

# Whakakā Lake



## Key Values

Cultural

Ecology (wildlife, dune vegetation)

Landscape

**Table 1: List of documents reviewed**

Year	Name	Author
1986	A List of Rivers and Lakes Deserving Inclusion in A Schedule of Protected Waters	Grindell & Guest
1999	Whakakā Wetland Complex – Management Requirements to Protect and Enhance 1999- 2004	Hawke’s Bay Regional Council
2001	World Wetland Day 2001: New Zealand	Ramsar.org
2002	Lake Whakakā Management Plan	Boffa Miskell for Pt. Hereheretau B2L2 Trust
2006	Areas of Significant Conservation Values: HB Coastal Marine Area (HBRC Report Number 4203 - Draft)	Hawke’s Bay Regional Council
2006	A Review and Risk Assessment of Toxic Cyanobacteria in the Hawke’s Bay	Cawthron Institute
2007	Whakakā Lagoon Ecological Monitoring	Hawke’s Bay Regional Council
2008	To Roto O Te Whakaki – Nga Matauranga me Nga Tikanga Ecosystem Research Project	Murray Palmer
2008	Wetlands ecosystems of national importance for biodiversity: criteria, methods and candidate list of nationally important wetlands.	Landcare Research
2008	Wetland Monitoring Review	Hawke’s Bay Regional Council
2011	The Whakakā Wetlands Restoration and Enhancement Project	Wairarapa Museum of Art and History
2013	Project 1116 – 2013 Trend Counts: Paradise Shelduck and Black Swan Counts for Hawke’s Bay	Fish and Game New Zealand

2014	Attributes for Intermittently Open and Closed Lakes and Lagoons (ICOLs) applicable to the National Objectives Framework for Fresh Water	Ministry for the Environment
2015	Collaborative Decision Support Framework for managing Whakakī Lake. Phase 1: Ecological Information	HBRC, Whakakī Lake Trust, DOC
2016	New Zealand Geo-preservation Inventory	Geological Society of New Zealand
2016	The IUCN Red List of Threatened Species	Global Species Programme, various scientists and partners worldwide
2016	Iwi and Hapū of Te Rohe o Te Wairoa Deed of Settlement + Documents Schedule	Iwi and Hapū of Te Rohe o Te Wairoa and the Crown
2017	Assessment of Lakes in the Hawke's Bay Region using LakeSPI	NIWA
2017	Whakakī Lake and Wairoa River	Hawke's Bay Regional Council
2017	Whakakī Lake residents invited to have a say	New Zealand Herald
2018	Summary of Cultural Values associated with Water Bodies in Hawke's Bay, Wairoa District – Whakakī Catchment (2018)	Ngāti Kirituna Hapū – Ki Whakakī Nui-a-Rua, Allen Smith, Christine Smith
2018	Government funding for Hawke's Bay forest at Whakakī Lake	New Zealand Herald
2018	Department of Conservation Website	Department of Conservation
2018	Water Quality in Whakakī Lake	Hawke's Bay Regional Council

## Discussion

### *Purpose of report*

1. The purpose of this report is to assist the RPC members to determine whether any of the values of Whakakī Lake are outstanding for the purposes of the National Policy Statement for Freshwater Management (NPSFM).
2. This report presents the summarised findings of the values attributed to the Whakakī Lake in those documents referred to in Table 1, above.

### *Overview*

3. Whakakī Lake is a 400 hectare coastal lake which is separated from the sea by a narrow strip of sand dunes on its southern shore. The lake has significant wildlife values and is the largest coastal lake on the North Island's east coast. The lake has an additional 200 hectares of adjacent wetland margin comprising sand dunes and swamp areas.
4. Whakakī Lake is an intermittently closed and open lake (ICOLL) which is a rare habitat type both in New Zealand and internationally. The wetland complex supports 46 species of waterbirds, including the New Zealand Dabchick, an uncommon endemic, and the globally endangered Australasian Bittern. Both shortfin and longfin eel are found in the Lake. During the months of May and June the area is highly valued for duck hunting/shooting.
5. Historically, Whakakī Lake was part of a much larger 6,000 hectare continuous wetland area that ran for 32 km between the Wairoa and Nuhaka River mouths. However, due to significant historical modifications through burning, clearance and drainage only 10% of the original wetland area remains. The remaining wetland area is in a degraded state and frequent algae blooms occur on the lakes surface.
6. Whakakī Lake is listed as a priority wetland in the Hawke's Bay Regional Resource Management Plan, and is identified as a 'significant lake' in the Wairoa District Plan. In 2001, the Environment Minister presented the Whakakī Lake Trustees with the New Zealand Wetland Award for their important contribution towards protecting and restoring our environment.
7. Whakakī Lake has been identified as one of the six environmental hotspots by Hawke's Bay Regional Council, and funding has been allocated towards improving the area. Recently the Government announced \$100,000 funding to assist with planting in the area as part of the Tuawhenua Provincial Growth Fund.

- In total, \$580,000 is planned to be invested to establish a mānuka plantation over the next five years on 80 hectares of retired land next to the Lake. The plantation will comprise 88,880 mānuka trees at Whakakī Lake to support a re-circulating wetland to filter water. This project is in its initial stages and funding is expected to be granted late 2018.

### Location

- Whakakī Lake is situated in northern Hawke's Bay around 10 km Wairoa township, adjacent to State Highway 2. The lake is part of a much larger wetland complex which includes the Ngamotu lagoon, Ohuia Lagoon, Waihoratuna Lagoon, Wairau Lagoon, Te Paeroa Lagoon, Rahui Channel, and Patangata Lagoon.
- Figure 1 shows the location and extent of Whakakī Lake and the other lagoons which are part of the larger wetland complex. Ngamotu lagoon is not identified by name on the location map, but is located to the east of the Wairoa River mouth.

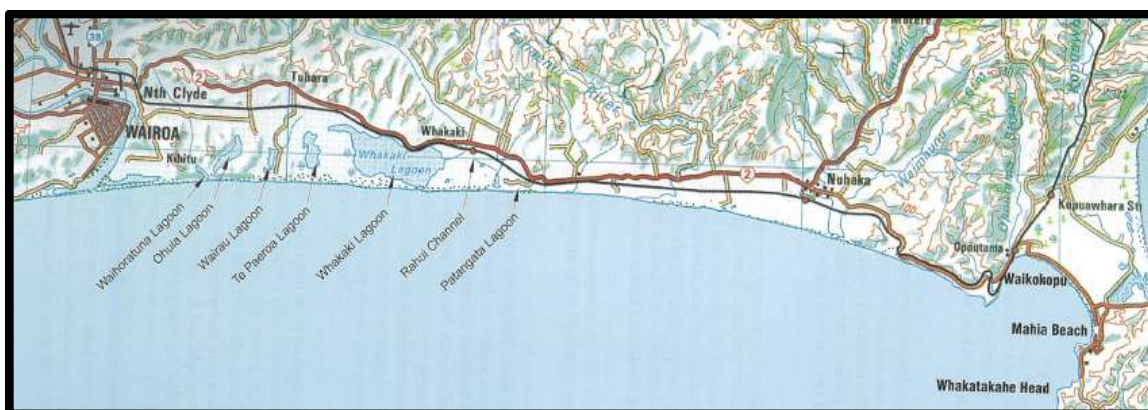


Figure 1: location of Lake Whakakī

### Cultural values

- Te Whakakī Lagoon is significant to the iwi and hapū of Te Rohe o Te Wairoa. Ngāti Kahukura, Ngāti Kirituna and hapū of Te Whakakī Nui-a-Rua have cultural associations with the lake.
- The area was important mahinga kai for local Māori and had a rich variety of food, including tuna and shellfish. Many birds harvested for food at the lake and also made their home there.
- The importance of Lake Whakakī to tāngata whenua continues today. There is a high abundance of short-finned eel, which has been linked to the customary harvesting practices of tāngata whenua.
- The Whakakī Lake Trust has a long history of being an active kaitiaki (guardian) of Whakakī Lake and its natural resources, particularly tuna. The Whakakī Lake Trust was established in 1969 to manage Whakakī Lake property on behalf of the Māori owners.
- Attachment 1 contains a more detailed explanation of the cultural values associated with Whakakī Lake.

### Recreation values

- Whakakī Lake is highly valued for its gamebird hunting with no other recreational activities occurring in or around the lake area.

### Gamebird hunting

- The greater Whakakī wetland complex is a renowned area for its gamebird population with swans, ducks, geese and Pukeko seasonally hunted in the wetland area. It is the most important area for waterfowl hunting in the East Coast/Hawke's Bay area with around 1,000 game birds harvested annually.
- In the 1950s, Black Swan numbers were around five to ten thousand. Currently, the population is estimated to be around seven hundred in the greater wetland complex area.

19. The southern peninsula between Whakakā Lake and the Pacific Ocean is administered by the Whakakā Lake Trust (The Trust) and used for duck shooting. Shooting huts are scattered along the peninsula and within the riparian habitat along the edge of the lake. Public access to the lake is limited and hunters need to get permits directly from The Trust.

### *Ecology values*

20. Whakakā Lake is the second largest coastal lake on the North Island's east coast. It has a total wetland area of 600 hectares and was once part of a much larger 6,000 hectare continuous wetland area that ran for 32 km between the Wairoa and Nuhaka River mouths. Despite being in a severely degraded state, it supports a large population of waterbirds and represents a large proportion of the remaining wetland habitat in Hawkes Bay.
21. Whakakā Lake is an intermittently closed and open lake (ICOLL) which is a rare habitat type both in New Zealand and internationally. The Lake is bordered by rushes, sedges and sand dunes and has a distinctive ecosystem due to the large variations in water temperature and salinity. It is one of eight notable ICOLL's on the east coast of New Zealand.
22. In the 1950s, the water level of Whakakā Lake was lowered by opening an artificial outlet channel directly through the dune system into the sea. This allowed salt water to enter the lagoon, which was previously a freshwater system, killing freshwater plants and animals and creating damaging algal blooms. It also disrupted the traditional migration paths of eels and inanga. The artificial outlet channel is now permanently closed, however from time to time the lake is still artificially opened using the traditional outlet to relieve flooding.
23. Despite significant modifications, the area is highly rated in the 'wetlands of ecological and representative importance' and the 'sites of special wildlife interest' databases held by the Department of Conservation.
24. Whakakā Lake is part of a much larger wetland complex which includes the Ngamotu, Ohuia, Waihoratuna, Wairau, Te Paeroa and Patangata Lagoons. Collectively these wetlands constitute the largest such system on the east coast of the North Island.
25. In 2006, the Whakakā Lake was included on a candidate list of nationally important wetlands by Landcare Research who were undertaking work on behalf of the Department of Conservation.

### **Fish**

26. Seven species of fish (six native) have been recorded in the lake. The most numerous species is the shortfin eel, followed by the common bully, goldfish, longfin eel, flounder, grey mullet and inanga. The lake supports a healthy population of shortfin eel.

### **Wildlife**

27. The greater Whakakā wetland complex is recognised as an important wildlife habitat due to the presence of significant populations of threatened waterbirds and its large waterfowl population. The area is highly ranked as a Site of Special Wildlife Interest (SSWI).
28. Forty six species of waterbirds have been recorded in this area including several rare and iconic species. The lake supports a large population of native waterbirds, including the native Australasian bittern, which is globally endangered, the New Zealand dabchick (grebe), an uncommon endemic which is near threatened globally, and the endemic Wrybill.
29. Migratory species previously recorded in the area include the white heron, golden plover, eastern bar tailed godwit, and several sandpiper species. Waterfowl include grey teal ducks, shoveler ducks, Canada goose and the black swan. The wetland also supports three native wetland birds being the Spotless Crake, Fernbird and Banded Rail who are common nationally, but very rare in Hawke's Bay.
30. Black swan and paradise shelduck counts have been carried out by Fish and Game since the early 1990s. Results show that both Shelduck and Black Swan numbers have significantly reduced at Whakakā Lake in the last 20 years. In the 1990s around 2000 black swans were counted on the lake, compared with 23 black swans counted on the lake in 2012. Similarly, in 2003 over 1200 shelducks were counted on the lake compared to 71 shelducks recorded in 2012.

31. Eighteen other species of land birds have been recorded at the lagoon in the past, including the Pipit, Riroriro, Fantail and Silvereye who are common natives, whilst the remainder are common introduced species in Hawke's Bay.
32. In 1986, the Department of Conservation rated Whakakī lagoon as a nationally significant wildlife habitat in the Wetlands of Ecological and Regional Importance (WERI) database.
33. In 1986, Whakakī Lake was placed in 'Group one'<sup>1</sup> in the Government's list of rivers and lakes deserving protection, for its outstanding wildlife habitat and it's in season duck shooting.

#### **Reptiles and amphibians**

34. Common skinks have been seen among dune vegetation, and frogs have been previously heard, but not sighted, on the south-western shore of the lagoon. The frogs are thought to be the southern bell frog, native to Australia and reasonably widespread in New Zealand.
35. Frogs have rapidly declined recently in New Zealand through fungal disease. As such, the presence of frogs in this wetland is viewed as positive, particularly given they do not significantly impact on the natural ecology of the area.

#### **Dune vegetation**

36. The dune plant communities surrounding Whakakī Lake are regarded as regionally significant. This is based on the relatively unmodified nature of the dune system, the absence of marram and the presence of a relatively diverse native flora, including species such as coastal scabweed, and the native sand binders spinifex and pingao. To date, no rare native plants have been recorded at Whakakī Lake.
37. The colony of mat daisy (*Raoulia* aff. *hookeri*) is the most note-worthy plant species present in the dune system, forming large cushion fields between the lagoon and the sea and in the sand hollows behind the beach. The mat daisy is a large thriving population at the northern end of the geographical range of this species and is classified as nationally threatened.

#### **Aquatic plants**

38. Historically, Whakakī Lake has contained significant beds of native aquatic macrophytic plants and fringes of primarily native vegetation, including saltmarsh ribbonwood, rushes, sedges and wetland turfs. Currently there are no submerged plants.
39. The exclusion of stock from the majority of the wetland edges will allow the turf communities to re-establish and the restoration efforts through native planting and pest control will enable the wetland to be restored to a more natural state in the future.
40. In 2017, NIWA assessed the condition of eleven lakes within the Hawke's Bay Region using the LakeSPI method. The LakeSPI (Lakes Submerged Plant Indicators) is based on a principle that the ecological condition of a particular lake in New Zealand can be characterised by the composition of submerged aquatic plants in them.
41. The LakeSPI monitoring results show that Whakakī Lake is in a degraded state with no submerged plants. Historical sampling shows a decline in submerged vegetation in the lagoon over the last 24 years, with submerged vegetation halving from 88% in 1992 to 35% in 2007, with no submerged plants recorded in 2016.

#### **Invertebrates**

42. Aquatic macroinvertebrates occupy a key place in aquatic ecosystem functioning and provide a useful measure of water quality and habitat condition.
43. In 2007, monitoring results indicated Whakakī Lake could support a considerable diversity of small animal life however, the water quality is compromised by the input of sediment and artificial nutrients. Sampling results show the lake sediments consist of firm sand and mud with some fibrous/woody organic matter on top near the lake margin.

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<sup>1</sup> Group One = Excellent rivers or lakes containing an outstanding cultural, fisheries, wild flora, location, recreation, scenic, scientific, tourism, wildlife habitat, value(s). Group One contains the very best examples of these values.

44. No freshwater mussels were observed during the 2017 aquatic plant survey undertaken by NIWA at Whakakī Lake.

#### **Dune Invertebrates**

45. The small native fauna of the dune/bar system is distinctive and ecologically unique to Whakakī Lagoon. This fauna includes lizards (skinks and geckos) and invertebrates such as sand scarab, giant earwig and katipo, mostly associated with the spinifex, mat daisy and extensive strand zone of storm-tossed driftwood.

46. Sampling to date suggests that populations of these native animals are currently small and at risk.

#### **Other Wetland areas – Ngamotu, Ohuia, Waihoratuna, Wairau, Te Paeroa, Patangata Lagoons**

47. Whakakī Lake is part of a much larger wetland complex which includes the Ngamotu lagoon, Ohuia Lagoon, Waihoratuna Lagoon, Wairau Lagoon, Te Paeroa Lagoon, Rahui Channel, and Patangata Lagoon. These wetlands are briefly described in Table 2 below:

**Table 2: Wetlands in the greater Whakakī wetland complex**

<b>Name</b>	<b>Description</b>
Ngamotu Lagoon	The Ngamotu Lagoon is a Government Purpose Administration Reserve and gazetted Wildlife Management Reserve. It is a saline lagoon with saltmarsh communities. Waterfowl and waders are present. It has high botanical values and contains some of the few representative examples of estuarine vegetation found within the Waihua Ecological District, including populations of two species, <i>Mimulus repens</i> and <i>Spergularia media</i> , that are of botanical interest The Lagoon has a Moderate/High 'sites of special wildlife interest' rating on the DOC database.
Ohuia & Waihoratuna Lagoons	The Ohuia & Waihoratuna Lagoons share an outlet to the sea and are locally known as Ohuia Lake, or Big and Little Ohuia. The Ohuia Lagoon previously drained to the north and east into Lake Whakakī, however the water now passes through an artificial structure to the southern end of the Waihoratuna lagoon and out to sea. The purpose of Ohuia Lagoon is to store water drained from surrounding farmland under the Ohuia Drainage Scheme. The margins of the lagoon are grazed and predominantly grass. The Waihoratuna Lagoon is the western most of the two lagoons and the outlet of the Waiatai Stream. The Waiatai Stream originally flowed directly into Lake Whakakī. The margins of the lagoon have a good variety of native wetland plants. Waihoratuna Lagoon is approximately 10 ha in size, increasing up to 30 ha or more after heavy rain. The Lagoon has significant siltation due to farming upstream and erosion of the hills in Waiatai Valley.
Wairau Lagoon	The Wairau Lagoon is approximately 35 hectares in size. The Lagoon has a 'moderate' rating on the DOC database for 'sites of special wildlife interest'. The area is protected by an Open Space Covenant under the Queen Elizabeth II Trust. The lagoon is fully fenced and used by a wide variety of birds, particularly waterfowl.
Te Paeroa Lagoon (Korito)	Te Paeroa Lagoon is a shallow basin with a limited catchment area covering approximately 105 ha, including the swamp margin. The lagoon with used by a variety of water fowl species, however is of limited value for breeding due to the lack of marginal vegetation. Te Paeroa Lagoon has a Moderate/High 'sites of special wildlife interest' rating in the DOC database. In 1997/98 the swamp completely dried up depleting most of the native vegetation.
Rahui Channel	In 1997 enhancement works undertaken at Lake Whakakī included the re-opening of the Rahui Channel. The area seaward end of the Rahui Channel is a low lying swamp land and important for waterfowl and eel harvesting. The Rahui Channel is subject to regular drain clearance.
Patangata Lagoon	Patangata Lagoon is a low shallow water filled depression covering approximately 10 ha. At times of low water, the lagoon is separated from the Rahui channel at the western end. The lagoon is the remnant waterbody of the original channel carrying Lake Whakakī to its historical outlet at the Opoho Stream. The area is extremely valuable for wildlife as a loafing, feeding and breeding area. A mixture of exotic and native plant species are present and a good range of aquatic plants are found near the margins.

### *Landscape / scenic values*

48. Lake Whakakī is a shallow wetland system with a total area of around 600 hectares of combined lake, sand dune and swamp areas. The wetland system is separated from the sea by thin sand dunes on the southern shore, with State Highway 2 and the Napier-Gisborne railway line bordering it to the north.
49. Whakakī Lake is part of a bigger wetland complex which includes the Ngamotu, Ohuia, Waihoratuna, Wairau, Te Paeroa, and Patangata lagoons. Collectively these wetlands are considered to be the best representative example of this coastal landscape type in the Hawke's Bay.
50. Photographs of Whakakī Lake are contained in Attachment 2.

### ***Geological features***

51. Whakakī Lake is a coastal lagoon which was created by the formation of a shingle bar which over time grew eastward and more impervious to water seepage, eventually cutting off the lagoon's inlet from the sea. This process, combined with its extended outlet, resulted in the Whakakī Lagoon becoming a freshwater lake with saline sea water no longer able to enter through the lagoons inlet.
52. Whakakī Lake is unique in that the natural drainage and seaward opening has been moved eastwards along the beach by longshore drift. This is different from most other coastal lagoons in New Zealand.
53. The National Geo-preservation Inventory, which identifies and ranks geological features according to their relative significance, classifies the Whakakī Lagoons as regionally significant, specifically recognising that these five well-defined coastal lagoons are the best in Hawke's Bay.

### ***Naturalness/intactness of waterbody***

54. Whakakī Lake is the last significant wetland of a much larger 6,000 hectare wetland landscape. The lake has undergone significant historical modifications through burning, clearance and drainage and only 10% of the original wetland remains.
55. During the 1950s an artificial outlet channel was installed through the dune system emptying almost the entire lake volume, transforming the lake ecology. The artificial outlet channel is no longer used.

### *Water Quality*

56. The amount of sediment coming into Whakakī Lake after rain events can be significant. This brings unwanted nutrients and sediments into the lake impacting on its water quality.
57. In 2016, blue green algae dominated the lake, which is potentially toxic to animals and is detrimental to the lake's ecosystem. In March 2018 the abundance of cyanobacteria in the lake was 50 times higher than the limit considered safe for contact recreation.
58. Hawke's Bay Regional Council regularly carries out water sampling at three locations around Whakakī Lake. Currently, none of the sites meet the guideline values for faecal coliforms and recreational use.
59. In 2017, NIWA assessed the condition of Whakakī Lake. Sampling results showed that the water quality of Whakakī Lake has deteriorated to the point where growth of submerged plants can no longer be supported. Whakakī Lake's ecological state is among the worst of all monitored lakes in New Zealand.

*Values Summary*

<b>Overarching Value</b>	<b>Sub-value</b>	<b>Description</b>	<b>Outstanding Yes/no</b>	<b>Comments</b>
Cultural	TBC	TBC	TBC	TBC
Recreational	TBC	TBC	TBC	TBC
Ecological	TBC	TBC	TBC	TBC
Landscape	TBC	TBC	TBC	TBC
Natural Character	TBC	TBC	TBC	TBC







The importance of Lake Taupo to ngatawhenua continues today. In a 2008 ecological report for the Lake Taupo Trust, a high abundance of smelt and eel were noted. This abundance was linked to the customary harvesting practices of ngatawhenua:

This level of abundance, and the high ratio of male fish present, we believe to also be a direct outcome of traditional harvest practices of ngatawhenua, their management of the fishery under a customary regime, and their ongoing restoration initiatives in terms of the lake and its margins.

### 3. Conflict

Awa Wahi is the place where the Lake was opened to delay pursuing enemies and allow ngatawhenua to escape to Moumoukai.

### 4. Archaeology

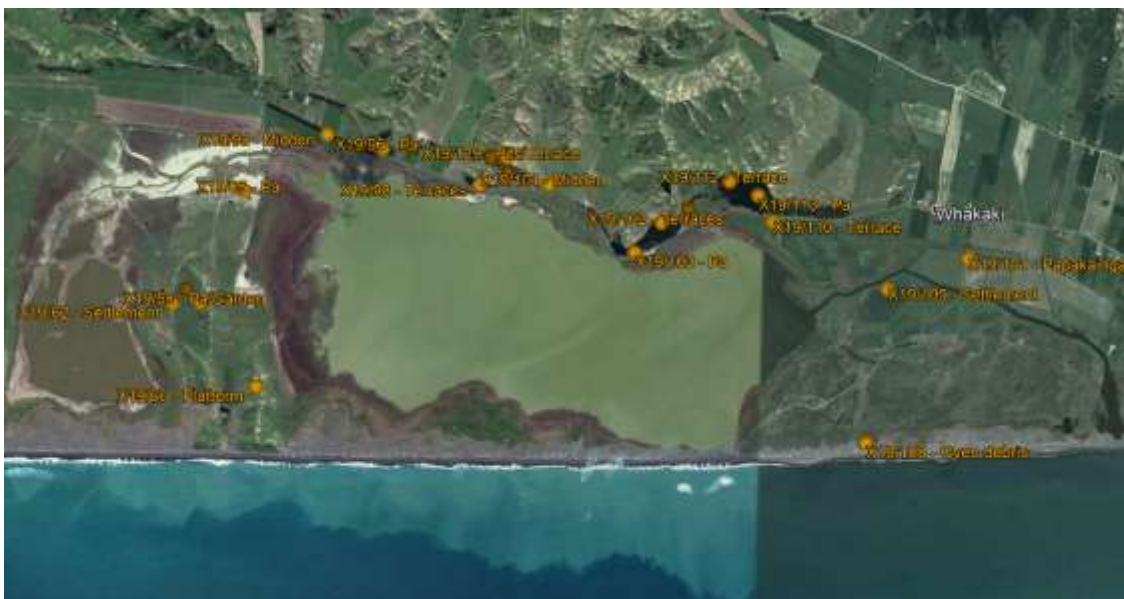


Figure 1: Archaeological Sites

### 5. Resource Management Plans

The following tables list any relevant resource management plans developed by the regional council or territorial authorities. The tables include any specific provisions that apply to them. They do not include all of the general policies or rules that apply. Water quality and water quantity provisions have been included as it is recognised that these aspects can significantly impact on cultural values.

<b>Regional Resource Management Plan</b>
Known Productive Aquifer Systems immediately east of confined and unconfined (Schedule 4)
Catchments Sensitive to Animal Effluent Discharges (Schedule 6b)
<b>Regional Coastal Environment Plan</b>
Within Coastal Environment Inland Boundary
Vegetation Clearance Management Area
Lake and surrounds past sensitive Catchment (Schedule Q)
Known Productive Aquifer Systems immediately east of confined and unconfined (Schedule O)
<b>Wairoa District Plan</b>
Significant Lakes and Rivers (Schedule 5)

**Attachment 2: Photographs - Whakakā Lake**



