**June 2015**

To Travis Ashcroft

P&I, Kauri Dieback Programme

From John Beachman.

# Report on Forestry Activities in Whangapoua State Forest and their possible roles in introducing and spreading Kauri Dieback disease.

## 1. General History of Whangapoua Forest

Whangapoua State Forest was largely built up as a forestry asset through 1940's Lands and Survey Department purchases of privately owned, mostly rough/reverting farmland within the Whangapoua catchment, mainly from the Bull family. These early farms were largely developed on cut over kauri forest. There had also been significant gold mining activity on and alongside these properties.

The easier, largely alluvial low country was developed by the Lands and Survey Department for farms for ballot to World War Two veterans.

The reverting hill country was assigned to the NZ Forest Service for exotic forest development.

NZ Forest Service set up an HQ at Te Rerenga in about 1948 and began planting up the hill country, initially with a wide range of exotic trees, but moving fairly quickly to forest establishment heavily dominated by Pinus radiata. The process of land clearing and pine forest establishment accelerated through the 60's 70's and 80's. Further strategic purchases of scrublands and native second growth through these decades added to the scale of forest development. (e.g. the Denize Block, Bryers Block, etc.).

The current configuration of the Whangapoua exotic forest was almost entirely developed by the Forest Service.

When the NZ Forest Service was disbanded in 1987, administration of Whangapoua State Forest passed to Timberlands, a forestry SOE, and then, via further Government decisions, the cutting rights for the forest were sold to Ernslaw One (E1), the current owner and manager.

**NB. The PTA positive Hukarahi Conservation Area** lies North West of Whitianga and forms the larger part of Kuaotuna Pt 3A, recorded as 1034 Acres (approx. 421 hectares) on old cadastral maps. It was held as Provisional State Forest long before the major land acquisitions of the 1940's set up Whangapoua State Forest. Small parts of Kuaotuna Pt 3A were severed off and developed as exotic forest and are now under E1 administration. The residual area of 377 hectares now known as the Hukarahi Conservation Area was eventually allocated to the Department of Conservation as Conservation (stewardship) land. Its western boundary lies against Whangapoua Forest administered by Ernslaw One.

(The name Hukarahi is not well known or used locally and is derived from the trig of that name at the northern end of the block).

## 2. The Kauri Plantations

**Early Kauri Plantations. See Map one**

Kauri plantations are of interest to the Kauri dieback programme because some nursery contaminations have led to spread of kauri dieback via kauri plantation establishment. Of particular interest are kauri raised in Waipoua forest nursery in the 1940's and 50's.

Within the above mentioned exotic forest agenda some planting of kauri occurred.

In 1949 6000 3/0 (i.e. 3 year old) seedlings were supplied to Whangapoua forest from the Waipoua Forest Nursery. These were seed lot number AK 47/533. They were planted out at 6 feet by six feet (1.8M by 1.8 M) spacing in an area of 5 acres (2.0 Hectares) in what was then described as Compartment 10, subsequently reclassified and now described as Compartment 45.

In 1950 2250 3/0 Waipoua seedlings, seed lot number 48/371 were planted out at 12 feet by 12 feet (3.6M by3.6M)spacing in an adjacent line cut area of approx. 7 acres (2.8 Hectares)also in compartment 10.

Diary notes supplied by Max Johnston describe their subsequent condition. Generally the descriptions tend to match what you would expect in such sites i.e. trees doing very poorly on the bony ridges but making better progress in the more fertile lower sites.

A 1968 evaluation inspection by the District Ranger Colin Sutherland, District Forester Dennis Kelly, and FRI scientists Harry Bunn and Tony Beveridge, made the decision to clear the site and replant it in Pinus radiata due to the poor survival and poor performance of the kauri.

Max Johnston re-inspected the site in 1971. He measured a sample of 40 kauri trees and recorded heights up to 4M. He recorded that mortality was high across the area. He commented that 'foliar colour and general sturdiness of 90% of these remaining stems…is quite good'.

The clearing of the kauri and conversion to radiate pine occurred in 1972

**Field Inspection.**

Norbert Klein, manager of Ernslaw One and I did a field search on 17/6/15 to see if any kauri have survived. We were guided by the 1959 stock map which we had just found in the E1 office and which clearly maps the two plantations. The area is currently in approx. 15 year old pinus radiata. We saw no kauri and I'd be fairly certain that none exist there. Given the density of the pines I can't be unequivocal re this absence. However, the area would have been burned prior to planting in 1972 and the logging coup of c. 2000 would have obliterated anything that was in the way i.e. there have been two major disruptions of the site since the decision was made to remove the kauri.

If the Programme wants complete certainty re the absence of these kauri, then an aerial search would finally put the matter to rest.

**Map One. C. 1959 stock map showing Te Rerenga HQ Site, 1949 and 1950 kauri plantations and 1959 FRI Provenance Trial. NZ Forest Service**


**Later Kauri Planting**

In 1983 kauri planting recommenced using seedlings supplied from Sweetwater Nursery near Kaitaia. Kauri plantings are as follows. They are very widely dispersed in the forest.

**Compartment 51.** 0.7 hectares planted with 750 trees. I inspected this site on 17/6/2015. There is a reasonable survival of kauri although I did not quantify this. Trees vary from approx. 2.0M tall through to stout saplings up to 12 CM DBH i.e. growth is slow but the site is harsh and the trees have not been released from competing native vegetation.

**Compartment 67.** 2.2 ha planted. This area is described as the Purunui block; it is an elbow on the Waiau River where 680 trees were planted in an area where there was reasonable natural regeneration of kauri. I've visually inspected the area from the 309 Road. There looks to be a confusing mix of natural and planted kauri which would be very difficult to unpick on the ground.

**Compartment 90**, 0.8 hectares. I have not inspected this site.430 trees were planted there in 1983

**Compartment 83.** 12.0 Hectares. 6000 trees planted here in 1984.Area was line cut prior to planting. Very steep exposed site. I was unaware of this plantation until Lindsay Arthur signalled his knowledge of it. I inspected this area with Lindsay on 18/6/2015. There is a reasonable survival on the upper slopes we inspected. Trees are small but are starting to push into the canopy and many are growing at approx. 30cm/year. A release cutting would benefit all of the plantations inspected.

**Flay's Road Coromandel**. I don't have records of the scale of this plantation. Lindsay Arthur brought it to my attention. He said it had been planted in 1984 by school kids in an areas line cut by Whangapoua Forest workers. He thought it contained perhaps 6000 kauri. I understand that the land tenure is District Council Reserve. I inspected it on 17/6/2015 via visual assessment from Flay's

Road. It looks to be a plantation established in reverting scrub lacking any natural kauri. The site appears quite fertile but steep. Some of the planted trees are starting to poke through the canopy so some certainty can exist re this area becoming a kauri forest, at least in part. The people who planted the trees will be adults with children themselves now. It would be very beneficial for them to come back and release cut the kauri saplings from competing vegetation.

**Kauri Dieback in the Kauri Plantations.**

None of the above 1980's plantations are showing any kauri dieback symptoms.

The possibility of kauri dieback vectoring from any of the above kauri plantations or kauri plantation sites can be judged as unlikely. Low Risk. However caution is advised re trust in kauri dieback symptomology as no soil testing has been done in these 1980's plantations

In terms of wider kauri dieback programme management, the 1980's plantations should be monitored in case kauri dieback symptoms appear or if soil tests indicate PTA infection. The Programme's monitoring of other Sweetwater Nursery derived 1970's and 1980's plantations should eventually provide a conclusion re the kauri dieback status of Sweetwater Nursery kauri stock.

In the meantime the main thrust of the kauri dieback programme's advice re the management of these plantations should be to **prevent them becoming infected** with kauri dieback i.e. hygiene measures for any visits or site work such as release cutting the competing vegetation.

## 3. Forest Research Institute (FRI) Sample Plot A 254 especially SPA 254/10 *Araucaria bidwillii*. **See Map one**

This was established in Compartment 11 (now Compartment 49) Whangapoua State Forest as a genetics trial by FRI in 1959. It is of interest to the kauri dieback programme because of its use of *A. bidwillii* or 'hoop pine', the seeds of which were imported from Queensland (Seed lot number FRI/56/587) Hoop pine is a close relative of kauri.

This FRI trial was established at Whangapoua Forest in 1959 and shows up as a 12 acre area on the c.1959 stock map uncovered in the E1 office. Note that the Hoop pine plantation was only 0.07 Acres (0.028 Hectares) so makes up only a very small part of the total trial area.

P&I is interested to find out if any of the *A. bidwillii* remain.

I inspected the site and can report that any vestige of the trial has been obliterated and the area the trial occupied is now carrying a stand of young Pinus radiata. Most likely there have been two pine rotations over this trial site and complete replacement of any element of the SPA 254. Hopefully the Scion records will confirm when this occurred if there is any interest in following it up.

## 4. Potential Kauri Dieback Vectors and Current Forest Management Practice.

I discussed Ernslaw One's current forest management practice with E1 Manager Norbert Klein to get a picture of possible vectoring.

**Q1 What are E1's current logging methods?**

A. All methods used i.e. ground logging methods or haulers as required by topography and economics.

**Q2. Is the road network complete or is it still being extended?**

A. Arterial system is complete, spur road and landing construction as required.

**Q3 What is the destination of forest products?**

A. Most (95%) logs go to the port of Tauranga for export. Approx. 5% go to Max Birt Sawmills, 155 SH 2, Pokeno. There are no other receivers of logs.

**Q4. What are current hygiene (biosecurity) practices on Whangapoua Forest?**

A. Vehicles and machinery must arrive 'clean'. Machinery generally does not leave Whangapoua Forest. Current biosecurity practices are based on concerns about weed transfer (Norbert noted that E1 is already carrying a heavy loading of weeds). Logging Trucks obviously leave the forest but, as described in Q3 above, they have limited destinations.

**Q5. What is source of road metal?**

A. Mainly Te Punga Road quarry (Peninsular Aggregates). Other Peninsular Aggregates quarries as required.

Norbert and Lindsay made some comments re the quarries. The Te Punga Road quarry was always a private quarry i.e. it was never State Forest and was not operated by NZ Forest Service. NZFS open up several quarries and metal pits within Whanagapoua Forest to support its roading and forest development agendas. None of these quarries are currently operating.

**Q6. Re Feral Pigs. Are pigs present through all of Whangapoua forest?**

A. Yes. Pig numbers are low. Pig hunter interest is high. E1 runs a permit system and an open area system for pig hunters. Open area hunters are not allowed vehicle access. Long walks are required to access these open areas.

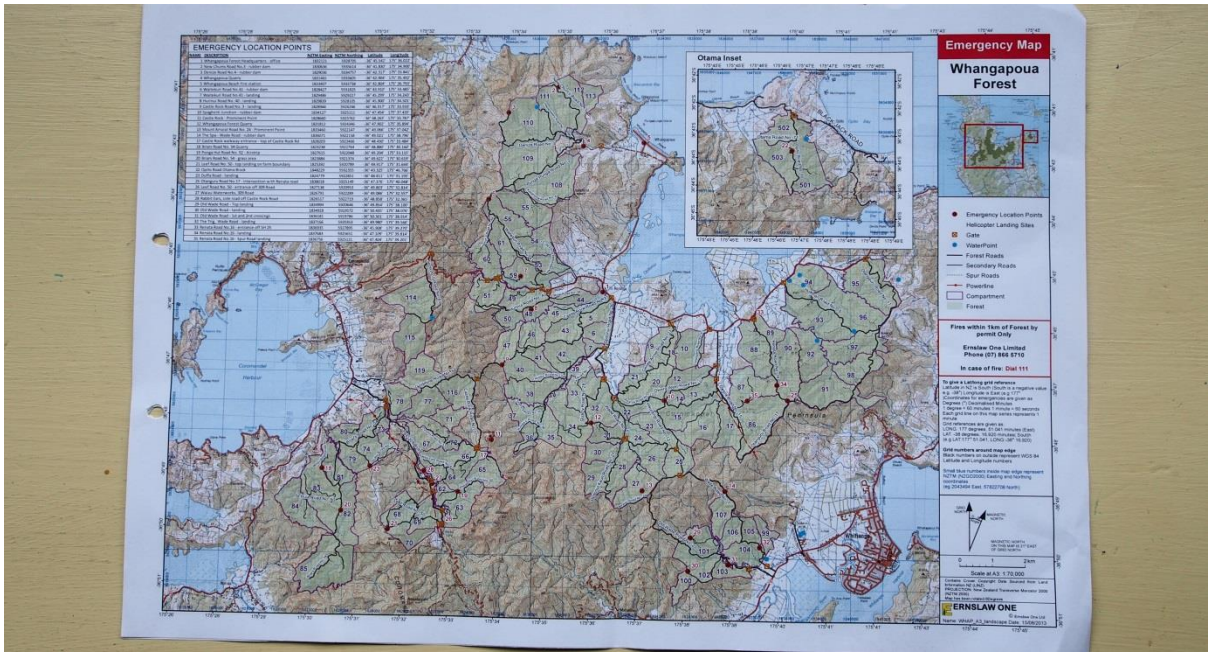
Permits are co-administered with Pig Hunting Clubs (Coromandel and Whitianga). 160 permits last year. Pig hunting may be closed as management and fire conditions require. Permits not allocated for kiwi management areas.

**Q7. Are there any grazing leases in Whangapoua Forest? Does grazing have any role in E1's management practice?**

A. No grazing leases. No use of grazing in forest management.

Note that we saw quite a lot of cattle sign when we inspected the kauri plantation in Compartment 83 so trespassing stock from neighbouring farms could offer a kauri dieback transfer risk to the Whangapoua kauri plantations.

## Map Two. Whangapoua Forest Compartment map. Ernslaw One




## Map Three. Whangapoua Forest Roads. Ernslaw One.

## 5. Possible Vectoring Activities associated with the Development of Whangapoua State Forest.

Most people are familiar with exotic pine forest landscapes. These forests provide a generally accepted green forested backdrop to many rural landscapes. Many of these forests carry trees of similar age within large landscape units and there is sometimes surprise/consternation expressed when the trees are harvested and the green landscape is suddenly removed and a brutal cutover revealed. The scale of activity startles.

It needs to be taken aboard that the development of a forest such as Whangapoua has involved huge scale landscape modification via;

- The purchased land was fenced to protect it from stock and other incursions.
- Roads and tracks needed to be located and constructed.
- Existing vegetation needed to be removed. Vegetation removal involved hand felling with axes and slashers, chainsaw felling of heavier material, vegetation crushing with tractors and bulldozers, crushing with towed rollers, crushing with steerable gravity rollers. All of these activities required supporting roads and tracks so that virtually all ridges are cleared down to mineral earth.
- A framework of firebreaks constructed to contain the controlled burns used to remove felled and crushed vegetation.
- The area hand planted with young trees usually at 1.8M by 3.6M

If we accept that the spread of kauri dieback is associated with the movement of soil, then exotic forest development of Whangapoua offers soil movement of an epic scale. Some of the early aerial photos of Whangapoua taken in the sixties seventies and eighties provide evidence of the scale of soil movement which occurred.

If we consider the locations of known kauri dieback infected sites in the Whitianga/Whangapoua area we note that none of these are within areas administered by Ernslaw One. They are either in the Doc area of Hukarahi (one infected ridge well away from the boundary with E1) or in bush remnants on private farm land around Whangapoua.

We have judged, most probably correctly, that kauri dieback was introduced to the area through activities associated with the development of Whangapoua State Forest. But we have no **evidence** of that introduction, just the disease's geographic association with forestry development.

Enclaves of remnant kauri forest within E1 have been visually assessed from the air by the kauri dieback programme and no PTA symptoms noted.

We have no evidence of any kauri dieback infection in any area administered by E1. If such a site existed we would be able to advise E1 on mitigation of possible spread via its forestry operations.

From what we have seen of the private land kauri dieback infections around Whangapoua, these are most likely being further spread by cattle.

Given the apparent absence of kauri dieback in kauri forest remnants within E1's operation, the most useful kauri dieback mitigation that E1 can implement will be to take all practicable steps to keep cattle out of their forest.
The second most useful step will be to keep pigs at very low numbers and perhaps focus E1's pig control effort towards Hukarahi and the infected sites around Whangapoua.

E1 has already agreed to take kauri dieback into consideration when carrying out its harvest planning. It will be important for the kauri dieback programme to maintain dialogue with E1 for planning purposes and to be seen to be actively monitoring and managing the currently known sites at Hukarahi and Whangapoua.

## 6. Summary Comments re Whangapoua State Forest.

1. We have located the sites of the 1949 and 1950 kauri plantations and from what we could see no kauri remain there.
2. I have located the site of the 1959 FRI Sample Plot A254. No trees from this sample plot remain.
3. We have located the sites of 1980's kauri plantations associated with Whangapoua State Forest and inspected some of these. None are showing any kauri dieback symptoms.
4. I have a picture of the use of machinery and harvesting and trucking patterns at Whangapoua Forest. Currently the use of this machinery does not offer risk of the spread of kauri dieback based on our current knowledge of the locations of the Northern Coromandel kauri dieback sites because the machines do not encounter any of these known sites.
5. Kauri in native forest enclaves within Whangapoua State forest are not displaying any kauri dieback symptoms.
6. The most useful things the E1 Forest Manager can do re kauri dieback exclusion and risk mitigation is to continue to manage wild pigs in very low numbers and to be vigilant and proactive in keeping cattle out of the forest, particularly around Te Rerenga and Whangapoua.
7. It will be very important for the kauri dieback programme to liaise closely with Ernslaw One Managers and to keep them informed of any new infections and developments. E1 is a large commercial operation and kauri dieback management constraints, if imposed, could have an adverse impact on the company's revenues.
8. E1 has already committed via the risk assessment process to take kauri dieback mitigation into consideration in its harvest planning.
9. I have compiled for the Programme a useful archive of Aerial photos and maps of the development of Whangapoua State Forest.

## 7. Comment on the Kauri Dieback Situation in Northern Coromandel

The current active vector risks there are not on Ernslaw One's Whangapoua Forest. They are on private land around Whangapoua and to a much lesser degree in the DOC administered Hukarahi Conservation Area. These are the priority areas for the Programme's attention.

## 8. Possible Further Lines of Enquiry.

**Archival Records**

Generally speaking, records of the development of Whangapoua State Forest have been poorly curated. The two days I spent at Archives NZ Mangere showed disappointing gaps in the record although in saying that in that time I did encounter very valuable material re Great Barrier and Waipoua Forests.

Some of the most useful material was found in the map cabinet in Ernslaw One's Te Rerenga Office.

Ernslaw One also holds the station (Whangapoua Forest) diaries which contain daily entries from 1948-1987.

John Gaukrodger located a 1961 aerial photo of the western part of Whangapoua Forest in an old map cabinet in storage in DOC's Kauerenga Valley workshop. He said there was more material there. This should be inspected and collated.

Tony Beauchamp and I have had a partial look at old records similarly casually stored in a fire store shed at Tairua Forest. This holds a good deal of material relating to the Northern Forest which were sold by the Government to Carter Holt Harvey. A further view of this material could prove useful.

Max Johnston holds a valuable personal record of his association with kauri management on Coromandel. Max is quite willing to assist the programme.

Lindsay Arthur of Matarangi was second in charge of Whangapoua State Forest from 1975-1986 and in charge from late 1986 to the end of the Forest Service in 1987. He worked for Timberlands at Whangapoua Forest before being employed by Ernslaw One when it purchased the cutting rights. He knows the forest and district intimately.

**Steerable Gravity Rollers**

The Steerable gravity roller is a land clearing tool which was evolved from the large rollers towed behind bulldozers to crush scrub and light bush. The steerable roller is harnessed to double winches on the bulldozer and lowered from a ridge track through the vegetation and then hauled back up to the ridge and lowered again. The Roller is usually water filled to add weight and has large external cutting plates to cut the vegetation into burnable lengths. The device was pioneered by Mike Johnson and later Lex Norton. Mike Johnson did a lot of land clearing in Northland including in the Glenbervie and Russell Forest areas. He also worked the machine in Whangapoua in the mid 70's. It seems like a very likely dieback vector conveyance.

Lex Norton developed his roller in Coromandel and cleared bush in Whangapoua Forest but has also done a lot of this work in Northland. He lives at Ohaeawai and could be worth interviewing.

**Archaeological Reports**

In its later years the Forest Service was very meticulous in assessing historic assets before embarking on major works. Fairly full files on these are held in Archives NZ. They may hold useful maps and

other records and could be worth following up at some point. They are generally classified by the name of the block surveyed for these values e.g. Bryers Block Whangapoua State Forest etc.

**Peninsular Aggregates Quarry Te Punga Road**

The Peninsular Aggregates Quarry on Te Punga Road needs further evaluation and risk assessment. I was unable to tackle this given time constraints and lack of a full picture of the kauri dieback management situation at Whangapoua.

**Aerial Search for any residual kauri in the 1949 and 1950 Plantations.**

Norbert and I had a look at this site for any residual trees. We did not find any and judged from the site's history that none are likely to survive there.

However, if the Programme wishes to put this issue to final rest, an aerial inspection of the now known site could be justified. Certainly if the programme is doing any aerial work in the vicinity, an additional five minutes spent checking out this site would be valuable.

**Further Search and Assessment of Kauri in Indigenous Forest Enclaves within Whangapoua Forest**

There have been a moderate level of aerial and ground appraisal of these sites with no PTA symptoms noted. These previous searches could be examined to check for any gaps and these gaps filled via aerial or ground searches.

No soil testing has been done in any of these sites because of the lack of observed PTA symptoms. P&I could possibly prescribe some sampling particularly in kauri remnants on former Denize properties.

## 9. Acknowledgements.

I'm very grateful for help and support from Lindsay Arthur of Matarangi, Norbert Klein of Ernslaw One and John Gaukrodger and Max Johnston of Thames.

## 10. Documents relating to this report.

**Whangapoua: Harbour of Shellfish. A History.** By Graeme Lay. Published 2009. Copyright Whangapoua Beach Ratepayers Association Inc. 256 pages.

**Hukarahi Risk Assessment and Site Management Plan - Final**. Internal Document, Kauri Dieback Programme. Currently being implemented?

**Denize Property/Te Punga Road Draft Risk Assessment and site Management Plan.** Internal Document, Kauri Dieback Programme. (Needs updating in view of addition PTA positive sites on former Denize properties).

**Coromandel Close Out Report to Ministers for Primary Industries and Conservation.** Current status of this Kauri Dieback Programme document is not known.