APPENDIX FOURTEEN

Iwi Priorities for Shallow Lakes – Project Assessments

Contents

Shallow Lakes 1 **Priority: High**	**Waikato-Tainui shallow lakes project – collecting, storing and sharing of traditional korero regarding our lakes.**
Project summary	This project was identified as a high priority by iwi at the iwi priorities wananga as it will contribute towards reconnecting whanau and passing on their history and knowledge of our significant lakes. It involves recording our traditional mātauranga regarding the shallow lakes and making it available for iwi in digital and print media format.
Vision for the project	Intergenerational knowledge and practices of shallow lakes are recorded, stored, shared and transferred.
Location	This project is located within the Waikato-Tainui rohe.
Brief description of site	The lakes within the Waikato-Tainui rohe are included in this project. Waikato-Tainui and the Waikato River (including the lakes) are inextricably linked. The creation of mātauranga resources that record and share our history and knowledge of the lakes will be a valuable resource now and for generations to come.
Key threats/impacts	• Loss of knowledge. • No transfer of customs and practices between generations.
Project goal/s (SMART)	Within 2 years of the project commencing, interviews and literature review will be completed. Within 3 years of the project commencing, resources will be developed (digital platform and print media) and available for iwi and others (where appropriate) to use.
Works required (quantity and description)	Works could be implemented at iwi, hapū, marae or whanau level. Co-funding contributions from other interested partners to iwi, hapū, or whanau to complete this project would be welcomed. **Project management ($33,000)** Project manager would be required to manage the project. Includes coordinating up to 30 interviews, engaging researchers/writers, publishing documents, monitoring and milestone reporting. Project management/staffing is estimated to be 25% of the project cost. **Mātauranga interviews ($59,400)** Interview knowledge holders, i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources. Assume • 30 kaumatua/kuia interviews at $500 per interview = $15,000. • Film and editing of interviews at $800 per day x 28 days = $22,400. • Interviewer at $800 per day x 20 days = $16,000.

<table>
<tr><td></td><td>
Transcribe interviews at $200 per interview x 30 = $6000.
Mapping and photographing lake sites (digital platform) ($37,600)
Map and photograph all significant lake sites. Enter information (and interviews) into digital database and maps.
Assume
Access and photograph sites at $800 per day x 7 days = $5600.
GIS mapping services at$200 per hour to input maps and develop digital platform x 20 days = $32,000.
Publish printed resource regarding traditional knowledge/mātauranga of Waikato shallow lakes ($35,000)
Literature review (archives, Māori text, early explorers etc) = $10,000.
Use literature review and interview content as basis to write shallow lakes book = $10,000.
Publish book = $15,000.
Book and digital platform launch ($5000)
</td></tr>
<tr><td>Risks to project success</td><td>May be difficult to find 30 knowledge holders.</td></tr>
<tr><td>Project duration (years)</td><td>3 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (25%)</td><td>33,000</td></tr>
<tr><td>Mātauranga interviews</td><td>59,400</td></tr>
<tr><td>Photographing and mapping sites (digital platform)</td><td>37,600</td></tr>
<tr><td>Publish printed resource</td><td>35,000</td></tr>
<tr><td>Launch book/digital platform</td><td>5000</td></tr>
<tr><td>Total</td><td>170,000</td></tr>
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Shallow Lakes 2 **Priority: High**	**Kainui lakes – paa harakeke and other native plant restoration and enhancement project.**
Project summary	This project was identified as a high priority by local tangata whenua. This project will enable paa harakeke to be re-established around the margins of the Kainui lakes; additionally other suitable trees, shrubs, rushes and sedges will be planted to restore riparian plant communities in key areas identified by mana whenua. If appropriate, watercress will be seeded into sites surrounding both lakes.
Vision for the project	Mana whenua are able to further fulfil their role as kaitiaki, utilise paa harakeke and other plant based resources as appropriate, thus continuing with their cultural practices and intergenerational transfer of indigenous knowledge.
Location	Kainui (Horsham Downs) peat lakes. Lakes are Whakatangi, Kaituna, Komakorau, Kainui, Tunawhakaheke, Pikopiko, Hotoangana and Areare.
Brief description of site	**Lake Kainui (Horsham Downs) peat lakes** Lake Kainui is highly peat-influenced as it is located within the Kainui peat bog in the Horsham Downs area. Previously no submerged vegetation has been recorded in this lake (Champion et al., 1993), however, the presence of charophytes was recorded during a recent survey. Lake Kainui suffers from regular cyanobacterial blooms, which can become a hindrance to recreational activities such as power boating. The original Māori name for the lake was Rotokauri meaning 'kauri tree lake'. Kainui means 'abundance of food' and relates to the lake being used to stockpile fish. The land between Turangawaewae and Kirikiriroa (Hamilton) was called the Whenua Momona by Māori, meaning 'fat land for food'. Maori used this whole area, including the Horsham Downs area, for food production purposes. Some of the food produced within this area was transported by waka along the Waikato River to the Auckland area. Flax mills were also located within the area, and produced rope and other flax products. A pa site was located close to Lake Areare and Lake Pikopiko, and contained a reasonable sized population. Lake Kainui was used for food gathering purposes and Lake Areare was utilised for spiritual purposes.

	Lake Kainui was used largely to stockpile fish caught from the Waikato River. As fish within the lake started to become ready to migrate, some were let back into the Waikato River. Food from the lake was used to supply the Kingitanga. Lake Kainui was also a water source for Māori. Medicinal plants surrounding the lake, such as kawakawa, were used by Māori. Reed branches were used for building purposes (roof thatching and creating walls for houses). Watercress would have also been used as a food source. Lake Kainui is one of a series of peat lakes in this area. This project relates to all of the lakes.
Key threats/impacts	• Loss of the ability to practice kaitiakitanga. • Weed species. • Loss of knowledge.
Project goal/s (SMART)	• Areas of up to 4ha (across all of the Kainui lakes) around the lake margins (and associated wetlands) are cleared of exotic weeds and planted in native plants (including paa harakeke) within 3 years of the project commencing. • 5 protected sites have been reseeded with watercress (if appropriate) within 3 years of the project commencing.
Works required	Works could be completed at the whanau, marae, hapū or iwi level. We welcome co-funding opportunities/partnerships. **Project management:** Manage the project, engage with marae, hapū, iwi, land owners, arborists, planting crews, nurseries, pest control, liase with land care groups, land care trust, DOC and complete reporting. ($54,684.8) 20% of project costs. **Site preparation:** Willow control should be undertaken using ground based methods to minimise off-target damage. Willows are densely populated. Assume $30,000. **Riparian planting:** Assumes 4ha of planting, including paa harakeke, across the 8 lakes at $179,524. **Animal pest control** (for plant establishment) over 3 years at $3900. **Watercress seeding:** 10 sites per lake at $5000 per site x 10 = $50,000. **Restoration wananga**: Marae or hapū based restoration wananga x 2 at $5000 per wananga = $10,000.
Risks to project success	• Land ownership (privately owned)

<table>
<tr><td></td><td>Insufficient funding</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Private and public land.</td></tr>
<tr><td>Knowledge gaps and response</td><td>Specific locations suitable for planting and establishing water cress have not yet been identified and this would need to be done during project planning.</td></tr>
<tr><td>Project duration (years)</td><td>5 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (20%)</td><td>54,684.80</td></tr>
<tr><td>Site preparation (willow control)</td><td>30,000</td></tr>
<tr><td>Riparian planting (paa harakeke) 4ha</td><td>179,524</td></tr>
<tr><td>Animal pest control</td><td>3900</td></tr>
<tr><td>Watercress seeding</td><td>50,000</td></tr>
<tr><td>Wananga</td><td>10,000</td></tr>
<tr><td>Total</td><td>328,108.80</td></tr>
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Shallow Lakes 3 **Priority: High**	**Kainui (Horsham Downs) lakes project – collection, storing and sharing of traditional korero regarding our lakes.**
Project summary	This project was identified as a high priority by iwi at the iwi priorities wananga. It will contribute towards reconnecting whanau and the history and knowledge of our significant lakes. It involves recording our traditional mātauranga regarding the Kainui (Horsham Downs) peat lakes and making it available for iwi in digital and print media format. This is for the eight lakes situated in the Kainui rohe.
Vision for the project	Intergenerational knowledge and practices of Kainui (Horsham Downs) peat lakes are recorded, stored, shared and transferred.
Location	This project is located within the Waikato-Tainui rohe and focused on the eight Kainui lakes: Whakatangi, Kaituna, Komakorau, Kainui, Tunawhakaheke, Pikopiko, Hotoangana and Areare.
Brief description of site	The Kainui (Horsham Downs) peat lakes within the Waikato-Tainui rohe are included in this project. Waikato-Tainui and the Waikato River (including the lakes) are inextricably linked. The creation of mātauranga resources that record and share our history and knowledge of the lakes will be a valuable resource now and for generations to come.
Key threats/impacts	• Loss of knowledge. • No transfer of customs and practices between generations.
Project goal/s (SMART)	Within 2 years of the project commencing, the interviews, literature review will be completed. Within 3 years of the project commencing, the resources will be developed (digital platform and print media).
Works required	Works could be implemented at iwi, hapū, marae or whanau level. Co-funding contributions from other interested partners to iwi, hapū, or whanau to complete this project would be welcomed. **Project management ($33,000):** Project manager would be required to manage the project. Including coordinating up to 20 interviews, engaging researchers/writers, publishing document. Monitoring and milestone reporting. Project management/staffing is estimated to be 25% of the project cost. **Mātauranga interviews ($52,400):** Interview knowledge holders i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources. Assume: • 20 kaumatua/kuia interviews at $500 per interview = $10,000. • Film and editing of interviews at $800 per day x 28 days = $22,400.

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Interviewer at $800 per day x 20 days = $16,000.
Transcribe interviews at $200 per interview x 20 = $4000.

Mapping and photographing lake sites (digital platform) ($37,600):
Map and photograph all significant lake sites. Enter information (and interviews) into digital database and maps.
Assume:

Access and photograph sites at $800 per day x 7 days = $5600.
GIS mapping services at $200 per hour to input maps and develop digital platform x 20 days = $32,000.

Publish printed resource regarding traditional knowledge/mātauranga of Waikato shallow lakes ($35,000):

Literature review (archives, Māori text, early explorers, etc) at $10,000.
Use literature review and interview content as basis to write Kainui (Horsham Downs) peat lakes booklet at $10,000.
Publish book at $15,000.

Book and digital platform launch ($5000)
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<tr><td>Risks to project success</td><td>Maybe difficult to find 20 knowledge holders.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Not applicable.</td></tr>
<tr><td>Knowledge gaps and response</td><td>All knowledge holders are yet to be identified. This should be carried out during project planning in order to refine expected costs.</td></tr>
<tr><td>Project duration (years)</td><td>3 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (25%)</td><td>32,500</td></tr>
<tr><td>Mātauranga interviews</td><td>52,400</td></tr>
<tr><td>Photographing and mapping sites (digital platform)</td><td>37,600</td></tr>
<tr><td>Publish printed resource</td><td>35,000</td></tr>
<tr><td>Launch book/digital platform</td><td>5000</td></tr>
<tr><td>Total</td><td>162,500</td></tr>
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Shallow Lakes 4 **Priority: High**	**Recognising and honouring our sites of significance – Kainui (Horsham Downs) lakes IPOU project**
Project summary	This project was identified as a high priority by iwi. It provides a means of sharing our knowledge, connection, history and relationship with the significant shallow lakes in the lower Waikato River catchment, which otherwise could be lost. The project will create a physical network of interactive pou (iPou) connected to a database that delivers cultural, historical, spiritual and ecological layers to smart phones and devices. The pou will also act as a physical presence to acknowledge the sites.
Vision for the project	Sites of significance are acknowledged through iPou (or some other appropriate tohu for the place, e.g. kohatu or carved pou) and the korero that is able to be shared with whanau.
Location	The project location is the eight Kainui (Horsham Downs) peat lakes in the Waikato River catchment: Whakatangi, Kaituna, Komakorau, Kainui, Tunawhakaheke, Pikopiko, Hotoangana and Areare.
Brief description of the site	The specific iPou sites will be determined by iwi, but could include waahi tapu sites, traditional fishing sites, traditional paa sites and/or any other significant sites determined by tangata whenua. Ten iPou sites may be selected due to historical, cultural, spiritual or ecological significance as determined by iwi. This project is significant because it enables iwi to tell their story as kaitiaki to acknowledge and share knowledge of the Kainui (Horsham Downs) peat lakes. This project would complement the project on Kainui lakes cultural history, with the history used to inform iPou content.
Key threats/impacts	● Connections and important history will be lost. ● Sites won't be appropriately recognised and acknowledged. ● Cultural safety.
Project goal/s (SMART)	Within 3 years of the project commencing, up to 10 iPou will be standing at Kainui (Horsham Downs) peat lakes.
Works required	Works could be implemented at iwi, hapū, marae, or whanau level. Co-funding contributions from other interested partners to assist with completing this project would be welcomed. **Project management ($42,000):** Manage the project; engage with iwi, hapū, marae to identify sites of

	significance; landowner liaison; negotiate agreements and engage with iPou developer and iPou fabricator, inspect completed works; organise hui to unveil iPou (catering and venue); provide monitoring and milestone reports over a 3 year period. **Collate Information for iPou ($10,000):** Collate information for the sites. Assume: • $1000 per site to undertake this task. **Fabricate and install up to 10 iPou onto the designated shallow lakes sites ($100,000):** Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou or kohatu). Assume: • $10,000 per iPou (fabrication and installation costs) per site = $100,000. **Technology/information loaded and installed into iPou ($20,000):** Engage iPou developer to install information collated into the fabricated pou. Upload/install the technology. Assume: • $2000 per pou = $20,000. **Cultural safety ($10,000):** Cultural advisors and practices to ensure cultural safety of this project.
Risks to project success	• Access to sites. • Access to knowledge.
Land tenure – likelihood of adoption and adoption circumstances	iPou to be located in lakes with public access.
Knowledge gaps and response	Permit requirements for iPou installation. Specific number of iPou would need to be determined once landowner consultation had been completed.
Project duration (years)	3 years

Costs

Work description	Cost ($)
Project management (30%)	42,000
Collate information for iPou	10,000
Fabricate and install up to 10 iPou onto the designated shallow lakes sites	100,000
Technology/information loaded and installed into iPou	20,000
Cultural safety costs	10,000
Total	**182,000**

Shallow Lakes 5 **Priority: High**	**Lake Kimihia, Lake Whangape and Lake Waikare tuna ponds**
Project summary	The restoration of tuna abundance was identified as a high priority by iwi. This project will see the creation of 15 tuna habitat ponds and areas associated with Lakes Waikare, Lake Kimihia and Lake Whangape (and their tributaries).
Vision for the project	Tuna (freshwater eels) are plentiful. Whanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred onto future generations.
Location	Lake Kimihia, Huntly Lake Waikare, Rangiriri/Te Kauwhata Lake Whangape, Huntly
Brief description of site	The sites will be areas that are suitable for tuna habitat ponds. This project is significant because tuna are a very significant mahinga kai taonga species for Waikato-Tainui. Downes (1918) noted that "the Mangatawhiri, the Maramarua, the Whangamarino, the Mangawara, the Waipā, the Awaroa, the Opuatia, and the two lakes Waikare and Whangape, all in middle Waikato, were famed for their eels. Along all these streams (most of them navigable) the Māoris in former times erected enormous eel-weirs, which have now been destroyed by floods or removed to admit of navigation by launches and barges. On the Maramarua there were most extensive pa-tuna, the main posts of which were frequently 2 ft in diameter, with roughly carved tops. How the old Māoris, without mechanical means of driving, ever got these heavy posts into position is not known, but it must have been a strenuous work".
Key threats/impacts	Tuna population will continue to decline and become less abundant. Whanau, hapū and marae will become less engaged with the practices of kaitiakitanga and mahinga kai.
Project goal/s (SMART)	Within 10 years, up to 15 tuna habitat ponds are created within the areas adjacent to Lakes Whangape, Lake Kimihia and Lake Waikare to provide an increase in habitat availability for tuna. Tuna wananga have been held with iwi members at (or near) the ponds transferring knowledge and tools to marae. Tuna from the ponds are being served at Poukai, thus contributing to restoring the relationship of the marae with the Waikato River.
Works required	Works are intended to be implemented by whanau, hapū and ngaa marae. Co-funding contributions will be sourced and welcomed from interested collaborative partners.

This project is intended to be undertaken as 15 individual projects, but may be undertaken as multiple ponds per project where appropriate.

Cultural practices to ensure cultural safety:
Cultural safety, $200 per hour or $1600 per 8 hours.
Estimated cost for up to 80 hours = $24,000.

Earthworks:
Excavate marginal low lying areas to create shallow ponds/wetlands.

- Ponds should be constructed up to a maximum of 5000m^2 and approximately 2m deep. They should be no deeper than 3m to avoid deoxygenation of bottom layers and associated fish deaths.
- Ponds are lined with suitable soils so they are capable of holding water with minimum leakage.
- Good quality water is maintained in the constructed ponds.
- Ponds are constructed in traditional mahinga kai area/sites identified by whanau, hapū and marae.

Note: Resource consent may be required

Costs include excavator transport and are based on ponds being 5000m^2 x 2m deep and a 12 tonne excavator moving 150m^3 per hour ($10,000), returning for one day to reshape the site once excavations have settled ($1800).

Cost per pond: $11,800.
Estimated cost across 15 ponds: $177,000.

Fencing:
Ponds should be fenced to exclude cattle and sheep with a 7-wire post and baton fence.

Cost per pond: 400m x $20/m = $8000.
Estimated fencing cost across 15 ponds: $120,000.

Planting:
Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree, flax).

- Native planting 0.3ha per pond = $11,865.
- Additional weed control for 3 years at each pond = $2520.

Planting and releasing cost per pond = $14,385.
Estimated planting cost across 15 ponds = $215,775.

Resource consent:
It is anticipated that most ponds will require resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately.

A generous cost estimate of $5000 per pond has been used.
Estimated resource consent cost across 15 ponds: $75,000.

Capacity development:
- Tuna wananga

Provide training for tribal members to learn about tuna restoration.

Tuna wananga (10) plus tuna tool kits.
Cost per wananga: $6000.
Estimated cost: $60,000.

<table>
<tr><td></td><td>Project management
Project manager to carry out knowledge holder interviews, work with whanau, marae, hapū, or iwi (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be up to 30% of the project cost.

Estimated project management cost per pond: $12,235.50.
Estimated project management cost across 15 ponds: $234,533.</td></tr>
<tr><td>Risks to project success</td><td>• Access to sites.
• Resource consents not granted.
• Inexperienced practitioners and/or in-completed works.
• Ongoing maintenance to control weed infestation.
• Commercial eel fisherman, fishing out completed pond.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whanau, hapū, ngaa marae and iwi.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>Whether consents or authorisations are required.
Exact location of tuna ponds is to be determined by whanau, hapū and/or marae.
Size of each pond including area to be fenced and restored will differ from site to site.</td></tr>
<tr><td>Project duration (years)</td><td>3 years per pond per site includes construction, planting and weeding programme.
10 year project.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Earthworks</td><td>177,000</td></tr>
<tr><td>Fencing (6km)</td><td>120,000</td></tr>
<tr><td>Planting (4ha)</td><td>215,775</td></tr>
<tr><td>Resource consents</td><td>75,000</td></tr>
<tr><td>Capacity development (tuna wananga)</td><td>60,000</td></tr>
<tr><td>Project management (30%)</td><td>194,332.50</td></tr>
<tr><td>Total</td><td>842,107.50</td></tr>
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<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Total estimate cost per individual pond (excludes capacity development and tertiary scholarships)</td><td>56,140.50</td></tr>
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Shallow Lakes 6 Priority: High	Lake Ngaroto and Lake Mangakaware paa harakeke and other native plant restoration and enhancement.
Project summary	This project was identified as a very high priority by local tangata whenua. This project will enable paa harakeke to be re-established around the margins of the lake; additionally, other suitable trees, shrubs, rushes and sedges will be planted to restore riparian plant communities in key areas identified by mana whenua. If appropriate, watercress will be seeded into sites surrounding both lakes.
Vision for the project	Mana whenua are able to further fulfil their role as kaitiaki, utilise paa harakeke and other plant based resources as appropriate. Thus, continuing with their cultural practices and intergenerational transfer of indigenous knowledge.
Location	Lake Ngaroto, Te Awamutu Lake Mangakaware, Paterangi.
Brief description of site	**Lake Ngaroto** The area of Ngaroto is steeped in ancient traditional history, being one of the more significant settlement regions following the migration of ancient Māori inland from the Käwhia shorelines circa 1400-1500 (Hingakaka-Ngaroto Iwi Management Plan). The region was settled by various tribes and hapū over the next two to three hundred year settlement period. At the time of the Hingakaka battle the Apakura, Hikairo, and Puhiawe tribes were the principle resident iwi of the Ngaroto area. The dominance of that occupation remained until the departure of Hikairo to Kawhia in the 1820-21 period and the eventual departure of Apakura to the Taupo region as a consequence of the confiscation of their ancestral lands by colonial Pakeha invasionary forces in 1864 (Hingakaka-Ngaroto Iwi Management Plan). The late 1700-1800s period saw turmoil and warfare beset the Tainui tribes in the Waipā region and as a consequence of raid and counter raid between the tribal factions of Tainui, and inter-iwi conflicts with external tribes in the North Island, invasionary forces from throughout the North Island converged on the Te Awamutu area to engage in battle with the Waikato-Maniapoto tribes of Tainui. Thus the ground for the epic battle of Hingakaka was set (Hingakaka-Ngaroto Iwi Management Plan). Archaeological evidence from five pa sites around Lake Ngaroto indicates people lived here and they cultivated their own food, using

	the nearby forest and lake as a food source and as a resource for building materials, medicine, and traditional rituals and ceremony. Lake Ngaroto is also where Uenuku was recovered from. Accordingly, Lake Ngaroto has national, historical, customary, cultural and spiritual significance for tangata whenua as kaitiaki of the region. It is the largest of the Waipā peat lakes. It is located 19km south of Hamilton city and 8km northwest of Te Awamutu. It has a maximum depth of 4 metres and an average depth of less than 2 metres. Lake Ngaroto has poor water quality, however a major effort has been launched to return this lake to a more natural state, surrounded by native vegetation. The lake catchment is mainly pastoral. Lake Ngaroto is hypertrophic. It has: • very high levels of nutrients • high levels of microscopic algae (phytoplankton) • high levels of suspended sediment • low water clarity. **Lake Mangakaware** Lake Mangakaware Recreation Reserve is very culturally significant and is located within a north-south orientated shallow valley, ringed by Anderson, Kakaramea and Meadways roads at Paterangi. It is the western most of the 16 Waipā peat lakes and drains west into Mangakaware Stream and eventually joins Waipā River at Te Rore. Three sites are registered by the NZ Archaeological Society, and all are swamp pa. Extensive surveys of these sites together with the lake bed were commissioned by the society during four periods between August 1968 and December 1970. Extracts from published reports referred to: "… the dwelling areas of the site were built up from sand lenses laid on the original peat surface and the whole unit would have been defended by the surrounding lake and swamp as well as man made palisades. The site dates to the sixteenth and seventeenth centuries A.D. and is one of the best preserved examples of a classic Māori habitation site to be excavated in New Zealand …" (Bellwood, P 1978). At least three canoes/waka found by divers during the survey lie in the mud and sediment of the lake bed. These were recorded, but left undisturbed. There are also examples of palisades still present at two sites although they are now in poor condition through lowering ground water levels and drying peat.

	Water levels are crucial for the preservation of organic materials within and around the three pa on the shores of the lake. Levels determine the degree to which archaeological deposits/artifacts are saturated and the rate of aerobic decomposition. Just making a note to the project team to note the connection between this project and the Mangakaware/Ngaroto projects in the general priorities section. These projects are complimentary and the other PAFs need to note the importance of inclusion of this project.
Key threats/impacts	• Loss of the ability to practice kaitiakitanga. • Weed species. • Loss of knowledge.
Project goal/s (SMART)	Per lake: • Areas of up to 2ha (identified as important by tangata whenua) around the lake margins and associated wetlands are cleared of exotic weeds and planted in native plants (including paa harakeke) within 3 years of the project commencing. • 5 protected sites have been reseeded with watercress (if appropriate) within 3 years of the project commencing.
Works required	Works could be completed at whanau, marae, hapū or iwi level. We welcome co-funding opportunities/partnerships. **Project management:** Manage the project, engage with marae, hapū, iwi, land owners, arborists, planting crews, nurseries and pest control, liase with land care groups and Waipā District Council, and complete reporting at $64,118.50. 25% of project costs. **Site preparation:** Willow control should be undertaken using ground based methods to minimise off-target damage. Willows are densely populated. Assume $15,000 for Lake Ngaroto. **Riparian planting:** Assumes 2ha of planting, including paa harakeke, per lake. $89,762 (for 2ha) x 2 lakes = $179,524. **Animal pest control** (for plant establishment): Over 3 years. Assume $1950 for Lake Ngaroto. **Watercress seeding:** 5 sites per lake at $1000 per site x 10 = $50,000. **Restoration wananga**: Marae or hapū based restoration wananga x 2 (1 per lake) at $5000 per wananga = $10,000.
Land tenure – likelihood of adoption and adoption circumstances	Both lakes have significant publicly owned margins that are managed by Waipā District Council.

<table>
<tr><td>Knowledge gaps and response</td><td>These lakes are of very high cultural significance and have archaeological remains. Investigation of preservation methods would be beneficial.</td></tr>
<tr><td>Project duration (years)</td><td>5 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (25%)</td><td>64,118.50</td></tr>
<tr><td>Site preparation (willow control)</td><td>15,000</td></tr>
<tr><td>Riparian planting (paa harakeke)</td><td>179,524</td></tr>
<tr><td>Animal pest control</td><td>1950</td></tr>
<tr><td>Watercress seeding</td><td>50,000</td></tr>
<tr><td>Wananga</td><td>10,000</td></tr>
<tr><td>Total</td><td>320,592.50</td></tr>
</table>
</td></tr>
</table>

Shallow Lakes 7 **Priority: Very high**	**Restoration of paa harakeke, watercress and raupo around Lake Waahi lake margins.**
Project summary	This project was identified as a very high priority by tangata whenua in the Lower Waikato River catchment. Much of the Lake Waahi lake margin has been fenced and planted through previous restoration projects, but there is still approximately 6km of lake edge and associated wetlands left to fence and plant. This project will see the Lake Waahi lake margin and associated wetlands fully fenced and planted with native plants. Through the native plantings, paa harakeke will be re-established; raupo will be specifically planted onto the northern shore of Lake Waahi which is prone to erosion, and watercress will be seeded into 10 seeps, puna, wetlands and tributaries surrounding the lake.
Vision for the project	The whole of the Lake Waahi lake margin is fenced to exclude cattle and a thriving riparian margin (including paa harakeke) is planted around the whole lake. Raupo beds have established on the northern shore of Lake Waahi in erosion prone areas. Watercress is readily available for wild harvest for ngaa whanau and marae o Rahui Pokeka
Location	Lake Waahi, Huntly
Brief description of site	Lake Waahi is culturally very significant for Waikato-Tainui and is the third largest lake in the Waikato region. It has suffered from high levels of suspended sediment entering the lake, originating from both pastoral and mine drainage. Currently, the lake is considered to be hypertrophic. At times, 90% of the sediment entering the lake resulted from coal mining. Mine discharge, increased agriculture, clearing of native forest and the resulting increase in nutrient and suspended sediment levels are the primary cause of water quality decline. Lake Waahi became dominated by exotic macrophytes prior to 1978 and in 1978-79 the macrophyte populations crashed. This was attributed to low lake levels due to low rainfall, high nutrient concentrations and continued sediment input from mining (Dell et al., 1988). Currently, Lake Waahi remains unvegetated and is extremely turbid, which renders it undesirable for recreational activities.
Key threats/issues	• Loss of the ability to practice kaitiakitanga. • Erosion and floods. • Stock access. • Weed species.
Project goal/s (SMART)	• The remaining areas of Lake Waahi's lake margin and associated wetlands (approx. 6km) is cleared of exotics and

	replanted with riparian margin species (including paa harakeke) within 3 years of the project commencing. (Note: two significant wetlands on the Lake Waahi lake margin are covered in a different project in the strategy.) • Two (1km x 5m) stretches of raupo have been planted on the northern shore of Lake Waahi in erosion prone areas within 2 years of the project commencing. • 10 protected sites have been reseeded with watercress within 3 years of the project commencing.
Works required	Works could be completed at whanau, marae, hapū or iwi level. We welcome co-funding opportunities/partnerships. **Project management:** Manage the project, engage with marae, hapū, iwi, land owners, arborists, planting crews, nurseries and pest control, and complete reporting at $74,868. 25% of project costs. **Fencing:** The lake margin shall be fully fenced primarily to exclude stock and should occur on the landward extent of the wetlands. Most of the lake is fenced but assume 2km requires fencing i.e. around wetlands. Assume $40,000. **Site preparation:** Willow control should be undertaken using ground based methods to minimise off-target damage. Willows are densely populated, Assume $30,000. **Riparian planting:** Assumes 3ha of planting including paa harakeke at $134,643. **Animal pest control** (for plant establishment): Over 3 years. Assume $1950. **Raupo planting**: Assume 1 hectare at $44,881. Additional resources to support raupo establishment (warrens/wire etc) at $2000. **Watercress seeding:** 10 sites x $5000 per site = $50,000. **Restoration wananga**: Marae or hapū based restoration wananga. Assume $5000.
Risks to project success	Land ownership (although with previous projects around Lake Waahi this has not been a problem).
Land tenure – likelihood of adoption and adoption circumstances	Private and public land.
Knowledge gaps and response	Specific areas for fencing and planting will need to be identified during project planning.
Project duration (years)	5 years

Costs

Work description	Cost ($)
Project management (25%)	77,118
Fencing (2km)	40,000
Site preparation (willow control)	30,000
Riparian planting (paa harakeke)	134643
Animal pest control	1950
Raupo planting plus support resources	46,881
Watercress seeding	50,000
Wananga	5000
Total	**385,592**

Shallow Lakes 8 **Priority: Very high**	**Lake Waikare paa harakeke and other native plant restoration and enhancement project.**
Project summary	This project was identified as a very high priority by local tangata whenua. This project will enable paa harakeke to be re-established around the margin (and associated wetlands) of Lake Waikare; additionally, other suitable trees, shrubs, rushes and sedges will be planted to restore riparian plant communities in key areas identified by mana whenua, and if appropriate watercress will be seeded into appropriate sites surrounding both lakes.
Vision for the project	Mana whenua are able to further fulfil their role as kaitiaki, utilise paa harakeke and other plant based resources as appropriate. Thus continuing with their cultural practices and intergenerational transfer of indigenous knowledge.
Location	Lake Waikare, Te Kauwhata
Brief description of site	**Lake Waikare** Lake Waikare is the largest lake in the Lower Waikato catchment, with 3442ha of open water. It has an average depth of 1.5m and a maximum depth of 1.8m. Lake Waikare has very poor water quality and is hypertrophic. There are no large submerged aquatic plants growing in the lake. In 1965 the lake level was lowered by 1m. This was in accordance with the Lower Waikato Waipā Flood Control Scheme and followed the construction of an outlet gate. Lake Waikare discharges to the Whangamarino Wetland from the artificial Pungarehu Canal. The lake is managed under a strict seasonal fluctuation regime of approximately 0.3 metres.
Key threats/impacts	• Loss of the ability to practice kaitiakitanga. • Weed species. • Loss of knowledge.
Project goal/s (SMART)	• Areas of up to 10ha (identified as important by tangata whenua) around the lake margins and associated wetlands are cleared of exotic weeds and planted in native plants (including paa harakeke) within 3 years of the project commencing. • 10 protected sites have been re-seeded with watercress (if appropriate) within 3 years of the project commencing.
Works required	Works could be completed at whanau, marae, hapū or iwi level. We welcome co-funding opportunities/partnerships. **Project management:** Manage the project, engage with marae, hapū, iwi, land owners, arborists, planting crews, nurseries and pest control, liaise with land care groups, land care trust and DOC and complete reporting at $121,759.60.

<table>
<tr><td></td><td>20% of project costs.

Fencing: The lake margin shall be fenced primarily to exclude stock. Most of the lake is fenced but assume 4km requires fencing, i.e. around wetlands, at $80,000.

Site preparation: Willow control and other pest weeds should be undertaken using ground based methods to minimise off-target damage. Willows are densely populated. Assume $100,000.

Riparian planting: Assumes 8ha of planting including paa harakeke around the lake margins/or associated wetlands. $44,881 x 8 = $359,048.

Animal pest control (for plant establishment): Over 3 years. Assume $9750.

Watercress seeding: 10 sites per lake x $5000 per site = $50,000.

Restoration wananga: Marae or hapū based restoration wananga x 2 at $5000 per wananga = $10,000.</td></tr>
<tr><td>Risks to project success</td><td>Land ownership (although with previous projects around Lake Waahi this has not been a problem).</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Private and public land.</td></tr>
<tr><td>Knowledge gaps and response</td><td>These lakes are of very high cultural significance and have archaeological remains, investigation of preservation methods would be beneficial.</td></tr>
<tr><td>Project duration (years)</td><td>5 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (20%)</td><td>121,759.60</td></tr>
<tr><td>Fencing</td><td>80,000</td></tr>
<tr><td>Site preparation (willow control)</td><td>100,000</td></tr>
<tr><td>Riparian planting (paa harakeke)</td><td>359,048</td></tr>
<tr><td>Animal pest control</td><td>9750</td></tr>
<tr><td>Watercress seeding</td><td>50,000</td></tr>
<tr><td>Wananga</td><td>10,000</td></tr>
<tr><td>Total</td><td>730,557.60</td></tr>
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Shallow Lakes 9 **Priority: Very high**	**Kaitiakitanga in action through reducing koi carp (and other pest fish) in the Lower Waikato Lakes**
Project summary	This project was identified as a very high priority (second highest priority) by tangata whenua in the lower Waikato River catchment. Koi carp (and other pest fish) were identified as a major source of harm to our tupuna awa (which by definition includes the shallow lakes) and also as a major threat to future restoration efforts, including lake bed plant restoration, water quality improvement projects and/or mahinga kai restoration projects. The concerted effort to remove koi carp (and other pest fish species) is a modern version of kaitiakitanga in action. As kaitiaki we have an inherent responsibility to restore, protect and enhance not only our shallow lakes but our taonga species. The project would see a team of kaitiaki actively fish down and dispose of primarily koi carp, but also other pest fish species such as perch, cat fish, etc. All year round. These fish have a detrimental effect on te mana o te awa and compete with mahinga kai (eg tuna) for food and habitat.
Vision for the project	Koi carp and other pest fish are significantly reduced in three Lower Waikato shallow lakes (Waahi/Whangape/Waikare) resulting in better outcomes for mahinga kai species, water quality and plant reestablishment efforts.
Location	Lake Waahi, Lake Whangape and Lake Waikare
Brief description of site	The lower Waikato shallow lakes are highly significant to Waikato-Tainui. All of the shallow lakes have significant pre-European history and were major food baskets for our tupuna. The three lakes identified for this project all have high pest fish populations, all have poor water quality and little to no significant macrophyte beds. They have also been identified for other parallel restoration works to occur in their catchments. The project will involve rotating between the lakes and fishing down pest fish populations. Daily catches will be recorded. Changes in catch rates and water quality as identified by lake buoys will be monitored. Depending on the results of the project, following the five year period, this project could get extended into the other shallow lakes.
Key threats/impacts	Loss of the ability to practice kaitiakitanga on the ground has led to a disconnection of the whanau and the lakes.
Project goal/s (SMART)	• Koi carp populations have been significantly reduced in the three shallow lakes (by at least half or more). • The methods have been refined and can be applied across other koi hot spots.

Works required	**Project management:** • Manage project, engage with landowners, mana whenua, coordinate fishers, design and installation of gates, monitoring and reporting over 5 year period at $335,000. **Project plan:** • Detailed project plan at $20,000. **Koi gates:** • Design and consents at $40,000. • Install one way koi gates at the outlets of the three lakes at $300,000. **Fishing gear, training and vehicle:** • Purchase boat, nets, safety equipment at $50,000. • Purchase or lease truck at $30,000. • Fuel, etc, for boat at $500pw x 52 x 5 = $130,000. • Health and safety training, etc, at $10,000. **Kaitiaki fishers:** • 3 x fishers x $45,000 each per year = $135,000 annually. • 5 years x $135,000 = $675,000. **Monitoring:** • Engagement with WRC, review of buoy data, plus baseline and final fisheries survey at $80,000. **Pest fish wananga:** • Wananga to learn about pest fish at $5000.
Risks to project success	• Flooding. • Vandalising.
Land tenure – likelihood of adoption and adoption circumstances	Crown land. Iwi owned land (Lake Waikare and some margins). Maaori owned land.
Project duration (years)	5 years

Costs

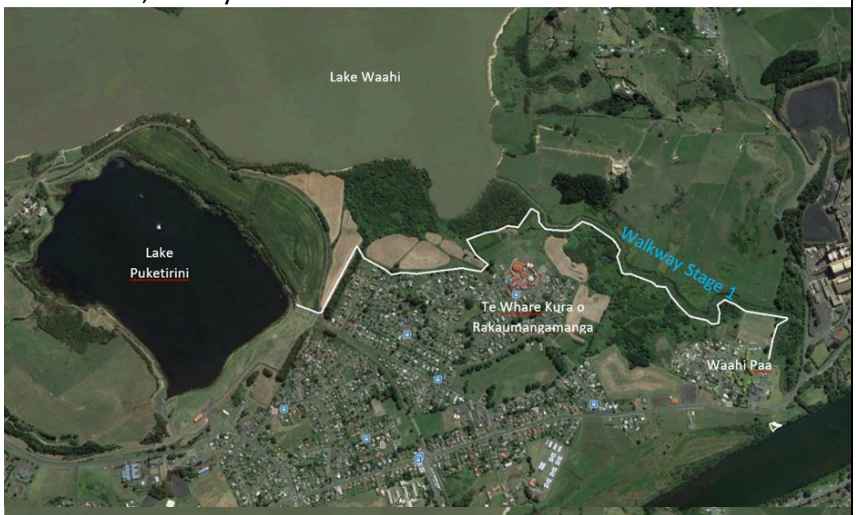
Work description	Cost ($)
Project management (25%)	335,000
Project plan	20,000
Koi gates	340,000
Fishing gear, training and vehicle	220,000
Kaitiaki fishers (x 3) over 5 years	675,000
Monitoring	80,000
Wananga	5000
Total	**1,675,000**

Shallow Lakes 10 **Priority: High**	**Recognising and honouring our sites of significance – Lower Waikato lakes iPOU project**
Project summary	This project was identified as a high priority by iwi. It provides a means of sharing our knowledge, connection, history and relationship with the significant shallow lakes in the Lower Waikato River catchment, which otherwise could be lost. The project will create a physical network of interactive pou (iPou) connected to a database that delivers cultural, historical, spiritual and ecological layers to smart phones and devices. The pou will also act as a physical presence to acknowledge the sites.
Vision for the project	Sites of significance are acknowledged through iPou (or some other appropriate tohu for the place, eg kohatu, or carved pou) and the korero that is able to be shared with whanau.
Location	The project location is the significant shallow lakes in the Waikato River catchment.
Brief description of the site	The specific iPou sites will be determined by iwi, but could include waahi tapu sites such as Lake Kopuera, traditional fishing sites like Lake Whangape, and/or traditional paa sites like Lake Kimihia or any other significant sites. Twenty iPou sites may be selected due to historical, cultural, spiritual or ecological significance as determined by iwi. 10 carved pou sites selected by iwi. This project is significant because it enables iwi to tell their story as kaitiaki to acknowledge and share knowledge of the shallow lakes around the Waikato River and its tributaries.
Key threats/impacts	● Connections and important history will be lost. ● Sites won't be appropriately recognised and acknowledged. ● Cultural safety.
Project goal/s (SMART)	Within 3 years of the project commencing, up to 20 iPou and 10 carved pou will be standing at lakes of significance in the Waikato River catchment.
Works required	Works could be implemented at iwi, hapū, marae, or whanau level. Co-funding contributions from other interested partners to assist with completing this project would be welcomed. **Project management ($222,000):** Manage the project; engage with iwi, hapū, marae to identify sites of significance; landowner liaison; negotiate agreements and engage with iPou developer and iPou fabricator; source wood, source carvers, inspect completed works; organise hui to unveil iPou

	(catering, venue); provide monitoring and milestone reports over a 3 year period. **Collate information for iPou ($20,000):** Collate information for the sites. Assume: • $1000 per site to undertake this task. **Fabricate and install up to 20 iPou onto the designated shallow lakes sites ($200,000) and up to 10 carved pou at $32,000 per pou ($320,000)** **Wood $150,000** Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design e.g. carved pou, or kohatu). Assume: • $10,000 per iPou (fabrication and installation costs) per site = $200,000 • $32,000 per carved pou (carving) • $6000-$15,000 per pou for wood, depending if pine or native. For the purpose of this costing, native wood has been used at $15,000. **Technology/information loaded and installed into iPou ($40,000):** Engage iPou developer to install information collated into the fabricated pou. Upload/install the technology. Assume: • $2000 per pou x 20 = $40,000. **Cultural Safety ($10,000):** Cultural advisors and practices to ensure cultural safety of this project.
Risks to project success	Access to sites. Access to knowledge, although if the project regarding collection of traditional knowledge is completed then this is no longer an issue.
Land tenure – likelihood of adoption and adoption circumstances	Mix of public, private and iwi owned. Very high likelihood of adoption.
Knowledge gaps and response	Permit requirements for iPou installation.
Project duration (years)	3 years

Costs

Work description	Cost ($)
Project management (30%)	222,000
Collate information for iPou	20,000
Fabricate and install up to 20 iPou onto the designated shallow lakes sites	200,000
Up to 10 carved pou (approx. 6m by 0.6m)	320,000
Materials (wood for pou)	150,000
Technology/information loaded and installed into iPou	40,000
Hui costs	10,000
Total	**962,000**

Shallow Lakes 11 **Priority: High**	**Nga tapu wae o te wherowhero project**
Project summary	This project was identified as a high priority by representatives from Waahi Paa. The project will involve the construction of a gravel walkway connecting Waahi Paa, Lake Waahi and Lake Puketirini. The walkway will contain iPou, picnic tables and some sections will be planted out in native vegetation.
Vision for the project	Whanau are re-establishing their relationship with Lake Waahi and Lake Puketirini by using the walkway and enjoying hauora benefits. Intergenerational knowledge and practices are recorded, shared and transferred.
Location	Lake Waahi, Huntly.  
Brief description of site	Lake Waahi is very significant culturally and has been a food bowl for Ngaati Mahuta and the Kiingitanga for generations. Waahi Marae functions as the focus of much of the community life of Ngaati Mahuta. As the home of the Kaahui Ariki since the 1890s, it also functions as a focus for all the tribes of the Waikato-King Country and beyond who are affiliated to the King Movement. The long

	association with Kiingitanga gives this marae special significance in the Māori world. Located on the bank of the Waikato River in Rahui Pokeka (Huntly) and adjacent to the Huntly power station, Waahi is the principal marae of Ngaati Mahuta of Waikato and home of the Kaahui Ariki, the paramount family in the King Movement. The marae is strategically located next to the Waahi Stream which connects Lake Waahi to the Waikato River.
Key threats/impacts	• Flooding
Project goal/s (SMART)	Within 2 years of the project commencing, the gravel loop walkway is completed, including the installation of 4 iPou or other signage as appropriate. Within 3 years of the project commencing, the Waahi Stream will be planted.
Works required	Works could be implemented at iwi, hapū, marae or whanau level. Co-funding contributions from other interested partners to iwi, hapū, or whanau to complete this project would be welcomed. This project could be undertaken in parts or as a whole. Prior to any works taking place, a full concept plan and costings should be developed for the project. The costs provided below are estimates only. **Project management:** Project manager would be required to manage the project, including, landowner liaison, providing information, negotiating agreements, inspecting works and project managing parts of the work as required. Project management/staffing is estimated to be 25% of the project cost. **Project plan:** Detailed project plan at $20,000. **Walkway:** Installation of a 4.5km walking track reconnecting whanau to both Lake Waahi and Lake Puketirini. Estimate of $600,000 based on Ohinewai Walkway PAF. Installation of 4 picnic tables and viewing areas along the walkway at $28,000.

<table>
<tr><td></td><td>iPou:

Installation of 4 iPou (or other signage as appropriate) x $15,000 per iPou = $60,000.

Waahi Stream planting:

Site preparation at $10,000.

Assume 1 hectare of planting at $44,881.

Animal pest control (to allow plants to establish) at $750.</td></tr>
<tr><td>Risks to project success</td><td>Funding.
Vandalism.
Private landowners not allowing a public accessway.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mix of public and privately owned.</td></tr>
<tr><td>Knowledge gaps and response</td><td>If consents or authorisations are required.</td></tr>
<tr><td>Project duration (years)</td><td>3 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (25%)</td><td>190,908</td></tr>
<tr><td>Project plan</td><td>20,000</td></tr>
<tr><td>Walkway plus picnic tables</td><td>628,000</td></tr>
<tr><td>iPou x 4</td><td>60,000</td></tr>
<tr><td>Waahi Stream planting</td><td>55,631</td></tr>
<tr><td>Total</td><td>954,539</td></tr>
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</td></tr>
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Shallow Lakes 12 Priority: Very high	Nga rauwiri o te riu o Waikato-Tainui
Project summary	The project was a very high priority for iwi and will involve the construction of a paa tuna in the Waahi Stream and Whangape Stream.
Vision for the project	Whanau are able to express mana whakahaere and reconnect with traditional fishing practices along Waahi Stream, at Lake Waahi, and the Whangape Stream, Lake Whangape. Intergenerational knowledge and practices are recorded, shared and transferred. The ability to act as kaitiaki is enhanced, and the learnings/methodology can be extended to other whanau and other lakes.
Location	Lake Waahi, Waahi Stream Huntly. Lake Whangape. Whangape Stream.
Brief description of site	Waahi Stream links Lake Waahi and the Waikato River. Waahi Marae is located adjacent to Waahi Stream and is well known throughout Māoridom for providing puhi eel. Fishing for puhi has occurred at Waahi over many generations. Historically there were several paa tuna along Waahi Stream, the remnants of which still remain. These were used to fish the downstream migration of tuna leaving Lake Waahi and heading to the Waikato River. Lake Whangape is very significant for tangata whenua. It was once a rich source of tuna, and had many paa tuna located along the lake edge and Whangape stream. The paa tuna were so productive that several battles were fought over access. One such battle was in March 1843 when "Te Ahiwera" displayed his diplomatic skill and his fearlessness. A quarrel respecting the ownership of a paa-tuna called Kororipo threatened to involve the whole of Waikato in a war. This paa (also called Rauwiri) was a great V-shaped structure extending nearly across the lake, near the place where a stream flowed from Whangape to the Waikato River. At the apex of the work, the hinaki or eel-traps, woven of mangémangé creepers, were set. The new paa tuna can be used traditionally to harvest tuna but also for kaitiaki monitoring of fish stocks and educational purposes.
Key threats/issues	Floods.
Project goal/s (SMART)	Within 2 years of the project commencing, the paa tuna is constructed.
Works required	Works could be implemented at iwi, hapū, marae or whanau level. Co-funding contributions from other interested partners to iwi, hapū, or whanau to complete this project would be welcomed. **Project management ($41,750):**

<table>
<tr><td></td><td>Project manager would be required to manage the project, including landowner liaison, providing information, negotiating agreements, inspecting works and project managing parts of the work as required. Project management/staffing is estimated to be 25% of the project cost.

Project plan ($20,000):
Prior to any works taking place a full concept plan and costings should be developed for the project. The costs provided below are estimates only.

Consents ($35,000)
Prepare consents and authorisations as necessary.

Cultural safety ($20,000)
Project cultural advisors at $10,000 per lake.

Installation of paa tuna ($80,000)
Based on historical designs, reinstall paa tuna at$40,000 per paa tuna.

Tuna wananga ($12,000)
Two tuna wananga and tuna tool kits. Use the paa tuna for monitoring purposes.</td></tr>
<tr><td>Knowledge gaps and response</td><td>If consents or authorisations are required.</td></tr>
<tr><td>Project duration (years)</td><td>2 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (25%)</td><td>41,750</td></tr>
<tr><td>Project plan</td><td>20,000</td></tr>
<tr><td>Consents</td><td>35,000</td></tr>
<tr><td>Cultural safety</td><td>20,000</td></tr>
<tr><td>Installation of paa tuna</td><td>80,000</td></tr>
<tr><td>Tuna wananga</td><td>12,000</td></tr>
<tr><td>Total</td><td>208,750</td></tr>
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Shallow Lakes 13 **Priority: High**	**Waikato-Tainui – Te Wharekura o Rakaumangamanga and kura – tuna ponds project**
Project summary	The aim for this project is to restore tuna abundance through the construction of up to four dividable tuna ponds to increase, support and promote quality tuna habitat. This project will see the creation of four tuna habitat ponds adjacent to an area that was traditionally known by whanau, hapū and marae as being historically, culturally, ecologically or spiritually significant to them. The project is of high priority.
Vision for the project	Tuna (freshwater eels) are plentiful at the sites. Whanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred on to future generations.
Location	 The project site is located directly west of Te Wharekura o Rakaumangamanga, immediately south of Waahi Stream.
Brief description of site	Exact locations of the four dividable tuna ponds will be identified between Lake Waahi and the rear of Rakaumangamanga. The land is currently wetland type area prone to flooding and known to be whanau, hapū and marae traditional paa tuna sites. This project is significant because tuna are a very significant mahinga kai taonga species for Waikato-Tainui, Waahi Whaanui Trust and Ngaa Muka Development Trust. Whanau, hapū and marae have witnessed a steady decline in the tuna abundance over time. The restoration of taonga species and the ability to again provide these taonga as food for manuwhiri (visitors) is a critical marker of the whanau, hapū and marae's mana and status. It also confirms the whanau, hapū and marae proficiency in manaaki tangata or the practice of generosity

	and reciprocity. The abundance of food and other resources that were traditionally available to Waikato-Tainui within its tribal rohe are well known by other tribes throughout the motu.
Key threats/issues	• Tuna population will continue to decline and become less abundant. • Whanau, hapū and marae will become less engaged with the practises of kaitiakitanga and mahinga kai.
Project goal/s (SMART)	Within 5 years, four tuna habitat ponds have been created. Tuna wananga have been held with iwi members at (or near) the ponds, transferring knowledge and tools to the kura. Tuna from the ponds are being monitored on a regular basis with the future inclusion of the monitoring into the kura's learning curriculum using matauranga Māori and available science where required. Tuna for the ponds may be served at Poukai, thus contributing to restoring the relationship of the marae with the awa.
Works required	Works could be implemented at iwi, hapū, marae, whanau and kura level. Co-funding contributions from other interested partners to iwi, hapū or whanau to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Earthworks:** Excavate marginal low lying pasture areas to create shallow ponds/wetlands. • Construct ponds up to a maximum of 5000m^2 and approximately 2m deep. Ponds should be no deeper than 3m deep to avoid deoxygenation of bottom layers and associated fish deaths. • Ponds are lined with suitable soils so they are capable of holding water with minimum leakage. • Good quality water is maintained in the constructed ponds.

Note: Resource consent may be required.

Costs include excavator transport and are based on ponds being 5000m^2 x 2m deep and a 12 tonne excavator moving 150m^3 per hour ($10,000), returning for one day to reshape the site once excavations have settled ($1800).

4 ponds = $47,200.

Fencing:
Ponds should be fenced to exclude cattle with a 7-wire post and baton fence.

- Per pond: 400m x $20/m = $8000.

Estimated total fencing cost: 4 ponds x $8000 = $32,000

Planting
Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree, flax).

- Native planting 0.3ha per pond at $11,865.
- Additional weed control for 3 years at each pond at $2520.

Estimated planting cost of 4 ponds = $57,540.

Resource consent
It is anticipated that most ponds will require resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately.

A generous cost estimate of $5000 per pond has been used.

	Estimated resource consent cost across 4 ponds = $20,000.  **Capacity development** • Tuna wananga Provide training for tribal members to learn about tuna restoration. Tuna wananga (4) plus tuna took kits. Estimated cost at $24,000. **Project management** Project manager to carryout knowledge holder interviews, work with whanau, marae, hapū or iwi (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be up to 30% of the project cost. Estimated cost across 4 ponds at $47,022.
Risks to project success	Access to sites. Resource consents not granted. Inexperienced practitioners or in-completed works.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership public and private (by agreement) but predominantly land owned by whanau, hapū, ngaa marae and iwi. Very high likelihood of adoption.
Knowledge gaps and response	Whether consents or authorisations are required.
Project duration (years)	3 years per pond per site includes construction, planting and weeding programme. 5 year project in total.

Costs

Work description	Cost ($)
Earthworks	47,200
Fencing	32,000
Planting	57,540
Resource consents	20,000
Capacity building	24,000
Project management (30%)	47,022
Total	**227,762**

Shallow Lakes 14 **Priority: High**	**Waipā peat lakes project – collection, storing and sharing of traditional korero regarding our lakes.**
Project summary	This project was identified as a high priority by iwi at the iwi priorities wananga. It will contribute towards reconnecting whanau and the history and knowledge of our significant lakes. It involves recording our traditional mātauranga regarding the Waipā peat lakes and making it available for iwi in digital and print media format.
Vision for the project	Intergenerational knowledge and practices of Waipā peat lakes are recorded, stored, shared and transferred.
Location	This project is located within the rohe of the Waipā peat lakes and includes but is not limited to Lake Ngaroto and Lake Mangakaware.
Brief description of site	The Waipā peat lakes are included in this project. They are very culturally significant. The creation of mātauranga resources that record and share our history and knowledge of the lakes will be a valuable resource now and for generations to come.
Key threats/impacts	• Loss of knowledge. • No transfer of customs and practices between generations.
Project goal/s (SMART)	Within 2 years of the project commencing, the interviews, literature review will be completed. Within 3 years of the project commencing, the resources will be developed (digital platform and print media).
Works required	Works could be implemented at iwi, hapū, marae or whanau level. Co-funding contributions from other interested partners to iwi, hapū, or whanau to complete this project would be welcomed. **Project management ($33,000):** Project manager would be required to manage the project, including coordinating up to 30 interviews, engaging researchers/writers, publishing documents, monitoring and milestone reporting. Project management/staffing is estimated to be 25% of the project cost. **Mātauranga interviews ($59,400):** Interview knowledge holders, i.e. kaumatua/kuia (as appropriate) and collate relevant information from literature sources. Assume: • 20 kaumatua/kuia interviews x $500 per interview = $10,000 • Film and editing of interviews at $800 per day x 28 days = $22,400. • Interviewer at $800 per day x 20 days = $16,000. • Transcribe interviews at $200 per interview x 20 = $4000.

<table>
<tr><td></td><td>Mapping and photographing lake sites (digital platform) ($37,600): Map and photograph all significant lake sites. Enter information (and interviews) into digital database and maps.

Assume:
Access and photograph sites at $800 per day x 7 days = $5600.
GIS mapping services at $200 per hour to input maps and develop digital platform x 20 days = $32,000.
Publish printed resource regarding traditional knowledge/mātauranga of Waipā peat lakes ($35,000):
Literature review (archives, Māori text, early explorers etc) at $10,000.
Use literature review and interview content as basis to write Waipā peat lakes booklet at $10,000.
Publish book at $15,000.
Book and digital platform launch ($5000)</td></tr>
<tr><td>Risks to project success</td><td>May be difficult to find 20 knowledge holders.</td></tr>
<tr><td>Knowledge gaps and response</td><td>Knowledge holders will need to identified during project planning.</td></tr>
<tr><td>Project duration (years)</td><td>3 Years</td></tr>
<tr><td>Costs</td><td><table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Project management (25%)</td><td>33,000</td></tr>
<tr><td>Mātauranga interviews</td><td>52,400</td></tr>
<tr><td>Photographing and mapping sites (digital platform)</td><td>37,600</td></tr>
<tr><td>Publish printed resource</td><td>35,000</td></tr>
<tr><td>Launch book/digital platform</td><td>5000</td></tr>
<tr><td>Total</td><td>163,000</td></tr>
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Shallow Lakes 15 **Priority: Very high**	**Lake Whangape weir project**
Project summary	This project was identified as a very high priority by iwi. The level of the lake and its effect on taonga species and water quality is concerning for iwi. Historically the lake was at much higher levels than it is now. This project is to restore the lake to more historical levels by repairing or replacing the rock rubble weir at the outlet.
Vision for the project	The water level for the lake is at a level that is considered beneficial for the mauri of the lake, water quality and also taonga species habitat.
Location	Lake Whangape is located northwest of Huntly and is the second largest lake in the Lower Waikato catchment.
Brief description of site	Lake Whangape has a surface area of 1450ha, an average depth of 1.5m and a maximum depth of 3.5m. Lake Whangape catchment is mostly pastoral and the lake drains to the Waikato River via the Whangape Stream. In 1999 a rock rubble weir was consented by the Waikato Regional Council and had been constructed on the outlet of the lake – the maximum weir height at the weir crest should not exceed 4.91m (Motoriki Datum). The weir is need of repair/replacement. Lake Whangape is very significant for tangata whenua. It was once a rich source of tuna, and had many paa tuna located along the lake edge and Whangape stream. The paa tuna were so productive that several battles were fought over access. One such battle was in March 1843 when “Te Ahiwera” displayed his diplomatic skill and his fearlessness. A quarrel respecting the ownership of a paa-tuna called Kororipo threatened to involve the whole of Waikato in a war. This pa (also called Rauwiri) was a great V-shaped structure extending nearly across the lake, near the place where a stream flowed from Whangape to the Waikato River. At the apex of the work, the hinaki or eel-traps, woven of mangémangé creepers, were set.
Key threats/issues	Flooding. Weir damaged. Taonga species affected by low water levels.
Project goal/s (SMART)	Within 2 years of the project commencing, the old weir has been replaced with a new more effective weir.

Works required	Works could be implemented by iwi, hapū, marae, whanau or in partnership with an organisation. Co-funding contributions from other interested partners to complete this project would be welcomed. Prior to any works taking place, a full concept plan and costings should be developed for the project. The costs provided below are estimates only. **Project plan and design specifications for weir ($30,000):** Detailed project plan including more detailed costings. **Site investigation, survey of ground levels ($10,000):** This project will require investigation to determine the most feasible method to repair/install the weir. This is likely to require some initial site investigation to determine ground levels. **Consents preparation. Consent fees and stakeholder consultation ($35,000):** Consent will be required to undertake earthworks associated with repair/replacing the weir. **Cultural safety ($10,000):** Cultural safety advisors. **Installation/repair of weir ($100,000):** Rock rubble weir. **Project management ($46,250):** Project manager would be required to manage the project, including, landowner liaison, providing information, negotiating agreements, inspecting works and project managing parts of the work as required. Project management/staffing is estimated to be 25% of the project cost.
Knowledge gaps and response	Tangata whenua also want the possibility of dredging the lake to restore depth explore.
Project duration (years)	2 years

Costs

Work description	Cost ($)
Project management (25%)	46,250
Project plan and design	30,000
Site investigation, survey	10,000
Consents	35,000
Cultural safety	10,000
Installation of weir	100,000
Total	**231,250**

Shallow Lakes 16 **Priority: High**	**Recognising and honouring our sites of significance – Waipā peat lakes iPou project**
Project summary	This project was identified as a high priority by iwi. It provides a means of sharing our knowledge, connection, history and relationship with the significant Waipā peat lakes which otherwise could be lost. The project will create a physical network of interactive pou (iPou) connected to a database that delivers cultural, historical, spiritual and ecological layers to smart phones and devices. The pou will also act as a physical presence to acknowledge the sites.
Vision for the project	Sites of significance are acknowledged through iPou (or some other appropriate tohu for the place, e.g. kohatu, or carved pou) and the korero that is able to be shared with whanau.
Location	The project location is the significant Waipā peat lakes in the Waipā and Waikato River catchments.
Brief description of the site	The specific iPou sites will be determined by iwi, but could include traditional paa sites (eg Lake Mangakaware), traditional fishing sites, traditional battle sites (eg Lake Ngaroto), or any other significant sites. Twenty iPou sites may be selected due to historical, cultural, spiritual or ecological significance as determined by iwi. 2 carved pou sites selected by iwi. This project is significant because it enables iwi to tell its story as kaitiaki to acknowledge and share knowledge of the Waipā peat lakes around the Waipā catchment.
Key threats/impacts	● Connections and important history will be lost. ● Sites won't be appropriately recognised and acknowledged. ● Cultural safety.
Project goal/s (SMART)	Within 3 years of the project commencing, up to 20 iPou and 2 carved pou will be standing at Waipā peat lakes of significance in the Waikato River catchment.
Works required	Works could be implemented at iwi, hapū, marae, or whanau level. Co-funding contributions from other interested partners to assist with completing this project would be welcomed. **Project management ($109,200):** Manage the project; engage with iwi, hapū and marae to identify sites of significance; landowner liaison; negotiate agreements and engage with iPou developer and iPou fabricator; source wood, source carvers, inspect completed works; organise hui to unveil iPou

	(catering, venue); and provide monitoring and milestone reports over a 3 year period. **Collate information for iPou ($20,000):** Collate information for the sites. If a collection of knowledge project has been completed, this step will be less arduous. Assume: • $1000 per site to undertake this task. **Fabricate and install up to 20 iPou onto the designated Waipā peat lakes sites ($200,000) and up to 2 carved pou at $32,000 per pou ($64,000)** **Wood $30,000** Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu). Assume: • $10,000 per iPou (fabrication and installation costs) per site = $200,000. • $32,000 per carved pou (carving). • $6000-$15,000 per pou for wood, depending if pine or native. For the purpose of this costing, native wood has been used at $15,000 **Technology/information loaded and installed into iPou ($20,000):** Engage iPou developer to install information collated into the fabricated pou. Upload/install the technology. Assume: • $2000 per pou = $40,000. **Cultural safety ($10,000)** Cultural advisors and practices to ensure cultural safety of this project.
Risks to project success	Access to sites. Access to knowledge.
Land tenure – likelihood of adoption and adoption circumstances	Mix of public, private owned. Very high likelihood of adoption.
Knowledge gaps and response	Permit requirements for iPou installation. Ongoing maintenance.
Project duration (years)	3 years

Costs

Work description	**Cost ($)**
Project management (30%)	109,200
Collate information for iPou	20,000
Fabricate and install up to 10 iPou onto the designated shallow lakes sites	200,000
Up to 2 carved pou (approx. 6m by 0.6 m)	64,000
Materials (wood for pou)	30,000
Technology/information loaded and installed into iPou	40,000
Cultural safety costs	10,000
Total	**473,200**