

# KINLOCH LAKE FRONT RESERVES

EASTERN RESERVE  
KINLOCH ESPLANADE

ACTION GROUP SUBMISSION



27 JANUARY 2017

26 January 2017

To: Mr Garth Green (CEO, Taupo District Council)

Councillor Rosie Harvey (Deputy Mayor, Taupo District Council)

From: John Wordsworth (Chairperson, Kinloch Reserve Action Group)

### **Prologue**

The Kinloch Recreations Reserve Management Plan 2007 lists numerous Issues.

Issue B - Vegetation Management. Policy D relates to reducing the effects of erosion through a programme of beach replenishment and /or appropriate reserve reinforcement.

Issue E - General Access. Policy C relates to the allowing for easy access by all ages and abilities, including wheelchair access, where safe and practical.

Issue F - Vehicle Access and Parking. Objective 1, Policy B relates to the allowing of motorized vehicles to enter the Kinloch Lakefront Reserve but only within existing and future designated vehicle access and parking areas.

At their meeting on the 13<sup>th</sup> of December 2017 a majority of the councilors present voted, on the information received from Council staff, to close the Kinloch Reserve to vehicular traffic.

This decision evoked an immediate and strong negative response from many Kinloch residents and other users of the reserve.

As a consequence a petition was organized, a public meeting called and questions raised by one local in particular as to missing submissions.

### **The Petition**

The petition was instigated by a daughter in law of the late Sir Keith Holyoake's daughter.

The petition has attracted 1502 signatures - 829 online and 673 handwritten.

The petition will be presented to the Council per kind favour of Councillor Jollands on the 31<sup>st</sup> of January.

### **The Public Meeting**

The public meeting was held in the Kinloch Hall on Saturday the 7<sup>th</sup> of January.

In the vicinity of 200 people attended including Mayor Trewavas, Concillors Jollands and Williamson and TDC CEO Green.

It is assumed that some at the meeting supported the closure of the reserve to vehicular traffic. One person spoke to this. The vast majority however, including several who bound the reserve, supported it remaining open to such traffic.

The meeting passed a resolution to form an action group to work with the Council to see if a more inclusive long term outcome could be reached.

### **Missing Submissions**

The Council has acknowledged that over 170 submissions were not included in information given to Councillors on the 13<sup>th</sup> of December. A letter was sent to all submitters apologizing for this oversight.

### **The Action Group**

The Action Group has meet on several occasions and as a consequence have prepared a submission that supports the reserve remaining open to vehicular traffic.

Numerous affected parties have been communicated with including residents who live on the Esplanade and the reserve side of Keitha Place. Their thoughts are included in a design for the Esplanade and Kinloch Reserve that is considered to be a good compromise considering the competing interests.

Design drawings are attached.

There are two main elements to the design:

## **Erosion mitigation and Reserve usage.**

### **Erosion Mitigation**

It is the firm belief of the Action Group that vehicles, whilst damaging the surface areas of the Reserve are NOT the cause of the beach front erosion. The beach front erosion is being caused primarily through a lack of sand on the beach.

Messrs Grigg and Todd have done considerable work around this topic.

Their recommendation is that sand be taken from the western side of Whangamata Bay and deposited along the eastern beach.

A letter written by Mr Grigg and supporting documentation is attached.

### **Reserve Usage.**

The following recommendations are made understanding that they will need to be assessed by competent Council staff and as a consequence there may need to be some fine tuning done. Should this be necessary we would want to work with Council staff in this regard.

## **Kinloch Reserve**

Parking would be limited to approximately 20 vehicles. Large trailers, campervans and trucks would be discouraged from entering the reserve through signage and the size of the turning circle.

Traffic would be calmed by the installation of three judder bars, one of which would be for pedestrian access from Keitha Place.

Bollards, rocks or other forms of barrier would keep cars off the grassed areas and the required distance away from the existing notable trees. Gaps would be created in the barrier so that Keitha Place and other nearby residents could walk small water craft across the reserve to the beach.

The Poplars not be replaced with tall trees but rather a variety that has a clean trunk (so that residents can see out to the lake from their properties) and a wide canopy for shade.

Large open grassed areas and so limited other planting.

Picnic tables, BBQs and seats be appropriately installed through the Reserve.

A small children's playground be established towards the eastern end of the reserve.

The installation of a paved cycle way from the eastern end of the reserve to the turning circle.

The installation of an irrigation system to assist with grass growth.

### **The Esplanade**

Three parallel car and trailer parks be designated stretching from the entrance of the Scotsman's ramp along the Esplanade.

Remainder of parking to stay as parallel parking. (Open to review at a later time)

The rationale for this is that whilst the Scotsman's ramp and ski lane are in their present location the grassed area and beach are not well used by general beach goers. It is felt by locals living along there that the small amount of available beach, even when replenished with sand is a dangerous place to swim or undertake any form of water sport because of proximity to the ski lane and marina entrance.

Encourage a better take of the grass through more topsoil and attention but no further planting.

### **Conclusion**

On behalf of the Kinloch Community the Action Group is grateful for the opportunity to work with the Council in resolving this matter.

We affirm our commitment to the Kinloch Reserve remaining open to vehicular traffic and our desire to see further beach front erosion controlled through the relocation of sand.

We believe that we have addressed all the issues raised when the Council last considered this matter and so are confident of a positive outcome for the environment and the public.

John Wordsworth  
Chairperson  
Kinloch Reserve Action Group



# KINLOCH EASTERN RESERVE :

COMMUNITY DRAFT DESIGN FOR CONSULTATION: 07 FEB 2017

## KEY DESIGN POINTS:

- RESERVE PROTECTED FROM EROSION
- NOTABLE TREES PROTECTED FROM CARS
- 1 PEDESTRIAN CROSSING
- 2 RAISED SPEED HUMPS
- 20 CARS SPACES (APPROX)
- 1 TURNING CIRCLE
- PLAYGROUND AND PICNIC/BBQ AMENITIES



Kinloch Reserve

# KINLOCH ESPLANADE:

COMMUNITY DRAFT DESIGN FOR CONSULTATION: 07 FEB 2017

- KEY DESIGN POINTS:**
- 17 PARALLEL CAR PARKS ON ESPLANADE
  - 3 CAR & TRAILER PARKS ON ESPLANADE NEAR SCOTSMANS RAMP
  - PEDESTRIAN CROSSING ON MARINA TERRACE
  - ADEQUATE SPACE FOR RESIDENTS ENTERING & EXITING DRIVEWAY WITH BOAT TRAILERS
  - ROCKS REMOVED NEXT TO SH LANE



**TURNASQUO AREA**

**17 CAR PARKS**

**3 CAR & TRAILER PARKS**

**BARrier DOLLARD**

**TURNAROUND AREA**

**SCOTSMANS RAMP**

**Kinloch Reserve**



Gareth Green  
Chief Executive Officer  
Taupo District Council.

21 January 2017

**Kinloch Foreshore – December Eastern Beach Erosion Decision**

Dear Sir

At the December council meeting much was made of the issue about cars destroying vegetation and causing erosion thus affecting the poplar trees. Supporting evidence in the form of the WRC submission was mentioned in the agenda item and staff presentation. Councillors expressed the view that the lake foreshore must be protected and the decision to ban cars on the reserve was made.

I have been corresponding with WRC about the erosion issue and had a response from the current Taupo Zone Manager. He expressed the view that the marina groyne was a factor but that the destruction of vegetation by cars was the main cause of erosion. Nowhere in any of the public documents that I have researched have I seen the cause of erosion at Kinloch being cars. This is also refuted by Lawrie Donald, previous WRC Zone manager. Lawrie's response in attachment.

It is well known and documented that littoral drift occurs at Kinloch is in a west to east direction and that the primary source of sediment to the foreshore is via the Whangamata Stream. The establishment of the Kinloch Marina and the rock groyne's, allowing access to the lake, interrupts this natural process of beach sediment distribution. This is documented in numerous scientific reports and documents available on TDC and WRC websites as public information. During the consenting process some years ago for the marina extension, the Marina Company agreed to a joint consent application with TDC to run parallel with its consent application. In the end the commissioners did not wish to potentially block the marina development with this condition. Material from the dug out marina was to lay the base, followed by a transfer of sand from the west to the east. This consent lapsed. The work was not done.

Sand replenishment at Kinloch by transferring sand from west beach will aid accretion along the entire eastern beach. Both TDC and WRC have budgets under the joint foreshore strategy to complete this work and as many ratepayers in the district benefit from the marinas existence we see this as a joint project that requires some urgency to protect the trees and restore the health of the foreshore.

The Kinloch Reserve Action Committee request that Councillors be given the true reasons and information about the erosion issue, which shows that sand replenishment is the preferred option, before they revisit the vote on 7 Feb. This will give them a better understanding of the issues and possible solutions backed by scientific information. This information has been around for some years but omitted in the previous agenda put in front of them. We find this odd, since the staff officer presenting at the Dec 13 meeting was actually on the TDC technical committee for the Erosion study some years ago.

The above mentioned documents include the following;

Email from Lawrie Donald

SPO Joint Hearings Committee June 2009 page 37

Beca Lake Taupo Erosion Study – Stage 4 2008, Rev. G pages 61 - 65

Lake Taupo Erosion and Flood Strategy 2009 pages 16, 32 and 41

Yours faithfully

Larry Grigg

( Member Kinloch Reserve Action Group )

## Kinloch Eastern Beach Sand Replenishment Option

This Document contains information that should have been part of the agenda item considered by TDC councillors on 13 Dec 2016. And supporting email from Lawrie Donald, Waikato Regional Council Taupo Zone manager retired. If sand replenishment is to be undertaken then the rocks that have been placed may need some rearrangement so that some of the lost beach can be partly reinstated. Some of these rocks may have a use elsewhere on the reserve.

I also refer you to pages 41 and 48-50 of The Kinloch Reserves Management Plan.

**From:** lazza grigg  
**Sent:** Wednesday, 25 January 2017 7:51 p.m.  
**To:** John crowley; jandlwordsworth@gmail.com; tim@storthoaks.co.nz; Kate Stace; Grant T; Chris Todd  
**Subject:** FW: Kinloch foreshore closure to Vehicles that are causing erosion.

- Hi, Will include this discussion in our latest submission document as requested.

Cheers Larry

**From:** lawrie donald  
**Sent:** Monday, 2 January 2017 11:20 a.m.  
**To:** lazza grigg  
**Subject:** Re: Kinloch foreshore closure to Vehicles that are causing erosion.

[REDACTED] f. Allan Kirk certainly does not understand the basics of the erosion issue at Kinloch if he does not consider the halting of the sediment transport along Kinloch beach by the marina groyne as being a primary cause of the erosion.

I bet that his response to you was vetted by Anne and possibly a whole range of people at Hamilton. I hope that you realise that you are probably causing at least five people to be "kept busy". Somebody will get so concerned that they will need an engineering firm to investigate and supply a report on this matter.

With the shifting of the beach material, WRC are the hassle here as they insist that Tuwharetoa are the reason it is not done as they are against shifting the material. My discussions on this when there was that Tuwharetoa were not the problem but the regional consent team and district council staff were the hassle and got all upset when I tried to get something moving.

As you know the only reason Kuratau got sand was because of the power companies and you and I. Without our push it was never a starter.

What you need to do is see if somebody in Tuwharetoa are prepared to say that shifting the beach material around the groyne is a good option for the health of the beach and they have no issue with the movement of that material. You may have to see if Todd is willing to help the cause.

Good luck with it. May be in Taupo this weekend as my sister is out from Melbourne and staying with other sister in Kinloch. May call in for a beer.

Lawrie

**From:** lazza grigg <lazza99@hotmail.com>  
**Sent:** Sunday, 25 December 2016 10:42 a.m.

**To:** lawrie

**Subject:** FW: Kinloch foreshore closure to Vehicles that are causing erosion.

I am still composing a response.

Was it EW policy to let all the Catchment Committee public members do the moving and seconding. ie Pope, Barton Penton etc. So that the staff were off the hook if it turned pear shaped. Seems to be the policy now reading through the minutes. They obviously forgotten the Kuratau sole issue is lack of sand. No cars down there and the vege got all washed away as well. Plus Tuwharetoa must have approved.

**From:** [Allan Kirk](#)

**Sent:** Tuesday, 20 December 2016 4:25 p.m.

**To:** '[lazza803@hotmail.com](mailto:lazza803@hotmail.com)'

**Cc:** [Anne McLeod](#); [Greg Ryan](#)

**Subject:** Kinloch foreshore

Good afternoon Larry

Thanks for your recent email to our CEO re foreshore erosion at Kinloch. The regional council agrees that the groyne's impact on beach replenishment is a factor in the erosion of the eastern beach at Kinloch. But we don't agree it is the sole, or even primary, cause. Since, as you rightly point out, permission has not been granted to move sand from the western to the eastern beach, we support focusing on better establishing vegetation cover at the eastern end to prevent erosion.

From your time as a staff member in the regional council's Taupo Office, you'll know foreshore soils around Lake Taupo are particularly susceptible to erosion if they don't have enough vegetation. So we believe maintaining deep-rooted vegetation at this location to protect the vulnerable part of the foreshore is the most important anti-erosion strategy there. As you'll also know, Taupo District Council recently consulted on allowing vehicle access and car parking on the foreshore at the eastern Kinloch beach. But it was felt the impact of vehicles, hard surfaces and the launching of light craft has the potential to accelerate damage and exacerbate the issues apparent along this part of the foreshore.

The regional council strongly supports development of a long-term management plan to sustain the entire Kinloch foreshore, particularly the eastern end. We also agree that a proactive stance on erosion is required. Any further thoughts you have on how to achieve this are welcome.

Regards Allan Kirk

**Allan Kirk** | Zone Manager - Taupo/Upper Waikato | Integrated Catchment Management

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**Kinloch**

Mr Carroll observed that the difficulty at that site was that the marina had resource consent to continue to operate with the groyne. Beach replenishment would certainly improve the amenity and recreational value, however, that was likely to become an ongoing commitment.

Mr Carroll observed that consent had been granted to the Marina expansion. At the same time another consent had been granted for beach replenishment to mitigate the effects of the groyne. He observed that the Kinloch Marina had been willing to do the necessary beach replenishment. However, the proposal to do so was with the Tuwharetoa Maori Trust Board for approval. It was suggested that it may be an opportune time to readdress the matter. It was noted that the resource consent was to be reviewed in the near future.

Mr Carroll noted that the Marina was a valuable asset for the Kinloch community and should remain fully utilised, whilst mitigating the effects thereof.

Mr Copeland suggested that the design of the groyne could be revisited, and the length reduced, so that sediment that was currently being trapped and/or diverted, would reach the affected part of the beach.

The Chairman noted a clause within the resource consent that allowed for a review of conditions to mitigate the effects of the activity. However, he did not believe that section 128 of the RMA allowed EW to stipulate a redesign of the consented structure.

Mr Carroll proposed that Council staff revisit discussions with the Marina and The Tuwharetoa Trust Board in an attempt to resolve the beach replenishment matter. He suggested that staff also suggest the redesign of the groyne to the Marina Company and highlight the benefits of such vs the necessity of continual and ongoing replenishment of the beach.

In response to a query, Mr Carroll noted that whilst EW were the authority responsible for the issue of resource consent, there was value in TDC being involved in the suggested discussions as a representative on behalf of the local ratepayers.

**Five Mile Bay**

Mr Copeland observed that the Strategy recommended that planting trials be undertaken at Five Mile Bay to see how effective planting could be in halting erosion issues.

In response to a query, he observed that whilst planting was proposed, it was valuable to continue monitoring of the area. In response to submissions received in opposition, he noted that the proposed planting could be readdressed.

Mr Copeland noted that there were similarities between erosion experienced at Five Mile Bay and Waitahanui. However, given that the strategy was promoting 'soft' options, planting was the preferred option. He believed that it may help to reduce erosion whilst further monitoring and research continued.



#### 6.3.4 Kinloch (Whangamata Bay)

##### a. Location description

Kinloch is situated in the Whangamata Bay, which forms a pocket bay compartment that acts independently of adjacent bays. The main sediment inputs into the bay are from the Otaketake and Whangamata Streams. Large influxes of material are reported to have been flushed into the bay during development in the 60's and 70's, including a reported farm dam break. Much of this material appears to have been trapped behind the groyne at the western marina entrance, where the land has accreted almost 40m. The net littoral drift is towards the east as evidenced by the build up of this sediment.

The area of focus from an erosion point of view is the length of shoreline immediately to the east of the marina entrance. The full length of this area has a reserve approximately 20 - 30 m deep. To the western end, where the erosion is most prevalent the reserve is backed by a road and then houses. The reserve is predominantly grassed with approximately 25 individual protected trees including poplars.

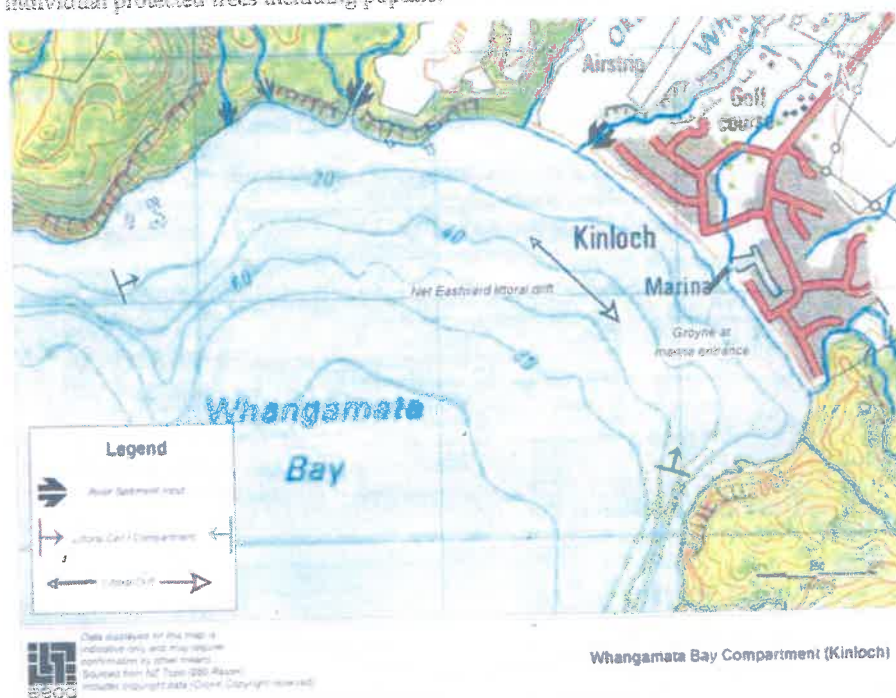


Figure 16. Whangamata Bay Compartment (Kinloch)



b. Erosion Risk Areas and Causes

Following periods of high lake levels and wind events in 2004, significant erosion occurred immediately to the east of the groynes at the marina entrance. Following these events rock revegetment was placed in this area to prevent further erosion and protect the poplar trees.

These erosion episodes immediately to the east of the marina entrance during high lake levels have been attributed to sediment bypassing this length of the shoreline. This is due to the presence of the groynes at the marina entrance as well as a reduction in the sediment entering the system since the early significant influxes.

The Kinloch area has had a shorter-term trend of tectonic subsidence, and since 1979 has been dropping approximately 7mm on average compared to Acacia Bay. Although this does not appear to be causing major erosion issues at present, if this trend continues it is considered that this may cause problems in the long term.

c. Assets at Risk

At Kinloch, the area of erosion is relatively confined to the downdrift side of the marina leeward breakwater. The main items at risk are approximately 4-5 poplars and the reserve area itself. A reasonable buffer still exists before the road and houses. Services such as water and sewer are also well clear of the area at risk.

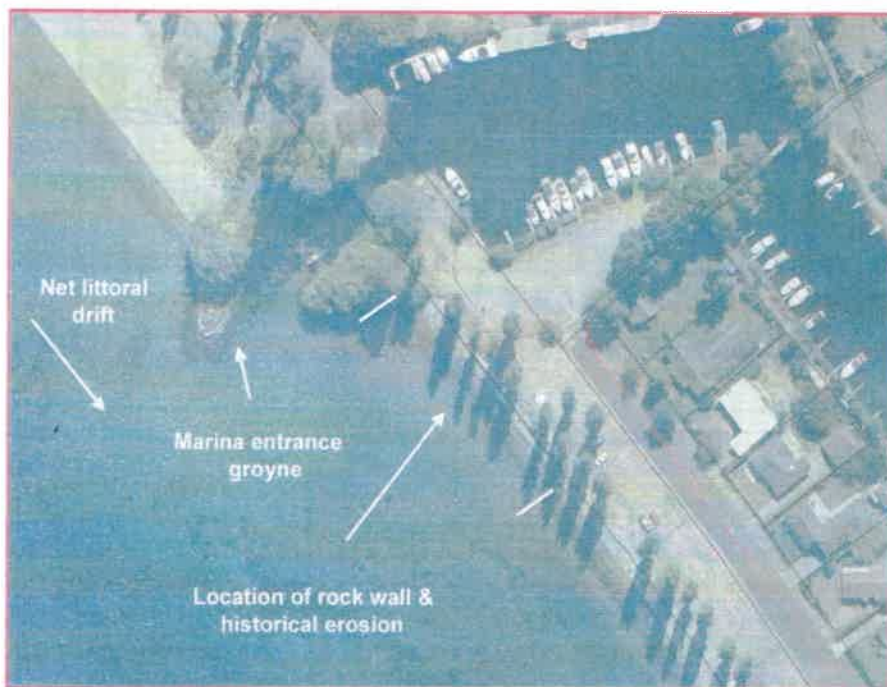
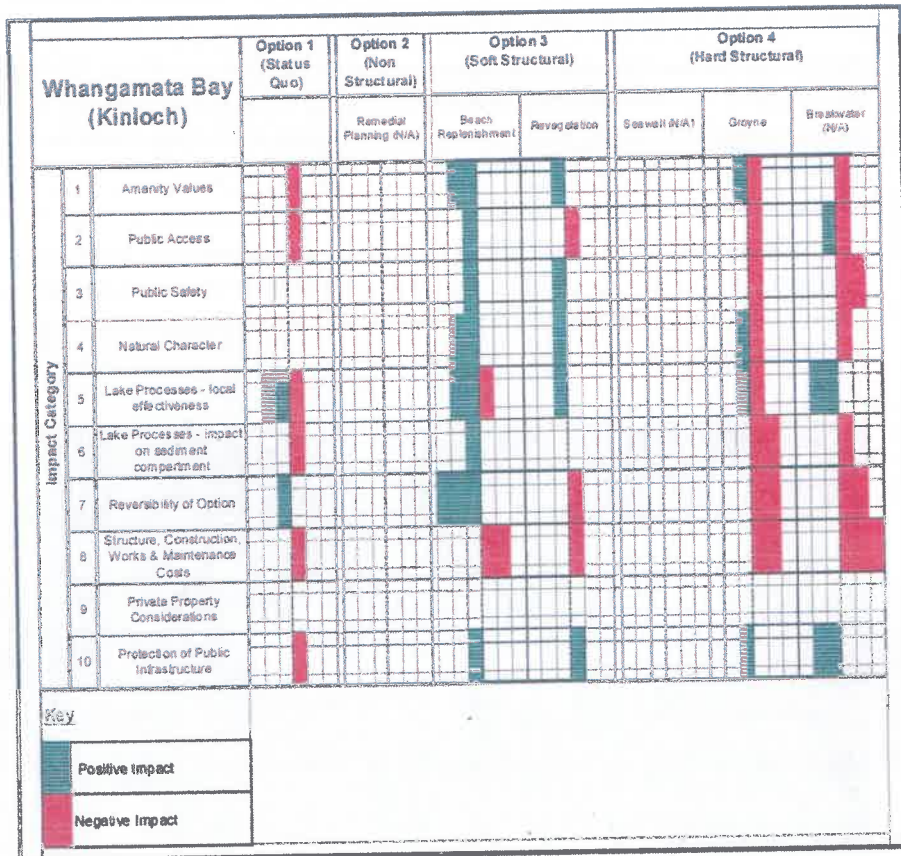


Photo 7. Kinloch shoreline, [2003]

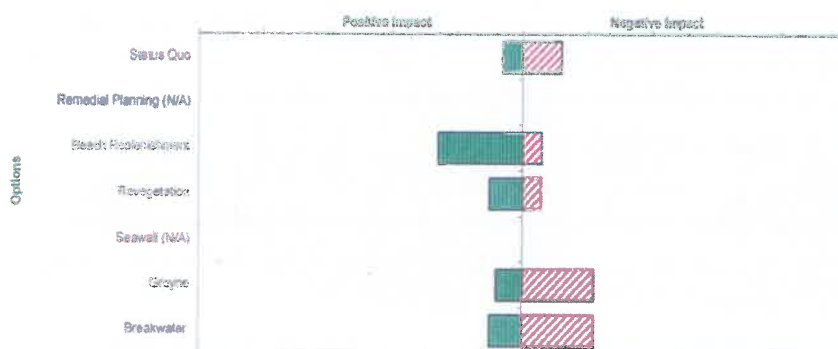
**Evaluation matrix for Whangamata Bay (Kinloch)**

*How to use the Matrix – Each option along the top of the matrix has been assessed against the criteria down the left hand side of the table based on whether or not it will have a positive or negative impact (red represents negative, green is a positive impact). The length of the bar indicates the degree of impact. The gradings are either High (long bar), Medium, or Low (short bar). No bar would indicate that there is no impact or not assessed in this study*

**d. Whangamata Bay (Kinloch) Qualitative Analysis Summary**

The graph below shows, in summary form, the results of the qualitative matrix for Whangamata Bay. Non structural options were not considered applicable in this management area based on the current level of erosion and because a reasonable buffer already exists. The results show that the soft structural options have the greatest positive impacts with the least negative impacts. A seawall exists so hasn't been specifically assessed, options for enhancing the wall are discussed further below. The other hard options have the greatest level of negative impact with only minimal positive impact. The status quo option has a moderate level of negative impact relative to the other options and has the least positive impacts of the options available.

WHANGAMATA BAY/KINLOCH –  
QUALITATIVE ANALYSIS SUMMARY



The situation at Kinloch is one of a post implementation phase of the installation of a rock seawall in response to erosion events in 2004. As part of the expansion of the marina there were also plans to carryout beach nourishment in front of the revetment creating a buried seawall. This process was held up due to getting approvals for the nourishment. The result is that the wall has assisted in stabilising the erosion area, however the character of the beach and access has been affected. Secondary or localised erosion/scour has also occurred at the end of this rockwall structure (i.e. 'end effects').

At this site beach nourishment would be achieved by taking sand from the west side of the marina and placing it on the east side. It is effectively a sand by-passing system, bringing the overall beach into equilibrium by transferring the sand held back by the marina entrance.

The shoreline at Kinloch is relatively free of structures and development along the length of the esplanade reserve. Similar to Kuratau and Whareroa, this reserve provides a buffer zone which allows continued monitoring of the shoreline movement without the need to take immediate responsive actions. The exception to this is some of the trees which are in close proximity to the shoreline.

Opportunity for further non-structural options would be limited as the rear of the reserve is already developed and currently properties are already set back sufficiently without the need for remedial planning techniques.

With limited structures and development the beach and amenity value of the shoreline for recreational purposes is important to local and visitors to the area. Further consideration of options therefore needs to acknowledge these values.

Consideration of further options needs to take into account the wall already in place. An inspection of the wall should be carried out to assess its performance within recent years. If it is considered to be providing effective protection then two principal options exist. If the visual and access impact of the wall isn't significant, the status quo option of leaving it in place and monitoring would be recommended. If the wall is considered by the local



community to have a significant impact on the amenity and character of the beach then options of burying the wall and beach replenishment should be considered further.

Although not directly assessed an option of addressing the causative factor of removing the groynes at the marina entrance exists. As the groynes are understood to be essential for maintaining access into and protecting the marina, and the value of the marina to the local area is significant this is unlikely to be considered a viable option.

**e. Summary of Recommendations**

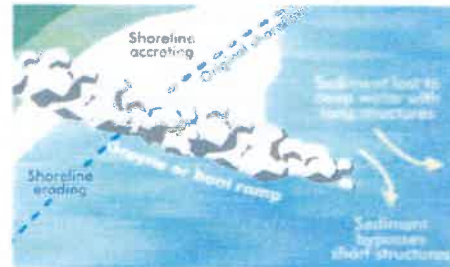
Based on our current understanding, if action is considered necessary, the recommended approach to the selection of preferred options would be as follows:

1. Monitor performance of the wall and in particular any end effects and internal soil erosion.
2. Continue to investigate options for undertaking beach replenishment in front of the wall if its aesthetic impacts are not acceptable.



Photo 8. Kinloch rock wall, August 2005

### Causes of erosion



### Lake level

Lake Taupo's water levels are managed as the primary store of water for the Waikato hydro scheme that generates electricity for the nation. They are managed within a 1.4m regime that is authorised by resource consent.

The Tongariro Power Scheme is operated to provide water to the Tokaanu and Rangipo power stations and uses a series of lakes, canals and tunnels to do so (refer to Appendix 3). The scheme ultimately discharges water diverted from other catchments into Lake Taupo. During periods of high flow those additional discharges are required to be stopped to prevent flooding being exacerbated.

Although the annual average lake levels are closely matched to what would have happened naturally, the managed regime has resulted in the Lake spending more time at higher levels than it would have naturally.

The management of the Lake levels has been identified as contributing to accelerated lakeshore erosion during periods of strong winds

Despite the fact that the Lake is managed there are times during storm events when there is more water coming into the Lake than can flow through the control gates. As an example, during some recent floods the cumulative Lake inflows from tributaries has reached approximately 3000m<sup>3</sup>. At such times, high lake levels will continue to occur (as they did before the installation of the gates) to levels beyond the maximum level that the gates are allowed to be used to control lake levels.

### Sediment

Sediment inputs into the Lake are a major factor in terms of erosion and accretion cycles. Historically, sediment has been fed into the Lake by the tributaries like the Tauranga-Taupo River. A number of hydroelectric power stations have been established on the Hinemaiaia and Kuratau Rivers. These schemes hold back significant quantities of sediment that would have naturally flowed into the Lake, feeding long shore drift and contributing to making beaches more stable.

In the Lake itself there are a range of other structures that have localised impacts in terms of inhibiting sediment flows along the shoreline. Boat ramps have been identified along with stormwater pipes and groynes, including the one that protects the entrance to the Kinloch marina.

It is also recognised that other land use practices have had an impact on sediment flows into the Lake. Historically logging contributed to periods of large sediment input into the Lake, while in more recent years planting and better catchment management practices have actually reduced sediment inputs.

## Physical works

What	Lead agency	When	Estimated cost (2009 \$)
<b>Kuratau</b> Asset management – detailed identification of assets at risk e.g. sewer pipe, car park. Investigate possible relocation of key assets over time and appropriate placement of new assets.	Taupo District Council	As part of the next plan review	Included within current budgets
Physical Works – Design and obtain consents for beach replenishment and planting. This will involve consultation with the local community and Tuwharetoa Maori Trust Board approval	Taupo District Council to project manage design and consenting processes with support from Environment Waikato	Begin 2010/11	Approximately \$170,000 for investigation, design, consenting, project management and site setup.  Approximately \$500,000 for the replenishment
Investigate in conjunction with King Country Energy options to better manage sediment trapped behind the hydro dam.	Environment Waikato	Begin 2010/11	No cost implications
<b>Five Mile Bay</b> Physical works – Trial planting programme as already approved	Taupo District Council to project manage with support from Environment Waikato	2009/10	Included within current budgets
<b>Whareroa</b> Investigate re-contouring of the beach and potential for replanting	Taupo District Council to project manage design and any consenting processes required with support from Environment Waikato	Begin 2010/11	\$50,000
Discuss the operation and design of the boat ramp with the Department of Internal Affairs to establish whether changes can reduce erosion effects	Environment Waikato	Begin 2010/11	No cost implications
<b>Tapuaecharuru Bay</b> Develop a management plan to identify desired shoreline characterisation and prioritisation for different areas taking into account high public and cultural amenity values, recreation & tourism values, the number of properties and assets at risk and existing control structures. This will involve consultation with the local community and Tuwharetoa Maori Trust Board approval	Taupo District Council	2011/12	Included within current budgets
<b>Kinloch</b> Address with the Kinloch Marina Company compliance issues (including the outlet structure), and matters inhibiting the implementation of their beach replenishment consent.  If the Company does not implement that consent then beach replenishment works by the councils should be investigated.	Environment Waikato	2010/11	No initial cost implications, however beach replenishment costs would need to be reconsidered if works are required by the councils



### Whangamata Bay (Kinloch) sediment compartment

There is a significant build up of sediment behind the western side of the groyne constructed to protect the entrance to the marina. To the east of the groyne the shoreline has suffered from ongoing erosion.

There is also an outlet structure from the marina, which is impacting on erosion on the eastern side of the marina groyne.

The overriding cause of erosion in this compartment is considered to be the marina groyne impeding the eastward littoral drift of sediment. The groyne is also responsible for the partial loss of sediment out into deeper water.

### The lake wide influence of lake level Management

There have been a number of previous investigations into lake level regime comparing the current regime to a simulated uncontrolled regime. There appears to be general consensus for the analysis undertaken up to 2000 that the lake level regime of recent times has been operated close to the simulated natural conditions. Any variations have been considered

minor and have not been assessed as contributing significantly to erosion.

In addressing the influence of the lake level regime Beca undertook comparative assessments of the managed and simulated uncontrolled regimes over the last 10, 5 and 3 year periods. For the 5 and 3 year periods it is apparent that the recorded maximum levels were higher than the simulated uncontrolled maximum levels by about 100mm.

As the time periods reviewed were made shorter and more recent the difference between seasonal regimes became more apparent with summer recorded levels remaining high. Over the 3 year period the actual recorded level exceedence was up to 200mm higher than the natural simulated regime for most the level ranges.

From historical analysis it appears that this timing of holding the lake levels higher during late summer does not coincide with the time of year having high average wind speeds. However, analysis of the highest wind events has shown that they do tend to occur during this time.

Over recent years, there is some evidence that lake level management may be having more

of an influence on lakeshore erosion. However the short timeframes of only a few years will not necessarily be reflective of the longer term trends, and are likely to be more susceptible to short term variations such as weather patterns for those particular years.

On the basis of the evidence presented, the management of lake levels is considered to be a lake wide factor in accelerated erosion, in combination with the factors identified for the different sediment compartments.

### Other contributing factors

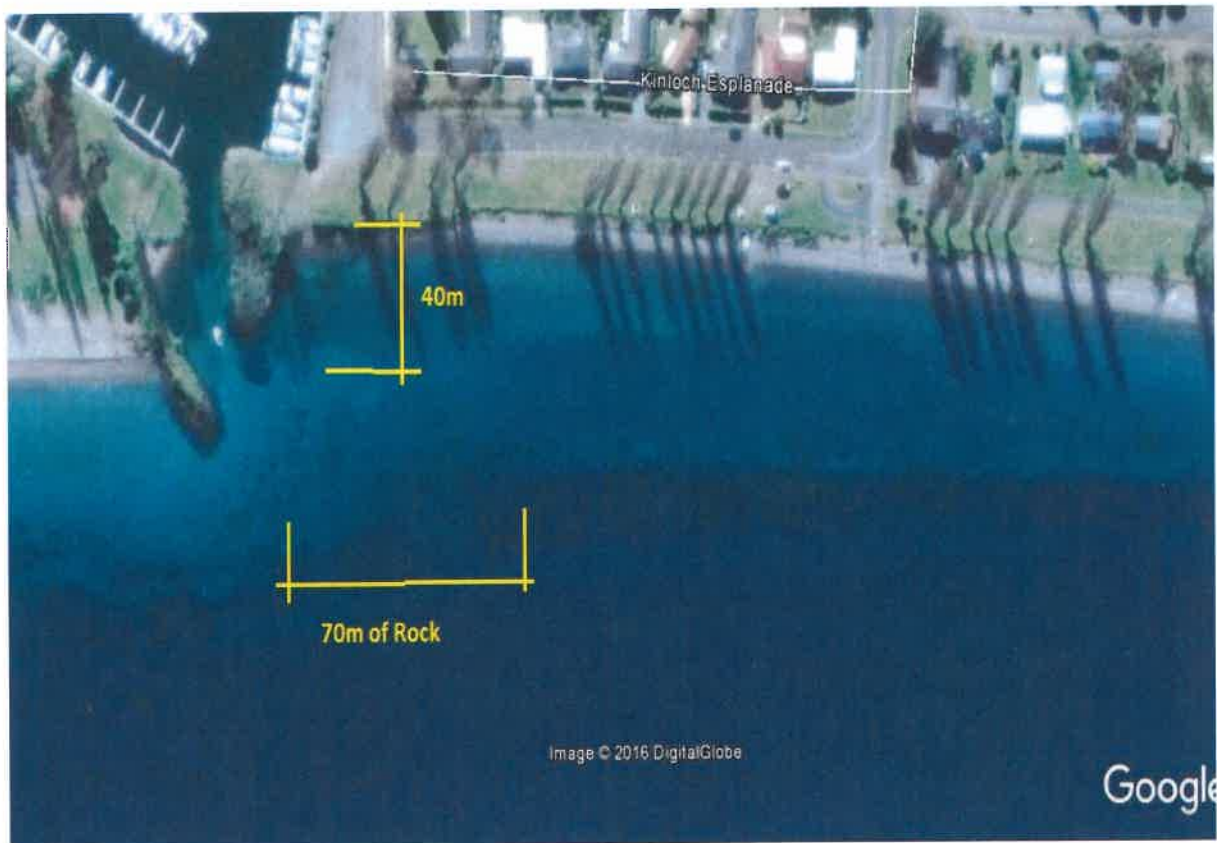
Some localised factors have contributed to accelerated erosion, including:

- the removal of vegetation along the shoreline, or
- localised structures like walls protecting private property
- privately owned boat launching facilities

However the effects attributed to these factors are considered to be minor compared to the factors identified for the sediment compartments and lake level management above.

**Kinloch marina showing sediment trapped behind the groyne**





Google Earth 2015

Prepared By Larry Grigg

Ex Works Supervisor WRC 2009-2013

21. Jan 2017