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Estuarine vegetation survey - Port Waikato

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Estuarine Vegetation Survey

Port Waikato

December 2011

Prepared for Waikato Regional Council

Estuarine Vegetation Survey – Port Waikato, December 2011

Report prepared for:

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1. Introduction

A 1997 pilot study of Whangamata, Wharekawa, and Otahu estuaries determined that it is feasible to map vascular estuarine vegetation from aerial photography together with field surveys. The success of this work encouraged the Waikato Regional Council to continue with this method. The estuarine vegetation of Tairua, Coromandel, Te Kouma, Manaia, Whitianga, Port Waikato, Raglan, Aotea, Kawhia, Otama, and Whangapoua harbours and the inner Firth of Thames have since been surveyed and mapped. Of these surveyed harbours, Whangamata, Wharekawa, Otahu, Tairua, Coromandel, Te Kouma, Manaia and Whitianga have been re-surveyed to determine changes in vegetation communities over time.

The mapped vegetation is within the Coastal Marine Area (CMA) and includes the spatial cover of mangrove, seagrass, sea meadow, saltmarsh and estuarine weed communities. The results of the estuarine surveys are included in Waikato Regional Council's Geographic Information System (GIS) database, and are used for State of the Environment investigations and assessing consent applications that may affect estuarine vegetation.

The estuarine vegetation of Port Waikato was first mapped in 2004 using 2002 aerial photographs. This report details the results from the second survey of estuarine vegetation at Port Waikato. Comments are included on the estuarine vegetation present, threats to the native estuarine vegetation communities, and other field notes of interest. This report is accompanied by digitised aerial maps of the survey site with vegetation community overlays.

2. Methodology

The field survey was undertaken over 2 days on the 5th and 6th December 2011. The survey was undertaken using a combination of boating and walking. The same methodology for mapping saltmarsh, mangrove, seagrass and weed communities was followed as that previously used to map Coromandel Peninsula estuaries (e.g. see Graeme, 2010b) using a personal digital assistant (PDA) loaded with 2007 aerial photographs of the survey area. Coded polygons were drawn directly onto the PDA aerial photographs to define the spatial extent of wetland vegetation types as they were ground-truthed in the field. The use of colour pen notations on hard copy aerial photographs was reserved as a backup for when there were instrument problems or the weather made using the PDA difficult e.g. sun lighting made it too difficult to see the PDA screen clearly in the field.

The upper saltwater influence in an estuary is usually indicated by the upstream limit of oioi, saltwater paspalum or saltmarsh ribbonwood. The limit of these plants determined the inland/upstream extent of the survey.

Field notes were made of estuarine wetland characteristics and their vulnerability to particular threats.

2.1. Wetland vegetation classification

Estuarine wetland vegetation of the Waikato Region is defined by four groups:

1. **Saltmarsh -** a multi-species community in which three sub-communities are distinguishable in the Waikato Region. They are:

    a) 'Rush/sedge community' – This is generally sea rush (*Juncus krausii* subsp. *australiensis*), oioi *(Apodasmia similis),* and generally only common on the West Coast: three-square sedge *(Schoenoplectus pungens).* Marsh clubrush *(Bolboschoenus fluviatilis)* is commonly found up streams and rivers at the upper estuarine limit in some harbours, although it is not mapped within this survey as it is a species of brackish-freshwater.

    b) 'Saltmarsh ribbonwood community' - Saltmarsh ribbonwood *(Plagianthus divaricatus)* dominates this zone, although rushes are often common giving a patchy appearance compared with the uniformity of the 'rush/sedge community'. Small areas of sea primrose *(Samolus repens)*, remuremu *(Selliera radicans)*, the coast spear grass *(Austrostipa stipoides)*, and glasswort *(Sarcocornia quinqueflora)* can also be present.

    c) 'Sea meadow community' - This is devoid of tall plants such as rushes and saltmarsh ribbonwood, with the exception of coast spear grass. The sea meadow community can include sea primrose, remuremu, glasswort, slender clubrush *(Isolepis cernua)*, and

arrow grass (*Triglochin striata*), and in more brackish areas bachelor's button (*Cotula coronopifolia*), leptinella (*Leptinella doica)* and sharp spike-sedge (*Eleocharis acuta*).

2. **Mangrove** *(Avicennia marina* subsp. *australasica)* – This is usually a monospecific community although seagrass, spartina *(Spartina* spp.*)*, saltwater paspalum *(Paspalum vaginatum)* and sea meadow beds can sometimes be found underneath mature mangrove stands.

3. **Seagrass** *(Zostera capricorni*) – This is usually a monospecific community, and is the vegetation which occurs at the lowest level in the tide.

4. **'Weed community'** - In the Waikato Region the most significant estuarine weeds are saltwater paspalum and spartina. Both of these grasses generally grow in the open estuary and trap sediment, greatly increasing the harbour's infilling rate. These grasses also compete with the native wetland communities.

   There are other weed species (such as tall fescue (*Schedonorus phoenix)* and alligator weed (*Alternanthera philoxeroides*)) which can tolerate a degree of salt influence but for clarity of mapping they have not been included in the surveys due to their presence above the spring high tide mark.

Table 1 lists common estuarine plant species (and their associated 'estuarine vegetation community') mapped during the survey. Table 2 lists freshwater species that are commonly noted in the survey in conjunction with the estuarine plants.

Mixed mapping categories are used to indicate the occurrence of 'mixed' vegetation communities. Saltwater paspalum in particular is spreading and mixing with rush/sedge, sea meadow and saltmarsh ribbonwood communities. Where vegetation is found under the canopy of mangroves (e.g. seagrass or saltwater paspalum under mangroves) this is mapped as a 'mixed' community.

Table 1: Estuarine plant species found at Port Waikato

Common/Maori name	Scientific name	Estuarine Vegetation Community
arrow grass	*Triglochin striata*	sea meadow
bachelor's button	*Cotula coronopifolia*	sea meadow
coast spear grass	*Austrostipa stipoides*	sea meadow
glasswort	*Sarcocornia quinqueflora*	sea meadow
	Lilaeopsis novae-zelandiae	sea meadow
mangrove	*Avicennia marina* subsp. *australasica*	mangrove
oioi	*Apodasmia similis*	rush/sedge
remuremu	*Selliera radicans*	sea meadow
saltmarsh ribbonwood	*Plagianthus divaricatus*	saltmarsh ribbonwood
saltwater paspalum *	*Paspalum vaginatum*	weed
seagrass	*Zostera capricorni*	seagrass
sea primrose	*Samolus repens*	sea meadow
sea rush	*Juncus krausii* subsp. *australiensis*	rush/sedge
sharp spike-sedge	*Eleocharis acuta*	sea meadow
slender clubrush	*Isolepis cernua*	sea meadow
spartina	*Spartina* spp.	weed
three square	*Schoenoplectus pungens*	rush/sedge

*** denotes an exotic species**

Table 2: Freshwater plant species noted during the survey at Port Waikato

Common/Maori name	Scientific name
alder *	*Alnus glutinosa*
crack willow *	*Salix fragilis*
lake clubrush / kapungawha	*Schoenoplectus tabernaemontani*
Mercer grass	*Paspalum distichum*
pampas *	*Cortaderia selloana and C. jubata*
raupo	*Typha orientalis*
reed sweetgrass *	*Glyceria maxima*
short marsh clubrush	*Bolboschoenus fluviatilis and medianus?*

*** denotes an exotic species**

3. Results

The estuarine vegetation in Port Waikato is described clockwise from the river mouth. Figure 1 shows locations of photo waypoints referred to below. A table of these locations is included in Appendix A.

3.1. Site description

In behind the frontal dunes, the lower true right bank (TRB) of the estuary is characterised by eroding dune banks with pines and pampas (Figure 2). The first estuarine vegetation is about 2 km south of the treatment pond at the end of Ghezzie Road which includes saltwater paspalum intermingled with marsh clubrush and with a few sea rush clumps at the back. Patches of oioi occur around the treatment pond edges (e.g. Figure 3) and further upstream along the TRB towards the islands. The upstream extent of oioi along the main TRB of the river is near the river islands. Figure 4 shows the river bank dominated by willow, cabbage trees and pampas opposite the lower western river islands.

Of the lower river islands surveyed the dominant vegetation is the tall lake clubrush. An exception is the larger south-western island which is dissected by tidal inlets and supports freshwater species such as the purple flowered water speedwell, freshwater rushes, *Cyperus eragrostis*, mercer grass and the occasional Bachelor's button and sharp spike sedge (Figure 6). Similar to the last survey in 2004, this wasn't mapped as sea meadow due to the predominance of freshwater species. Clumps of oioi were found scattered along the seaward edges of some of the lower islands.

The true left bank (TLB) of the estuary near the lower river islands is characterised by thick swards of marsh clubrush and reed sweetgrass, some raupo and backed by alder forest and some willow. Oioi is scattered in front of the freshwater sward (Figure 7 and Figure 8). In the vicinity of the Klondyke Rd intersection alligator weed is common. This invasive weed is found growing with sharp spike sedge and bachelors button at the edge of the salt influence (Figure 9). Not far downstream at a stream mouth is the first definite presence of saltwater paspalum (Figure 10 and Figure 11) intermingled with sea meadow communities. Upstream of this point it appears to be its freshwater relative Mercer grass.

Downstream of Klondyke Rd the embayment is dominated by a fringe of tall lake clubrush with occasional scattered small clumps of oioi. Figure 12 shows a stream in the foreground with oioi fringing its mouth and with lake clubrush, some marsh

clubrush and then reed sweetgrass in behind. Saltwater paspalum is present around the stream mouth.

Further downstream the coastal edge supports clumps of lake clubrush with saltwater paspalum higher up on the rocky edge. Slender clubrush, three square and *Carex pumila* occur amongst the saltwater paspalum. Small communities of sea meadow including sea primrose, remuremu, slender clubrush, and bachelor's button were also noted.

Figure 14 shows a view looking over thick saltwater paspalum lining a creek and a small population of lake clubrush. There is a small patch of seagrass in this embayment. Moving further seaward to the main boat ramp, there is a large area of sea meadow with saltwater paspalum present and sea rush along the landward edge (Figure 15) and a rocky promontory with coast spear grass and glasswort (Figure 16). Continuing further seaward, saltwater paspalum continues to line the foreshore around into the next bay.

Around in the next bay it appears that the bed level and extent of seagrass has changed over time (see Figure 17 and Figure 18). This bay supports the largest population of seagrass found at Port Waikato (Figure 19). Saltwater paspalum is the main feature of the upper foreshore and is growing out into the seagrass beds in places (Figure 20). The bay also supports one lone mangrove surrounded by saltwater paspalum and some sea rush patches.

There is very little estuarine vegetation further along the coastline until the next bay which has fine patchy seagrass beds and saltwater paspalum lining the upper foreshore (Figure 21). Titiko and cockles were noted in this area.

Moving further seaward along the coastline there is little estuarine vegetation of note until around past the Cobourne gardens (Figure 22). Large patches of glasswort are found against the urban garden edge (Figure 23) and saltwater paspalum is common along the edge of the foreshore (Figure 24). Saltwater paspalum dominates a large outwash fan of the Maraetai Stream with small patches of sea meadow still surviving in places (Figure 25). The stream has meandered along the coastal edge over time. Figure 26 shows a view overlooking dense saltwater paspalum either side of the stream and to housing development behind. Saltwater paspalum continues as a thin band along the coast line out towards the large dunes. The vegetation changes here from estuarine communities to dune communities including spinifex and knobby clubrush.

3.2. General notes

Mullet jumping out of the water was a common sight as were the orange fins of the introduced koi carp. Freshwater ecosystems are seriously compromised by dense infestations of sweet reed grass, alligator weed, common alder and willow.

3.3. Birds

Birds noted during the survey include:
Pied shags, mallards , pukeko, swallows, spoonbills, pied stilts, plovers, gannets, white faced heron, paradise duck and black backed gulls.

3.4. Threats

The most significant threat to the native estuarine vegetation communities at Port Waikato is the invasive saltwater paspalum that is a prevalent estuarine weed amongst low-growing sea meadow communities and also threatens rush/sedge communities. Saltwater paspalum also encroaches into seagrass habitat.

Another pest plant in the area is alligator weed which although a predominantly freshwater species, was found scattered along the TLB on sand banks with rush/sedge and sea meadow communities.

Koi carp were seen in the lower estuary but it is unknown how much of a threat they pose to seagrass. It is assumed that the salt concentration is enough of a deterrent to these freshwater fish. A lot of dead koi carp were found washed up along the foreshore and local opinion was that they were killed by eddies with higher salt concentrations.

Development is not likely to be much of a threat to the estuarine vegetation mainly due to the fact that most housing development is on the landward side of the road. Any further armouring of the coast line will however affect the health of associated estuarine vegetation.

4. Discussion

Due to the 'river mouth' characteristic of this estuary the estuarine vegetation is generally restricted to a fringe along the lower river banks. No major changes were observed since the last survey in 2004, although it is only 5 years between the aerial photographs used (2002 and 2007). The most ecologically significant estuarine vegetation at Port Waikato is still the seagrass beds. These have been influenced by sediment movement but a large population still occurs half way between the settlement and Klondyke Road. The fringing rush and sea meadow bands are still compromised and threatened by the invasive saltwater paspalum which dominates much of the upper intertidal zone. One solitary mangrove was found and no saltmarsh ribbonwood was seen.

The most effective restoration action that could be taken to enhance the health of the estuarine vegetation communities would be to undertaken saltwater paspalum control.

The aerials that this survey is based on were taken in 2007 so there may be a discrepancy between what is visible on the aerials and what was actually seen during the field survey at the end of 2011.

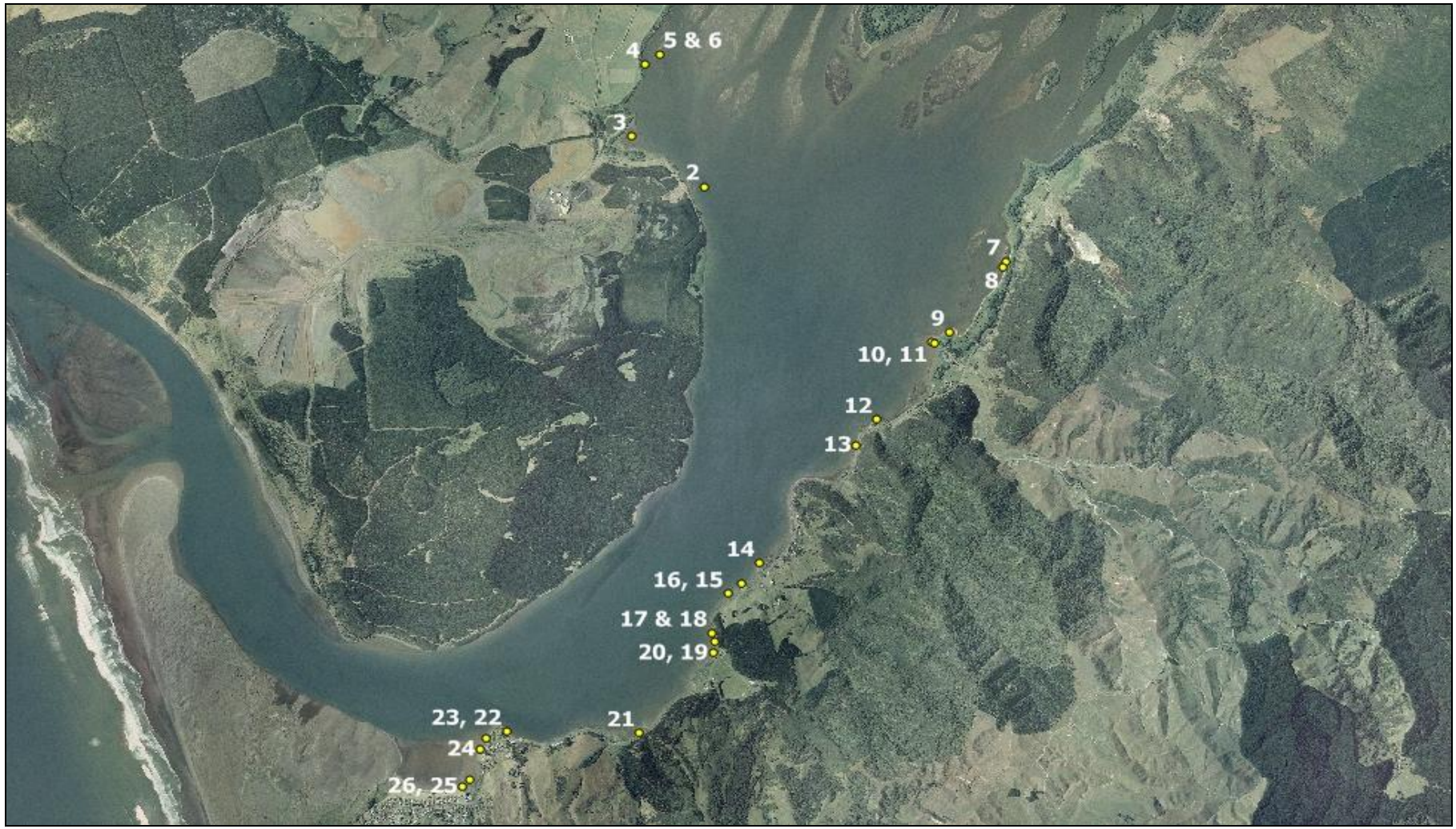

Figure 1: Map of Port Waikato showing names of feature and photo points.

Figure 2: View of eroding dune banks with pampas and pines.

Figure 3: View of lake clubrush (tall rush to right) and oioi (shorter rush to left) along the TRB. The treatment pond is in behind the line of trees.

Figure 4: The view looking upstream along the true right bank from where scattered clumps of oioi finish. Willow dominates the bank. Note the remains of an old structure stand out from the bank.

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Figure 13: Saltwater paspalum communities high on the shore line with lake clubrush further down along the low tide mark.

Figure 14: Lake clubrush along the stream edge in the foreground surrounded by saltwater paspalum dominating the entire foreshore with only small clumps of sea rush or oioi along the seaward edge.

Figure 15: Sea meadow, saltwater paspalum and sea rush further seaward of the main boat ramp.

Figure 16: Coast spear grass and glasswort on a rocky promontory seaward of the boat ramp. Lake clubrush in the lower background with saltwater paspalum and sea rush higher on the shoreline.

Figure 17: The estuary bed seems to have eroded here when compared to a similar shot taken in 2004 (following) resulting in more rock being visible and patchier (though healthy) seagrass.

Figure 18: For comparison with the previous photo, this is the same view taken in 2004.

Figure 19: A view of the largest area of seagrass at Port Waikato.

Figure 20: Saltwater paspalum and seagrass beds intermingling.

Figure 21: Patchy thin seagrass in the foreground and saltwater paspalum in the background.

Figure 22: A view along the coastal edge of the Cobourne Reserve.

Figure 23: Urban garden edges extend right out onto the coastal margin. Glasswort clumps can be seen along the high tide mark and saltwater paspalum alongside a boat ramp.

Figure 24: A view over an expanse of saltwater paspalum to a stretch of armoured coastline.

Figure 25: A patch of sea primrose being overwhelmed by saltwater paspalum.

Figure 26: A view over thick saltwater paspalum to the meandering Maraetai Stream mouth, inner harbour reserve and housing. The open dunes are visible in the right background.

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Appendix A – Photo waypoints

Photo Number	E	N
2	2664913	6426565
3	2664427	6426925
4	2664517	6427444
5 & 6	2664621	6427516
7	2666923	6426023
8	2666910	6425979
9	2666551	6425514
10	2666433	6425449
11	2666455	6425438
12	2666063	6424888
13	2665926	6424707
14	2665276	6423857
15	2665160	6423711
16	2665065	6423637
17 & 18	2664958	6423356
19	2664981	6423294
20	2664965	6423214
21	2664474	6422636
22	2663583	6422652
23	2663448	6422607
24	2663408	6422526
25	2663337	6422305
26	2663290	6422259