to be removed, maintained, or put into place; 3) a **Local Value** defined by community members as needing protection or enhancement through management efforts; 4) a **Goal**, or a concise statement and central strategy for maintaining, protecting, or enhancing a Local Value; 5) an **Indicator** measuring advancement towards the attainment of the stated Goal for which progress can be measured and evaluated; and, 6) an **Action** specifying a specific plan of activities that must be implemented to achieve the stated Indicator. Because the criteria and indicators approach requires continued monitoring and evaluation, the research emphasized a process of capacity-building and participatory action in order to help ensure research relevance as well as continuity.
Indigenous values systems	The report does not discuss the values systems of LRRCN, except within the analysis included below regarding issues of western v indigenous environmental worldviews. However, substantial participation by LRRCN and the discussion below show the researchers and writers to be familiar with, and sympathetic to, the indigenous values system and the tables in our Appendix B reflect this.
Western versus Indigenous values	Some understanding and sympathy with indigenous perspectives is demonstrated, and weaknesses in the previously described methodology when used with indigenous peoples are recognised. For example, the writers observe that indigenous community members rarely give direct advice or tell another person what to do other than through narrative, and that: *this method of inquiry asks community members to separate or compartmentalize specific components of the socio-natural environment. This effort to categorize information may in some ways conflict with the Cree worldview, a worldview that places an equal significance on all environmental features. Because of this holistic understanding of the environment, community members at times have had difficulty separating biophysical features of the landscape into distinct categories as well as segmenting the social, cultural, spiritual, and economic aspects of environmental interaction.* This is referred to as reductionist methodologies, that force the compartmentalization of the environment contributes to a form of Cartesian dualism that attempts to separate people from the environment.
Models	Models are not discussed. The project is said to have been conducted through a "participatory action research" framework: *By adapting an international strategy to meet local needs, Little Red River has developed a participatory framework capable of integrating local*

	knowledge, values, and concerns into an inclusive management process. This is discussed in Methodology above. It is stated that this framework has been established based on locally-defined mechanisms for community participation that are culturally and functionally specific to Little Red River. The report says that this framework provides a more encompassing assessment of the economic, environmental, and social factors associated with human-environmental interaction, thus allowing for a balance to be made between community sustainability and planned change. The evaluation framework developed is the sustainability matrix, also described in Methodology and included in the tables in Appendix B of this PUCM Māori Report 5.
Outcomes described	While outcomes are not discussed, both the Critical value and Local value (and sometimes indicator) fields of the evaluation matrix developed are actually phrased as outcomes according to the definition adopted for our review of literature. This being accepted, there are numerous outcomes listed, these tables are included in Appendix B of this PUCM Māori Report 5.
Indicators described	Contrary to the name of the document and the statement that 6 criteria and 62 associated indicators for community and forest sustainability have been identified, indicators as per the definition adopted by us here are not included. As observed above, the indicators in the document are actually stated as either goals/objectives or outcomes. See Appendix B of this PUCM Māori Report 5.
Currency	There is little discussion regarding variation over time, for example in the contemporary validity of traditional indicators. The writers acknowledge the value of the knowledge of earlier generations, and the need to make accessible both the temporal (i.e., generational experiences) and spatial knowledge (i.e., expertise of the functioning landscape) of community members in order to make informed land management decisions in the future.
Universality	The report considers the emphasis that has been placed by organisations, such as the UN on international and national level forestry, and observes that consequently criteria and indicators have been applied to regional, national, and international levels of forest management throughout the world. The Canadian Council of Forest Ministers produced a set of six national criteria and 83 indicators for evaluating forest sustainability, and the writer finds that few examples have addressed local level information needs. The report says that it is at this local level of analysis that measurements become more precise and the impacts of forest management on the local population more transparent. By eliminating largely non-relevant criteria and indicators developed at the national level, and extending beyond provisions of sustained timber yield, the report emphasises that the LRRCN has undertaken an assessment of the environmental, social, cultural and economic

	factors associated with local forest management.
Implementation	The report predates the implementation of proposed outcomes / indicators.

Other international indigenous indicators projects were identified in the course of this investigation, but were either incomplete, or results not yet published, or involved primarily non-environmental indicators. Examples in summary include:

7. First Nations Health Development: Tool for Program Planning and Evaluation.

(Ahenakew, Jeffery, Abonyi and Hamilton, 2003)
http://www.centre4activeliving.ca/Research/ResearchUpdate/2003/September.htm
This report briefly describes a Canadian initiative to provide tools (such as a manual and training package) to help First Nations health organizations and managers plan and evaluate programmes under their jurisdiction. These tools include developing culturally appropriate indicators and an evaluation framework to track the effects of health and human service programmes on indigenous community health and capacity. The indicators had not yet been published by 2005.

8. Analysis of Some Indicators of Economic Development of First Nation and Northern Communities.

(Damus, 2004)
www.iog.ca/publications/fn_dev_indicators.pdf
This report describes an investigation into Canadian indigenous communities, concerned with indicators of economic development rather than with environmental indicators. The declared objectives of the programme were to build a consistent data set from available community data and select appropriate indicators of economic development and assess changes over time. Also, data permitting community characteristics associated with economic development were to be identified. Lastly, future lines of inquiry were to be recommended. Outputs from the programme were not yet available by 2005.

9. Performance Measurement, Development Indicators and Aboriginal Economic Development

(Lewis, 2002)
www.cedworks.com/files/pdf/papers/Perform_02_Indicators.pdf
While this project/report, like the preceding one, is primarily concerned with economic development of indigenous communities, it records as one of seven major "benchmark" categories environmental indicators. This is consistent with the widely articulated holistic indigenous world view, whereby social and economic considerations are not divorced from environmental matters. The author of this report is critical of the approach by Government agencies to develop First Nations indicators, and considers approaches elsewhere might better be applied. Specifically, the tendency to focus on measuring the effectiveness of policy is criticised. While indicators have not been finalised and are not listed, the following observation by the authors is relevant to our PUCM Māori study;
The INAC Accountability and Performance Measurement document on CEDP sets performance measurement squarely in programmatic terms, that is, simply a method for

assessing progress towards stated goals. The term "performance indicators" are the "measures of resource use and developmental results achieved that are used to monitor program performance."

The majority of the indicators used are focused on measuring the quantity of inputs (how much effort is put into service delivery) and the quantity of outputs (how much to we have to show for our service and expenditure of effort). What is missing, by and large, is what Friedman illustrates in his 4- quadrant matrix are the measures of quality. How good is the service delivered (is the service timely, accessible, consistent) and how good are the products (what percentage of our clients showed improvement in their well-being).
The fourth measure is the most important and, of course, it is also the measurement category that is directly tied to outcomes and which is most dependent on baseline data. We have already noted that both these areas are demonstrably weak. Therefore, it follows that this category of performance measurement is very problematic in the current context. The challenge is to move the focus of performance measurement from quantity to quality.

The three documents share a concern with indicators, which are as much about policy and programme performance as about performance in socio-economic or development terms of indigenous communities. Also, there is little evidence in them of control over, or participation in, the development of methodology by the indigenous subjects for any of these three projects.

PART 2

NEW ZEALAND/AOTEAROA:
MÄORI OUTCOMES AND INDICATORS

In line with New Zealand's commitment to international conventions, such as Rio and Agenda 21, and in response to its 1991 *Resource Management Act* (RMA), the Ministry for the Environment (MfE) embarked on a programme to develop environmental indicators. The Environmental Performance Indicators (EPI) programme gained momentum after the release of the *New Zealand State of the Environment Report* (MfE, 1997). That report has no Maori indicators, but directs readers to the new MfE indicators programme for information. The MfE EPI programme recognised the importance of providing for Māori-specific indicators as follows: "In developing the [EPI] the Ministry ... acknowledges Māori as tangata whenua and Treaty partner and the role Māori play in effective resource management" (Ministry for the Environment, 1999a).

By 2000, indicators were included in some local government plans (i.e., regional, district and city plans). More recently, both outcomes and indicators were found in Long-Term Council-Community Plans (LTCCP) required under the 2002 *Local Government Act* (LGA). Its Schedule 10, Part 1 requires local authorities to state measures in their LTCCP for assessing progress towards the achievement of community outcomes. Section 92 (1) states: "A local authority must monitor and, not less than once every 3 years, report on the progress made by the community of its district or region in achieving the community outcomes for the district or region."

Our search of New Zealand and international EPOI literature yielded a greater number of results for New Zealand than for all international items combined. Most were New Zealand government-driven and we were concerned at the extent to which they truly reflected tangata whenua (land and people of indigenous Māori) aspirations and perspectives -- concerns also shared by Māori participants in these projects. For example, regarding the MfE Environmental Performance Indicators programme, members of the Māori advisory panel wrote:

> *...fundamentally, [Mäori]EPIs ... need to be developed by Māori communities themselves. Whilst guidance and views can be expressed at a national level, in order for there to be real community 'buy in', MEPIs need to be created and managed at iwi [tribal], hapū [sub-tribal] and whānau [extended family] level... There has been an attempt by the Ministry's methodology to 'plug-in' Māori concerns without clear consideration of either the Treaty of Waitangi [1840] or the*

aspirations of methodologies arising from Māori knowledge (Ministry for the Environment, 1998).

In PART 2, we first further discuss development of EPOI (environmental performance outcomes and indicators) in Aotearoa/New Zealand and then tabulate the main documents using the aforementioned format (Table 1). Section 2.2 focuses on Central government programmes, Section 2.3 on Local government programmes; and Section 2.4 on Māori Management Plans. But first, Secion 2.1 explains Māori environmental outcomes and indicators.

2.1 Mäori Outcomes and Indicators

The recent concern with measurable environmental outcomes and indicators in Aotearoa appears to have developed out of government policy analysis, particularly from the health sector, on which there is a wealth of literature, although this is primarily related to general rather than Mäori outcomes and indicators.

2.1.1 Environmental outcomes

There is little published either here or internationally regarding environmental outcomes, and even less material specifically on indigenous outcomes.

The New Zealand Parliamentary Commissioner for the Environment and Controller and Auditor General together published a report called *Local Government Environmental Management - A Study of Models and Outcomes* (Parliamentary Commissioner for the Environment and Auditor-General, 1999). The following extract from that report, while referring specifically to local government, provides an appropriate starting point for an assessment of environmental outcomes as expressed within the literature.

Any future proposals to review the form of local government, including the system of environmental management, should first focus on the environmental outcomes sought, then consider the most appropriate structure, systems, resources and linkages to deliver those outcomes (i.e. form should follow function). In stating and reporting on the environmental outcomes sought it is important that local government:

- *states clear and measurable outcomes (including interim targets for long-term outcomes) that enable progress in achieving them to be assessed*
- *shifts attention from outputs to outcomes as a measure of environmental management performance*
- *links its output priorities to the environmental outcomes being sought*
- *establishes a monitoring regime (e.g. state of the environment monitoring and reporting) capable of measuring progress towards meeting environmental outcomes*
- *maintains the necessary capability to undertake the monitoring, analysis, reporting and review of environmental outcomes and associated policies and plans*
- *maintains or shares a critical mass of skills, and ensures that allocation of financial resources is appropriate to the outcomes being sought*
- *develops appropriate internal management structures designed to achieve environmental outcomes*
- *develops and maintains appropriate and effective relationships with tangata whenua, local communities and key stakeholders to ensure that environmental outcomes are relevant and achievable.*

Required under the recent *Local Government Act* 2002, Long Term Council Community Plans are largely intended to reflect community aspirations for social, economic, cultural and environmental outcomes. While these are in their infancy some examples are tabulated below in Section 2.3.3, as they represent one of the few published sources on environmental outcomes.

2.1.2 Environmental indicators

Similarly, Tohu Māori - Mäori environmental indicators - are not yet well documented, despite having been used traditionally for hundreds of years.

Māori indicators have more in common with the indigenous examples in PART 1 above than with contemporary western indicators in New Zealand, reflecting similar world views where people are genealogically linked to the land. Examples of these indicators are the encapsulation of traditional knowledge in placenames, and what are referred to here as alignment indicators, where one event in nature indicates another. For example, a particular plant species flowering is known to coincide with the optimum harvest time for another species.

A likely reason for the lack of documented Māori indicators is a concern regarding inappropriate use of traditional knowledge. The Ministry for the Environment's Environmental Indicators Programme (Section 2.2.1) and council district plans (Section 2.3.2) are amongst the few reports documenting Mäori environmental indicators.

As we will see, these are of questionable merit in terms of the extent to which indicators included in reports and plans are consistent with Mäori values. However, in the absence of Mäori publications on the subject these are the only ones listing Mäori environmental indicators as of 2005. The exceptions are iwi/hapu management plans a few of which are considered below in Section 2.4.

2.2. Central Government Programmes

In this Section, publications aimed at environmental outcomes and indicators for Māori are reviewed. As noted, the main programme is that instituted by the Ministry for the Environment (MfE) in the mid-1990s. Reactions by Māori advisors to early MfE reports led to MfE commissioning projects by Māori, and they are included among the eight publications reviewed below in Section 2.2.1. There was some work carried out by the Ministry of Māori Development – Te Puni Kokori - and one publication is reviewed below in Section 2.2.2.

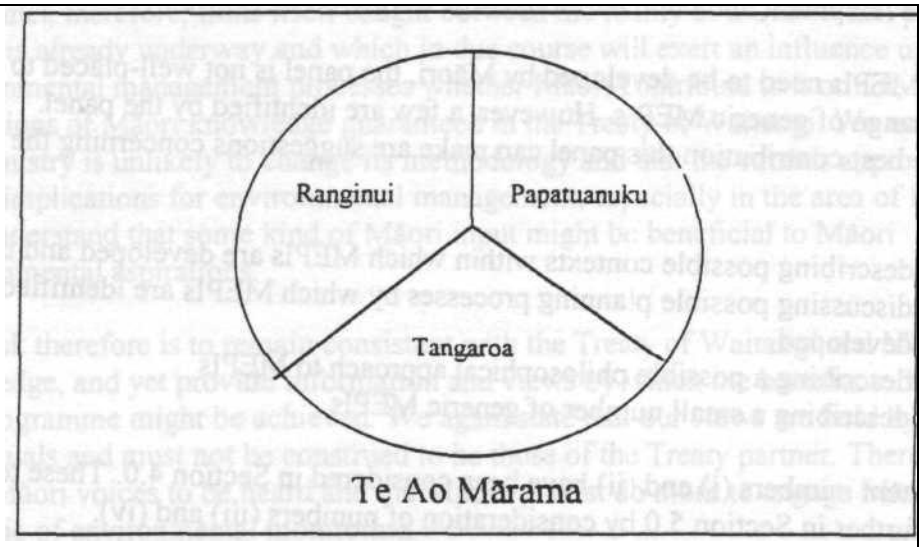
2.2.1. The MfE Environmental Indicators Programme – Mäori Indicators

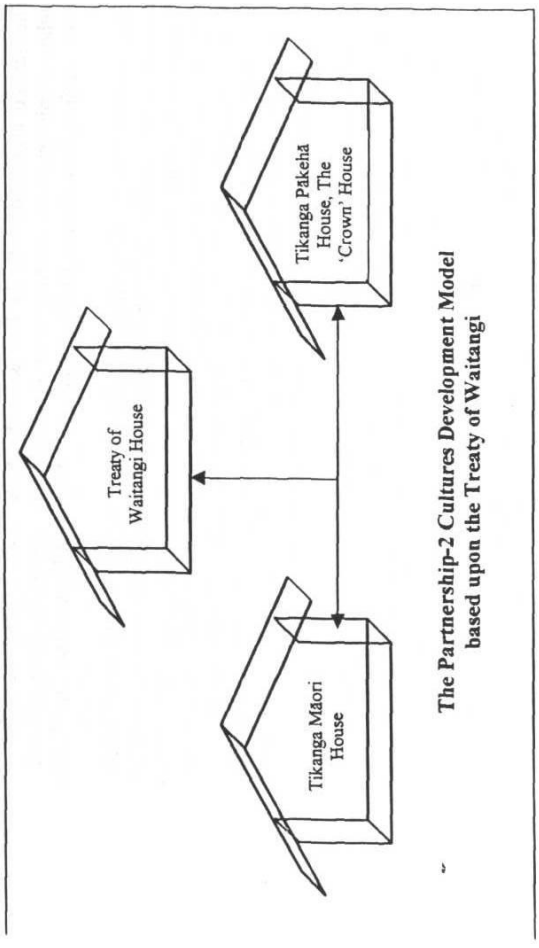
1. Mäori environmental monitoring

Authors	Ministry for the Environment (Ministry for the Environment, 1998)
Link	Not available electronically.
Notes	The report was written by Te Ahukaramü Charles Royal to express the views of an independent panel of Mäori individuals with expertise in the area of Mäori environmental management. The panel included

	Hirini Matunga (Ngäti Kahungunu, Ngäi Tahu), Vianney Douglas (Ngäti Porou), Cath Brown (Ngäi Tahu), Te Aue Davis (Ngäti Maniapoto), Aubrey Temara (Ngäi Tuhoe), Tikitü Tütüä-Nathan (Ngäti Awa), Hori Parata (Ngäti Wai), James Ataria (Ngäti Tüwharetoa`), Noreen Taylor (Ngäti Kahungunu), Te Ahukaramü Charles Royal (Ngäti Raukawa, Hauraki, Ngä Puhi). The writers indicate that the report was primarily for the perusal by staff in the EPI programme of the Ministry for the Environment. This is important, in that this report is relied upon substantially throughout the MfE indicators programme, to substantiate Mäori participation in the programme and its design. However, elsewhere they write that: *As the panel is located in the 'Tikanga Mäori House', its primary role is to encourage and facilitate discourse, debate and discussion on Mäori environmental management within the Mäori community as a whole. Given the undertaking to the Ministry for the Environment, this report, whilst is written from within the 'Tikanga Mäori House, is orientated toward making a contribution in the 'Treaty of Waitangi House'.* The panel indicate that their goal was to articulate some of the concerns and issues that might arise within the 'Tikanga Mäori House' (see models below) in relation to environmental monitoring. It was set three tasks: a. to define the concept of a Mäori Environmental Performance Indicator (MEPI); b. to define and describe frameworks within which Mäori monitor theenvironment; c. to define and describe a number of generic MEPIs. The report several times criticises the approach taken by MfE in its EPI programme, finding that Mäori knowledge and indicators are treated as an add-on to the programme, and that there are issues relating to Western v Mäori knowledge that have not been considered by the Ministry.
Methodology	The group – after two initial administrative hui (meetings) – met on five occasions to discuss MEPI, after which this report was written. They stressed to MfE that their views did not represent or replace appropriate consultation with Mäori. They describe themselves as: *a panel of individuals brought together to discuss issues concerning Mäori environmental monitoring that may be of interest to the Ministry for the Environment*. The panel were concerned with weaknesses within the MfE methodologies employed for the EPI programme as a whole, as being inappropriate for Mäori. One such observation is this: *Finally, it is the view of this panel that fundamentally MEPIs (and EPIs) need to be developed by Mäori communities themselves. Whilst guidance and views can be expressed at a national level, in order for there to be real community 'buy-in', MEPIs need to be created and managed at*

	iwi (tribe), *hapü* (sub-tribe) *and whänau* (extended family) *level. The top-down approach, suggested by the concept of the generic EPI, will probably work with statutory bodies and it is possible that they are the only audience anticipated by the EPI programme. However, environmental monitoring is being carried out by all manner of groups and individuals, formally and informally, and this is its true context.* And; *There has been an attempt by the Ministry's methodology to 'plug-in' Mäori concerns without clear consideration of either the Treaty of Waitangi or the aspirations of methodologies arising from Mäori knowledge.* The group found that the Ministry's methodology's major fault was that it is not based upon the *Treaty of Waitangi* (1840). They did not develop a project methodology, as neither consultation nor the development or trialling of indicators took place. The group approached the tasks given, by considering the development of MEPI at different levels, such as at the hapü level, or non-tribal groupings, such as weavers or carvers. While they do not presume to develop a Mäori indicators development methodology, they considered methodology and the process(es) by which Mäori would wish to define and develop their MEPIs, and were concerned with: a. *the operational, that is to say, who are people or groups who will employ this methodology?* *b. the paradigm, or philosophy of the methodology itself.* They present whakapapa as a methodology by which Mäori communities (iwi, hapü, and whänau) might determine their MEPIs, both generic and specific. (see values systems below)
Indigenous values systems	The report considers tikanga (values) Mäori as underlying Mäori environmentalism, and includes examples from around the motu of tikanga and whakatauäkï which express Mäori environmentalism as deriving from whakapapa. Mauri (life principle) is discussed, its maintenance as being a goal of Mäori environmentalism. The panel considered Te Ao Marama to represent the 'Maori World View'.

	 Ranginui (Sky Father); *Papatuanuku* (Earth Mother); *Tangaroa* (Sea Guardian) They continue to suggest that indicators could be related to particular realms within Te Ao Marama, and descendants of these: *As one proceeds through whakapapa, areas of the environment become more specific and whakapapa generates its own classifications:* *Te Ao Märama (the entire world) Ranginui, Papatuanuku, Tangaroa* *Te Waonui-a-Tane (forests)* *Te Aitanga-a-Pepeke (insects)* *Ngä Uri-a-Tinirau (marine sea life)* *Ngä Uri-a- Tütewehiwehi (amphious creatures of inland waterways)* *Waka, Iwi, Hapü, Whänau* They record that all these groupings and classifications can be found within a broad framework of whakapapa, which gives Kaitiakitanga its coherency and cohesion.
Western v Indigenous values	The panel found that a critical realisation among Mäori is that the full exploration of Mäori knowledge, its renewal and expansion, will not take place in structures, institutions, and contexts that are not designed for this purpose, and that one can not create management systems for one culture from within the paradigm of another. The report refers to tensions between the Ministry's EPI methodology and that of whakapapa that arise from the nature of having to 'marry' one methodology with another. This is described as: *The initial desire of the Ministry for the Environment to convene a group of Maori 'experts' who would input Mäori concerns and ideas into the EPI methodology is faulted. Such a plan does not comply with the Treaty of Waitangi (and the Partnership-2 Cultures Development model) and represents the attempted acquisition by one paradigm of knowledge created by another without due*

	consideration of the paradigm within which that knowledge is created. The 'strand-by-strand' method employed by the Ministry represents a paradigm and the Ministry is attempting to acquire Mäori knowledge by applying this paradigm. Without recourse to the Treaty of Waitangi and a properly mandated negotiation, such a move would create improper acquisition.
Models	Partnership-2 Cultures Development Model is derived from the *Treaty of Waitangi*. It was developed by the advisory panel members writing this report as a proposal for engagement with the Ministry on the development of MEPI (Mäori environmental performance indicators). The writers record: *The model advocates for the creation of discrete spaces or 'houses' within which the Treaty partners may conduct their affairs and develop their views on any topic; in this case, environmental performance indicators. The establishment of these discrete 'houses', however, is conducted in the context of the Partnership model as a whole so that the mana motuhake or independence of each house is cast in the context of Partnership and an obligation to entreat as partners in the 'Treaty of Waitangi House'. Separatism arises when there is no intention to entreat with the partner. Partnership arises when there is an intention and in this sense it can be argued that the Crown has been acting in a separatist manner with respect to its Mäori Treaty partner.*  **The Partnership-2 Cultures Development Model based upon the Treaty of Waitangi**

	Additionally, the panel defined two frameworks within which Mäori monitor the environment. 1) The '**Mana Whenua**' (trusteeship of land) framework orientates a Mäori community toward planning for their environment independent of external considerations and concerns. This framework is concerned with the identification of discrete and independent spaces, structures, contexts within which Mäori, whether at iwi (tribe), hapu (sub-tribe) or whänau (extended family) level, can develop their own agenda for the environment. And that such an agenda will be developed from traditional knowledge, but will also be concerned with developing new Mäori knowledge by renewing key traditional ideas in a contemporary context. 2) The **'Integrating'** Framework recognises that Mäori monitor the environment along with other kinds of groups, such as Crown agencies. The 'Integrating' Framework advocates for an application of the *Treaty of Waitangi* when Mäori communities, having at first developed independently their plan for their environment, encounter external groupings especially those of the Crown. The report states that a critical feature of this Partnership-2 Cultures Development Model is the need for the 'Mana Whenua' Framework to influence the 'Integrating' Framework: *It is our view that advocacy and negotiation in the Treaty House will be more successful if the Mana Whenua framework is in place. The models overall are not entirely independent and are certainly not separatist in their orientation. Rather, the Partnership-2 Cultures Development model describes a setting within which the two partners to the Treaty can develop their views independently and how these views might encounter one another.*
Outcomes described	N/A
Indicators described	The report supports a proposal within the earlier Tuanuku Consultants report that MEPI should be considered as belonging to two categories; 1. Ecocentric, concerned with indicators found in the environment itself, e.g., a. Mahinga-Kai-based EPIs b. Local Observation-based EPIs 2. Anthropocentric-based EPIs, where *tikanga* is generally used to denote philosophy when the report cites Kaitiakitanga (guardianship), Mauri (life principle) and Whakapapa (geneaology) under this heading. a. human-ecology based cultural indicators

	The group defined MEPI as: *A Mäori EPI is a tohu created and configured by Mäori to gauge, measure or indicate change in an environmental locality. A Mäori EPI leads a Mäori community towards and sustains a vision and a set of environmental goals defined by that community.* The following extract includes some of the panels discussion of indicators: • *Some members talked about the ability to harvest species at levels long known to be sustainable in a particular area. This impacted upon resources such as fish stocks to varieties of plants used in weaving and other traditional arts and crafts.* • *The quantity of the stock is a simple indicator of the health of the species in a particular area.* • *Quality is also important. For example, if mussel stocks are continually small in size or, as one panelist described, a plant is being attacked by non-indigenous species causing holes to appear in leaves rendering them unusable, this is another indicator.* • *Other panelist discussed the thinness of the shell on certain shellfish, a new phenomenon.* • *A whole range of experiences were described from 'empirical' type data, such as quantity and quality, to the aesthetic. For example, one panellist discussed the blossoming rata in his area and how the 'red' seen in the bush in his area is getting fainter as the years proceed.* • *Other issues included water pollution, availability of certain species, the occurrence (or non-occurrence) of certain natural phenomena contiguous with one another (for example, the flowering of a plant at the same time as inanga running in a stream) and other examples.* Rather than developing a list of indicators the report includes 25 environmental concerns, issues, and ideas, stemming from the above discussion that they suggest would inform the creation of MEPIs
Currency	Not discussed.
Universality	The panel observed the methodology employed by the Ministry for the Environment to be in conflict with the methodology Mäori communities (and writers) employ to define MEPIs. They write: *It is the view of the panel that generic (and specific) MEPIs must be defined by the communities within which those MEPIs are designed to operate. The panel's approach is to commence at the community level first. In contrast, the Ministry's goal of defining generic MEPIs (and EPIs generally) would tend to suggest a 'top-down' approach where nationally defined EPIs are imposed upon local contexts.*
Implementation	N/A

2. Māori Input into the MFE Environmental Performance Indicators Programme

Authors	Ministry for the Environment (Ministry for the Environment, 1999a)
Link	www.mfe.govt.nz/publications/ser/**maori-input**-may99.html
Notes	This report details, as the title suggests, Mäori input into the MfE Environmental Performance Indicators programme. Its stated objectives are to: • describe the Environmental Performance Indicators (EPI) Programme and the role of the Ministry for the Environment; • describe the current environmental performance indicators (EPIs) and seek Mäori endorsement of these; • provide an opportunity for Mäori to identify areas where more work might be needed; and • seek feed-back on the idea of a Mäori-specific strand. Mäori Environmental Monitoring Group (MEMG) determined that "A Mäori EPI is a tohü created and configured by Mäori to gauge measure or indicate change in an environmental locality." Submissions regarding the report and the list of indicators therein were invited before Oct 1999 – a period from publication of 6 months.
Methodology	Mäori input into this project had three components. • MEMG established to provide input at a conceptual level (reviewed above); • contracted Mäori input into the EPI Programme for the development of Mäori-specific EPIs (Not found or reviewed); • three commissioned local case studies: Taieri River Case, Hauraki Mäori Trust Board, and Te Runanga o Ngäti Porou. (each reviewed below). Input from Mäori was obtained via four national hui (meetings) of iwi / hapü / individuals and several national workshops involving experienced Mäori practitioners. From these, MEMG recognised the difficulty of conducting strand-by-strand indicator development in the absence of an agreed framework against which that development can be measured, and recommended a much tighter consultation process. The report found that Mäori participants in the strand by strand approach as artificially compartmentalising, and that hapü commissioned, iwi and individual Mäori prefer to view the environment from an holistic perspective, which treats its components as seamless and inter-changeable.

	The environmental categories/strands adopted for the EPI programme are listed, with some links as to the Mäori relevance of these. For example, under the heading "Land" it is recorded that "In Mäori cosmology Papatüänuku is the Earth Mother and therefore all efforts should be made to keep her free from impurities and abuse." Under the heading "Waste, Hazardous Substances, Hazardous Waste, Contaminated Sites and Toxic Contaminants" it is noted that the only Mäori-specific indicator to emerge, **which also met the selection criteria of the Ministry**, relates to rähui (Days per year and extent over which rähui (quarantine) is applied to address the adverse effects of waste). This comment is of interest as it indicates only those Mäori indicators that also met the criteria of the Ministry were adopted.
Indigenous values systems	The report suggests that many indicators selected by Mäori will overlap with those selected by western science, because of the common broad resource management goals, but observes that the interpretation of the indicators may differ, as a result of differences between world views. Thus: • participants are recorded as thinking there should be an over-arching goal to sustain and support the Mauri of Te Taiao; • they wished to protect and enhance natural resources of significance to hapü/iwi, especially those ecosystems from which medicinal, support resources (e.g. flax for kete), and food supplies are harvested; and • ensure hapü and iwi environmental interests are protected in accordance with the principles of the *Treaty of Waitangi*. The authors acknowledge the absence of Mäori concepts in the EPI asking submitters for identification of what these might be and how they might be woven into the Programme. They note the significance of the concept of mauri, which touches on all matters affecting the environment.
Western v Indigenous values	The report makes this observation – "*Mäori and the environment are inextricably inter-twined; theirs is a relationship spanning centuries. Centuries of observation of the environment equip Mäori with a unique body of experience. This experience enables them to contribute, alongside of western scientific knowledge and experience, to the development of tools and processes for ensuring that the mauri (life force) of the environment is maintained and improved*."
Models	No models are specifically referred to although pressure, state and response indicators are considered separately.
Outcomes described	No outcomes described
Indicators described	There are a few potential indicators described in the report, however, the annexed table includes only the non-Mäori-specific indicators! The Mäori indicators in the text are these:

	• Giant Kokopu; • Red-Finned Bully (no further explanation provided); • health of individuals, particularly skin ailments; • alignment between kowhai blooms and the harvest of mussels; • the alignment between pohutukawa blooms and kina harvest; • the spread of sand grasses and sedges and depth of toheroa; • changes in the volume of customary take of kaimoana (sea food measured by records of marae and kaumatua (elders) authorised to approve the take); • changes in the presence of customary/traditional target species (and associated species) observed by whänau members, hapü, iwi and marae; • change in the number of tangata tiaki/kaitiaki appointed under the customary fishing regulations to approve customary take; • changes in volumes and prices of kaimoana exported to whanau in the North Island.
Currency	N/A
Universality	In developing national policy goals at the national workshops, hapü, iwi and individual Mäori participants agreed that many of the general (i.e. non-Mäori) goals were applicable to Mäori. MEMG noted that generic MEPIs should be defined by local communities.
Implementation	The discussion here is around the development of indicators, and does not progress to their implementation.

3. Hauraki Customary Indicators Report

Author	Hauraki Mäori Trust Board (Hauraki Mäori Trust Board, 1999)
Link	http://www.mfe.govt.nz/publications/ser/tech-report-57-maori-jun99.html
Notes	The Hauraki project is described as a preliminary study of indicators for customary fisheries in extensively modified lowland catchments and adjacent coastal waters. The study focuses on three areas: the Waihou River; Manaia Harbour; and Firth of Thames. Hauraki is described at length – including the rohe (region) and its peoples, with an historic overview. The report includes a lengthy discussion of the environments of Hauraki, fishing methods and traditions, and fishery locations and their description. This study is stage one of a three-stage process. Based on the outcomes of this study future stages will include customary and conventional indicators being trialled, partnership arrangements with responsible agencies being established, and a Hauraki monitoring capacity developed.
Methodology	The project methodology is described as follows:

	▪ Information was gathered from kaumätua (elders) by interviewing. Twelve meetings were held, involving 17 Kaumatua with knowledge of the water-bodies being considered in the study individually and on a group basis. Each kaumätua was interviewed more than once to ensure reliability of information. ▪ Fluent speakers of the Mäori language were involved in the interviews to ensure reliability in the transfer of information. ▪ Interviews were recorded on audio or videotapes as a record for future generations. ▪ An information protocol was established to protect taonga (highly valued) status of the traditional information gathered. ▪ Maps of the historic environment, Mäori place names and waterways, project explanations in Mäori, and site visits enhanced the value and depth of the information gathered. However, there is no discussion as to how the methodological approach to the research was developed, and whether this was achieved with input from the kaumätua (elders) with whom interviews were conducted.
Indigenous values systems	The report details a Mäori world view, a Hauraki world view, and the instruments of Te Ao Mäori relating to the environment. These sections include a discussion about the values that underlie Hauraki's environmental management beliefs and the world view by which indicators have been interpreted; *Te Ao Mäori is synonymous with Kaupapa (principles) Mäori in that it seeks not merely to signify principles that encompass Mäori thinking, but also how that thinking influences and shapes the Mäori world view.* There is substantial discussion of Hauraki views regarding whenua (land), wai (water), mauri (life force), tapu (sacred), kaitiakitanga (guardianship), rähui (no trespass), etc. The report also recognises the dynamic nature of tikanga (values): *Hauraki kaitiaki (guardians) have an ancient obligation to and responsibility for: the environmental health of its tribal territories. This responsibility includes the development of new management systems to meet changing requirements for the well-being of the Hauraki community. The monitoring of carefully sited customary indicators would provide for more accurate measurement of change and sustainability for the natural resources and environment of the Hauraki nation.* Tikanga (values/customs) described include traditional fishing methods, as well as discussion of the tikanga that governed fishing.
Western v Indigenous values	The following extracts encompasses the discussion in the report regarding Western v Mäori world views: *The principal detractor of the world view of indigenous people generally and the Mäori in particular has been the concept of positivism which sets out perimeters in which the natural world might*

	be studied, examined and understood in scientific terms. And; *Positivism is above all a philosophy of science. Metaphysical speculation is rejected in favour of a positive knowledge based on systematic observation and experiment ... As applied to the human social world the positive[sic] method yields a law of successive states through which each branch of knowledge must pass: first theoretical, then metaphysical and finally the scientific. It takes a position that the social world of human beings and human societies can only be viewed in terms of scientific paradigms. The scientific approach represents three tiers of knowledge and all societies are at different levels of the three-tiered spectrum. Those societies that deal in the theoretical and metaphysical (spectrum) are at a lower level of understanding, but it is posed that those which have a scientific basis are at a higher point on the spectrum.* Rejecting the proposition that indigenous analysis is inherently less, alternatively the report observes that: *Modern scientific studies in the region cannot match the degree of accuracy that the personal observation and tupuna based knowledge of kaitiaki can bring to decision-making.* In contrast, the Mäori worldview is described as: *…holistic recognising the interconnectedness and interdependence of all things and like all indigenous peoples worldwide, they have always managed change in their natural environment*. The report refers to scientific research that has (or hasn't) taken place regarding the state of the environment and indicators. Often this discussion is not in terms of issues relating to scientific v tikanga analysis, but rather the merits of both systems are acknowledged, for example: *Benthic communities of the seabed, presumed to be predominantly of shellfish, polychaete worms and small crustacea, historically supported and attracted an abundant fishery: particularly flounder, snapper and sharks. Information on the nature of the benthic community is based on the observations of kaumatua and commercial fishers (Charley Kipa, pers. comm., 1998) and scientific studies. (ref provided).* And; *There is the potential to utilise customary indicators in parallel with conventional data to determine the ecological integrity and state of sustainability of the Hauraki environment*. There is discussion about a Western approach to indicators: *Western science seeks indicators of environmental health that can be measured quantitatively and validated statistically*. While the text goes on to contrast a Hauraki approach - *Hauraki tangata whenua (people of the land) sought historically to use indicators that were sufficiently reliable to predict the availability of important wild food resources, the timing of planting cycles, the*

	measurement of time. They had to be valid, repeatable and responsive to environmental change. It then demonstrates Hauraki indicators meeting the criteria of validification as per the western approach.
Models	The second objective of the study is described as: *to provide a model, by way of an iwi-specific case study, for the further development of environmental performance indicators for the marine environment and key freshwater catchments*. However, the term "model" is not used in the sense that analytical models are referred to in our study. Kaupapa Maori is referred to in the context of the Mäori world view, rather than the methodology of this project, as: *the guiding ethic and intrinsic discipline that will determine the action of the individual, the group, and the community.* But given the overarching definition it can be assumed that the writers also intended that Kaupapa Mäori is the guiding ethic for this study. Other models are referred to regarding the research approach, e.g.; *Smith (1990) has produced some useful guidelines to assist researchers in handling Mäori research. He refers to:* • *The Tiaki (mentor) Model: using Maori to test their ideas and theories against (John Rangihau-Peter Cleave)* • *The Whangai (adoption) Model: where the researcher is 'adopted' by the subject (Sterling Whanau-Anne Salmond)* • *The Power Sharing Model: C. Cuazden's Interaction between Mäori Children and Pakeha Teachers* • *The Empowering Outcomes Model: positive beneficial outcomes for Mäori first and foremost (Richard Benton, Language Research*) p.38 However, there is no association made between the criteria subsequently described in the report and these models, beyond them introducing the idea that the research should empower Mäori. Criteria for the conduct of the research follow, but there is no further reference to these in terms of a model. A holistic approach to environmental management is emphasised, though not described here as a model: *Inherent in this approach is the ethics of inter-generational responsibility and reciprocity. The latter ethic finds expression in the belief that the condition and health of the natural environment will in turn be a reflection of the condition and health of tangata whenua. It is the notion of reciprocity that holds the key to sustainability.* p.40 Finally toward the end of the report is discussion of the Pressure-State-response model: *Measurement of sustainability requires environmental benchmarks to determine where the Hauraki environment sits on a continuum.*

	Indicators, if correctly located, will allow measurement of both process and productivity change. This concept provides a practical framework for a customary 'state pressure response model'. Aligned with a conventional model, they could together measure the ability of the mauri (life force) to sustain both the wider environment and particular resources. This is discussed in relation to the recommendations of the Mäori working group on the MfE indicators programme.
Outcomes described	The report is generally not concerned with Outcomes, although there is some discussion of the intended benefits of the study – for example: *The Hauraki Indicator concept will only be useful if the extent of sites and the nature of the information collected allows for the holistic determination of sustainability state, direction and cause of change. A customary indicator process that is practicable, reflects tangata whenua attitudes to environmental care and is based on observation is needed*.
Indicators described	Indicators described relate primarily to fisheries and are mostly traditional seasonal indicators. Customary indicators are said to have been defined from an analysis of the following themes: definitions, resource abundance; habitat extent; fisheries use; tikanga Mäori; seasonal calendars; observation and inherited knowledge. Customary indicators identified in this project are further described as being of five types: celestial phenomena, seasons, weather, stages in the life cycle of plants or animals, and observed changes in fish behaviour or shellfish location. As an example of the latter: *It was recorded once that pipi (shell fish) was found as far inland as the mouth of the Matatoki Stream*. The following additional observations (these are elaborated on in the text) are given regarding traditional indicators: ▪ The generic term tohu, a sign or mark, defines some indicators, but is not universal. ▪ The Mäori calendar, set according to phases of the moon and star movement, is the primary celestial indicator. The calendar provided a monthly framework for expected events: the arrival of whitebait, the best fishing times. ▪ Seasons were not a sign in themselves. Natural events were the indicators, signalling the start and end of seasons. ▪ Monitoring changes in the weather was particularly important for tangata whenua fishing the waters of Tikapa Moana. Indicators warned of changes in fish behaviour and approaching bad weather. ▪ Changes in the environment and fisheries were observed in relation to expected events. ▪ Abnormal changes to seasonal patterns or location, once observed, became part of the local lore. There is a lot of information on seasonal patterns for fisheries for

	each of the study areas, and the manner by which environmental impacts can disrupt these seasonal events. These are not listed here. The indicators described include specific and general observations, and these are scattered throughout the document. For example: • *Natural indicators were seldom used to determine harvest readiness, with the exception of kina (sea urchins). In this case quality was determined by plant flowering. Kina are taken in November and December when the pohutukawa (tree) flower, an indication that the roes are of good quality. Harakeke (flax) flowering suggests that the roes are of poor quality.* • *The indicator for bivalve shellfish was observation of location and density. On the other hand, natural indicators, along with seasonal and monthly calendars, played a significant part in determining presence, and the best fishing times for finfish.* • *Whitebait was taken as it entered the rivers from the Firth of Thames. The state of plants and rivers were used as natural indicators.* • *Mussels are said to be in good condition year round, although a natural indicator may have been used to determine the period of highest quality prior to the main spawning.* • *True whitebait (inanga) always travelled up the sides of the river out of the current, while juvenile smelt were found in the middle of the river (D. Rakena, pers. comm., 1998).* • *Green-leaf buds on the willows signalled the imminent arrival of whitebait.* • *Plotting the location of old and new beds of cockles or pipi and the sediment profile may indicate the nature and extent of their present day and historical distribution. Settlement success and the impact of siltation from rivers could be gauged.* • *Changes in the biological diversity of the invertebrate communities of cockle and pipi beds may also provide an indication of their productivity as do measurement of meat quality.* • *Plotting the penetration of salt water into the Waihou (River) may provide an indication of where inanga could be expected to spawn, given the availability of riparian vegetation.*
Currency	There is some discussion about the extent to which environments have changed in Hauraki, and the relevance of this on the seasonal indicators described, e.g. *This section provides a context for the examination of the effect of environmental change on the ancient seasonal calendars used by the Hauraki whänui (range).* Several changes over time to species are considered in relation to environmental changes, but these are not investigated further. For example: *Hauraki customary fishery indicators were developed in a pristine environment. The local Mäori population was probably of a size that*

	led to few environmental impacts, the effects of fire on local forests being the major exception. *Habitat has shrunk considerably with the drainage of wetlands and the channelisation of the main river and its tributaries. The almost complete lack of galaxiids may be due to removal of riparian vegetation through stock trampling* (and) *The decline of freshwater mussels may have been caused by farm runoff changing the chemical character of the aquatic environment*. The report finds that despite significant environmental change: *the conditions that set the monthly calendar, the seasons and the Mäori year continued. This allowed kaitiaki to observe how fish and shellfish responded to their new environments, to seek new indicators and to adjust their fishing practices accordingly*. *The sustainability of customary resources and their environment today requires different information than that used by those of generations now gone. Information about the state of the resource, pressures or adverse effects on it and the value of the management tools designed to maintain or restore sustainability is required.*
Universality	The report refers to information from sources outside Hauraki, but there is little discussion of the universality of the indicators included. However, there is considerable reference to localised environmental conditions, and the influence these have on indicators. There was some brief discussion specifically regarding universality: *Customary indicators may not be universal, recognising the notion that plant or animal cycles are governed by the particular environments they are found in. Timing for the arrival of whitebait at (settlements of) Paeroa and Te Aroha had different indicators, recognising later arrival times further inland*.
Implementation	The study anticipates implementation as a future third stage of this project - a Hauraki monitoring capacity developed. While there is no reference to specific implantation of indicators, the uses of the indicators described are listed: *There appears to be three types of indicator use:* · *timing for fishing, gathering or planting, using natural events or calendars;* · *detection of resource change in location or density;* · *detection of weather or water changes in relation to fishbehaviour or safety.* The report ends with a wero, a challenge to the relevant agencies to support Hauraki in the developments and implementation of a series of customary fisheries indicators. .

4. Taieri River Case Study

Authors	Gail Tipa (Ministry for the Environment, 1999c)
Link	Not available on line
Notes	As part of the MfE Indicators programme, this report considers the development of a river catchment level set of indicators. The project was based on observation of the Taieri River over 12 months, and completed in association with Ngäi Tahü. The factor that pre-empted the study was an intention by the controlling authorities to reduce the minimum average flow of the river to levels that Ngäi Tahü were unhappy with.
Methodology	The methodology seems be developed by the authors of the report: *In developing this Mäori case study it was thought necessary to start "at the beginning" by designing a case study that, while specific to water initially, has potential to be extended to incorporate other resources that are identified by iwi as priorities for further investigation.* However, there is no indication in the report that the authors involved tangata whenua in the design of the methodology, or that tangata whenua had a substantial say in the structure of the project. It is reported that "Mäori need to develop processes that they are comfortable with to express their values", but it is not clear how Mäori in this project were able to influence this. Gail Tipa was on contract to Te Runanga o Ngäi Tahü, and it is not discussed the extent to which the Runanga influenced the project methodology. Ngäi Tahü is consistently referred to rather than "tangata whenua", but there is little discussion relating to what level within the iwi is being involved, e.g., local hapü. The report states that the Runanga (tribal assembly) were invited to identify kaumätua (elders) they felt should be interviewed. There is some discussion regarding methodology being changed in response to issues being raised by participating kaumätua, or as a result of observations along the way by the authors of the inadequacy of the number of interviews scheduled with kaumätua. Initially, there were to be eight interviews plus four field trips with kaumätua, and this was revised to 18. It is noted that the philosophy relating to the need to ensure that we continue to recognise the distinct world-views and the different conceptual origins in of approaches to managing the river influenced the design and structure of the Taieri River Case Study. The two main aims of the project are described, to: 1) identify the indicators that kaumätua thought were appropriate for assessing the health of the river; and 2) develop a methodology that uses the indicators and can be implemented by kaitiaki.

	The methodology employed involved: • Employing two observers to independently monitor the flow of the river and other factors weekly over 12 months. • Holding three field-trips, plus one informal visit, to Lower Taieri River, where kaumätua (elders) visited five sites on each occasion. Their comments were recorded relating to: site observations, recollection of past visits to the catchment, and thoughts on today's problems and possible causes. • Developing and testing a record sheet for what was observed, and after initial indicators were identified, altering the sheet to include these changes. • Holding a hui (meeting) on mauri (life force). • Interviews with kaumätua (elders) throughout the rohe (area)
Indigenous values systems	The discussion of Mäori values/concepts is restricted to mauri, such discussion is extensive. In the section specifically discussing Mäori concepts whakapapa is also considered. This said a Mäori world view is put forward as relating to the relationship of rivers with the wider environment and with Mäori, but this is conducted without specific reference to Mäori cultural concepts such as mana, mana whenua, kaitiakitanga, tapü, etc. One reference is made to a physical attribute of a river being related to the mauri, e.g., a stone in the river, and that such sites and physical features are known by kaitiaki. The report describes the need for Mäori cultural and spiritual values to be considered in relation to decisions made regarding riverine management, and also seeks to develop indicators that specifically relate to these. Kaitiakitanga, Mauri, Waahi tapu (sacred sites) or waiwhakaheke, Waahi taoka, Mahika kai, Kohanga, Trails, and Cultural materials are all listed, but only as being values listed in the Proposed Regional Water Plan. Water is referred to as a taonga, but otherwise discussion of wai is largely in terms of mauri. There is some additional discussion of a Mäori world view in the section discussing the indicators identified by kaumätua. For example the place-names indicators describe how place names record the presence of our tupuna in every part of the country, the history of settlement and resource use. *Such names take their source from the earliest people, creation traditions, incidents, mahinga kai resources, weather and tupuna (ancestors). Place names also provide us with descriptions of the character of the environment and give us an insight to the values and uses of sites and resources.*
Western v Indigenous values	Scientific formula for determining acceptable minimum river flows, e.g., maximum sustainable yield and minimum flows, are observed to ignore Mäori values, particularly mauri. A formula called the Instream Flow Incremental Methodology (IFIM) is referred to as appropriately protecting ecological values, but inappropriate for protecting cultural and spiritual values. The author forwards the view that it is important to continue to recognise the distinct world-views and the different conceptual

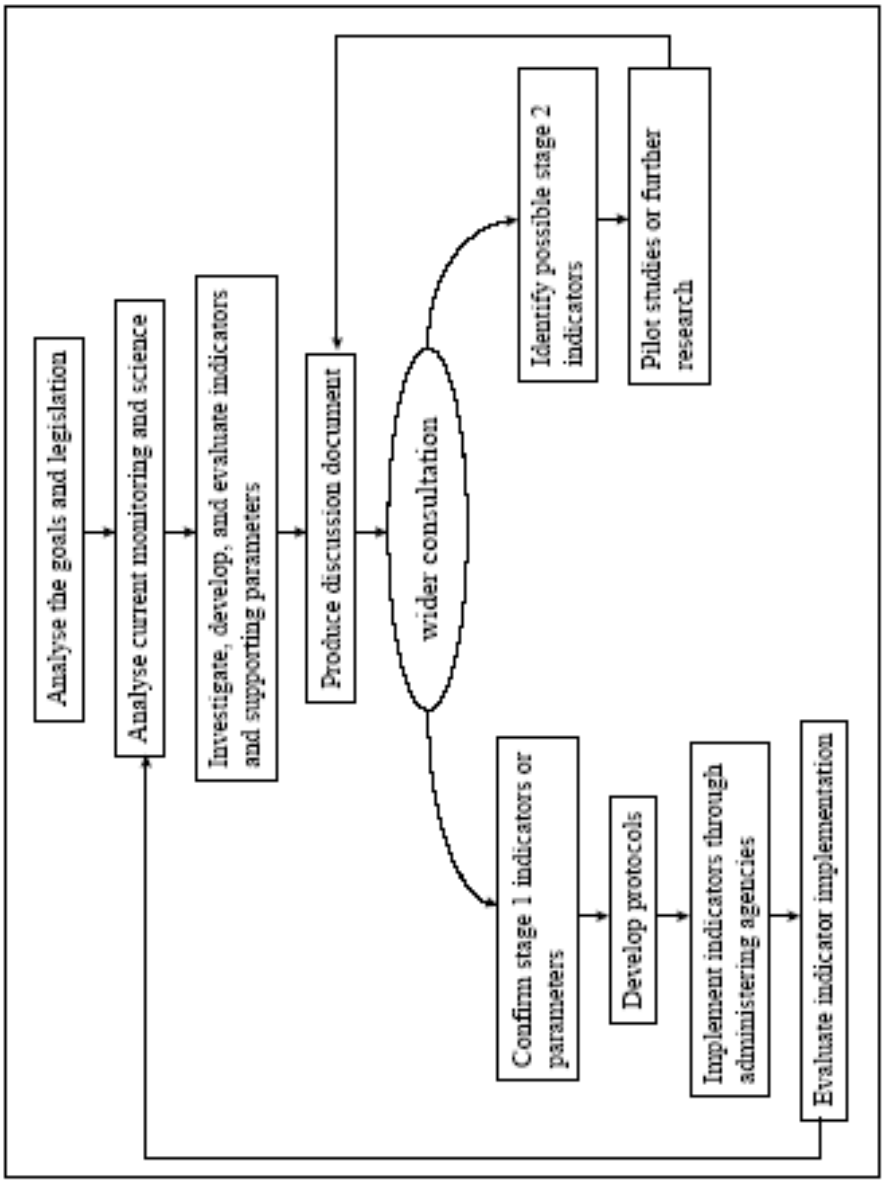
	origins and motivations behind the prevailing riverine resource management regime and that proposed in the report. A declared objective of the study include analysing the relationship between the observations and hydrological data, biological information and data obtained from western science, and determining the extent to which environmental performance indicators that are identified by other workstreams of the EPI Programme are relevant indicators for Mäori spiritual and cultural values. The result was that few matches were observed. In the final evaluation the report suggests that: *it is not sufficient to rely solely on objective scientific measurements. Resource managers must recognise that the perception of the health and well-being of a waterway has a reality of its own which is just as valid as the reality of the measurement of physical and chemical properties.*
Models	There is no discussion at all regarding models.
Outcomes described	While, as per many of the indicators documents, outcomes are inferred and desirable conditions relating to the river described, the report does not specifically identify environmental outcomes.
Indicators described	The report observes that the indicators developed rely on sensory perception, because signs relating to physical state were imperative to Mäori dependant on the physical environment. The following indicators of mauri are recorded. **General** • Traditional place names. **Touch** • The greasiness of the water. • Temperature. **Smell** • Freshwater has a distinct smell. • Unpleasant odours - from the water itself or from the riparian margins. **Sound** • The sound of the winds moving through the riparian vegetation. • The presence or absence of bird-life. • The current of a waterway - you can hear water flowing and in fact some of the traditional placenames relate to sound. • Flood flows - you can hear when the river is in high flows. **Sight** • A visible flow - to be a river, the water must flow - you must see the movement of water. • Riffles -White-water means the water is being aerated. • The extent and type of riparian vegetation, including the

	presence or absence of "overhang" tells about the likely presence or absence of life in the waterway. • The extent and type of riparian vegetation in the headwaters of a catchment is important as the mauri of the river stems from its source in the upper reaches of a catchment. • The presence or absence of activities (that cause adverse effects) in the headwaters of the catchment - again because the mauri of the waterway is strongest and stems from its source in the headwaters. • Colour - the clearness of the water or on the other extreme the level of turbidity of the water. • The presence or absence of sediment on the riverbed stones and gravels - if the stones are clean it is perceived as being safe to drink and harvest kai. • Continuity of vegetation - from the land, through the riparian zone, and down into the waterway itself. There should be no line or demarcation between the land, the riparian zone and the waterway itself. Often there is a black line or a pollution line that show the unhealthy state of the waterway. • Unnatural growths - of plants, weeds and algae - it shows us that something is "out of order." • The presence or absence of foams, oils, and other human pollution in the waterway. • Flood flows - we know that the river is cleaning itself by passing the water it no longer needs. • Willow infestation compared to the extent of native species in the riparian zone. • Abundance and diversity of fish species. • Abundance and diversity of bird-life. • The presence or absence of stock in the riparian margin and the waterway • Changes to the bar at a river mouth. • Unnatural sedimentation in channels - e.g. the appearance of islands. • Loss of aquatic vegetation in the marine environment e.g. bull kelp. • The health of the fish found in the waterway. • The "stomp test" - go into the water stamp around and see what floats to the surface. **Taste** • The extent of the tidal influence on the river.
Currency	There is no discussion regarding the currency of either the indicators developed or the relevance/currency of traditional tohü/knowledge in terms of the current work.
Universality	The project involved testing the methodologies developed with a different group of kaumatua and another river. The purpose was to

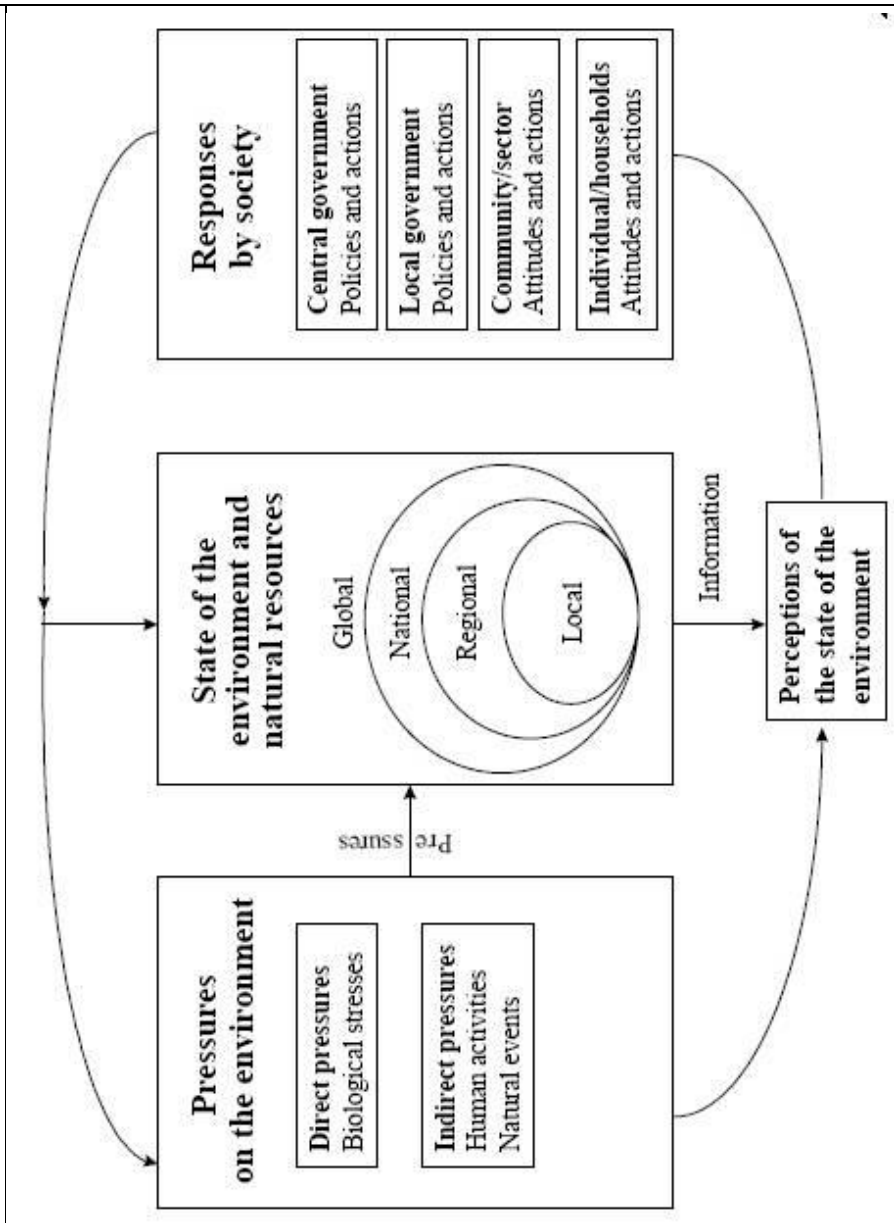
	see if the process being implemented in the Taieri River area could be replicated to enable kaumätua to understand flows and hydrological data elsewhere. This apparently confirmed the wider applicability of methodologies developed, particularly that kaumatua could understand and implement these. p. 16 Tipa notes that the indicators developed were solicited as being those kaumätua would use to assess a waterway, not specifically the Taieri River, but she also cautions that for any particular river local kaumätua would need to assess relevant indicators for their river.
Implementation	A recording sheet based on the indicators identified was trialled by one observer for a period of 6 months, this, according to the report, allowed them to make links between health and well-being of the river and the observed river conditions. The observations included periods of varying river conditions from very low to average/high flows, and fore each of the indicators scores of satisfactory or unsatisfactory were recorded. A recommendation is included that the final indicator recording sheet be used by kaitiaki elsewhere for river health monitoring. Future implementation of the indicators is discussed. Recommendations include that: • kaitiaki be given the opportunity to assess the mauri of a waterway; • resource managers invite kaitiaki to develop a cultural component of a water resource inventory that is based on traditional knowledge and observation based assessments; • kaitiaki be actively involved in determining flow regimes, especially: the setting of minimum flows; setting water quality standards; and developing enhancement programmes.

5. Proposals for indicators of the environmental effects of transport

Authors	Ministry for the Environment – NZ (Ministry for the Environment, 1999b)
Link	http://www.mfe.govt.nz/publications/ser/transport-proposals-jun99.html
Notes	Being a wide investigation into the environmental effects of transport in New Zealand (128 pages A4), and possible indicators for these, this report includes specific discussion of the effects of transport on Mäori and potential indicators. Hence it is the only one of the Ministries non-Mäori-specific reports included in this review. The report states: *"In addition to the indicators presented here for transport, this document discusses potential indicators relevant to Mäori. The Ministry acknowledges the value of indigenous knowledge and is seeking to incorporate this knowledge (mätauranga*

	Mäori) into the EPI Programme." The discussion here will concentrate those aspects of the document dealing with Mäori issues and Mäori indicators, this being a small proportion of the report.
Methodology	The methodology used for the development of these indicators – including the "issues of relevance to Mäori" - was essentially the standard methodological approach of the MfE indicators programme, this being shown in the following diagram.  In addition to this, a group of consultants undertook an international literature review and prepared a technical paper covering transport's effects on water, air and land, and issues of relevance to Mäori. There is reference to consultants who developed a report, with input from Ngäi Tahu, on the environmental effects of transport on Mäori, and the report notes that although this process does not amount to full consultation, it was useful because it enabled development of ideas to present to Mäori for comment. A group of "transport experts" meeting as the Transport Indicators

	Focus Group (TIFG) reviewed indicator development, prioritised the environmental effects of transport, and commented on proposed indicators. Finally a discussion document was prepared, and public responses called for. That document was released in April 1999 and then presented at several hui to allow Mäori the opportunity to consider issues raised and make their views known, these being taken into account before a final set of indicators (not included in this report) were developed. Feedback on the report is sought, and an invitation offered for comments on indicators in the report or others not included.
Indigenous values systems	The document records that traditional perspectives and knowledge about the environment remain an important part of the lives of Mäori, and that Mäori therefore have an interest in the development of indicators of the environmental effects of transport. References are given to the Mäori aspects of the MfE indicators programme. The report includes (Appendix 3) a list of environmental effects of transport of special relevance to Mäori , and the indicators proposed as being relevant to Mäori are associated with these. The series of potential effects of transport on Mäori relate to: Kaitiakitanga, Manaakitanga, Native flora and fauna, Cultural heritage, Wai, and Land, marae, Papakäinga (built communities). There is a short discussion of each of these under the heading "Matters of significance to Mäori."
Western v Indigenous values	Consistent with the EPI programme the report states that transport effects of concern to the general public are often also of concern to Mäori (for example, water quality), and that therefore, many of the general indicators proposed will also be relevant for Mäori. There is no discussion of issues relating the Mäori versus western approaches relative to environmental management or indicators.
Models	As per all the MfE Indicators reports reviewed here the OECD's Pressure-State-Response framework is adopted. This is described here as using an issue-based Pressure-State- Response (PSR) model for developing environmental indicators, saying that this "provides a simple yet effective way to think about indicators by asking three important questions: • What are the pressures on the environment? (identifies environmental issues and what causes them); • What is the state of the environment? (tells us what to monitor and where, relative to the issues); and • What is being done about these issues? (Identifies policy goals and management actions for the issues.) The model is represented below schematically.

	 Weaknesses in the PSR model are identified: *In particular, as a reporting framework it is prone to over-simplify the complex dynamics within any environment or ecosystem and misrepresent the causes of environmental change.*
Outcomes described	Consideration of outcomes in the document relate primarily to the outcomes of environmental policy and legislation. There are a few references to State indicators, these being said to reflect outcomes or effects.
Indicators described	There are only two specific Mäori indicators identified, these are included below with initial associated comments from the report in full. **Waahi tapu: location of transportation networks -** defined as a measure of transportation networks that are within 50 metres of waahi tapü, within iwi rohe (tribal areas).

	It is proposed that the percentage measurement would be provided by each iwi to government every five years. This would provide a useful measure of the increasing (or decreasing) encroachment of the effects of transportation on waahi tapü. *This proposed indicator assumes that waahi tapü are the most important sites of significance to Mäori. It is worth considering whether there are other sites of significance that should be measured in this way.* **Proposed indicator : waahi tapü – location of transportation networks** **Policy relevant** • *Providing for the culture and traditions of Mäori with their ancestral taonga is a matter of national importance under the RMA.* • *Avoiding or mitigating natural hazards is an important function of territorial authorities.* **Analytically valid** • *Establishment of a quality reporting procedure will be required.* • *The units chosen are considered to be useful for measuring change given it will be a relatively static measure.* **Cost effective** • *There is no co-ordinated database of sites of significance, although a significant amount of work has been done in this area to prepare statutory plans.* • *Co-ordination among heritage agencies (in particular tangata whenua) will be important.* **Simple and easily understood** • *Through mapping techniques the monitoring results will be easily displayed and understood.* **Responsibility for monitoring** *We propose that iwi measure this pressure indicator, both because iwi are best placed to identify and locate waahi tapü sites, and also because maintaining iwi control over this measure helps to avoid the disclosure of the location of waahi tapü. This would be a stage 1 pressure indicator for iwi who are able to report on it now. For iwi who are unable to assume this role, the indicator would be stage 2.* **Marae and papakainga: noise from transportation networks** *This indicator will provide a measure of the disturbance to sites of importance to Mäori. It replaces an earlier proposed indicator that assessed the proximity of roads, since it was thought that in many cases proximity to roads could be a positive effect and that noise would be a better indication of disturbance.* *This pressure indicator is defined as the percentage of marae and papakainga exposed to outside road traffic noise levels greater than*

	55, 60, 65 and 70 dBA (24h Leq) at the property boundary. **Assessment against criteria Table Proposed indicator T13: marae and papakainga – noise from transportation networks** **Policy relevant** • *Providing for the culture and traditions of Mäori with their ancestral taonga is a matter of national importance under the RMA.* • *Avoiding or mitigating natural hazards is an important function of territorial authorities.* **Analytically valid** • *Needs the establishment of a quality baseline, which will rely largely on information held by both territorial authorities and tangata whenua.* **Cost effective** • *Databases on the location of marae, papakainga, and flood hazards exist but are likely to vary.* • *The location of traditional food-gathering areas is personal to tangata whenua; for this reason, iwi and hapu should monitor these indicators.* **Simple and easily understood** • *Yes.* **Responsibility for monitoring** *The noise from transportation networks may be measured in the same way as location of travel networks – at an iwi level. Because this indicator requires a new monitoring regime, Mäori input into a regime would need to be determined.*
Currency	The discussion relates to the present, and there is no discussion about the currency or relevance of the indicators identified over time.
Universality	It is acknowledged in the report that although Mäori EPIs relate to matters of significance specifically to Mäori, some are relevant to all strands of the EPI Programme. These include: • direct and effective involvement of Mäori in the Programme • recognise customary rights and the *Treaty of Waitangi* • provide for traditional concepts, including whakapapa, mana and mauri. These matters are described as 'high level' and as relating to all aspects of the EPI Programme – its preparation, implementation and review.
Implementation	The possible implementation of these two indicators is discussed in the previous Indicators section, and such discussion relates to monitoring at an iwi level. The indicators are not tested as part of the project, and no implementation information is included.

6. Monitoring Changes In Wetland Extent: An Environmental Performance Indicator For Wetlands. Coordinated Monitoring of New Zealand Wetlands, Final Report – Project Phase One

Authors	J.C. Ward; J.S. Lambie (Ward, 1999)
Link	www.smf.govt.nz/results/5072_final.pdf
Notes	This report documents Phase One of the Coordinated Monitoring of New Zealand Wetlands (SMF) project (Wetlands Project), which aimed to develop a nationally consistent methodology for mapping and monitoring NZ wetlands. The report for Phase Two follows. The project aimed to develop indicators of spatial extent in Phase One (which this report describes) and indicators of wetland condition in Phase Two. The project was not Mäori-specific, but the report includes some consideration of the need and process for Mäori input into wetlands monitoring generally. Also briefly outlined are processes for partnership and two-way information sharing with Mäori organisations, which the authors see as a key component of coordinated wetlands monitoring and management in the future. Goal 4 of the project was to: *Build a framework for partnerships with iwi for two pilot regions, with a view to developing appropriate methods to incorporate iwi values and uses of wetlands in spatial databases and decision support systems.*
Methodology	The following three processes describe the project approach: 1. developing a draft classification of New Zealand wetlands, trialling it in the field, and re-assessing it so that it is consistent for wetland managers to use throughout the country; 2. developing tools so that wetland managers can use the classification and available maps, aerial photographs, and satellite imagery to determine the spatial extent of different wetland types in their region; 3. consulting and discussing the development of tools for wetland monitoring with tangata whenua with a view to incorporating their values and uses of wetlands in Phase Two of the Wetlands Project. Our review will concentrate on the third, consulting and discussing with Mäori. Consultations and discussions are said to have been held with iwi, hapü, or rünanga representatives from Tainui, Ngäti Te Ata, Ngäti Naho, Hauraki, Te Rünanga O Ngäi Tahu and Papatipu Rünanga. The project was undertaken largely by scientists, and the report records several methods that were used to extend the relationship between tangata whenua and scientists, these include:

	• *Hold (4) participatory hui with key iwi/hapü / rünanga representatives in a place agreed to by all parties.* • *Establish working groups with Mäori representatives.* • *Invite members of working groups to assist in fieldwork.* • *Invite feedback from tangata whenua regarding the process of partnership and ways to strengthen relationships further.* • *Share the results of research and monitoring work with Mäori representatives.* The following needs for future projects were identified by Mäori representatives in Phase One: • *there should be much greater tangata whenua involvement across all project areas if a true partnership for monitoring and managing wetlands is to be achieved;* • *recognition should be given to the role and legitimacy of mätauranga Mäori (traditional and contemporary Mäori knowledge) in all aspects of environmental monitoring and management of wetlands;* • *culturally significant wetlands should be included, so that Mäori environmental monitoring approaches and indicators can be developed, trialled, and evaluated at these sites.*
Indigenous values systems	The report deals primarily with a western approach to the analysis of wetlands. However, the validity of and need for mätauranga Mäori is acknowledged, and issues around this are briefly considered: *The collection of Mäori wetland information (e.g. mätauranga Mäori) and the way it is managed in an information system, will require a high level of Mäori input to develop databases which are culturally acceptable, take account of intellectual property rights, and can handle and store sensitive information.* The report does not discuss Mäori values systems, other than to suggest that there might be incorporated in later stages of the project. No Mäori terms are included, including in the glossary.
Western versus Indigenous values	As indicated, the report deals primarily with a western analysis, for example a complex scientific wetlands classification framework is developed, there is long discussion regarding methods, and issues such as locational accuracy of remote sensing techniques. The authors observe that the indicator is scientifically defensible. The incorporation of mätauranga Mäori is anticipated, and the authors speculate regarding the use of scientific data by Mäori; There will also be an increasing desire from Mäori organisations to have access to national and regional wetland scientific and technical databases and meta-databases. The writers report that an assessment of the need for a formal Mäori

	-based wetland classification system will be made within the second phase of the project, and that a generic set of Mäori-based indicators will be developed by iwi and the project team. In the section discussing plans for Phase two it is reported that as part of a planned web resource, a knowledge-based GIS or some other information management system will be devised to allow information from science and Mäori-based wetlands monitoring to be incorporated as an information layer into existing systems used by wetland managers. While Garth Harmsworth is cited in the report for his work on wetlands, his writing on issues relating to the incorporation of Mäori values in information systems is not considered.
Models	Models are not referred to, but "techniques" are discussed, such as the Atkinson System for the description of vegetation according to structure and composition.
Outcomes described	None
Indicators described	Wetland extent is the indicator developed, with the classification developed provides a systematic framework for monitoring change in wetland Extent.
Currency	N/A
Universality	The report describes two categories of indicators being identified, region specific indicators including spatial extent of wetlands and their number measured using aerial photographs and maps, and site specific indicators built around the ecological elements of natural character and wetland condition. It recognises that indicators may vary according to wetland type. Monitoring extent using the classification can be done at a range of cost options depending on what level (national, regional, or local) of information is needed.
Implementation	The project had not included implementation of the indicator at the time of the report. This is anticipated for Phase Two.

7. Mäori environmental performance indicators for wetland condition and trend: Coordinated Monitoring of New Zealand Wetlands, Phase 2, Goal 2

Author	Garth Harmsworth (Harmsworth, 2002)
Link	http://www.landcareresearch.co.nz/sal/maoriindicators.asp
Notes	This report describes one component – *development of a generic set of matauranga Mäori based indicators for wetland condition and trend* – being one of four goals in the second phase of a Ministry for the Environment project, this in turn being part of the MfE Indicators programme. This consisted of three main outputs: • Output 2a: Record and identify a generic set of matauranga Mäori -(iwi and hapü) based indicators for wetland condition and trend; • Output 2b: Field trial, verify, and calibrate Mäori wetland indicators for national application; and • Output 2c: Document final results.
Methodology	The following methods are recorded as being used to ascertain Mäori concepts for environmental monitoring and indicator development: recording general Mäori knowledge and values on wetlands; • identifying and evaluating wetland information for indicator development; and • developing Mäori methods for environmental assessment and SOE reporting. The report records that steps involved; *developing an understanding of Mäori concepts and approaches for each area, identifying and building on previous indicator work, understanding Mäori values and aspirations, developing appropriate frameworks and classifications for indicator development, and determining methods for environmental assessment and reporting.* The report also indicates that conceptual approaches and Mäori knowledge were recorded during field visits, hui, one-on-one interviews and discussion with Mäori resource managers, researchers, planners, and kaumatua, and interaction with other wetland specialists. A range of wetland environmental performance indicators were identified and recorded through hui/workshops and field visits. Culturally significant wetlands were chosen for the study.
Indigenous values systems	Among the factors needed to be taken into account when identifying or developing Mäori environmental performance indicators (MEPI), and specifically relating to Mäori values are*:* • *adherence to tikanga,* • *adherence to processes/protocols/procedures,* • *appropriate MEPI frameworks to work within,* • *access to relevant knowledge and information held by tangata*

	whenua/runanga representatives (e.g., based on matauranga Mäori, environmental knowledge from a Mäori perspective), • *Mäori classification systems and organisational frameworks for collecting and recording information, and understanding of MEPIs and their relevance to providing information on environmental change and trends*. p.13 Based on these factors (and others not exclusively Mäori the report describes criteria for selecting "good" Mäori environmental performance indicators. These relate closely to the factors, but also include; • *able to be assessed/measured and interpreted both by local and by other Mäori groups* • *cost-effective, repeatable, able to show environmental change in two directions: positive (e.g., enhanced), the same (maintained), or negative (e.g., degraded)* • *useful in a wide range of wetland sites, environments, not in a few, and able to be used generically* • *able to show gradational, incremental, or orderly change, ranging from qualitative to quantitative and practical and tangible* p.14. It is noted in the report that the last one must be explored more fully with groups. These latter criteria could be argued to reflect western scientific values more than Mäori values. For example the requirements for cost effectiveness, quantitative indicators, and tangibility are not based on Mäori values. However, there is discussion about the relationship between Mäori versus Western knowledge – for example it is proposed that Mäori terms used for wetlands be integrated with scientific classifications. There is, however, no further discussion regarding issues surrounding such actions, such as whether Mäori understandings of wetlands would be distorted in order for these to conform to western classificatory systems. Whakapapa, Te reo, Mauri, Tikanga, and Kaitiakitanga are investigated and described as key Mäori "concepts" forming the basis for developing MEPIs and environmental monitoring. Additionally, "Mäori frameworks and classifications" are discussed including categories of places, waters, and issues surrounding these. There is a substantial section describing Mäori values and concepts p.17-20, and an excellent glossary of Mäori terms included as Appendix one.
Western versus Indigenous values	The report states that it is important to develop environmental monitoring programmes that provide a balance in cultural perspectives and take into account other forms of knowledge for different parts, or strands, of the environment. And that this expanded knowledge base can complement scientific knowledge for environmental systems. Accordingly, Harmsworth finds that in addition to those tikanga-

	related factors described above in "Indigenous values systems", factors needed to be taken into account when identifying or developing Mäori environmental performance indicators include access to scientific information and knowledge and national and regional databases / expertise. Appendix 2 adopts a western classification system for wetlands, and interprets this in terms of Mäori equivalents – the point being that the starting point it the Western system rather than a tikanga Mäori perspective. This despite earlier recognition that Mäori have developed their own frameworks and classifications to understand, communicate knowledge about, regulate, restrict and manage parts of their natural and spiritual environment. The report describes how once all the indicators of interest to Mäori were developed these were categorised according to: Mäori indicators, based on Mäori knowledge and matauranga, which requires in-depth cultural understanding, to be monitored and interpreted by Mäori with this expertise: • Non-Mäori derived indicators but providing useful information to Mäori. These indicators were termed community–scientific, • Scientific indicators requiring specialist scientific knowledge, techniques, and often specialist equipment. While differing according to the underlying knowledge systems on which they are based, each of these is regarded as highly useful information to Mäori. There is no discussion regarding conflicts between western v Mäori values systems and related approaches to environmental management.
Models	Two "frameworks are identified which were proposed by the Mäori advisory panel to MfE in 1998, these are: *a) The Mana Whenua framework: orientates a Mäori community towards planning for their environment independently of external considerations and concerns.* *b) The Integrating framework: recognises that Maori monitor the environment along with other kinds of groups such as Crown agencies would require Mäori communities first to plan independently within their environment, before integration.* p.12. The report mainly refers to the Pressure – State – Response model, and states that the indicators developed were grouped as pressure, state, or response indicators: *The key generic Mäori indicators for wetland condition and trend (section 4.2) were grouped according to the pressure–state–response OECD model, and more practical, understandable terms were used to explain this model.* An indicator monitoring form was developed using the P–S–R organisational framework, and then sent to all Mäori participants for comment, trial and evaluation. The report notes that some participants modified the forms and assessment method, and that these variations

	and comments from a workshop of participants were used to further refine the assessment form from a Mäori perspective for national application. The resulting framework guiding the development of indicators is recorded as being : • *based on Mäori concepts and frameworks* • *based on Mäori knowledge* • *based on consistent and robust methodology* • *culturally appropriate, tikanga based* • *culturally sensitive, taking account of intellectual property rights* • *generic and could be used in a range of wetland types (e.g., wetland hydrosystems)* • *could assess wetland condition and trend* • *could be organised according to the P–S–R model* • *could be used to report on the state of the environment (SOE)* • *practical and cost effective.* p.36. Thus, the criteria are a mix of tikanga Mäori and conventional / mainstream, examples of the latter being the last four above.
Outcomes described	There is little discussion of outcomes in the report, and none listed. It is recorded that the model needs to identify clear sets of environmental outcomes, goals, or targets, to measure trends towards or away from these outcomes, goals or targets. An example given of an outcome in the report is: *to protect and restore all remaining wetland systems within some defined area*. It goes on to identify targets relating to that outcome; *to protect and restore 20% of remaining wetland systems to some stated condition by 2010*. p.34. A set of national and regional policy goals are recommended in the report, as reflecting Mäori values and concepts. Described as policy goals and being of a higher order to that generally considered for outcomes, the following examples are provided: • *maintain and enhance the cultural values of lakes, rivers, and wetland ecosystems;* • *identify and work towards cultural aspirations for defined environments;* • *assess and report on the degree and proportion to which cultural values are represented;* • *safeguard and restore the mauri of the lakes, rivers, and wetlands ecosystems;* • *assess and report on the proportion of waters for which mauri has been lost and/or restored.* p.44.

	Also the following paragraph describes as "the reasons why tangata whenua, iwi and hapü should be involved in monitoring the environment", but precedes this list with a discussion of environmental goals and outcomes, and while this is not stated the reasons align to cultural outcomes for Mäori; *It is noted that agreed environmental goals and outcomes, usually based on a balanced range of human and cultural values, is what actually provides the framework or context for environmental monitoring. Some of the reasons why tangata whenua, iwi and hapu should be involved in monitoring the environment are given below.* • *For iwi to monitor for themselves, the health and condition of the environment from a cultural perspective.* • *To help review performance of iwi and hapü management plans.* • *For iwi, hapü to prepare their own state of the environment (SOE) reports.* • *Provide information about what is happening to culturally significant environmental systems through time.* • *To build Mäori knowledge on environmental systems, such as wetlands.* • *To enhance te reo through environmental projects.* • *To provide long-term information on environmental change, which acknowledges the significance and legitimacy of Mäori knowledge.* • *To identify changes to the state or condition of the environment.* • *To identify remedial action to rehabilitate or restore culturally significant environments.* • *To measure and review the performance of other agencies regarding the welfare of the environment.* • *To measure and review the performance of other agencies responsible for achieving defined environmental and cultural outcomes.* • *To fulfil requirements for national and international reporting on the state of the environment.* p.37.
Indicators described	MEPI identified were classified as either positive or negative in terms of Mäori values. Accordingly, number, type, extent, etc. (in relation to certain places) of indigenous varieties of Rakau, nga otaota, ngahere (Plants), Nga ika, nga kararehe (Fish/animals), and Nga manu (birds) are recorded as positive. Aspects relating to introduced of pest species and their impacts on significant places are deemed negative. A third category describes indicators for mauri and a fourth for cultural heritage. The report says that there are initially over 100 Mäori and scientific indicators described (p.23-27), but most of these do not represent

	distinct indicators, for example, the following paragraph represents numerous indicators (in accordance with the over 100 indicators observation). *Indicators that give a negative measure of wetland condition and impact on Mäori values:* *(i) Indicator: Plants* *Examples: willow, grey willow, crack willow, gorse, blackberry, pinus radiata, himalayan honeysuckle, glyceria spp., algal growth, lagarosiphon spp. egeria spp., elodea spp.; hornwort, compsopogon hookeri (red algae), water buttercup, pondweed, water net.* *What to measure/assess: Invasion, numbers, type, areal extent, proportion of exotic-introduced plants to native plants; area of natural habitats affected, mahinga kai areas affected by exotic plants.* From these, 9 key Mäori indicators were arrived at. They are described as all being based to some degree on Mäori knowledge and expertise, and expressing a Mäori perspective of how they see the environment changing though time. *Furthermore, the indicators provide an understanding of Mäori value systems, the way Mäori view and perceive the state of health of the environment, and the way they wish to assess and report on the state of environmental health. The indicators can be used to monitor positive and negative environmental changes as determined by Mäori communities' values and aspirations, such as:* 1. *% area of land uses/riparian factors affecting cultural values;* 2. *number of point (sites) sources of pollution degrading te mauri;* 3. *degree of modification (draining, water table, in-flows, out-flows) degrading te mauri;* 4. *number of (and change of) unwanted (e.g., exotic, introduced, foreign) plants, algae, animals, fish, birds (pest types) affecting cultural values (*);* 5. *number of (and change of) taonga species within wetland % area of (and change in area) taonga plants within total wetland;* 6. *% area of (and change in area) unwanted (e.g., exotic, introduced, foreign) plants covering total wetland;* 7. *assessment of, and change in te mauri (scale); and* 8. *number of cultural sites protected within or adjacent to wetland.*
Currency	While there is some consideration of historic trends, particularly regarding environmental degradation, there is no discussion in this report about the currency of the indicators, i.e., whether indicators used historically remain effective. Rather the emphasis is on the identification and development of indicators that can be used now and into the future. Reference to weed or exotic species, and contemporary pressures

	facing wetland mean that many of the indicators developed are necessarily contemporary, in contrast to, say, the HMTB study, which considered largely traditional tohü.
Universality	Section 4 is entitled "Mäori wetland indicators for national application." The report anticipates that the indicators developed can be adopted by Mäori elsewhere, saying that generic Mäori indicators were developed for wetland monitoring of condition and trend. *Once the indicators were defined into groups, and those based only on Mäori knowledge determined (section 3.7), the Mäori indicators were checked using a matrix (Table 3). This narrowed the Mäori indicators down to those that could be used at a national level (generically), across a range of wetlands, based on tikanga and cost effectiveness, and those that could involve Mäori communities in their own environmental monitoring once adequate training had been given.* p.27 These criteria, applied to the development of indicators, were intended to result in a small number of suitable generic Mäori indicators that could be used for national application. For example, criteria included: • can be assessed and interpreted by Mäori communities; • able to be used in a wide range of wetland environments – generic; • can be used for SOE reporting. p.28. As indicated above, there is some discussion in the document regarding the relevance and applicability of mainstream or science based indicators to Mäori.
Implementation	This report essentially detailed the development of the Mäori indicators. There is little discussion of their implementation. The following described the indicator forms being trialled. *An indicator monitoring form was developed using the P–S–R organisational framework, and then sent (July 2001) to all Mäori participants for comment, trial and evaluation. The final Mäori wetland monitoring form in Appendix 5 was based on feedback and comments received from January 2002 to April 2002. Many Mäori groups reformatted the forms and assessment method (Table 7), and then with their own versions, trialled and evaluated the forms in the field.* But there is no mention of the results of such trials in terms of the indicators.

8. A Cultural Health Index for Streams and Waterways - Indicators for recognising and expressing Maori values

Authors	Gail Tipa and Laurel Teirney (Tipa, 2003)
Link	www.mfe.govt.nz
Notes	The report is as the product of three years' work by the authors to develop Mäori stream health indicators for mauri and mahinga kai. The Cultural Health Index (CHI) is said to have three distinct components (the status of the site, a mahinga kai measure and a cultural stream health measure), each of these being made up of multiple "measures". The declared purpose of this study was to develop a tool to facilitate the input and participation of iwi into land and water management processes and decision making. The result reported is the CHI for streams, described as being developed by linking Western scientific methods and cultural knowledge about stream health.
Methodology	The report says that the starting point for the project was the indicators that Māori use to assess stream health. Interviews were carried out with kaumātua and iwi resource managers, from which indicators are said to have been derived as being important in determining whether a river is healthy. Kaumätua initially identified features of the catchment and stream that, from a cultural perspective, are fundamental to healthy streams. These features were assessed directly by rünanga members at selected stream sites. The three distinct components of the CHI referred to above are described as: **Component 1**: **Status of the site** • Stream sites are classified according to traditional association and intention to use in the future by asking: - Is there a traditional association between rünanga and site? - Would Mäori come to site in the future? **Component 2**: M**ahinga kai measure** • Sites are evaluated for the following mahinga kai features: - How many mahinga kai species are present? - Are the mahinga kai species that were gathered in the past still there? - Are the mahinga kai species accessible for gathering? - Would Mäori come to the site in the future? **Component 3**: **Cultural stream health measure** • Sites are evaluated for cultural stream health. First, the average scores for the rūnanga team members are calculated for 18 indicators of stream health in each site. Then, using a set of criteria, the list of indicators is condensed to a smaller set that

	effectively encapsulates overall stream health (as assessed on the recording form). The average score for all included indicators provides the cultural stream health measure (1 is poor and 5 is the highest cultural stream health rating). The objective was to develop a quantitative index; therefore the recording form was designed to make a clear distinction between positive and negative statements, introduce a rating scale (1–5), and ask for an overall assessment of stream health (rated 1–5) on which to base an evaluation of the contribution each indicator makes to overall stream health.
Indigenous values systems	The authors write that the overriding goal when developing the CHI was to have a tool grounded in the beliefs, values, and practices of Mäori. Also, that they attempt to explain the Mäori perspective on freshwater in terms more readily understood by those resource managers that may apply the CHI, recognising that a Mäori perspective is fundamentally different in its treatment of the interactions between people and nature. Four cultural values central to the development of the case study are identified: mauri, mahinga kai, kaitiakitanga, and ki uta ki tai. The document goes on to briefly describe these four, and concludes that the primary resource management principle is, protecting the mauri of a resource from desecration. Elsewhere, Wāhi tapü and wāhi taonga are added, as indicating the traditional significance of particular locations. The CHI is described as being designed in such a way that it must be applied by Mäori, and the calculation of CHI scores must be informed by traditional knowledge. Participation of mana whenua is said to ensure that the values mana, mana whenua, and kaitiakitanga are recognised. There are various discussions in the report of the way in which tikanga informed the study, for example; *Our subjective choice of individual factors from five habitat categories was the same as the result from the objective stepwise multiple regression analysis (described below), except that the latter did not identify catchment land use as a significant component of the model. This is probably because catchment land use and use of the riparian margin were strongly correlated with each other (0.84). On this basis, we could have decided to omit catchment land use from our cultural measure. However, the holistic view of river systems held by Mäori is such that it seemed more appropriate to retain catchment land use*.
Western v Indigenous values	The authors record that they found that the cultural and Western scientific measures of stream health are focused at completely different levels. Whereas the Western scientific measures are based on specific measurable components in the stream, cultural perceptions about the entire catchment are the basis of the cultural stream health component of the CHI. The project reconfirmed the significance of holism to Mäori. Attempting to combine measures that are so philosophically distinct

	was not considered appropriate. However, the cultural measure fits comfortably alongside Western scientific measures and provides a significant and complementary addition to tools for assessing stream health. As noted above, Mäori have values outside those captured by Western measures. It is recorded that the project originally sought to develop indicators consistent with the values of mauri and mahinga kai, but resulted in the incorporation or recognition of other cultural values in the CHI and unanticipated social and cultural outcomes. p.39. The results of the CHI are compared in the study to two western stream health assessment programmes to "place the cultural stream health component of CHI in a broader perspective". These were the Stream Health Monitoring and Assessment Kit (SHMAK) and the Macroinvertebrate Community Index (MCI). In comparison, the results from the CHI were consistent with the two scientific methods. There is some consideration of the extent to which the Western methods can be adapted to accommodate Mäori cultural values, the conclusion being that they can't. "*It is important to acknowledge that although the MCI and the cultural stream health measure correlated well, the cultural stream health measure is specifically designed to assess Mäori values. While it represents a means of facilitating communication between resource managers and Mäori, the MCI should not be seen as a surrogate for resource managers to consider the likely status of Mäori values*". p. 36 However, there is a section entitled "Combining Cultural and Scientific Perspectives", this relates to the input into the project of the University of Otago Streams team, and it is noted; "*One of the major advantages of this project was the way the two knowledge systems complemented each other. Linking Western scientific design and analytical skills and cultural knowledge has been shown to be an innovative way of developing a potentially effective tool for iwi*." p. 50.
Models	Models are referred to in the text, but not in the sense of there being an overarching model on which the project is designed. The writers state that the cultural stream health measure derived in the study must encapsulate and be closely related to the overall measure of what rūnanga members consider healthy from their point of view". This is followed by an observation that selecting the indicators that best express stream health from a cultural perspective involved four steps. Regarding step C the authors write that in constructing an **"overall model" stepwise multiple regression of stream health indicators** (a statistical analysis method) is used. Stepwise multiple regression is described as a statistical procedure that mathematically selects a reduced set of variables (from the 14 indicators considered in step A) that best account for the variation in a dependent variable (in this case, the overall health score). The full

	stepwise procedure was applied, which adds variables one at a time in building an overall model. This is explained; *The first variable added is the one that explains the most variation in the dependent variable (i.e. has the highest correlation with overall stream health). This first variable will not explain all of the variation in the dependent variable, so there is 'residual' variation left unexplained. The stepwise procedure then adds another variable, specifically the one that accounts for the most residual variation after the first variable. The procedure continues in this manner until a set of variables is included in a model such that each one explains a significant portion of the variation in the dependent variable in the overall model.* *Our stepwise regression analysis (setting the necessary statistical significance for inclusion of an indicator as $p < 0.05$) yielded the four indicators below, given in order of importance. When these four factors are taken together they account for an acceptable 76% of the variation in overall stream health at the sites: (i) water quality – pollution (ii) use of riparian margin (iii) use of river – modification (iv) river flow – visible.* Further, it is observed that the subjective choice of individual factors from five habitat categories (step B) was similar to the result from the objective stepwise multiple regression analysis. Thus, the model is only one of several analytical methods employed.
Outcomes described	Outcomes are not specifically described. However, many environmental outcomes of importance to Mäori, while not referred to as outcomes, are included. Some from which outcomes can be identified include: • protecting sensitive headwater catchments (e.g. outcome = sensitive headwater catchments are protected); • supporting abundant mahinga kai resources, particularly in important wetlands, backwaters, tributaries and mainstem rivers; • protecting the quality of the waters; • protecting other wähi tapu / wähi taonga; • protecting cultural landscapes; • developing more appropriate flow regimes; • ensuring variability in river levels; • providing a sufficient buffer, or safety margin, to mitigate the adverse effects of changing land uses on waters; • undertaking the restoration, enhancement and creation of wetland areas, to act both as flow moderators and habitats for mahinga kai species; • enhancing access throughout the river system; • addressing issues relating to changing land uses in catchments; • protecting habitats in estuaries.
Indicators	The following indicators were derived initially as being important in

described	determining whether a river is healthy: • shape of the river; • natural river mouth environment; • sediment in the water; • water quality; • water quality throughout the catchment; • abundant and diverse range of mahinga kai species; • flow characteristics; • riparian vegetation; • flow variations; • use of river margin; • flood flows; • temperature; • sound of flow; • catchment land use; • movement of water; • riverbank condition; • fish are safe to eat; • water is safe to drink; and • uses of the river.
Currency	There is no discussion relating to currency of indigenous indicators
Universality	"*This CHI is based on Ngäi Tahu perspectives about stream health and their assessment of hill country rain-fed rivers. Given that kaumätua and other rünanga members from throughout the rohe were involved in identifying stream health indicators, we are confident that the index can be applied to other hill country rain-fed rivers throughout the rohe by Ngäi Tahu rünanga.*" "*It is less certain that the CHI will be valid for very different river types and for other iwi. During development, the risk of implementing the CHI widely without validating the tool for different river types and different iwi was identified. Validation only applies to the stream health component of the index, as the traditional status of a site and the mahinga kai component are generic to iwi throughout the country. Confidence in applying the CHI more widely is critical if the tool is to be applied successfully in the longer term*." There is some investigation relating to how widely the CHI can be applied, e.g.; "*We found no significant correlation between the cultural health component of the CHI and either stream order (1–2, 3–4, 5+) or river (Taieri, Kakaunui). This means that the tool developed is equally applicable to the different rivers and streams of different size.*" There is brief discussion relating to wider application of the CHI, to validate the CHI for nationwide use by iwi and resource managers. Three specific areas of work have been identified:

	• guidance to improve consistency of assessment by different members and different teams; • testing the applicability of the CHI in river types other than the type in which the CHI was first developed; and • testing the acceptance of the CHI methodology by iwi other than the iwi who were involved in initial development of the CHI. Processes are proposed for applying the CHI for other rain fed rivers and for other river types, and for other iwi, with discussion surrounding issues relating to each of these.
Implementation	The Cultural Health Index was tested extensively at 46 sites in two Ngäi Tahu river catchments, but the results of only five are included in the report. The report considers how the CHI can now used. The two rünanga involved in the development and trialling of the CHI are said to be able to now use the results of the CHI on Taieri and Kakaunui River sites to work with the Otago Regional Council, identify stream health issues of cultural importance and to decide how these might be addressed. p.46.

Subsequent participation by Mäori in the MfE EPI Programme

A Mäori caucus met during two workshops on marine classification system development held in May and June 2000. A report was commissioned by the Ministry to suggest a process by which mätauranga Mäori could be factored into a classification system for the marine environment and ultimately contribute to a marine management regime (Ministry for the Environment, 2001). Any outputs relating to this have not been located.

Department of Conservation (DoC) and Ministry for the Environment (MfE) in 2004 received funding from the Ministry of Research Science and Technology (FRST) for a project called Mäori Methods and Indicators for Marine Protection. No outputs were available by 2005.

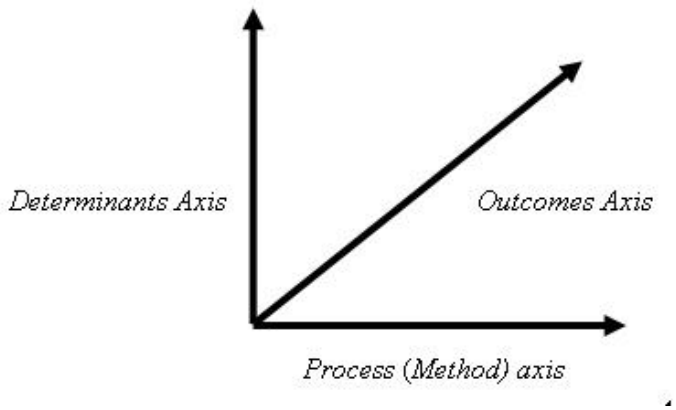
2.2.2 Ministry of Mäori Development – Te Puni Kokiri

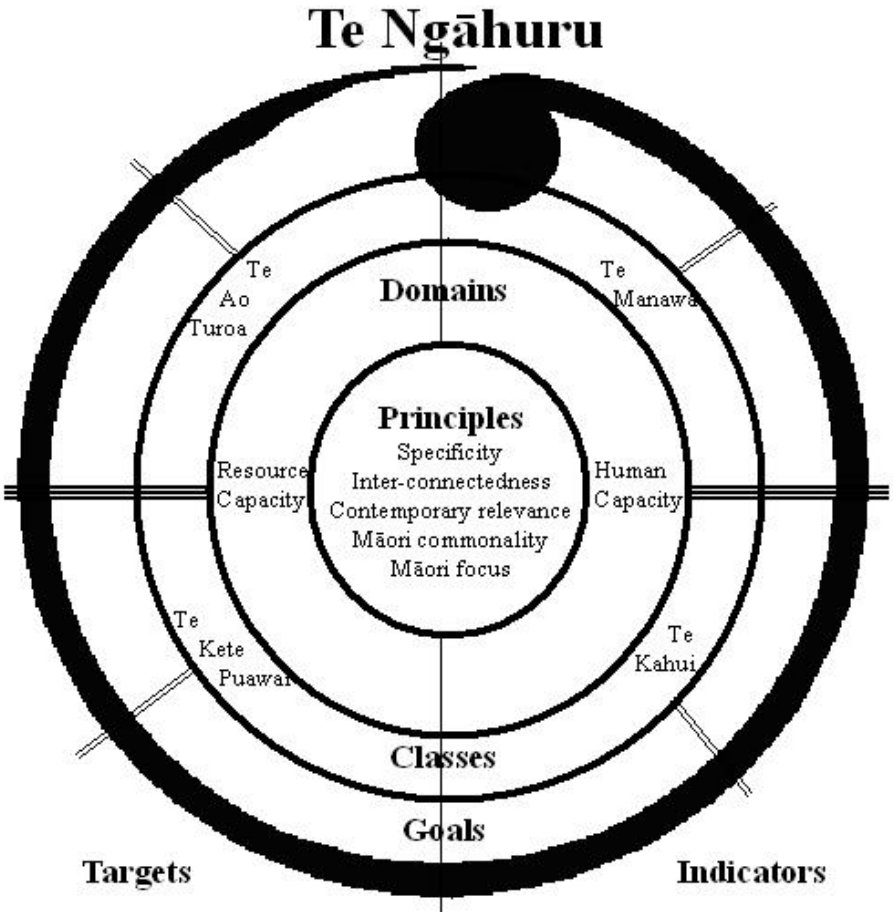
Although concerned mainly with Mäori development rather than environmental indicators, publication of work commissioned by Te Puni Kokiri is worth including in our literature review.

1. Maori Specific Outcomes and Indicators (2002)

Writers	Mason Durie, Eljon Fitzgerald, Te Kani Kingi, Sheridan McKinley, Brendan Stevenson (Durie, Fitzgerald, Kingi, McKinley and Stevenson, 2002)
Link	http://www.tpk.govt.nz/publications/research_reports/default.asp
Notes	A substantial report (62 pages at A4) prepared for Te Puni Kokiri (Ministry of Mäori Development), it is concerned with Mäori

	development rather than environmentalism, but these are interrelated. It is an important work for its investigation of Mäori outcomes, and goes further in this regard than much of the other literature, which is often concerned with indicators with little discussion of the outcomes those indicators are intended to reflect. The intention is introduced with this opening paragraph – "*This report is about the measurement of outcomes for Māori. Because public policies, programmes and interventions made on behalf of Māori should contribute to Māori advancement, it is essential that the desired outcomes should be identified and reliable instruments developed to measure them*." The report is described as representing the writers' response to a request for a set of Māori specific outcomes and indicators that could be used to evaluate programmes intended to benefit Māori.
Methodology	A fourfold approach is described, 1. Review of relevant outcomes/indicators literature. 2. Semi-structured interviews with a range of 20 Māori public servants who had: a range of views across social, economic, and cultural domains; could articulate Māori world views; recognise current practice; and had expertise in one or all of the areas under consideration. 3. Based on the two above steps, a set of Mäori outcomes and indicators was developed by the writers, 4. Previous research undertaken by Te Pūtahi a toi (the School of Mäori Studies at Massey University) in Māori development, cultural identity, and outcomes was also used to inform the study. However, the methodology was developed by the writers, and without the opportunity for iwi/hapu/whänau input. In this sense, while written by Mäori academics of significant standing and incorporating the views of 25 Mäori within government organisations, the methodology and resulting outcomes/indicators were not developed according to any sort of wider discussion and consensus of kamatua (elders) and Mäori in local communities.
Indigenous values systems	The writers early on acknowledge that the interpretation of Mäori development should incorporate Mäori view points, and there is a long section on defining Mäoriness and cultural uniqueness. It is reported that both the outcomes and the indicators recommended for the measurement of the outcomes reflect Māori world views and are relevant to policies and programmes that are specifically aimed at Māori advancement. It is observed that there was a need for a sound understanding of Māori philosophy and an equally sound appreciation of contemporary Māori aspirations.
Western v Indigenous values	The following section is from discussion in the report dealing with Mäori and western approaches; "*However*, i*n addition to articulating Māori views, the methodology of Māori development should be swayed by empirical data. Assumptions made on the basis of opinion alone lack credibility, not*

	because they are necessarily unreasonable or even incorrect, but because they do not satisfy the requirements of reasoned inquiry. In this respect the methodology underpinning Māori development ought not to be confused with the methods of mātauranga Māori. While both are concerned with explaining the Māori position, they are essentially based on different approaches to the compilation and organisation of knowledge. Māori development, like mātauranga Māori, is centred on Māori values, aspirations, frameworks and holistic interpretations, but differs from mātauranga Māori in so far as it leans towards empiricism for validation. *While a Māori centred approach to Māori development does not ignore other views or values, it presumes that the study of Māori development is primarily a study of Māori people and their perspectives. It is that dimension which creates coherence, enabling an analysis of multiple factors and determinants, albeit from a Māori bias.*" The report does not, therefore, substantially investigate issues surrounding the validation of indigenous v scientific knowledge, but considers that both are necessary for the methodology adopted.
Models	The report describes the construction of a "framework" within which Mäori development could be analysed and advanced, this is referred to as a Tri-axial framework, which (on my reading) is the model employed. The three components of the tri-axial framework are: process (method), determinants, and outcomes. **Process:** examples given are: *the application of Māori values, recognition of Māori aspirations, use of Māori-centred analytical frameworks, the adoption of an evidence based approach, holistic interpretations of knowledge through the integration of multiple sectoral and disciplinary insights.* **Determinants** described include: *indigeneity and globalisation, application of the* Treaty of Waitangi, *political agendas, Māori participation in society, education and the economy, Māori access to te ao Māori (the Māori world), Māori societal change, demographic factors and historical factors.* **Outcomes** described are listed below. The model is represented by this diagram. 

	Additionally, outcomes are interpreted according to a six part schema called "Te Ngāhuru", which is structured according to principles to guide application of outcome measurements, these being: ***Domains**: Human Capacity, Resource Capacity* ***Classes**: Te Manawa: a secure cultural identity, Te Kahui: collective Māori synergies, Te Kete Puawai: Māori cultural and intellectual resources, Te Ao Turoa: the Māori estate* ***Goals**: Positive Māori participation in society as Māori, Positive Māori participation in Māori society, Vibrant Māori communities, Enhanced whānau capacities, Māori autonomy (Tino rangatiratanga), Te Reo Māori in multiple domains, Practise of Māori culture, knowledge and values, Regenerated Māori land base, Guaranteed Māori access to a clean and healthy environment, Resource sustainability and accessibility* ***Targets**: Outcome targets have not been defined in this Report. Instead it is proposed that targets for each goal be set in association with key participants. Targets will be quite specific and measurable.* 
Outcomes described	Well-being; Wealth and sound economic base; Secure cultural identity; Environmental integrity and Autonomy; tino rangatiratanga.

Indicators described	No indicators are included.
Currency	The authors explore issues of historical antecedents and consider the fact that Mäori development has a history, and understanding the history is important for an informed appreciation of the subject area. It is observed that "*an ideal outcome for Mäori must make sense in today's reality without assuming that a Mäori outcome should be premised on lore and attitudes that pre-dated colonisation*." And that the principle of contemporary relevance recognises the realities and diverse situations of modern Mäori, as well as Mäori aspirations. However, given that the report is not primarily concerned with Mäori environmentalism, there is not consideration of the relevance of traditional indicators in the context of changing environmental conditions.
Universality	The writers' report: "*This section has provided an abridged overview of outcome measurement, design, and application. It has considered the complexities of measuring outcome and at what levels (individual, group, or population) outcomes should be measured. Issues of process, intervention, and output were also discussed*. *Though broad-ranging and theoretical, the discussion provides an important foundation for considering Māori-specific outcomes, measures, and indicators*." The outcomes arrived at are general and clearly universal in terms of Mäori and probably indigenous peoples. However the writers say that "*the outcomes arrived at reflect essential characteristics of being Māori and the desirable outcomes that should be sought, and make clear that the outcomes are "not transferable to other populations*". Regarding applicability within Mäoridom the writers state; [the] "*report proposes a series of outcome capacities and targets that can be applied to all Māori. But it is acknowledged that other measures will be necessary to identify hapū or iwi specific outcomes*". The report states that the *Framework* anticipates three sets of indicators and four levels of application. It goes on to say that indicators are categorised as universal (i.e. indicators that are in wide use and are accepted for cross-national comparisons), Māori specific indicators (i.e. indicators that capture the relevance of being Māori) and Māori organisational indicators (i.e. the indicators that will be useful to Māori groups and organisations in assessing progress). The four levels of application are local, regional, national, and international. However, no indicators are included, the report ending with a recommendation that the Te Ngahuru model be considered as a basis for the further development of Māori-specific outcomes and

	indicators.
Implementation	The report does not discuss the implementation of the outcomes developed.

2.3. Local Government Programmes

We start our review of local government efforts at including Māori environmental outcomes and indicators in published plans with a summary of these efforts reviewed by MfE (Ministry for the Environment) as part of its programme for transferring knowledge to end-user groups, such as local government staff and consultants, through the MfE Quality Planning Website (Section 2.3.1). We then review regional level planning publications (Section 2.3.2) followed by city and district level planning publications.

2.3.1 MfE Quality Planning Website

The *MfE Quality Planning Website* includes information from State of the Environment reports based on monitoring undertaken or planned by each local council. As of 2005, there were summaries for 14 councils, including several regional councils. For some, such as the Hawke's Bay region, there are several years of reports referred to.

Given that the Quality Planning data is already summarized from source documents the information held has not been presented here in the tabular structure we used in earlier sections.

There is no information included on the Quality Planning site regarding how monitoring activities were categorised; indeed many of these councils' Plans themselves include no discussion about this. Accordingly, we simply list Māori related indicators by council. Additionally, it is not possible without examining the source documents to confirm whether indicators listed are described as "indicators" at source.

It should be noted that some of the councils listed additional indicators/information that are relevant to Māori as well as the wider community. For example, whether shellfish is unfit for gathering, or water unfit for swimming, but these are not referred to at source in relation to Māori. Similarly where issues relating to archaeological sites are listed, but with no reference to Māori these are omitted. On this basis all these documents could be read as including indicators relevant to Māori, but this is not the position taken here.

Council	Māori-specific Indicators Listed on MfE QualityPlanning Website
Dunedin City Council	None
Tauranga District Council	None
Waikato District Council	None
Rotorua District Council	Tangata whenua: Number of resource consents referred for Iwi consultation; Number of protected Waahi Tapü sites.
Auckland City Council	Number of resource consents to modify/remove heritage sites (not Maori specific) Number of Mäori sites
Environment Waikato	None
Environment Bay of Plenty	None
Hawke's Bay Regional Council	None
Northland Regional Council	None
Greater Wellington Regional Council	Document notes Council says it will monitor information relating to iwi, but Indicators section lists none
Kapiti Coast District Council	Has a specific Heritage and Tangata Whenua indicator topic. Number, type, and location of Wahi Tapü sites protected in the district Plan; number of resource consents applied for that involve or affect culturally significant sites or heritage features; % of resource consent applications that involve Iwi consultation; number of plan changes or designation procedures that have iwi have submitted on; number of notified resource consents applications Iwi submitted.

Whangarei District Council	Number and distribution of archaeological sites – (c) In iwi and hapü management plans. Number and distribution of heritage trees of significance to Mäori. Number and distribution of sites of significance to Mäori in District Plan in relation to water bodies; sites of significance to Mäori in iwi and hapü management plans in relation to water bodies. Heritage buildings, sites and objects, heritage trees and sites of significance to Mäori; historic and cultural landscapes identified in iwi and hapü management plans. Extent and location of ecological corridors (mapped); identified indigenous vegetation and habitats of indigenous fauna of significance to Mäori. Tangata Whenua: institutional arrangements for liaison between Council and tangata whenua, including: (a) Mäori liaison personnel; (b) Protocols or memoranda of agreement; (c) Mäori standing committee; (d) Mäori working parties or advisory groups; frequency of use of marae and hui and use of Te Reo Mäori; transfer of functions, powers and duties to iwi authorities; recognition of customary authority and rights, cultural and spiritual values and traditional practices; iwi and hapü management plans developed; agreements and protocols set up to facilitate consultation; council provision of resources (amount and type); number and percentage of consent applications involving consultation with tangata whenua; frequency of consultation on policy and planning initiatives; number and distribution of sites of significance to Mäori on the planning maps; number and distribution of resource and building consents in relation to sites of significance to Mäori; number, cause and frequency of complaints relating to tangata whenua issues; qualitative and quantitative assessments relating to tangata whenua issues; consultation with tangata whenua. Local Authority Cross Boundary Issues - Iwi and hapu processes. State of the Environment Monitoring – Tangata Whenua, heritage buildings/sites and objects, heritage trees, archaeological sites, sites of significance to Mäori.
Western Bay of Plenty District Council	Number and percentage of resource consents distributed to Iwi for comment.
Matamata Piako District Council	Tangata Whenua indicator topicS Pressure, State: Number of complaints received from iwi, Number of responses to consultation from iwi, area of land in Mäori ownership or management. Response: number of consultants with iwi, number of consent

	conditions imposed to protect iwi interests; number of iwi development and management plans in operation; number of Council initiated working parties which have iwi representation, e.g., District Plan, Memorandum of Understanding**.** Number of resource consent applications submitted/granted involving sites, which contain or adjoin a culturally significant site (note cultural not Mäori). Number of resource consent applications submitted/granted involving sites, which contain or adjoin a culturally significant site.

2.3.2. Regional Level Policies and Plans

We start this sub-section by reviewing plans and reports at a regional level to help increase the sample over that provided by the review of councils from the MfE Quality Planning data referred to above in Section 2.3.1. There are five publications for revierw in this Sub-section 2.3.2.

1. Hauraki Gulf Marine Park - State of the Environment Report

Authors	Hauraki Gulf Forum. (Hauraki Gulf Forum, 2005)
Link	http://www.arc.govt.nz/ARC/environment/coast/hauraki-gulf-forum.cfm#soe
Notes	This report is described as providing a snapshot of the state of the Gulf and also including a stock take of what the statutory agencies are doing in response to the issues that affect the Hauraki Gulf. While the report does not comprehensively list indicators, it does provide some discussion of the indicators work that has been undertaken to date, particularly that relevant to the Hauraki Gulf. Most of the indicators included are non Mäori indicators. While the report is intended for a wide audience, and particularly to fulfil statutory requirements to report on the state of the environment, the Hauraki Gulf Forum and consequently the authors incorporate substantial consideration of a Mäori perspective. For a number of reasons, this report is valuable in terms of our PUCM Mäori research on developing a methodology for identifying environmental outcomes and indicators of relevance to Mäori. The reasons are: • it was recently released and includes an analysis of the MfE indicators programme; • the gulf Forum includes representation of tangata whenua (albeit 1 in 4); • the *HGMP Act*, which requires the state of the Environment report includes perhaps the most substantial recognition of Mäori rights and environmental values of any contemporary NZ legislation;

	• there is specific discussion about Western versus Mäori world views in the report; • it includes consideration of both Mäori and Western based indicators; and • It includes consideration of social and qualitative indicators. The bulk of the report presents information according to the conventional Western paradigm (lots of statistics, empirical data, and scientific analysis), particularly for topics such as water quality. However, this is less the case for the socio-cultural chapters.
Methodology	The report is based on the collection and interpretation of previously collected data and published material. It reports that monitoring of aspects of the environment in the Gulf is carried out by multiple agencies, for a whole host of purposes. Data used was collected by local authorities, Department of Conservation, Ministry of Fisheries, tangata whenua, MfE and Crown Research Institutes. The report uses both indicators and case studies to convey information about the environment. How the views of tangata whenua were obtained, over what period, and by what process, and who participated were not discussed. The only specific reference in the text to the source of Mäori information is to the Hauraki Customary fisheries Indicators Report. There are references to various non-Mäori MfE indicators project reports. The report includes strategic issues and related objectives, and the pressure-state-response analysis is undertaken within this framework. While outcomes are not specifically listed, actions that the forum has proposed are assessed in the report and progress on these discussed. It identifies these key "strategic issues": Water quality, Natural heritage and biodiversity, Natural character and landscape, Cultural heritage, Recreation tourism and access, Coastal hazards, Soil erosion and sedimentation, Bio-security, Fisheries and aquaculture, Relationships with tangata whenua and community, and Knowledge and monitoring.
Indigenous values systems	The report incorporates a substantial discussion of Tikanga Mäori and a Mäori world view as this relates to environmental management: *Mätauranga Maori is knowledge, understanding and interpretation of the creation and all that exists within it. It is knowledge based on fundamental truths, and the belief that everything in the universe is interconnected.* And; *Mätauranga Maori contains information relating to methods of utilising and conserving natural resources (for example the use of medicinal plants, and the giving back to Tangaroa of the first fish caught). Much of this knowledge has been lost, and there have been deliberate efforts to undermine its value.* Mäori environmentalism is acknowledged, and descriptions of kaitiakitanga and rähui included.

Western versus Indigenous values	This report includes a substantial discussion on issues relating to these differing values. A few brief, but useful, examples follow: *There are some deep-seated aspects of European culture that pervade all its institutions and understandings. Two critical differences with Maori society and its conceptual frameworks are the Western emphasis on the individual, rather than the collective; and the separation rather than the synthesis of the physical and the metaphysical. In science, and specifically in environmental management, these differences have major impacts. Problems of cross cultural understanding, and hence the near impossibility of genuine partnerships in practice, are the common result.* *Both science and mätauranga seek to codify knowledge in a useful manner. Both result in useful and unuseful [sic] concepts. Both rely on empirical observation and codifying that knowledge in a theoretical framework. The perspectives, however, are different. Science seeks to isolate the study matter from the real world under a set of very specific conditions, understand the topic in its isolation, and from there drawing observations about its place in the real world. Mätauranga studies a topic in the real world, and from its interactions in the real world seeks to build a conceptual framework in which to codify that knowledge.* The following failure in the MfE indicators programme is identified; *At a national level, the Ministry for the Environment attempted to determine a set of tangata whenua indicators, but has to date not managed to complete the task. While some useful information was collated, the underlying clash of paradigms – Western science, and mätauranga Mäori – was not sufficiently addressed.*
Models	The report adopts the Pressure State Response model.
Outcomes described	N/A
Indicators described	In introductory section 1.6, Mätauranga Mäori , 1.6.1 is entitled Scale of Indicators Relevant to the Gulf. This section states: *The tangata whenua membership in the Forum, and recent decisions of the Forum, make the wider range of indicators more relevant and important. Unfortunately, because we are largely reliant on existing data, there are real constraints.* It is then observed that the indicators so far developed are the actual defined in terms of biota and the physical details, such as degree of sedimentation, and that there are few tools available for anyone to apply to cultural and social dimensions necessary to represent many tangata whenua concerns. After lengthy discussion of Mäori values, the section concludes: *In producing this first Hauraki Gulf State of the Environment Report the Forum is not able to solve the problems encountered by MfE and others in identifying and applying tangata whenua indicators.*

	General indicators of interest to Mäori included: • *Shellfish can be used as an indicator of contaminant levels in a surrounding water body over time. Because shellfish are always present at the same location and filter large volumes of water, contaminants accumulate in their tissues over time.* • *The percentage of the season beaches or coastal areas were suitable for bathing or shellfish gathering.* • *Invertebrate communities found in waterways can be used as an indicator of water quality.* • *For any monitoring programme, the benefits of the ability to use species diversity as an indicator of community health must be weighed up against the costs associated with the additional identification that this involves, compared to the use of a selected, limited number of indicator species.* • *The visual and scenic qualities of coastal landscapes and seascapes are important indicators of visual amenity. The proportion of coastal land in public ownership is a common indicator of the amount of public access to and along the coast.* • *The number of sites for which an Historic Places Trust Authority for modification or destruction is issued can be monitored. This is not a fully reliable indicator, as some authorities may not be implemented, and others may lead to the destruction of multiple sites.* The following indicators have been suggested for measuring the pressures on cultural heritage sites (Mackintosh, 2001): • *Extent of pest and weed impact* • *Extent of erosion impact* • *Extent of natural hazards impact* • *Extent of visitor impact* • *Extent of fencing protection* • *Extent of development impact* • *Land use pressure* • *Adjacent land use pressure*
Currency	Not discussed
Universality	Regarding the Mäori specific indicators projects within the MfE Indicators Programme the report finds *Some direct empirical studies have been completed. These provide some useful information, but they are not able to be easily generalised to other iwi and other environmental studies.* For one of the non-Mäori indicators identified the report finds (for example in investigating pollution at bathing beaches) that localized studies must be relied on in the absence of any universal indicator that can be applied across the whole Gulf.
Implementation	N/A

2. ARC (Auckland Regional Council) State of the Region Report 2004

http://www.arc.govt.nz/arc/index.cfm?4BDDD143-BCD4-1A24-9DC4-A7FBB951204CCAB35E63-88E4-4358-889C-043A012DF815
(Auckland Regional Council, 2004c)

Despite apparently significant recognition and support for tangata whenua, this ARC report is disappointing in terms of any discussion of Mäori issues, outcomes, or indicators. Broken into major sections called Our People, Air and Atmosphere, The Land, and Our Fresh and Coastal Waters, the report has 41 subsections.

Given that I was downloading each subsection, and anticipating topics of particular concern to Mäori the following subsections were collected: Introduction, Population, Ethnicity, Families and Households, Leisure Patterns, Landscape, Cultural Heritage, Fresh Water Resources, Pollution Events, Earthworks and Contaminated Sites, Natural Character of the Coastal Environment, Coastal Water Quality, Our Fresh and Coastal Waters: ARC Responses, and conclusion.

Searching these documents for references to Mäori or Tangata Whenua revealed 14 references to Mäori, all but two in the section on Ethnicity, and six references to tangata whenua, all within the Cultural Heritage section. Of these, only two or three are vaguely related to Mäori outcomes or indicators, and then only in relation to cultural heritage.

Sections relating to soil, fresh water and the coast -- where Mäori environmental values are repeatedly stressed to councils -- are conspicuously void of any Mäori references.

The *Maori* outcomes (such as they are), include:

- *A number of kaitiakitanga projects have also been initiated by the ARC with tangata whenua. Examples include; the Ngati Te Ata 'Tohu Kaitiaki' project in rural Franklin, the erection of nine carved pou throughout the regional parks network, and the promotion of these initiatives through the regional Maori newsletter, the Taiao Times.*
- *There has been solid growth of the Mäori population in Rodney, North Shore City and Waitakere City, but low growth in Auckland City. Overall, the Maori population has increased by 24,000 people.*

3. ARC Coastal Plan

http://www.arc.govt.nz/arc/about-arc/publications/proposed-arp-coastal.cfm
(Auckland Regional Council, 2004a)

No indicators listed. None anticipated relating to Mäori, although there are a few references to general environmental outcomes to be developed.

In the section Ngä Take Takutai Tuturu Mo Tangata Whenua: (Coastal Matters of Significance to Tangata Whenua) the following outcomes, described as "anticipated environmental results", are recorded;

- The special Treaty relationship between the Crown and Tangata Whenua is recognised and facilitated.

- The relationship of Tangata Whenua and their culture and traditions with their ancestral taonga, including use of and access to these taonga, are recognised and provided for.
- Adverse effects of subdivision, use and development on the relationship of Tangata Whenua and their culture and traditions with their ancestral taonga are avoided, remedied, or mitigated.
- Appropriate and meaningful consultation is undertaken with Tangata Whenua on all matters of resource management of signifi cance to them.
- Involvement of Tangata Whenua in managing their ancestral taonga, including decision making, in accordance with tikanga Maori.
- The historic, traditional, cultural and spiritual relationship of Tangata Whenua with the Hauraki Gulf, its islands, catchments, foreshore and seabed is provided for. Those natural, historic and physical resources (including kaimoana), islands, catchments, foreshore and seabed of the Hauraki Gulf with which Tangata Whenua have a historic, traditional, cultural and spiritual relationship are recognised and, where appropriate, enhanced.

Outcomes from other sections;

- The extraction of sand, shell, shingle or other natural material avoids any significant adverse effect on Tangata Whenua values associated with sites and places of significance to them.
- Avoidance of damage from dredging activities to Coastal Protection Areas, places and areas of heritage importance, and those parts of the coastal marine area that have characteristics of special value to Tangata Whenua.
- Maintenance and enhancement of water and sediment quality, recognising and providing for the relationship of Maori in terms of section 6(e) of the RMA.

4. ARC Air, Land and Water Plan

http://www.arc.govt.nz/arc/about-arc/publications/proposed-arp-alw.cfm
(Auckland Regional Council, 2004b)

The plan makes several references to anticipated indicators, and to other documents in which these are described, however none of these are Mäori indicators.

Environmental results / outcomes - Tangata Whenua Values section;

- The special Treaty relationship between the Crown and Tangata Whenua is recognised and facilitated.
- The relationship of Tangata Whenua and their culture and traditions with their ancestral taonga, including use of and access to these taonga, are recognised and provided for.
- Adverse effects of use and development on the relationship of Tangata Whenua and their culture and traditions with their ancestral taonga, are avoided, remedied or mitigated.
- The recognition of the relationship of Tangata Whenua with the wetlands, lakes, and rivers of the region in accordance with Section 6 (e) of the RMA.
- The relationship of Tangata Whenua with water is recognised and provided for in the management of the taking, use, damming and diverting of water and avoiding damage to waahi tapu sites from drilling.

The following two outcomes were removed from the decisions version of the plan following references to the Environment court

- Appropriate and meaningful consultation is undertaken with Tangata Whenua on all matters of significance to them.
- Involvement of Tangata Whenua in managing their ancestral taonga, including decision making, in accordance with tikanga Maori.

5. ARC Regional Policy Statement

http://www.arc.govt.nz/arc/about-arc/publications/ak-rps.cfm
(Auckland Regional Council, 1999)

There are some (9) references to indicators of various kinds, but none of these are Mäori. The document indicates that the Objectives within are stated in the form of environmental outcomes to be achieved, and that the Anticipated Environmental Results are the outcomes expected as a result of implementing the objectives, policies and methods.

The statement stands out for making explicit connections between its various parts – objectives, policies etc., for example the Policy ;

Significant resource management issues for Tangata Whenua
This policy gives effect to Objective 7.3-9.
1. Maori cultural and traditional values shall be recognised and taken into account in the management of the coastal environment.
(Refer to Chapter 3 – Matters of Significance to Iwi for methods, reasons and other relevant provisions.)

Anticipated Environmental Results within section – Matters of Significance to Iwi;

- Ongoing beneficial relationships between Tangata Whenua and the ARC and TAs.
- Protection and enhancement of relationships of Tangata Whenua with their ancestral taonga.
- Consultation on all matters of resource management significance to Tangata Whenua.
- Provision for social, economic and cultural wellbeing of Tangata Whenua, in accordance with Treaty rights and obligations.
- Involvement of Tangata Whenua in managing their ancestral taonga, including decision-making, in accordance with Treaty rights and obligations.

Within other sections;

- Maori cultural and traditional values are taken into account in the management of water conservation and allocation.
- Relationships between resource management agencies and Tangata Whenua will be enhanced. the relationship of Tangata Whenua with their ancestral taonga will be recognised and provided for;
- Maori cultural and traditional values will be recognised and provided for in the management of water quality.

2.3.3 Local Level District Plans

At local level (city and district) councils are required to prepare district plans under the *Resource Management Act* (RMA) 1991, and are to have regard to Mäori interests. We found some district plans to have credible sections relating to tangata whenua (Mäori people of the land), and some of these include environmental outcomes and/or indicators. More often, however, the need for indicators is acknowledged in plans and their development anticipated.

It should be noted that most plans refer to "Environmental Results" rather than outcomes, and this is because Section 75 of the RMA - Contents of District Plans – requires identification/inclusion of significant issues, objectives, policies, methods, reasons, and environmental results anticipated.

Ther on-going research programme on Planning Under Cooperative Mandates, (PUCM) started with PUCM Phase 1. It examined the quality of publicly notified regional policy statements, regional plans, and district plans. The PUCM Mäori report titled *Iwi Interests and the RMA: An Evaluation of the Quality of First Generation Council Plans (1995-98)* highlights what was or was not done with regard to Mäori provisions in District Plans.

Briefly, it was found that 17 of 28 district plans studied had a section referring solely to Mäori interests under the RMA. However, on deeper analysis it was noted that many of these plans paraphrased key sections of the RMA (notably 6(e), 7(a) and 8). A further 13 Plans did not even recognise the existence of iwi within their territory.

Some of the observations made in that report include: 1) of the district plans assessed, most (24 of the 28) made some reference to Section 8 of the RMA and included objectives and policies recognising principles of the Treaty; 2) just 10 of the 28 district plans recognised the importance of a good relationship between council and iwi in facilitating effective consultation; 3) just three district plans (11 percent) made reference to kawanatanga and only seven (or 25 percent) made reference to tino rangatiratanga.

The PUCM research found that there were very few high quality Plans. The better plans came from Wellington City Council, Waitakere City Council, Christchurch City Council, and Gore District Council. Of the four councils, only Wellington and Gore have their plans available for download in 2005. These two are considered further below. In addition, several plans not assessed as part of the PUCM Phase 1 report are considered below, Hauraki, Thames Coromandel, Wairoa, and Waitomo.

Given that there is little detail provided in district plans about Mäori-specific participation in the Plan development process, only those aspects of plans relating to Mäori outcomes and indicators are included in the Section.

1. Gore District Plan

http://www.goredc.govt.nz/index.cfm/fuseaction/gdc.displayDocuments/docpath/district_plan.cfm
(Gore District Council, 2002)

Indicators are not even referred to in the plan. There is a brief section entitled Mana Whenua, in which the following anticipated environmental results are included:

- *Waahi tapu, waahi taonga, other taonga and mahinga kai sites are protected from the adverse effects of land use activities;*
- *The protection of urupa sites and notification of koiwi.*

The only other outcome relating to Mäori is;

- *The protection and preservation of heritage and archaeological site.*

2. Thames Coromandel District Plan (TCDC)

http://www.tcdc.govt.nz/Information/Documents/ProposedDistrictPlan/District%20Plan%20Process.htm
(Thames Coromandel District Council, 1999)

The *TCDC Proposed District Plan* (nearly all references were resolved by 2005, so it is effectively the operational Plan), includes a section on Tangata Whenua, and also consideration of Mäori issues relating to other sections. Seven broad issues relating to Mäori are identified.

The plan goes on to list in relation to these issues Objectives, Policies, Methods, Reasons, and Environmental Results Anticipated, in accordance with Section 75 of the RMA – Contents of District Plans. The cascade between these is poor with only a single method, this being weak and bearing little relation to the Mäori issues.

Under TCDC's Monitoring Strategy the following State of the Environment monitoring techniques are anticipated:

Through consultation with local hapu and iwi develop concepts and indicators which are useful and meaningful to tangata whenua to:

- *13.1 Ensure concepts and indicators are relevant to the spiritual and philosophical goals of Maori*
- *13.2 Enable hapu and iwi to track the health of the environment in their areas.*
- *13.3 Ensure hapu and iwi environmental interests are protected in accordance with Council obligations under the Treaty of Waitangi*

The bottom line environmental results simply paraphrase the issues as outcomes. These are included in the following table, which also anticipates related indicators.

Outcomes and Indicators table from the plan.

Environmental Result	**Indicators to be derived from**	**District & Regional Data Sources**
Decision making more sensitive to Tangata Whenua values.	eview plan following Iwi environmental/ resource management plans • audit resource consent and application process • maintain watching brief on cross boundary issues	Iwi management plans Resource consents
Acknowledgment and greater community awareness of Treaty of Waitangi principles.	• monitor Treaty claims • review plan following any settlements	WT register Deed of Settlement
Greater protection of land, water, sites, waahi tapu and taonga.	• review plan following Iwi environmental/ resource management plan • audit resource consent and application process	Iwi management plans Resource consents
Enhanced communication between Council, the public and tangata whenua.	• opinion survey the stakeholders • audit resource consent and application process • convene workshops to rate performance	Survey results Resource consents Record of meeting
Development of Maori land and resources, increased involvement in decision making over it, recognition of kaitiaki role.	• number and type of resource consent applications • implementation of management plans • implementation of Sections 33 & 34 RMA • opinion survey of stakeholders • maintain watching brief on jurisdiction issues with Regional Council and Government Departments.	Resource consents Management Plan application Recorded use Survey results

3. Wellington City Plan

www.wellington.govt.nz/plans/district/understandplan/pdfs/1-3.pdf
(Wellington City Council, 2000)

This plan has a section entitled "Issues for Tangata Whenua," which includes discussion of a Mäori world view, environmental values and approaches, an analysis of the Mäori provisions in the RMA, and Mäori history for the area. Under the heading "Planning and Policy Influences" there is analysis of Mäori principles of resource management, particularly in relation to tino rangatiratanga and kaitiakitanga.

The description of kaitiakitanga includes an observation that resource indicators, where resources themselves indicate the state of their own mauri are one of the constituent ideas or principles of the root word tiaki. However, no Mäori-specific indicators (or indicators at all) are included in the plan.

Mäori areas (e.g. Marae) are recognised within the Plan as "precincts", Tangata Whenua Precincts, Landscape Features Precincts, or Development Precincts, landscape features or sites; for which it is stated that the policies, objectives, and outcomes are determined by the tangata whenua to ensure that their needs in relation to the area's identity are met.

The same objective - To facilitate and enable the exercise of tino rangatiratanga and kaitiakitanga by Wellington's tangata whenua and other Mäori - is repeated within many of the plan's sections relating to different issues and policies.

Mäori specific Environmental Results included in the Plan:

- *The environmental result will be that such sites and precincts are identified and protected from inappropriate development.*
- *The environmental result will be that appropriate developments respect the existence of Maori cultural values.*
- *The environmental result of the implementation of this policy will be that such uses (*activities that fulfil the needs and wishes of tangata whenua and other Maori) *establish where there is a need.*
- *The environmental result of this policy will be that such activities (Te Ara Haukawakawa provisions facilitate a wide range of activities, including marae, papakäinga / group housing and kohanga reo/language nests) are able to be provided for subject to meeting minimum environmental standards.*
- *The environmental result will be that, if such non-rural uses establish (*marae, papakainga/group housing, kohanga reo/language nests, or similar activities in rural areas that relate to the needs and wishes of tangata whenua and other Maori), *they are managed in such a way as to avoid or mitigate any adverse effects.*
- *The environmental result will be the retention of a significant proportion of heritage sites that are of significance to tangata whenua and other Maori.*
- *The environmental result will be the recognition of Maori heritage by development proposals in their design or by contribution through the development process.*

Some of the above outcomes are repeated for several different sections.

4. Wairoa District Plan

http://www.wairoadc.govt.nz/planspolicy/districtplan/
(Wairoa District Council, 2001)

No indicators are included. The plan proposes the development of state of the environment monitoring with input from the community and tangata whenua, to assess the changes in the environmental quality of the District's natural and physical resources, and agreement on key indicators is included as a component of this.

The anticipated Environmental Results are described as the outcomes that are hoped to be achieved, and should be able to be determined from monitoring.

The anticipated Environmental Results for the Tangata Whenua Issues section are:

- The sustainable management of natural and physical resources within Wairoa District while recognising and providing for the relationship of Mäori and their culture and traditions with their ancestral lands, water, sites, waahi tapü and other taonga as a matter of national importance.
- Greater public awareness of Mäori cultural considerations concerning the management of natural and physical resources.
- Mäori communities and their culture and values are sustained and enhanced within the Wairoa District.

Those from other sections:

- Mäori cultural values are recognised and protected.
- Use, development and subdivision that maintains and enhances the natural character, amenity values and the values that tangata whenua associate with the coastal environment.

5. Waitakere State of the City Report

(Waitakere City Council, 2002)
http://www.waitakere.govt.nz/AbtCit/ps/socreport.asp

In contrast to the ARC documents, the *Waitakere State of the City Report* includes numerous Mäori references. The report is structured into Social Environment, Natural environment and Economic Environment, comprised of 19 chapters relating to different aspects of the community, including Mäori Community and *Treaty of Waitangi* (1840)

The report is divided into three sections, with about six chapters in each:

1. Natural Environment (the state of mauri – the life force) -*Treaty of Waitangi*, State of our Land, State of our Water, State of our Air, State of our Biodiversity, Landscape;
2. Social Environment (the state of wairua - the spiritual) - Who lives in Waitakere City, Maori Community, City Wellbeing, City Form & Design, Heritage, Arts & Culture, Democracy & Participation;
3. Economic Environment (the state of Te oranga - the wellbeing) – Economic Development, Industries & Businesses, Business Clusters, Work and Income, Transport & Communications, Energy Resources & Waste.

Outcomes are not specifically discussed, but rather principles, issues, and priorities. The indicators (or measures as they are generally referred to) are largely statistical. There is discussion of Mäori performance relative to other sections of the community and also to Mäori elsewhere and nationally. Statistical data provided is obtained from Stats NZ and Te Hoe Nuku Roa – Mäori profiles research project – Massey University, Dec., 98. (Based on a survey of 305 randomly selected Mäori households in the Auckland Region.)

For example, under the sub-section Te Taha Hinengaro (Knowledge), it is observed that one of the principles of education is that children need to learn te reo (Mäori language), and this sets the foundation for all the learning that follows. Additionally, it is observed that 60% of Mäori over 15 years of age in Waitakere City have some form of educational qualification, and that while this is below the level for non- Mäori in the City (67%) it is about the same as the level for Mäori the Auckland Region (59%) and higher than for Maori in New Zealand as a whole.

Similarly under Te Taha Tinana (Physical) it is reported that nationally, Mäori fare significantly worse than non- Mäori across a range of indicators of health and well-being. The health data that is available at a city level confirms the large gap between Mäori and non- Mäori health in Waitakere City. Infant mortality, birth weight and suicide statistics are offered as indicators. No outcomes are included.

The *Treaty of Waitangi* Section
This section is structured differently from Sothers, and accords recognition to Te Kawarau a Maki and Ngati Whatua iwi/tribes as tangata whenua (indigenous people of the land).

There are tables for both Te Kawerau a Maki and Ngati Whatua, which list iwi concerns relating to any of the other sections in the report, Council responses to these, and Monitoring Results. While the iwi concerns (which have been written by the iwi) are very much environmental outcomes, the monitoring information requires some interpretation to be considered indicators. I include below a few rows from one table, then list outcomes from both tables that are of particular interest.

Iwi Concerns	**Council Responses**	**Monitoring Results**
The iwi supports active restoration programmes, including stream-edge plantings.	The Council, community groups, and private landowners have been active in replanting stream-sides and controlling weeds throughout the City.	Currently around 70% of streams (by length) provide moderate or better habitat for native fish.
The iwi requires that spiritual and cultural concepts be recognised as key issues in water management.	Spiritual concerns, especially the particular repugnance of discharging human waste into water, are a feature of the Council's decision-making. The advice of iwi representatives is regularly sought to assist in this.	The monitoring of the spiritual health of waterways is not yet undertaken in any formal way, but this is a possibility for the future.
Coastal Marine Area		
Ensure protection of	Iwi representatives maintain a	The protection of iwi sites

heritage sites.	"silent file" of waahi tapü (sites of significance to iwi), and advise the Council on how best to protect iwi interests, including the protection of significant sites.	is monitored by iwi, rather than by the Council.

Other outcomes (described in the text as Iwi concerns);

- That the mauri of natural waterways is protected.
- That the food producing capacity of natural waterways is protected and enhanced, as is their life supporting capacity.
- The iwi opposes the direct disposal of any waste into waterways and requires that waste pass through the soils before discharge.
- The iwi supports active restoration programmes, including stream edge plantings.
- The iwi requires that spiritual and cultural concepts be recognised as key issues in water management.
- Ensure protection of heritage sites.
- Protect the quantity and availability of kaimoana (seafood).
- Limit the disposal of waste from boats.
- Involve Te Kawerau a Maki trust in any changes which may increase access to areas on the coast with significant sites; ensure that spiritual and cultural concepts are recognised as key issues in managing this area.
- In selection of sites for waste water and solid waste treatment or disposal, cultural and spiritual values are not harmed.
- The iwi opposes the generation, entry or disposal of toxic or hazardous waste within their tribal area.
- Te Kawerau a Maki is concerned that native bush and fauna, and the cultural meaning, amenity and aesthetic values of the landscape, are protected.
- The iwi has a pre-eminent concern, that a land-base and marae complex for Te Kawerau a Maki is re-established.
- The iwi is concerned about access to flora and fauna for cultural harvest and craft.
- Iwi participation in decisions on the introduction of new plants and animals to the country and ensuring that property rights (patents, licenses) are not given to native species in breach of *Treaty* rights.
- Te Kawerau a Maki Trust supports the protection of regenerating bush and regulations that limit native vegetation clearance during development.
- The iwi wishes to ensure recognition of and provision for cultural and spiritual values in decision making.
- The iwi wishes to have opportunities to manage, enhance and monitor heritage concerns relating to waahi tapü.
- A fundamental concern that resource management systems run by Central and local government run counter to holistic views of the environment and do not provide for the spiritual as well as physical dimensions of the environment. People have duties and obligations to protect the environment which go beyond the approach taken in the legislation.
- Mixing of waters from different sources, which is spiritually offensive
- The need to reintroduce and retain natural wetlands
- Wastes derived from the land should be returned to the land.
- Ngati whatua have concerns about the discharge of wastes into the air

2.3.4. Comments on Regional and District Planning

This sample of five regional policy statements and plans, four district plans and one state of city report is not intended to be representative, and was not chosen by any particular criteria. While other plans were reviewed that had few or no Mäori indicators and outcomes (such as Waitomo DP), no comment is made here regarding Plan quality generally in terms of Mäori outcomes.

A large number of environmental outcomes relating to Mäori have been identified in the above policies and plans. However, those we reviewed are characterized by a tendency to have proportionally very few Mäori-specific outcomes.

Conspicuous also was that even where documents included the highest recognition of Mäori, there was a tendency to only include Mäori outcomes for a few environmental issues, such as the coast, water, and heritage.

A few documents extended to consideration of Mäori values in relation to things such as air quality and soil, but virtually none recognised that Mäori have a particular perspective and contribution to make in relation to, for example, urban amenity, hazardous substances and contaminated sites, minerals, subdivision, or transport. This tendency possibly relates to areas where specific recognition exists within legislation, like the RMA, or for which jurisprudence has been established protecting specific Mäori values, such as that relating to mauri and water.

Many of the outcomes identified simply paraphrase Mäori provisions within the RMA, such as the Mäori-related requirements of Sections 6, 7, and 8.

It appears that recognition of Mäori environmentalism, particularly in terms of outcomes, is being stereotyped to a few key resource management areas. Also there is generally little mention regarding the process by which Mäori participated in the development of the Mäori-related outcomes in plans. Accordingly, there is doubt as to whether these outcomes adequately reflect tangata whenua views. For these reasons it was deemed unproductive to include a greater number of plans for review in our Report 5.

2.3.5. Long-Term Council Community Plans

Long-Term Council Community Plans (LTCCPs) are largely concerned with having regional and district councils identify community outcomes, including environmental outcomes, as required under section 93 of the *Local Government Act* 2002 (the LGA).

Section 93.6(b) requires LTCCPs "to describe the community outcomes of the local authority's district or region." These are a community's desired outcomes in terms of the present and future social, economic, environmental, and cultural well-being. A Special Consultative Procedure must be used to consult with communities to determine the outcomes that they require. There is a specific requirement within the Act that Mäori are consulted and councils are required to provide for Mäori participation in decision-making.

On this basis, the outcomes recorded should reflect community, including Maori, aspirations. Section 91.2(c) requires councils to provide scope to measure progress towards

the achievement of community outcomes. This is being discussed largely in terms of indicators. However, indicators have generally not been developed as yet in LTCCPs.

An initial review of available LTCCPs indicates that there is little information included regarding the process by which Mäori-specific outcomes were determined. Additionally, Mäori outcomes are often bundled with wider community outcomes. For example: *Recognition of the District's diverse cultural values: Close working relationships are developed and maintained with Mäori, Pacific Island, and other ethnic groups and their values factored into District policies, strategies, and decisions.*

The LGA allowed for the initial round of LTCCPs to be an interim plan, for which full public consultation to determine outcomes was not required. These plans might therefore be expected to be less representative of the communities, including Mäori aspirations.

However, the outcomes within a few LTCCPs are innovative, possibly because the means by which they could be achieved and the difficulties associated with this did not constrain selection. Rather, it could reflect the time outcomes were expressed as aspirations of the community. For the above reasons the following section will simply list Mäori outcomes and indicators.

Similarly, and because there is limited benefit in terms of identifying Mäori indicators, only three LTCCPs are reviewed below.

1. Taupo District Council LTCCP

http://www.taupodc.govt.nz/PoliciesPlans/Adopted/LTCCP.htm
(Taupo District Council, 2004)

Outcomes;

- Protection of waahi tapü (sacred sites)
- The relationship that tangata whenua have with our natural surroundings is recognised (protecting the life-giving energy of the waters of Lake Taupo and the Waikato River are part of the kaitiakitanga of tangata whenua over this taonga)

Other Mäori-related outcomes are bundled with wider community outcomes.

2. Waikato Regional Council LTCCP

http://www.ew.govt.nz/policyandplans/annualplan/ltccp.htm
(Waikato Regional Council, 2004)

The EW LTCCP is structured with a single outcome (or combination of a few outcomes) identified for each of the "Groups of Activities" Council deals with. These groups of activity sections are entitled: Air, Energy and Climate Change, Biodiversity, Bio security, Coastal, Community and Economy, Forging Natural Heritage Partnerships, Geothermal, Inland Waters, Protecting Lake Taupo and its catchment, Land and Soil, Navigation Safety, Regional Hazards and Emergency Management, River Systems Management, The Peninsula Project - Better river and catchment management, Transport, Waste and Contaminated Sites.

For each of these, subsections include statements in which intentions are sometimes phrased as outcomes. These include Mäori-specific outcomes for sections that do not have

first level Mäori outcomes. For this reason each section is analysed according to these first and second level outcomes.

As with previous types of documents in this review, only statements phrased as outcomes are included here. Mäori outcomes inherent in other statements are ignored.

For example, "*engage the Mäori community in kaitiakitanga related projects by supporting projects at Ngahere Kokako and Moehau" is found in the Biodiversity section in the subsection called "This year we will", which elsewhere includes explicit outcome statements. The consequential outcome here would be "the Mäori community is engaged in kaitiakitanga related projects through supported projects, including Ngahere Kokako and Moehau*".

Mäori outcomes

Biodiversity,
First level Mäori outcomes:

- *People can experience the full range of our native plants, animals and ecosystems, and some of these resources are available for sustainable traditional uses and economic activities.*

Second level Mäori outcomes: none

Coastal
First level Mäori outcomes: none
Second level Mäori outcomes:

- *Decision-making, planning processes and policies take into account community concerns and priorities, protects sites and areas of significance, and recognises tangata whenua's role as kaitiaki.*

Geothermal
First level Mäori outcomes:

- *The relationship of Maori with their geothermal taonga provided for, and the mauri of geothermal resources preserved and enhanced.*

Second level Mäori outcomes; none

Inland Waters
First level Mäori outcomes: none
Second level Mäori outcomes:

- *Recognising and providing for tangata whenua concerns relating to the mauri (life force) of water.*

Waste and Contaminated Sites
First level Mäori outcomes: none
Second level Mäori outcomes; *Addressing cultural concerns (particularly those of Mäori) that arise when waste is discharged into the environment and when natural and physical resources are not managed in a holistic sense taking into account their impacts throughout their life cycle.*

Governance and Democracy
First level Mäori outcomes: None
Second level Mäori outcomes:

- *Robust and effective relationships with Mäori in the Waikato Region.*

- *For significant projects, consultation processes are tailored to the needs of the Mäori community and are audited for effectiveness.*

Sections for which neither first nor second level Mäori indicators are included;

- Air, Energy and Climate Change
- Bio security
- Community and Economy
- Forging Natural Heritage Partnerships
- Protecting Lake Taupo and its catchment
- Land and Soil
- Navigation Safety
- Regional Hazards and Emergency Management
- River Systems Management
- The Peninsula Project - Better river and catchment management
- Transport

Indicators are anticipated, but not yet developed in this plan: *Over the next few years, Environment Waikato will be working with district councils and other partners to identify the specific measures or indicators we should use to monitor and report on the progress being made toward achieving those larger community outcomes.* And; *By June 2007 investigate the development of indicators of sustainable development.*

3. Waitakere City LTCCP 2003 (amended 2004)

http://www.waitakere.govt.nz/AbtCnl/pp/ltccp.asp
(Waitakere City Council, 2004)

The Waitakere LTCCP includes the identification of five key priorities, of which the Treaty is one. After identifying a primary outcome the plan goes on to include a series of actions, but some of these are phrased as outcomes, as per the EW LTCCP reviewed above.

While these are not labelled outcomes, but rather "measures of success", these are listed here because outcomes are explicitly stated, as opposed to future actions identified, such as: *Work toward agreement of a Treaty of Waitangi Framework.* They are sometimes referred to in the plan as measures, whether they have been achieved or not being the indicator.

Vision	**Outcome**
Te Tiriti o Waitangi People in the City are proud to uphold the *Treaty of Waitangi*.	Strong Mäori leaders are working side by side with the Council and achieving positive outcomes for Mäori.
Listed as actions or measures	• Marae policy adopted. • Mäori Library work programme implemented. • *Treaty of Waitangi* Framework agreed. • *Treaty* framework in place.

	• Whare Wananga Stage 1 completed. • Major new technology industries operating in the City - Mäori scholarships available. • Harbourview (Te Atatu) Marae built. • Mäori and European heritage sites of significance actively protected.

While these examples demonstrate the potential for Mäori outcomes and indicators to be identified through LTCCPs, the first round was generally disappointing. The following LTCCPs, while often containing other recognitions of their respective tangata whenua, either include no Mäori-specific outcomes, or Mäori related outcomes are bundled with wider community outcomes:

- Far North District Council
- Franklin District Council
- Hawke's Bay Regional Council
- Palmerston North City Council
- South Waikato District Council
- Thames Coromandel District Council
- Tauranga City Council

As noted with regard to District Plans, there appears to be a tendency for Mäori outcomes to only be included for a core set of environmental issues.

However, as previously indicated, no conclusions can be made here regarding the presence of Mäori indicators in LTCCPs generally, not all of these were reviewed, the first round of LTCCPs is expected to have involved minimal community participation, and – apart from ease of online access - there was no particular method used to determine which were reviewed. Accordingly, the findings here might not be nationally representative.

2.4 Iwi Management Plans

Iwi management plans (these go by many different names) have statutory weight under the RMA, Sections; 61.2.a.2, 66.2.c.2, and 74.2.b.2. Each of these sections requires that in the preparation of changing of policy statements of plans authorities are required to have regard to any relevant planning document recognised by an iwi authority affected by the policy statement or plan.

Iwi Management Plans are a valuable tool for articulating Mäori aspirations for the environment. A few include specific references to environmental outcomes and indicators (such as the Ngäti Koata plan). Others refer to issues or objectives, which are often equivalent to environmental outcomes. Not all iwi environment plans were obtained for review.

Given that each of the plans considered include the recognition of issues and expression of objectives and policies, and in some cases methods for achieving these, it is possible in each case to interpret environmental outcomes. For example, in the 1995 *Ngaiterangi Iwi*

Resource Management Plan the overarching policy statement relating to the visual appearance of Mauao (Mt Maunganui) includes: *The cultural and amenity value of Mauao is to be preserved by regulating the height of structures erected within a defined radius of Mauao.* The implicit outcome here is: The cultural and amenity value of Mauao is preserved as a result of regulating the height of structures erected within a defined radius of Mauao.

Similarly, in the 1999 Addendum to the above Plan (which adds objectives, working policies, and methods) policies relating to wahi tapü include: *To ensure that Ngaiterangi are involved in all decisions relating to use and development, which impacts on Wahi tapü and cultural heritage sites*. From this the obvious outcome would be: Ngaiterangi is involved in all decisions relating to resource use and development, which impacts on Wahi tapu and cultural heritage sites.

Clearly, it is possible to derive many outcomes from the hapu/iwi management plans that have been completed to date. However, this is not the point of this review and unless outcomes and indicators are explicit plans have not been included here. Additionally, of the plans reviewed only the Ngati Koata plan included any mention of indicators, implicit or otherwise.

A likely factor here is that some of these plans preceded the current interest and research of environmental outcomes and indicators, such as the MfE programme, since the mid-nineties.

1. Ngäti Koata Iwi Management Plan

Authors	Ngati Koata No Rangitoto Ki Te Tonga Trust (Ngati Koata No Rangitoto Ki Te Tonga Trust, 2002)
Link	http://www.smf.govt.nz/results/1019_ngatikoata.pdf
Notes	This plan incorporates an update to the 1993 *Ngati Koata Coastal Plan* and builds on the earlier 1993/94 iwi management plan made by Te Runanganui O Te Waka A Maui Inc. The primary purpose of the plan is to provide a means by which Ngati Koata are properly and fully considered in decision- making affecting their interests in Te Tau Ihu. Other functions described are reinforcing who they are and where they came from, and to publish the group's consultation requirements. This plan is structured somewhat like some District Plans, including these sections: Cultural Heritage, Coastal Water, Freshwater, Flora / Fauna, Land, Air Quality Monitoring & Research: each include the following headings: Issues, Objectives (including Anticipated Environmental Results) , Policies, Methods, and Monitoring. It is one of the most recent plans reviewed.
Methodology	While there is a methodology section, this includes little detail regarding the methodology or process used to develop the plan.

	The plan is said to have been developed through a process involving hui to identify issues, a drafting phase which resulted in a draft IMP and further consultation and meetings within Ngati Koata to produce the final version. It acknowledged that the plan drew on the earlier 'Coastal Section of the *Ngati Koata Management Plan'*, the *Eel Management Plan*, and relevant resource management policy and planning documents currently in place within the Marlborough District. Feedback on the plan was provided by National Institute of Water and Atmosphere (NIWA) the Department of Conservation (DOC) and the Marlborough District Council (MDC).
Indigenous values systems	As indicated above the plan includes sections on tikanga, Mäori history, and the *Treaty*. Starting with a Tikanga section, the plan refers to the domains of the natural world being according to ätua (gods), who are described as the original kaitiaki of each domain. It is stated that the domains of Atua provide integration across resources giving a more holistic approach to environmental management.
Western versus Indigenous values	There is no discussion relating to indigenous versus western values systems. However, it is worth noting the extent to which the plan adopts non-Mäori methods. For example, the Tikanga section describes the domains of the natural world according to their respective ätua. The plan states that the Ngäti Koata approach to environmental management incorporates the needs and values of people and recognises the interrelated nature of the natural world. Hence, individual Chapters of this Plan cannot be read in isolation from the others, but the distinctions used for sections of the plan do not follow this lead (see Notes above), the whakapapa that ties these different realms are not evident in the text. However, there are references within the plan back to Atua, e.g.; *Ngäti Koata culture and traditions involve fishing. Fishing is spiritual, ritual and traditional to Ngäti Koata. There are various rituals that we adhered to before we can enter and leave the domain of Tangaroa (Atua of the Sea). Recognition of Atua by Maori was achieved through the practice of Karakia, Kawa and Tikanga.* The mission statement refers says: *Ngäti Koata seeks to ensure that the environment and human activities are culturally managed in harmony with the appreciation that the natural world is dynamic, fragile and finite*; but the only definition for environment provided is that provided in the RMA. The following "outcome", under the heading "The protection of Ngati Koata heritage values," illustrates this bias: *Protection of the coastal environment by avoiding, remedying or mitigating any significant adverse effects of activities that alter or modify the foreshore or seabed.* This example uses language from the RMA to represent Ngati Koata aspirations for the coast. Similarly, while some outcomes described reflect Mäori tikanga/values, many of the associated indicators are

	essentially western indicators (see Indicators below).
Models	There is no mention of models.
Outcomes described	Outcomes are not specifically listed. The plan includes Objectives, Policies, and (for some sections) Anticipated Environmental Results. While it is noted above that most plans can be interpreted to arrive at outcomes, this plan is distinct in including the anticipated environmental results, which of all the plans reviewed most closely equate to environmental outcomes. Within the section Cultural Heritage the stated Objective is "The protection of Ngati Koata heritage values." Associated policies include: • *Recognition, when appropriate, of the location of heritage values in the relevant resource management planning documents;* • *Ensure that rules governing land disturbance and both terrestrial and marine based development activities have full and proper regard to potential impacts on heritage values;* • *Involvement in decision-making affecting management of Ngati Koata heritage values.* The section on Coastal Water includes these objectives: • *Maintenance or enhancement of water quality in the coastal marine area at a level that enables the gathering or cultivating of shellfish for human consumption (Class SG);* • *Protection of the coastal environment by avoiding, remedying or mitigating any significant adverse effects of activities that alter or modify the foreshore or seabed.* Which are followed buy these Anticipated Environmental Results: • *Maintenance and enhancement of the coastal environment following occupation of coastal space and from alterations to the foreshore or seabed.* • *Only appropriate structures, which are sensitive to the coastal environment being constructed.* • *A progressive improvement in water quality in the coastal marine area at a level that enables the gathering or cultivating of shellfish for human consumption.* • *The continuation of activities that do not significantly or adversely alter the foreshore or seabed.* • *Tikanga input into the decision-making policies.* • *Greater recognition of Treaty of Waitangi rights.* Flora / fauna • *Long term protection of indigenous biological and ecological diversity;* • *Sustainable stocks of native fish and distribution of rare and endangered species.* Air Quality

	• *Local ambient air quality being enhanced in those areas where it is, or has been, degraded by specific discharges of contaminants to the air.*
Indicators described	The monitoring and research section includes a sub-section called Environmental Performance Indicators (14.6), but this only refers to the local council's State of the Environment report and indicates that in future Ngati Koata intend this to include a section on Tangata Whenua. The section on Freshwater includes a sub-section entitled Environmental indicators, but this is actually a list of issues statements, e.g.: • *For Ngati Koata, water, land, air, flora and fauna are equally important, as they are vital elements. The state of water is directly linked to the well being of people. Water is pivotal to the traditional Ngati Koata way of life. Water is also used in Maori ceremonies throughout life from birth to death.* • *Monitoring native fish populations and the presence and well being of native birds is particularly relevant for Mahinga Kai (food gathering activities) and for determining Mauri.* There are only one or two indicators listed for any section, other than air Quality, for which the indicators are shown below. Others included are for flora and fauna: *Ngati Koata supports biannual monitoring of indigenous flora and fauna and their habitats. Population sizes and the wellbeing of indigenous flora and fauna is considered appropriate in order to properly measure the performance of management programmes or the effects of activities on such flora and fauna resources.* Some sections include sub-sections entitled Monitoring. These describe monitoring requirements from the perspective of the iwi. Examples from the Cultural Heritage monitoring section are: • *The level of protection given to heritage values in district plans will be monitored at appropriate times.* • *The adequacy and performance of other protection methods.* • *The frequency of works being consented to and/or undertaken without consultation with Ngati Koata, by monitoring non-notified and notified resource consent applications.* • *The state of heritage sites and their maintenance and condition over time.* The Air Quality Section includes a number of indicators as per the definition of indicator within this review. 12.14 includes the following image schematically illustrating air quality indicators.

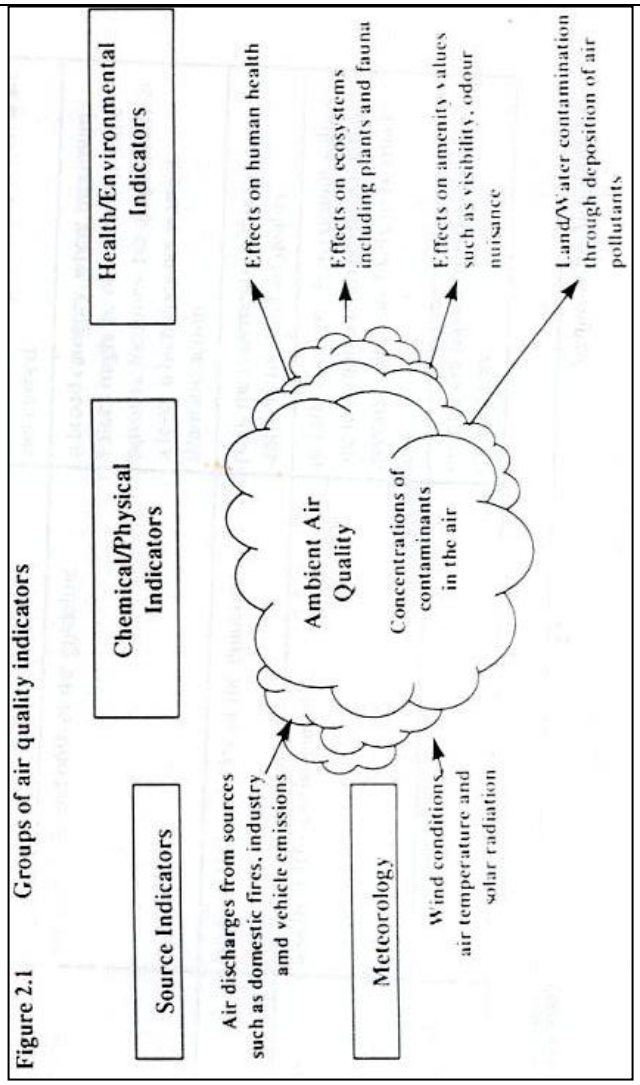


Figure 2.1 Groups of air quality indicators

12.16 Potential Source, Chemical / Physical and Environmental / Human Health Indicators of Air Quality lists the following.

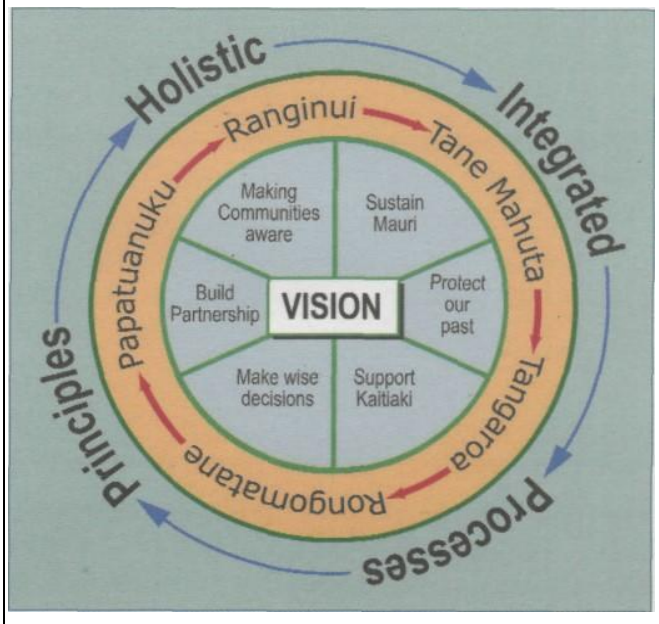
Source Indicators	**Chemical / Physical Indicators**	**Environmental / Human Health Indicators**
Fuel Consumption Coal consumption Wood Consumption Volatile hydrocarbon production Vehicle kilometers traveled Industrial growth	Carbon monoxide Sulphur dioxide Particulate matter, such as: total suspended particulate (TSP), Inhalable Particulate less that 10 microns in diameter (PM10), Particulate matter less than 2.5 microns in	Complaints databases Number of hospital admissions relating to air pollution Asthma epidemiological studies Odour complaints Lost work days Hastened deaths Visibility Biomonitoring e.g. using lichens

	Emissions inventors	diameter (PM2.5), visibility reducing particulate 0.1um to 2um. Nitrogen dioxide Ozone Nitrogen oxide Hydrocarbons / Volatile organic Compounds (e.g. benzene, toluene etc) Formaldehyde Products of incomplete combustion e.g. PAH dioxins Heavy metals (led, cadmium, mercury, nickel) Hydrogen sulphide.	Concentrations of air contaminants in human blood and hair	
	Note that air quality is classified according to the MfE guidelines.			
Currency	N/A			
Universality	N/A			
Implementation	N/A			

2. Whaia te Mahere Taiao A Hauraki – Hauraki Iwi Environment Plan

Authors	Hauraki Mäori Trust Board (Hauraki Mäori Trust Board, 2004)
Link	N\A
Notes	The *Hauraki Iwi Environment Plan* was formally released in March 2004, and is representative and inclusive of Ngä Iwi o Hauraki. It is the only plan reviewed that includes outcomes as a section, this is likely because of the recent attention environmental outcomes and indicators have been receiving. Being one of the most recent iwi management plans the authors benefited from reference to the many earlier plans. As discussed in Methodology below, the plan is structured by issues, objectives, and outcomes for each of the ätua (gods) responsible for environmental domains - Papatüänuku, Ranginui, Tane Mahuta, Tangaroa, and Rongo-ma-Tane. Additionally, the are sections entitled Ngä Nekenekehanga – which puts forward goals and strategies, and Hauraki Whenua Whai Taonga – which sets out a framework for action

	by Hauraki Whanui to progress towards the objectives and outcomes stated. This identifies specific actions that might be taken.
Methodology	The Plan was developed over a period of 4 years, and involved a process of several hui of Hauraki whänui at various Marae, the development of a discussion document, workshops, another hui, the release of a Draft plan, a submissions process, another hui, input from the Hauraki Kaumatua kaunihera and then revision and publication. The process was initiated and driven by the Hauraki Mäori Trust Board, constituted of representatives of all the Hauraki tribes, but there were many opportunities for Hauraki whänui to have input. The structure of the document, and the content including issues, objectives, and outcomes, was substantially determined by participants in the process. The writers observe that the plan takes a strategic approach in the sense that it tries to look at environment and it's heritage through the eyes of mokopuna yet unborn.
Indigenous values systems	The plan is described as a strategy for collective action by Hauraki whänui to sustain the mauri of the natural environment and cultural heritage of the Hauraki rohe over the next 50 years – Kia mau ki te mauri o te Taiao o Hauraki. A Mäori world view and observance of tikanga are evident. The plan is therefore structured according to a Hauraki Mäori world view. It is divided into six parts: Whakamohiotanga, Nga Matapono, Te Whenua o Hauraki - He Taonga, Nga Nekenekehanga, and Hauraki Whenua Whai Taonga, and Te Ao Hurihuri. The analysis of environmental issues is undertaken according to the domains of the appropriate ätua they fall within, "whose tikanga helps guide the wise use and management of resources": Papatüänuku, Ranginui, Tane Mahuta, Tangaroa, and Rongo-ma-Tane. A holistic perspective is described, whereby the Hauraki rohe is "an entity encompassing all natural taonga from the sky above to the core of the earth and there interconnections with each other". Under the heading central principles the following observations are provided: • *The belief the natural world is the domain of Atua and that all things, both tangible and intangible are interconnected and possess a life energy principle or mauri guides our interactions with the environment. Sustaining the mauri of a taonga, whether a resource, species or place, is central to the exercise of kaitiakitanga.* • *Mauri is the life energy force or unique life essence that gives being and form to all things in the universe. Tikanga has emerged around this duty bringing with it an intimate knowledge and understanding about local environments and a set of rules that guide our way of life, both spiritual and secular.* *We shall achieve our vision and goals in a manner that actively fosters the values expressed by: Rangatiratanga, Kaitiakitanga, Wairuatanga, Manaakitanga, Whanaungatanga, and Kotahitanga.*

Western versus Indigenous values	The plan is concerned with the Actions and positions of the Crown, councils, and developers versus that of Hauraki iwi, and the way their scientific rationales are used to undermine Mäori perspectives in the RMA arenas. For example, Toko Renata in his opening statement says that "we should continue to be vigilant on how government agencies, councils, and developers are treating with Hauraki iwi". It is observed, however, that Hauraki traditional knowledge was substantially diminished by the social and economic upheaval experienced by the old people in the 19th and 20th centuries: *At present, traditional knowledge and practice of Hauraki Whanui is being incrementally lost as each generation passes. There is a common concern amongst Hauraki Whanui that traditional knowledge, its practice and application to contemporary environmental management will continue to be lost if current approaches to preserving and restoring mätauranga Maori are maintained.* The observations put forward relating to environmental condition include empirical and "scientific" information. The report records issues relating to accessibility of Scientific information to Mäori. It also briefly discusses a Hauraki perspective on the place of mätauranga Mäori and scientific knowledge in environmental management: *Hauraki Whanui regard traditional knowledge and practice as the basis for their environmental management approaches and practices today. Western scientific knowledge can, if used wisely, strengthen the ability of Hauraki Whanui to exercise their role as kaitiaki and participate effectively in statutory environmental management processes.* (see Outcomes - Ngä Nekenekehanga below)
Models	 The document does not refer to models in the sense of an interpretive model on which analysis was based, such as the state pressure response model. The development of "working models" is proposed. For example, it is stated that one of the plan's objectives is to develop action-oriented programmes and working models for kaitiakitanga. Similarly, for

	models and information guidelines on soil erosion prevention and cultural heritage protection. The model involves use of the realms as a basis for environmental resource management.	
Outcomes described	**Domain**	**Outcomes Listed**
	Papatüänuku	• Sustainable development and use of peat lands, wetlands • Local communities more aware of sustainable land use, waste safe disposal of contaminants and local energy efficiency practices. • Increased diversity of native species, habitat and ecosystems through wetland, peatland, river and stream and duneland restoration activities. • Natural buffers for flood pulse and drought relief restored • Regional growth strategies that protect taonga of Hauraki Whanui from future use and development in the Hauraki tribal region. • Reduced environmental risk from mining and quarrying industries, landfills and contaminated sites in the Hauraki tribal region. • Erosion and sedimentation problems will be reduced • Reduction, re-use and recycling of waste
	Ranginui	• Increase in local energy efficiency initiatives by Hauraki Whanui and local communities • Hauraki Whanui participating in the development of domestic and global Climate Change Policy • Improved community awareness and responsibility about the importance of energy efficiency and the harms of ozone depleting substances.
	Tane Mahuta	• Forests, wetlands, coastal dune lands, species and ecosystems protected and restored • Hauraki native seed stock protected and sustained for future generations • Intellectual property rights protected • Use of native plants as sustainable tribal resource
	Tangaroa Rerenga Wai Maori	• Enhancement of the freshwater fisheries habitat. • Survival status of the Kaeo fishery. • Restoration of wetland, river and stream plant life. • Improved water quality. • Sustainable use of the water resource by people. • Increased populations of fisheries, birds and plant resources.

	Tangaroa Rerenga Wai Tai	• Restoration of the mauri of local ecosystems and fisheries • Improved water and seabed quality • Increased fisheries production from Tikapa Moana • Fisheries and marine farming at sustainable levels in Tikapa Moana • Productive pipi and cockle beds • Protection for whales, dolphins and seals • Assured access to a customary take for Hauraki tangata whenua • Increased ability for tangata whenua to fulfil manaakitanga obligations • An effective Hauraki coastal monitoring capacity • Improved integration with government agencies and local communities • Greater understanding of coastal values by communities.
	Rongomatäne	• Consensus view on genetic modification • Traditional knowledge is valued and being passed on to the next generation • Intellectual property rights are protected • Hauraki Whanui are exercising their kaitiaki responsibilities • Heritage landscapes, heritage sites, features, places and wahi tapu are protected • Cultural resources are used, enhanced and sustained • Greater community and agency awareness of the importance of Hauraki cultural heritage
	Ngä Nekenek-ehanga	• Mätauranga Mäori as it relates to environmental management is protected, maintained and enhanced • Hauraki Whanui possess a range of knowledge and skills necessary to participate as kaitiaki in resource management decision making processes • Treaty based relationships with central and local government and others • Hauraki Whanui have access to the results of scientific research. • The wider community is informed about and understands the relationship of Hauraki Whanui with the environment. • Communication of information amongst Hauraki Whanui on environmental issues is improved.

		• Hauraki Whanui initiatives to address sustainability and heritage issues in the region are encouraged, and supported and where appropriate, coordinated.
Indicators described	N/A	
Currency	There is discussion regarding the loss of traditional knowledge, but not about the currency	
Universality	The report is only concerned with the Hauraki rohe	
Implementation	N/A	

3. Other Iwi Plans

Other Plans assessed and found to have few or no environmental outcomes or indicators (as per the definitions adopted here) include:

Ngati Rehua Hapu Management Plan, Ngati Wai Trust Board Kaitiaki Kaupapa
Ngäti Tüwharetoa Iwi Environmental Management Plan
Ngati Tahu Pounamu Resource Management Plan
Kaupapa / Regional Policy Document, Ngati Whatua o Orakei Mäori Trust Board
Manuka Harbour Fisheries, Huakina Development Trust
Ngaiterangi Iwi resource Management Plan (including 1999 Addendum)
A Ngati Paoa Perspective on Resource Management. 1993.
Ngai Tai Kaitiaki/Resource Management Principles & Operational Policies

PART 3

MAIN FINDINGS AND SUMMARY

3.1. Main Findings

A notable finding of this review is that there is little published in the international literature that in a substantial manner discusses indigenous environmental outcomes and/or indicators. There was none found relating to USA indigenous communities. This section provides some analysis of the literature we did find according to the various themes with which we assessed the documents.

Methodology

Our PUCM Maori research was initially concerned with identifying from the literature methodological approaches where outcome/indicator programme development or investigation is based on indigenous values, and the projects are driven by indigenous communities. We found participation taking place to varying degrees within projects described in the literature, and there are a few good examples. Documents describing strong indigenous community participation in both the development and execution of programmes included:

1) *First Nations - Environmental Knowledge and Approaches to Natural Resources* (Research project),
2) *Voices from the Bay: Documenting and Communicating Ecological Knowledge from the Hudson Bay Bioregion.*
3) *Habitat Of Dogrib Traditional Territory: Placenames As Indicators Of Bio-geographical Knowledge,*
4) *Mäori Environmental Monitoring.*

The Participatory Action Research (PAR) model described in *Habitat Of Dogrib Traditional Territory* is a good example of a framework within which the indigenous community determines the foundation values, objectives, and methodology for a project.

In this regard, there is a stark contrast between these Canadian studies and those we reviewed from Auatralia. The Australian studies were designed and controlled investigations into indigenous knowledge by non-indigenous Australians. While they did give recognition to indigenous perspectives and values in relation to the projects on heritage places and language indicators, they provided minimal opportunities for indigenous participation in project design, implementation, or review. The minimal participation of indigenous people in Australian projects came only after the methodological approach had been determined. Indigenous perspectives were provided primarily by academics, primarily anthropologists from nearby universities.

The MfE (New Zealand Ministry for the Environment) series of Mäori indicator programmes included substantial participation of tangata whenua (people of the land) within the projects. These came in the form of interviews, hui (meetings at Maori sites), site visits, and fieldwork undertaken by tribal members. However, the reports do not describe involvement of Mäori communities at the project and methodology development stage.

The majority of the regional and local level planning documents in New Zealand, particularly Council plans, have little description of project methodology or participation by tangata whenua against which the resulting outcomes and indicators can be assessed in terms of their validity as being representative of the values and concerns held by tangata whenua (indigenous people of the land).

Indigenous knowledge and Western Scientific knowledge

The majority of the documents reviewed investigate the perspectives and values systems of the subject indigenous peoples, although the depth of investigation varies. Widespread is an indigenous perspective reported of genealogical connection to all parts of the natural world, with the Earth seen as mother and mankind her descendents. This is, of course, consistent with a Mäori world view. This worldview is consistently reported as providing the basis for traditional environmental management approaches, whereby the needs of indigenous peoples must be balanced against the requirements of the parent environment and reciprocal obligations operate.

While it was not the primary concern of the review, our motivation for including a section on indigenous v western approaches is to provide a basis against which resulting outcomes and indicators can be assessed. However, as for methodology (above), it is important to identify whether traditional knowledge discussion within literature was written about or by indigenous peoples. For example, the Australian report *Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage* states that: *The archaeological record also has special values for the community that may be quite divorced from the scientific research values. These must be respected, and community involvement fostered, with development of culturally appropriate approaches to the identification, investigation and interpretation of indigenous places of archaeological significance.* But the subsequent discussion of indigenous values is entirely cited from a prominent anthropologist.

A large number of the documents consider the relevance of both indigenous and western scientific knowledge to the development of indigenous indicators. These include those such as: 1) *Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage*; and 2) *Hauraki Gulf Marine Park - State of the Environment Report* (written mainly by non-indigenous peoples; 3) *Hauraki Customary Indicators Report*; 4) *Maori Environmental Performance Indicators for Wetland Conditions and Trends*; and 5) *Maori-Specific Outcomes and Indicators*, all written entirely by Maori.

Models / Frameworks

We were interested in identifying indigenous models or frameworks described within the literature, based on value systems of indigenous peoples, which could inform our own approach to the development of Mäori environmental outcomes and indicators.

For example, the approach taken within *Whaia te Mahere Taiao A Hauraki* (the Hauraki Iwi Environment Plan), is to structure environmental management to the domains of the relevant ätua (gods). With its foundations in tikanga (values) Mäori, the PUCM team believes this model provides an effective approach to ensuring tangata whenua values prevail throughout.

However, it is not always clear from the literature whether "theoretical models" for the purposes of analysis and/or representation are being referred to in projects. As well, ideas about models differ amongst authors, so it is not always clear from our reading what exactly is intended.

In some cases, the term "framework" is used, apparently interchangeably with the term "model". This happens, for example, in *Maori Environmental Performance Indicators for Wetland Condition and Trend.* The MfE technical paper *Land: Review of international literature, draft framework & Indicators* makes the following observation about the use of indicator frameworks:

Generally, development of an indicator framework addresses the wider needs of sustainable development or sustainable management indicators. Environmental indicators are not, in themselves, sustainability indicators until they incorporate dimensions of time and threshold. Sustainability indicators should also be related to carrying capacity and, from this, to thresholds or irreversibility (Mulcock, 1996).

This is, apparently, the context in which the Pressure State Response framework is used within several of the MfE documents. A large number of other documents reviewed had also adopted the Pressure, State, Response "model/framework" for the development or consideration of EPOI (environmental protection outcomes and indicators). For example, the *Hauraki Customary Indicators Report* has indigenous values that strongly influence the project. This report, however, records the intention to develop a "customary model" for measuring the state, pressure, and response status of customary resources and environment, rather than identifying PSR as the model.

Whether its widespread adoption indicates that the PSR model is found to be the optimum approach despite indigenous alternatives, or whether this model has become entrenched as a result of the work of the OECD, is not clear. Observations were made in the introductory section regarding issues relating to the influence that OECD appears to be having internationally in the development of indicators.

However, weaknesses have been identified with the PSR model. For example, the MfE final report on transport indicators observed that as a reporting framework it is prone to over-simplify the complex dynamics within any environment or ecosystem and misrepresent the causes of environmental change. The World Bank paper *Indicators of Environment and Sustainable Development — Theories and Practical Experience* suggests that it tends PSR suggest linear relationships in the human activity / environment interaction.

Models named within the literature

- Participatory Action Research (PAR) Model: the primary (indigenous in this case) experts with knowledge of the environment being investigated, retained control over the way the research was conducted, and the manner in indigenous their knowledge was presented and used.

- Partnership-2 Cultures Development Model: is derived from the *Treaty of Waitangi*. It advocates for the creation of discrete spaces or 'houses' within which the Treaty partners may conduct their affairs and develop their views on any topic; in this case, environmental performance indicators. The model describes a setting within which the two partners to the Treaty can develop their views independently and how these views might encounter one another.

- Other Models: The following models are cited in the Hauraki report from other sources, as being "useful guidelines to assist researchers in handling Mäori research";
  - The Tiaki (mentor) Model: using Maori to test their ideas and theories against
  - The Whangai (adoption) Model: where the researcher is 'adopted' by the subject
  - The Power Sharing Model: C. Cuazden's Interaction between Maori Children and Pakeha Teachers
  - The Empowering Outcomes Model: positive beneficial outcomes for Maori first and foremost.

- Stepwise multiple regression: The first variable added is the one that explains the most variation in the dependent variable (i.e. has the highest correlation with overall stream health). This first variable will not explain all of the variation in the dependent variable, so there is 'residual' variation left unexplained. The stepwise procedure then adds another variable, specifically the one that accounts for the most residual variation after the first variable. The procedure continues in this manner until a set of variables is included in a model such that each one explains a significant portion of the variation in the dependent variable in the overall model.

- Te Ngahuru model: a six part schema which is structured according to Principles to guide application of outcome measurements, Outcome Domains, Outcome Classes, Outcome Goals, Outcome Targets, and Outcome Indicators. (linked to the tri axial framework below)

Frameworks referred to in the literature:

- The Mana Whenua framework: orientates a Maori community towards planning for their environment independently of external considerations and concerns.

- The Integrating framework: recognises that Maori monitor the environment along with other kinds of groups such as Crown agencies. Would require Maori communities first to plan independently within their environment, before integration.

- Tri-axial framework: The three components of the tri-axial framework are: process (method), determinants, and outcomes.

As indicated above, indigenous models are referred to within the literature. For example, in *First Nations - Environmental Knowledge and Approaches to Natural Resources* an unnamed "research model" is described as being based on ancient Haudenosaunee and other indigenous principles, which directly involves members of the indigenous communities. Apart from an indication that this is based on traditional ecological knowledge there is not further elaboration as to what this model involves.

Other writers refer to models based on indigenous values, knowledge, and systems. There is regular discussion of the holistic approach, and inference that this in itself represents an indigenous environmental management model. However, this idea is not developed within the literature reviewed here.

Currency and Universality

The intention in including "currency" as an area of analysis here was to consider whether traditional indigenous indicators are still considered relevant in the face of contemporary environmental pressures.

The study *Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage* states that indicators may be appropriately applied at different spatial and temporal levels, and that measurement and reporting should be undertaken accordingly

Most of the documents did not, however, consider the issue of "currency" at all, and *Maori Specific Outcomes and Indicators* is the only document reviewed that substantially considers contemporary relevance at a societal level rather than specific to the project.

The recurring theme in some literature is that traditional knowledge does provide the tools necessary for contemporary problems. This observation is made in *First Nations - Environmental Knowledge and Approaches to Natural Resources*. However, others observe that traditional indicators have become unreliable or that their relevance is uncertain given environmental change. This theme is found in *Voices from the Bay*, and the *Hauraki Customary Indicators Report*.

For some indicators, such as place names, whether they are still valid over time is the indicator. This is explored in *Habitat of Dogrib Traditional Territory: Placenames as Indicators of Bio geographical Knowledge*, where place names are described as regularly indicating places where resources were found. Environmental change is identifiable based on whether place names still accurately decribe the location.

In contrast to "currency," there is wide consideration of the "universality" of outcomes and indicators, meaning geographic scale – local, regional, or national - and applicability to different places, tribes or peoples, either indigenous or non-indigenous.

Some reports describe efforts to address problems of scale, such as *First Nations - Environmental Knowledge and Approaches to Natural Resources*, where communities were selected that had diverse geographic, environmental, tribal, and socio-economic environments in an effort to scale-proof resulting indicators. However, more often reports simply acknowledge universality issues. The report *Mäori Environmental Monitoring* expresses a position regarding universality for Mäori indicators, thus: *It is the view of the panel that generic (and specific) MEPIs must be defined by the communities within which those MEPIs are designed to operate. The panel's approach is to commence at the community level first. In contrast, the Ministry's goal of defining generic MEPIs (and EPIs generally) would tend to suggest a 4top down' approach where nationally defined EPIs are imposed upon local contexts.*

All of the Mäori Indicators literature reviewed here discusses the issue of "universality", and identifies that some indicators are place specific and their applicability elsewhere should not be assumed.

Implementation

Few of the documents reviewed described the "implementation" of outcomes or indicators, the notable exception being *Implementing State of the Environment Indicators for Knowledge and Condition of Heritage Places and Objects*. While implementation in this case was limited to a single State of the Environment reporting cycle, recommendations were made that included the need for better data collection and mechanisms to ensure this. The report recommended that some of the previously developed indicators required modification or replacement.

While the outcomes and indicators described in the report are weak in terms of the extent to which they reflect input by and values of the relevant indigenous community, the report is important in that it describes the only implementation of indigenous outcomes and indicators found within the literature.

Of the New Zealand projects the *Taieri River Case Study* within the MfE programme is notable in that the indicators developed were trialled over a six month period. This allowed for testing during different seasonal and weather conditions. However, as noted in the report, it was observed that the framework needed to be tested in other locations and environments before conclusions could be made as to the potential for wider implementation.

3.2 Summary

Indigenous environmental outcomes and indicators programmes are currently limited largely to those undertaken by central or local government agencies, although the Canadian examples involved substantial cooperation between indigenous communities and universities.

A tendency exists, particularly within the agency driven projects, for indigenous perspectives to be compromised where these are incompatible with prevailing frameworks and models within which outcomes / indicators development is occurring.

In New Zealand, Mäori indicators are paid little attention outside project specific work within MfE. For example, the 2002 report *Socio-Economic Indicators for the Environment: Summary of Submissions and Final Indicators* published by Statistics NZ includes no recognition of Mäori indicators at all, despite extensive referencing to all the non-Mäori components of the MfE Indicators programme (Statistics New Zealand, 2003).

Recent indicators developments, such as anticipated in District Plans, have not been assessed here. Such developments might have occurred without having been independently published or Plans updated accordingly. The main published sources to date (2005) of Mäori environmental outcomes are Long-Term Council Community Plans, probably because their recent advent (2002) postdates international attention to outcomes.

Internationally (with the exception of Canada), indigenous environmental indicators receive even less attention than in New Zealand, and indigenous environmental outcomes less again. The three things that stood out most in the writing of this review are:

- there is little research published on international indigenous environmental indicators, although there is more on indigenous social, economic, and health indicators;

- of that which is available, most projects were designed and conducted with little or no input from the indigenous communities being the subject of the research;

- there is practically no literature on indigenous environmental outcomes, either in New Zealand or internationally.

Our findings, as of 2005, should be considered in the context of the relatively recent advent of environmental outcomes and indicators internationally. These have developed out of environmental monitoring obligations resulting from recent international agreements such as the Rio declaration and Agenda 21.

The disparity between resourcing of mainstream and indigenous groups is a likely contributing factor for the lack of literature from indigenous communities, as is national and international prioritisation of the development of general indicators over indigenous. It is not possible to adequately investigate these wider dynamics here.

However, several indigenous projects were identified for which reports were not yet able to be obtained, such as one entitled First Nations Environmental Knowledge and Approaches to Natural Resources and Results of the First and Second Year of the Pilot Project and it is likely that indigenous outcomes and indicators, as with non-indigenous, will become more widely developed and reported in line with international environmental reporting obligations and standards.

Appendix A

Indigenous Indicators listed within the literature

Note – Indicator tables from Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage and Voices from the Bay follow the main indicators table.

The classificatory headings adopted in the appendix tables reflect those found in the literature reviewed, and therefore are used here to conveniently present outcomes and indicators from within that literature. It should be noted that these are not neccesarilly consistent with the framework being developed within PUCM Onjective 3 in association with tangata whenua groups.

Category	Indicator	Source
Significant or heritage places	The number of heritage places assessed (by sampling) as being in (i) good, (ii) average and (iii) poor condition.	Implementing SOE Indicators
	The proportion of places being in good, fair or poor condition, based on physical condition, integrity, occupation, use and conservation activity	Implementing SOE Indicators
	No. of places destroyed or whose values have been severely diminished.	Implementing SOE Indicators
	No. of places reserved for conservation purposes where heritage values have been seriously impaired by visitor use.	Implementing SOE Indicators
	Proportion of natural heritage places with a condition statement, proportion with a recent condition statement, and age distribution of condition statements.	Implementing SOE Indicators
	Waahi tapu: location of transportation networks - defined as a measure of transportation networks that are within 50 metres of waahi tapu, within iwi rohe (tribal areas).	Effects of Transport Report
	Marae and papakainga: noise from transportation networks This indicator will provide a measure of the	Effects of Transport Report

	disturbance to sites of importance to Maori.		
	No. of cultural sites protected within or adjacent to wetland.		MEPI Wetlands
	No. of protected Waahi Tapu sites		Rotorua DC
	No. of resource consents to modify/remove heritage sites (not Maori specific)		Auckland CC
	No. of Maori sites		Auckland CC
	No., type and location of Wahi Tapu sites protected in the district Plan		Kapiti Coast DC
	No. of resource consents applied for that involve or affect culturally significant sites or heritage features;		Kapiti Coast DC
	No. and distribution of archaeological sites – (c) In iwi and hapu management plans		Whangarei DC
Kai / Kaimoana	The ability to harvest species at levels long known to be sustainable in a particular area		Mäori Env. monitoring
	The quantity of the stock is a simple indicator of the health of the species in a particular area.		Mäori Env. monitoring
	Changes in the presence of customary/traditional target species (and associated species) observed by whänau members, hapu, iwi and marae		Maori Input EPI
	No. of species - current, known cycles, 'optimal' numbers. What are the indicators of health/disease of species? Observed changes in numbers, health		1st Nations – Env. Knowledge
	Presence, condition and Numbers of :	Giant Kokopu	Maori Input EPI
		Red-Finned Bully	Maori Input EPI
		Quality is also important, for example, if mussel stocks are continually small in size	Mäori Env. monitoring
		The indicator for bivalve shellfish was observation of location and density	Hauraki Report
		Abundance and diversity of fish species	Taieri River

		Abundance and diversity of birdlife	Taieri River
		Loss of aquatic vegetation in the marine environment e.g. bull kelp.	Taieri River
		The health of the fish found in the waterway	Taieri River
		Ngä kararehe	MEPI Wetlands
		Ngä ika	MEPI Wetlands
		Ngä manu	MEPI Wetlands
		No. of (and change of) taonga species within wetland	MEPI Wetlands
		Abundant and diverse range of mahinga kai species	CHI Waterways
	Quality / Health of individuals, particularly skin ailments		Maori Input EPI
	The thinness of the shell on certain shellfish, a new phenomenon.		Mäori Env. monitoring
	Changes in the biological diversity of the invertebrate communities of cockle and pipi beds may also provide an indication of their productivity as does measurement of meat quality.		Hauraki Report
Species behaviour	True whitebait (inanga) always travelled up the sides of the river out of the current, while juvenile smelt were found in the middle of the river		Hauraki Report
	Observed changes in fish behaviour or shellfish location		Hauraki Report
	Plotting the penetration of salt water into the Waihou may provide an indication of where inanga could be expected to spawn, given the availability of riparian vegetation.		Hauraki Report
"Alignment" indicators	Kowhai blooms and the harvest of mussels		Maori Input EPI

	Pohutukawa blooms and kina harvest	Maori Input EPI
	Kina are taken in November and December when the pohutukawa flowers, an indication that the roes are of good quality.	Hauraki Report
	Harakeke flowering suggests that the kina roes are of poor quality	Hauraki Report
	The flowering of a plant at the same time as inanga running in a stream	Mäori Env. monitoring
	The state of plants and rivers used as natural indicators for whitebait	Hauraki Report
	Green leaf buds on the willows signalled the imminent arrival of whitebait	Hauraki Report
	The spread of sand grasses and sedges and the depth of toheroa	Maori Input EPI
Plants	A plant is being attacked by non-indigenous species causing holes to appear in leaves rendering them unusable	Mäori Env. monitoring
	The blossoming rata in an area and how the 'red' seen in the bush in an area is getting fainter as the years proceed.	
Presence, condition and Numbers of :	Number of (and change of) unwanted (e.g., exotic, introduced, foreign) plants, algae, animals, fish, birds (pest types) affecting cultural values	MEPI Wetlands
	Nga otaota	MEPI Wetlands
	Ngahere	MEPI Wetlands
	Rakau	MEPI Wetlands
	% area of (and change in area) taonga plants within total wetland	MEPI Wetlands
	% area of (and change in area) unwanted (e.g. exotic, introduced, foreign) plants covering total wetland	MEPI Wetlands
Environmental	Description of environmentally important locations	1st Nations –

Condition	related to the time of the year seasonality, stability of the location should categorized (stable, stable with variations, unstable).	Env. Knowledge
	Changes to the bar at a river mouth	
	Wetland extent	Monitoring Wetland Changes
	Invasion, numbers, type, areal extent, proportion of exotic-introduced plants to native plants; area of natural habitats affected, mahinga kai areas affected by exotic plants.	MEPI Wetlands
	Presence or absence of stock in the riparian margin and the waterway	Taieri River
	% area of land uses/riparian factors affecting cultural values	MEPI Wetlands
Health of Waterways	shape of the river	CHI Waterways
	natural river mouth environment	CHI Waterways
	sediment in the water	CHI Waterways
	water quality	CHI Waterways
	water quality throughout the catchment	CHI Waterways
	flow characteristics	CHI Waterways
	riparian vegetation	CHI Waterways
	flow variations	CHI Waterways
	use of river margin	CHI Waterways
	flood flows	CHI Waterways
	temperature	CHI Waterways

	sound of flow	CHI Waterways
	catchment land use	CHI Waterways
	movement of water	CHI Waterways
	riverbank condition	CHI Waterways
	fish are safe to eat	CHI Waterways
	water is safe to drink	CHI Waterways
	uses of the river	CHI Waterways
	Water pollution	Mäori Env. monitoring
Feel	The greasiness of the water	Taieri River
	Temperature	Taieri River
Smell	Freshwater has a distinct smell	Taieri River
	Unpleasant odours - from the water itself or from the riparian margins	Taieri River
Sound	The sound of the winds moving through the riparian vegetation	Taieri River
	The current of a waterway - you can hear water flowing	Taieri River
	Flood flows - you can hear when the river is in high flows	Taieri River
Sight	A visible flow	Taieri River
	Riffles -White-water means the water is being aerated	Taieri River
	The extent and type of riparian vegetation, including the presence or absence of "overhang" tells about the likely presence or absence of life in the waterway	Taieri River
	The extent and type of riparian vegetation in the headwaters of a catchment is important as the mauri of the river stems from its source in the upper reaches of a catchment.	Taieri River

	The presence or absence of activities (that cause adverse effects) in the headwaters of the catchment - again because the mauri of the waterway is strongest and stems from its source in the headwaters.	Taieri River
	Colour - the clearness of the water or on the other extreme the level of turbidity of the water.	Taieri River
	The presence or absence of sediment on the riverbed stones and gravels - if the stones are clean it is perceived as being safe to drink and harvest kai.	Taieri River
	Continuity of vegetation - from the land, through the riparian zone, and down into the waterway itself. There should be no line or demarcation between the land, the riparian zone and the waterway itself. Often there is a black line or a pollution line that show the unhealthy state of the waterway.	Taieri River
	Unnatural growths - of plants, weeds and algae - it shows us that something is "out of order.	Taieri River
	The presence or absence of foams, oils, and other human pollution in the waterway	Taieri River
	Flood flows - we know that the river is cleaning itself by passing the water it no longer needs.	Taieri River
	Unnatural sedimentation in channels - e.g. the appearance of islands	Taieri River
	The "stomp test" - go into the water stamp around and see what floats to the surface.	Taieri River
Condition of mauri	Number of point (sites) sources of pollution degrading te mauri	MEPI Wetlands
	Degree of modification (draining, water table, in-flows, out-flows) degrading te mauri	MEPI Wetlands
	Assessment of, and change in te mauri (scale)	MEPI Wetlands
Human Activity Indicators	Changes in the volume of customary take of kaimoana (measured by records of marae and kaumätua authorised to approve the take)	Maori Input EPI
	Change in the number of tangata tiaki/kaitiaki appointed under the customary fishing regulations to approve customary take	Maori Input EPI

	Changes in volumes and prices of kaimoana exported to whänau in the North Island.	Maori Input EPI
	How many people (groups, structure of these groups) visit the environmentally important areas	1st Nations – Env. Knowledge
Significant places	No. and distribution of sites of significance to Maori in District Plan in relation to water bodies	Whangarei DC
	Number and distribution of heritage trees of significance to Maori	Whangarei DC
	Sites of significance to Maori in iwi and hapu management plans in relation to water bodies	Whangarei DC
	No. and distribution of sites of significance to Maori on the planning maps	Whangarei DC
	Heritage buildings, sites and objects, heritage trees and sites of significance to Maori	Whangarei DC
	Heritage buildings/sites and objects, heritage trees, archaeological sites, sites of significance to Maori	Whangarei DC
	The state of heritage sites and their maintenance and condition over time.	Ngäti Koata IMP
	No. of resource consent applications submitted/granted involving sites, which contain or adjoin a culturally significant site (note cultural not Maori)	Matamata Piako
	No. of resource consent applications submitted/granted involving sites, which contain or adjoin a culturally significant site	Matamata Piako
	Historic and cultural landscapes identified in iwi and hapu management plans	Whangarei DC
	No. and distribution of resource and building consents in relation to sites of significance to Maori	Whangarei DC
	Identified indigenous vegetation and habitats of indigenous fauna of significance to Maori.	Whangarei DC
Tü takiwä	Traditional significance of names – records previous environment or features	Habitat Of Dogrib
	Place names that have been handed down from the ancestors through oral narratives are indicators that	Habitat Of Dogrib

	more is known about a place and its surroundings.		
	Place names lead individuals to places where resources should be available		Habitat Of Dogrib
	Place names are designed to keep individuals away from potential hazards.		Habitat Of Dogrib
	Traditional place names		Taieri River
	Some of the traditional placenames relate to sound		Taieri River
Seasons	The Maori calendar is the primary celestial indicator	The arrival of whitebait	Hauraki Report
		The best fishing times	Hauraki Report
	Natural events were the indicators, signalling the start and end of seasons.		Hauraki Report
	Indicators warned of changes in fish behaviour and approaching bad weather.		Hauraki Report
	Abnormal changes to seasonal patterns or location, once observed, became part of the local lore		Hauraki Report
Kaitiakitanga	No. of resource consents referred for Iwi consultation		Rotorua DC
	% of resource consent applications that involve Iwi consultation		Kapiti Coast DC
	No. of plan changes or designation procedures that have iwi have submitted on		Kapiti Coast DC
	Number and percentage of consent applications involving consultation with tangata whenua		Whangarei DC
	No. of notified resource consents applications that Iwi have submitted.		Kapiti Coast DC
	Council provision of resources (amount and type)		Whangarei DC
	No. cause and frequency of complaints relating to tangata whenua issues		Whangarei DC
	Qualitative and quantitative assessment regarding tangata whenua issues		Whangarei DC
	State of the Environment Monitoring - Tangata Whenua		Whangarei DC

	No. and percentage of resource consents distributed to Iwi for comment	Western BOP DC
	No. of complaints received from iwi	Matamata Piako
	No. of responses to consultation from iwi	Matamata Piako
	No. of consultants with iwi	Matamata Piako
	No. of consent conditions imposed to protect iwi interests	Matamata Piako
	The level of protection given to heritage values in district plans	Ngäti Koata IMP
	The adequacy and performance of other protection methods	Ngäti Koata IMP
	The frequency of works being consented to and/or undertaken without consultation with Ngati Koata, by monitoring non-notified and notified resource consent applications.	Ngäti Koata IMP
Tino Rangatiratanga	Institutional arrangements for liaison between Council and tangata whenua, including; (a) Maori liaison personnel (b) Protocols or memoranda of agreement (c) Maori standing committee (d) Maori working parties or advisory groups	Whangarei DC
	Frequency of consultation on policy and planning initiatives	Whangarei DC
	Frequency of use of marae and hui and use of Te Reo Maori;	Whangarei DC
	Recognition of customary authority and rights, cultural and spiritual values and traditional practices	Whangarei DC
	Transfer of functions, powers and duties to iwi authorities	Whangarei DC
	Iwi and hapu management plans developed	Whangarei DC
	Agreements and protocols set up to facilitate consultation	Whangarei DC
	Local Authority Cross Boundary Issues - Iwi and hapu processes	Whangarei DC
	Consultation with tangata whenua	Whangarei

		DC
	Area of land in Maori ownership or management.	Matamata Piako
	No. of iwi development and management plans in operation	Matamata Piako
	No. of Council initiated working parties which have iwi representation e.g. District Plan, Memorandum of Understanding**.**	Matamata Piako
Socio economic / Cultural Indicators	Estimate of number of people living predominantly in direct contact with the Community natural environment of the community, types and forms of the direct contact; data estimates for approximately 1970 and 1945 (one and two generations back).	1st Nations – Env. Knowledge
	Similar information for people with more than half- or quarter- of their time living in direct contact with the natural environment	1st Nations – Env. Knowledge
	Overview of elders living in the community and its individual settlements, who have extensive knowledge of natural environment and its descriptive and spiritual characteristics.	1st Nations – Env. Knowledge
	Changes in the number of women who preserve food as a measure of domestic and social security. Women preserve fruits, vegetables, meat and fish when they feel assured of social and domestic stability.	1st Nations – Env. Knowledge

Indicators tables from; Environmental Indicators for National State of the Environment Reporting - Natural and Cultural Heritage			
Issue or element	**Indicator**		**Condition (C), Pressure (P), Response (R)**
GENERAL INDICATORS			
Knowledge of the heritage resource	G.1	Number and distribution of identified heritage items (places and objects)	C/R
	G.2	Number of heritage places assessed using best practice assessment standards	R

Condition of heritage	G.3	Number of places destroyed or whose values have been severely diminished	C
	G.4	Number of places reserved for conservation purposes where heritage values have been seriously impaired by visitor use.	C/P
Resources and training	G.5	Funds provided for maintaining heritage values	R
	G.6	Amount of funding provided to heritage agencies responsible for heritage places and objects.	R
	G.7	Number of conservation practitioners and training courses	R
Community awareness and action	G.8	Community awareness of and attitudes towards heritage places and objects and their conservation.	R
SPECIFIC NATURAL INDICATORS			
Knowledge of natural heritage places	N.1	Proportion of natural heritage places with a condition statement; proportion with recent condition statements; and age distribution of condition statements.	C
Protection by Government	N.2	Proportion of natural heritage places with protected area status.	R
	N.3	Proportion of natural heritage places with a management plan.	R
SPECIFIC INDIGENOUS (ARCHAEOLOGICAL) INDICATORS			
Issue 1 Knowledge of indigenous (archaeological) heritage places	IA1.1 Number of, and level of funding for, programs initiated or continuing focussed on recording scientific and social values of places involving collaborative research.		C/R
	IA1.2 Level and distribution of funding or other resources provided to support systematic studies of indigenous heritage places of archaeological significance.		R/P
	IA1.3 Net population movement of local (indigenous and non-indigenous) people away from rural lands and townships.		C/P
Issue 2 Impact of development	IA2.1 Number and proportion of archaeological		C/R

(humanly initiated actions including tourism)	assessment studies initiated prior to development that include assessment of indigenous archaeological places and values. IA2.2 Extent of land area (per region or catchment) under cultivation, cleared, clear-felled forests, open mine site bare ground, or lands recorded as under stocking pressure in the Rangelands or arid zones.	P
Issue 3. Impact of natural processes and humanly accelerated or initiated natural processes	IA3.1 Number of indigenous archaeological heritage places on lands reserved for conservation purposes reported as destroyed or damaged by natural forces such as flood, fire, storm (wind/wave).	C/P
Issue 4. Statutory protection, management regimes and resources	IA4.1 Areal extent of lands reserved for conservation purposes under all jurisdictions including: (a) proportion which is 'unmodified' plant or animal habitat, or landscape (b) proportion preserved for their indigenous heritage values, and (c) proportion in category (b) with provisions for management and its implementation. IA4.2 Number and total area of protected areas or individual indigenous places under: (a) the primary control of local communities (b) the control of traditional owners (c) joint management regimes, or	C/R C/R

	(d) designated as Aboriginal lands managed by resident communities according to traditional canons of practice in caring for country.		
SPECIFIC INDIGENOUS (CONTEMPORARY) HERITAGE INDICATORS			
Issue 1 'Culturally appropriate' directions in conservation and management of heritage places of significance to Indigenous custodians/communities	IC.1	Number of places (sample) where Indigenous people are involved in heritage management decision making by virtue of: i) Indigenous land ownership ii) joint management iii) recognised custodianship iv) direct consultation.	C/R
	IC.2	Number of government heritage agencies including those agencies providing heritage research and funding programs that incorporate procedures of consultation or referral to indigenous custodial / community groups, on: i) priority setting ii) individual projects iii) annual programs iv) policy formulation on Indigenous issues.	C/R
	IC.3	Number of trained Indigenous heritage professionals or custodial representatives employed by government heritage agencies, or Indigenous people serving on councils or boards of such agencies, who are actively involved in the management and / or administration of Indigenous heritage places.	C/R

	IC.4	Number of Indigenous community based funding applications for government heritage funding: i) that are successful ii) are not successful iii) as a percentage of total government heritage funding provided iv) as a percentage of total government heritage funding applications.	C/R
	IC.5	Number of programs and funds allocated for repatriation of Indigenous artefactual material and / or human remains.	C/R
Issue 2 Questions of Indigenous community cultural heritage maintenance (places being one part)	IC.6	Number of Indigenous communities / organisations establishing: i) 'keeping places' ii) cultural centres iii) site / place data bases iv) heritage tours, trails / walks.	C/R
SPECIFIC INDIGENOUS LANGUAGES INDICATORS			
Condition of Indigenous languages	IL.1	Number of people who identify as knowing each indigenous language.	C
	IL.2	Number of people in age group who identify as knowing each indigenous language; proportion of total identifying as indigenous.	C
	IL.3	Number of traditional languages at each recognised stage of inter-generational dislocation.	C
State of documentation of	IL.4	The number of indigenous languages for	C

languages		which (a) documentation is: (i) good (ii) adequate (iii) inadequate (b) documentation is close to complete (given the state of the language)	
The wider use of Indigenous languages	IL.5	The number of/proportion of traditional language used in: i. broadcast media: radio, TV, published books, magazines, cinema, WWW, distinguishing: (a) programs aimed at speakers; (b) programs aimed at a general audience; ii. signage in public places (streets, parks), advertisements	C/R
	IL.6	Number of approvals of geographic names, including map sheet names, using indigenous place names.	R
Funding, research and education	IL.7	Amount (in $) of funding provided for language programs through government departments and agencies, including ATSIC, DEETYA, ARC and AIATSIS; distinguishing allocations to: (a) research; (b) language maintenance; (c) education and training; and (d) information dissemination and public education (eg translation of notices of government programs).	P/R
	IL.8	The number of projects which document knowledge of traditional	R

		languages, by type of project.	
	IL.9	The number and type of indigenous language programs undertaken in language centres, schools, and other institutions.	R
SPECIFIC HISTORIC INDICATORS			
Condition of heritage places	H.1	The number of heritage places assessed (by sampling) as being in (i) good, (ii) average and (iii) poor condition	C
Protection by government	H.2	Number of statutory mechanisms actively used to protect historic places	R
SPECIFIC OBJECTS INDICATORS			
Knowledge of Heritage Collections	O.1	The number of objects /collections adequately catalogued.	C
Knowledge of Condition of Heritage Collections	O.2	The proportion of collections surveyed for preservation treatment by a trained curator/conservator.	C/R
	O.3	The proportion of collections requiring preservation subsequently treated.	C/R
	O.4	The proportion of collections stored in appropriate environmental conditions.	C/R
Condition of Heritage Collections	O.5	Number of heritage collections with statutory protection for that heritage type/category outside museum collections.	C
	O.6	Number of reported applications of provisions of existing legislation to protect heritage objects in museums and in situ.	C/R
Societal responses to heritage collections	O.7	Number of users of object collections for scholarly study, and the number of programs for the public use of collections.	R

Indicators table from Voices from the Bay

Environmental Condition	*Indicator*	*Geographical Reference*
Bad Weather	Wildlife aren't around	Hudson Strait
	Birds travel in flocks	
	Currents are mixed up and change directions rapidly	
	Seawater comes up over the top of ice in winter	
	High tides	Eastern Hudson Bay
	Threatening-looking clouds to the left or right of the sun at daybreak	
	Sand particles in water	Western Hudson Bay
• with rain or wind	Sky is red at sunrise	Eastern Hudson Bay
• for two to three days	Currents are active towards the full moon	
• later in the day	Small cloud just above the daylight when sun starts to rise	
	Sun is a reddish colour in early morning	Hudson Strait
• same day or next	Caribou or seals shake their heads	Eastern Hudson Bay
	On calm days, dogs stay inside igloo porch and start to shake their bodies or roll over to clean themselves for no real reason	
• next day	In winter, halo appears around sun or moon just before it sets	Hudson Strait
	Stars called "tuktuyuit" and "sakiasiak" blink on a clear night	Eastern Hudson Bay
• in the spring or early summer	Dark, thick clouds	Hudson Strait
• wind storms—spring/early summer	Canada geese fly south during their spring migration	
	High waves start coming in on a calm day	Hudson Strait
Very Bad Weather	Geese do not move	Hudson Strait
Not So Good Weather	Moon has a light colour just before it sets	Eastern Hudson Bay
	West wind; eastern sky isn't necessarily red	
• same day	Thin layer of clouds gets dark in places Sun is bright red as it sets	
Stormy Weather		
• for a few days	Clouds seem to be moving into the wind	Hudson Strait
• unusually long	Winds shift more than once in short time	
• doesn't get better	Winds keep changing without slowing down	
	Clouds are coming with the wind	

Storm • same day • coming • building up • big storm coming • snow storm	 No animals anywhere on a nice day Haze out in the bay Birds gather in large numbers; animals move in same direction Feather-like clouds appear at low tide; eastern sky is red at sunrise Cirro-cumulus clouds appear and cover a clear, blue sky	 Hudson Strait Eastern James Bay Hudson Strait Eastern Hudson Bay Hudson Strait
Better Weather • next day • may even turn calm • coming	 Flat clouds Reddish colour sun rays in evening Halo changes from a yellowish to rainbow colour in stormy weather Large white clouds on a windy day Clouds are not in layers Land or island mirage appears on horizon Horned larks, Lapland longspurs, and snow buntings become active Wind slows down on a windy day Winds blow continuously from one direction Animals start moving around in bad weather Geese fly high even on windy days	 Hudson Strait Hudson Strait
Good Weather • brings	Rainbow appears around the sun Big fluffy clouds Moon stands straight up Sky is red at sunset Clean sea ice (after break-up)	 Hudson Strait Eastern Hudson Bay Western Hudson Bay Eastern Hudson Bay
Clear Weather	Skies clear up over the bay after being cloudy for a few days	Western Hudson Bay
Blue Sky • coming • not staying	 Appears on north western horizon during a thick, cloudy day Appears from nowhere and passes by	 Eastern Hudson Bay

Cold Weather • part of the day • for four or five days • coming • extremely cold	Rainbow on both sides of the sun in morning Woodpecker's beak moves fast Halo around the sun appears close to the sun Bright halo above the sun either in morning or in evening Sun has bright spots and a lighter halo around it Grouse are fat Bright northern lights cover entire sky	Eastern Hudson Bay Western Hudson Bay Western James Bay Eastern James Bay Western Hudson Bay
Warmer Weather • for almost a week • for only short time • more warm weather during week • within hours, for about 3 days	Large halo appears around the sun or moon (in either summer or winter) Halo around the sun is in close proximity to the sun Small black flies fall on the snow Northern lights are reddish-orange on their southern side	Eastern Hudson Bay Western James Bay Western Hudson Bay
Mild or Warm Weather • might change-for half day only • for part of the day-afternoon only • next day	Thick reddish cloud in winter Halo is far from the sun Northern lights move in one direction Woodpecker's beak moves slowly Chickadees appear suddenly during cold day	Hudson Strait Western Hudson Bay
Very Mild Weather	Quick lightning flash	Hudson Strait
Calm	Northern lights do not move	Western Hudson Bay
Wind Direction • will blow mostly from southeast	Sun is reddish colour Cirrus clouds with "hooks-Northern lights	Eastern Hudson Bay

Windy • with rough water • gusts	Northern lights move east to west Camp stove makes whistling sound Sun goes dark Red-throated loon calls out Sun becomes hazy on calm day in summer	Western Hudson Bay Northwestern Hudson Bay Western Hudson Bay Northwestern Hudson Bay
Strong Winds or Storm	Halo around the sun	Eastern James Bay
Strong Winds • coming • may come from any direction • during the day • won't slow down • will slow down • for two to three days	Glowing red sun Lots of northern lights in a clear sky Dark cloud appears from nowhere and disappears again Long, thin clouds above other clouds in a mostly blue sky Small birds fly in large groups Bottom of moon is light-coloured early in morning Clouds move counter-clockwise Winds are blowing clockwise Winds change directions quickly without settling down	Hudson Strait Eastern Hudson Bay Hudson Strait Eastern Hudson Bay
Low Pressure System	Geese fly low	Hudson Strait
Tides •high • very big	Moon is bigger Full moon	Western Hudson Bay
Rain • later same day or next day	Beavers shake their heads Small black flies come every day Dark clouds in evening Loon cries and flies off in evening Call of the red-throated loon	Eastern James Bay Western James Bay Western Hudson Bay Hudson Strait

Snow • rest of the month • next day • falling snow, blowing snow • falling snow • next day • snowfall or will turn very	First or third quarter moon is upright Cracking ice makes large booming sounds Half moon is leaning to one side Owls call at night Large, thick, white, oval clouds in winter Scattered clouds Dark clouds appear with white, round clouds as the sun is about to set on a nice calm day Long, smooth ice fog shows up	Eastern Hudson Bay Western Hudson Bay Eastern Hudson Bay Western Hudson Bay Hudson Strait Eastern Hudson Bay
Blizzards	Rainbow appears around the moon	Hudson Strait
Ice • freshwater ice will be slushy	Air makes a "bubbly" sound in the ice during night and day in winter	Western Hudson Bay
Sea-ice Safety • floe-edge ice will not break	Ice fog in mountains and lower valleys Ice fog is down to the ground	Hudson Strait
Seasonal Changes • changing from cold to warmer • thin layer of ice on top of snow will not freeze anymore • snowmelt will begin and continue • beluga whales will be coming • sea gulls will lay eggs • Arctic char will return from seawater	Particular animals coming and going Rotation of big dipper When snow buntings and Lapland longspurs arrive When rough-legged hawks start to arrive (spring) When falcons arrive (past) When common and red-throated loons start to arrive When wet snow begins to occur When snow geese, sandpipers, and shorebirds start migrating south	Hudson Strait Western Hudson Bay Hudson Strait

Fall		
• nice weather	High tides	Eastern Hudson Bay
• coming	Particular sound of a woodpecker	Western James Bay
• early snowfall	Fish going upriver	Hudson Strait
	Rabbit paws turn white early	Western James Bay
Winter		
• will be early	Grass turns yellow in September	Western James Bay
• will be warm or cold	Type of cracking sound in the trees at night in the first frosty weather	
• warm weather	Thunder in late fall	Western Hudson Bay
	Foggy in fall	
• cold or rough winter	Rabbit paws change to white in October instead of November	Western James Bay
	Fall skies are clear	Western Hudson Bay
	Beaver or moose give birth to small offspring	Western James Bay
• long winter	Big dipper turns its tail to the north	
• less cold	Big dipper is straight up at sunrise	
• Christmas		Western Hudson Bay
Spring	Thick-billed murres arrive	Hudson Strait
• coming	Begin to see walrus (past)	
	Black bear leaves den in early April	Western James Bay
• beginning	A particular underwater lake and river plant is about *2″* [50 mm] long	
• early	Black bear walks out in April	Western James Bay
	South wind during April full moon	Western Hudson Bay
	Pussy willows sprout in February	Western James Bay
• long	Big dipper is directly overhead by mid-December, January Groundhog comes out February 2	Western Hudson Bay
• difficult	Evening star is high at dawn	Western Hudson Bay
	Groundhog doesn't come out February 2	

Summer • early • warm weather • hot	Evening star is low at dawn Bright red sunset Thunder in early spring	Western Hudson Bay Western James Bay Western Hudson Bay
Sea Mammals • coming	Eider ducks start coming	Cape Dorset
Moose • close by	Two stars on the north and south side of the moon	Western James Bay
Caribou • coming or increasing in number	Influx of wolves when only a few caribou	Western Hudson Bay
Animal Populations • generally high • fox—high • geese—high • geese—low	Lots of thunder and lightning in summer Sudden population explosion in mice during summer Snow birds come first, and from the east Snow birds come from west	Western Hudson Bay Western Hudson Bay
Birds • fly back out	Fly in during a frost	Northwestern Hudson Bay

Appendix B

Indigenous Outcomes listed within the literature

Note – Within this review actual stated outcomes have been sought, rather than those that can be identified from statements of intention. However, very few actual outcomes were found. For this reason the following table includes statements listed within documents as iwi concerns, or goals, where outcomes are clearly implicit.

Category	Outcome	Source
Kai / Kaimoana	supporting abundant mahinga kai resources, particularly in important wetlands, backwaters, tributaries and mainstem rivers	CHI Waterways
	People can experience the full range of our native plants, animals and ecosystems, and some of these resources are available for sustainable traditional uses and economic activities.	EW LTCCP
	Maintenance or enhancement of water quality in the coastal marine area at a level that enables the gathering or cultivating of shellfish for human consumption	Ngäti Koata IMP
	A progressive improvement in water quality in the coastal marine area at a level that enables the gathering or cultivating of shellfish for human consumption.	Ngäti Koata IMP
	Sustainable stocks of native fish and distribution of rare and endangered species.	Ngäti Koata IMP
	Enhancement of the freshwater fisheries habitat	Hauraki IMP
	Increased fisheries production from Tikapa Moana	Hauraki IMP
	Fisheries and marine farming at sustainable levels in Tikapa Moana	Hauraki IMP
	Productive pipi and cockle beds	Hauraki IMP
	Protection for whales, dolphins and seals	Hauraki IMP
	Assured access to a customary take for Hauraki tangata whenua	Hauraki IMP
	Increased ability for tangata whenua to fulfil manaakitanga obligations	Hauraki IMP

Environments	Increased diversity of native species, habitat and ecosystems through wetland, peatland, river and stream and duneland restoration activities.	Hauraki IMP
Streams / Wetlands	To protect and restore all remaining wetland systems within some defined area	MEPI Wetlands
	That the food producing capacity of natural waterways is protected and enhanced, as is their life supporting capacity.	Waitakere SOE
	Maintain and enhance the cultural values of lakes, rivers, and wetland ecosystems	MEPI Wetlands
	Undertaking the restoration, enhancement and creation of wetland areas, to act both as flow moderators and habitats for mahinga kai species	CHI Waterways
	Maintenance and enhancement of water and sediment quality, recognising and providing for the relationship of Maori in terms of section 6(e) of the RMA.	ARC Coastal Plan
	The recognition of the relationship of Tangata Whenua with the wetlands, lakes, and rivers of the region in accordance with Section 6 (e) of the RMA.	ARC ALW Plan
	The relationship of Tangata Whenua with water is recognised and provided for in the management of the taking, use, damming and diverting of water and avoiding damage to waahi tapu sites from drilling.	ARC ALW Plan
	Restoration of wetland, river and stream plant life.	Hauraki IMP
Mauri	That the mauri of natural waterways is protected.	Waitakere SOE
	Safeguard and restore the mauri of the lakes, rivers, and wetlands ecosystems	MEPI Wetlands
	Assess and report on the proportion of waters for which mauri has been lost and/or restored	MEPI Wetlands
	The relationship of Maori with their geothermal taonga provided for, and the mauri of geothermal resources preserved and enhanced.	EW LTCCP
	Recognising and providing for tangata whenua concerns relating to the mauri (life force) of water.	EW LTCCP
	Restoration of the mauri of local ecosystems and fisheries	Hauraki IMP

Significant sites	Heritage landscapes, heritage sites, features, places and wahi tapu are protected	Hauraki IMP
	Waahi tapu, waahi taonga, other taonga and mahinga kai sites are protected from the adverse effects of land use activities;	Gore DP
	Protecting other wāhi tapu / wāhi taonga	CHI Waterways
	To identify remedial action to rehabilitate or restore culturally significant environments	MEPI Wetlands
	The protection and preservation of heritage and archaeological sites	Gore DP
	Greater protection of land, water, sites, waahi tapu and taonga.	TCDC DP
	(Mäori) sites and precincts are identified and protected from inappropriate development.	Wellington DP
	The retention of a significant proportion of heritage sites that are of significance to tangata whenua and other Maori.	Wellington DP
	Protection of waahi tapu (sacred sites)	Taupo LTCCP
	Maori and European heritage sites of significance actively protected.	Waitakere LT-P
Tino Rangatiratanga	Well-being	Mäori Outcomes
	Wealth & a sound economic base	Mäori Outcomes
	Secure cultural identity	Mäori Outcomes
	Tino Rangatiratanga	Mäori Outcomes
	To measure and review the performance of other agencies responsible for achieving defined environmental and cultural outcomes	MEPI Wetlands
	The special Treaty relationship between the Crown and Tangata Whenua is recognised and facilitated.	ARC Coastal Plan
	The relationship of Tangata Whenua and their culture	ARC Coastal

	and traditions with their ancestral taonga, including use of and access to these taonga, are recognised and provided for.	Plan
	Involvement of Tangata Whenua in managing their ancestral taonga, including decision making, in accordance with tikanga Maori.	ARC Coastal Plan
	The historic, traditional, cultural and spiritual relationship of Tangata Whenua with the Hauraki Gulf, its islands, catchments, foreshore and seabed is provided for. Those natural, historic and physical resources (including kaimoana), islands, catchments, foreshore and seabed of the Hauraki Gulf with which Tangata Whenua have a historic, traditional, cultural and spiritual relationship are recognised and, where appropriate, enhanced.	ARC Coastal Plan
	Appropriate and meaningful consultation is undertaken with Tangata Whenua on all matters of significance to them.	ARC ALW Plan
	Involvement of Tangata Whenua in managing their ancestral taonga, including decision making, in accordance with tikanga Maori.	ARC ALW Plan
	Ongoing beneficial relationships between Tangata Whenua and the ARC and TAs.	ARC RPS
	Protection and enhancement of relationships of Tangata Whenua with their ancestral taonga.	ARC RPS
	Provision for social, economic and cultural wellbeing of Tangata Whenua, in accordance with Treaty rights and obligations.	ARC RPS
	Involvement of Tangata Whenua in managing their ancestral taonga, including decision-making, in accordance with Treaty rights and obligations.	ARC RPS
	Decision making more sensitive to Tangata Whenua values.	TCDC DP
	Acknowledgment and greater community awareness of Treaty of Waitangi principles.	TCDC DP
	Enhanced communication between Council, the public and tangata whenua.	TCDC DP
	Appropriate developments respect the existence of Maori cultural values.	Wellington DP
	Such uses (activities that fulfil the needs and wishes of tangata whenua and other Maori) establish where there is a need.	Wellington DP

	Such activities (Te Ara Haukawakawa provisions facilitate a wide range of activities, including marae, papakäinga / group housing and köhanga reo/language nests) are able to be provided for subject to meeting minimum environmental standards.	Wellington DP
	If such non-rural uses establish (marae, papakainga/group housing, kohanga reo/language nests, or similar activities in rural areas that relate to the needs and wishes of tangata whenua and other Maori), they are managed in such a way as to avoid or mitigate any adverse effects.	Wellington DP
	Maori communities and their culture and values are sustained and enhanced within the Wairoa District.	Wairoa DP
	Robust and effective relationships with Maori in the Waikato Region.	EW LTCCP
	For significant projects, consultation processes are tailored to the needs of the Maori community and are audited for effectiveness.	EW LTCCP
	Strong Maori leaders are working side by side with the Council and achieving positive outcomes for Maori.	Waitakere LT-P
	Marae policy adopted.	Waitakere LT-P
	Treaty of Waitangi Framework agreed	Waitakere LT-P
	Treaty framework in place	Waitakere LT-P
	Harbourview (Te Atatu) Marae built.	Waitakere LT-P
	Tikanga input into the decision-making policies	Ngäti Koata IMP
	Greater recognition of Treaty of Waitangi rights.	Ngäti Koata IMP
	Use of native plants as sustainable tribal resource	Hauraki IMP
	Improved integration with government agencies and local communities	Hauraki IMP
	Cultural resources are used, enhanced and sustained	Hauraki IMP
	Greater community and agency awareness of the importance of Hauraki cultural heritage	Hauraki IMP
	Treaty based relationships with central and local	Hauraki IMP

	government and others	
	The wider community is informed about and understands the relationship of Hauraki Whanui with the environment.	Hauraki IMP
	Hauraki Whanui initiatives to address sustainability and heritage issues in the region are encouraged, and supported and where appropriate, coordinated.	Hauraki IMP
	Involvement in decision-making affecting management of Ngati Koata heritage values.	Ngäti Koata IMP
Kaitiakitanga	A customary indicator process that is practicable, reflects tangata whenua attitudes to environmental care and is based on observation is needed	Hauraki Report
	Identify and work towards cultural aspirations for defined environments	MEPI Wetlands
	Assess and report on the degree and proportion to which cultural values are represented	MEPI Wetlands
	For iwi to monitor for themselves, the health and condition of the environment from a cultural perspective	MEPI Wetlands
	To help review performance of iwi and hapu management plans	MEPI Wetlands
	For iwi, hapu to prepare their own state of the environment (SOE) reports	MEPI Wetlands
	Provide information about what is happening to culturally significant environmental systems through time	MEPI Wetlands
	Environmental integrity and Autonomy	Mäori Outcomes
	In selection of sites for waste water and solid waste treatment or disposal, cultural and spiritual values are not harmed.	Waitakere SOE
	Adverse effects of subdivision, use and development on the relationship of Tangata Whenua and their culture and traditions with their ancestral taonga are avoided, remedied, or mitigated.	ARC Coastal Plan
	Appropriate and meaningful consultation is undertaken with Tangata Whenua on all matters of resource management of significance to them.	ARC Coastal Plan
	The extraction of sand, shell, shingle or other natural	ARC Coastal

	material avoids any significant adverse effect on Tangata Whenua values associated with sites and places of significance to them.	Plan
	Avoidance of damage from dredging activities to Coastal Protection Areas, places and areas of heritage importance, and those parts of the coastal marine area that have characteristics of special value to Tangata Whenua.	ARC Coastal Plan
	Consultation on all matters of resource management significance to Tangata Whenua.	ARC RPS
	Maori cultural and traditional values are taken into account in the management of water conservation and allocation.	ARC RPS
	Development of Maori land and resources, increased involvement in decision making over it, recognition of kaitiaki role.	TCDC DP
	The environmental result will be the recognition of Maori heritage by development proposals in their design or by contribution through the development process.	Wellington DP
	The sustainable management of natural and physical resources within Wairoa District while recognising and providing for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga as a matter of national importance.	Wairoa DC
	Greater public awareness of Maori cultural considerations concerning the management of natural and physical resources.	Wairoa DC
	Use, development and subdivision that maintains and enhances the natural character, amenity values and the values that tangata whenua associate with the coastal environment.	Wairoa DC
	The relationship that tangata whenua have with our natural surroundings is recognised (protecting the life-giving energy of the waters of Lake Taupo and the Waikato River are part of the kaitiakitanga of tangata whenua over this taonga)	Taupo LTCCP
	Decision-making, planning processes and policies take into account community concerns and priorities, protects sites and areas of significance, and recognises tangata whenua's role as kaitiaki.	Taupo LTCCP
	Addressing cultural concerns (particularly those of Maori) that arise when waste is discharged into the	EW LTCCP

	environment and when natural and physical resources are not managed in a holistic sense taking into account their impacts throughout their life cycle.	
	Recognition, when appropriate, of the location of heritage values in the relevant resource management planning documents;	Ngäti Koata IMP
	Ensure that rules governing land disturbance and both terrestrial and marine based development activities have full and proper regard to potential impacts on heritage values	Ngäti Koata IMP
	Long term protection of indigenous biological and ecological diversity	Ngäti Koata IMP
	Sustainable development and use of peat lands, wetlands	Hauraki IMP
	Regional growth strategies that protect taonga of Hauraki Whanui from future use and development in the Hauraki tribal region.	Hauraki IMP
	Increase in local energy efficiency initiatives by Hauraki Whanui and local communities	Hauraki IMP
	Hauraki Whanui participating in the development of domestic and global Climate Change Policy	Hauraki IMP
	Hauraki native seed stock protected and sustained for future generations	Hauraki IMP
	An effective Hauraki coastal monitoring capacity	Hauraki IMP
	Hauraki Whanui are exercising their kaitiaki responsibilities	Hauraki IMP
Mätauranga Mäori	Hauraki Whanui possess a range of knowledge and skills necessary to participate as kaitiaki in resource management decision making processes	Hauraki IMP
	To enhance te reo through environmental projects	MEPI Wetlands
	Maori Library work programme implemented.	Waitakere LT-P
	Whare Wananga Stage 1 completed	Waitakere LT-P
	Major new technology industries operating in the City - Maori scholarships available.	Waitakere LT-P
	Intellectual property rights protected	Hauraki IMP

	Intellectual property rights are protected	Hauraki IMP
	Mätauranga Mäori as it relates to environmental management is protected, maintained and enhanced	Hauraki IMP
	Hauraki Whanui have access to the results of scientific research.	Hauraki IMP
	Communication of information amongst Hauraki Whanui on environmental issues is improved.	Hauraki IMP
	To build Maori knowledge on environmental systems, such as wetlands	MEPI Wetlands
	To provide long-term information on environmental change, which acknowledges the significance and legitimacy of Maori knowledge	MEPI Wetlands

The following series of tables are from *A Criteria and Indicators approach to Community Development*. Contrary to the field titles the columns Critical Value, Local Value and Indicator are generally phrased as outcomes. Therefore the report does not actually list indicators, but outcomes.

Criterion I. Modify Forest Management Operations to Reduce Negative Impacts to Wildlife Species				
A) Critical Element	B)Local Value	C) Goal	D) Indicator	E) Action
1. Species Diversity and Availability.	1.Healthy population of bison in the Caribou Mt. lowlands and drainages.	1.Limit clear-cut activity along the Caribou Mt. slope to ensure turbidity of drainage is not adversely affected by erosion and sedimentation.	1.Reduce timber harvesting along the Caribou Mts. slope to maintain lowland bison habitat.	1.Reduce harvesting along the Caribou Mt. slope and increase streamside buffers to no less than 300 meters in order to offset increased runoff caused by clear-cuts.
2. Species Diversity and Availability	2.Healthy population of woodland caribou.	2.Enhance critical habitat for woodland caribou.	2.Protection of critical habitat blocks of old growth conifer along the Caribou Mt. slope.	2.Long-term harvest rotation of critical conifer habitat along the Caribou Mt. slope, specifically in elevations between 1500-2000 feet.
3. Species Diversity and Availability	3.Availability of bison throughout the management area.	3.Protect and enhance bison range throughout the management area.	3.Protect bison migration routes.	3.Placement of protective zones along bison migration routes that run north-south between Fox Lake and Tall Cree.

4. Species Diversity and Availability	4.Healthy population of fox, coyote, mink, fisher, and lynx.	4.Maintain critical habitat for primary prey species (squirrels).	4.Protection of critical habitat of blocks of spruce (availability of cones) necessary for squirrel habitat.	4.Long-term harvesting rotation and staggering of cut-blocks to ensure the continued availability of spruce cones for squirrels – and thus predator species.
5. Species Diversity and Availability	5.Healthy population of moose.	5.Enhance critical habitat for moose ranging throughout the management area.	5.Limit the harvesting of white spruce along river drainages.	5.Limit harvesting operations along the Mikkwa River and expand stream-side buffers to no less than 300 meters from each shoreline.

Criterion II. Modify Forestry Operations to Ensure Community Access to Lands and Resources				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Continued access to lands and resources.	1.Ensure travel is not impeded by forestry operations.	1.Modify silviculture methods to ensure continued access to lands and resources.	1.Discontinue the practice of scarification following harvesting as it impedes human and non-human travel.	1.* Utilize alternative silviculture methods: - Controlled Burns. - Hand scalping followed by hand seeding and planting.
2. Continued access to lands and resources.	2.Ensure travel is not impeded by forestry operations.	2.Maintain travel corridors throughout the management area for local hunters and trappers.	2.Expand buffers along creeks and streams to limit windfall across waterways.	2.Expand buffers on creeks, streams and rivers to no less than 300 meters from each shoreline.
3. Continued access to lands and resources.	3.Continued availability of balsam poplar throughout the management area.	3.Modify forest operations so as to ensure the availability of balsam poplar near trapline cabins and camps as balsam polar burns well when green with little sparking.	3.Continued availability of balsam poplar near trapline cabins and camps.	3.Protective buffer of no less than 200 meters around trapline cabins and camps to ensure the continued availability of balsam poplar.
4. Continued access to lands and resources.	4.Limit blow-down (wind velocity) of protective buffers in order to protect critical habitat and travel	4.Modify harvesting sequence and cutblock layout in order to limit blow-down.	4.Maintain stand integrity of buffers along critical habitat areas and travel corridors	4.Stagger cutblocks and expand buffers to no less than 300 m. from each shoreline along eastern end of cutblock.

	corridors.			
5. Continued access to lands and resources.	5.Forestry operations should in no way obstruct hunting, trapping and camping trails.	5.Ensure that forestry operations do not obstruct community access trails.	5.Buffers along all known hunting, trapping and camping trails used by LRRCN band members.	5.Buffers no less than 200 meters should be placed along all known hunting, trapping and camping trails used by LRRCN band members.

Criterion III. Provide Protection to all Areas Identified by Community Members as Having Biological, Cultural, and Historical Significance.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Areas of cultural significance are protected from forestry operations.	1.Protection of areas of natural and/or environmental sensitivity.	1.Modify forestry operations to ensure areas of natural and/or environmental sensitivity are not adversely affected by forestry operations.	1.Harper Creek caves are protected from resource development activities.	1.Protective buffer of no less than 300 meters around caves located along Harper Creek south of Fox Lake.
2. Areas of cultural significance are protected from forestry operations.	2.Protection of historical cabins and traditional settlements.	2.Cabins and settlements of historical and cultural significance are protected from forestry operations.	2.Protective buffers are placed around all cabins and settlements of historical and cultural significance.	2.Protective buffers of no less than 500 meters should be placed around settlement sites located at the confluence of the Mikkwa and Peace Rivers.
3. Protection of sites of biological significance	3.Protection of mineral licks throughout the management area.	3.Modify forestry operations to ensure mineral licks are protected from harvesting activities.	3.Protective buffers placed around mineral licks that are located throughout the management area	3.Protective buffers of no less than 300 meters should be placed around mineral licks.
4. Areas of cultural significance are protected from forestry operations.	3.Protection of all burial sites located through the management area.	4.All burial sites located throughout the management area are protected from forestry operations.	4.Protective buffers are placed around all burial sites located throughout the management area.	4.Protective buffers of no less than 200 meters should be placed around burial sites known to be located within the management area.

5. Areas of cultural significance are protected from forestry operations.	5.Protection of rare, endangered and medicinal plants.	5.Plants known to be rare, endangered, or used for medicinal purposes by LRR/TC band members should be protected from forestry operations.	5.Protective buffers placed around areas known to support rare, endangered and medicinal plants.	5.Protective buffers of no less than 100 meters should be placed around upland areas known to support rare, endangered and medicinal plants and no less than 300 meters for riparian zones.

Criterion IV. Recognize and Protect Aboriginal and Treaty Rights to Hunting, Fishing, Trapping and Gathering Activities.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Continued ability to participate in subsistence activities.	1.Ensure forestry operations do not infringe upon Aboriginal or treaty rights.	1.Maintain or enhance opportunities to participate in subsistence activities.	1.Modify existing annual allowable cut to ensure subsistence activities are not limited by forestry operations.	1.Implement a selective logging program for the management area.
2. Continued ability to participate in subsistence activities.	2.Trapline areas remain productive and readily accessible to community trappers.	2. Maintain existing age structure and species diversity found within trapline areas	2.Long-term harvesting rotation in registered trapline areas.	2.Long-term sequencing and cutblock rotation within trapline areas. Implemented through a consultative framework between community trappers and Board representatives.
3. Continued ability to participate in subsistence activities.	3.Rights of trappers are recognized in the planning process.	3. Compensation for lost or reduced access.	3. Implementation of a trappers compensation program.	3. Implement a trappers compensation program for trappers affected adversely by forestry operations.
4. Continued availability of subsistence resource.	4.Priority use of large ungulates for subsistence use.	4.Limit poaching by non-local hunters of large ungulates.	4.Limit access to areas representing critical ungulate habitat.	4.Reclaim access roads leading to the Caribou Mt. slope.
5. Continued availability of subsistence resource.	5.Wild foods are utilized to their fullest extent.	5.Limit the illegal wastage of wild foods by non-local hunters and outfitters.	5.Community elders receive the meat harvested from trophy hunts.	5.Implement wild meat sharing program with commercial guides and outfitters.

Criterion V. Increase Forest-Based Economic Opportunities for Community Members.

A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Community self-sufficiency.	1.Empowerment through education.	1.Provide community members with the education and training necessary to assume responsibility for forest management operations.	1.- Forestry educational program delivered at K through 12. - Delivery of a post-secondary training program.	1.- Implement a forestry education program in each of the LRRCN schools. - Deliver a post-secondary forest worker training program through Kayas College.
2. Community self-sufficiency.	2.Empowerment through employment and training opportunities.	2.Provide community members with on the job training opportunities in the forestry industry.	2.Training and employment program with industry partners.	2.In partnership with Footner Forest Products implement an employment and training program in forestry operations.
3. Community self-sufficiency.	3.Empowerment through capacity-building and marketable skill development.	3.Developing technical skills needed for forest management and planning.	3.Community members receive training in the technical and managerial aspects of forest planning and management.	3.Implement a GIS training program for community members. To be delivered on-site and at regional training centers.
4. Community self-sufficiency.	4.Empowerment through economic development.	4.Expand and diversify economic opportunities for community members.	4.Increase in the number of individually owned primary, secondary or value-added community services.	4.Promote value-added resource-based business opportunities with industry partners.
5. Community self-sufficiency.	5.Empowerment through employment and training opportunities.	5.Provide community members with on the job training opportunities in the forestry industry.	5.Training and employment program with industry partners – planning to production.	5.Implement an internship and job-shadowing program with forest industry partners.

Criterion VI. Increase the Involvement of Community Members in Decision-Making.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Intra/Intra Community Information Exchange.	1.Equitable participation of community members in policy and decision-making.	1.Direct communication between industry and community members.	1.Recognized point of contact is established between industry and each of the three LRR communities.	1.Community-industry information liaison representing each of the three LRR communities should be appointed.

2. Intra/Intra Community Information Exchange.	2.Equitable participation of community members in policy and decision-making.	2.Industry goals and management plans are communicated to each of the three LRR communities.	2.Information is disseminated in a format accessible to community members.	2.Posters and newsletters for information dissemination.
3. Intra/Intra Community Information Exchange.	3.Equitable participation of community members in policy and decision-making.	3.Pluralistic participation on Management Board.	3.Community representation on the SMA Management Board is diversified.	3.Youth (3), Women (3), and Elder (3) involvement on SMA Management Board. (Rotated involvement)
4. Intra/Intra Community Information Exchange.	4.Equitable participation of community members in policy and decision-making.	4.SMA management objective are made more accessible to community members.	4.Forums to facilitate community participation in the management of the SMA are created.	4.Community Steering Committees should be created and comprised of family representatives.
5. Intra/Intra Community Information Exchange.	5.Equitable participation of community members in policy and decision-making.	5.Local ecological knowledge is given an equitable role in management and planning decisions.	5.Traditional ecological knowledge is used to inform management and planning objectives.	5.Implement a consultation program with community trapline holders.

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