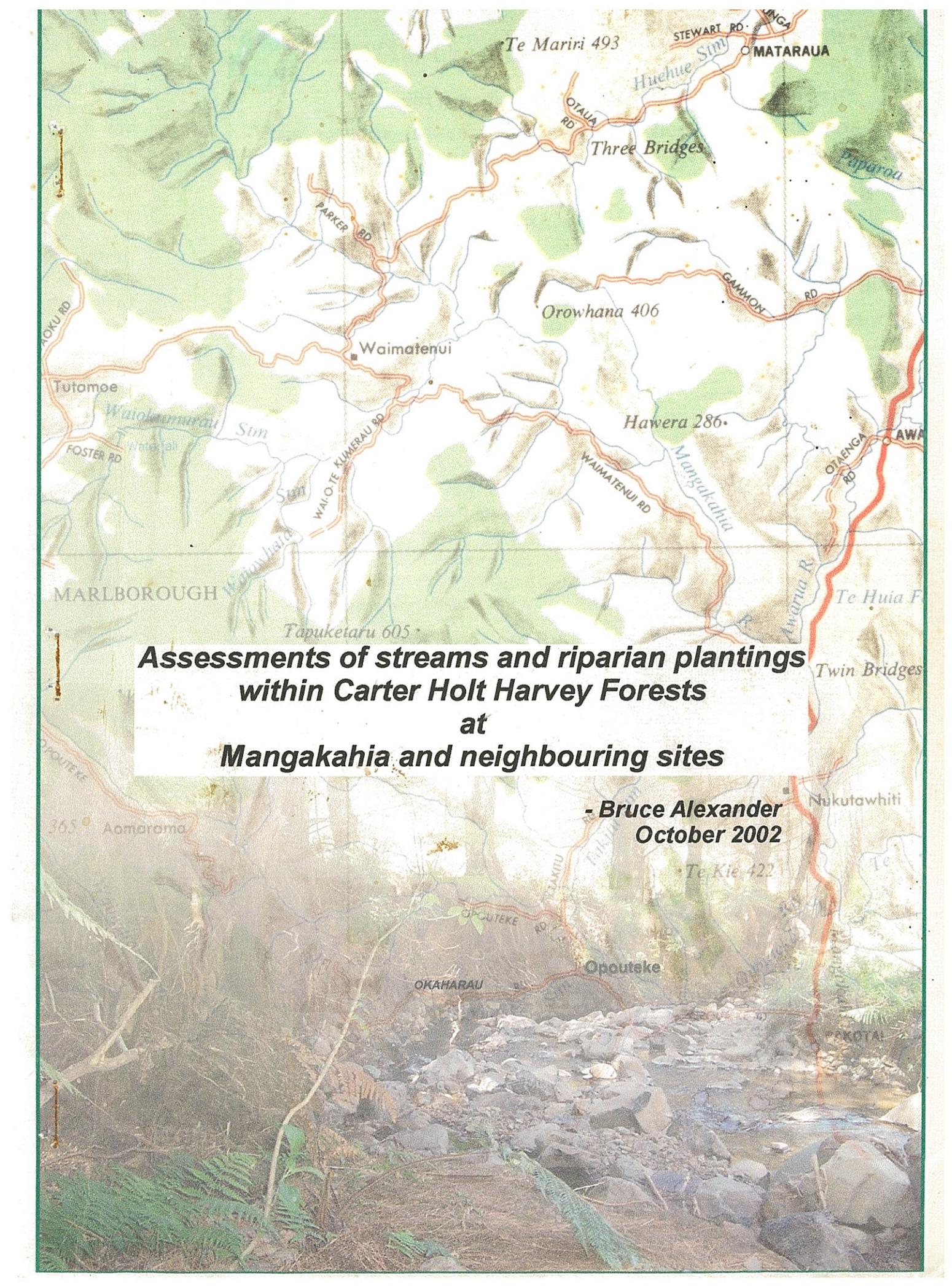


Assessments of streams and riparian plantings within Carter Holt Harvey Forests at Mangakahia and neighbouring sites

- Bruce Alexander

October 2002

B & J Alexander
Mangakahia Rd.
R.D.2, Whangarei

B & J Alexander
Mangakahia Rd
R.D.2, Whangarei

An assessment of streams and riparian plantings within Carter Holt Harvey's Forest at Mangakahia and neighbouring sites.

B & J Alexander
Mangakahia Rd.
R.D.2, Whangarei

In recent years residents have expressed alarm to the Northland Regional Council and Carter Holt Harvey over the number of pine trees toppling and entering associated waterways with adverse effects.
At a public meeting in Pakotai on 12th June 2001 concern was raised and this culminated in a meeting of Northland Regional Council, Carter Holt Harvey , Pakotai District Committee and the Mangakahia Landcare groups meeting on 11th March 2002 to discuss

- Clean Up Areas
- Outline of an Accord for Replanting

An effort is being made to identify known "hot spots" and plantings where environmental pressure and damage is occurring due to the influence of toppling trees.

Many of these areas occur near small perennial or forest streams with banks and adjacent slopes comprising soft wet clay soils in areas of high rainfall and runoff.

REASON:

- When the Mangakahia Forest was first established in 1980, riparian zones were not observed and since then no streamside management has been carried out.
- Pine trees toppling into streams are a serious issue and there is a need to act on the problem.
- The extent of toppling shows that it is inappropriate to establish some areas with pine and that the proposed five metre planting setback would not be sufficient to prevent damage to waterways and streams in the areas concerned.
- Pines are a low value crop which means there is no incentive to salvage trees before the planned harvesting of blocks takes place.

OBJECTIVE:

- To ascertain the state of the catchments feeding the Mangakahia Valley and surrounding areas in Northland.
- To identify problem areas requiring immediate attention.
- To identify where it would be more appropriate to **extend** the planting setback from riparian areas.
- To commence ongoing monitoring.
- To find solutions at Local or National level to prevent further occurrences.

ASSESSMENT:

Carter Holt Harvey employed Bruce Alexander to visit their sites and report on the plantings and state of the environment.

There will be documentation of:

- Current state of each area visited with numbered photographs and maps where necessary
- Actual harmful negative environmental effect
- Estimated timing of occurrences
- Recommendations

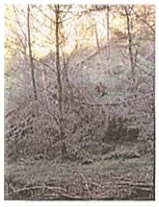
- Risk categories:

  High. There is a risk of major damage to stream and habitat in heavy rainfall.

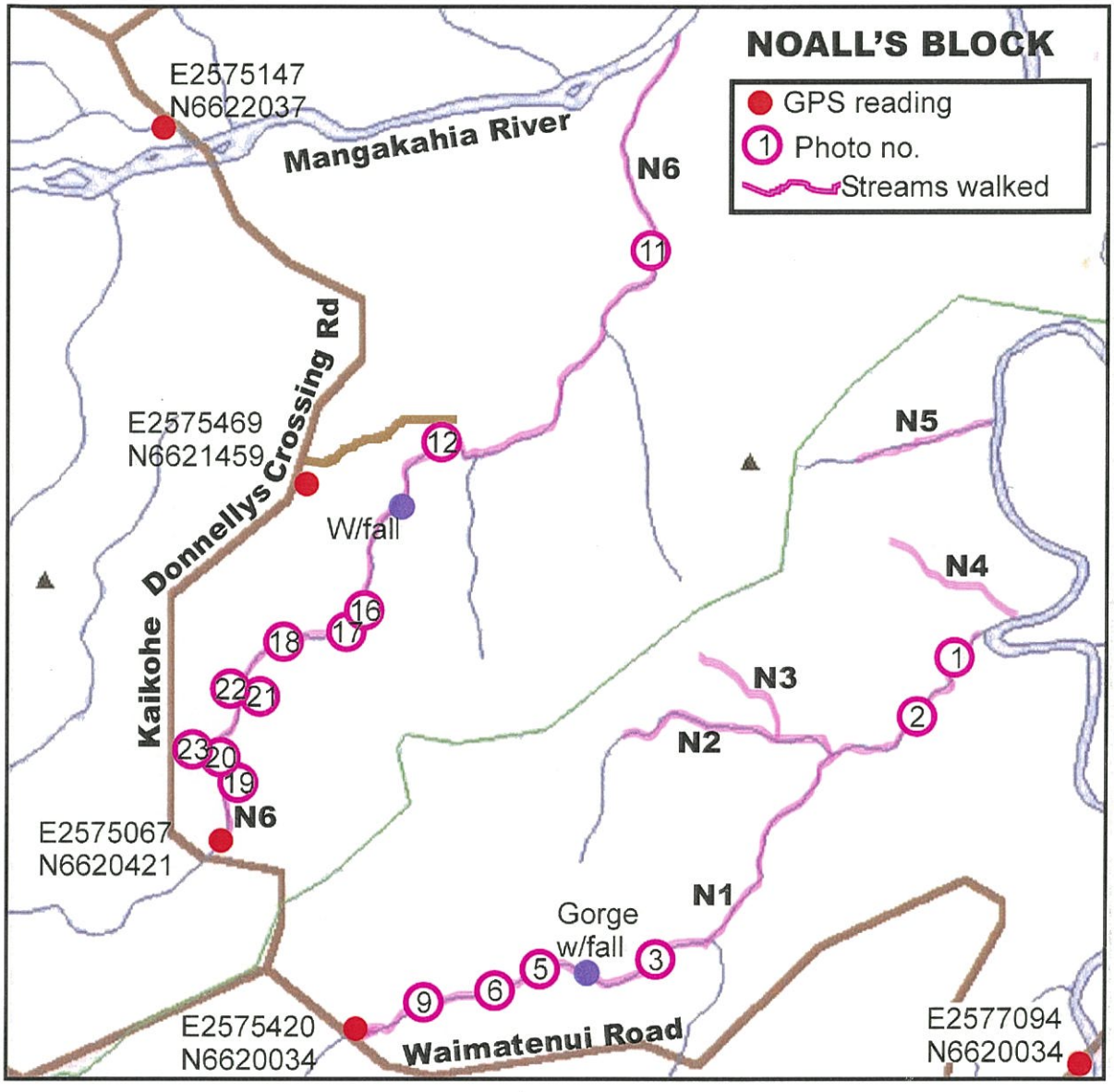
  Moderate. Damage occurs less frequently and in stream material is not detrimental to fauna or structures and is stable. Damage would be contained within the forest with minimal erosion.

RIVERS & STREAMS VISITED:

STREAMS	PGE	DATE	STREAMS	PGE	DATE
Noall's	3	August 2002	Kaimaro	38	September 2002
Carson's & Parrot's	14	August 2002	Okaharau	41	September 2002
Takitu	20	September 2002	Opouteke	43	September 2002
Onetai	27	September 2002	Mangakahia	51	October 2002
HaHa	32	September 2002	Overview	57	B Alexander



- These trees have been toppling for a number of years. *(page 34, photo 4)*
- There are many blockages *(page 49, photo 16)*
- Trees must be cut back from river's edge *(Page 45, photo 3)*
- Further bank damage will cause this noxious weed to spread *(Page 22, photo 4)*
- The soft wet nature of the steep land *(Page 53, photo 6)*
- Leaving toppled trees in waterways is like playing Russian roulette *(Page 54, photo 9)*


NOALL'S BLOCK
GPS reading
Photo no.
Streams walked
E2575147
N6622037
Mangakahia River
N6
11
Donnellys Crossing Rd
E2575469
N6621459
12
W/fall
N5
N4
Kaikohe
16
17
18
22
21
23
20
19
1
2
N3
N2
N6
E2575067
N6620421
N1
Gorge
w/fall
3
5
6
9
E2575420
N6620034
Waimatenui Road
E2577094
N6620034

NOALL'S 1

1

A considerable amount of soil has been released into the water. This photo shows silt build-up where Noall's 1 enters the Waiotekumerau river.

2

Access gained by Lena Road and this blockage is 200 metres upstream.

3

This demonstrates streambank erosion due to a blockage by pine trees.

Stream is being diverted and cutting away the bank.

4

Fifty metres from the beginning of a gorge there is a total collapse of trees, waterways and streambanks making a terrible mess.

5

The pines are too tall and heavy for the soft soils. The restricted root growth and action of toppling close to streams is depositing large amounts of soil in the water..
There is very bad erosion and this would appear to have been ongoing for several years. This general area could be the cause of a major adverse effect.
This site has been visited in the past by both CHH and NRC.

6

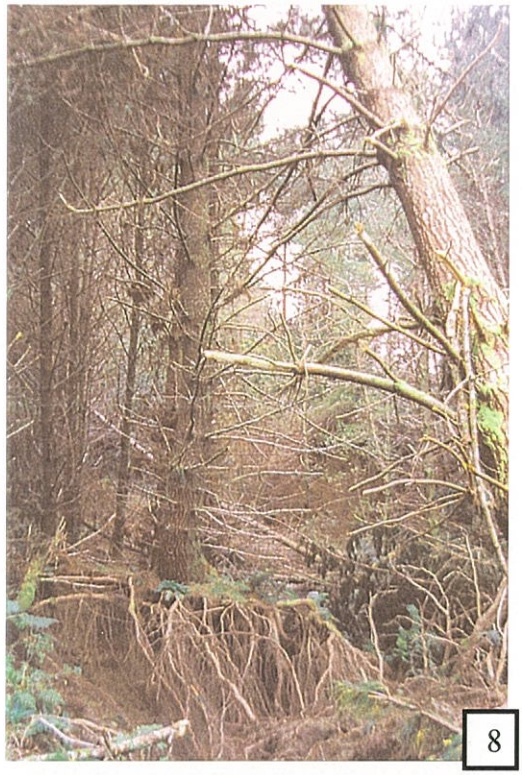
A better idea of the extent of toppling.

Note the small root system.

(GPS: E2575420; N6620034)

7

Wet and swampy land is prone to this slumping, even more so when the weight of a very heavy mature tree is bearing downwards pressure.



8

8 is an example of a domino effect ready to commence where the tree on the right hand side has four unstable trees in line to knock down.

This buttsweep (9) indicates a less than favourable start for the trees. There are many examples of poor growth as one reaches the top of this area.
There are three perennial streams at the top of N 1.

9

SUMMARY – NOALL'S 1

Top and bottom of this stream are **high risk.**
This is a classic display of Mother Nature showing where not to plant pine trees and what happens when plants are asked to grow outside of their environment in conditions that will not support them.
Toppling appears to have been taking place for eight years.
The number of trees that have fallen down below the gorge would be at least 300 and above the gorge 500. Accurate counting was not possible due to the danger at the time.
When walking across hillsides here, one finds many areas of sodden ground, small waterways, earth subsidence and toppling. It would appear that a continuation of this can be expected in the future.

NOALL'S 6

After three fine days water quality is acceptable and there is a presence of aquatic life in this stream which runs directly into the Mangakahia River.

10

Shows the upper end of Noall's 6 stream undamaged where a planting setback has occurred

11

Bottom end of the stream walking 1 Km upstream from the Mangakahia river.

Six trees have fallen here, and a further eight will topple shortly, due to the lean they are on in the soft ground.
Large volumes of water appear to flow here to a depth of 3 metres.

Severe erosion

12

Water depth here was between 2 to 2.5 metres deep. Twenty trees are due to topple due to the undermining of streambank. A large amount of soil has been washed downstream as can be seen by the buildup on the left of stream.

13

Typical of what is occurring when the trees develop size and weight --- they fall over and the remainder left standing is mainly native.

Further up blockage material is forming and showing continued streambank erosion.

Stream 3 – 4 metres wide

14

This waterfall is about half way up and next photo shows a slip where seven trees have slid down to the stream. There are about thirty others ready to follow.

Note the trees here. Some have slid 30 metres.

15

Close-up of slip referred to above. A huge amount of soil disappeared downstream here.

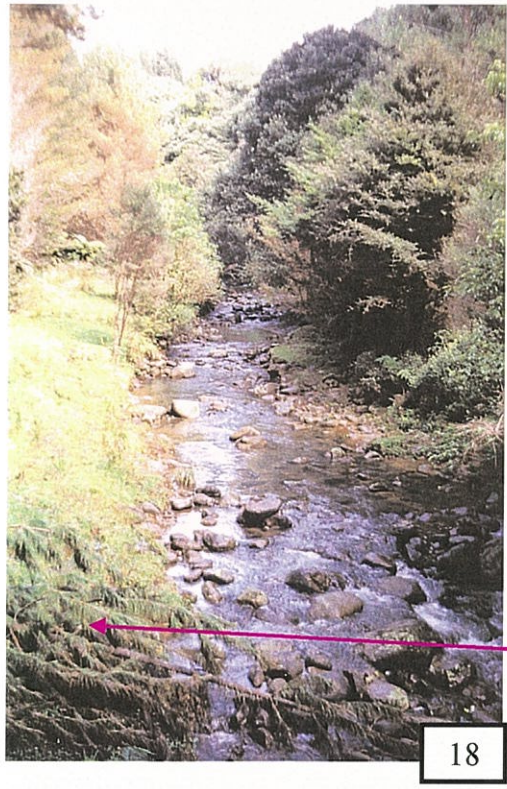
Stream

16

There are nine trees in this immediate area above the waterfall lying down with the two on the right of photo at risk from scouring of the bank when water is deflected sideways by the trees lying in the streambed. There is the possibility of a large buildup or dam occurring here. Access is handy for machinery.

17

Shows another section of the streambank eroding due to blockages within the streambed.



18

This is a classic example showing the same stream without damage immediately above the fallen pine in the foreground, simply because at the time of planting it was left clear due to the ground being extra wet. There is minimal leverage on the soil structure with this type of vegetation as compared with the above scenarios.

19

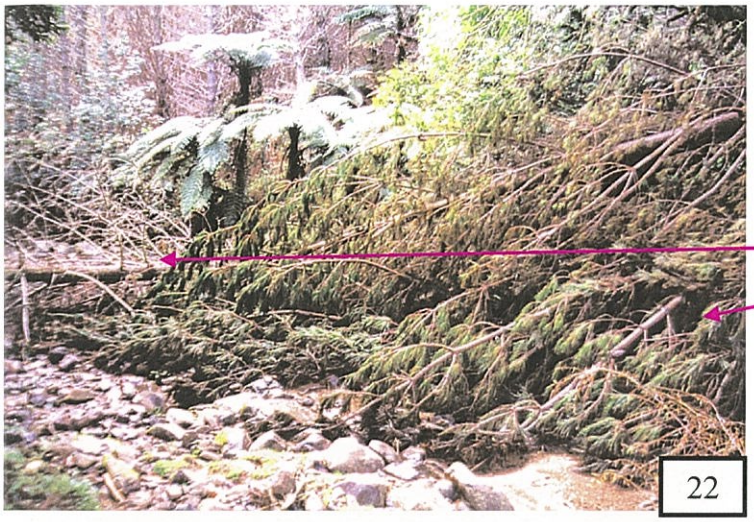
Trees that have been fallen for 2 to 3 years with many more on the edges ready to follow.

20

These also, have been down for about 2 to 3 years with many more on the edges ready to follow.

21

21 & 22 are in an area upstream where the flooding varies between 2 to 3 metres. Water flow has been diverted outside of streambed .
There are signs of decay amongst the older toppling in this forest which is of concern. As they break, they provide a ready source of smaller branches and fragments which when combined with tree trunks already in the stream make very effective dams.



22

Further effects of damming.

Older toppling in place.
Recent toppling builds up against it.

23

Here we have an example showing four pine trees that have toppled periodically, over something like five years. The tree on the left is starting to break up. Take note that all other vegetation is intact as it is more suited to the environment of soft wet clay soils.

SUMMARY – NOALL'S 6

There was very little wind damage observed.
I feel **most of this stream poses a high risk.**
Three quarters is accessible by machines.
Existing blockages will increase scouring and stream diversions because of volume of water involved.

NOALL'S 2

This stream is a tributary of Noall's 1.

24

An uprooted tree on a wet hillside showing a stunted and diseased root system.

NOALL'S 4

25

A smaller perennial stream not likely to have a large flow but there are trees down in this watershed also.

NOALL'S 5

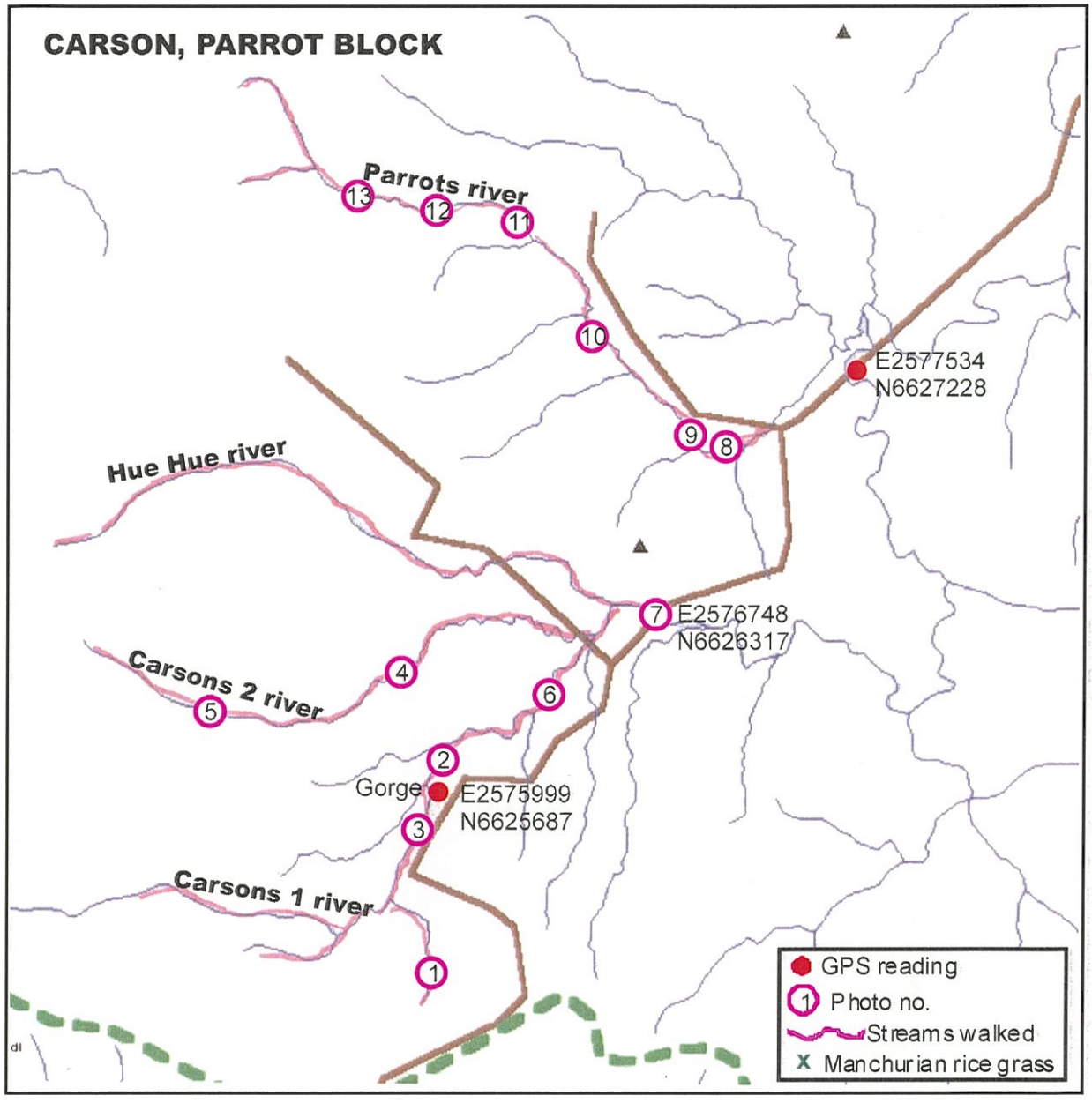
26

Also a small stream with a lot of windfall.

SUMMARY – NOALL'S 2, 4 & 5:

Noall's 2 is not accessible for clearing and some debris can be expected to carry into Noall's 1.

Noall's 4 and 5 are **moderate risk**


CARSON, PARROT BLOCK
Parrots river
13
12
11
10
E2577534
N6627228
9
8
Hue Hue river
7
E2576748
N6626317
Carsons 2 river
4
5
6
2
Gorge
E2575999
N6625687
3
Carsons 1 river
1
GPS reading
Photo no.
Streams walked
Manchurian rice grass

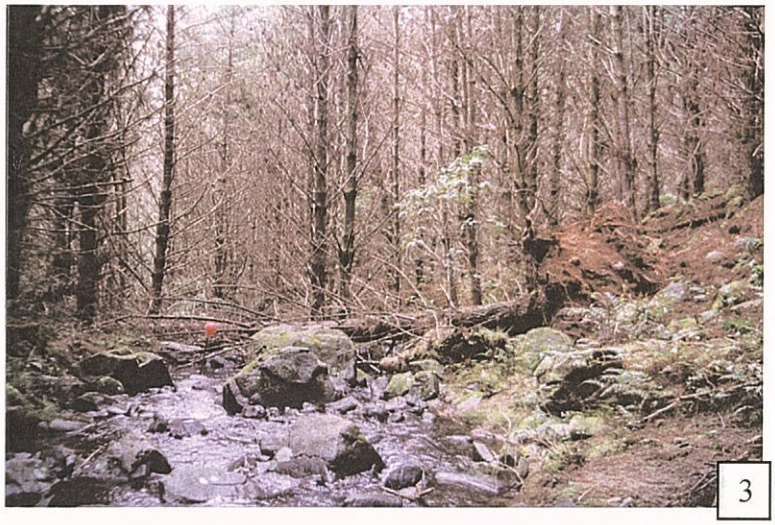
CARSONS STREAMS Nos.1 & 2

1

Left shows a perennial stream feeding into Carson's 1 and toppling exists for about 100m here in the soft ground.

2

Extensive toppling has occurred in most areas surrounding these streams.

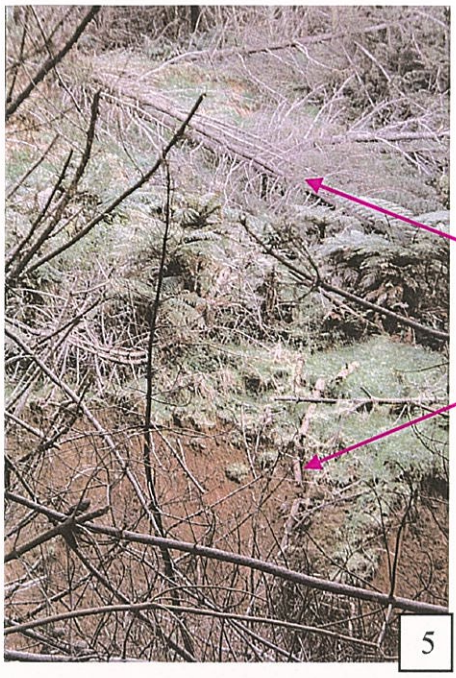


3

Flood height here would be about one to one and a half metres which is to the top of the red hat. This section above the gorge also has considerable toppling into the stream and comprises soft areas of hillside.

4

There are signs of a domino effect in several places.



Old toppling up from stream

Recent streambank erosion

5

6

Large trees and many tonnes of soil have been deposited in the streambed.

From one vantage point over a distance of sixty metres, about forty trees have fallen over. About five to six hundred fallen and leaning trees would be accessible in Carson's 1 & 2.

HUE HUE STREAM

Note submerged logs midstream.

Hue Hue River bridge showing the remains of a blockage which caused scouring of the opposite bank.

This stream needs monitoring as it is subject to blockages.
The top end has toppling.
Numerous streams feed it with additional debris.

A tree like this makes an excellent battering ram!
Stream banks, native trees and fences do not stand a chance.

PARROT'S STREAM

8

This section is about fifty metres from the security gate.

9

Continuing upstream about one hundred metres.
A lot of toppling, almost a complete blockage and there are standing trees that will need removing as they are about to fall over.

10

There are signs of trees that have been dead for some time breaking up and forming debris in the stream.
The terrain is good for machinery to travel about six hundred metres upstream here.

11

About one hundred trees over a distance of one hundred metres here have toppled and are affecting the streambed in one way or another. There is a lot of ground movement.

12

There is a lot of slumping (12) and signs of erosion with trees entering streams in earth flows.

13

At the boundary with Department of conservation, land toppling is less because trees have not grown very large.

There are no signs of kiwi but there is a significant opossum population and some goats.

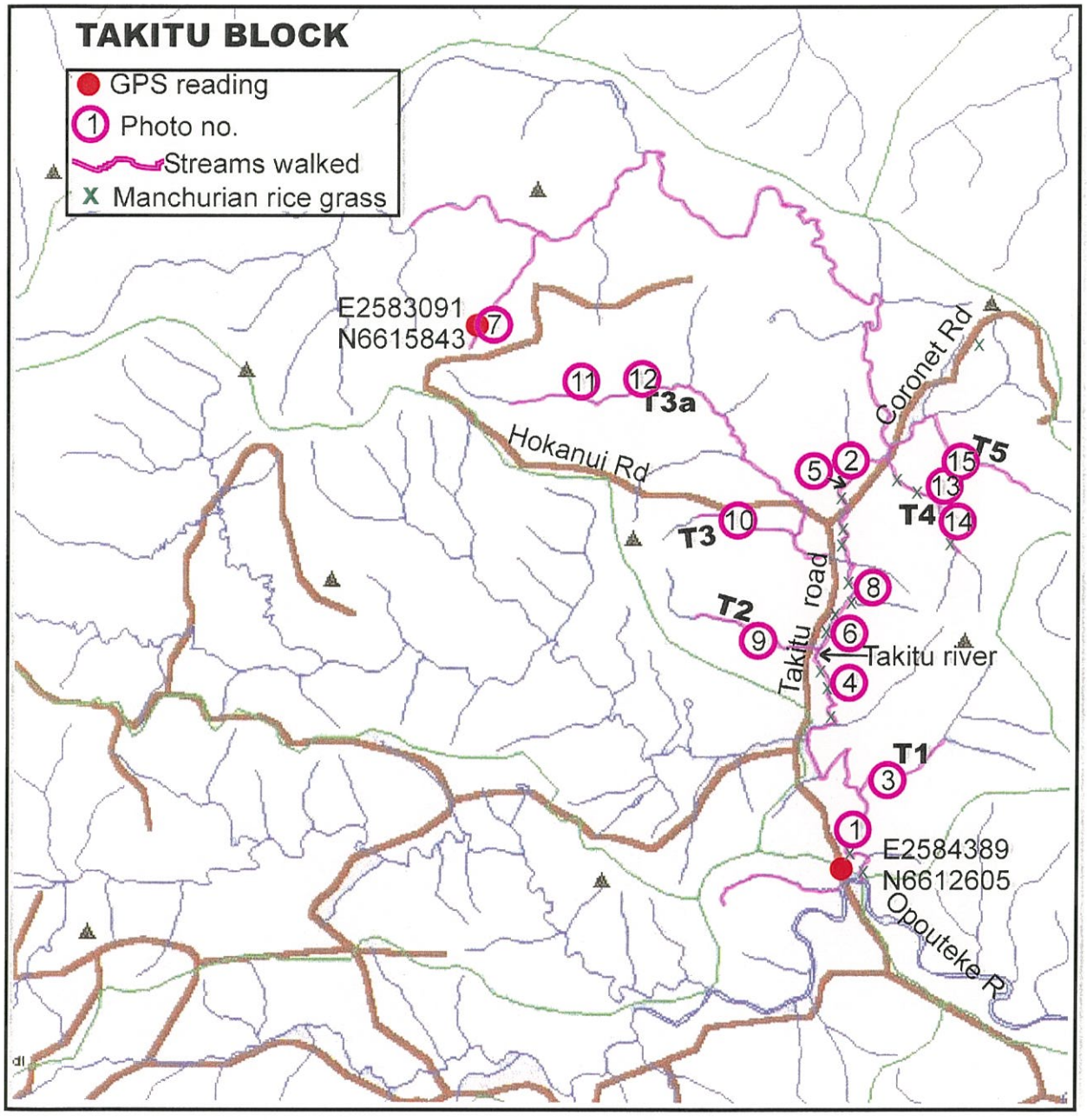
SUMMARY: CARSONS & PARROT'S STREAMS

The lower half of all these streams appears to be **high risk** with the remainder **moderate risk.** As the trees break up further over time a massive amount of debris will occur and be transported downstream along with more trees ready to topple.

A good portion of Carson's streams can be cleared and photo 2 shows the spot midway up Carson's 1 that is as far as a machine can go due to a gorge. The remaining portion could be accessed from upstream. This also applies for Carson's 2.

At the time of inspection there was heavy silting downstream. The top portion of streams have good water quality with little silting.
Some invertebrates were sighted in the water.
Stream bank erosion has taken place and undermining of trees is occurring.
The height of flooding had varied from two to three metres above normal at the lower ends.
Two kilometres upstream there are signs of water flows rising about two and a half metres deep by five metres across.

One would estimate about one thousand trees are in Parrot's stream. It is not a pretty sight.


TAKITU BLOCK
GPS reading
Photo no.
Streams walked
Manchurian rice grass
E2583091
N6615843
E2584389
N6612605
T1
T2
T3
T3a
T4
T5
Hokanui Rd
Coronet Rd
Takitu road
Takitu river
Opouteke R

TAKITU STREAM

This stream is a source of Manchurian ricegrass. It would appear that debris and logs that break and loosen the root system are transporting this noxious weed downstream. There is an important issue here that needs addressing.
When the forest was established some contractors came from the Northern Wairoa area where the noxious weed is prevalent.

1

While these remain they will collect debris and erosion will proceed on the opposite bank.

2

A small side stream shows decaying logs, indicating that toppling has existed for some time.

3

Manchurian Ricegrass

Further bank damage will cause this noxious weed to spread downstream.
Two clumps have completely disappeared from nearby and plants have been detected 10 kilometres further down the Opouteke stream.

This scene is common. Water will be deflected into the opposite bank until the tree is washed away.

Further damage extending fifty metres from the streambank

The whole bank has ruptured.

7

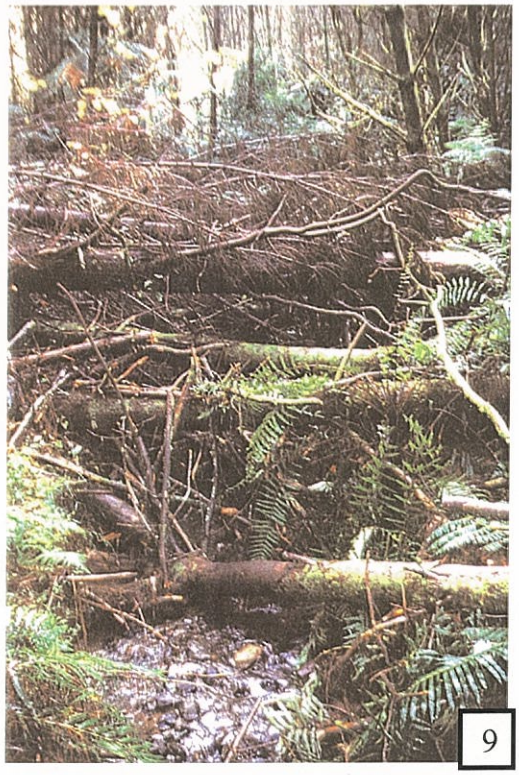
Taken at the top of stream. A pool no longer exists and is filled with mud.

A bit more debris from upstream and this would make a good dam. (or damn!!.)

8

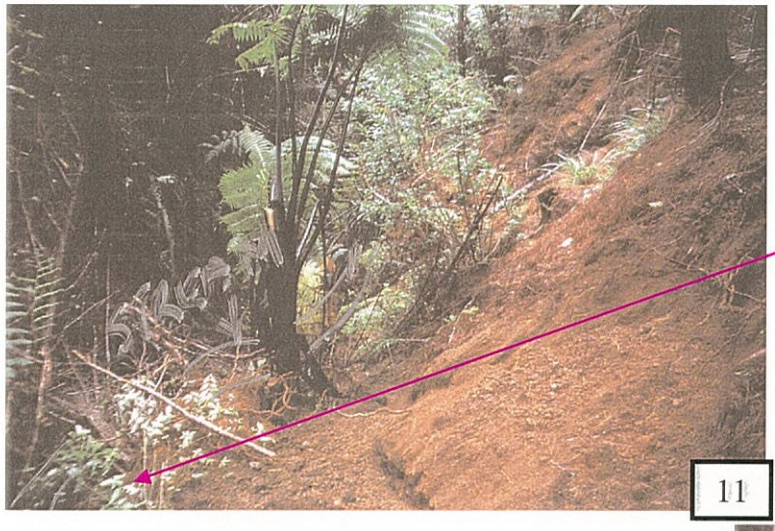
TAKITU 2

Judging by the moss and decay of trees, damage here in the wet fragile soil has been continuing for a lengthy period and has caused a lot of erosion and silt.
Twenty trees are down, fifty metres from the Takitu road.



9

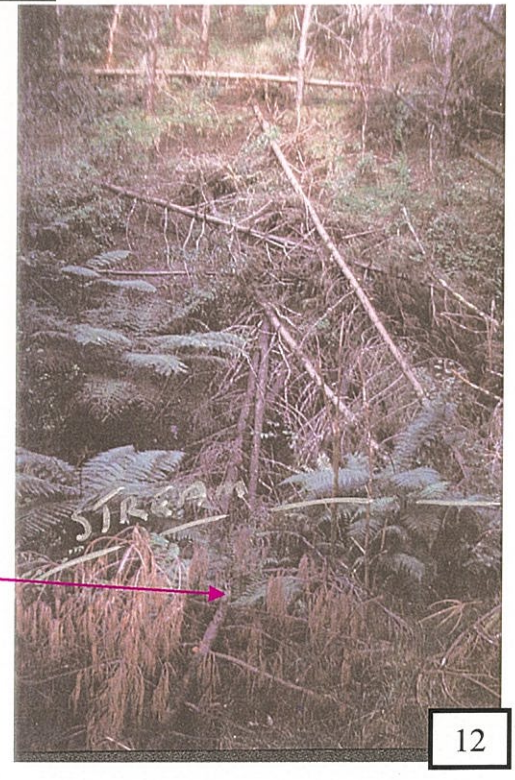
Takitu 3 - Extensive old and new toppling in stream.



Takitu 3 - The amount of soil displacement into streams is considerable with this tree having slid its full length to end up in water.

Takitu 3 - Roots could not anchor trees here and over eighty have fallen at this point.

There is a stream buried underneath.



Takitu 4 - Areas up to one hundred metres from the stream edge are affected, there is more of the same through here with ricegrass present also.

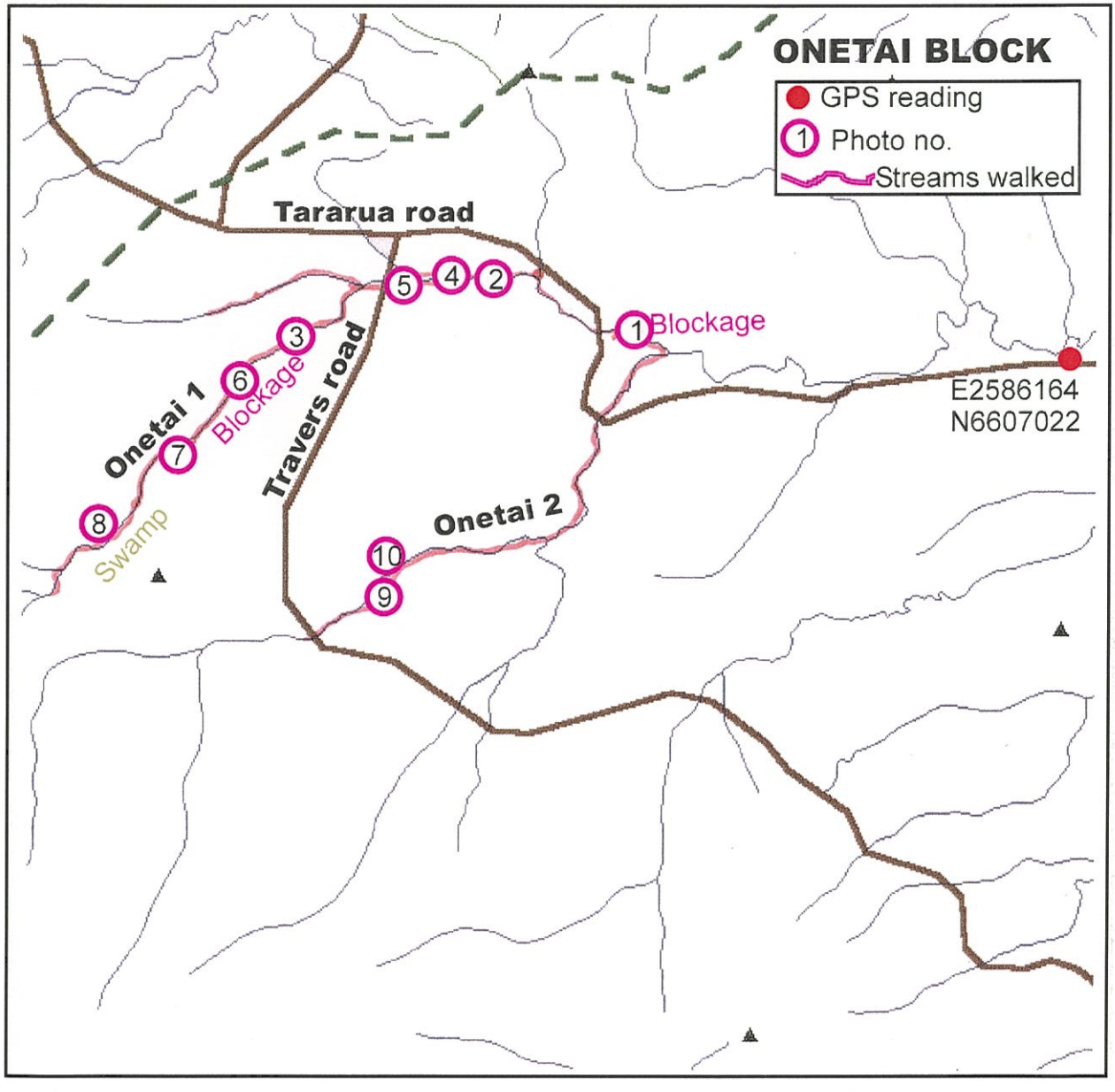
Takitu 4 – There is ricegrass as well as a stream under these trees.

Takitu 5 - The steep faces and shallow soil have contributed to a high loss of trees that have slid downhill.
The planting setback needed on sites like this is anybody's guess.

SUMMARY, TAKITU STREAMS

The main stream is a **high risk** and machinery could access three quarters of it.
This stream has some very high peak flows as is confirmed by its use eighty five years ago as a driving stream for transporting kauri logs.

Some tributaries are partly blocked with silt and debris and while in this state some clearing may be needed and regular monitoring carried out, particularly where there is ricegrass.
An unacceptable amount of toppling and erosion has taken place into all of these streams inspected.


ONETAI BLOCK
GPS reading
Photo no.
Streams walked
Tararua road
Travers road
Onetai 1
Onetai 2
Blockage
Blockage
Swamp
E2586164
N6607022
1
2
3
4
5
6
7
8
9
10

ONETAI STREAM

1

This blockage occurs below the Tararua road and gives a good indication of the size of material involved. There are more trees, twenty and thirty metres from the banks that are leaning and will topple eventually. Sixty toppled trees can be seen by standing in one spot.
Water flow here reaches a height of two metres and is thirty metres wide.

2

Water is diverted by blockages cut ting new channels with more trees eventually toppling. About fifty are directly affected.

3

Older trees starting to break.

4

These trees could not stay upright and fell in all directions.

5

This twenty metre wide streambed is smothered. Some trees have been down for a considerable time and more trees appear ready to follow as slumping takes place and banks erode.

6

This blockage was present in 2001 and has now been washed downstream.

Some trees have moved as much as thirty and forty metres in slips with many tonnes of soil and debris being washed downstream.

Stream 10m to 12m wide

7

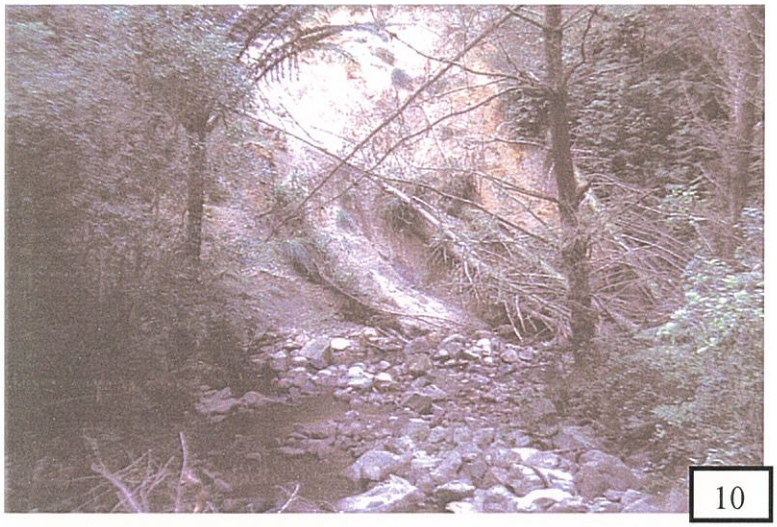
This swampy area has most of its trees lying down. The weight of timber has caused its level to drop about three metres since planting. It has subsided more recently as shown in photo 8.

8

ONETAI 2

This area is just below Travers road

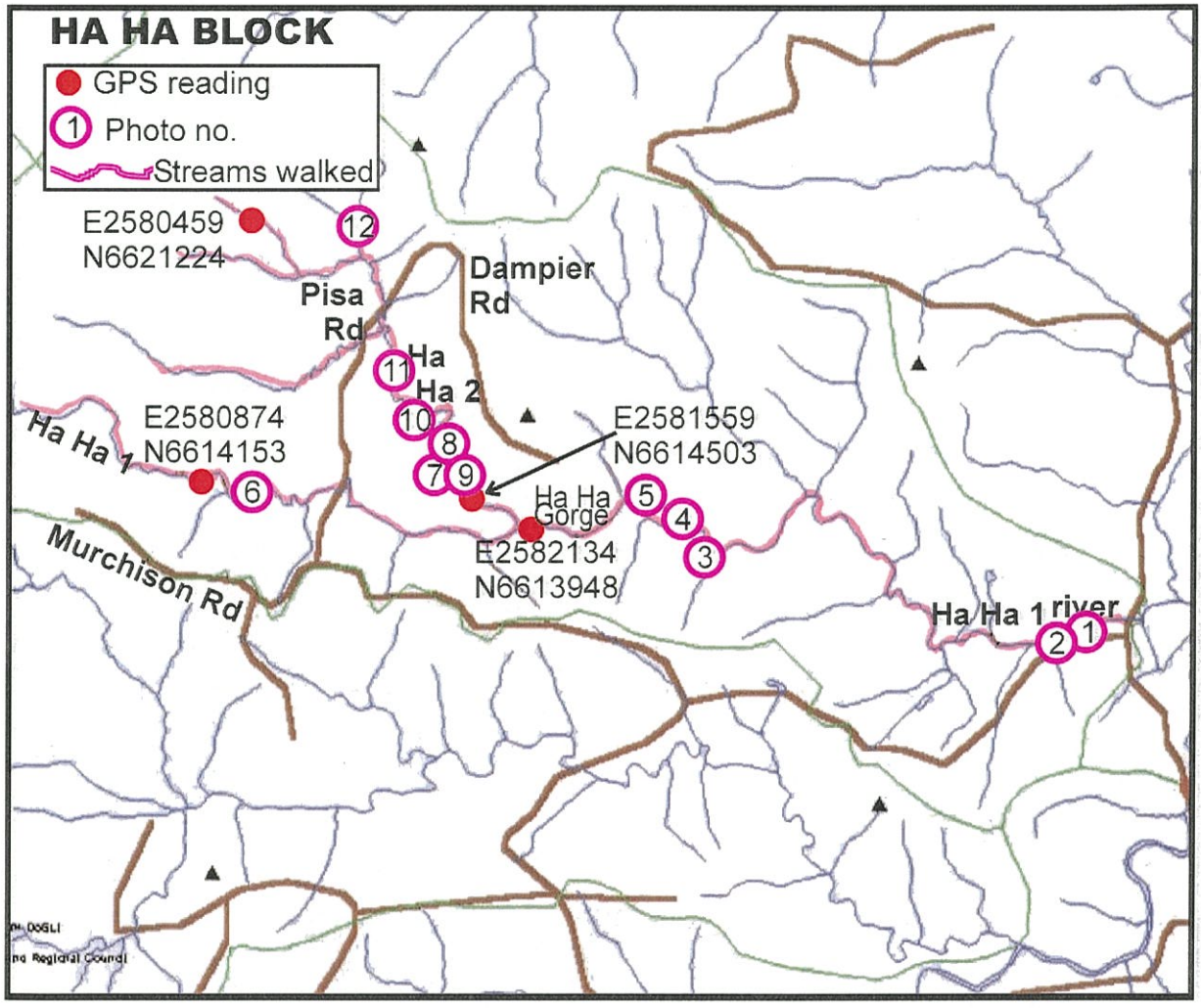
9



Also below Travers road.

SUMMARY ONETAI STREAM

This is a **high risk** stream. It is noticeable that logs and blockages have moved during heavy rain. This is partly assisted by the large rocks that tumble their way down the streambed. Clearing can easily be done for three hundred metres from Travers road and possibly further. This stream has been visited on several occasions. **An agreement was made with Northland Regional Council last year to have it cleared before the winter of 2002 but this has not been carried out. An estimated 1000 trees are down.**


HA HA BLOCK
GPS reading
Photo no.
Streams walked
E2580459
N6621224
12
Pisa
Rd
Dampier
Rd
11
Ha
Ha 2
10
8
7
9
E2581559
N6614503
E2580874
N6614153
Ha Ha 1
6
Ha Ha
Gorge
5
4
3
E2582134
N6613948
Murchison Rd
Ha Ha 1 river
2
1

HA HA STREAMS 1& 2

1

This toppling is just up stream from the Kaimaro – Ha Ha road junction by Froggetts property. The condition of this is disheartening.

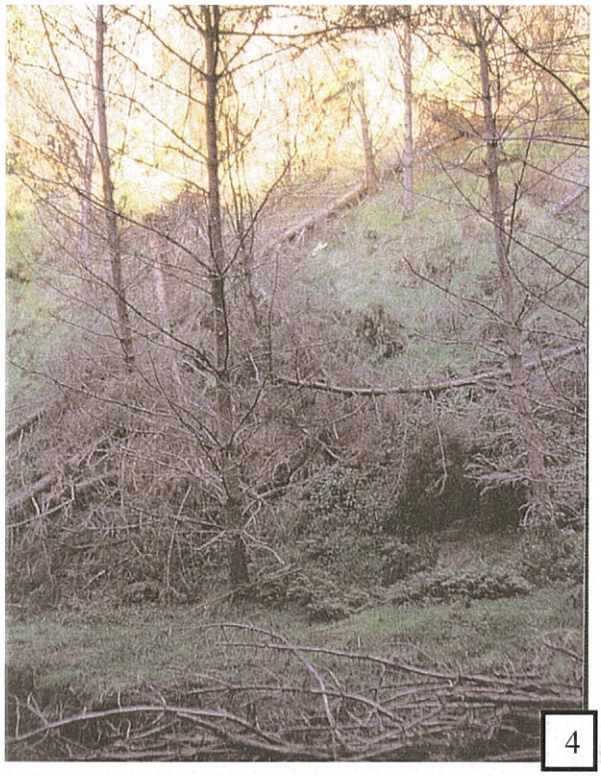
2

A lot of silt and older damage is working its way downstream. Even light rain makes the water cloudy.

3

This blockage just below the gorge is one of many in the stream. Floodwater here is two metres high by about twenty metres wide.
Machinery can come to here.

GPS
E 2583222 – N 6613820



4

These trees have been toppling for a number of years.(From about 15 yrs. age onwards.) The catchment is noted for its high rainfall and soft wet conditions.

5

A typical scene where this and many other streams narrow down.

A lot of erosion and silting has been occurring.

Note small root systems. They cannot hold tall trees upright.

6

HAHA 2 STREAM

7

This tree has moved one hundred metres in the last six months.

8

This area is easily accessed by machine above the waterfall from Dampier road. There is a dam to be cleared.

GPS
E 2581559 – N 6614503

9

These build ups readily occur where streams are narrow.
At flood time it would appear the water rises up to 3 metres deep in places.

10

Halfway down between native forest and the junction with HaHa 1, water quality has gone from clear to murky.

When one encounters native vegetation among debris this often is the reason. The ground finally gave way under the weight of the pine tree.

11

Further up stream.

Note that soil has been completely washed off the tree roots.

12

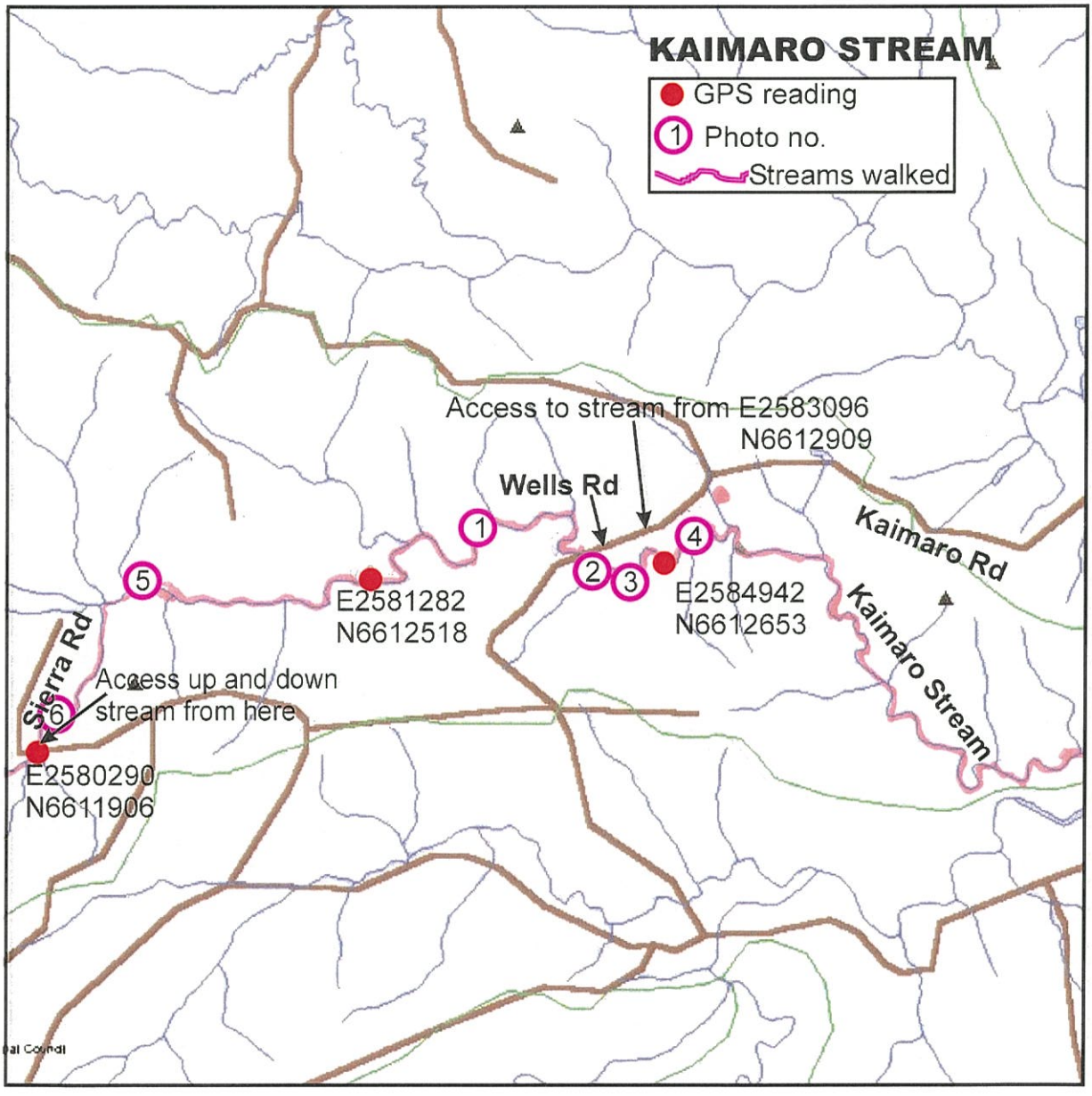
Just below the boundary with native bush erosion quickly commences. This is the result of water diversion in soft soil.

There are about five hectares of swampy ground not far from here with 20% of toppling.

GPS E 2580459 – N 6621224

SUMMARY OF HAHA STREAM

Two blockages above Dampier road E2580874 N6614153 and five above the main waterfall and gorge make this a **high risk** stream.
From photo 9 to above Pisa road can be worked by machine as well as from 2 to 5.
Material can travel from the HaHa to Takitu then the Opouteke River as heavy cloudbursts occur in the upper catchment areas.


KAIMARO STREAM
GPS reading
1 Photo no.
Streams walked
Access to stream from E2583096
N6612909
Wells Rd
Kaimaro Rd
Kaimaro Stream
Sierra Rd
1
2
3
4
5
6
E2581282
N6612518
E2584942
N6612653
Access up and down
stream from here
E2580290
N6611906

KAIMARO STREAM

This blockage is not far from Wells road.
Machines can travel as far as:

GPS
E 2581282 – N 6612518

At least twelve toppled here.

This mess should not be left lying here.

Silently waiting to enter the water – a familiar sight.

Starting to lean over

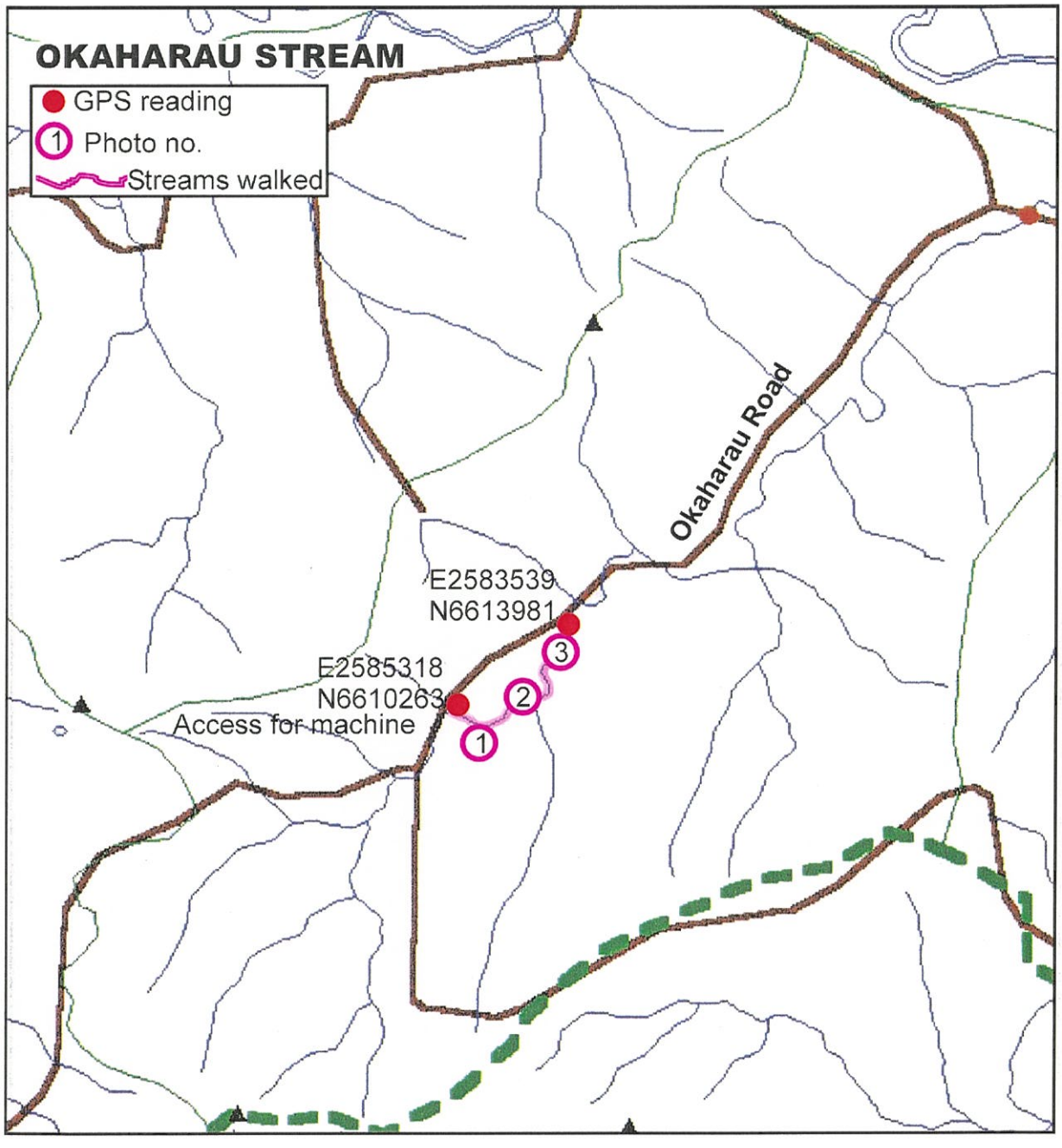
Already in the water

This log has already moved from where it fell.
Water rises to over two and a half metres.

This blockage is about sixty metres long.
Access can be gained from Sierra road.
Much of this stream could be cleared.

SUMMARY

This stream has a large catchment for its size and generates deep flows of water.
Access can be gained upstream from Well's road and downstream from Sierra road.
A large portion should be cleared.
This area is a **high risk** as debris remaining in the stream at flood time will enter the Opouteke river.


OKAHARAU STREAM
GPS reading
1 Photo no.
Streams walked
Okaharau Road
E2583539
N6613981
3
E2585318
N6610263
2
Access for machine
1

OKAHARAU STREAM

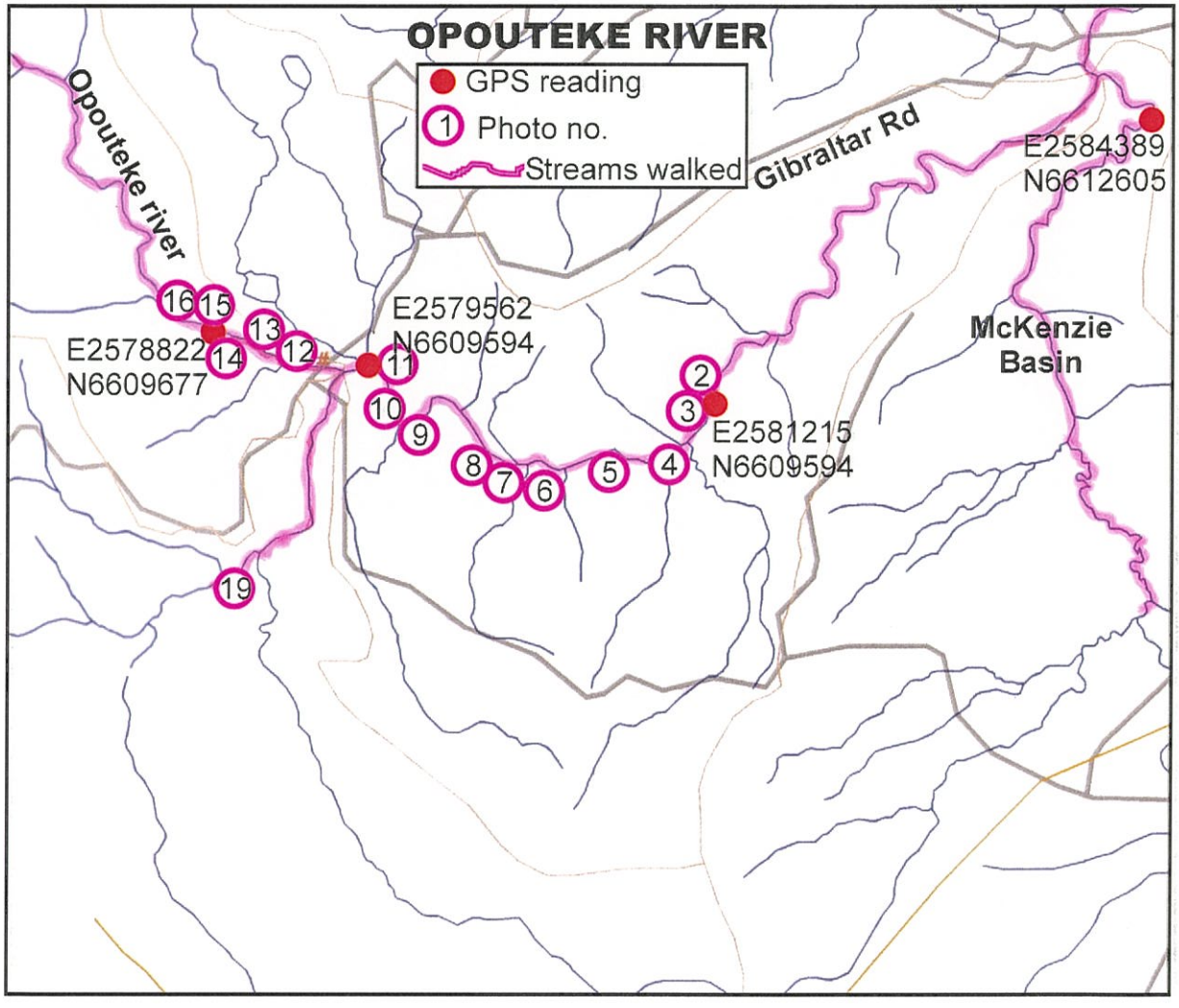
This stream is also subjected to excessive toppling and erosion. The plant to the left of photo is wild ginger.
GPS: E2585318 – N6610263

This blockage shows the typical pattern of erosion that follows. Deflected water eats into the opposing bank. Silt is a problem.

Damage is prevalent in this catchment also, with plenty of soil disturbance occurring.

SUMMARY

Moderate risk. Cleaning up here would be difficult and best left until harvest. The land is soft , erodable and has swampy areas.


OPOUTEKE RIVER
GPS reading
Photo no.
Streams walked
Opouteke river
Gibraltar Rd
E2584389
N6612605
McKenzie
Basin
E2579562
N6609594
E2578822
N6609677
E2581215
N6609594
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
19

OPOUTEKE RIVER

This is a type 2 river with a streamflow of up to 1000L per sec. As can be seen from the contour map there are numerous perennial and forest streams contributing to it. These indicate a high rainfall and soils of a soft nature.

Heavy rain turns it into a swift flowing confined stream that readily transports trees.

Water quality in the upper reaches about one kilometre above Gibraltar road is good. This is not so however once tributaries enter and quality drops off progressively further downstream. As the toppling and slips have exposed and loosened soil, only moderate rain is now needed to affect water quality.
This is occurring at an alarming level, particularly for those people who up until now have been able to depend on drawing clean water from the river.


1

At the lower end of the river the soft banks have allowed this to happen to twelve trees in this area.

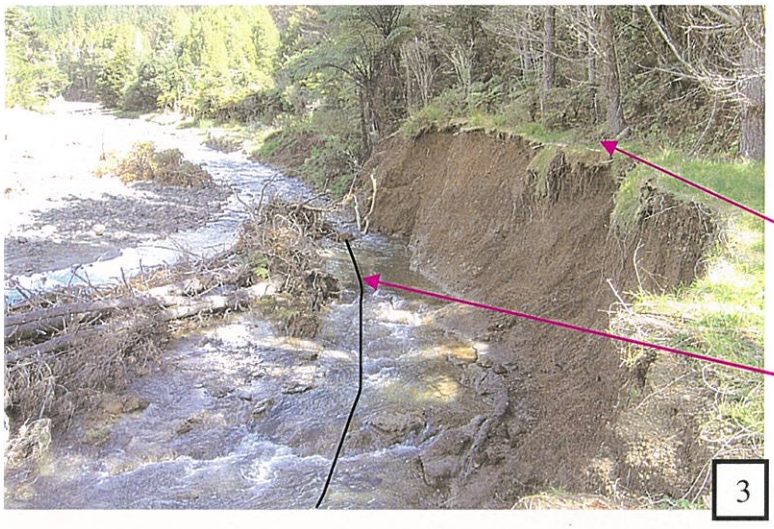
GPS E 2586348 N 6611695


2

Up from Well's Flat continuous erosion is taking place depositing thousands of tonnes of soil in the water.

This debris has deflected water which has eaten a channell into the bank on its left.

GPS. E 2581215 N 6609430



3

There are more trees here ready to topple if the bank does not undermine first

Trees must be cut back from the river's edge in situations like this.

Original bank line

4

Access is gained from Cascade road

5

This has to be cleared.
Trees are forming a queue to join those downstream.

6

These are completely across the waterway.
Heavy silting is noticeable.

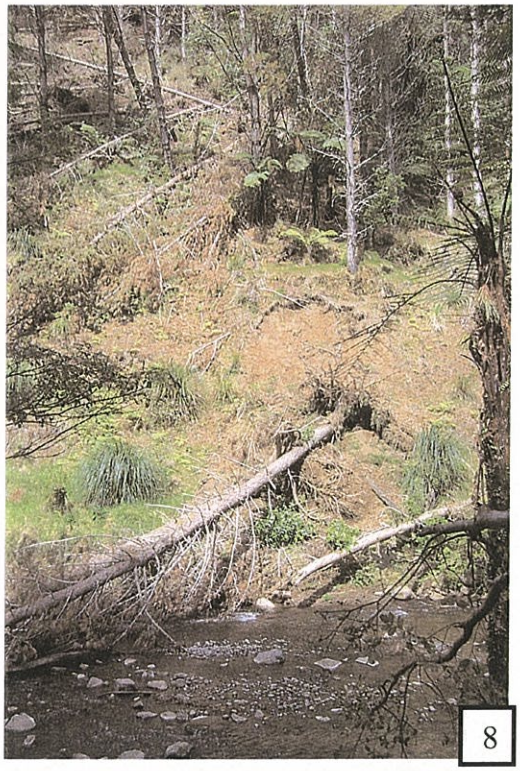
7

Here trees fall and snap their heads off on the opposite bank.

The native regeneration is stable and more suited to the environment as seen here.

The question is raised again " what planting setback is needed for this soft wet land near streams? "

Soil disturbance is prevalent along this river and its tributaries. There appears to be fewer invertebrates down stream.



8

9

This island is a resting place for trees that are washed downstream.

They have enormous power when transported in swift flowing water.

10

The log in the foreground has been down for several years.

Note pines planted too close to the river's edge.

11

This blockage in the main river is about two hundred metres below Gibraltar road.
It will readily wash downstream if left here.
There are at least one thousand trees endangering this river.

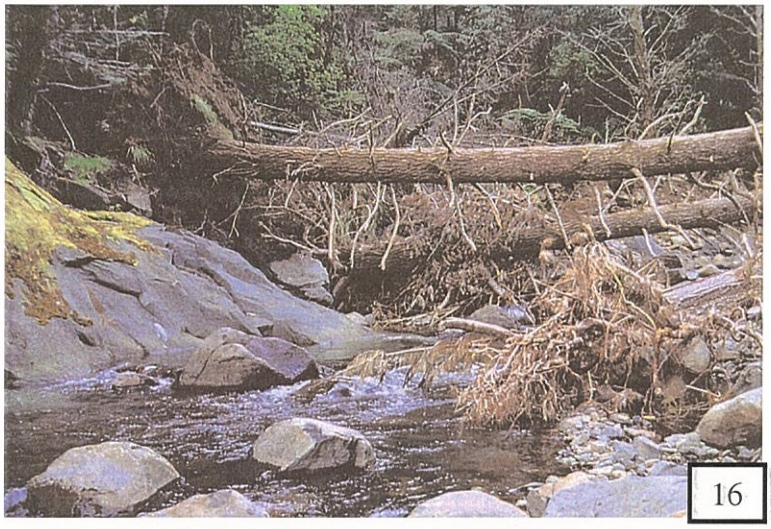
Upstream from Gibraltar road blockages continue

An older blockage that can be readily accessed.

Not all scenes like this are photographed as it's impractical to do so.

15

There is major scouring of banks and riverbeds at places. It is disgusting that planters showed no regard for stream protection.
The build up of debris deflecting water to the left has undermined the bank. This mess should not be allowed to happen again.
GPS
E 2578822 – N 6609677



16

There are many blockages, and if trees like this are left in flood paths, everything will get a thrashing.

SUMMARY OF OPOUTEKE RIVER

Without doubt, a **high risk** stream.
With its large water flow any timber allowed to remain in flood paths will have little trouble travelling beyond the forest property.
Access is available up and down from Gibraltar and Cascade roads.
It is important that tributaries are monitored and cleared **before their timber enters this river because a lot gets flushed beyond the forest boundary.**
All trees in waterways and those liable to topple must be cleared under an emergency programme so as to observe fundamental environmental principles that have been ignored to date.
Follow up work must be to a standard that will avoid further trees entering streams.
There has not been time to walk all tributaries.

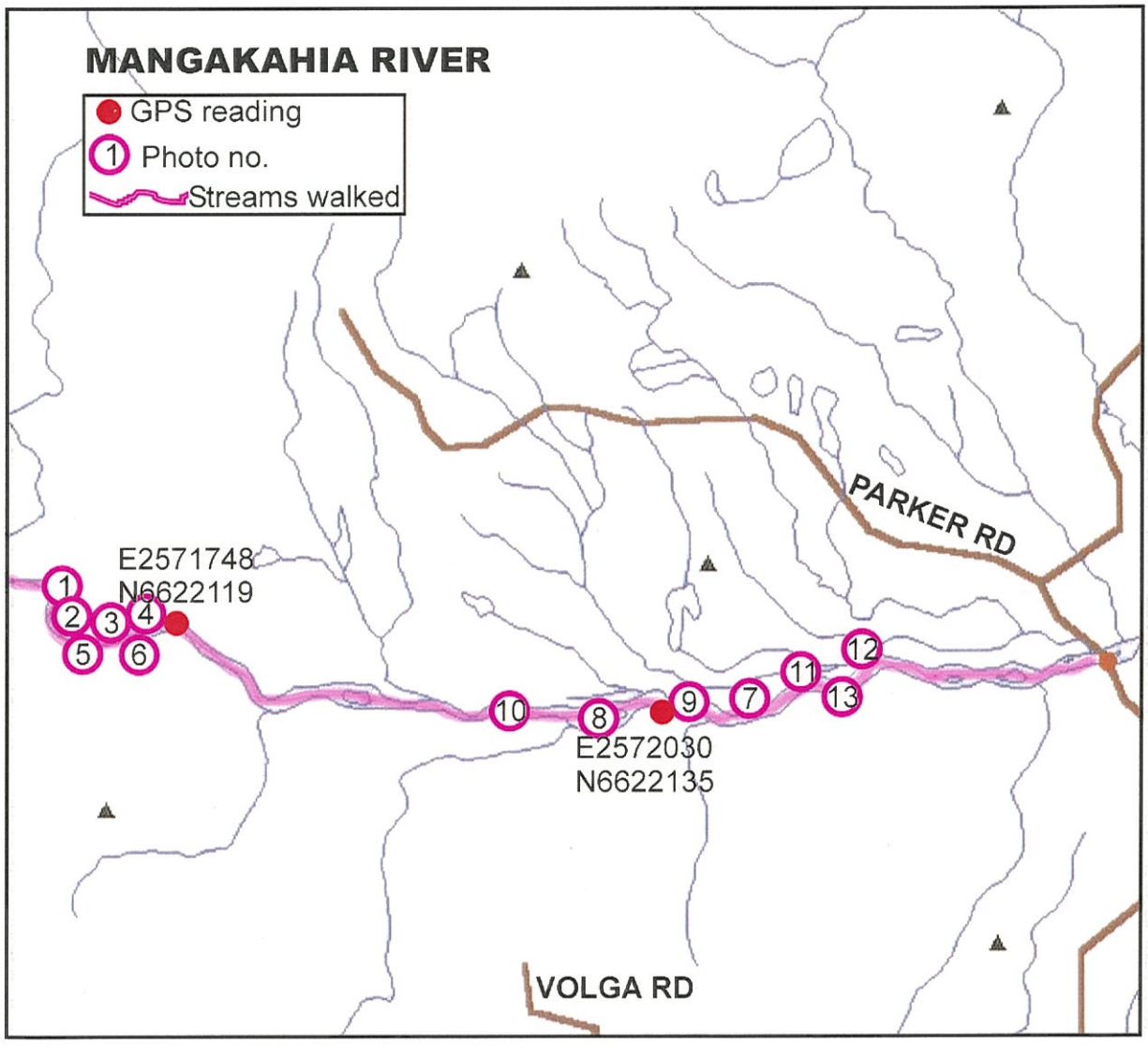
This is a tributary just above the Opouteke river bridge.

GPS. - E 2584389 – N 6612605

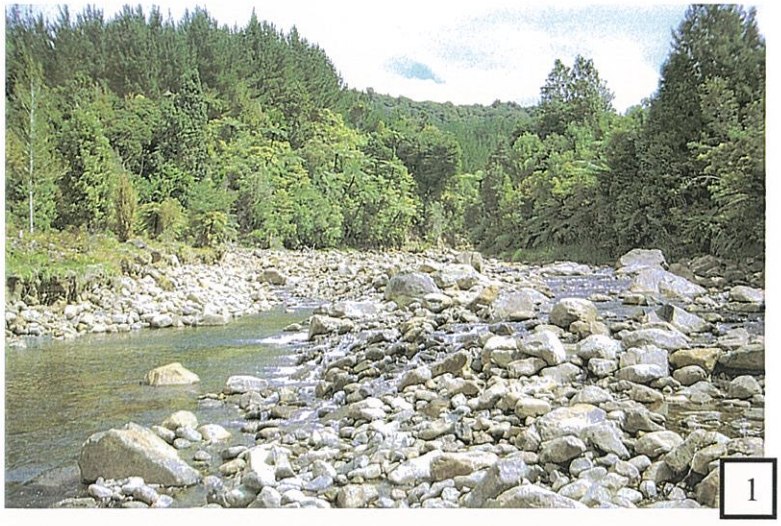
There is a lot of earth movement and erosion.

This is a tributary in the McKenzie basin which had excellent setback for the first 1Km going up. The trees were planted back at least a full length due to the awkwardness of the terrain.
However in the top half every now and again some idiot planted closer and the trees are in a creek again.

Ahomarama stream, also a tributary of the Opouteke.
There is potential for ten trees to topple and dam the narrowed stream here.
Just upstream there is a pileup lying in the waterway that should be removed.


MANGAKAHIA RIVER
GPS reading
Photo no.
Streams walked
PARKER RD
E2571748
N6622119
1
2
3
4
5
6
7
8
9
10
11
12
13
E2572030
N6622135
VOLGA RD

MANGAKAHIA RIVER



1

Just downstream from the top end by Danube road a large presence of invertabrates was noticed. Water quality is excellent here.

2

GPS: E 2571748 N 6622119

Most areas of damage can be accessed off Volga road or alternatively up from the bridge on the Kaikohe, Donnelly's crossing road.

3

Debris is to be found dumped like this in many places.

Damaged bank with further potential of toppling.

4

These blockages have increased in the last six months.

Blockage 1

Blockage 2

5

An illustration of how destructive water can be.

6

The soft wet nature of steep land such as here is conducive to toppling of tall trees. Erosion continues unabated and contributes to the reputed three hundred million tonnes of soil washed into the ocean each year from New Zealand.

7

About one kilometre down a buildup of sediment becomes obvious.

8

9

Problems are highlighted here in photo 8 above.
To leave toppled trees in waterways is like playing Russian roulette.

Large setbacks when planting will prevent more of this.

10

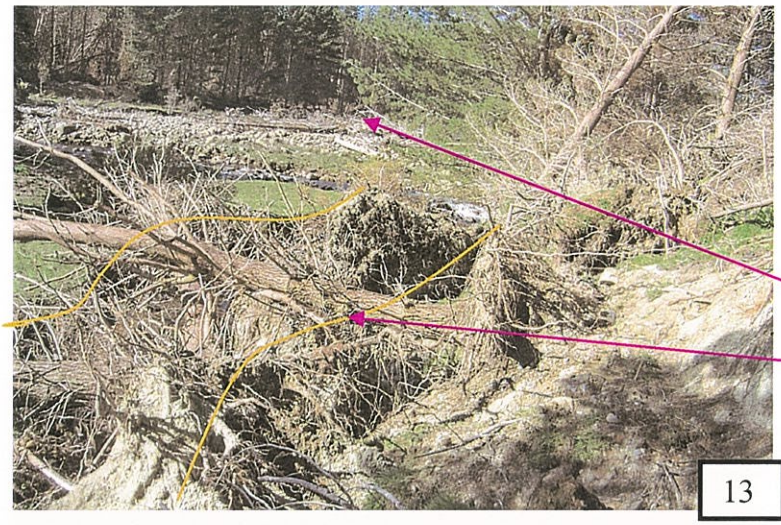
11

Erosion is prevalent where the toppling occurs on stream banks.

Photo 11 shows what was a continually flowing part of the main river until a recent diversion took place.

12

Once again, more toppling. As can be seen the river bed is very wide and is easily traversed.

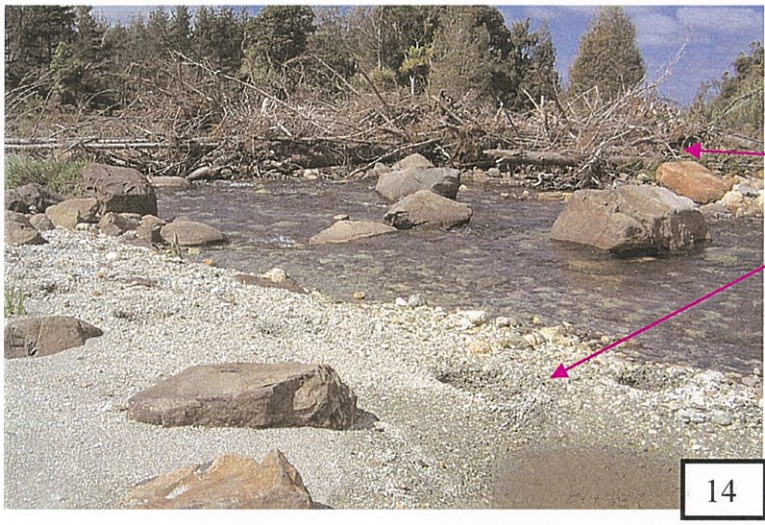


13

A collapse here smothers the outlet of a perennial stream where it joins the Mangakahia river.

Debris on main riverbed

Streambed is under here



14

A mixture of old and new

There is a lot of soil mixed with this.

SUMMARY OF MANGAKAHIA RIVER

This is **a high risk** Type 2 river which experiences a lot of cloud bursts.
There will be a lot of damage if it continues to be ignored.
It is vital that, to prevent ongoing risk appropriate steps be taken. That is the removal of trees in waterways and those likely to enter them.
There appears to be little or no damage upstream within the native forest.
Where water is constantly eroding banks, consideration should be given to diverting it back to the centre of riverbed.

OVERVIEW

In these Northland areas of high rainfall which are subject to sub-tropical deluges and rainstorms there are water resources, soils and fragile eco-systems that are unique to the biological diversity of this environment.

Special habitats such as riparian areas, unstable slopes, wetlands, soft wet soil, "old slips" and some rock outcrops should be protected from forestation. These areas have shown they are unsuitable for such practices.

After completing a survey of the following streams;

Parrots, Hue Hue, Carson's, Noalls, Onetai, Takitu, Ha Ha, Kaimaro, Opouteke, Okaharau and Mangakahia, items of concern are noted as follows;

The steady build up of trees toppling into waterways is an ongoing problem and is accelerated during wet and stormy weather.

For at least five years I have been aware of toppling occurring when the trees are about fifteen years old onwards.

This survey has proved that the amount of toppling of trees into waterways has increased and subsequent erosion worsened.

For example, in the Ha Ha there was one blockage in February/March 2002. Now in October 2002 there are five blockages.
Monitoring five times of the Mangakahia river, above Kaikohe/Donnelly's Crossing road, between December 2001 and October 2002 has shown large increases in erosion, continual toppling and build up of debris.
These are just two examples of what I have seen occurring throughout all areas covered.

As many tributaries of rivers and streams mentioned above, were visited as was practical within time constraints, not all problems were photographed. Some 400 photos were taken, a small proportion of which are printed in the reports.

The most common problems are trees toppling from riparian areas into waterways, in many instances causing diversions of water flow. This causes large amounts of erosion. Soil and silt build up in the streams resulting in unsuitable habitat for invertebrates.

Logs and debris cause devastation to stream and river beds and banks when transported in waterflows.

What used to be very deep pools in streams, are completely filled with soil and silt to a depth of three to four metres.

I have compared water clarity, judged by vision only to waterflow entering and exiting Pine forests.

Large aquatic life, was extremely scarce, one eel and six crayfish sighted throughout my survey; no small inunga or other very small fish.

The reports highlight **High Risk** areas. Trees and debris in these areas should be removed, some urgently.

In the upper Mangakahia consideration must be given to diverting, and thus returning, current water flows back to where they originally were in conjunction with removal of debris.

It is vital that appropriate steps be taken to rectify damage that has occurred. The Mangakahia river is joined by the Opouteke river at Pakotai and areas affected downstream extend as far as Dargaville and the Kaipara Harbour.

Some of these rivers, streams and small waterways have suffered permanent damage. This is a matter of grave concern.

It is important to take note of what Nature is showing us all:

> Do not plant in inappropriate areas, the evidence of which I have seen, by the damage to the environment around streams, rivers, wetlands and waterways.
> Toppling has been caused by planting too close to the bank edge and on wet and unsuitable soils, indeed in places, in the streams themselves!
> The root systems observed on toppled trees are perhaps more suited to a tree half their height. This would appear to be because of root systems in wet, shallow soil, unable to develop to sufficient size needed to hold a tree of the height of a mature twenty year old pine.

Toppling of trees that could be avoided is of no commercial gain, only a cost to the environment.

In areas that have large catchments and waterflows, as shown by recent "rainfall storm events" (streams where logs can be transported by waterflows) there should be a mandatory twenty metre horizontal set-back from stream bank. Where terrain is 15° or more, a thirty metre horizontal set-back.
Notable streams are the HaHa, Takitu, Ahomarama, Kaimaro, Opouteke and Mangakahia.

Throughout all areas, evidence is clear, that trees are entering significant waterflows from inside these setbacks as stated above.

Quite simply, without effective planting set-backs, the streams and unique diversity of this environment is at extreme risk.

By encouraging significant riparian areas the benefits would be:

1. An area of stream protection for runoff and debris to settle.
2. Habitats for rare species; kiwi, kereru, pupurangi (kauri snail), banded rail, fern bird etc
3. Enhancement of water clarity and aquatic life, invertebrates, eels, kura and fresh water fish.

During this survey notice was taken of:

1. Kiwi sign. – Only seen adjacent to D.O.C. forested areas and near significant indigenous vegetation.
2. Kauri Snail. – Some numbers apparent throughout, more significant near indigenous vegetation. I noted a number of dead snail on Zambeze road, Noalls block.

3. Opossum. - Seen throughout, with large numbers apparent near D.O.C. areas, particularly Parker road end Matarau forest boundary.
4. Cattle. - Considerable numbers of cattle were encountered in Okaharau, Opouteke, Upper Opouteke, Takitu, some of Noalls and some of Carsons and Parrots.

In streams of the Takitu and Opouteke rivers Manchurian Rice Grass has spread from within Takitu forest to within 800 metres of the Mangakahia river. It is vital that all debris entering these waterways be controlled and removed wherever practical because of the potential to transport the weed downstream.
As quoted by knowledgeable personnel: "*this weed has the potential to completely block the Mangakahia River in places.*"
Consideration will have to be taken of these affected areas before harvesting.

Signed:.....B. Alexander.....
(B Alexander)

Date:.....18-10-02.....