Māori values approaches for setting freshwater limits

MFE Link seminar July 30 2013

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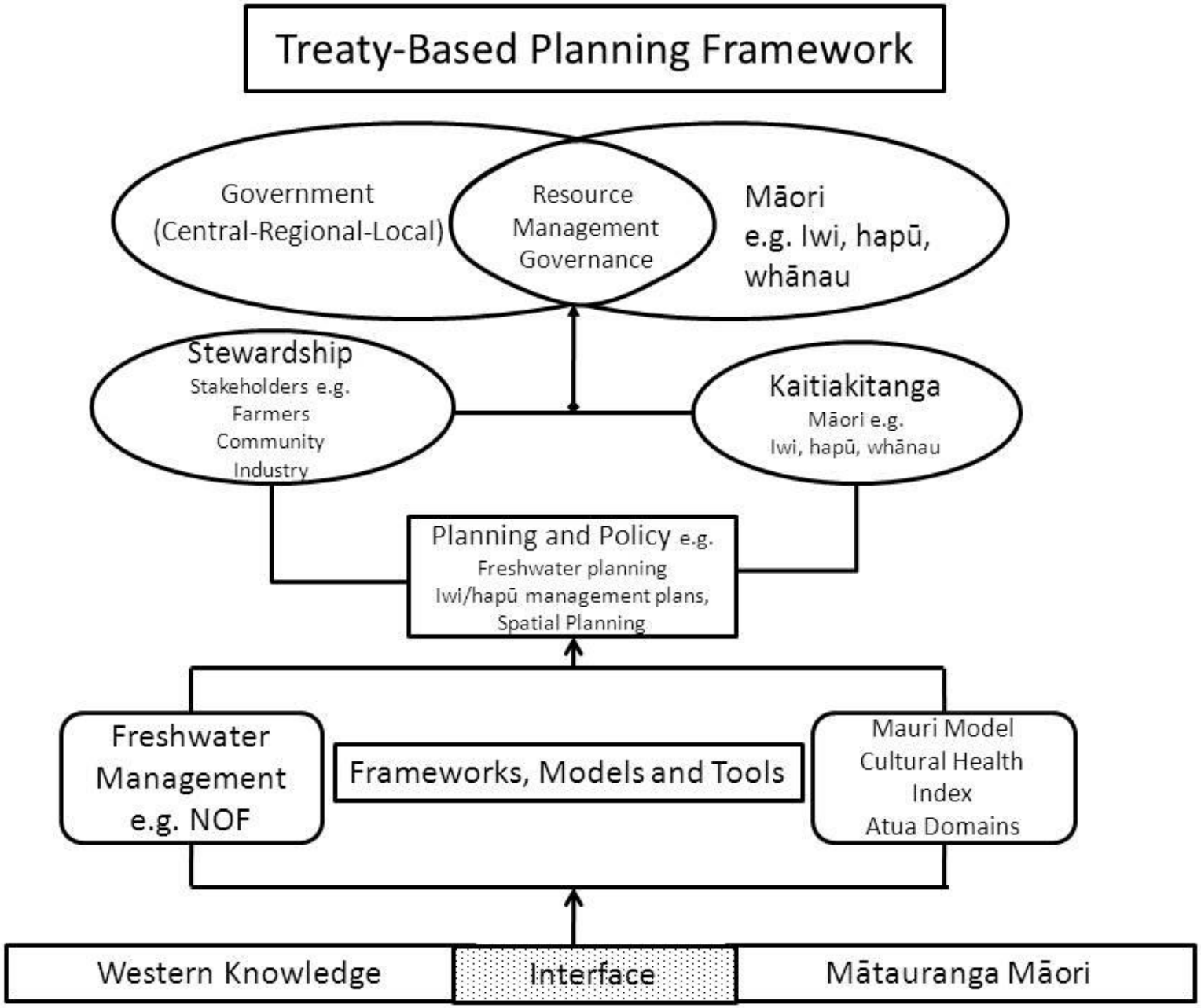
Steps for Freshwater Management

1. Mana Whakahaere: A Treaty-based planning framework is used for engagement and policy development
2. Whakamāramatia ngā Pou Herenga: Tāngata whenua values are defined and reflected in engagement processes
3. Whakamāramatia ngā Huānga: Outcomes are defined at the beginning of the engagement process

Steps for Freshwater Management

3. Whakamāramatia ngā Uaratanga: Goals and objectives are established
4. Whakamāramatia ngā Aroturukitanga: Monitoring approaches are developed and implemented
5. Whakamāramatia ngā Mahi: Actions on the ground that demonstrate kaitiakitanga and progress iwi/hapū towards their goals/objectives/aspirations through tangible projects


Treaty-Based Planning Framework
Government
(Central-Regional-Local)
Resource
Management
Governance
Māori
e.g. Iwi, hapū,
whānau
Stewardship
Stakeholders e.g.
Farmers
Community
Industry
Kaitiakitanga
Māori e.g.
Iwi, hapū, whānau
Planning and Policy e.g.
Freshwater planning
Iwi/hapū management plans,
Spatial Planning
Freshwater
Management
e.g. NOF
Frameworks, Models and Tools
Mauri Model
Cultural Health
Index
Atua Domains
Western Knowledge
Interface
Mātauranga Māori

Ngā Pou Herenga
Core Principles

- Whakapapa
- Kaitiakitanga
- Whānaungatanga
- Manaakitanga
- Mana Whenua
- Wairuatanga

He Kāpehu

A values compass

Core Principles

- Whakapapa (cultural identity): Does the policy provide a connection to, and/or protect and enhance, the local ecology and iwi/hapū identity and integrity?

Core Principles

- Mana Whenua (authority): Does the policy acknowledge, recognise and provide for tangata whenua involvement?

Core Principles

- Kaitiakitanga (sustainable resource management): Does the policy reduce the discharge of waste and pollution to air, land, and water?

Core Principles

- Wairuatanga (spirituality): does the policy enhance the spiritual well-being of our natural environment? If the mauri or life force of our natural environment is strong then we too as a people are strong.

Core Principles

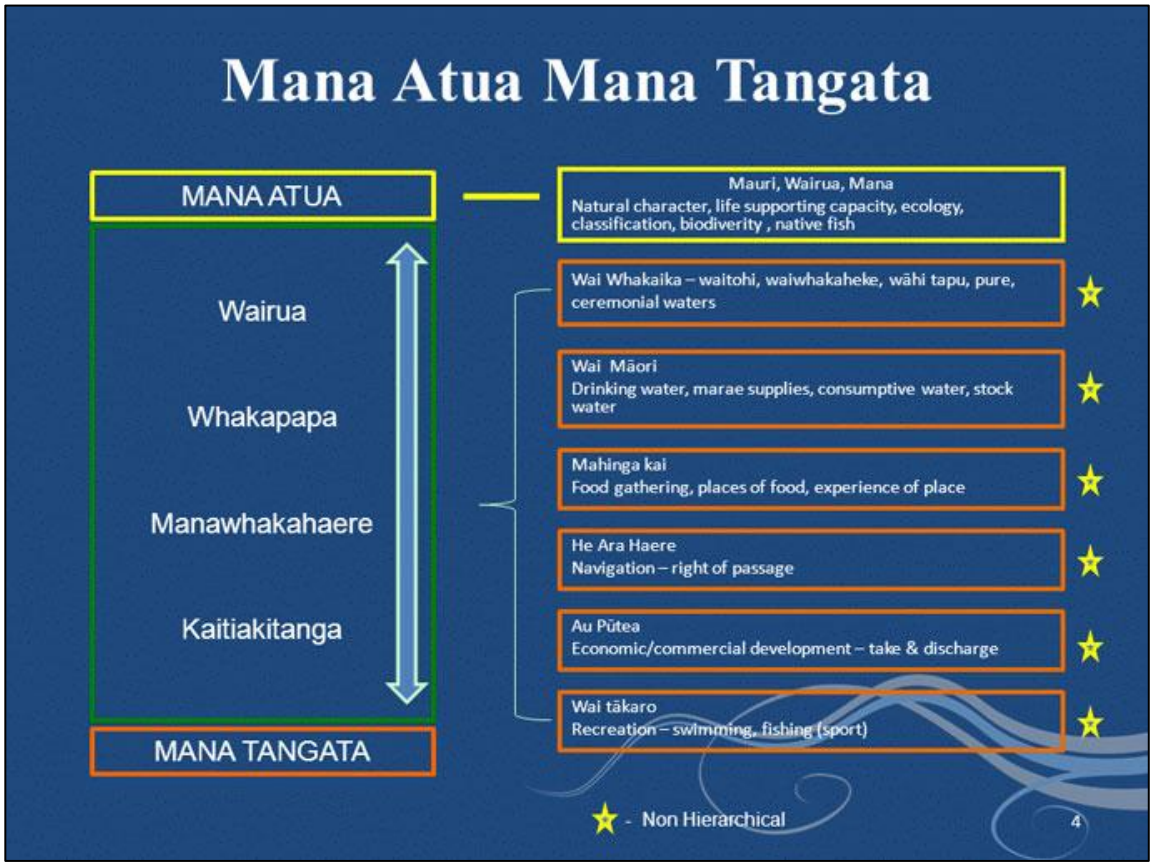
- Manaakitanga (nurturing relationships): Does the policy nurture and care for our natural environment in order to furnish us with the resources we require to provide hospitality to our manuhiri, kaumātua and whānau members.

Core Principles

- Whānaungatanga: (community development): Does the policy provide work and business environments where iwi/hapū and manuhiri alike are welcome, encouraged, and proud to be involved?

He Wero

- How to apply the Mana Atua Mana Tangata Framework



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Links between science and cultural indicators

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In future environmental monitoring programmes could be classed into three main types that are complementary:

Māori knowledge based

Māori indicators –
In depth Māori understanding and knowledge of particular environments.
Understanding of Māori values, goals, and aspirations required.
Examples:

- Taonga lists;
- Key sensitive taonga indicators;
- Te Mauri/ wairua;
- Knowledge on uses and preparation of taonga;
- Land-uses, point discharges, modification, impacting on cultural values and uses.
- Key pest species

Community – scientific based

Community based indicators –
requiring low levels of technical input and skill but scientifically robust and part-value based.
Cost effective, relatively simple and short duration.
Examples:

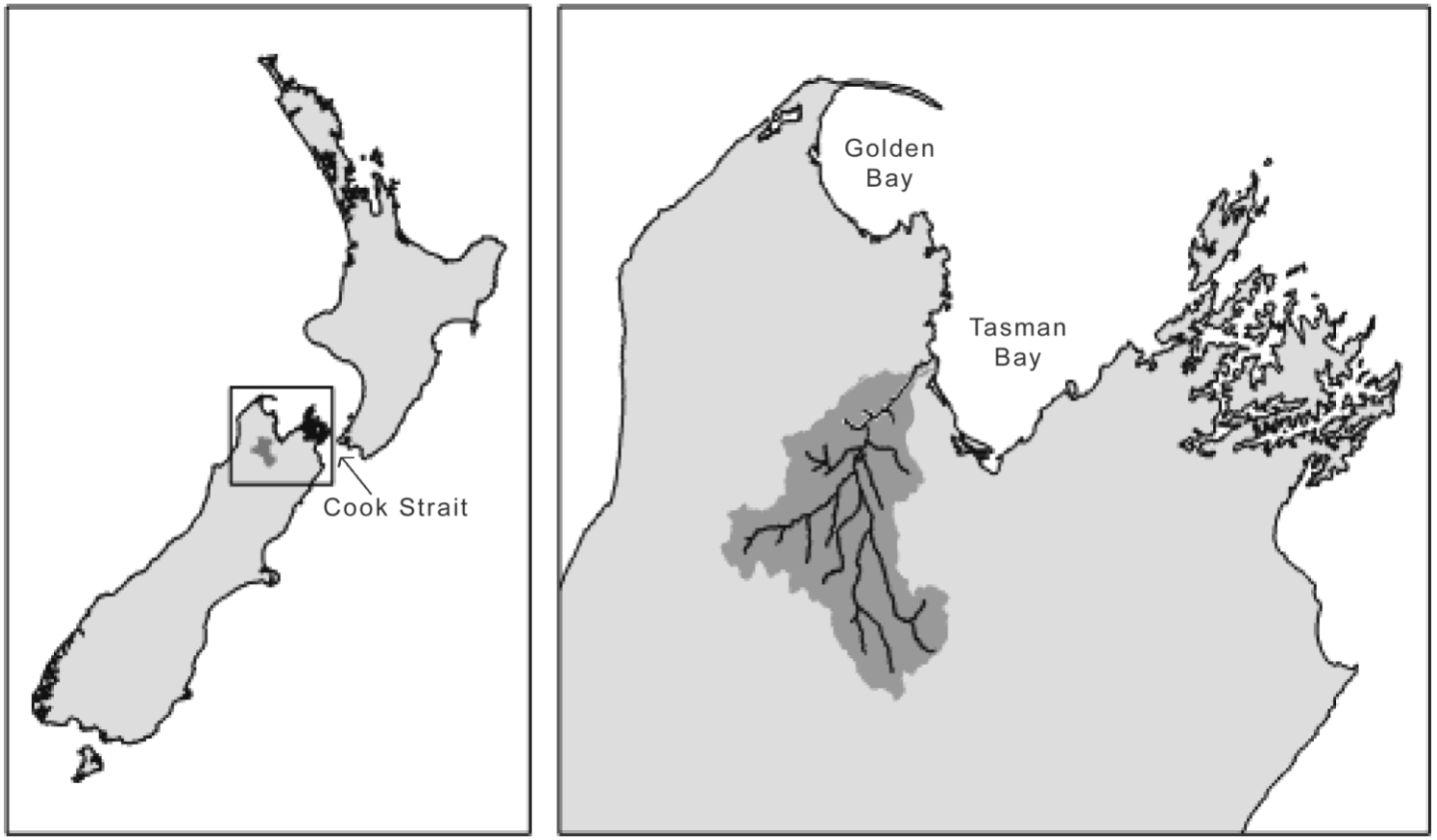
- Hydrology;
- Soils/Nutrients;
- Intactness of wetland;
- Connectivity/Buffering or Fragmentation;
- Introduced plants;
- Animal damage;
- Modifications to catchment hydrology;
- Water quality within catchment;
- Other landuse threats;
- Key undesirable species;
- % catchment in introduced vegetation;
- Animal access.

Scientific based

Scientific indicators –
requiring higher levels of technical input and skill, robust sampling strategies, analysis and interpretation.
May be time consuming.
Examples:

- Chemistry, water quality, nutrients;
- Hydrology;
- Water table modeling;
- Botanical mapping, classification of plants;
- pH;
- Bacterial counts;
- Giardia;
- Cryptosporidum;
- GIS applications;
- Satellite imagery;
- Studies of fish, macro-invertebrates, macrophytes.

Example: Cultural monitoring in the Motueka and Riwaka catchments



Ngā Atua domains framework

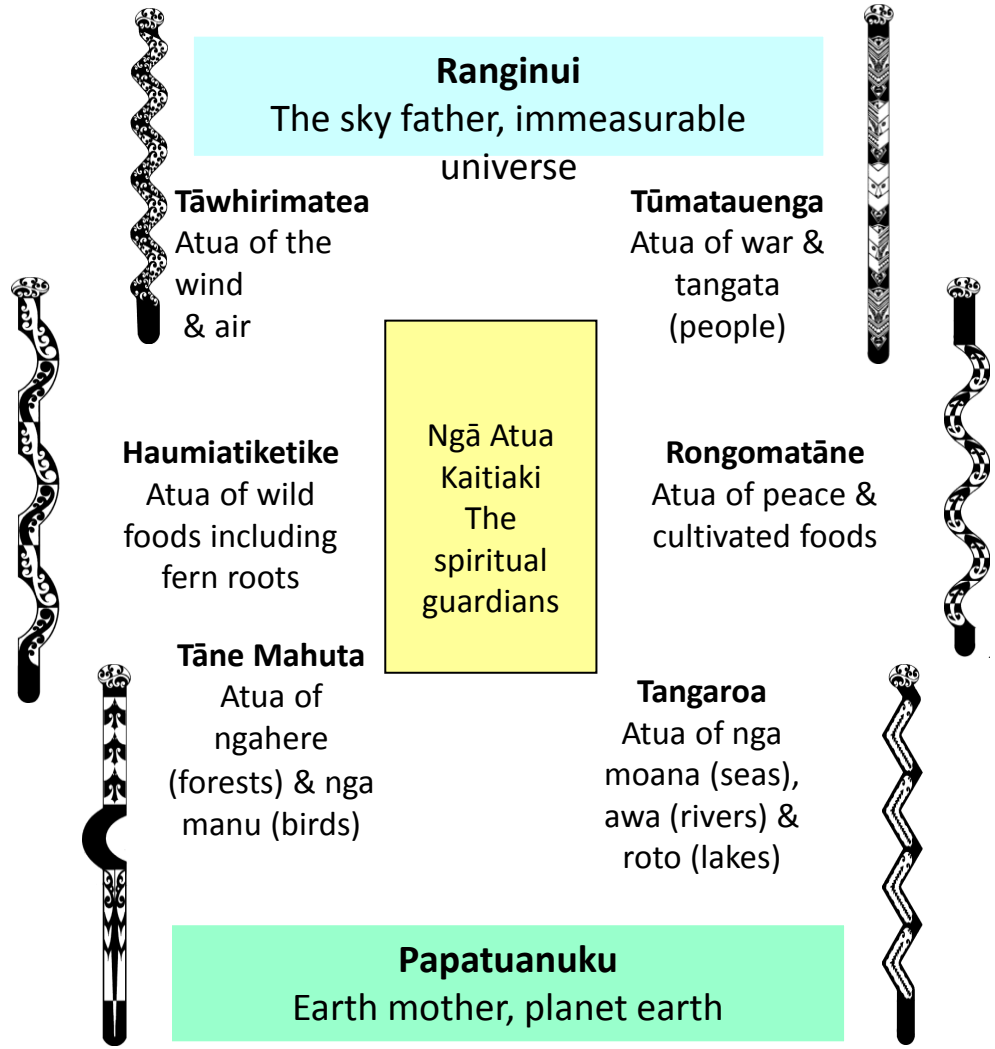


Figure 1: Atua (departmental gods) domain framework
Source: Tiakina te Taiao.

Indicators (examples)

Tangaroa

- Water Clarity
- Water Flow
- Water Quality
- Shape and form of river, riverbank condition, sediment
- Insects
- Fish

Tāne Mahuta

- Riparian vegetation
- Catchment vegetation
- Bird life (species)
- Ngahere/Taonga
- Pests

Haumia tiketike

- Mahinga kai
- Rongoa

Tūmatauenga

- Human activity, Use of river
- Access
- Cultural sites

Tāwhirimātea

- Smell

Mauri / Wairua

- Feeling, taste, wellbeing

The iwi monitors in the field

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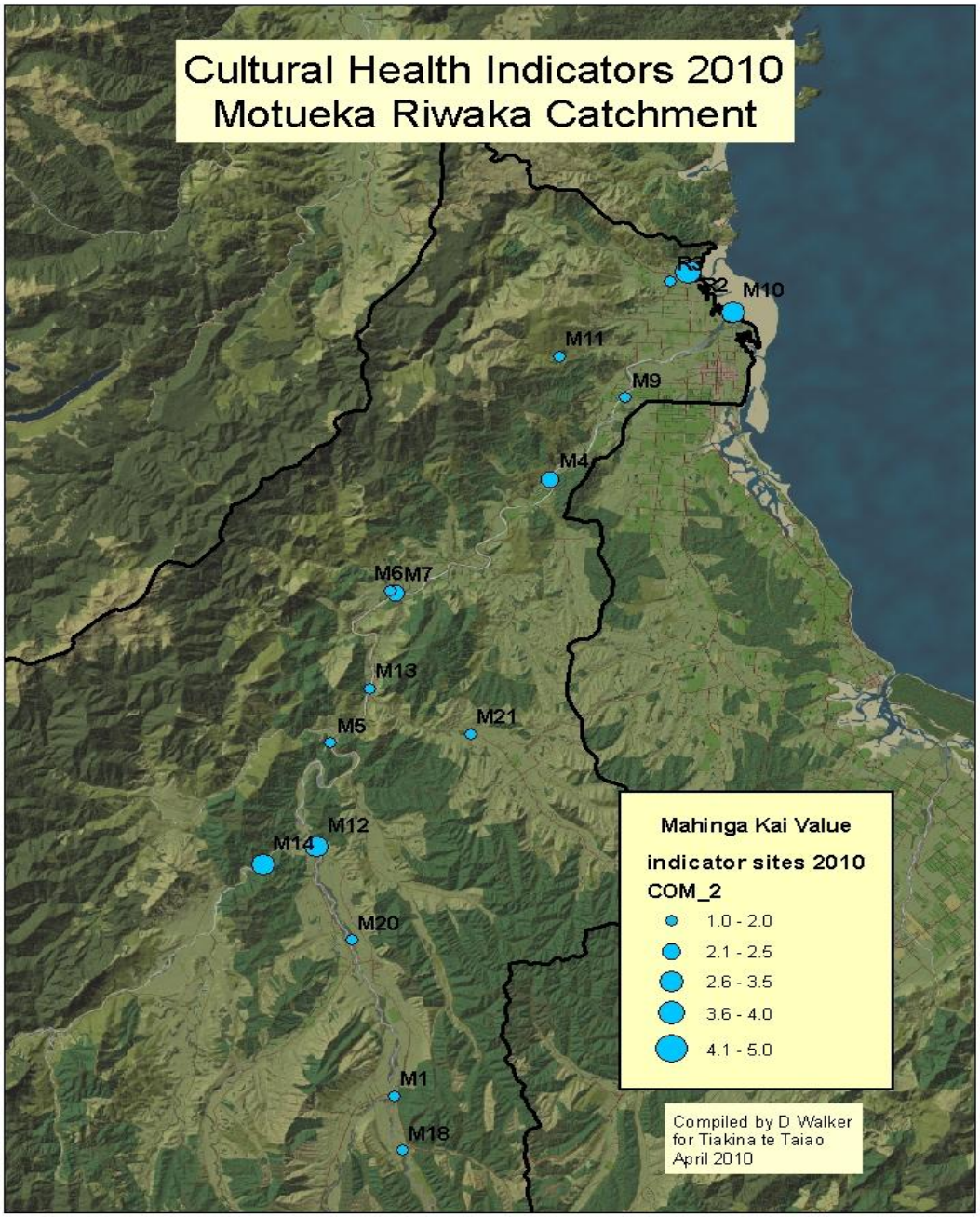
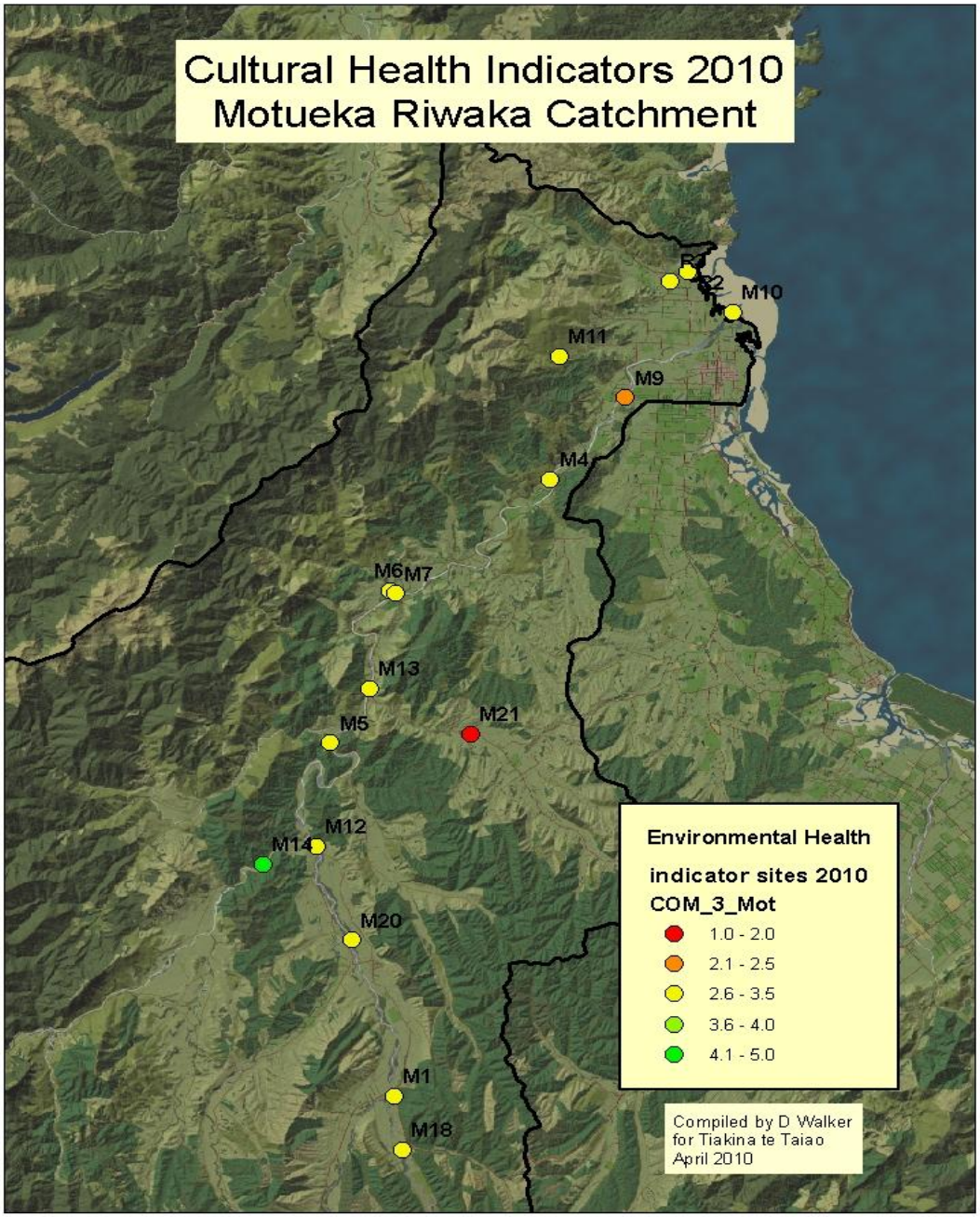
Indicator assessment and recording


Cultural Health Indicators 2010
Motueka Riwaka Catchment
M10
M11
M9
M4
M6M7
M13
M21
M5
M12
M14
M20
M1
M18
Mahinga Kai Value
indicator sites 2010
COM_2
1.0 - 2.0
2.1 - 2.5
2.6 - 3.5
3.6 - 4.0
4.1 - 5.0
Compiled by D Walker
for Tiakina te Taiao
April 2010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Compiled by D Walker
for Tiakina te Taiao
April 2010

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MĀORI VALUES APPROACHES FOR SETTING FRESHWATER LIMITS

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Internal core Māori values – customs, guide behaviour, ethics, principles, decision-making

Whakapapa (ancestry, lineage, rights)	Whānaungatanga (relationships, family connections)
Tikanga (custom, tradition, protocols, values)	Kotahitanga (unity, consensus, participation)
Rangatiratanga (sovereignty, empowerment, autonomy, management, decision-making)	Mana, mana whenua, mana moana, mana atua, mana whakahaere, mana tangata, whakamana, (based on whakapapa represents authority, power, control, status, leadership)
Manaakitanga (caring for, looking after, hosting)	Kaitiakitanga (environmental guardianship)
Tohungatanga (the retention and use of knowledge to benefit the tribe or business)	Tau utu utu (reciprocity, giving back what you take)
Wairuatanga (spiritual wellbeing, taking into consideration the spiritual dimension)	

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External Maori values – expressed in the landscape, lakes, rivers (~location specific), etc:

Wāhi tapu (sacred sites), e.g. urupā (burial grounds), sacred shrines (tuahu), wai whakaika (ritual or ceremonial sites), ana (caves)	**Wāhi taonga** (treasured sites), e.g. marae, kainga (settlements), pā (old fortified villages), forest
Wāhi tupuna (ancestral sites) – waka landing and anchorage sites (e.g. unga waka, tauranga waka), old battlegrounds, ara (tracks), rock outcrops, wāhi tohu (indicators) etc.	**Mahinga kai** – resource sites (traditional food source/collection areas), wāhi raranga – plant sources for weaving
Taonga: Flora and fauna, taonga species (**plants, trees, animals, birds, fish, etc**.), habitats (e.g. wetlands), rongoa (medicines), etc.	**Te Reo** – Place names
Landmarks: mountains, peaks, hills, lakes, rivers, coastal, geothermal areas, etc.	**Rock and mineral** source and trade areas (e.g. pounamu/nephrite/greenstone)
Important **archaeological sites**: artefact finds (e.g. adzes, carvings-whakairo, rock art, middens-ovens, waka/canoe remains etc.	**Metaphysical** (e.g. Taniwha), Atua domains

Maori values – at every site:

- Connection to the resource (e.g., *whakapapa, mana*)
- Spiritual attachment to the resource (e.g., *wairua*)
- Use or action related to the resource (e.g. *mahinga kai, takaro*)
- A sense of wellbeing based on the resource (e.g., *mauri, wairua, oranga, whaiora, whanaungatanga*)

Rangitāne O Manawatū Values to be Monitored (example)

- **Wai – Mauri**
- **Mahinga kai**
- **Taonga spp.:, e.g. ngahere, rākau; Ika, pātiki, tuna; manu; harakeke**
- **Wāhi tūpuna e.g. pā/kainga, kauhanga riri (historic battle grounds)**
- **Wāhi tapu: e.g. Urupā**
- **Wāhi taonga: e.g. awa, ara, repo, wai repo**
- **Wairua**

Integrated knowledge systems

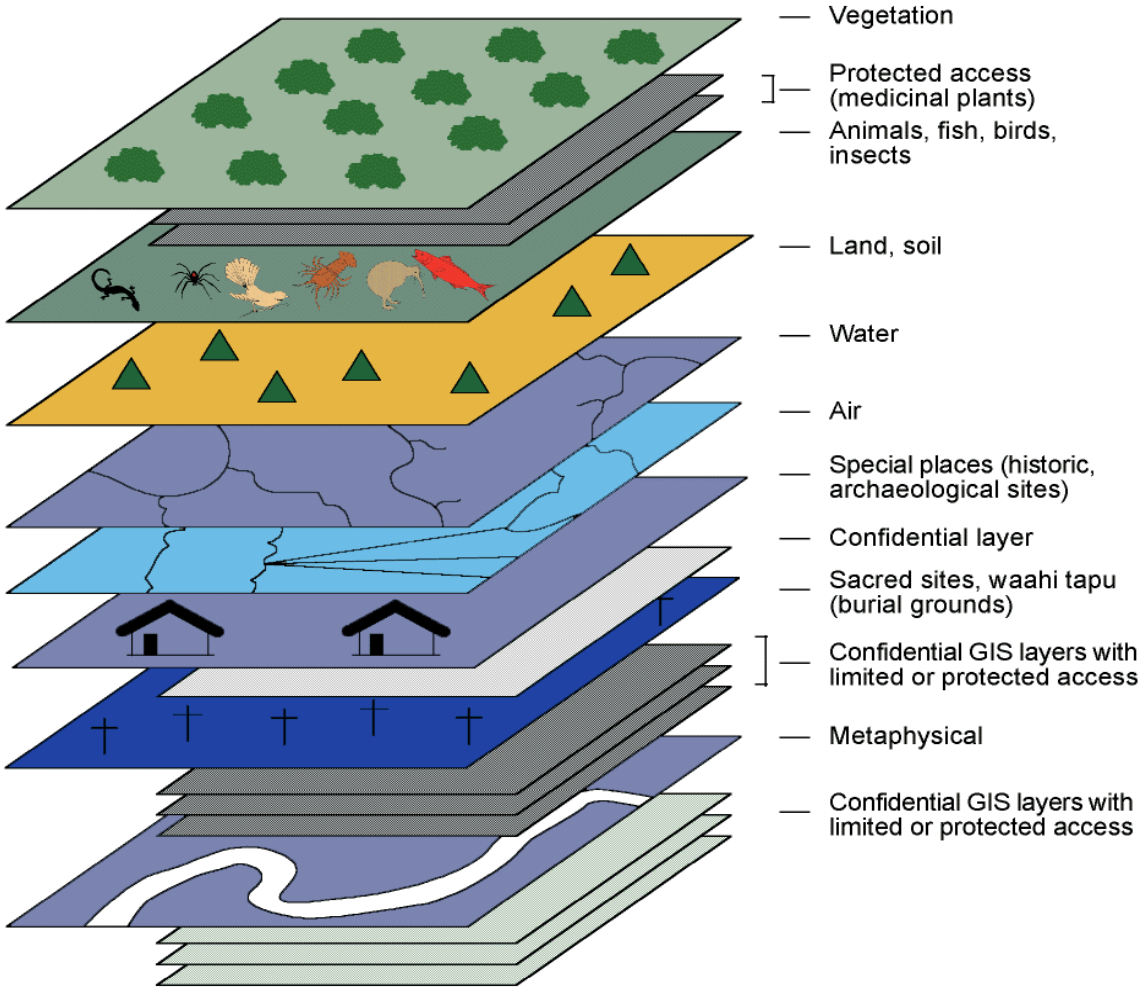

Figure 1: GIS layers and confidential sub-layers

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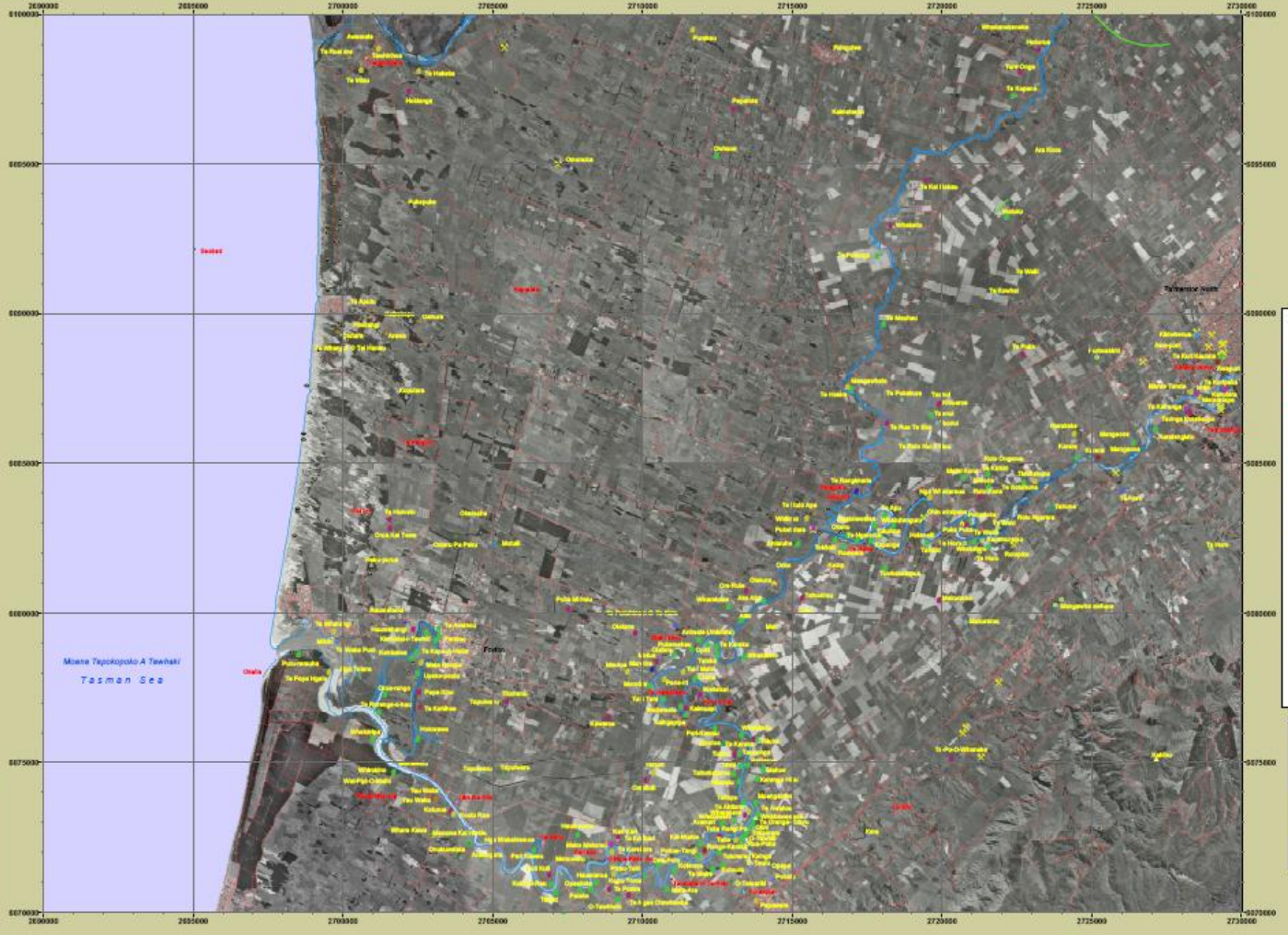
Rangitaane O Manawatu

Map 2 - Te Awahou / Foxton

SITES OF SIGNIFICANCE
NZMS 260 S24 Foxton



Significant Sites Legend

Structures
- Canoe Mooring
- Church
- Kainga
- Marae
- Occupied Location
- Pa
- Post Office
- Track
- Urupa
- Village
- Whare

Sites
- Area
- Battle Site
- Beach
- Bluff
- Burials
- Ceremonial Site
- Maori Monument
- Maori Tomb
- Reserve
- Signal Fire
- Site
- Site River

Natural Resources
- Cultivation
- Eel Weir
- Kereke Grove
- Kumara Pits
- Moana Tuna
- Rat Path
- Snaring Trees

Natural Sites
- Bush
- Clearing
- Dune
- Fossil Forest
- Hill
- Mound
- Peak
- Range

Hydrological Sites
- Lagoon
- River
- Stream
- Swamp

Archaeological Sites
- Archaeological Sites
- Burial Caves
- Burials
- Midden

Tracks (pre-european)
Roads
Rivers
Streams
Rangitaane O Manawatu Rohe
Image
LINZ S24 95_96
Sea

Acknowledgements
Tranki'ata
Landcare - Manaaki Whenua
Peter Stephens
Garth Harmsworth
Hamish Heke

Map Compiled By
Jonathan Procter
Te Ao Turoa
Tanenuiarangi Manawatu Inc.
PO Box 1341
Palmerston North

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N W E S

Projection
Geodetic Datum
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International Spheroid
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Northing 6023150
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Latitude -41

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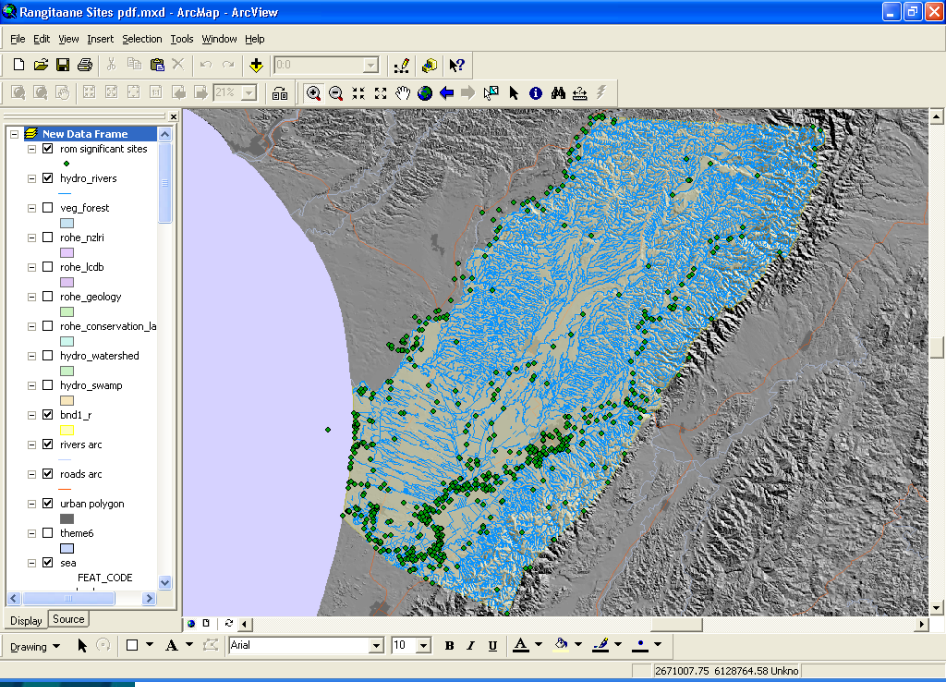
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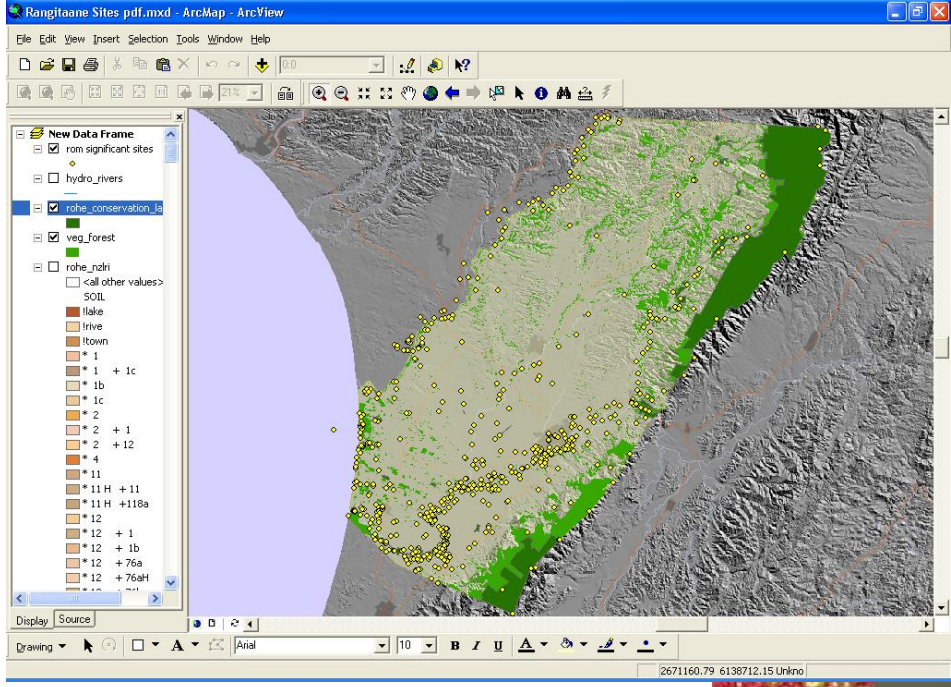
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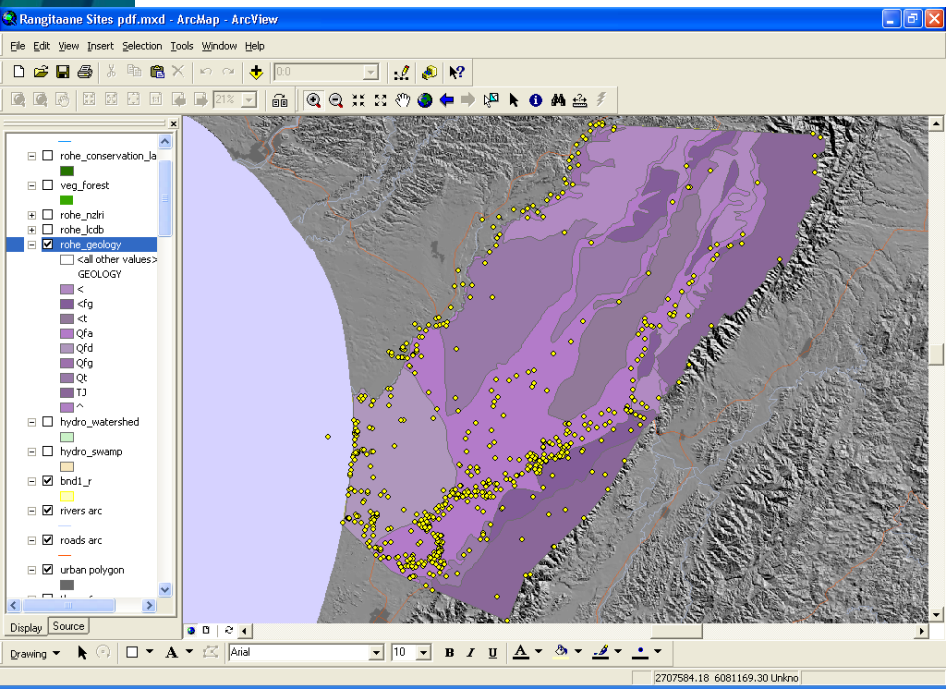
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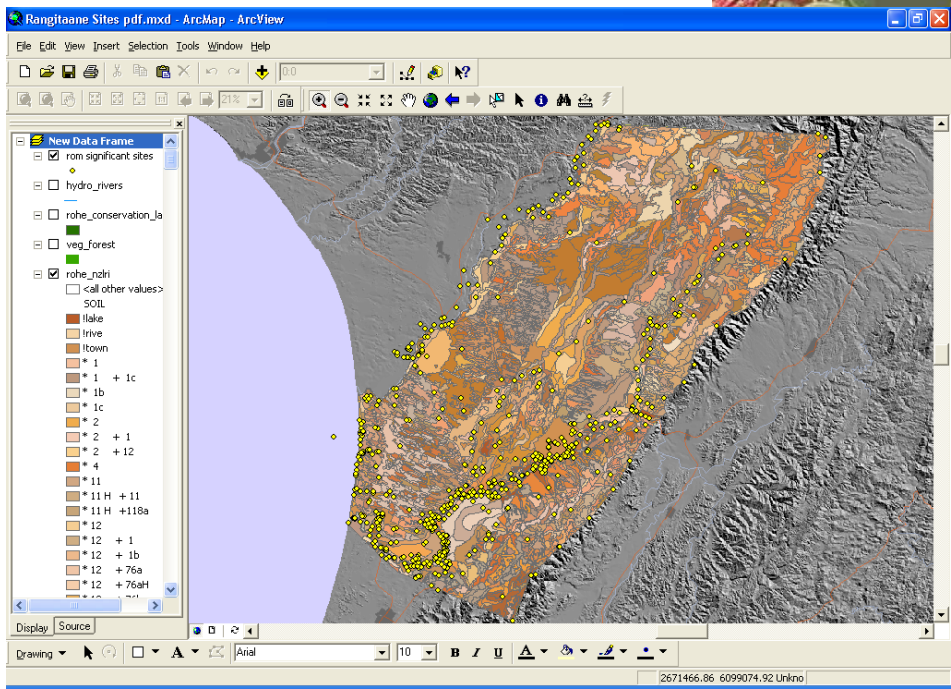
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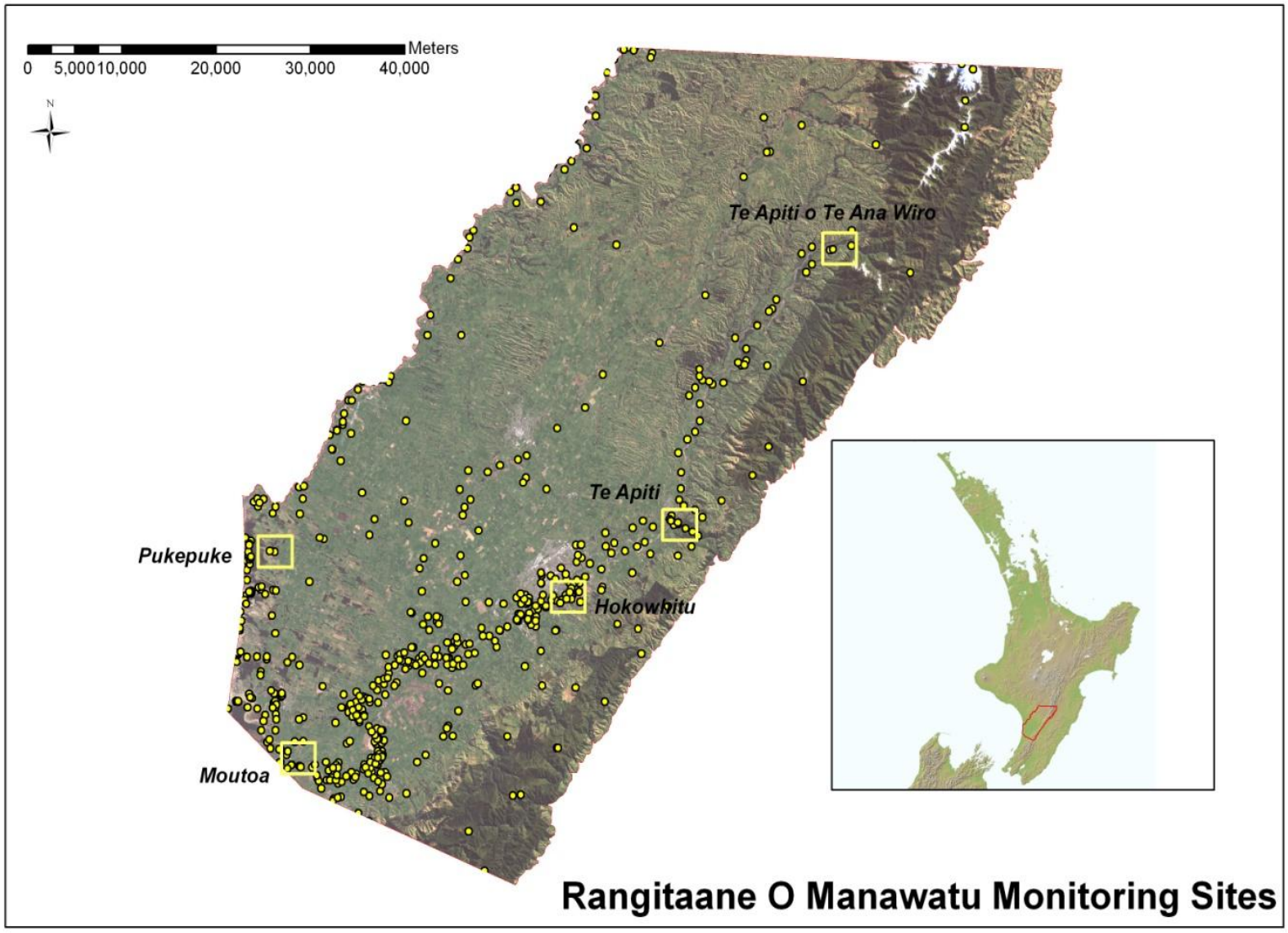
Moutoa/Te Pehu - General Classification table and framework of values and mātauranga

Main categories of attributes/values	Presence/absence in catchment/river	Assessment			Significance		Priority
	Y/N	Current condition	Risk	Ability to restore	Existing value (high, moderate, low)	Historically (high, moderate, low)	1 = low 5 = High (1-5)
1. Vegetation	Y Harakeke	3	4	y	high	high	5
2. Animals, birds, fish, insects, other	Y Tuna/Mudfish	3	4	y	moderate	moderate	5
3. Whenua, land, soil	Y Wetland/Organic	2	4	y	moderate	high	4
4. Water	Y Wetland	2	3	y	high	moderate	4
5. Air	Not considered						
6. Wāhi taonga, Special places	Y	1	2	y	high	high	4
7. Wāhi tapu, Sacred sites	y	1	2	y	high	moderate	4
8. Wairua, Metaphysical	y	3	3	y	moderate	moderate	4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Pukepuke
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Moutoa
Rangitaane O Manawatu Monitoring Sites

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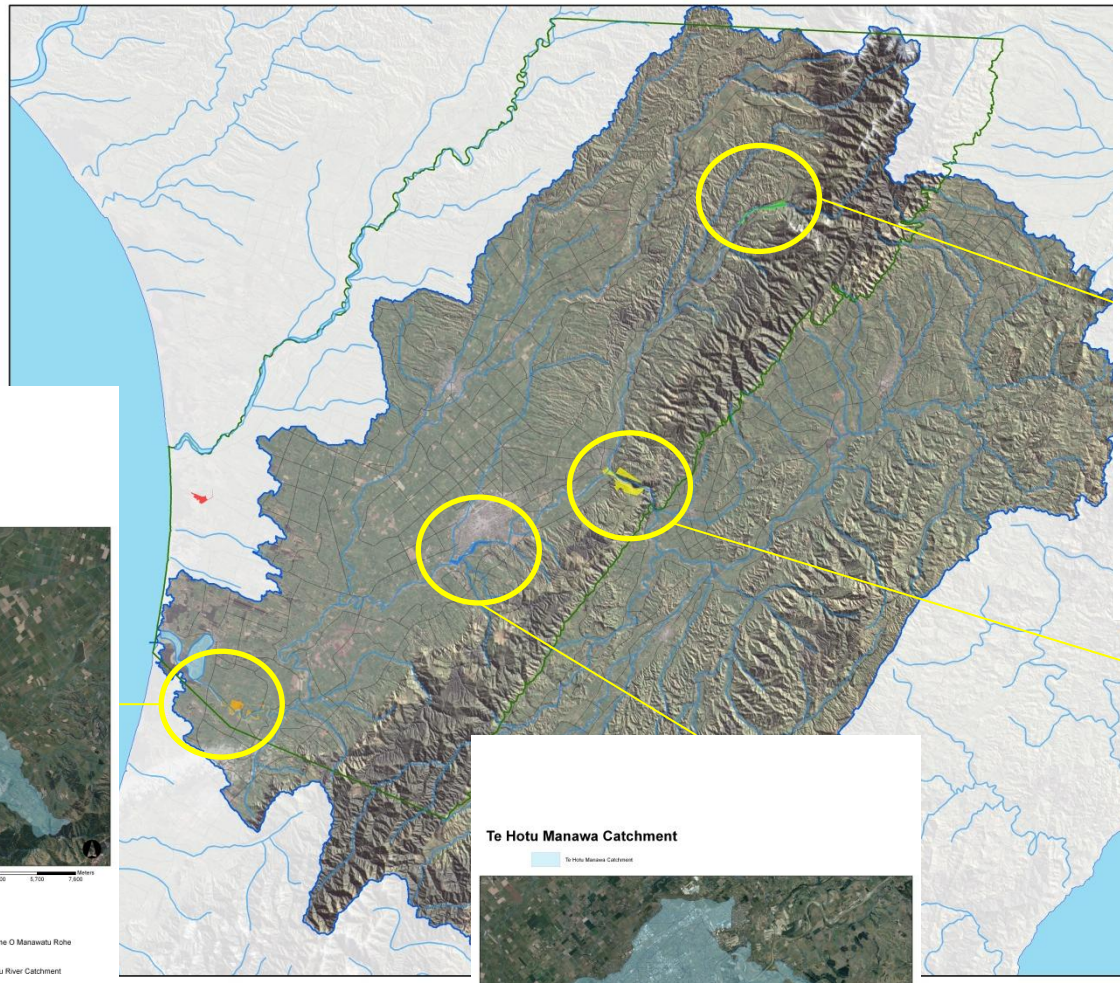
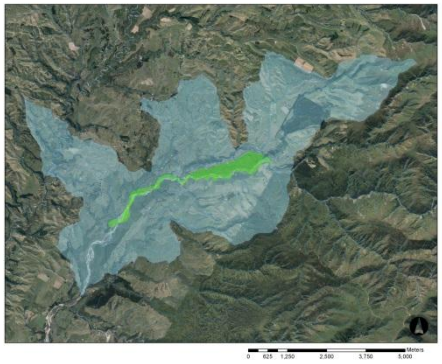


Pohangina Catchment
Pohangina Catchment
Pohangina Catchment

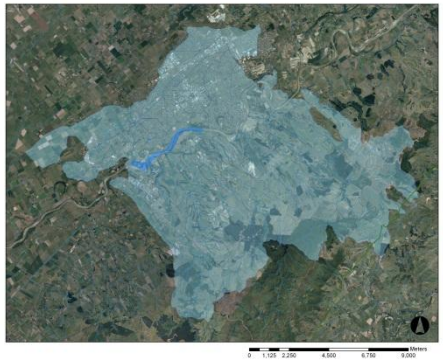


Rangitaane O Manawatu Cultural Monitoring Sites
Pohangina/Te Apiti Te Ana Wiro
Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

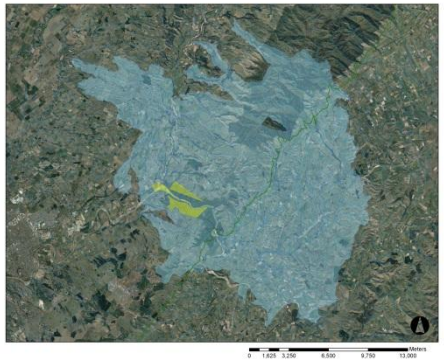
Moutoa Catchment
Moutoa Catchment

Rangitaane O Manawatu Cultural Monitoring Sites
Moutoa
Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

Te Hotu Manawa Catchment
Te Hotu Manawa Catchment



Te Apiti Catchment
Te Apiti Catchment



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Rangitaane O Manawatu Cultural Monitoring

Pohangina/Te Apiti Te A
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Rangitaane O Manawatu Cultural Monitoring Sites
Te Hotu Manawa/Kahuterawa
Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

Rangitaane O Manawatu Cultural Monitoring Sites
Te Apiti
Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

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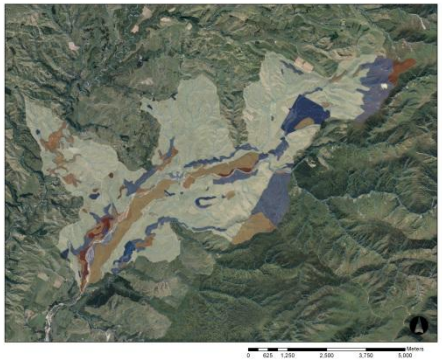
Land Cover Database 2008

- Alpine Grass/Herbfield
- Broadleaved Indigenous Hardwoods
- Built-up Area (settlement)
- Coastal Sand and Gravel
- Deciduous Hardwoods
- Estuarine Open Water
- Exotic Forest
- Fernland
- Flaxland
- Forest - Harvested
- Gorse and/or Broom
- Gravel and Rock
- Herbaceous Freshwater Vegetation
- Herbaceous Saline Vegetation
- High Producing Exotic Grassland
- Indigenous Forest
- Lake and Pond
- Landslide
- Low Producing Grassland
- Manuka and/or Kanuka
- Matagouri or Grey Scrub
- Mixed Exotic Shrubland
- Orchard Vineyard & Other Perennial Crops
- River
- Short-rotation Cropland
- Sub Alpine Shrubland
- Surface Mines and Dumps
- Tall Tussock Grassland
- Transport Infrastructure
- Urban Parkland/Open Space

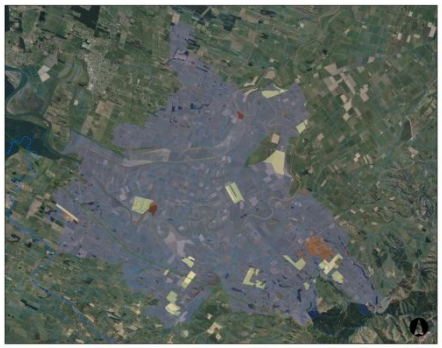
Pohangina Catchment



Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

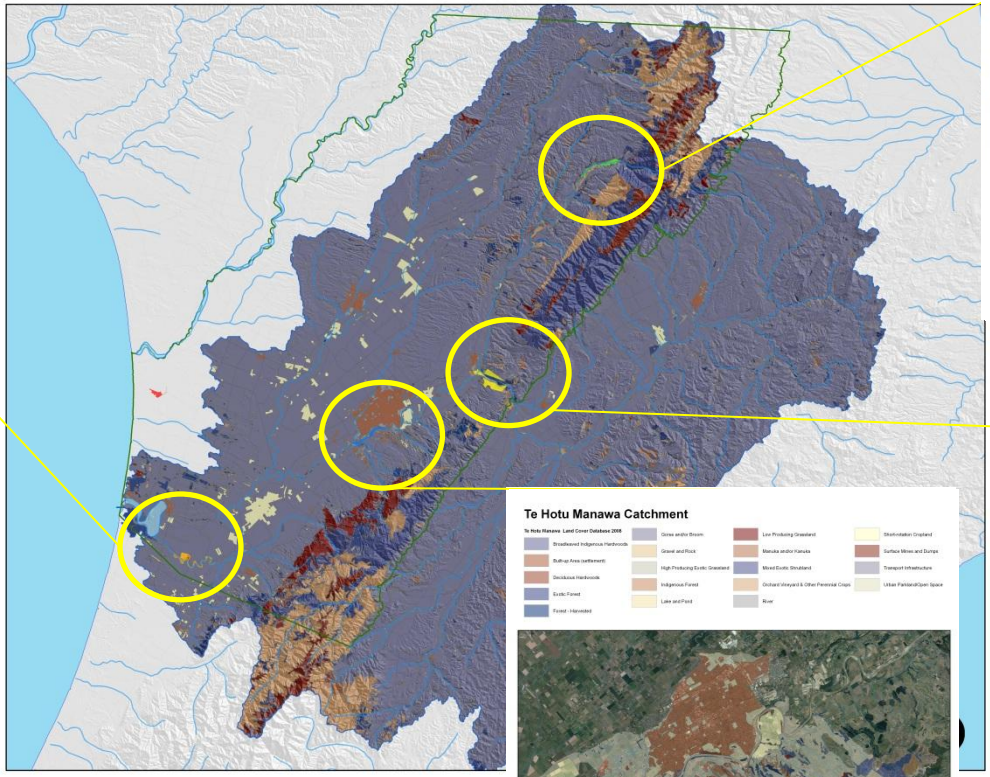
Rangitaane O Manawatu Cultural Monitoring Sites

Moutoa Catchment

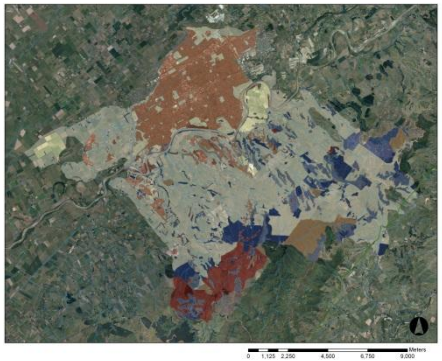


Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

Rangitaane O Manawatu Cultural Monitoring Sites



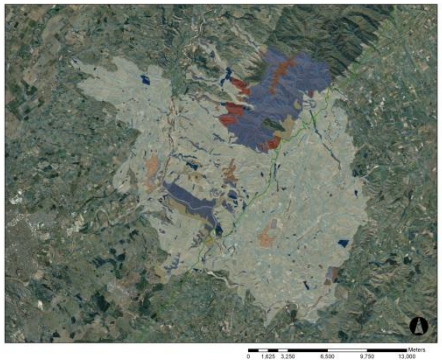
Te Hotu Manawa Catchment



Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

Rangitaane O Manawatu Cultural Monitoring Sites

Te Apiti Catchment



Rangitaane O Manawatu Rohe
River
Manawatu River Catchment

Rangitaane O Manawatu Cultural Monitoring Sites

Rangitaane O Manawatu Cultural Monitoring Sites

- Pohangina/Te Apiti Te Ana Wiro
- Moutoa
- Pukepuke
- Te Hotu Manawa/Kahuterawa
- Te Apiti

Key concepts: can be used to manage, assess, monitor Māori values

- Tikanga (customs)
- Mauri (life force, energy, spirit)
- Ora, oranga (wellbeing, health)
- Ritenga, tapu, rahui, noa (regulation and use)
- Classifications for water; e.g. waiora, waipuna, waimāori, waimate, waikino, waitakaro, waitai etc
- "Ki uta ki tai", "Ngā maunga ki te ngutu awa", Ngā maunga ki te moana" "ko te awa ko au" – Mountains to sea approach (whole catchment, big picture, holistic)
- Taonga tuku iho (inter-generational)
- Te Ao Turoa (sustainability)

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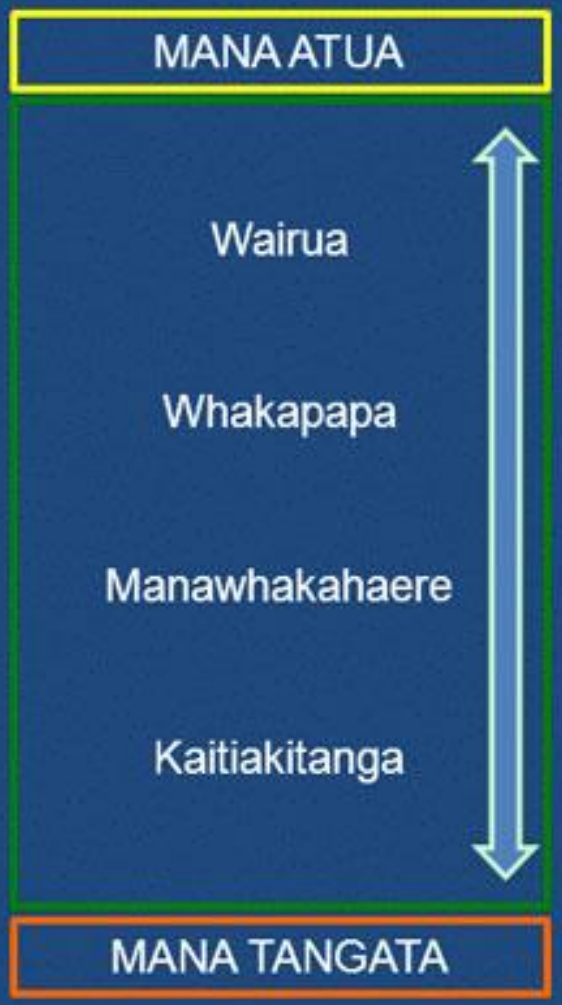
General classification of water (relationship to tapu and noa)

Wai ora	Water in its purist form, e.g. rainwater
Wai puna	Spring water
Wai whakaika	Ritual waters, pools, ceremonial
Wai māori	Freshwater water, water for normal consumption
Wai mate	Water that has lost mauri, degraded, and is no longer able to sustain life
Wai kino	Water that is dangerous, such as rapids
Wai tai	Seawater, saltwater, the surf or the tide

Mana Atua Mana Tangata



Mauri, Wairua, Mana
Natural character, life supporting capacity, ecology, classification, biodiverity , native fish

Wai Whakaika – waitohi, waiwhakaheke, wāhi tapu, pure, ceremonial waters ☆

Wai Māori
Drinking water, marae supplies, consumptive water, stock water ☆

Mahinga kai
Food gathering, places of food, experience of place ☆

He Ara Haere
Navigation – right of passage ☆

Au Pūtea
Economic/commercial development – take & discharge ☆

Wai tākaro
Recreation – swimming, fishing (sport) ☆

☆ - Non Hierarchical

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Setting limits to:

Protect/restore/sustain/enhance:

A range of cultural Māori values, practices, uses at given locations

e.g. catchment, sub-catchment, locally specific, habitats, rivers, streams, wetlands, etc.

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Taonga tuku iho

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Bands (narrative, e.g.)

Lakes

Excellent: Healthy ecological communities and are functioning well. Not under stress from nutrients and rarely experience algal blooms.
Good: Largely native ecological community that is functioning under some stress from exotic species and nutrients. Maybe occasional algal blooms.
Fair: Native ecological community is dominant but highly stressed from exotic species and nutrients. Likely occasional algal blooms.
Poor: Ecological community dominated by exotic fish and plant species and high nutrient levels. Most macrophyte communities lost.

Rivers

Excellent: Healthy ecological communities and are functioning well. Not under stress from nutrients and rarely experience algal blooms.
Good: Largely native ecological community that is functioning under some stress from exotic species and nutrients. Maybe occasional algal blooms.
Fair: Native ecological community is dominant but highly stressed from exotic species and nutrients. Likely occasional algal blooms.
Poor: Ecological community dominated by exotic fish and plant species and high nutrient levels.

Cultural values

Excellent: mauri enhanced and a full range of cultural values and practices exhibited and maintained
Good: mauri maintained (ecosystem functioning well), and a wide range of cultural values and practices are expressed, supported, and maintained
Fair: mauri below acceptable iwi/hapū standards and a paucity of cultural values and practices are expressed and maintained
Poor: mauri diminished/degraded and cultural values and practices not being sustained

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Values, uses and Limit setting

Characteristics	Primary contact (e.g. swimming)	Secondary contact (e.g. boating, fishing)	Visual uses (no contact)
Microbiological guidelines	✓	✓	
Nuisance organisms (e.g. algae)	✓	✓	✓
Physical and chemical guidelines:			
• Aesthetics	✓	✓	✓
• Clarity	✓	✓	✓
• Colour	✓	✓	✓
• pH	✓		
• Temp	✓		
• Toxic chemicals	✓	✓	
• Oil, debris	✓	✓	✓

Maori values

WaiMaori, Waiwhakaika, Mahinga kai, Taonga tuku iho, Waitakaro, Waiputea, Waiara

Attributes/variables	Drinking water standards	Primary contact (e.g. swimming)	Secondary contact (e.g. boating, fishing)	Aesthetic, visual (no contact)
Microbial/Bacterial counts Viruses (no data available)	E coli less than one in 100mL of sample	<260 cfu/100ml (acceptable) 260-550/100ml 35 enterococci organisms/100mL (max 60-100 orgs/100mL)	Median 1000 faecal coliform organisms /100mL 230 enterococci organisms/100mL (max in any 1 sample 450-700)	
Protozoa	<1 infectious cyst per 100L of sample			
Natural clarity		Not >20% reduction Secchi disc >1.6m		
Turbidity NTU	2.5			
Periphyton	>8	>8	>8	>8
pH	7.0-8.0	6.0-9.0	5.0-8.0	5.0-9.0
Temp °C	<18	18-25	18-25	18-25
T Nitrate	50 mg/L (short term)	N = ug/L =10,000 Excellent <0.07 g N/m^3		Satisfactory: 0.07-0.44 g N/m^3
Nitrite	3 mg/L			
T Phosphorus		Excellent: <0.005 g P/m^3	Satisfactory: 0.005-0.01 g P/m^3	
Ammonia (as N)	Ammonia -1.5 mg/L	10		
Inorganic determinands of health significance (e.g. Arsenic, cadmium, mercury, etc) Toxic chemicals	Guidelines	Guidelines	Guidelines	Guidelines

Limits for Taonga spp										
Taonga	**Temp range °C**	**pH**	**T Nitrogen (ug/m³)**	**T Phosphorus (ug/m³)**	**Ammonia NH_3 g/m³**	**Sediment (sensitivity)**	**DO(30 day mean) (mgL^{-1}**	**Habitat loss**	**Catchment condition**	**Predators (vulnerability)**
Piharau (lamprey)	18-25	6.5-7.0	<0.7 <500	<20	Low-mod sensitivity	✓ (suspended)	>6.5 (>80%)	✓ v high	✓ (riparian, dams)	Humans
Tuna (eel)	22-25	6.5-7.0	<500	<20	Low-mod sensitivity	✓ (suspended)	>6.5 (>80%))	✓ v high	✓ (riparian, dams)	Humans
Toitoi (common bully)	20-22	8.7	<500	<20	High sensitivity	✓ not turbid	> 3mg/L ~6.0-9.0 (>80%)	✓ v high	✓	✓ (trout)
Kōaro	<13-20	7.6	<500	<20	High	✓ not turbid	8.0-9.0 (>80%)	✓v high	✓(loss of forest)	✓ (trout, smelt)
Banded kōkopu	12-18	6.5-7.0	<500	<20	High	✓ Most sensitive	8.0-9.0 (>80%)	✓ v high	✓	✓ (trout)
Giant kōkopu	11-15	6.0	<500	<20	High	✓ not turbid	8.0-9.0 (>80%)	✓ v high	✓(loss of forest, dams)	✓ (trout)
Shortjaw kōkopu	12-18	8.3	<500	<20	High	✓ not turbid	8.0-9.0 (>80%)	✓ v high	✓ (loss of forest, dams)	✓ (trout)
Inanga	17-20	9.5	<500	<20	Low-mod	✓ not turbid, 420 NTU	8.0-9.0 (>80%)	✓ v high	✓	✓ (trout)
Kōura	<16	7.0-7.5	<500	<20	V high sensitivity	✓ not turbid	8.0-9.0 (>80%)	✓ v high	✓	✓(trout, catfish, perch, etc.)
Smelt	15-17	8-9	<500	<20	High sensitivity	✓ not turbid	8.0-9.0 (90%)	✓ v high	✓	✓ (e.g trout)
Kākahi		7.0-7.5	<500	<20	High sensitivity	✓v high	8.0-9.0 (90%)	✓ v high	✓	✓(parasites)
Invertebrates		7.0-7.5	<500	<20	<0.8g/m³	✓ v high	8.0-9.0 (>80%))	✓ v high	✓	✓