

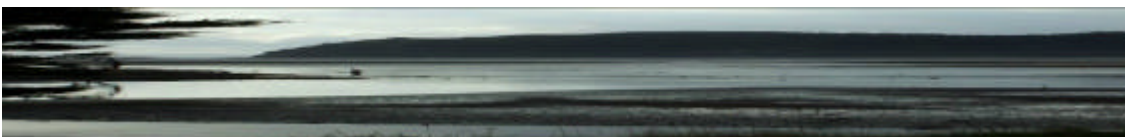


Executive Summary to WWF-NZ Final Report

Waikawau Bay Estuary and Wetlands Systems August 2009



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1. Introduction:

Funding was received in June 2008 from World Wildlife Fund to do baseline surveys of the Waikawau Bay wetlands and estuary and also to produce educational material associated with this project. Further funding was received in August 2008 from Environment Waikato, primarily to look at the spread of saltwater paspalum (*paspalum vaginatum*) and its impacts in the estuary.

It was expedient to combine the two projects, both from the economic point of view, but also because it was thought likely that the spread of saltwater paspalum was affecting the life and physical environment of the estuary and saltmarsh, as well as the wetlands behind the estuary.

Rodent control, monitoring of some species, and vegetation restoration of some areas, had begun in the wetlands and estuary, two years prior to the funding of this project. All this work had been carried out by the authors and overseas students on a volunteer basis.

Considerable restoration plantings have been carried out over the last three years. To date over 1000 plants have been planted and released, all by schoolchildren, the authors and other volunteers.

Two ecologists have worked two days per week since October 2008 on this project. Many more hours have supplemented this work, on a voluntary basis by overseas students and others.

This wetland project is part of greater system of restoration being undertaken by Moehau Environment Group in the Northern Coromandel. Other MEG projects include: a buffer zone for pest control of approximately 1K wide, in operation from the east to the west coast, just north of the wetlands and estuary; a rodent control project, which has recently allowed the reintroduction of North Island robins into the Pt Charles area; mustelid control over an area of 10,000ha (the MEG Kiwi Zone); and considerable environmental education, such as the annual MEG Summer Holiday Programme. All projects have a public buy in, which has leant greatly to their success.



2. Background:

2.a Site description:

Waikawau Bay is situated on the Northern Coromandel on the eastern seaboard. The survey area comprises: the estuary/wetlands proper, of approximately 75ha, which is a remnant part of a much larger river/estuary/ harbour/lagoon system, characterized by in-filled, coarse to fine grained silts, sands, and dune and marsh systems. The survey area encompasses both public and private lands.

The Northern Coromandel has a warm moist maritime climate, influenced by two bodies of water (Hauraki Gulf –western side, Pacific Ocean –eastern side). The prevailing winds are gusty southwesterlies (bringing little rain); or easterlies bringing intense and often severe rainstorms (200mm+/hr have been recorded). Heavy rainfall is common with frequent flooding and sea wash.



Tidal influences in association with heavy rainfall events cause severe flooding because valleys are long, narrow, and low lying with abrupt steep ranges behind them. Erosion is often severe with silt laden flood waters.

Salt laden winds during severe easterly storms damage vegetation and cause coastal erosion. These easterlies and the strong southwesterlies have caused noticeable damage to the dune systems at the northern end of the bay in the past ten years.

The systematic stripping of riparian forest remnants in the farming valley behind the estuary, to the northwest has contributed to this, and there is now little vegetation to break the south-westerlies as they gust down the valleys. As a result of this lack of vegetation, a sand island of some 1200 cu.m (approx.) in the mouth of the estuary eroded away in two years 2006 - 2008. This has led to the mouth of the estuary being more exposed to the sea.

Geology is characterized by andesites with occasional basaltic extrusion plugs. Rhyolite clays are present behind the wetlands. Yellow clays are present throughout rest of the estuarine area. Soils are of medium to poor fertility. There is little evidence of peat deposits.

Thirteen streams feed into Waikawau Bay with two fourth order streams feeding the northern end wetland and estuary. Two third order streams also feed directly into the north end wetland system. The two largest stream watersheds are estimated to be in excess of 3,500ha (approx).

The Bay itself is dominated by the DOC Farm Park Reserve with a large dry stock beef and sheep farm lease. A long narrow fore dune reserve (100m wide) with regenerating native flora separates the agricultural lands from the beach. Farmlands are hard up on the southern edge of the estuary but with good fences to keep stock out.

2.b Human Occupation:

The Waikawau Bay area has a long history of human occupation and land modifications.

There is considerable evidence of Maori occupation throughout the Bay and includes all the common indicators (eg. kianga and pa sites, middens, fish traps, earthworks, gardens and mounds). There is evidence to suggest early occupation 850 – 950 AD

Midden evidence suggests major occupation between 1300 –1600 AD. While there is no visible evidence of land clearance, there is evidence of several large garden sites and food storage pits, suggesting that some land was cleared for gardens. There is no way of knowing exactly how species of flora and fauna were modified due to Maori occupation.

Coromandel was renowned for the quality of its kauri timber and extraction took place from the early 1800's right up into the early 1900's. Other high quality timbers were also being removed at this time. Gum digging and gold mining followed and there is evidence throughout the Bay of adits, mine shafts, tramway beds, dams, tailings mounds, stamper batteries

Traditional farming of sheep, beef and dairying was carried out from the late 1800's to the early 1970's. Dune stabilization was carried out in the early 1900's and there is evidence still of berms, floodgates and tidal stock gates. There are examples throughout the estuary of reclamations; however, most of these are now abandoned.

All farmed lands received significant government subsidies for fertilizers, clearance, fuels and stock transportation. Farm subsidies pre 1970 contributed to some major environmental impacts in

the area. Farmers cleared land, dug ditches, diverted streams and drained wetlands in an effort to make the land more agriculturally productive. With the removal of subsidies much marginal agricultural land was retired, converted to forestry, or sub divided into smaller lifestyle blocks. The more gently rolling hill country and valley floors remained in farms.

Almost all of this retired land is now in regenerating scrub and forest (and weeds); and is contributing positively to reduction of steep hill country erosion, (and therefore improved water quality) and the water purity of streams, and the subsequent health of wetland, estuary and ocean beach ecosystems. Forest remnants are all heavily modified.

There are now only two major farms in the Bay, one of which is the DOC Farm Park lease. Both farms are dry stock. There are three large lifestyle blocks (175ha + each) which are mainly made up of regenerating forest and several small lifestyle blocks (20ha or less), two of which are small dry stock farms – the rest are regenerating forest lands.

2.c. Animal Pest Control¹ and Monitors:

Considerable pest control had been carried out in the area prior to the funding of the baseline work. Monitoring of rodent numbers, pateke and fernbird numbers has been carried out since 2006. Most pest control, the development of a pest control infrastructure, and all monitor work has been carried out by volunteers.

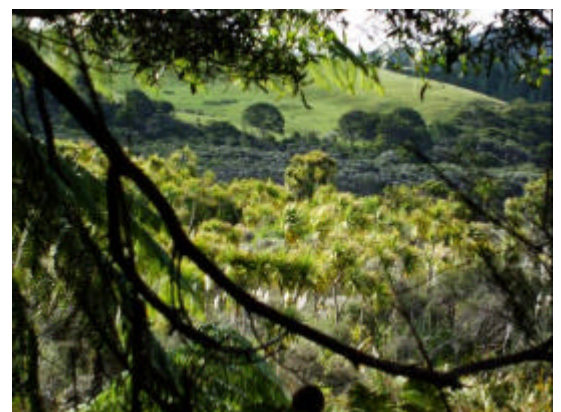
In 1999, 35 traps were installed for trapping mustelids and hedgehogs² along the foreshore of the Bay and the northern margins of the estuary system. Traps are serviced by volunteers on a monthly basis, except over the summer period when they are checked weekly. Further trap lines for mustelids were installed on the eastern, western and southern margins of the wetlands in 2005. These traps are serviced by contractors employed by Moehau Environment Group (with funding from BNZ Save the Kiwi Trust) as part of kiwi protection work.

In 2006, 150 rat traps were installed around the margins of the wetlands. At this time 75 bait stations were also installed around the perimeter and on two lines in the heart of the wetlands.³ Rat traps are checked approximately every two weeks by volunteers. Bait stations are serviced every three months. Data is kept of all rats and mice trapped. Monitoring of the effectiveness of trapping is done every three months by independent auditors. To date, monitors show that rodent numbers have declined significantly and weta and skink numbers have increased. More traps will be installed in the next year on the north western margin of the saltmarsh – where there are only bait stations at present.

3. The Surveys:

Baseline surveys cover five broad fronts, each interconnected or overlapping:

- Flora studies:
 - A full list of botanical species present.
 - Saltwater paspalum monitors (see below)
- Fauna studies:
 - Reptile surveys: Artificial gecko houses
Pitfall traps
Tracking tunnels
Each Surveyed every 1-2 months (two surveys completed – May and June)
 - Invertebrate surveys:
One survey over a 2 week period by an entomologist covering prescribed survey lines in the area.



¹ All animal pest control is carried out after full consultation with landowners. Only methods approved by each landowner (be they public or private) are utilized. Approval by all landowners to carry out pest control has been given.

² Hedgehogs are trapped along the foreshore and dune systems, as they are one of the main predators of dotterels and Variable Oyster Catcher eggs and chicks.

³ Rat traps were not placed in the heart of the wetlands, so that human impacts are minimized in this fragile environment.

Material found in pitfalls used for reptile surveys
Observations made during the course of other survey work.

- Shellfish Surveys:
Three survey areas on the north and south sides of the estuary. Each area containing 16 survey plots (2.5mX2.5m), dug and sifted to a depth of 8cm.
 - Bird Surveys: Five minute bird counts, covering 2X2k lines (two surveys; late spring and late autumn)
Pateke census (annual)
Fernbird monitors (Twice a year)
Observations made during the course of other survey work.
 - Freshwater fish surveys:
Daylight trawls of streams, inundated pastures and ditches, using handheld nets
Baited fish traps placed in streams and ditches overnight
Night surveys of streams and ditches using nets and spotlights
Mudfish traps placed in likely places for a number of nights and checked daily.
- Saltwater paspalum surveys:
- Measurement of growth (tenx10m wide plots established,[including two test spray plots] which are to be measured every three months, for two years. First survey completed).
 - Core sampling and random fauna squares taken in each of the measurement areas established (above)
 - Photo diary and photo plots (two 10X10m sq plots established in the saltmarsh in north and south side of estuary). All plant species were mapped.
 - Observations made during the course of other survey work.
- Mapping:
- An independent mapping expert was employed to construct maps from the GPS data obtained in the survey work and to construct other maps where required.
- Physical studies:
- 7 Profile lines were surveyed across the estuary, from estuary mouth to upper reaches. Core samples and fauna sample were taken at intervals along key lines. Surveys of these lines will be repeated at six month intervals, or after heavy weather events, to determine changes in the estuary floor and hydrology.

Anecdotal evidence was used where appropriate to supplement survey work.

4. Findings:

- All common native flora species were well represented in both the saltmarsh and the wetlands. This was established and verified by the Waikato Botanical Society.
- Significant patches of pampas, mistflower and small amounts of woolly nightshade and grey willow are present in the wetland. In the saltmarsh there are patches of pampas, and spartina and significant areas of saltwater paspalum. The paspalum is changing the hydrology, flora, fauna and physical makeup of the environment.
- It was expected that copper skinks would be present, but none were found. Rainbow skinks, however, were found in abundance throughout the survey area. It is possible that the rainbow skink is supplanting the copper in this habitat.
- The golden/green bell frog was found. This exotic frog is now returning after a dramatic decline due to the chytrid fungus in the area.
- Green geckos and common forest geckos were found on the margins and in the surrounds of the survey area, but not in the area itself.
- For the five minute bird counts A total 289 birds were recorded in the December survey. There were 34 species. A total of 22 species were either native or endemic (65%). 12 species were exotic (35%). Of these 172 birds were native (60%) or endemic and 117 were exotic (40%).

- There were a total number of 317 birds recorded during the April five Minute Bird Counts Survey. There were 28 species recorded. 19 species were native or endemic (68%) and 9 were exotic (32%). 217 of the birds recorded were native or endemic (68%) and 100 were exotic (32%).
- There is a healthy and rapidly increasing (recently established) population of pateke (100+).
- There is a healthy and abundant fernbird population (80+).
- Banded rail are present and increasing. They are now seen most days during field surveys.
- Spotless crake and bittern are also present. Bittern are now known to be breeding in the area. It is not known how many spotless crake there are, but two pair have been observed so far.
- Observations suggest that as a consequence of animal pest control there has been a noticeable increase in the number of birds and bird species present in the area under survey; waders, wetland, bush and field species.
- Large numbers of banded kokopu and short finned eels were found in all the streams and ditches.



- Large numbers of giant bullies and red finned bullies were also found in some streams.
- Healthy populations of inanga and freshwater shrimps were found.
- Ground beetles were abundant in some areas.
- Large numbers of spiders, including the Australian whitetail were found.
- At least two species of ground weta are present (as yet to be identified).
- Few species of butterflies were recorded.
- Several introduced predatory wasp species were found with the Asian paper wasp present in significant numbers throughout the wetland and upper estuary.
- Cockle beds are large, healthy and densities are up with the highest recorded in the North Island. Other common shellfish species are present, although pipis are small in size and number.
- As a consequence of trapping and baiting over the last three years, rodents are now present in reduced numbers. Mice presence was recorded in 50% of tracking tunnels at the last monitor (June 2009). Rat presence is between 3-5% (3% at June monitor). A number of feral cats have also been taken out of the wetlands over the last three years.
- 40 core samples have been taken along key profile lines. The results are yet to be analyzed. Core samples, and fauna squares have also been taken from the saltwater paspalum

measurement plots. Provisional findings here, indicate little fauna within paspalum growth and silt build up with anoxic patches within the survey areas.

5 Recommendations:

5.1 Continued reptile monitors using pitfall, artificial shelters and tracking tunnels be carried out every two months for the next two years. Particular efforts need to be made to locate copper skinks. Night searches need to be instigated.

5.2 Continue 5minute bird counts in Spring and Autumn and carry out estuary and coastline census of wading bird species at least once per year.

5.3 Pateke populations continue to be monitored annually.

5.4 Fernbird monitoring, as an indicator of rodent control, be carried out twice a year.

5.5 Rodent monitoring, using tracking tunnels, continue to be done every three months.

5.6 Eradication of introduced wasp species and monitoring of butterfly species needs to be initiated (wasps have been shown to wipe out our native butterflies). Wasps, may also have an impact on fernbirds, as they are competing for the same food sources.

5.7 The health of the estuary is indicated by shellfish beds. These beds filter sediments, support bird life and fish stocks. Therefore, further work assessing the health and size of the shellfish beds is desirable. Impacts of saltwater paspalum growth on the beds will need to be monitored closely.

5.8 Netting to live capture, identify, measure and release estuarine fish species, be carried out in the next twelve months.

5.9 Core sampling, fauna plot sampling, and other measurements along profile lines, to be carried out for at least two years.

5.10 Paspalum measurements should continue to be done three times per year, for the next two years. A Report assessing of the impacts of this weed will need to be written, and a Management Plan for controlling the saltwater paspalum constructed.

5.11 Work to control pampas and other invasive weeds needs to be initiated immediately.

5.12 Restoration planting (using locally sourced plants) will need to be continued, especially in areas where weed species are removed.

5.13 Install rodent trap lines on the northern side of the estuary. Find funding to support the payment of a part time contractor to service all trap and bait lines, as servicing of these lines is presently done by volunteers and is therefore sometimes intermittent

5.14. Write a Management Plan for the restoration of the wetlands and estuary.

6. Conclusions:

A substantial amount of survey work has been completed. Findings indicate that there is much more that can be investigated. However initial findings suggest that while the estuary may be threatened by introduced species of plants and some invertebrates, it is in surprisingly good health with robust numbers of many native flora and fauna species.

As improvements are made and monitored there has been a substantial, and immediately noticeable, change in bird populations (fern birds, banded rail, and pateke in particular), but all species.

Further gains will be made as impacts of alien plant and animal species are reduced. It is hoped that monitoring positive changes over time will provide useful examples, for educational purposes, and inspire other coastal wetlands restoration projects.

Report and surveys by Wayne Todd and Kathi Parr, for: Moehau Environment Group, World Wildlife Fund and Environment Waikato