



Tiakina te Taiao

Iwi Estuarine Indicators  
for Nelson

March 2009



Landcare Research  
Manaaki Whenua

# Iwi Estuarine Indicators for Nelson

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Prepared for

Nelson City Council  
under a FRST Envirolink grant NLCC 27

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Acknowledgements .....	4
1. INTRODUCTION.....	5
1.1 Methodology .....	6
1.1.1 Literature search.....	6
1.1.2 Initial Hui and Site Visits.....	7
1.1.3 Development of Monitoring Tools.....	8
1.1.4 Establishment of Monitoring Sites and Refinement .....	9
2. RESULTS AND DISCUSSION .....	11
2.1 Monitoring Form and Guideline .....	11
2.2 Monitoring Programme and Protocols .....	11
3. RECOMMENDATIONS .....	13
4. REFERENCES.....	13
4. REFERENCES.....	14
5. APPENDICES.....	15
Appendix 1. Tiakina Estuarine Indicators Form Version 1.0 .....	15
Appendix 2. Tiakina Estuarine Indicators Guide V 1.0 .....	18

Toitū te marae o Tāne  
Toitū te marae o Tangaroa  
Toitū te iwi  
If the domain of Tāne survives to give sustenance  
and the domain of Tangaroa likewise remains  
So too will the people<sup>1</sup>.

## Acknowledgements

Kia ora koutou  
Ko Horoirangi mei Maungatapu nga maunga  
Ko Maitahi mei W'akapuaka nga awa  
Ko Kurahaupo, Tainui, mei Tokomaru nga waka  
Ko Ngāti Koata, Ngāti Kuia, Ngāti Rarua, Ngāti Tama, mei Te Atiawa nga iwi  
Ko Whakatu te Marae

E nga uri o Ranginui raua ko Papatuanuku. Nga Atua kaitiaki:

- Tangaroa
- Tāwhirimātea
- Haumiatiketikie
- Tāne Mahuta
- Rongomatāne
- Tūmatauenga

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na Dean Walker for Tiakina te Taiao Ltd

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<sup>1</sup> B James (1993, p6)

# 1. INTRODUCTION

Nelson City Council (NCC) approached Landcare Research Manaaki Whenua and Tiakina Te Taiao Ltd. (Tiakina) to provide technical advice and professional expertise on cultural monitoring tools for estuarine areas within the NCC administrative area. This information was deemed necessary by NCC in order to enhance scientific monitoring in the four estuaries within the bounds of Nelson City and to give a fuller picture of their environmental health and cultural use.

The desire by Tiakina is that NCC will use this work as a basis for developing cultural input, assessment and advice into future state of environment (SOE) reporting and for council decision-making, management plans and assessments in relation to these estuaries.

The four estuaries within the administrative area of NCC are Kokorua Inlet, Delaware (Wakapuaka) Inlet, The Haven (Paruroa) and the eastern edge of the Waimea Inlet. Wakapuaka Inlet was chosen as a case study in which to trial and establish monitoring sites (see Figure 1 below).

This report contains the following;

1. A brief review of iwi/cultural literature and knowledge (mātauranga) on monitoring tools and indicators/indices applicable to coastal and estuarine environments.
2. A monitoring form for the collection and analysis of cultural health data gathered from estuaries across the rohe of Tiakina te Taiao.
3. A guide for the use of the monitoring form above.
4. Recommendations on a set of methods and iwi indicators that can be used in the NCC area for estuarine and sub-tidal environments along with a suggested monitoring programme.



## 1.1 Methodology

This project was carried out in 5 parts. These are described in the following sections and include;

- Literature search,
- Hui and site visits and development of draft guide and form
- Testing of guide and form and review,
- Establishment of monitoring sites and refinement
- Completion of report including recommendations on monitoring



Figure 1: Map of Wakapuaka (Delaware) Inlet

### 1.1.1 Literature search

Methods for monitoring environmental performance and change are well developed within a traditional scientific context. A recent publication (MfE, 2009) outlines a range of environmental indicators across a range of key NZ environmental domains. Within these key domains two earlier reports (Ward, 1997 and Ward and Snelder, 1997) were more specific to the estuarine environment.

In the late 1990's Gail Tipa carried out a study on the Taieri River for the development of environmental performance indicators from an iwi perspective. The project was funded by the Ministry for the Environment through the Office of Te Rūnanga o Ngai Tahu (Tipa, 1999). Since this time Tipa and her colleague Laurel Teirney have continued to develop what have become known as cultural health indices (CHI) both for use within the rohe of Ngai Tahu and nationally for freshwater situations (Tipa and Teirney 2003, 2006a, 2006b). In 2007 Craig Pauling from Te Rūnanga o Ngai Tahu further developed this work into an electronic recording format as part of the "State of the Takiwa" project (Pauling, 2007).

In 2005 the Nelson Iwi Resource Management Advisory Komiti (now part of Tiakina te Taiao) funded by Nga Whenua Rahui with the support of Nelson City Council carried out an environmental indicators project based on the Maitai River (Passl *et al*, 2003). Tipa and Teirney's work was used as a basis for the development of CHI's for the tangata whenua ki Whakatu though it was modified somewhat for local conditions. It has since been used (and further refined) in the Motueka and Riwaka catchments by the Motueka Iwi Resource Management Advisory Komiti (now also part of Tiakina te Taiao). This work was and continues to be funded through the Manaaki Whenua FRST funded Motueka Integrated Catchment Management science programme. A report contrasting iwi and scientific indicators in the Motueka catchment was recently prepared (Young *et al*, 2008). Other monitoring sites in other catchments across the rohe of Tiakina te Taiao have also been established as funding has allowed i.e. Kroos, 2007.

Other iwi monitoring projects outside of the South Island and/or other domains or ecosystems have been limited with little or no work done on the estuarine environment. Harmsworth 2002 developed Māori indicators for wetlands and Swartz *et al* 2005 community indicators for mangrove habitats. The coastal marine environment has received particular attention in recent times (MfE and Otaraua Hapu, 2003. Ngati Kere, 2007). These reports offer information on types of tohu (or indicators) to monitor as well as survey methods though neither project offered firm indicators for measuring either the marine or estuarine environments.

### **1.1.2 Initial Hui and Site Visits**

Prior to this work being undertaken a hui and site visits were held in April 2008 as part of Tiakina te Taiao's regular monitoring of the Motueka and Riwaka catchments. One of the site visits was to Tapu Bay where possible iwi indicators for the estuarine environment were discussed. The notes from this meeting were subsequently written up within the context of Tiakina's Ngā Atua Kaitiaki model (see Figure 2 below). These notes, the Ngā Atua Kaitiaki Model as well as the form and guide for our freshwater indicators formed the framework of our subsequent hui and site visits.

On 10<sup>th</sup> of December 2008 a hui and site visits were held. The participants included 6 of the 7 members of the working party plus a facilitator. Five sites in 2 estuaries, Paruroa (The Haven) and The Waimea Inlet, were visited within the jurisdiction of the Nelson City Council. Potential issues and indicators were discussed at each site within the framework above with emphasis on the concerns of each of the ngā kaitiaki atua.

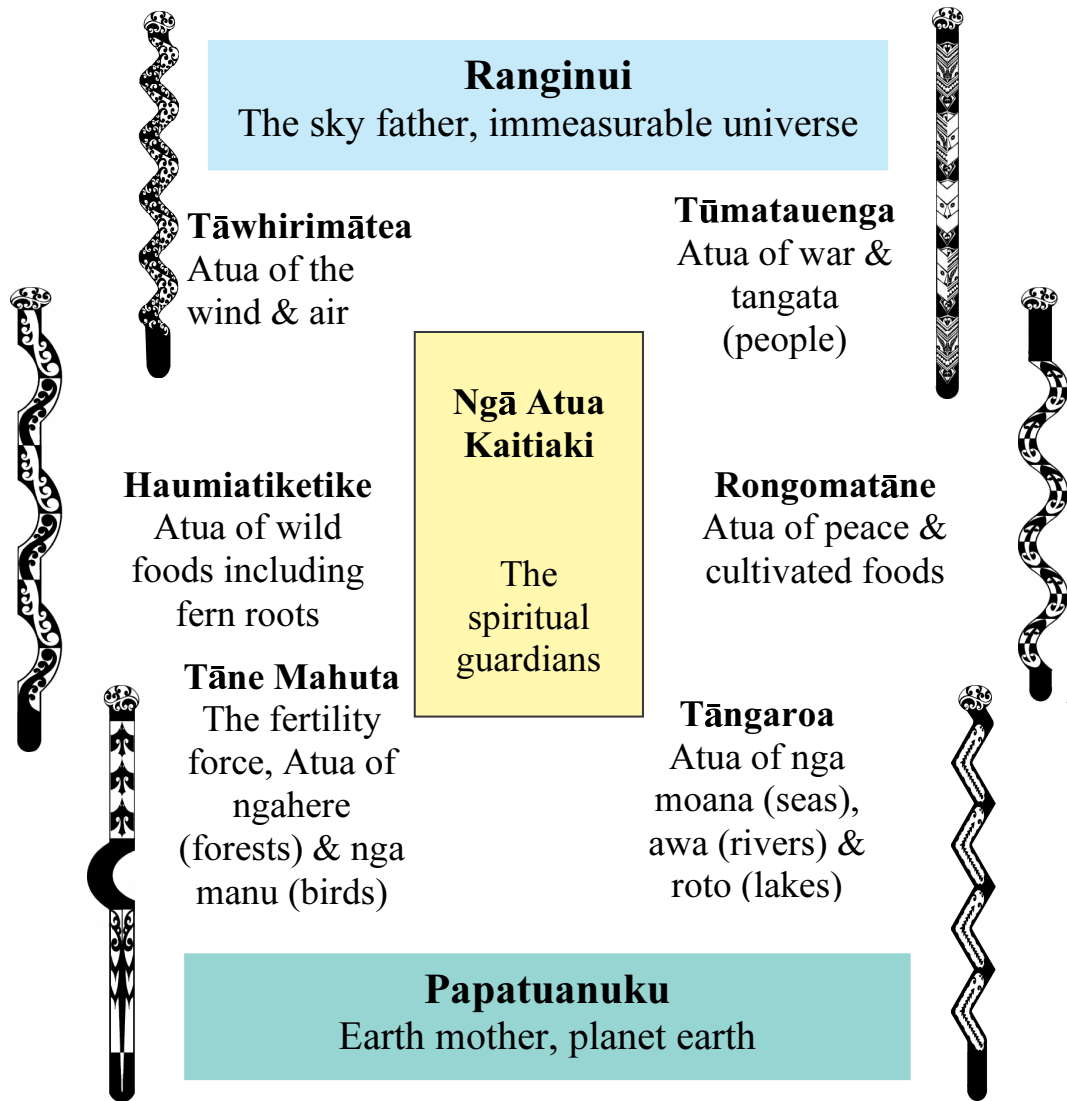


Figure 2: Nga Atua Kaitiaki Model

### 1.1.3 Development of Monitoring Tools

Each of the participants then wrote up their version of the days activities and forwarded this to the facilitator. The facilitator then developed a draft monitoring form along with a set of guidelines.

Copies of the draft monitoring form and guidelines were sent to each member of the working party in late January. These were then tested at a variety of estuaries across the rohe of Tiakina both within and outside of the Nelson City Council boundaries. It was emphasised to the members that the purpose of the exercise was not to “get it right”, rather the point was to see if there were problems associated with understanding the form and guidelines and/or if there were other aspects that the member felt were missed or misrepresented. The testing was carried out from late January through to late February 2009. Some members carried out the exercise as part of a group. Others did it individually. The diversity in testing methods and sites across the rohe was carried out in an attempt to enhance the rigour of the tools as well as help make them applicable to a range of estuaries.



The completed forms, guides and comments were returned to the facilitator and these were then incorporated into an updated draft form and guide.

### 1.1.4 Establishment of Monitoring Sites and Refinement

Prior to field trials at Wakapuaka Estuary six possible monitoring sites were selected after discussions with the iwi working party and Paul Gillespie from Cawthron. The monitoring sites were selected on the basis of the following criteria.

- Cultural Significance; All sites chosen have a cultural significance. This is, or at least will be, reflected in the site name. At this stage not all sites have had their historical names assigned. Discussions on the agreed name for some sites are still taking place. In the interim the names Tahi, Rua, Toru and Wha have been temporarily assigned for sites 1 to 4 (see Figure 3 below).
- Adjacent Landholder. These are the landholders immediately adjacent to the estuary. The categories are Iwi, Department of Conservation, Nelson City Council and Private or a mix of two of these.
- Mahinga Kai Value. An initial estimate of Mahinga Kai value and biological productivity based on gut feeling, anecdotal evidence and vegetation patterns.
- Human Influences. Sites which were immediately adjacent to housing or had high recreational use were rated high. The more remote sites from these influences were rated low.
- Science Site. If Cawthron have established a monitoring site at or near site. Of the six proposed sites three are also monitored by Cawthron and three are not.

ID	Site Name	Adjacent Landholder	Mahinga kai Value	Human Influence	Cawthron Site
1	Tahi	Iwi	Medium	Low	Yes
2	Rua	Private	Low	High	No
3	Toru	Iwi/NCC	Medium	Low	Yes
4	Wha	Private	Low	High	Yes
5	Rotokura	DoC/Private	Low	High	No
6	Hawaiki	Private	Medium	Medium	No
7	Paramata	NCC	Medium	Medium	No

Figure 3: Table of Monitoring Sites

In selecting the final sites we attempted to achieve diversity across the criteria. The mix should allow for comparative analysis across the criteria should we choose to so at a later date. An addition site, Site 7, is part of the Wakapuaka River monitoring programme being carried out by Tiakina and is also included in the table (Figure 3) and map (Figure 4).



Figure 4: Location of Monitoring Sites (Overlain from 1983 base map published by Franko, 1988 courtesy of Cawthron (Gillespie, 2008).

On March 18<sup>th</sup> 2009 selected members from the working party and the Te Huria Matenga Wakapuaka Trust trialled the updated monitoring form and guide. Paul Gillespie from Cawthron also attended and assisted the group on some technical issues. The group was split into 2 parties, one of three and one of four. The form and guide were then trialled at two sites. The group's results were then compared and the guide and form were subsequently amended following feedback from the working party.

## 2. RESULTS AND DISCUSSION

Essentially the results for this work are two-fold. The first is a set of tools for the monitoring of estuaries from a cultural perspective. The second is a monitoring programme and set of protocols.

### 2.1 Monitoring Form and Guideline

This cultural health indices (CHI) tool includes a monitoring form and guidelines for the monitoring of estuaries within the Nelson City bounds. The monitoring form is contained in Appendix 1 and the guideline in Appendix 2. These tools have been developed over the last 5 months and form the bulk of the work. They are evolutionary by their nature. They have changed considerably over the last few months and they will continue to be refined through use and time. There are probably monitoring items that are surplus to our understanding of the health of estuaries and others that need improved methodologies or new methodologies to be developed. Through repeated use and validation the tools will invariably change but their essence and what they are trying to achieve will not.

### 2.2 Monitoring Programme and Protocols

An appropriate monitoring programme was discussed on a number of occasions throughout this project. This programme would be for the four estuaries within the bounds of Nelson City Council, these being Whangamoia, Wakapuaka (Deleware) Inlet, Paruroa (The Haven) and the Waimea Inlet (Eastern edge). A programme based on the seasons was dismissed early on in favour of a regime based on annual animal or plant events. This is when monitoring was done traditionally. Events discussed included;

- Annual migration of eels. Eels arrive as young elvers around August to October. Adults leave for breeding March to April.
- Annual migration of whitebait species. Whitebait arrive in August to September and breeding takes place in late autumn (May) with eggs travelling down rivers and estuaries into the ocean at this time.
- Annual migration of Tamure (snapper). Snapper arrive for breeding in estuaries and warm water November to January. Traditionally the start of the snapper season was marked with the flowering of the ti kouka (cabbage tree). As the water gets cooler they migrate out to deeper water from March.
- Annual migration of kuaka or bar-tailed godwits. Godwits arrive from late September to early October and then depart March to early April.

In the event, it was decided that ideally that each site would be monitored twice a year based on the annual migration of the kuaka. Their migration patterns coincidentally overlap with the migrations of the other species somewhat but the kuaka are the most obvious of the four. It is unclear as to whether kuaka reside in Wakapuaka Inlet or Delaware Bay for the summer but iwi members have observed them in Paruroa (The Haven).

Each of the six monitoring sites would ideally be monitored by three iwi monitors twice yearly under the management of the research programme manager. The data will then be input into Tiakina te Taiao's GIS. This data will then be used to track changes in the health and mahinga kai value of the estuary. Annual reports will be generated as well as reporting tied in with Nelson City Council's State of the Environment coastal resources reporting every five years.



### 3. RECOMMENDATIONS

The following recommendations are made from Tiakina te Taiao.

- That the iwi estuarine indicators form, guideline and protocol be accepted by Tiakina te Taiao Ltd as the appropriate way in which to monitor estuaries in future from an iwi/ cultural perspective within the rohe of iwi members of Tiakina.
- That the appropriate timing of the monitoring programme be twice yearly based on the departure and arrival of the migratory kuaka (bar-tailed godwits) and that six monitoring sites be regarded as a sufficient number to gather data on a range of estuarine health and mahinga kai indicators.
- That funding is sought to continue this monitoring approach across Te Tau Ihu rohe potae in order to improve environmental sustainability and strengthen iwi capability in terms of the management of estuaries.
- That five yearly monitoring and reporting be carried out by Tiakina te Taiao and Te Huria Matenga Wakapuaka Trust of the Wakapuaka (Delaware) Inlet and prepared in a form that can feed into State of the Environment (SOE) reporting systems.
- That Tiakina te Taiao plans to carry out a five year monitoring and reporting programme in the Whangamoa, Paruroa and Waimea estuaries and will seek funding to do this. This would feed into State of the Environment reports.
- That a two year trial to test and refine these estuarine monitoring tools be carried out and funding sought.



## 4. REFERENCES

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## 5. APPENDICES

### Appendix 1. Tiakina Estuarine Indicators Form Version 1.0



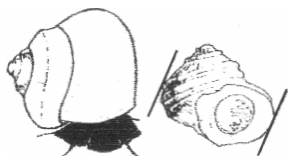




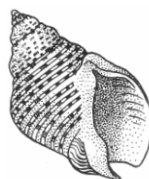
15. Use of Estuary (wet part)				
16. Use of Estuary Margins (dry part)				
17. Access to Estuary				
<b>TAWHIRI MATEA</b>	Rating 1-5	Rating 1-5	Rating 1-5	Comments
18. Smell of Estuary				
19. Sound of Estuary				
<b>HAUMIA / RONGO</b>				
20. Rongoä Species (list)				
21. Mahinga Kai Species (list)				
22. Mahinga Kai today				
23. Mahinga Kai traditional				
<b>OVERALL WAIRUA/ MAURI</b>	Rating 1-5	Rating 1-5	Rating 1-5	Comments
24. Feeling in puku				
25. CHI Score (office)				
26. Comments Action Points Recommendations				



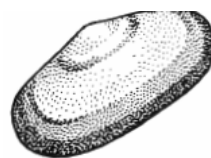
Kuku (mussel)



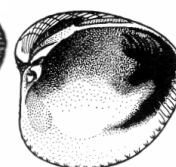
Pupu (mud snail)



Kawari (welk)



Pipi



Tuangi

**Attachments:**

Photos Y/N  
Map Y/N  
Drawings Y/N

**Logged into GIS:**

Name:  
Date:

## Appendix 2. Tiakina Estuarine Indicators Guide V 1.0



## Guide for Tiakina te Taiao Estuarine Indicators Form – Version 1.0

This guide is to be used in conjunction with Tiakina te Taiao Estuarine Indicators Form v1.0. The form is similar to Tiakina’s Freshwater Indicators format and is based on the Nga Atua Kaitiaki model. Most of the first section is self explanatory except below.

**Estuary Name:** Name of estuary. Kokorua, Wakapuaka, Paruroa (The Haven), Waimea Inlet, Moutere, Tapu Bay, Otuwhero, Torrent Bay, Awaroa.

**Catchment:** Name of river of stream that flows into estuary nearest to point.

**Site Number:** Start with first letter of estuary and number consecutively i.e. P1 for Paruroa 1st site.

**Site Status:** “A” means that the site has been used for traditional activities. “B” means that the site has not been used for traditional purposes.

**Site Type:** If it has been or is being used for traditional activities describe these. Include NZAA or Tiakina te Taiao site record numbers. Site type include kainga site, mahinga kai area (name kai i.e. pipi), trading route, working area (i.e. net manufacture).

**Return Status:** Is this a one off record “0” or will we return either for research or harvest purposes “1”.

**Name of Iwi monitor:** Each site is usually monitored by 3 iwi members. Discussion is encouraged and consensus is preferable but not required.

**Note 1:** All completed forms to be returned to Dean Walker at Tiakina te Taiao, PO Box 1666, Nelson for inclusion into Tiakina’s GIS.

**Note 2:** Please note any difficulties in understanding the form or suggestions for improvement. Forward these to Dean at the above address.

**Note 3:** Digital photographs of the site can also be taken and forwarded to Dean at [dean@tiakina.co.nz](mailto:dean@tiakina.co.nz) along with site number and direction taken.

**Note 4:** The estuarine indicators form is based on a 1 to 5 rating system. 1 indicates a site with poor values and 5 indicates a site with high values. Half marks are allowed except 0.5 and 5.5

TANGAROA	
1. Estuary edge	Q ~ Is there evidence of modification of the estuary edge i.e. human induced erosion, reclamations or the dumping of rubbish. 1 ~ Human or animal induced erosion/ land reclamation / dumping of rubbish/ gravel or sand has been removed. 3 ~ Minor erosion and litter associated with recreational use/ land reclamation but restoration work carried out 5 ~ No human induced erosion or litter/ no reclamation, stopbanks or extractive works
2. Channel condition	Q ~ Is there evidence of modification of the estuary channels? i.e. channel straightening, gravel or sand extraction 1 ~ Single channel has been straightened/ gravel or sand has been removed. 3 ~ Single channel with possible modifications. 5 ~ No human induced erosion or litter/ no reclamation, stopbanks or extractive works/ Channels of variety in width and depth.
3. Water Clarity/ Quality	Q ~ Is the water is stagnant or discoloured outside of what would normally be found in an estuary 1 ~ Water is stagnant or discoloured. Effluent, road run-off and/or storm water is observed entering directly into estuary. 3 ~ Effluent, road run-off or storm water is entering the estuary but some measures have been taken to reduce the effects.

	5 ~ No effluent, road run-off, or storm water is entering the estuary. At slack tide the water is reasonable clear (for estuaries)
4. Seawater/ freshwater interface.	Q ~ Does the freshwater source (wetland, river or stream) have impediments (i.e. gated culverts) to mixing with the seawater 1 ~ The freshwater source has obvious gated or other impediments to mixing with the sea water. 3 ~ Impediments exist such as culverts but are either not gated or allow mixing 5 ~ No impediments exist between the mixing of freshwater and saltwater.
5. Estuarine habitats (wet).	Q ~ Are there a variety of habitats and estuarine landforms such as silt, mudflat, sandbars, shell banks, pools and channels? Black (anaerobic) mud is an indicator of poor quality. 1 ~ Little diversity (or uniformity) in terms of habitats. No shell banks. Plenty of black mud. 3 ~ Some diversity in terms of habitat. Some shell banks. Some black (anaerobic) mud is okay. 5 ~ Much diversity in terms of habitat. Shell banks obvious.
6. Shellfish	Focus on pupu (mud snail), tawari (whelk), Bivalve ((pipi, tuatua, mussel, etc (name species)), Pacific oyster as indicator species. Either carryout random quadrats (1m x 1m) and measure or rate densities for each (1 = low, 3 = medium, 5 = high)
7. Fish species	Focus on flounder (and sole). Either night observations or drag netting. Give fish counts including length of time and area fished and number caught. Note other species seen swimming or jumping. This work would only be carried out on occasional basis.
<b>TANE MAHUTA</b>	
8. Estuarine vegetation (wet part)	Q ~ What sort of estuarine vegetation is present. Estuarine vegetation includes algae, eel grass (or seagrass) and salt marsh vegetation such as the juncus rush and the jointed rush (oioi). Salt meadow (salt wort is the identifying species) is also included. sea lettuce and green filament algae are indicators of nutrient loading often bloom on a seasonal basis. Estuarine vegetation does not include woody vegetation. This is included in “edge vegetation” below. 1 ~ Little or no estuarine vegetation. Or large areas of sea lettuce or green filament algae. 3 ~ Pockets of estuarine vegetation. Small areas of sea lettuce or green filament algae okay. 5 ~ A wide variety of estuarine vegetation including salt wort, eel grass and/or salt marsh.
9. Edge vegetation (dry part)	Q ~ Is edge vegetation present such as the marsh ribbonwood (makamaka) and coastal scrub such as manuka ? Is the edge wide or narrow? Does it provide nesting sites or roosts for birds? Are these sites affected by roads, housing or other developments? 1 ~ Little or no edge vegetation. Edge highly modified. Few or no nesting sites. Conflicts with developments obvious. 3 ~ Pockets of edge vegetation. Some nest sites. Conflicts between developments and edge vegetation and/or birds minor 5 ~ Edge vegetation is wide and intact. Plenty of estuarine edge with numerous nesting and roosting sites.
10. Catchment vegetation	Q ~ What vegetation types are within the catchment area? (Take

	<p>particular notice of native vegetation and their ecotypes). How are these vegetation types connected to each other? How are they connected to the estuary?</p> <p>1 ~ There are mainly 1 or 2 non-native (exotic) vegetation types in the catchment. They have poor connections between the estuary.</p> <p>3 ~ There are a range of vegetation types but they are poorly connected to the estuary. There are few vegetation types but they are well connected to the estuary.</p> <p>5 ~ There is a range of vegetation types, particularly native, and they are well connected to the estuary.</p>
11. Estuarine habitats (dry)	<p>Are there dead trees or other roosting sites for birds? Is there habitat for insects and lizards such as stone, logs, and other debris? Is the high tide retreat area for birds sufficient and safe.</p> <p>1 ~ The estuary is quite clean of debris or other habitat for birds, insects and lizards. At high tide birds have insufficient area to retreat to and/or it is unsafe because of conflicts with human activities or pests.</p> <p>3 ~ The estuary has some obvious habitat value and the high tide rest area is either sufficient or safe.</p> <p>5 ~ The estuary has plenty of roosting sites and other dry estuarine habitats. There is sufficient and safe areas for birds to retreat to at high tide.</p>
12. Bird and Reptile life	<p>Provide a snapshot of bird and reptile life during your time at the site. Include species seen and interactions between species. Take particular note of kotuku, godwits and lizards.</p>
13. Pest plants/animals	<p>Note species and negative effects. Has any control taken place? If so has it been successful? Rate the site 1 to 5 for pest plants and animals.</p>
14. Taonga	<p>Note plants, birds, stone etc., of cultural significance other than mahinga kai that are able to be harvested.</p>
<b>TUMATAUENGA</b>	
15. Use of Estuary (wet part)	<p>Q ~ Is the estuary being used poorly or well?</p> <p>1 ~ Reclamation is still occurring. Recreational use is excessive. No opportunities exist for cultural use. Vehicles are driving in estuary.</p> <p>3 ~ Restoration of reclamation area is occurring. There are opportunities for recreation and cultural use. Vehicles drive occasionally in the estuary.</p> <p>5 ~ Reclamation is light, non existent or fully restored. Opportunities for recreation and cultural use are abundant and well managed. Vehicles do not have access to estuary.</p>
16. Use of estuary margins or edge (dry)	<p>Q ~ Does the use of the estuary margins, whether commercial, recreational or cultural, have an adverse or positive effect on the estuary. Is the dumping of rubbish occurring? Is the Council or private works affecting the estuary margin?</p> <p>1 ~ Estuary margin is heavily modified or overused, human induced erosion is obvious, rubbish is being dumped, Council or private works are overzealous.</p> <p>3 ~ Estuary margin is moderately modified and used. Council or private works are sensitive to the</p> <p>5 ~ Estuary margin is unmodified and lightly used.</p>
17. Access to Estuary	<p>Q ~ Are there legal and/or physical impediments to your access to</p>

	<p>the site (by foot)?</p> <p>1 ~ Poor legal and/or physical access</p> <p>3 ~ Access is possible with some difficulties but able to be overcome.</p> <p>5 ~ Good legal and/or physical access</p>
<b>TAWHIRI MATEA</b>	
18. Smell of Estuary	<p>Does the estuary have a fresh or stale smell? Does it have a natural or unnatural odor? The smell of hydrogen sulphide may indicate a problem. No smell may indicate lack of biological activity.</p> <p>1 ~ Estuary has offensive (hydrogen sulphide) or unnatural odor</p> <p>3 ~ Estuary has no smell</p> <p>5 ~ Estuary has natural smell or pong</p>
19. Sound of Estuary	<p>Rate the estuary on its sound. Closing eyes helps.</p> <p>1 ~ Mainly human induced noise, i.e. traffic, factory, farm noise.</p> <p>3 ~ No noise, few sounds.</p> <p>5 ~ Mainly natural sounds mixed with a hum of human activity</p>
<b>HAUMIA/ RONGO</b>	
20. Rongoā species	Note rongoa species present in edge vegetation. Are they harvestable both in quality and quantity?
21. Mahinga Kai species	Note all mahinga kai species including (fish, birds and ngahere ). “Mahinga kai” includes all products that were harvested for a variety of purposes – not just kai. Do not include species that were not traditionally harvested.
22. Mahinga Kai today	Rate the site in terms of its mahinga kai value today. Add together number of mahinga kai species (fish, birds, ngahere, and rongoā) present today. 1 ~ no mahinga kai species, 2 ~ 1 to 3 species, 3 ~ 4 to 5 species, 4 ~ 6 to 8 species, 5 ~ 9 + species
23. Mahinga Kai traditional	Are the mahinga kai species that were harvested in the past still here? 1 ~ non-traditional site or none of the species harvested in the past are left, 2 ~25% of species are left, 3 ~ 50% of species are left, 4 ~ 75% of species are left, 5 ~ 100% of species that were harvested in the past are still present.
<b>WAIRUA/ MAURI</b>	
<b>OVERALL HEALTH</b>	
24. Feeling in puku	<p>1 ~ Overall gut feeling about site is poor</p> <p>3 ~ Overall gut feeling is okay</p> <p>5 ~ Overall gut feeling about site is excellent</p>
25. CHI score (This is worked out at the office)	<p>Site significance component = (Site status + Return Status)</p> <p>Mahinga kai component = (17+22+23)/ 3</p> <p>Estuary health component (1+2+3+4+5+8+9+10+11+15+16+18+19)/13</p>
26. Action points	Comments, recommendations and action points for improvement