



Ministry for the
Environment
Manatū Mō Te Taiao


Using the Cultural Health Index:

How to assess the health of streams and waterways

Te whakamahi i te Kuputohu Hauora Ahurea:

Me pēhea te arotake i te hauora o ngā pūkaki
me ngā awa wai





The purpose of *Using the Cultural Health Index: How to assess the health of streams and waterways* is to explain how the Cultural Health Index can be used. This document therefore does not describe the research that led to the development of the Cultural Health Index. This user guide should be read alongside the reports describing the development of the Cultural Health Index which are referenced in Appendix 8 on page 53.

Published in February 2006 by the
Ministry for the Environment
Manatū Mō Te Taiao
PO Box 10-362, Wellington, New Zealand

ISBN: 0-478-25949-2
ME number: 711

This document is available on the Ministry for the Environment's website:
www.mfe.govt.nz

Other publications in this series include:

*A Cultural Health Index for Streams and Waterways:
Indicators for recognising and expressing Māori values.* June 2003.

*A Cultural Health Index for Streams and Waterways:
A tool for nationwide use.* February 2006.

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Chapter page photo: Museum of New Zealand Te Papa Tongarewa (1.004223)

We are indebted to many people whose contribution made the development of the Cultural Health Index possible. The reward for their involvement is a new tool that holds much potential for promoting the input and participation of Māori in natural resource management. In particular, Colin Townsend has provided ongoing advice about study design, analysis and documentation throughout the study. It is hard to see how this project would have progressed to where it is without Colin's support and direction.

Acknowledgements and thanks also to:

University of Otago Stream Team

Professor Colin Townsend

Dev Ngogi

Chris Arbuckle

Christoph Matthaei

The coordinators of our fieldwork

Dr Terry Broad who, aside from being a good friend, was the coordinator for part of the Taieri and Kakaunui fieldwork.

Isaac Russell undertook interviews with members of Te Runanga o Arowhenua and coordinated the Ashburton fieldwork. Remote-controlling a project from a distance is difficult but Isaac made sure the project progressed without incident.

Jenny Mauger undertook interviews with whānau living in the Tukituki catchment and whānau who whakapapa to the Tukituki. Jenny also coordinated the fieldwork.

Other fieldworkers

Rose Clucas – Rose has been involved in some capacity through stages 1, 2 and 3 of this project. Her mahi is valued but her friendship is valued more.

Shannon Crow – helped with the MCI scores for the sites.

Our Runanga Stream Teams

Te Runanga Otakou

Te Runanga o Moeraki

Te Runanga o Arowhenua

Members from Ngāti Kahungunu

Ngāti Kahungunu – For supporting the project and getting us underway, we thank Ngahiwi Taimoana.

Te Runanga o Ngāi Tahu – Linda Constable, Bob Penter, David O'Connell

Hawke's Bay Regional Council – Brett Stanfield was instrumental in helping us choose the sites within the Tukituki and then providing the stream health data that was held by the Hawke's Bay Regional Council.

Environment Canterbury – Adrian Meridith made a valuable contribution identifying the sites in the Hakatere, collecting invertebrate samples for determining MCIs and sampling fish at all sites. His support was unstinting and advice given freely. We appreciated the help.

Ministry for the Environment

For believing our project was worth supporting and providing the resources that enabled us to deliver the Cultural Health Index for streams we are most grateful to those involved from the Ministry for the Environment.

Finally, thanks to all those who agreed to be interviewed. A special thanks must then go to those who took part in the training day and then the field assessments. Without the data from their assessments this study could not have been completed.

Gail Tipa and Laurel Teirney

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Why a Cultural Health Index?

He Aha te Take o te Kuputohu Hauora Ahurea?

Healthy waterways have always been prized by tangata whenua. Ensuring the mauri of the waterway is not diminished, gathering mahinga kai for sustenance and maintaining the mana of the tribe are all fundamental cultural values. As the country was settled, the kaitiakitanga role of tangata whenua was downgraded.

More recently, the right of tangata whenua to take part in managing freshwater resources has been formally recognised and legislated for.¹ The issue now is to find meaningful ways of incorporating cultural perspectives and values into current water management decision making.

The challenge for both Māori and resource managers is how to satisfy these obligations and expectations in the absence of knowledge, tools and processes that provide resource managers with access to a Māori perspective. Without these, resource managers will have trouble incorporating Māori values in the planning and application of environmental management and working in partnership with the iwi and hapū who share a responsibility for the areas in question.

¹ The relationship Māori have with the environment is referred to in Part 2 of the Resource Management Act, particularly sections 5, 6(e), 7(a) and 8. Here resource management agencies are required to recognise and provide for the culture and traditions of Māori relating to ancestral lands, water, sites, waahi tapu and other taonga. They must also have particular regard to kaitiakitanga and take into account the principles of the Treaty of Waitangi. Māori expect that they will be included and will be actively involved in environmental management processes given these provisions in Part 2 of the RMA.

The Cultural Health Index is such a tool. Based on cultural values and knowledge, the index provides a means by which iwi can communicate with water managers in a way that can be understood and integrated into resource management processes.

The Cultural Health Index (CHI) was developed to help Māori participate meaningfully in the management of freshwater – specifically stream health. The Cultural Health Index aims to achieve two main goals:

1. **To provide a way for Māori to take an active role in managing freshwater resources.** The index does this by providing a framework for Māori to apply traditional methods and perspectives in assessing the overall health of waterways in their area.
2. **To provide an opportunity for resource management agencies to discuss and incorporate Māori perspectives and values for stream health in management decisions.** The CHI recognises and expresses Māori values and links this cultural knowledge to western scientific methods in a way that satisfies the needs of iwi/hapū and resource managers.

What is the Cultural Health Index?

The CHI is a tool that Māori can use to assess and manage waterways in their area. It is an index that allows iwi/hapū to assess the cultural and biological health of a stream or catchment of their choosing. These guidelines outline how to identify areas that need to be evaluated and how to set the programme up. They then direct how to collect data and analyse it so that changes at a site are identified and the site can be restored or enhanced if necessary. The CHI can also be used to monitor changes after restoration work has been carried out at a stream site.

All aspects of the CHI are grounded in an iwi perspective of stream health and apply cultural values determined by the iwi/hapū.



Four team members discuss the health of a stream site in their catchment

How does the Cultural Health Index work?

The CHI is made up of three linked components. Each component is assessed separately by the iwi/hapū and then all three are combined to provide a cultural health measure. Combining the three components – status of the site, mahinga kai values and stream health – gives a comprehensive assessment of the cultural health of the river site.

Component 1 – Site status

Site status is a statement of whether or not the site is an area of traditional significance to tangata whenua. The status of the site can be assigned by tangata whenua independently of the on-site assessment of the stream. A traditional site is assigned an **A**, a non-traditional site a **B**.

A second measure making up the site status is an evaluation of whether tangata whenua would return to the site in future. **1** is assigned if tangata would return to the site, **0** if not.

Component 2 – Mahinga kai

The second component of the CHI allows the mahinga kai values of a site to be evaluated and expressed. Examining mahinga kai values recognises that the mauri of a waterway can be tangibly represented by physical characteristics, indigenous plants and animals, productive capacity and whether mahinga kai is suitable for cultural use.

The mahinga kai measure is made up of four elements:

1. Identification of mahinga kai species present at the site. The productive capacity of a site includes the ability of the waterway to support mahinga kai species.
2. Comparison between the species present today and the traditional mahinga kai sourced from the site.
3. Assessment of access to the site. Mahinga kai implies that tangata whenua have physical and legal access to the resources they want to gather.
4. Assessment of whether tangata whenua would return to the site in the future as they did in the past.

The four mahinga kai elements are then combined to give a single mahinga kai measure between 1–5.

Component 3 – Cultural stream health

The cultural stream health measure is made up of an assessment of eight individual stream health indicators. These indicators result from research carried out in four catchments across New Zealand where the CHI was developed. Tangata whenua identified a list of indicators that made up overall cultural stream health. At stream sites each of the indicators were assessed, as well as the overall stream health. Of the tested indicators, eight were found to best describe how tangata whenua assess overall stream health. Together, the eight indicators make for a robust cultural stream health measure.

The following descriptions of the indicators show how each indicator can impact on stream health.

1. **Catchment land use** – relates to the land use or land cover in the wider catchment that can be seen from the site being assessed. Heavily used land can impact on stream health.
2. **Riparian vegetation** – is the vegetation, indigenous or exotic, that is visible along the margins (100m either side) of the waterway. A lack of vegetation along the margins can impact on stream health.
3. **Use of the riparian margin** – is the extent the margins of a stream are being used. Heavy use of the margins can impact on stream health.
4. **Riverbed condition/sediment** – the state of the riverbed can be assessed by the amount of sediment that has built up. Sediment impacts on the habitat of invertebrates ('bugs on the bottom') – a critical source of food for many stream inhabitants.
5. **Channel modification** – refers to the river channel shape and whether that has been modified by work in the channel or other similar types of activities such as gravel abstraction. A modified stream channel can impact on stream health.
6. **Flow and habitat variety** – refers to how variable the rate of flow is in the river. It also examines what variety of flow-related habitats such as pools, runs and rapids are present. Little or no current and a lack of flow-related habitat variety can impact on stream health.
7. **Water clarity** – should water clarity be low the stream might be carrying sediment or some form of effluent that can impact on stream health.
8. **Water quality** – is the most important indicator of cultural stream health. Degraded water might be discoloured and carry films and scum, all of which impact on stream health.

Assessments of the eight indicators are combined for each site to give a single measure of cultural stream health between 1–5.

This measure provides a reliable appraisal of the cultural health of the stream, and the individual indicators provide detail about features which might be responsible for maintaining or downgrading stream health. This information can be very helpful in deciding the most effective management action to improve stream health.

Cultural Health Index score

The overall Cultural Health Index score is made up of the three linked components – site status, mahinga kai and stream health.

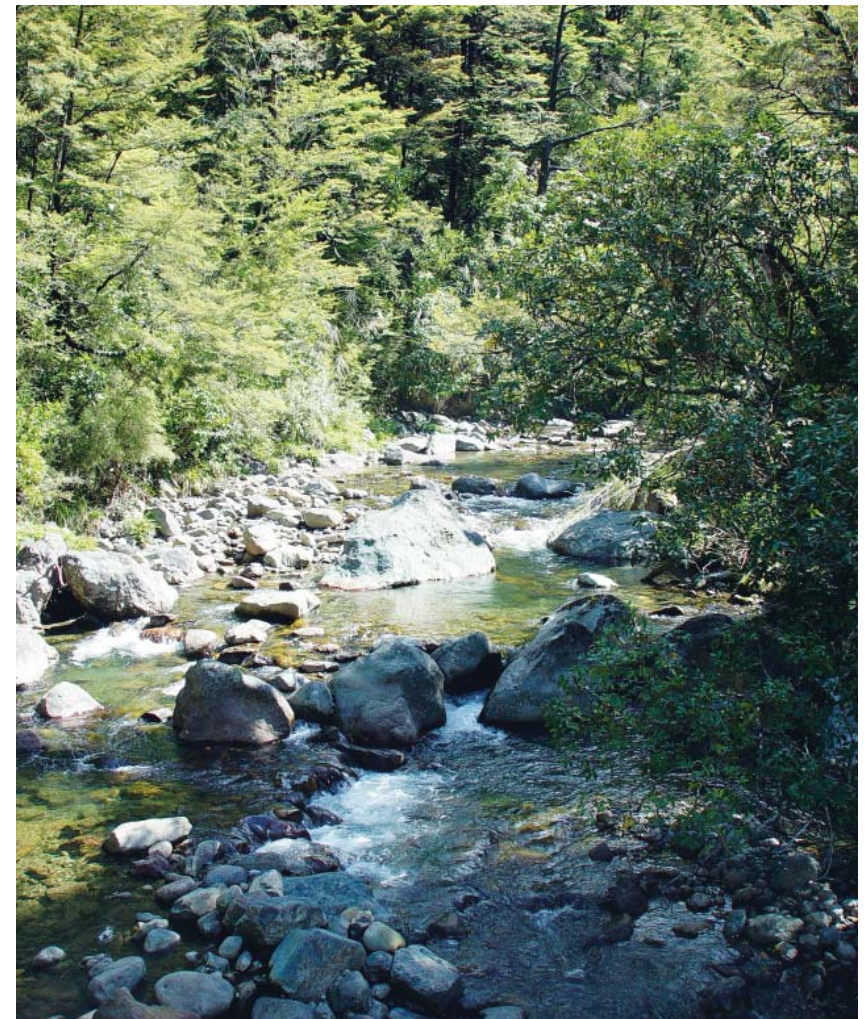
When the CHI is put together for a specific site the score is presented in the form:

A-1/3.25/4.87

Component 1: Site status	Component 2: Mahinga kai measure	Component 3: Stream health measure
A-1	3.25	4.87

This example is the CHI score for Bowyers Stream (Sharplin Falls) on the Hakatere (Ashburton) River.

The CHI score for Sharplin Falls describes a site of traditional significance that tangata whenua will return to / the mahinga kai values are above average / and the overall health of the stream is exceptionally high. The Sharplin Falls site was one of the best in the entire study of 107 stream sites.



Bowyers Stream (Sharplin Falls)

Where was the CHI developed?

The Cultural Health Index was developed from research undertaken on the Taieri, Kakaunui, Hakatere (Ashburton) and Tukituki rivers. Two iwi (Ngāi Tahu and Ngāti Kahungunu) were involved in identifying indicators and undertaking field assessments.

The Taieri and Kakaunui rivers within the Ngāi Tahu rohe and the Tukituki river in the rohe of Ngāti Kahungunu are all single channel, rain-fed rivers. The Hakatere in the Ngāi Tahu rohe is a braided, rain and snow-fed river.

This research was supported by the Ministry for the Environment's Environmental Performance Indicators Programme. Under this programme the Ministry worked to develop environmental indicators that would express Māori values for the environment and their relationships with it.

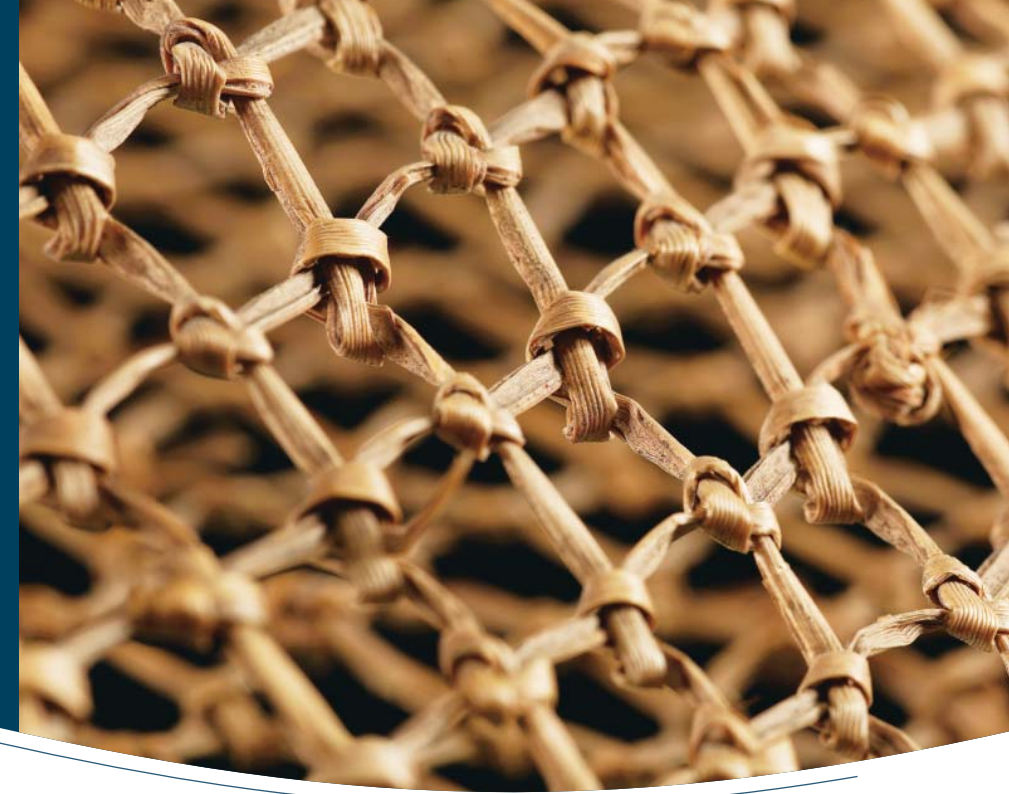


*Two hāpu members assessing Three O'clock Stream in the Taieri Catchment.
The CHI score was B-0/1.25/β.55.*

Why Assess the Health of Waterways?

He Aha te Take o te Arotake i te Hauora o Ngā Awa Wai?

Water is fundamentally significant to tangata whenua, and it is critical that the health of waterways can be evaluated. The CHI enables tangata whenua to assess the overall health of freshwater streams and rivers and collect data that is specific to cultural values such as mauri, mahinga kai and kaitiakitanga.



The CHI provides information that can be crucial to tangata whenua. It can be used as the basis for discussions between tangata whenua and district and regional councils. These resource management agencies will receive an overall CHI score for each site – such as A-0/2.1/4.2 – which will give them an indication of the status of the site, its mahinga kai values and its cultural stream health. To appreciate the detail within the CHI scores and therefore the issues in greater detail, resource managers and tangata whenua need to work together.

Tangata whenua will have this score as well as all the data collected at the site, including an inventory of mahinga kai species. By analysing the individual scores for each of the factors that make up the index, tangata whenua will be able to diagnose issues, decide on priorities and devise remedial actions necessary to the restoration or enhancement of the cultural values of the site. The CHI will allow them to monitor changes and improvements over time.

The CHI can be used as a tool to address questions such as:

How healthy are the streams and rivers in our rohe?

How can we be more involved in the management of our river? Being able to monitor the health of the streams in an entire catchment – ki uta ki tai (mountains to the sea) using our methods is an important part of kaitiakitanga for us.

How have our rivers, and the way we use them, changed over time?

How can we create a baseline so that we can detect any future changes in our stream/s?

How can we measure the changes that we're seeing in our river?

How can we talk about these changes with councils in a way that is meaningful for both of us?

How can we make the council aware of sites that are most significant to us?

What effects are different land uses having on our mahinga kai?

How do activities approved under resource consents affect our river and our mahinga kai gathering areas?

We need quantitative monitoring tools to support the goals we've included in our Iwi Management Plan.

We know that our river is degraded. How can we work out what we can do, together with water managers, to restore and enhance the health of our river?

How can we tell whether restoration efforts are successful?

Identifying the need for a Cultural Health Index study

The CHI is applied to a stream or specific stream sites for a particular purpose. Identifying the need for a CHI study and stating its purpose is the first step in the process.

Specific reasons for setting up a CHI study may include:

- + to carry out an overall assessment of a stream or sites along a stream
- + to carry out an assessment of existing issues within a stream that would identify problems and possible causes so that ways of managing them could be explored
- + the need to evaluate the success of restoration efforts
- + the desire to re-establish relationships with sites of significance
- + to teach rangatahi about freshwater values and get people more involved with their local stream
- + to identify priorities for inclusion in regional council resource management initiatives and ongoing monitoring programmes.



Members of Te Runanga o Moeraki training in how to use the CHI

Applying the CHI

Te Whakamahi i te CHI

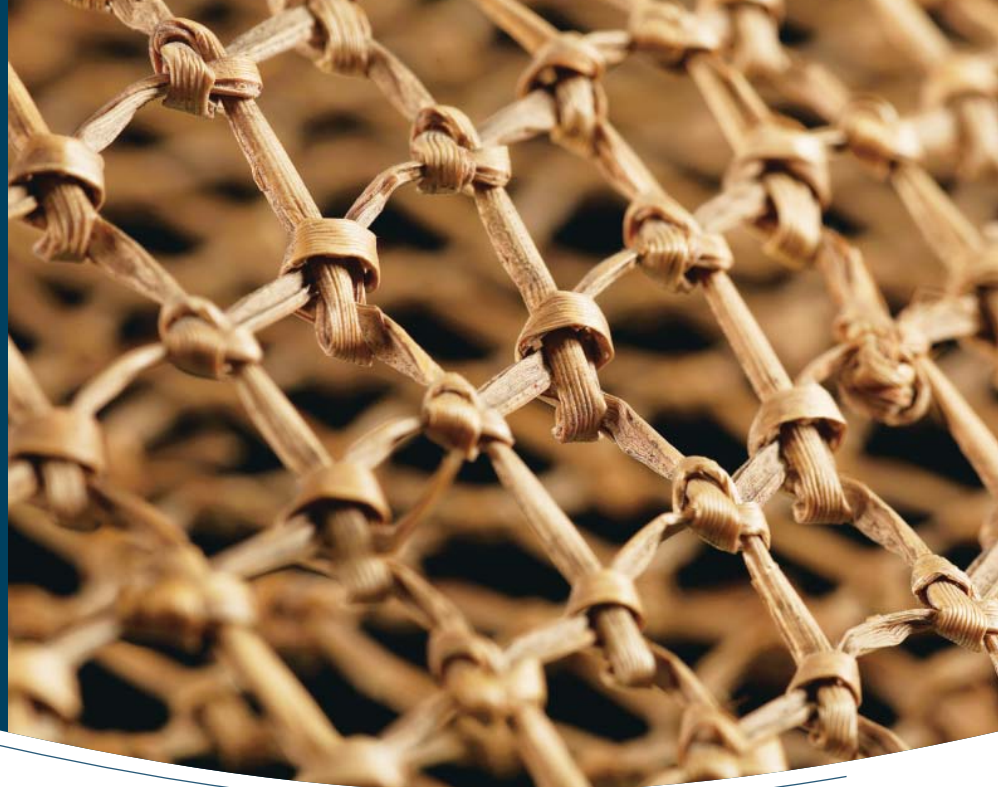
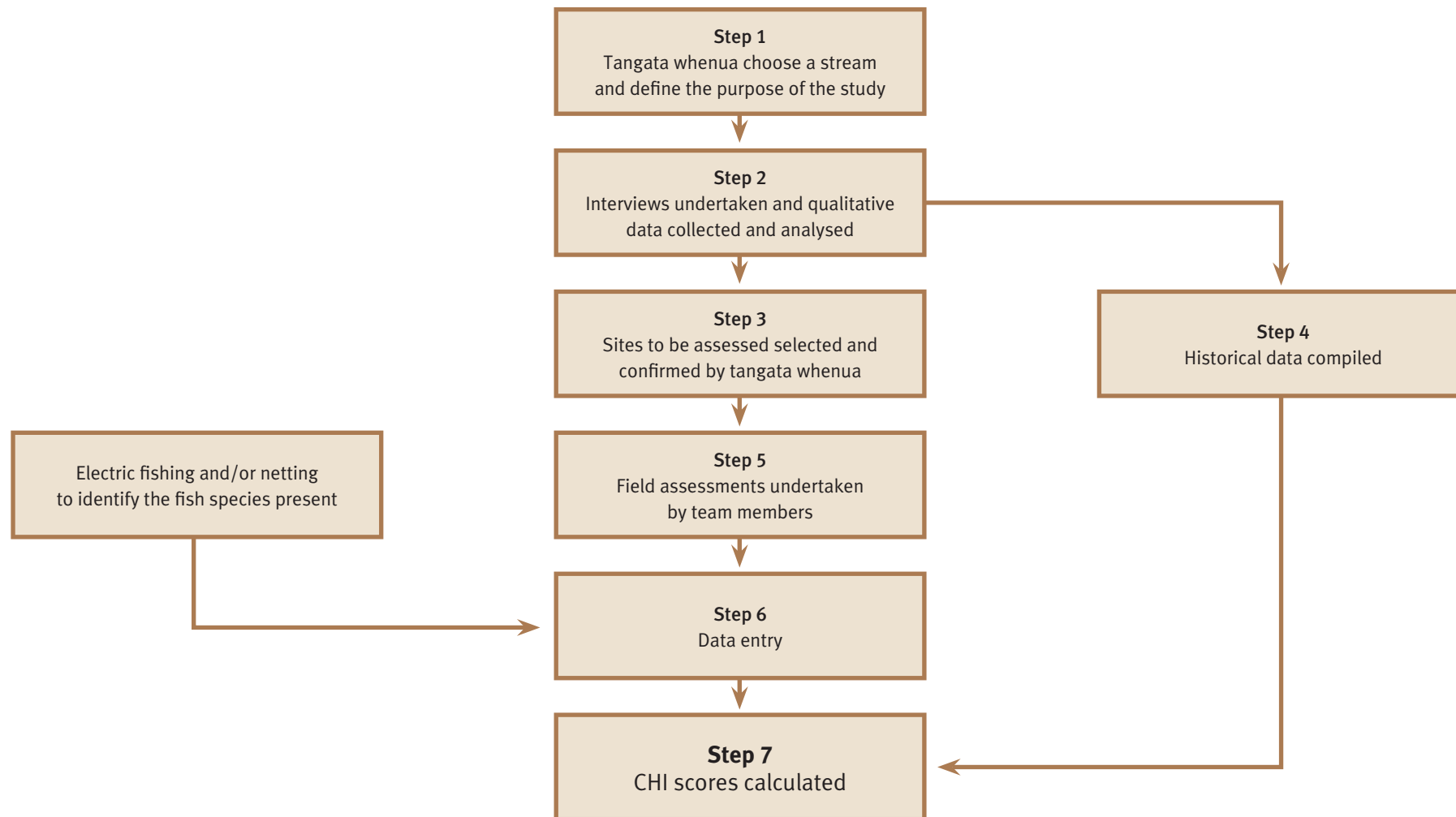


Figure 1, on the following page, sets out the steps required to successfully implement the CHI. Each of the steps is explained in the sections that follow.

Figure 1: Steps to implement the Cultural Health Index



Timeframes

Based on previous experiences, the time necessary to complete a CHI study depends on the size of the catchment and the number of sites being assessed.

It takes one hour to assess each site in the field. Given travel between sites and other factors, 4 – 5 sites might be managed in a day. This requires a dedicated and well organised team. For a whole of catchment assessment where 30 sites may need to be visited, up to seven days might be dedicated to field assessments.

If the project is being carried out on a voluntary, time-permitting basis, the timeframe will be longer.

To collect the data in the shortest time and most efficient way we recommend that a coordinator is appointed to manage the project and coordinate all aspects of the work (see the following page).

Choosing a stream

Which streams, and which sites on those streams, the Cultural Health Index will be applied to will be determined by the purpose of assessing streams or a stream reach.

The CHI has been designed so that it can be reliably applied throughout a catchment on streams of different sizes and types (eg. rain-fed, spring-fed, snow-fed, lowland, highland, braided etc). It is also a reliable measure for streams in catchments where land use varies from indigenous forest, planted forest, tussock, grazed pasture, scrub and bare ground.

This means that tangata whenua can apply the CHI in any stream they have chosen to study.

Tangata whenua will need to agree on which sites are to be assessed and those who may be representing tangata whenua will need the appropriate mandate. An early indication of who is interested in being involved will be useful for longer-term planning and specifically for setting up the project team.

Tangata whenua will need to identify:

- + values associated with the river
- + traditional sites along the river
- + traditional uses of the river
- + important qualities of the river.

The knowledge and experience of tangata whenua will be critical to the success of the CHI study.

Appointing a coordinator

Managing the logistics of a CHI study is critical to its success. A skilled coordinator will make all the difference to the outcomes. One area of the study that would particularly benefit from the attention of a single person is the data analysis phase. It is recommended that the task of calculating the CHI scores be given to a single person – the coordinator.

When considering who to appoint as coordinator, the following skills are worth seeking:

- + experience in conducting interviews
- + ability to establish and maintain relationships at the grass roots level
- + credibility with tangata whenua
- + project management expertise
- + experience and ability in analysing qualitative data.

The coordinator should be appointed by the tangata whenua. The coordinator's role includes:

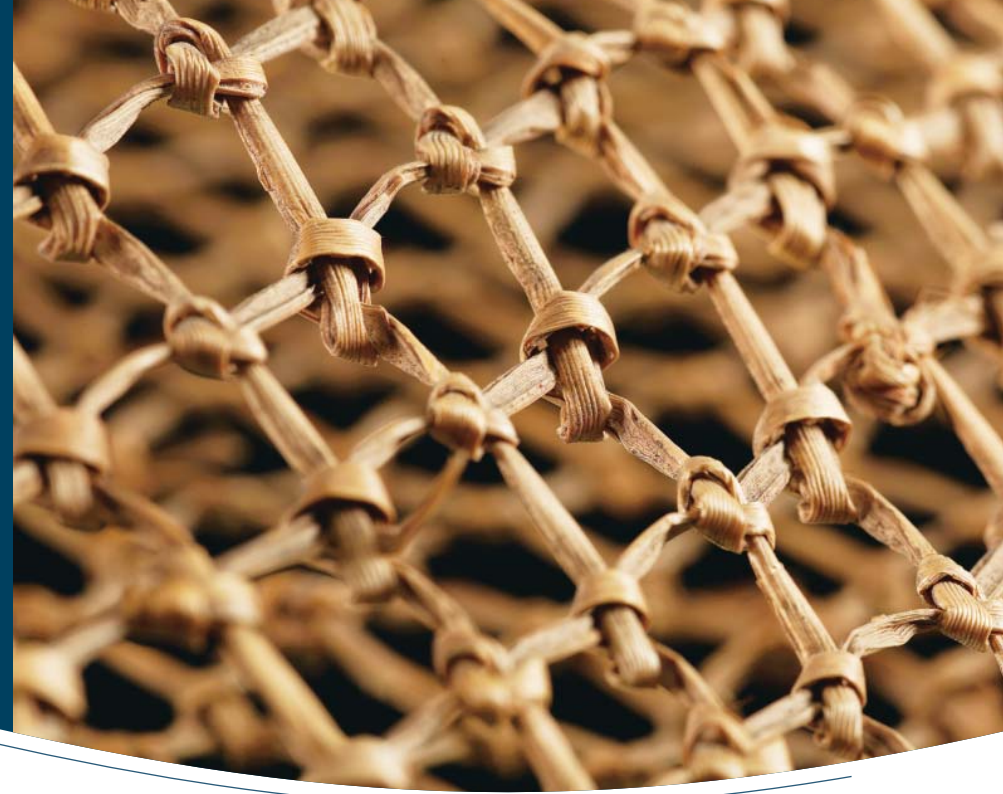
- + managing the interview process and conducting interviews
- + working with tangata whenua to bring the team together
- + organising the training of the team
- + organising the field work and all the associated logistics
- + analysing the data and calculating the CHI scores
- + being involved in any follow up work that results from CHI monitoring.



A coordinator and team having a break from monitoring in the field.

The Interview Process

Te Hātepe Uiuitanga



Interviews with tangata whenua are an important and effective way of gathering specialist knowledge of the waterways being studied.

The purpose of these interviews is threefold:

- + to identify sites of traditional significance
- + to identify why sites were valued and how they have been used by tangata whenua
- + to identify how sites and the uses of them have changed over time.

The tangata whenua will identify people with the knowledge and right to speak about the river being studied. These are the individuals that the coordinator would interview at the start of the project. Ideally those interviewed would include:

- + kaumātua
- + those who have lived near the river for a long period
- + those who live and work in the area
- + those who are active kaitiaki or engage in mahinga kai activities.

It is essential that the people interviewed have an active relationship with the waterway being studied.

It is recommended that 15 people representing tangata whenua are interviewed.

In the course of the interview the interviewer should cover the following:

1. Introduce the CHI and invite the person's participation. This can be discussed in the context of having the consent form signed – see Appendix 2. If appropriate, interviews should be taped to record details.
2. Work through the interview questions below.
3. When identifying traditional sites during the interview, a map of the river catchment will be required. It is recommended that a plastic overlay be used and sites marked on the plastic with a marker pen during the interview. The name of the site (as known by the interviewee) should be recorded. The table in Appendix 6B will be useful for this.
4. Mahinga kai sites and the species and materials gathered from the site in the past can be recorded in a table such as the one in Appendix 6B.

Recommended interview questions

1. Why is this river/stream important to you?
2. If you could protect five sites in the catchment which sites would you choose? Why would you protect them? (You will need to explain that for the purposes of the study a site is a reach of the river that can be viewed from one point during the study).
3. How was this river used in the past? What sites were used?
4. Can you still use each of these sites today?
5. How is this river used today? What sites are still used?
6. What mahinga kai sites did you use in the past in this river/stream? What was gathered from these areas? What mahinga kai sites do you still use today? What is gathered from these areas?
7. For each species identified in the response to Question 6, ask the following:
 - + How important was the species in the past?
 - + How abundant was the species in the past (relative assessment)?
 - + What was it used for in the past?

8. What changes have taken place within the catchment that have affected your traditional sites?
9. What are the main changes you have seen in this river/stream over the years? The following may be useful prompts:
 - + catchment land use
 - + river banks
 - + river channel
 - + flow
 - + water quality
 - + river mouth.

Interviews should be informal in nature, carried out in a conversational style and free of jargon or technical language. Each interview should last no more than an hour and a half (it may take less but should never be longer).

Organising the interview data

After the interviews have been carried out, the following steps need to be taken to organise the interview data:

1. Collect the taped interviews together, along with the transcripts of the tape or detailed notes if the interview wasn't taped.
2. Produce a list of the sites that interviewees want to see protected.
3. From the plastic overlays transfer the sites onto one base map. Map references should be recorded for each site. The table in Appendix 6B will be useful for bringing this information together.
4. Compile the interview data received about mahinga kai sites and the various species or material that was/is gathered there. The table in Appendix 6B will help with this.

Selecting Sites

Te Kōwhiri Papanga

The CHI is a credible measure of stream health. It gives reliable results across all stream sizes and stream types, from headwater streams to the lower reaches of the main stream. In cultural terms, this means that you can choose sites from any catchment and any part of a catchment consistent with the ki uta ki tai (mountains to the sea) philosophy.

You can choose:

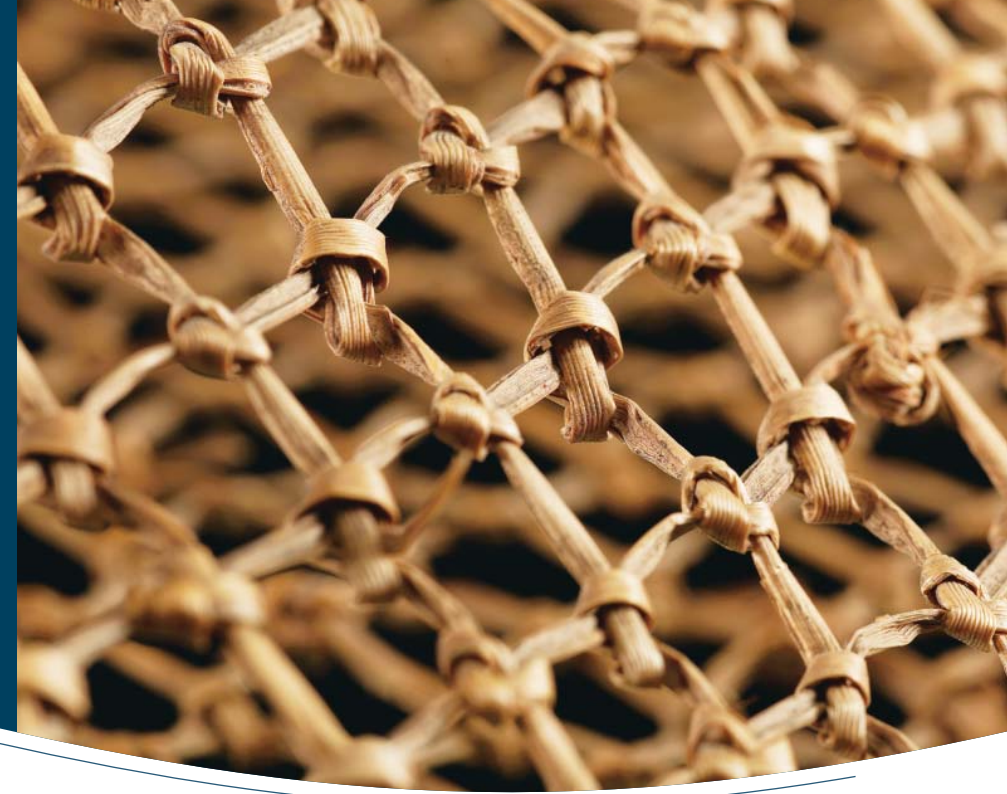
- + the smallest or headwater streams
- + medium-sized streams in the middle reaches which may be tributaries or mainstream
- + larger streams in the lower reaches which may be major tributaries or mainstream.

The number of sites selected and the number of assessments will depend on the purpose of the assessment.

The following examples are a guide:

Assessing the cultural health of streams within a whole catchment

For the Taieri, Hakatere and Tukituki River CHI studies, 30 sites were selected so as to include traditional sites, small, medium and large stream sites and sites in a range of land uses. For the smaller Kakaunui River 18 stream sites were assessed. Repeat assessments at one to two yearly intervals should be adequate to monitor changes in cultural stream health.



Evaluating the cultural health of selected traditional sites

The number of traditional sites and how important each is to tangata whenua will determine how many stream sites to include in a study. These may only need to be assessed once if the purpose is to establish the cultural health of traditional sites.

Treating a degraded traditional site and monitoring improvements

If assessments reveal degraded sites, tangata whenua might decide to undertake improvements or approach the regional council to help improve the quality of chosen traditional sites. Sites that have been treated will need to be monitored at regular intervals to find out whether improvements are taking place. How often follow up monitoring needs to be carried out can be based on how soon improvements are expected. To be sure that the treatment is causing improvements rather than some other feature, sites upstream and downstream will also need to be monitored.

Once the sites have been selected and agreed, the project coordinator should visit each site to confirm:

- + the exact map reference (using a GPS location device)
- + the site is still part of the river system and has not been diverted, drained or destroyed
- + the site is accessible for the field team members. A vital aspect of this step is ensuring the landowners are informed and comfortable with access.

During this initial visit, prepare a description of the site and take photos of the upstream and downstream views of the river from the site.

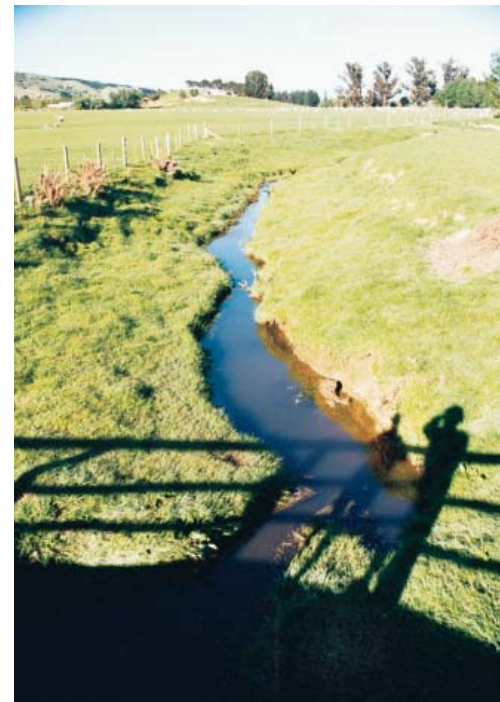
At this time it might be useful to think about how to introduce the site to the field team during their training and orientation before executing the study. You might like to consider:

- + the location of a suitable vantage point for the best views
- + the best approach (upstream, downstream, overland) remembering the different physical abilities of the team members. It is important that this approach is consistently taken throughout the study.

- + that the way the site is approached and described may affect judgements made on the reporting form
- + possible access problems (legal and physical) around the site.

Once every site has been visited and canvassed, a plan can be made for visiting all the sites. Think about vehicles; travel time; access (legal access and physical access); equipment that will be needed; food and drink for the team; and other relevant logistics.

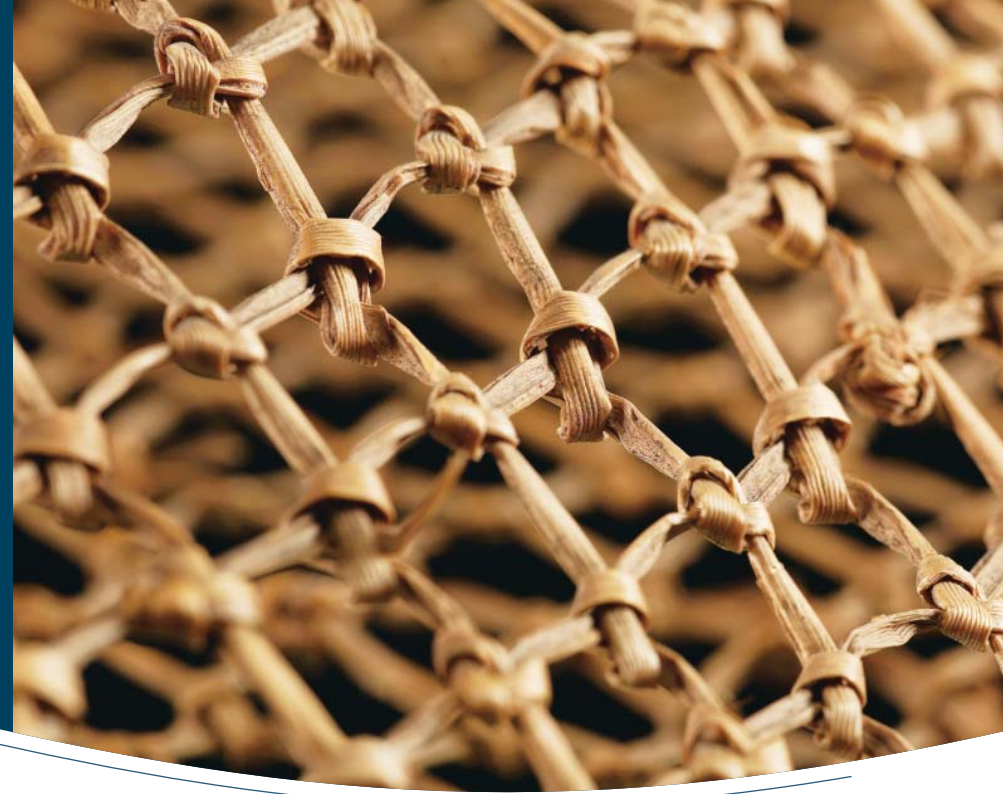
It is recommended that you consider health and safety issues. All team members need to be briefed on health and safety before fieldwork actually starts.



Evaluating a traditional stream site from the vantage point of the bridge above

The Team

Te Kāhui



A field team will be needed to apply the CHI to your chosen stream. A team of five or six members is recommended.

Choosing the team

It is for tangata whenua to appoint the team and support them as they do the work required to monitor the health of the waterway. The chosen coordinator will have a key role in helping bring the team together.

Here are some points to consider when building a field team:

- + Team members should have a strong connection with the area being assessed, especially an appreciation of rivers and streams within the rohe, including the kind of changes that have taken place over time.
- + An understanding of cultural uses, in particular knowledge about mahinga kai (plants, birds and fish) associated with streams will be very important. This knowledge needs to be available to the team but may only be held by one or two of the team members.

- + It is important that there is consistent involvement throughout the study. Team members need to be able to commit themselves and their time and energy for the duration of the study. Each site takes approximately one hour to view and up to five sites can be visited each day depending on travel between sites. If, for instance, a whole catchment is being assessed it could take up to seven days to complete. These days are likely to be spread over a number of weeks depending on weather conditions and other commitments team members may have.
- + The inclusion and involvement of kaumātua will ensure that different life experiences and perspectives are represented and incorporated.
- + A CHI study is a learning experience and provides a learning environment. It may be appropriate to take rangatahi into the field as part of the assessment team.

Training the team

A training programme will result in the tangata whenua field team having a clear understanding of the purpose of the study and an appreciation of how their work will benefit their people. During training, team members will become familiar with the range of cultural stream health conditions they will encounter. This is achieved by having the team assess three sites (one healthy, one unhealthy and one in average condition). From this exercise team members will also gain experience in collecting data. They will become comfortable and confident in what is expected of them and in their use of equipment and their ability to accurately record what they observe. During training the team will benefit from the involvement of someone skilled and experienced in applying the CHI and its rating system to different waterways. Quality training underpins a successful team.

A training programme could usefully include the following components:

1. Introduction of the CHI: facilitated by someone experienced with using the CHI.
2. The 1–5 scoring framework: in visiting three sites team members will experience and become familiar with stream or river stretches in various states of health, ranging across the five ratings or grades, from healthy stream (5 rating) to seriously degraded stream (1 rating).
3. Familiarity with the recording form: team members will become familiar with the recording form, including the indicators that will be assessed.

Equipping the team

The team will need access to the following equipment when carrying out the fieldwork.

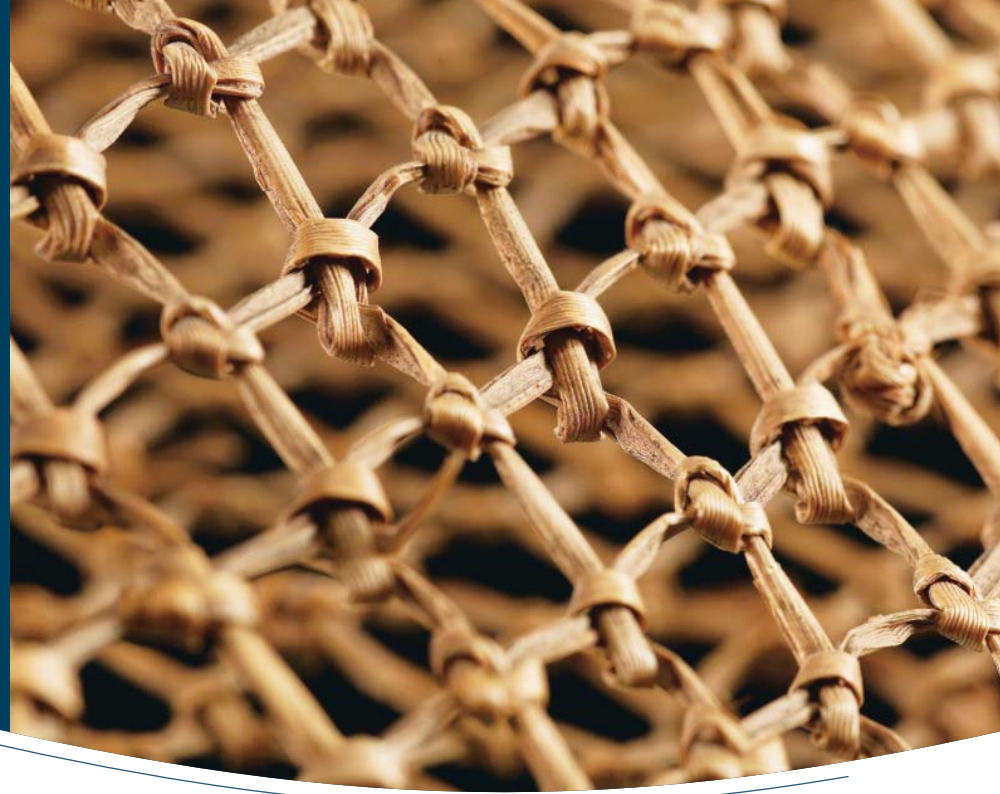
- + Assessment forms²
- + Clipboards
- + Pens
- + Camera
- + Maps and aerial photos of the area
- + GPS
- + First aid kit.

Note: Knowledge of local mahinga kai species (plants, birds and fish) needs to be available within the team.

² A field assessment form for data collected in the field is included in Appendix 4.

Dealing with Data

Te Whakamahi i ngā Raraunga



During the course of a CHI study various types of data will be collected.

The field team and its coordinator may collect all or some of the following:

- + tapes, transcripts or notes from the interviews
- + maps and plastic overlays from the interviews
- + photographs and diagrams
- + lists of traditional sites
- + mahinga kai information
- + record and assessment sheets
- + consent forms
- + various other notes, planning papers and reports.

Security of data and information

The CHI has been designed to accommodate and incorporate the local knowledge of the tangata whenua. In fact the CHI score cannot be calculated without access to this knowledge about the river being assessed. There is often, however, concern about the disclosure of this information. There are a number of ways that data and information can be handled to minimise the risk to its integrity and to safeguard its security. We stress that tangata whenua have overall responsibility for all aspects of data/information management throughout the study. This may be achieved by the tangata whenua providing oversight and direction about handling and analysing information.

Decisions about where and how to store this data will need to be made before starting the field work. It is recommended that these decisions are made by tangata whenua and recorded as part of the planning process.

For example, you may want to answer questions such as:

- + How will we protect our records from physical degradation or computer failure?
- + Where will multiple backup copies of data be kept?
- + How will members of the iwi or hapū access the information if they want to?
- + How do we ensure the ongoing care of the information when iwi/hapū members move away or pass on?
- + How widely available should the information be? Who owns it?
How do we protect sensitive information?
Do we want to be able to control access to it?
- + Do we expect councils to use this information, and if so, how?

As the study continues and data from successive time periods are added, systems need to be in place to manage the new and subsequent material.

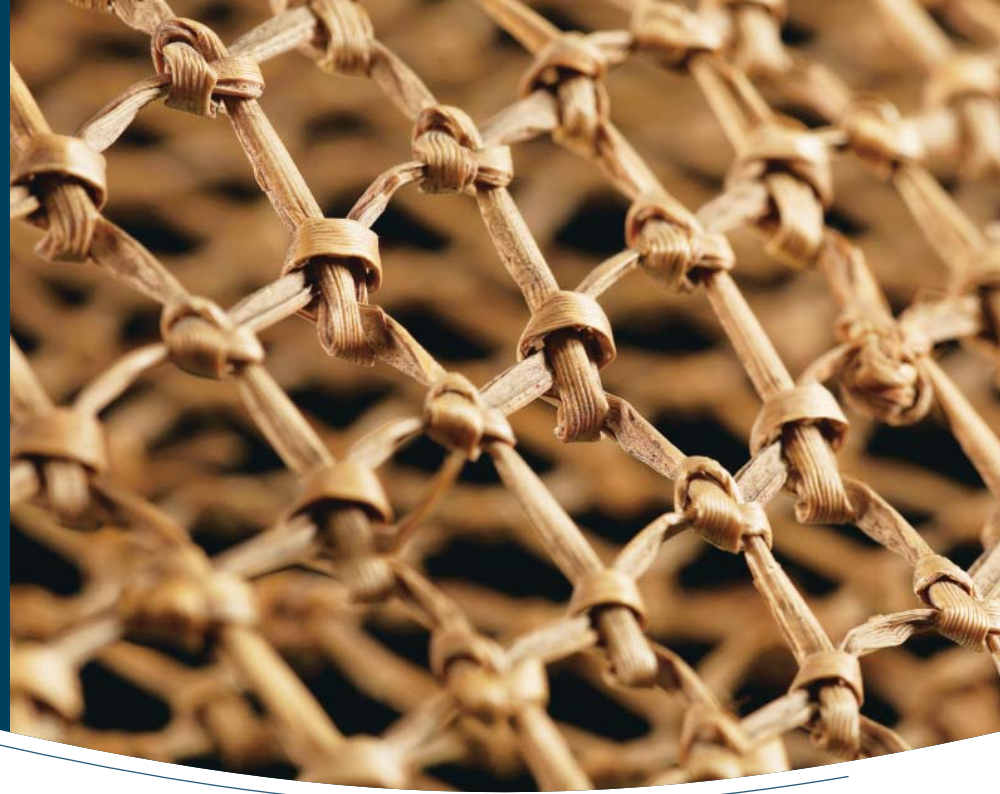
Overall there will be two types of data collected:

1. **The interview data** results from the interview process and will likely consist of tapes and their transcripts and handwritten notes taken at the time of the interview. It may also include maps and overlays where those who are interviewed have indicated sites as they were interviewed.
2. **Field assessment data** is that collected by the field team as they visit the sites and make measurements and observations. This data is likely to be recorded on the record and assessment sheets; it is more likely to be numeric or descriptive.

A software program has also been developed that can be used to record the data you collect and to prepare reports. The software is called Takiwā and is available on the Ngāi Tahu website at www.ngaitahu.iwi.nz by typing 'Takiwa' in the search box.

In the Field

Kei Roto i te Hapori



When applying the CHI in the field, members of the team will visit selected sites in a catchment and look over a reach of the waterway from one point. The field team will also walk along the river bank and view the river upstream and downstream from the selected site, visually assessing the health of the site. While they are doing this they will be filling in an assessment form and recording their observations according to the questions on the form.

If the preparatory work has been done well, the fieldwork should run smoothly. It will take approximately one hour to view the site and complete the assessment form.

Once at the site the coordinator needs to:

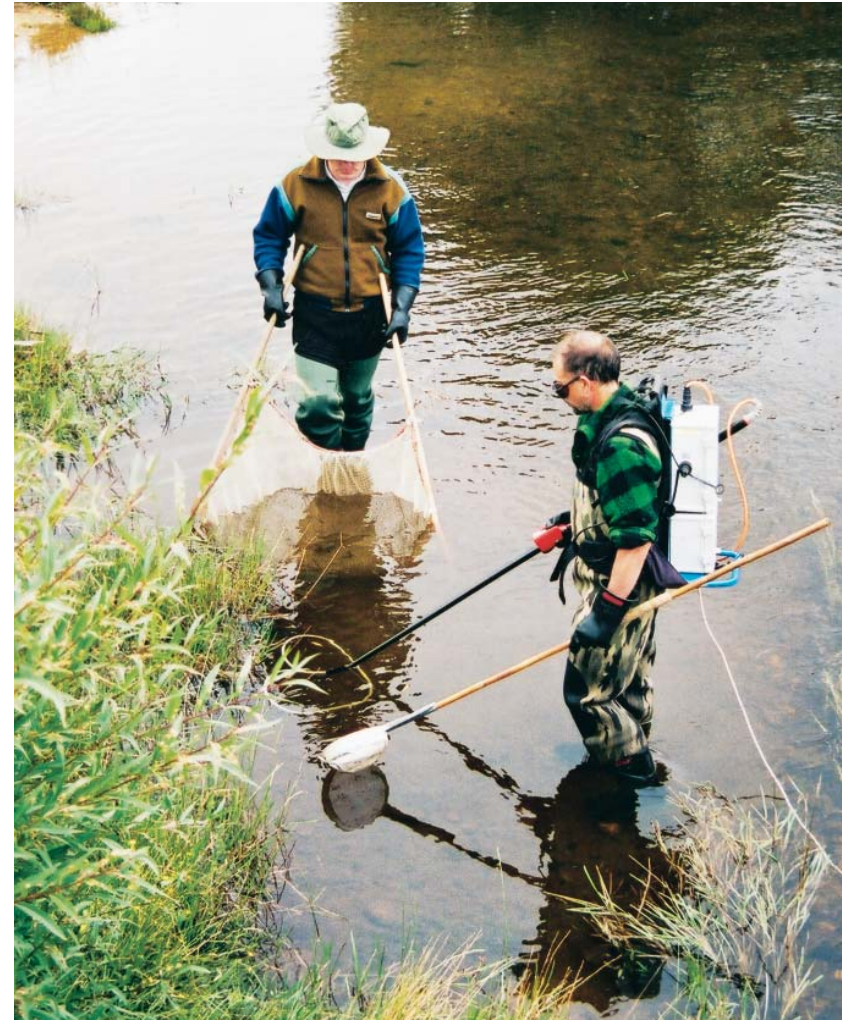
1. Keep instructions clear and interpretation to a minimum so as not to influence perception or scoring.
2. Assign each individual a number with which to label their assessment form at each site. It is important that they use the same number for the duration of the study.
3. Hand out a new recording form to each team member at each site. Each person on the team will be recording their individual assessment of the indicators listed on the recording form. For each site a form will be completed by each team member (the average for each indicator is calculated later when analysis is carried out). Each team member will complete a new form at each site.
4. The site details need to be added first (eg, the name and number of the site, the team member's number, the date etc).

5. Once the forms are complete, check them before moving on. It is often hard to recall aspects of a site after leaving it. Clarify species names, for example, on site.
6. Once checked, collect all forms from the site and store them together until data entry.
7. Before moving on from the site, get the team together for a feedback session during which members can discuss issues that arose during the recording. The coordinator can indicate the range of scores awarded and discussion can foster agreement between team members. Striving for consistency in this way is part of the ongoing nature of the team training, so it is important to have a feedback session after each site visit.

Collecting fish data

As part of the data collection for mahinga kai, it is necessary to identify the fish species present at the site. Collection of these data can take place at any stage before, during or after the field assessment is carried out.

This can be achieved by electric fishing, netting or through a combination of methods. Your regional council may have already sampled the sites that you have chosen or data may be available from the New Zealand Freshwater Fish Database managed by the National Institute of Water and Atmospheric Research (NIWA).³ Check with both your regional council and the Department of Conservation before you commit to any new fish data collection.

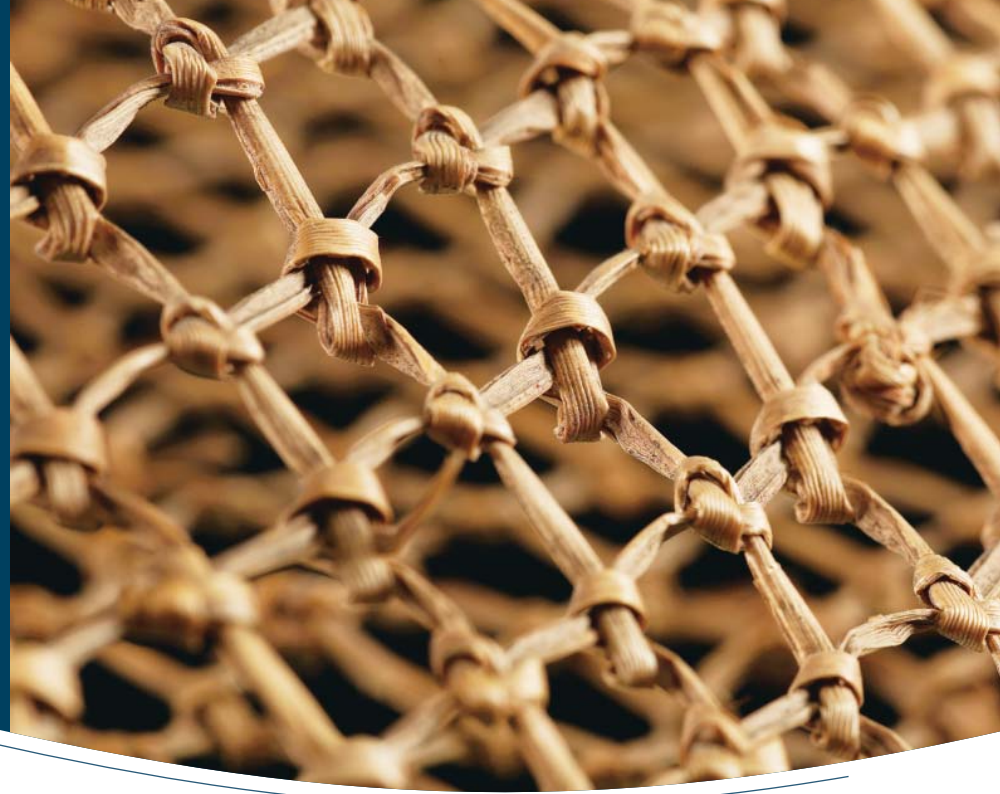


Two project members electric fishing on a tributary of the Taieri Catchment

³ How to access the NZ Freshwater Fish Database is described in Appendix 8.

Calculating your CHI Scores

Te Tātai i o Paneke CHI



Carrying out interviews and field work will produce a large amount of data. For example, if six team members have assessed thirty sites, 180 forms will need to be analysed. The coordinator should calculate the CHI scores. A worksheet which can be downloaded from the Ministry for the Environment website⁴ is one way of entering and then analysing the data. All the data needed to calculate the CHI score has either been collected as part of the interview process or can be found on the forms that have been collected from the field team.

⁴ The way the worksheet is set out is shown in Appendix 6A. To use it in calculating your CHI scores, you can download the worksheet from the Ministry for the Environment website at www.mfe.govt.nz/publications/water

Component 1 – Site status

Here the significance of the site to tangata whenua is assessed as well as the distinction between traditional and contemporary sites.

The **first question** can be answered when the sites are first selected, ie, before the fieldwork. Sites are classified as:

- A an area of traditional significance to tangata whenua; *or*
- B an area *not* recognised by tangata whenua as being of traditional importance but which has been included in the CHI study to enable the entire river to be included or other aspects to be considered (for example it could be a site monitored by the regional council).

The **second question** on the field assessment form asks whether tangata whenua would return to the site in the future. Yes (1) indicates the belief that traditional uses can be sustained.

- 1 Tangata whenua *would* return to the site and use it as it was used in the past.
- 0 Tangata whenua *would not* return to the site and use it as it was used in the past.

When answers to the two questions are collated there are four possible combinations:

A-1	A-0	B-1	B-0
This is a traditional site, that tangata whenua would return to and use as they did in the past.	This is a traditional site that tangata whenua would not return to. It would not be used in the future.	This is a site that is not of traditional significance to tangata whenua. However, they would go to the site in future.	This is a site that is not of traditional significance to tangata whenua. Further, they would not go to the site in future.

Component 2 – Mahinga kai

Here the mahinga kai values of a site are assessed – ie, the food and other resources present.

There are four parts to the mahinga kai aspect of the Index. Each of the four elements receives a score of 1 to 5. The scores are then added together and averaged to give an overall mahinga kai measure for each site.

Element 1: Identification of mahinga kai species present at the site

While in the field a collated list of plant, bird and fish species is prepared for each site. A score of 1–5 is then made, depending on the total number of species present.

To assign a 1 to 5 score for each site, you need to identify the one site in the catchment that out of all your chosen sites has the largest number of species present. The number of species at this site will affect which grading is given to all the other sites.

Refer to the table in Appendix 5 to see how the 1 to 5 scores are assigned.

Example 1

Site 27 in a catchment has a collated total of 15 species, the largest number of species present compared to all the other sites visited in the catchment.

Table 1, under ‘*Maximum 15*’, shows the scores that will be made for each site in the catchment, according to how many species are present:

Maximum 15		
1-3	species present scores	1
4-7	species present scores	2
8-10	species present scores	3
11-14	species present scores	4
15+	species present scores	5

Site 27 (15 species) gets a score of 5, site 28 (9 species) gets a score of 3, site 29 (5 species) scores 2.

Example 2

On a different river, site 12 has 9 different species, the highest number of species at a site in that catchment.

Under the column 'Maximum 9' in Table 1, the scores for sites will be:

Maximum 9		
1-2	species present scores	1
3-4	species present scores	2
5-6	species present scores	3
7-8	species present scores	4
9+	species present scores	5

Site 12 (9 species) gets a score of 5, site 13 (4 species) scores a 2, site 14 (7 species) scores 4.

Element 2: Comparison of species present today and mahinga kai species historically sourced from the site

A score of 1 to 5 is assigned based on the number of species of traditional significance that are still present:

- 1 Non-traditional site.
- 1 None of the species sourced in the past are still present at the site.
- 2 Less than half the species sourced in the past are still present.
- 3 At least half of the species sources in the past are still present.
- 4 More than half the species sourced in the past are still present.
- 5 All species sourced in the past are still present at the site.

Element 3: Accessibility of the site

A score of either 1, 3 or 5 is given based on the legal and physical access tangata whenua have to the site:

- 1 No access to the site.
- 3 Either physical or legal barriers make access difficult.
- 5 Unimpeded easy access to the site.

Element 4: Whether tangata whenua would return to the site

A score of either 1 or 5 is given depending on whether tangata whenua would return to the site in future to use it as they did in the past to gather mahinga kai:

- 1 No, would not return to the site in future for mahinga kai gathering.
- 5 Yes, would return to the site in future for mahinga kai gathering.

The four mahinga kai elements are then averaged to produce a single mahinga kai score out of 5.

For example, the four scores for site 6 were 3, 1, 5, 5.

The total of 14 is divided by 4 to give an overall mahinga kai score of 3.5.

Component 3 – Cultural stream health

Here the health of the waterway according to eight indicators is assessed.

The eight indicators were identified from analysis of stream health data generated from all 107 sites on the Taieri, Kakaunui, Hakatere (Ashburton) and Tukituki Rivers. The method of selecting and refining the indicators is described in the technical report that was compiled to accompany these guidelines⁵.

The description of Component 3 on page 8 includes an explanation of the eight indicators and the field assessment form (Appendix 4) provides a guide to the 1–5 ratings for each indicator. Apart from this, further detail on the cultural stream health indicators and how they are rated needs to be the focus of training for the team.

All eight indicators are scored from 1 to 5 by each team member. In the analysis phase the coordinator needs to calculate the average score given by members of the team for each indicator by using the worksheet that can be downloaded from the Ministry for the Environment's website⁶.

For each indicator add all the scores together to produce a total, and then divide by how many scores there are. This produces an average score for each indicator.

For example, for *water clarity* if the six team members gave the following scores – 2, 3, 2, 3, 2, 3, 2, 2 – then the average score for water clarity would be 2.37:

Step 1. Add $2+3+2+3+2+3+2+2 = 19$

Step 2. Divide by 8 ($19 \div 8 = 2.37$).

Once average scores have been calculated for each of the eight indicators, add them together and average them to obtain the overall Cultural Stream Health Measure score.

For example, if the scores are as follows:

1.	Catchment land use	2.3
2.	Riparian vegetation	3.0
3.	Use of riparian margin	2.5
4.	Riverbed condition/sediment	4.6
5.	Channel modification	2.9
6.	Flow and habitat variety	3.6
7.	Water clarity	4.2
8.	Water quality	4.1
	Total:	27.2
	Divide 27.2 by 8 =	3.4

The Cultural Stream Health Measure score is 3.4.

⁵ Tipa and Teirney (February 2006). *A Cultural Health Index for Streams and Waterways: a tool for nationwide use*. Available at www.mfe.govt.nz/publications/water

⁶ Refer to Appendix 6A.

Overall CHI score

The overall three-part Cultural Health Index is expressed as a string, as shown in the following example.

A-0	3.5	3.4
A identifies the site as traditional	Mahinga kai score	Stream health score
0 identifies that the site will not be used in the future	1 = poor mahinga kai values	1 = poor stream health
	2.5 = average mahinga kai values	2.5 = average stream health
	5 = excellent mahinga kai values	5 = excellent stream health

Examples of analysing a Cultural Health Index score

Some examples of the CHI scores are set out below. They have been obtained for 10 sites in the Taieri, Kakaunui, Hakatere (Ashburton) and Tukituki catchments.

Stream health indicators (the third component of the index) have varied in number and nature between the rivers studied in the development of the CHI. The Taieri and Kakaunui feature five indicators, as does the Hakatere, but for the Taieri two of the five indicators are different. The stream health of the Tukituki was assessed by only two indicators. These differences are seen in the following examples of CHI scores.

In the most recent development of the Cultural Health Index these various indicators have been integrated to produce one set of eight cultural stream health indicators for national use of the CHI.⁷

⁷ The process of developing the cultural stream health indicators is described in the technical report that was compiled to accompany these guidelines. This is available on the Ministry for the Environment website at www.mfe.govt.nz/publications/water



Taieri Catchment

Site 1: McRaes Creek (B-1 / 2.69 / 4.87)

The assessment confirmed that:

- + This is not a traditional site.
- + Despite this, runanga members would return to the site.
- + Its mahinga kai values are only average.
 - + It receives an average score for access. It is accessible although it involves a significant walk.
 - + There is a reasonable range of mahinga kai species present, especially plants. However, this is a small tributary and there are not many fish species present.
 - + This is not a traditional site and therefore species sourced traditionally cannot be compared with those present today. Accordingly a 1 was assigned to this part of the mahinga kai component.
 - + It scores highly because runanga members would return to the site.
- + It scores very highly for component 3 stream health – 4.87. In fact McRaes Creek received the highest ratings of all 46 sites in the Taieri and Kakaunui catchments:

+ Catchment land use	4.6
+ Channel modification	4.75
+ Use of the riparian margin	5
+ Flow visible	5
+ Water quality	5

The slightly lower score for *catchment land* use reflects the presence of some exotic species within a native catchment. The score for *channel modification* reflects the presence of a track through the watercourse that is used by mountain bikes and motorbikes.

Site 6: Barbours Stream (B-0 / 1.3 / 3.02)

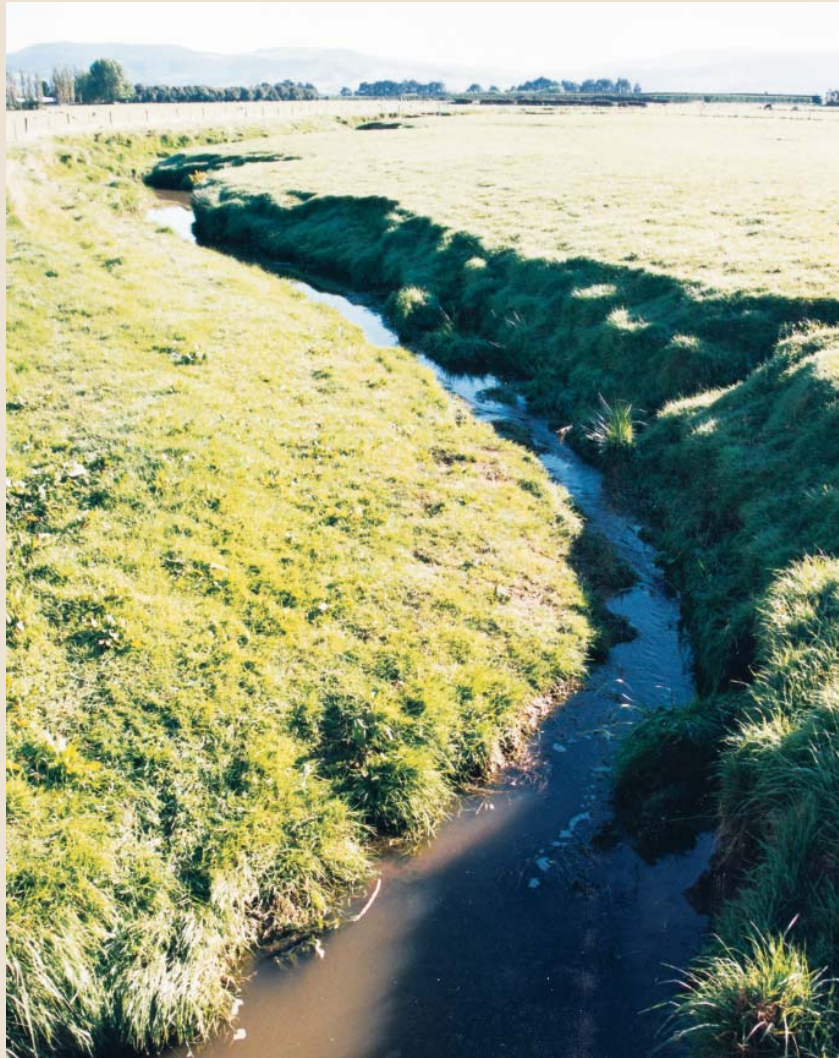
The assessment confirmed that:

- + This is not a traditional site.
- + Because of the degraded condition of the site, runanga members would not return to the site.
- + Its mahinga kai values are poor.
 - + It scores poorly for access. It was difficult for runanga members to find this site without assistance.
 - + Mahinga kai species were absent.
 - + This is not a traditional site and therefore species sourced traditionally cannot be compared with those present today. Accordingly a 1 was assigned to this part of the mahinga kai component.
 - + It only scores 1 because runanga members would not return to the site.
- + It received an average score for stream health:

+ Catchment land use	2.5
+ Channel modification	2.6
+ Use of the riparian margin	1
+ Flow visible	5
+ Water quality	4

The low scores for *catchment land use*, *river modification* and *use of the riparian margin* results from this site being heavily modified by stock. In particular, the riparian margin was considered to be in poor condition. Despite this, the flow and water quality received exceptional ratings, possibly because of the tussock in the catchment.





Site 11: Owhiro Creek (A-0 / 1.75 / 1.65)

The assessment confirmed that:

- + This is a traditional site.
- + Runanga members would not return to the site.
- + Its mahinga kai values are low.
 - + It receives a high score for access.
 - + Because the site is so modified, there is an absence of mahinga kai species, aside from eel.
 - + It scores highly because it was traditionally a significant site for eels and these are still present.
 - + It scores poorly because runanga members would not return to the site.
- + It scores very poorly for stream health, in fact it was one of the two poorest scoring sites for this component among the Taieri and Kakaunui sites:

+ Catchment land use	1
+ Channel modification	1
+ Use of the riparian margin	1
+ Flow visible	4
+ Water quality	1.25

All scores apart from a *visible flow* are very low.

Kakaunui Catchment

Site 38: Island Stream – Maheno (A-0 / 2.56 / 1.06)

The assessment confirmed that:

- + This is a traditional site.
- + Runanga members would not return to the site.
- + Its mahinga kai values are only average.
 - + It receives a high score for access. It is easily accessible.
 - + There is a limited range of mahinga kai species present.
 - + It scores highly because it was a significant eel fishery and has the highest density of eels within the Taieri and Kakaunui catchments.
 - + It scores poorly because runanga members would not return to the site.
- + It scores very poorly for stream health:

+ Catchment land use	1
+ Channel modification	1.3
+ Use of the riparian margin	1
+ Flow visible	1
+ Water quality	1

The consistently low scores for each of the indicators confirm the poor health of this site, the worst of the Taieri and Kakaunui study sites.



Hakatere Catchment

Site 1: Gentleman Smith (A-1 / 4.25 / 3.80)

The assessment confirmed that:

- + This is a traditional site.
- + Because of the healthy condition of the site, runanga members would return to the site.
- + Its mahinga kai values are exceptional.
 - + It scores highly for access. It was easy for runanga members to access this site without assistance.
 - + A reasonable range of mahinga kai species were present.
 - + This is a traditional site and all the species sourced traditionally are present today. Accordingly a 5 was assigned to this part of the mahinga kai component.
 - + It scores 5 because runanga members would return to the site in the future.
- + It received a score of 3.8 for stream health that was made up of lower scores for out of the river indicators and higher scores for in the river indicators.

+ Catchment land use	2.33
+ Channel modification	3.33
+ Water clarity	4.66
+ Riverbed condition	4.5
+ Water quality	4.16

Of the 30 sites assessed in the Hakatere, this site scored the highest for component 2 – mahinga kai values.

Site 3: Lambies Stream (B-0 / 2.0 / 3.13)

The assessment confirmed that:

- + This is not a traditional site.
- + Runanga members would not return to the site.
- + Its mahinga kai values are only average.
 - + It receives an average score for access.
 - + There is a limited range of mahinga kai species present.
 - + This is not a traditional site and therefore species sourced traditionally cannot be compared with those present today. Accordingly a 1 was assigned to this part of the mahinga kai component.
 - + It scores poorly because the majority of runanga members would not return to the site.
- + It receives above average scores for stream health:

+ Catchment land use	2.3
+ Channel modification	3.66
+ Water clarity	3.16
+ Riverbed condition	3.33
+ Water quality	3.16

Site 9: Bowyers Stream – Sharplin Falls (A-1 / 3.25 / 4.87)

The assessment confirmed that:

- + This is a traditional site.
- + Runanga members would return to the site.
- + Its mahinga kai values are above average.
 - + It receives a high score for access.
 - + Because the site is unmodified, there is a good range of mahinga kai species present.
 - + It scores poorly because it was traditionally a significant site for eels and there are no eels currently present.
 - + It scores highly because runanga members would return to the site.
- + An exceptional score was awarded for stream health:

+ Catchment land use	4.5
+ Channel modification	5
+ Water clarity	5
+ Riverbed condition	4.83
+ Water quality	5

Of the 30 sites assessed in the Hukatere catchment this site received the highest score for stream health. In fact the Sharplin Falls site was among the most highly rated streams sites in the study.

Tukituki Catchment**Site 2: Mangaomate Stream (B-1 / 2.72 / 3.75)**

The assessment confirmed that:

- + This is not a traditional site.
- + Because of the healthy condition of the site, iwi members would return to the site.
- + Its mahinga kai values are average.
 - + It scores average for access. It was easy for iwi members to access this site without assistance.
 - + A reasonable range of mahinga kai species were present.
 - + This is not a traditional site and therefore scores 1 for the traditional species indicator in the mahinga kai component.
 - + It scores 5 because iwi members would return to the site in the future.
- + It received an above average score for stream health:

+ Flow visible	3.7
+ Water quality	3.8 ⁸

⁸ See the explanation of the number of indicators on page 27.

Site 4: Unnamed tributary – Totora Hills stream (B-0 / 1.42 / 2.3)

The assessment confirmed that:

- + This is not a traditional site.
- + Because of the unhealthy condition of the site, iwi members would not return to the site.
- + Its mahinga kai values are below average.
 - + It scores average for access. It was relatively easy for iwi members to access this site without assistance.
 - + A limited range of mahinga kai species were present.
 - + This is not a traditional site and therefore scores 1 for the traditional species indicator in the mahinga kai component.
 - + It scores 1 because iwi members would not return to the site in the future.
- + It received a below average score for stream health:
 - + Flow visible 2.4
 - + Water quality 2.2

Site 5: Mangaoho Stream (B-1 / 2.62 / 4.0)

The assessment confirmed that:

- + This is not a traditional site.
- + Because of the healthy condition of the site, iwi members would return to the site.
- + Its mahinga kai values are average.
 - + It receives an average score for access.
 - + A reasonable range of mahinga kai species were present.
 - + This is not a traditional site and therefore scores 1 for the traditional species indicator in the mahinga kai component.
 - + It scores above average because iwi members would return to the site in the future.
- + It received a high score for stream health:
 - + Flow 4.1
 - + Water quality 3.9

Storing and accessing data

The data collected is for tangata whenua to manage. Applying the CHI creates a large amount of valuable information. It is important to think about how the data might be used and how to manage the information that has been collected. The data may be used to identify issues associated with a specific site and can be used to set priorities. If appropriate, the issues and priorities for management can be discussed with councils.

Note that the Takiwā software programme can be used to store the data you collect and to prepare reports. The software is available on the Ngāi Tahu website, www.ngaitahu.iwi.nz



Team members producing stream health data at a site.



Future Use of the CHI

Te Whakamahi i te CHI i Ngā Wā Ki Mua

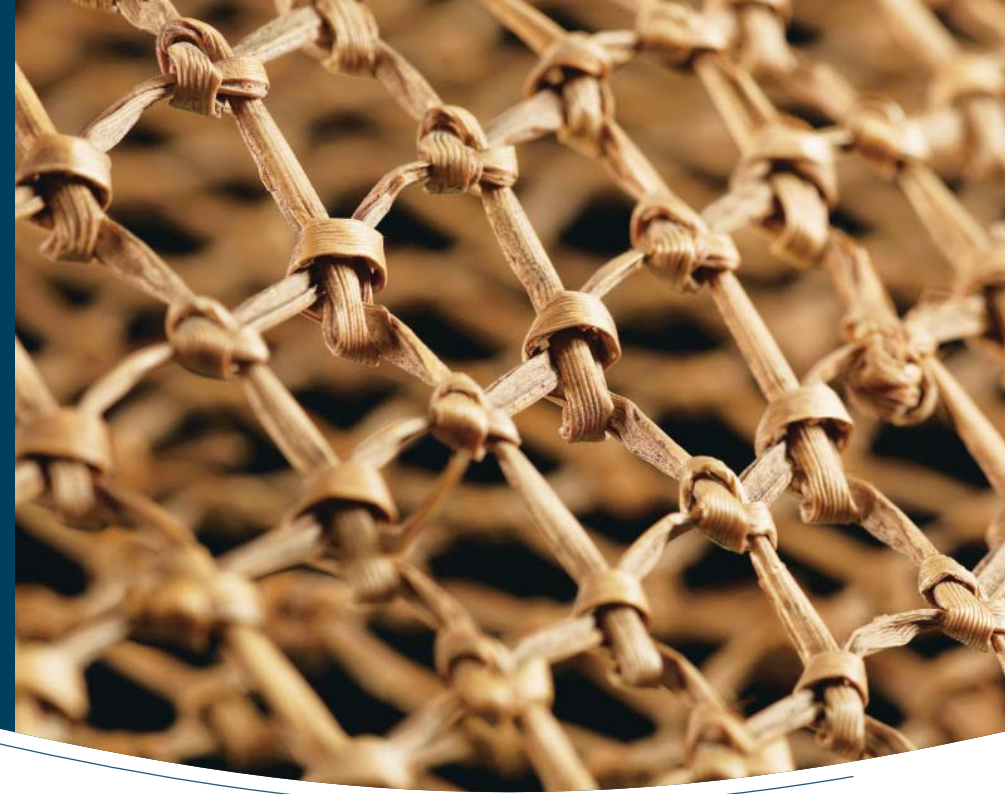
The CHI was designed for the assessment of stream health by tangata whenua who wish to exercise kaitiakitanga over their rivers and streams and work with resource managers to achieve an improvement in the health of the resource. The objective was to provide a relatively straight-forward yet reliable measurement that can be repeated at regular intervals.

Continued data gathering – ongoing monitoring

Decisions about ongoing monitoring will be determined by the purpose of applying the CHI. Usually follow-up is important. Creating a record (from both CHI scores and the associated photographic record) of cultural health over time will allow trends in the health of the streams and rivers within your rohe to be identified and monitored.

To monitor stream health over time, data must be gathered in a consistent manner and on a regular basis. It must be stored in a way that it can be easily retrieved and compared to newly gathered data.

The timing of repeat assessments is important to capture trends. Stream sites should be monitored at the same time each year and preferably during the summer when stream health is likely to be under the most pressure. If monitoring is required on an annual or two yearly basis, a monitoring plan can be developed. This will ensure that the team is ready to assess the sites at the right time of the year, as laid out in the schedule.



The ongoing use of the CHI has many benefits and can link to a range of other activities your hapū or iwi may be involved in.

Ways the CHI could be used in the future:

- + to identify sites of significance for ongoing monitoring by your hapū/iwi
- + to educate others about your sites of significance and increase recognition of these sites
- + to restore the health of degraded waterways
- + in case studies of freshwater stream and river management options
- + to monitor changes in mahinga kai resources
- + to monitor the impacts of different land use.

Ways the CHI fosters working with councils:

- + provides councils with a better understanding of the key pressures on the environment for cultural health and the state of the environment from a tangata whenua view
- + enhances tangata whenua participation in resource management
- + identifies possible changes to council resource management plans through the observations made during monitoring
- + gives early warning of problems in waterways before they become serious
- + motivates for change through documented evidence (robust data over a period of time) when monitoring shows that current approaches may not be working (eg, streams are being degraded)
- + increases the effectiveness of tangata whenua input into council policy and plan making.



A team monitoring changes in mahinga kai and stream health at a site.


Conclusion

Te Mutunga

The Cultural Health Index for Streams and Waterways is an exciting tool. Cultural Health Index results have the potential to create a meaningful connection between tangata whenua and statutory water managers (regional and district councils). Using the Cultural Health Index results for streams/sites of cultural significance or concern gives tangata whenua and water managers common ground for discussion and a better appreciation of one another's perspectives. This is likely to see the development of joint initiatives that promote the participation of tangata whenua in water management decision making and a much desired improvement in culturally significant streams and waterways.

The CHI is entirely tangata whenua based – from the identification of traditional stream sites to the choice and assessment of indicators of stream status, mahinga kai and cultural stream health. It is a very versatile tool that can be applied to streams of all different sizes and types. It is also sensitive to changes in land development within a catchment.

Despite the lack of western scientific measures corresponding to stream site status or mahinga kai, cultural stream health can be compared to other non-cultural stream health measures currently in use. The cultural stream health measure is highly correlated with other widely used stream health measures such as the Macro Invertebrate Index (MCI). The cultural stream health measure is made up of perceptions that encompass the whole catchment. In contrast the MCI is based on samples of invertebrates from the riverbed ('bugs on the bottom'). That these two very different measures produced similar results gives added confidence that the Cultural Health Index is a robust tool. Water managers have good reason to value CHI results provided by tangata whenua.

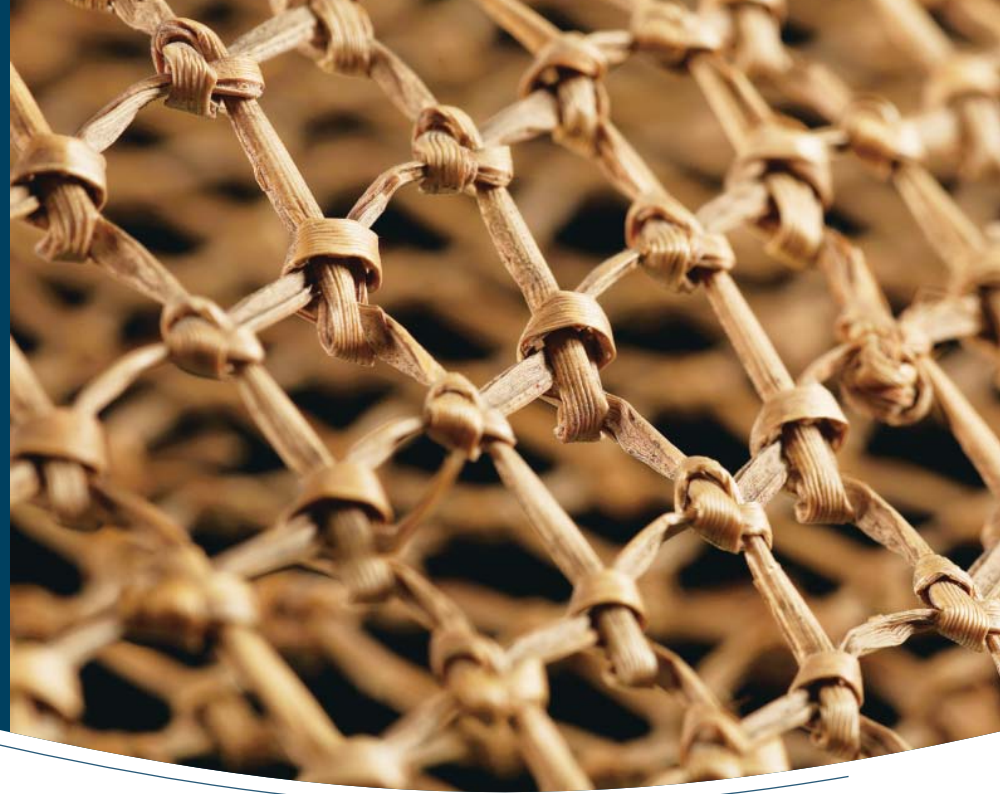


The CHI gives tangata whenua the opportunity to assess culturally significant stream sites, identify downgraded stream sites, assign priorities for management or restoration and monitor changes and improvements. It is a powerful tool that also provides a way for tangata whenua to take part in water management in a meaningful way. Indeed the CHI is primarily intended to facilitate the participation of tangata whenua in resource management.

Throughout these guidelines reference has been made to tangata whenua using the CHI results from streams and rivers of traditional significance to work with resources managers. The combination of cultural information and resource managers' statutory responsibilities can support cultural values to be recognised in a practical way, such as achieving an improvement in degraded streams of cultural importance. And finally, the CHI is proving to be a highly valued tool that builds strong, committed tangata whenua stream health teams. These teams have a vital role to play in the future improvement of cultural stream health and stream health in general.

Glossary

Papakupu



hapū	sub-tribe, extended whānau
hui a hapū	a meeting of the hapū
iwi	tribe
iwi authority	the authority that represents an iwi and which is recognised by that iwi as having authority to do so
kaitiakitanga	the exercise of guardianship
kaumātua	a respected elder within the tribe
ki uta ki tai	from the mountains to the sea
mahinga kai	food and other resources and the areas that they are sourced from or in which they grow
manawhenua	those who hold rangatiratanga for a particular area or district
mauri	the essential life force or principle; a metaphysical quality inherent in all things, both animate and inanimate

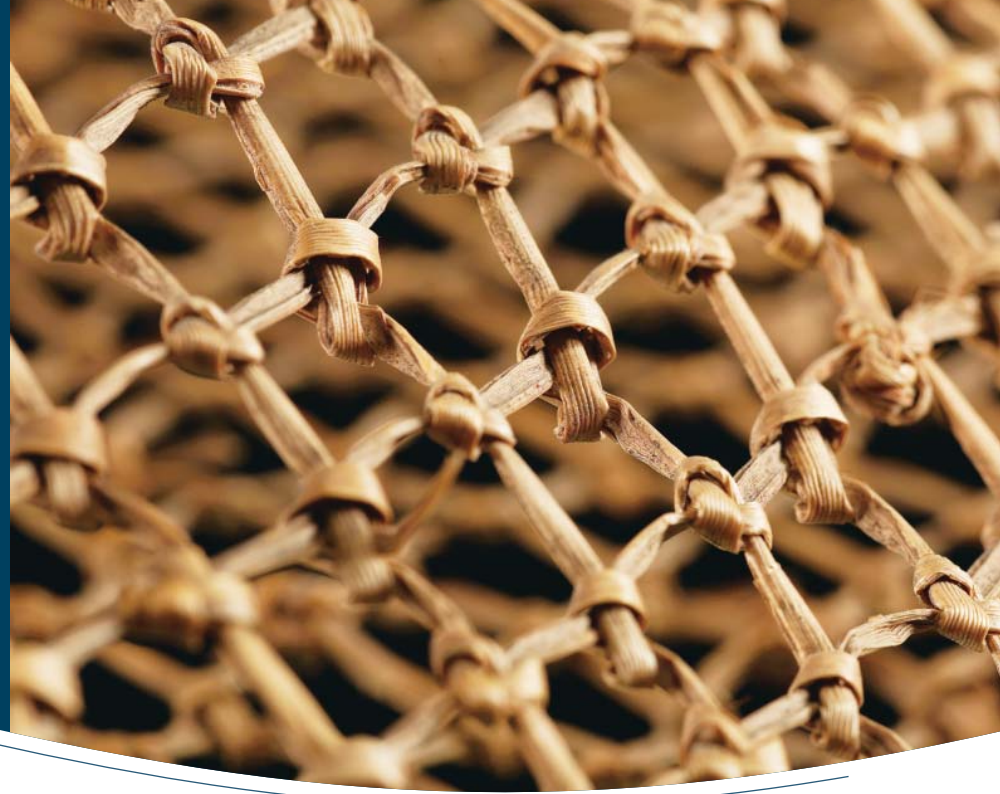
Ngāi Tahu	South Island tribe
Ngāti Kahungunu	North Island east coast tribe
rangatahi	teenager, young adult
rangatiratanga	chiefly authority
rohe	area
runanga	local representative groups or community system of organisation
takiwā	area, region, district
tangata whenua	the iwi or hapū that holds manawhenua in a particular area
taonga	treasured possessions, both tangible and intangible
tapu	sacred
waahi tapu	sacred places
whānau	family



Appendices

Ngā Tāpiritanga

The following appendices consist of forms, tables, worksheets and information that will help you carry out a Cultural Health Index study. These resources can be referred to, photocopied or modified for use in your assessments.



Appendix 1: Information Sheet

The information sheet concerns the proposal to use the Cultural Health Index for streams.

It is necessary to collect data about the catchment to identify and understand stream related issues. It is important to agree how that data is to be managed. Therefore this information sheet presents a data management process.

1. Participants will be informed of the nature of the project.
 - a. Participants will be asked to give their informed consent before participating (see attached consent form).
 - b. Hui will inform participants/iwi members of overall progress of the research.
2. Participation in the research project, or parts of, will be voluntary. Participants are free to withdraw at any stage and request that any information they have provided be returned to them.
3. We acknowledge the sensitivity of the information gathered and the need to carefully manage that information. All information and material gathered during the course of interviews will remain anonymous. If an interviewee consents, his/her tapes will be held by the kaitiaki runanga. If the interviewee does not consent to the runanga holding his/her tape, management of that tape will be decided by the interviewee at the time of the interview.
4. The outcome of this project is an assessment of the health of streams within your area. No individually identifiable information (either from an individual interviewee or site specific information for the catchment involved) will be disclosed.
5. The information gathered will be used solely for the purpose of assessing stream health using the Cultural Health Index and using the data collected to develop improved management regimes.

Appendix 2: Participant Consent Form

This consent form will be held for a period of seven (7) years.

I have read the Information Sheet and have had the project explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being audio-taped.
(If applicable include this statement)

I wish/do not wish to have my tapes returned to me.
(If applicable include this statement)

I wish/do not wish to have a copy of the transcript returned to me.
(If applicable include this statement)

I wish/do not wish to have data placed in an iwi / runanga archive.
(If applicable include this statement)

I agree not to disclose anything discussed in the interview.
(If applicable include this statement)

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature of interviewee:

Date:

Full name *(printed)*:

Appendix 3: Recommended Interview Questions

1. Why is this river/stream important to you?
2. If you could protect five sites in the catchment which sites would you choose? Why would you protect them? (You will need to explain that for the purposes of the study a site is a reach of the river that can be viewed from one point during the study).
3. How was this river used in the past? What sites were used?
4. Can you still use each of these sites today?
5. How is this river used today? What sites are still used?
6. What mahinga kai sites did you use in the past in this river/stream? What was gathered from these areas? What mahinga kai sites do you still use today? What is gathered from these areas?
7. For each species identified in the response to Question 6, ask the following:
 - + How important was the species in the past?
 - + How abundant was the species in the past (relative assessment)?
 - + What was it used for in the past?
8. What changes have taken place within the catchment that have affected your traditional sites?
9. What are the main changes you have seen in this river/stream over the years? The following may be useful prompts:
 - + catchment land use
 - + river banks
 - + river channel
 - + flow
 - + water quality
 - + river mouth.

It is recommended that the interview be informal in nature, carried out in a conversational style and free of jargon or technical language. Each interview should last no more than an hour and a half (it may take less but should never be longer).

Appendix 4: Field Assessment Form

Cultural Stream Health Assessment		Date:			Site no:
Indicators	Unhealthy				Healthy
1. Catchment land use	1. Land heavily modified Wetlands+marshes lost	2.	3.	4.	5. Appears unmodified
2. Vegetation – banks & margins (100m either side)	1. Little or no vegetation – neither exotic or indigenous	2.	3.	4.	5. Complete cover of vegetation – mostly indigenous
3. Use of the river banks + margins (100m either side)	1. Margins heavily modified	2.	3.	4.	5. Margins unmodified
4. Riverbed condition (sediment)	1. Covered by mud/sand/slime/weed	2.	3.	4.	5. Clear of mud/sand/sediment/weed
5. Changes to river channel	1. Evidence of modification e.g. stopbanks, straightening, gravel removal, shingle build up	2.	3.	4.	5. Appears unmodified
6. Water quality eg, foams, oils, slime, weeds etc	1. Appears polluted	2.	3.	4.	5. No pollution evident
7. Water clarity	1. Water badly discoloured	2.	3.	4.	5. Water is clear
8. A variety of habitats	1. Little or no current, uniform depth and limited variety of flow related habitats	2.	3.	4.	5. Current and depth varies, creating a variety of different flow related habitats
How would you describe the overall health of the river at this site?	1. Very unhealthy	2.	3.	4.	5. Very healthy
Please explain your answer					

BIRDS: Please list the mahinga kai bird species that you can see at this site				
1.	2.	3.	4.	
5.	6.	7.	8.	
PLANTS: Please list the mahinga kai plant species that you can see at this site				
1.	2.	3.	4.	
5.	6.	7.	8.	
ACCESS: Do you consider access to this site is sufficient to harvest mahinga kai?				
1. Not able to gather at this site	2.	3.	4.	5. Able to gather – no restrictions
Please explain your answer				
Would you return to this site in the future?				
1. Yes	2.	3.	4.	5. No

Appendix 5: Mahinga Kai Table

Calculating the 1–5 score for the number of species present

Maximum 1		Maximum 2		Maximum 3		Maximum 4		Maximum 5	
1	species scores 1	1	species scores 1	1	species scores 1	1	species scores 1	1	species scores 1
		2	species scores 5	2	species scores 3	2-3	species scores 3	2	species scores 2
				3+	species scores 5	4+	species scores 5	3	species scores 3
								4	species scores 4
								5+	species scores 5

Maximum 6		Maximum 7		Maximum 8		Maximum 9		Maximum 10	
1-2	species scores 1	1-3	species scores 1	1	species scores 1	1-2	species scores 1	1-2	species scores 1
3	species scores 2	4	species scores 2	2-3	species scores 2	3-4	species scores 2	3-4	species scores 2
4	species scores 3	5	species scores 3	4-5	species scores 3	5-6	species scores 3	5-6	species scores 3
5	species scores 4	6	species scores 4	6-7	species scores 4	7-8	species scores 4	7-8	species scores 4
6+	species scores 5	7+	species scores 5	8+	species scores 5	9+	species scores 5	9-10+	species scores 5

Maximum 11		Maximum 12		Maximum 13		Maximum 14		Maximum 15	
1-3	species scores 1	1-4	species scores 1	1-2	species scores 1	1-3	species scores 1	1-3	species scores 1
4-5	species scores 2	5-7	species scores 2	3-4	species scores 2	4-5	species scores 2	4-7	species scores 2
6-8	species scores 3	8-9	species scores 3	5-8	species scores 3	6-8	species scores 3	8-10	species scores 3
9-10	species scores 4	10-11	species scores 4	9-11	species scores 4	9-12	species scores 4	11-14	species scores 4
11+	species scores 5	12	species scores 5	12, 13+	species scores 5	13, 14+	species scores 5	15+	species scores 5

Maximum 16		Maximum 17		Maximum 18		Maximum 19		Maximum 20	
1-4	species scores 1	1-5	species scores 1	1-4	species scores 1	1-4	species scores 1	1-5	species scores 1
5-7	species scores 2	6-8	species scores 2	5-8	species scores 2	5-7	species scores 2	6-10	species scores 2
8-10	species scores 3	9-11	species scores 3	9-2	species scores 3	8-11	species scores 3	11-15	species scores 3
11-15	species scores 4	12-15	species scores 4	13-16	species scores 4	12-17	species scores 4	16-19	species scores 4
16+	species scores 5	16, 17+	species scores 5	17, 18+	species scores 5	18, 19+	species scores 5	20+	species scores 5

Appendix 6: Worksheets

There are two worksheets referred to in these guidelines.

The first, the worksheet in Appendix 6A, can be used to enter and then analyse the data produced during a Cultural Health Index study. This is done by downloading the worksheet file onto your computer. This worksheet file is available from the Ministry for the Environment's website at www.mfe.govt.nz/publications/water

The second, Appendix 6B, can be photocopied and used to analyse data collected from interviews or historical records.

Appendix 6A

The format of the worksheet file looks like this:

River Health – Analysis For Site No. 1

Name of Stream/River:								
Cultural Health Indicator	Individual Rankings					Range of Rankings	Average Ranking	Comments
	1	2	3	4	5			
Catchment land use								(1) Final Comments
Use of riparian margin								
Riparian Vegetation								
Channel Modification								
Riverbed condition / sediment								
Flow and Habitat variety								
Water quality								
Water clarity								
Overall Health(1)								

Access:								
Cultural Health Indicator	Individual Rankings					Range of Rankings	Average Ranking	Comments
	1	2	3	4	5			
Sufficient to gather mahinga kai								
Future visits								

Species List:								
Mahinga kai bird species present								
1.								
2.								
3.								
4.								
5.								
6.								
7.								
Mahinga kai plant species present								
1.								
2.								
3.								
4.								
5.								
6.								
7.								



Appendix 6B

Analysis of Site Specific Data Collected from Interviews and Written Records

Site name	Descriptions of site	Description of mahinga kai species sourced	Description of other values associated with the site	Any other comments

Appendix 7: Contacts

Any queries about the Cultural Health Index can be directed to:

Gail Tipa	Laurel Teirney
115 Main South Road	6 Marion Street
East Taieri	McAndrew Bay
Otago	Dunedin
Phone: (03) 489 4534	Phone: (03) 476 1242
Email: gtipa@xtra.co.nz	Email: l.teirney@xtra.co.nz

Ministry for the Environment

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Write to	Ministry for the Environment PO Box 10362 Wellington New Zealand
Phone	(04) 439 7546
Fax	(04) 439 7700

To talk with someone at the Ministry for the Environment about the Cultural Health Index contact:

Maruwhenua
Ministry for the Environment
PO Box 10362
Wellington
Freephone: 0800 545 554
Email: maruwhenua@mfe.govt.nz

Appendix 8: References and Resources

The following references can be obtained from the Ministry for Environment:

Tipa G. (October 1999). *Taieri River Case Study, Ministry for the Environment Technical Paper No 58, Environmental performance indicators: Māori Indicators Case Study.*

Tipa G, Teirney L. (June 2003a). *Mauri and Mahinga Kai Indicators Project: Development of the Cultural Health Index* (unpublished project report).

Tipa G, Teirney L. (2003b). *Mauri and Mahinga Kai Indicators Project: Summary of the Process of Developing the Cultural Health Index* (unpublished project report).

Tipa G, Teirney L. (June 2003c). *A Cultural Health Index for Streams and Waterways: Indicators for recognising and expressing Māori values.* Available at www.mfe.govt.nz/publications/water/cultural-health-index-jun03/

Tipa G, Teirney L. (June 2005a). *A Cultural Health Index for Streams and Waterways – Applying the CHI framework to the Hakatere (Ashburton River): a different river type* (unpublished).

Tipa G, Teirney L. (June 2005b). *A Cultural Health Index for Streams and Waterways – Applying the CHI framework to the Tukituki River: a different Iwi* (unpublished).

Tipa G, Teirney L. (February 2006a). *Using the Cultural Health Index: How to assess the health of waterways.* Available at www.mfe.govt.nz/publications/water

Tipa G, Teirney L. (February 2006b). *A Cultural Health Index for Streams and Waterways: a tool for nationwide use.* Final Technical Report. Available at www.mfe.govt.nz/publications/water

National Institute of Water and Atmospheric Research (NIWA) resources

New Zealand Freshwater Fish Database (NZFFD)

The New Zealand Freshwater Fish Database (NZFFD) records the occurrence of fish in fresh waters of New Zealand, including major offshore islands. NIWA maintains the database at their Wellington campus. Data stored include the site location, the species present, their abundance and size, as well as information such as the fishing method used and a physical description of the site. The description of the site includes an assessment of the habitat type, substrate type, available fish cover, catchment vegetation, riparian vegetation, water widths and depths, and some water quality measures.

Data which are recorded in the field on pre-printed forms are generally contributed voluntarily by NIWA, fish and game councils, the Department of Conservation, regional councils, environment consultants, universities and interested individuals.

Access to NZFFD information

Access to the NZFFD data requires registration and users are encouraged to contribute data. Registering involves signing a memorandum of understanding about the use of information from the database and agreeing to contribute data from your monitoring. Information on the process of registration is available on <http://www.niwascience.co.nz/services/nzffd/register>

Alternatively, you can work with NIWA directly to access information on fish species in your area. For any complicated or extensive searches, NIWA's services will need to be contracted.

NZFFD Assistant Software

NIWA provides free Assistant Software to assist contributors in entering new data and visualising data retrieved from the database.

Contributing data to the NZFFD

To contribute data, you can send NIWA's completed forms to NIWA Hamilton (PO Box 11-115, Hamilton) for processing and entry of data using the Freshwater Fish Database Assistant software. Data entered using the Assistant is then sent to NIWA via email or on disk for inclusion in the NZFFD.

Freshwater Fish Atlas

More information about New Zealand's freshwater fish can be found in NIWA's Freshwater Fish Atlas which includes species distribution maps produced using the Database Assistant software to display data retrieved from the NZFFD.

Contact

Please direct any queries regarding the New Zealand Freshwater Fish Database to the NZFF database administrator (Jody Richardson) at NIWA Hamilton, phone (07) 856 1746 or email fwdba@niwa.co.nz.

Further information on the NZFFD is available at: www.niwascience.co.nz/services/nzffd/index



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