

# **Future directions for the management of gravel extraction in Taranaki rivers and streams**

Review of the Regional Fresh Water Plan for Taranaki

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# 1. Introduction

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## 1.1 Purpose

The purpose of this report is to review issues relating to avoiding, mitigating and remedying adverse effects on water bodies arising from riverbed gravel extraction in the Taranaki region. The report contributes to the review of the *Regional Fresh Water Plan for Taranaki* (the Freshwater Plan) with a focus on developing draft policies, methods and rules.

## 1.2 Background

The Freshwater Plan, which was adopted in 2001, encapsulates a restrictive approach to managing riverbed gravel extraction. The Plan's restrictive approach was adopted in response to localised environmental degradation caused by past extraction from some rivers in the region, which was occurring at a rate greater than the natural rate of supply.

It has been ten years since the Taranaki Regional Council (the Council) adopted the Freshwater Plan. The Freshwater Plan contains a suite of policies, objectives, and methods associated with riverbed gravel extraction.

In 2011 the Council undertook a preliminary analysis of river aggradation<sup>1</sup> in Taranaki. The report entitled *Aggradation in rivers and streams on the Taranaki ring plain* (2011) highlighted that the limited extraction of material from river channels, coupled with accelerated erosion in the upper catchments of the Egmont National Park, has intensified aggradation in some waterbodies. The report described the Freshwater Plan's current approach to managing riverbed gravel extraction as unnecessarily restrictive. Current policies and rules restrict the purpose for which gravel extraction can take place, limits the volume of gravel that can be extracted as a permitted activity by adjoining landowners and prescribes drybeach operations to protect instream aquatic life. The report recommended that as part of the Freshwater Plan review, current provisions could be amended to promote gravel extraction to mitigate aggradation issues.

This report gives effect to that recommendation. In particular it examines issues associated with riverbed gravel extraction and identifies opportunities to mitigate riverbed aggradation while still avoiding and mitigating adverse impacts on freshwater. The report then sets out draft provisions for gravel extraction to be included in the Proposed Plan.

### **The relationship between riverbed gravel extraction and aggrading river channels**

Aggradation involves the deposition of bedload material in the channel of a watercourse. The deposited material occupies channel space decreasing the area available for stream flow. In this situation river flow may be forced into the banks of the channel resulting in their erosion. This erosion promotes channel enlargement or overflows, and sometimes a combination of both.

Controlled riverbed gravel extraction can offset this process by removing excess bed material at locations where river channels have aggraded, helping to return channels to a state of relative stability.

Of note, river aggradation is a natural process and therefore is not a use or activity which has effects which are controlled under the Resource Management Act. The Act's focus is on human induced activities and their impacts on natural and physical resources. Hence, the report's focus on gravel extraction.

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<sup>1</sup> Aggradation refers to the process through which the bed of a river rises by the natural deposition of riverbed material.

### **1.3 Structure**

The working paper has six sections.

Section 1 introduces the working paper, including its purpose, background, and structure.

Section 2 outlines the relevant policy documents and legislation that must be considered in addressing the avoidance, mitigation and remedying of adverse effects on water bodies arising from riverbed gravel extraction.

Section 3 provides a contextual understanding of riverbed gravel extraction in Taranaki, including associated adverse impacts.

Section 4 outlines management issues relating to riverbed gravel extraction.

Section 5 sets out options relating to riverbed gravel extraction in the region, including draft policies, methods and rules to be considered for inclusion in a Proposed Freshwater Plan.

Section 6 sets out the conclusions and summary of key findings reached in this report.

Appendix I presents case study examples of aggradation in the Taranaki region.

Appendix II of this paper presents the proposed rules for inclusion into the Freshwater Plan.

## 2. Statutory and planning context

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This section sets out the statutory and planning context relevant to riverbed gravel extraction in the Taranaki region.

### 2.1 Crown Minerals Act 1991

The Crown Minerals Act 1991 (CMA) must be considered when the extraction of Crown owned minerals is proposed. Where not on private land, 'sand and gravel' is a Crown owned mineral included within Section 2(1) of the CMA under 'Industrial rocks and building stones'. When referred to in the Act a mineral has the same meaning as in section 2(1) of the CMA.

A permit is required to prospect, explore or mine Crown owned minerals, unless the mineral exists naturally in land owned or occupied by the person, for reasonable use on the property, or is sand, shingle or any other natural material in the bed of a river, lake or in the coastal marine area unless otherwise specified in a minerals programme.

If the Crown does not own the gravel for which extraction is proposed (i.e. gravel is on private land), then the applicant does not require a mineral permit from New Zealand Petroleum and Minerals, and can move on to applying for consents required under other applicable acts. In Taranaki it is considered unlikely that a mineral permit would be required to carry out riverbed gravel extraction, as the majority of riverbed gravel resources are privately owned.

### 2.2 Soil Conservation and Rivers Control Act 1941

During the late 1940's and early 1950's catchment boards were established under the SCRCA. The overriding purpose of the SCRCA is to make provision for the conservation of soil resources, the prevention of damage by erosion and to make better provision for the protection of property from damage by floods. Catchment boards were made responsible for activities in their catchment district and were required to administer the SCRCA.

The enactment of the 1988-1989 central and local government review and reorganisation processes resulted in many significant organisational changes including the establishment of regional councils and their assumption of catchment authority responsibilities. Further changes occurred with the introduction of the Act and the abolition and amendment of related statutes.

### 2.3 Resource Management Act 1991

Under section 30 of the Act, regional councils have the following functions for the purpose of giving effect to the Act and in relation to managing riverbed gravel extraction:

- the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the natural and physical resources of the region.
- the control of the use of land for the purpose of avoiding and mitigating natural hazards, the maintenance and enhancement of water quality and quantity and the maintenance and enhancement of ecosystems in water bodies.

Section 13 of the Act states that "*...no person may in relation to the bed of any lake or river excavate, drill, tunnel, or otherwise disturb the bed... unless expressly allowed by a rule in a regional plan...or a resource consent*".

Section 6(a) of the Act requires the Council, when carrying out its functions under the Act, to recognise and provide for the preservation of “...the natural character...of wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development”, as a matter of national importance.

The Act provides for a hierarchy of policies and plans and other statutory powers to enable central and local government to carry out their functions. These include a national policy statement for freshwater, regional policy statements, regional plans, and district plans.

## **2.4 National Policy Statement for Freshwater Management**

The *National Policy Statement for Freshwater Management 2011* (NPS) sets out objectives and policies that direct local government to manage water in an integrated and sustainable way while providing for economic growth. These objectives and policies are broad and no specific reference to riverbed gravel extraction is made.

Notwithstanding the above, objectives and policies relating to water quality, water quantity and integrated management apply. Accordingly there are national policy directives for regional councils to effectively manage the effects of use and development. Worth noting are objectives A1 and C1 of the NPS.

Objective A1 of the NPS seeks to “safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and of discharges of contaminants”.

Objective C1 of the NPS seeks to “improve integrated management of fresh water and the use and development of land in whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment”.

## **2.5 Regional Policy Statement for Taranaki**

The *Regional Policy Statement for Taranaki* provides for riverbed gravel extraction under ‘Issue 6.6 Managing effects associated with the use of and disturbances to river and lake beds’. River and Lake Beds Objective 1 seeks:

“...to enable appropriate use of and disturbance within river and lake beds in Taranaki while avoiding, mitigating or remedying any adverse effects of activities on the environment”.

River and Lake Beds Policy 2 makes specific reference to riverbed gravel extraction, stating that:

“...the adverse effects of extraction of material from river and lake beds will be avoided, remedied or mitigated”.

Relevant methods include the application of regional rules to allow, regulate and avoid adverse effects on the environment from the use of river and lake beds (RLB METH 2), and provide information and technical assistance to persons wishing to carry out activities involving river and lake beds (RLB METH 6).

## **2.6 Regional Fresh Water Plan for Taranaki**

The Freshwater Plan generally restricts activities undertaken on, under or over the bed of a river and provides for activities undertaken for river and flood control purposes. Riverbed gravel extraction is explicitly addressed under ‘Issue 6.6 Adverse effects on the environment from the uses of river and lake beds’. The Plan is ‘silent’ on the wider issue of river aggradation because it



is a natural process and therefore is not a use or activity which has effects which are controlled under the Act.

Objectives 6.6.1 and 6.6.2 seek to ensure principles of sustainable management are applied when managing activities that use the beds of lakes and rivers and that the effects of flooding and erosion on land uses in floodplains are avoided, remedied or mitigated. In achieving these objectives, Policy 6.6.5 prohibits the extraction of material from riverbeds except for circumstances in which extraction is for reasonable domestic and on farm needs, to avoid, remedy or mitigate the adverse effects of flooding and erosion and as necessary for the placement and maintenance of structures within the bed.

Rule 70 in the Freshwater Plan permits the extraction of sand or gravel from the bed of a river for domestic or on farm purposes subject to a number of conditions. Amongst other things extraction must be for private use on the property from which it is extracted and the quantity extracted must not exceed 15m<sup>3</sup>/yr. Rule 71 permits extraction where it is for the purpose of flood or river control carried out by or on behalf of the Council and is inline with the prescribed conditions in the Freshwater Plan.

If extraction for a purpose stated in rules 70 and 71 does not meet the relevant conditions it will be considered a discretionary activity under Rule 72 and would require a resource consent before any work could commence. Extraction from a lake for a purpose not provided for in Rules 70 and 71 is considered a discretionary activity. If extraction in a river is proposed for a purpose not specified in Rules 70 and 71 it is considered a prohibited activity under Rule 73.

As previously noted, the generally restrictive policy approach adopted in the Freshwater Plan is based on a period when localised extraction from some rivers in the region occurred at a rate greater than the natural rate of supply, causing the degradation of these river channels and the associated environmental values.

## **2.7 District plans**

Dry land quarry operations would be required to comply with territorial authority land use provisions in relevant district plans.

## 3. Riverbed gravel extraction in the Taranaki region

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### 3.1 Historic approach to riverbed gravel extraction

Prior to the adoption of the Freshwater Plan, riverbed gravel extraction in the region was managed under the Shingle Extraction Bylaw introduced under the SCRCA that sought to “*not restrict the wining of metal but to protect the streams from the effect of uncontrolled exploitation*”. The adoption of the bylaw in 1974 was prompted by extraction activities that were exceeding the rate of supply in the Kapuni and Waiwhakaiho rivers.

Subsequently when the issue was addressed under the Freshwater Plan, concerns regarding riverbed gravel extraction in Taranaki translated to the adoption of a generally restrictive approach to managing riverbed gravel extraction. This approach restricted gravel extraction to domestic or on farm purposes (Rule 70) or river and flood control work (Rule 71).

Standards, terms and conditions attached to Rule 70 limit the area from which gravel can be extracted to the dry beach of a riverbed and restrict the quantity of material that can be extracted to 15m<sup>3</sup>/yr. If riverbed gravel extraction is proposed for a purpose not provided by these rules, it is prohibited under the current Freshwater Plan.

Since the enactment of the Plan in 2001, it has become clear that restrictions could be eased with little or no environment consequences to the state of rivers and streams in Taranaki. This report aims to provide for the appropriate use of an available resource where it may have been unnecessarily restricted in the past.

### 3.2 Significant volumes of gravel bedloads

A large number of the rivers and streams on the ring plain flow from within the Egmont National Park and the majority of these have their headwaters on the volcanic cone of Mt Taranaki. The mountain slopes are naturally relatively unstable, steeply sloping and attract a high annual rainfall, often delivered in high intensity short duration storm events.

Watercourse channels are very steep in the upper reaches typically dropping over 1800m in altitude over a distance of some 10km to exit the Egmont National Park. The channels continue on a relatively steep and straight course across the ring plain with high energy forces capable of transporting significant volumes of gravel bedloads.

The mountain and ranges have a strong influence on rainfall by producing orographic type events which are often associated with frontal systems and depressions moving across the Tasman Sea. Although the annual totals are quite high, the way in which rainfall is delivered is more significant. Short duration, high intensity bursts of rain occurring during a storm event are potentially much more significant in terms of runoff generated and related damage within the catchment and watercourse channels than longer duration events.

The characteristics of runoff, once it becomes flow in watercourse channels, is dependant on a number of features irrespective of size. The slope or grade of the bed is a major factor controlling rates (speed) of flow. The speed and volume of flow has an influence on channel width and depth which may be changed naturally by bank erosion or bed aggradation. Where material is deposited on a riverbed it is made available for extraction. Often it is beneficial to promote gravel

extraction in this situation to help reduce the risk of flooding and erosion resulting from aggradation.

### **3.3 Environmental effects of riverbed gravel extraction**

Where extraction involves the removal of significant volumes of gravel from riverbeds at a rate that exceeds the natural rate of supply, or where smaller volumes are extracted under inappropriate circumstances, there exists potential for environmental degradation. Although degradation is most likely to occur when extraction is carried out within the normally wetted area of the channel, adverse effects can also result from the over extraction of drybeaches.

#### **3.3.1 Adverse effects of gravel extraction on river morphology**

Riverbed gravel extraction has the potential to trigger bed degradation upstream and downstream of the extraction site by modifying the flow of water, the grade of the channel and reducing the natural supply of gravel to the downstream channel.

Degradation is often accompanied by lateral instability and changes in channel width, triggering bank erosion in formerly stable reaches.

#### **3.3.2 Adverse effects of gravel extraction on ecological values**

Riverbed gravel extraction in the wetted part of the channel can destroy inchannel fluvial features (riffles, pools) important for enhancing habitats and their diversity. Extraction can impact upon fish migration, potentially preventing access to spawning areas upstream of the extraction site.

Riverbed gravel extraction can further increase suspended sediment transport downstream, affecting benthic invertebrates and fish populations.

Inappropriate operation of equipment may result in the direct destruction of the river banks and beds, while discharges from equipment and refueling could contaminate water. These ecological effects can generally be avoided if extraction is limited to drybed beaches and managed appropriately.

#### **3.3.3 Beneficial effects of gravel extraction on river aggradation**

Erosion and flooding resulting from aggradation has the potential to impact on the operation and maintenance of public roading networks and other infrastructural utilities. In particular, the integrity of bridges, culverts, farm fences, buried pipelines and other structures in river channels or on land adjoining river channels can be undermined. The associated erosion and flooding may also impact on high value intensive agricultural production dominating the ring plain.

In some catchments the potential impacts of aggradation are significant (refer to Appendix I for case studies). Gravel extraction activities may therefore mitigate adverse effects arising from river channel aggradation. Removing gravel from an aggraded riverbed helps to increase water flow, decreasing the potential for erosion and overland flow.

## **4. Management issues associated with riverbed gravel extraction**

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This section outlines management issues considered in determining future directions for riverbed gravel extraction.

### **4.1 Regulating gravel extraction**

Regulation is designed to manage what type activities can be carried out, or alternatively the effects of activities. Riverbed gravel extraction is a regulated activity in the Freshwater Plan.

The current approach in the Freshwater Plan restricts extraction activities that can be carried out on the bed of a river, limiting opportunities to mitigate and avoid natural hazards. Issues with that approach primarily relate to restrictive conditions regarding permitted riverbed gravel extraction and the complete lack of provision for commercial extraction operations.

Through the review of the Freshwater Plan, there is an opportunity to amend policies and rules to promote a better balance between extraction and supply, allowing for the appropriate use of riverbed gravel whilst helping to maintain channel capacity and mitigate any potential for flooding and erosion. It is believed a more permissive approach to managing riverbed gravel extraction would provide the public with more freedom to consider extraction for a variety of purposes not feasible under the current rules.

Implementing a more permissive approach will still need to ensure gravel extraction activities avoid, remedy or mitigate adverse effects on freshwater resources while promoting an appropriate balance between extraction and supply. It is difficult to achieve this balance through regulation alone. Non regulatory methods such as advice and information are still important to support the application of rules and to ensure extractors are aware of the environmental risks associated with riverbed gravel extraction.

### **4.2 Restrictions under the Crown Minerals Act 1991**

While it is possible to adopt a more permissive approach in the Freshwater Plan to allow for more freedom in extracting gravel from riverbeds, any effect in regard to Crown owned minerals is likely to be constrained by what can be carried out under the CMA without a permit. It is possible, although unlikely, that despite a more permissive approach to permitted riverbed gravel extraction in the Freshwater Plan, potential extractors will still be discouraged if they are required to obtain a permit under the CMA.

Land ownership in and around water bodies is an important factor in determining whether proposed riverbed gravel extraction requires a permit subject to provisions of the CMA. Making this determination can be confusing and often incites much debate when a resource of value is in question. However, riverbed gravel resources in Taranaki are predominantly privately owned, meaning the potential for conflict or confusion is reduced.

### **4.3 Limited potential for commercial extraction**

Bedload gravels, as aggregate are a commodity of wide use and demand where they exist in larger volumes, are of good quality, suitable for processing to multiple uses and generally located closer to centres of demand. With a small number of notable exceptions, ring plain watercourses

radiating out from Egmont National Park passing through private property do not possess the attributes necessary to make commercial extraction financially viable.

The Freshwater Plan's prohibitive approach to commercial riverbed gravel extraction is therefore unnecessarily restrictive and may be impeding appropriate use and development, while also exacerbating adverse environmental effects associated with river aggradation.

Any changes to the Freshwater Plan allowing commercial riverbed gravel extraction in the region to be considered for resource consent, will need to ensure there is no repeat of the historic situation that occurred in localised parts of the Kapuni and Waiwhakaiho rivers, where extraction occurred at a rate greater than supply resulting in significant adverse environmental effects.

#### **4.4 Riverbed gravel extraction for river and flood control purposes**

Physically intervening and modifying the flow of a river is reserved for situations outside of the Egmont National Park boundary, where work can be justified as practical, affordable and necessary. Situations where assets of value are at risk of damage resulting from erosion or flooding generally trigger a response by the Council or private land owners to initiate river or flood control work.

Extracting gravel and relocating it outside of the channel from which it was extracted is rarely carried out for river and flood control purposes in Taranaki due to the significant cost of transporting large amounts of gravel. The extraction and placement of gravel within a channel for river and flood control purposes is much more common. This process of shifting gravel on a riverbed can help increase waterflow in a concentrated channel.

In total five resource consents have been issued under Rule 72, all of which have been for river management and flood control works. Under Rule 71 the Council has undertaken selected channel management works directly and also by contribution to works for flood damage restoration and river and flood control purposes. The more significant Council directed projects include:

- Stony River - channel training adjacent to the Blue Rata Reserve and in the vicinity of SH 45
- Kaihihi Stream - channel clearing and training adjacent Okato township
- Mangatete Stream - channel clearing in the vicinity of Saunders Road
- Waiaua River - channel training upstream of SH 45
- Waiwhakaiho River - channel training in the upper reaches adjacent to Alfred Road.

#### **4.5 Advice, guidelines and monitoring**

The restrictive and in some cases prohibitive approach adopted in the Freshwater Plan means there is currently a lack of policy support for non regulatory methods of managing riverbed gravel extraction that differ from physical intervention. Consequently, 'Methods of Implementation' in the Freshwater Plan that relate to advice, guidelines and monitoring fail to identify riverbed gravel extraction as a point of interest, meaning there is a lack of information available to the public that relates to best practice on riverbed gravel extraction. Information must instead be sought directly from Council staff that have expertise in this area.

## 5. Future directions for the management of riverbed gravel extraction in Taranaki

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This section sets out policy options relating to the future management of riverbed gravel extraction in the region, including draft policies, methods and rules to be considered for inclusion in a Proposed Freshwater Plan.

### 5.1 Desired outcomes

Subject to the outcomes of public consultation associated with the review of the Freshwater Plan, the desired outcomes sought from any future changes to riverbed gravel extraction is as follows:

*The best practicable option is adopted that allows for the appropriate use and development of riverbed gravel resources while avoiding, mitigating and remedying adverse environmental effects associated with riverbed gravel extraction.*

### 5.2 Policy options

There are essentially two broad policy responses to be considered when reviewing the Freshwater Plan. They are:

- *Option 1: status quo* – this option would retain current Freshwater Plan policies and rules that unnecessarily restrict appropriate use and development of gravel. This option accepts an increased risk of flooding and erosion and the associated loss of land, instream and stream bank habitat, riparian vegetation, regional assets and possibly human life. The risk associated with doing nothing may be too great and the consequences too severe to implement such a philosophy.
- *Option 2: Amend relevant sections in the Freshwater Plan to allow and promote appropriate riverbed gravel extraction* – this option, which is the preferred alternative, involves relatively minor amendments to the Freshwater Plan to adopt a more permissive approach for riverbed gravel extraction when the size and scale of that activity will have less than minor adverse effects. This option gives effect to the Act by better addressing the potential for natural hazards while achieving integrated management of natural and physical resources.

### 5.3 Evaluation of alternatives

In determining an appropriate approach to adopt in regard to riverbed gravel extraction, it is important to assess the relative costs and benefits of adopting each approach. Table 1 overleaf presents an analysis of the costs and benefits of two options available to the Council to manage riverbed gravel extraction.

**Table 1:** Evaluation of the alternatives

<b>Outcomes sought:</b>		1. The best practicable option is adopted that allows for the appropriate use and development of riverbed gravel resources while avoiding, mitigating and remedying adverse environmental effects associated with riverbed gravel extraction.			
Option		Increased environmental outcomes	Flexibility for resource users	Least cost	Conclusion
1	Status quo – with rules restricting/limiting riverbed gravel extraction.	X	X	√	Option 2 is the preferred alternative for adoption into the Freshwater Plan. Option 2 gives effect to the Act, addressing the potential for natural hazards while achieving integrated management of natural and physical resources.
2	Amend relevant sections in the Freshwater Plan to promote appropriate riverbed gravel extraction.	√	√	√	
<b>Matters for consideration:</b>		<ul style="list-style-type: none"> <li>• The current Freshwater Plan adopts an unnecessarily restrictive approach to managing riverbed gravel extraction, limiting appropriate use and development of riverbed gravel resources.</li> <li>• Extracting gravel can result in significant adverse environmental effects</li> <li>• Extracting gravel from an aggraded riverbed can help maintain channel capacity, avoiding, remedying and mitigating flooding and erosion.</li> <li>• Aggradation is a natural process and despite there being a documented relationship between riverbed gravel extraction and aggradation, the extent to which aggradation can be controlled through regulating riverbed gravel extraction is limited.</li> <li>• River channel aggradation can result in flooding and erosion, damaging capital assets and pastoral land.</li> <li>• There are number of options outside the Resource Management Act for the management of aggrading river channels and these have been identified in the report <i>Aggradation in rivers and streams of the Taranaki Ring Plain</i> (2011).</li> </ul>			

## 5.4 Recommended amendments to the Freshwater Plan

It is proposed that the Freshwater Plan be amended to permit increased volumes of gravel to be extracted from riverbeds and a more permissive approach be promoted in regard to the purpose of extraction. This approach seeks to encourage appropriate use of riverbed gravel. It is important to recognise that proposed amendments are not prioritising riverbed gravel extraction, but helping to promote a balance between the natural rate of supply and extraction. To ensure consistency is maintained throughout the Freshwater Plan, any amendment to rules that promote a new policy direction must be reflected in issues, objectives, policies and methods.

### 5.4.1 Amend description of the issues

#### Recommendation

It is recommended that Issue 6.6 regarding the use and disturbance to river and lake beds be amended to read (proposed changes are highlighted in italics):

Issue 6.6 Adverse effects on the environment from uses of river and lake beds

Certain uses of river and lake beds can protect water quality and provide other positive environmental effects. For example, culverts and other access structures can avoid the direct passage of vehicles or stock through a river and thereby avoid regular bed disturbance and the discharge of animal wastes to water. *Riverbed gravel extraction can offset the process of aggradation reducing the risk of flooding and erosion, while river and flood control works protect land and property from the adverse effects of flooding and erosion.* However, the construction and positioning of structures *and the methods used to extract gravel* need to be carefully planned so as to ensure that adverse effects are avoided, remedied or mitigated.

**Explanation**

Riverbed gravel extraction is not identified in the Freshwater Plan as an activity with the potential to effect river and lake beds. The proposed changes will highlight the positive effects of gravel extraction to offset river aggradation and the potential to avoid, remedy and mitigate associated erosion and flooding.

**5.4.2 Amend definition of terms**

**Recommendation**

It is recommended that the revised Plan includes a definition for aggradation in ‘Section 2’ (Definitions) that reads as follows:

*“.... **Aggradation** means the process through which the bed of a river rises by the natural deposition of riverbed material”*

**Explanation**

As noted in section 5.4.1 above, it is proposed to identify the positive effects of gravel extraction to offset river aggradation in the Freshwater Plan. Accordingly, a definition of that term is considered appropriate to allow for the easy interpretation of the Freshwater Plan.

**5.4.3 Objectives and policies**

**Recommendations**

No changes are proposed to objectives in the Freshwater Plan relating to the use of river and lake beds.

It is recommended that Policy 6.6.5 of the Freshwater Plan be amended to underpin a more permissive approach to managing riverbed gravel extraction. Policy 6.6.5 will be amended to read:

POL 6.6.5      The Taranaki Regional Council will provide for gravel extraction from river and lake beds while avoiding, remedying and mitigating associated adverse environmental effects.

Explanation      The Taranaki Regional Council will manage riverbed gravel extraction to:  
(a) allow for the appropriate use and development of riverbed gravel resources.  
(b) sustainably manage and safeguard assets from flooding and bank erosion.  
(c) minimise bank erosion, bed instability and risks from flooding.  
(d) ensure that any adverse effects on aquatic ecosystems are avoided where practicable or otherwise mitigated and remedied.

**Explanation**

Currently Policy 6.6.5 prohibits riverbed gravel extraction unless it is for the purpose of meeting reasonable domestic on-farm needs, avoiding, remedying or mitigating the adverse effects of



flooding and erosion or as necessary for the placement and maintenance of structures. This report considers this to set an inappropriate policy direction, placing an unnecessary emphasis on restriction. The amended policy will provide support for a more permissive approach to managing riverbed gravel extraction in Taranaki.

**5.4.4 Amend Methods of Implementation**

**Recommendation**

It is recommended that methods in the Freshwater Plan be amended to recognise best practice for riverbed gravel extraction. Methods of implementation will relate to the provision of advice, information and technical assistance, the preparation of guidelines and the monitoring and gathering of information.

**Explanation**

Currently there is a lack of information available to the public that relates to best practice on riverbed gravel extraction. Regulation needs to be supported by good advice and information promoting best practice that is easily accessible to the wider public and resource users. It is likely a single list of methods of implementation will be adopted that can be applied broadly to issues in the revised Freshwater Plan.

**5.4.5 Amend regional rules**

**Recommendation**

It is recommended that rules 70-72 of the Freshwater Plan be amended and Rule 73 be removed. Proposed amendments to rules 70-72 can be seen below (proposed changes are highlighted in italics).

Rule 70	<i>Extraction of sand or gravel from the bed of a river</i>
Classification – Permitted	
Standards, terms and conditions	
<ul style="list-style-type: none"> <li>• <i>The entitlement to extract sand or gravel up to a volume of 50m<sup>3</sup>/yr per property is limited to the occupier or those acting on behalf of the occupier of the property adjoining the riverbed from which the gravel or sand is to be extracted;</i></li> <li>• Disturbance of the bed shall be the minimum necessary to carry out the required works;</li> <li>• Sand or gravel is extracted from an area of the river bed not covered by water at the time of extraction;</li> <li>• <i>Any extraction of sand or gravel in a river channel commences at the edge of the flowing water and moves progressively towards the bank across the drybed beach of the river channel;</i></li> <li>• <i>The area from which sand or gravel is extracted is left with a natural beach contour rising gently from the river edge to the channel banks. No mounds or depressions shall remain on the beach following completion of the extraction;</i></li> <li>• Between 1 may and 31 October there shall be no disturbance of any part of the bed covered by water;</li> <li>• <i>Machinery used to excavate gravel shall not operate on the parts of the river bed that are covered by water;</i></li> <li>• <i>The extraction shall not cause erosion or instability to the banks or bed of a river;</i></li> <li>• <i>The activity shall not result in any damage to or destruction of any archaeological, historic, or waahi tapu site listed in Appendixes XYZ and XYZ;</i></li> <li>• <i>The activity shall immediately cease should any archaeological or historic site be discovered as a result of the activity, until any necessary authorisation is received under the Historic Places Act 1993.</i></li> </ul>	

Rule 71      *Extraction of sand, gravel, aggregate or rocks from a river or lake bed and where necessary its placement on a river or lake bed for river and flood control purposes carried out by or on behalf of the Taranaki Regional Council.*

Classification – Permitted

Standards, terms and conditions

- *An officer from the Taranaki Regional Council will oversee works associated with the extraction and placement of sand, gravel, aggregate or rocks;*
- *Sand or gravel is extracted from the area of a river or lake bed not covered by water at the time of extraction;*
- *Any extraction of sand or gravel from a river or lake bed commences at the edge of the main body of water and moves progressively towards the bank across the drybed beach;*
- *The area from which sand or gravel is extracted is left with a natural beach contour rising gently from the waters edge to the banks of the water body. No mounds or depressions shall remain on the beach following completion of the extraction;*
- *Between 1 May and 31 October there shall be no disturbance of any part of the bed covered by water;*
- *Extraction or placement must not restrict the passage of fish;*
- *Sediment disturbance shall not conspicuously change the visual clarity of water beyond a zone of reasonable mixing;*
- *Disturbance of the bed shall be the minimum necessary to carry out the required works;*
- *The extraction shall not cause erosion or instability to the banks or bed of a river or lake;*
- *The extraction or placement of gravel shall not obstruct the free flow of water in such a manner that it results in a blockage, the flooding of a river or erosion of the banks of any water body;*
- *The activity shall not result in any damage to or destruction of any archaeological, historic, or waahi tapu site listed in Appendixes XYZ and Xyz;*
- *The activity shall immediately cease should any archaeological or historic site be discovered as a result of the activity, until any necessary authorisation is received under the Historic Places Act 1993.*

Rule 72      *Extraction of sand, gravel, aggregate or rocks from the bed of a river or lake that does not comply with the standards, terms and conditions in Rules 70 and 71.*

Classification - Discretionary

### **Explanation**

Currently the Freshwater Plan restricts permitted riverbed gravel extraction to a volume not exceeding 15m<sup>3</sup>/yr and for private use on the property from which it is extracted. These conditions unnecessarily restrict the use of riverbed gravel.

It is proposed that Rule 70 is amended to permit riverbed gravel extraction up to 50m<sup>3</sup>/yr and restrictions regarding purpose be removed to allow for extracted material to be transported and utilised on property away from the site of extraction. The right to extract gravel from a riverbed under Rule 70 should be limited to the occupier of land adjoining the riverbed from which gravel is extracted or those acting on behalf of the occupier.

A number of additional conditions have been proposed to ensure extraction is carried out appropriately, outlining the extractor's responsibilities before, during and after the extraction process. The following table outlines these conditions and provides a basis for their inclusion into the Freshwater Plan.

<b>Additional conditions proposed for Rule 70</b>	<b>Basis for inclusion in the Freshwater Plan</b>
Any extraction of sand or gravel in a river channel commences at the edge of the flowing water and moves progressively towards the bank across the drybed beach of the river channel.	Ensures the excavation process is carried out with the least possible impact on the riverbed from which gravel is extracted.
The area from which sand or gravel is extracted is left with a natural beach contour rising gently from the river edge to the channel banks. No mounds or depressions shall remain on the beach following completion of the extraction.	Ensures that extractors continue to act responsibly after the desired volume of gravel is removed, avoiding any adverse environmental effects resulting from unnatural riverbed morphology.
Machinery used to excavate gravel shall not operate on the parts of the riverbed that are covered by water.	Despite restricting extraction to the drybed beach of the river, it is considered appropriate to exclude the operation of diggers or any other piece of machinery used to excavate gravel from the wetted part of the channel.
The extraction shall not cause erosion or instability to the banks or bed of a river.	Protects against the potential for extraction to result in the erosion or instability of the bed or banks of a river.
The activity shall not result in any damage to or destruction of any archaeological, historic, or waahi tapu site listed in Appendixes XYZ and XYZ.	Protects against the potential for extraction to result in any damage to archaeological, historic, or waahi tapu sites identified to be of regional importance.
The activity shall immediately cease should any archaeological or historic site be discovered as a result of the activity, until any necessary authorisation is received under the Historic Places Act 1993.	In the event that a archaeological or historic site is discovered, operations must cease and any necessary authorisation must be obtained to ensure no further damage occurs.

It is proposed that Rule 71 remains a permitted activity with additional conditions to ensure that river and flood control work carried out by on or behalf of the Taranaki Regional Council will not result in adverse environmental effects. Additional conditions proposed for Rule 71 include those described above in relation to Rule 70, broadened to provide for extraction on a lake bed, with a number of other supplementary conditions that provide for the increased risk of extracting larger volumes of gravel.

It is considered inappropriate to permit the extraction and placement of sand, gravel, aggregate or rocks in the wetted channel of the riverbed, accordingly, it is proposed extraction activities for river and flood control works be limited to the drybed beach of the riverbed. Conditions also seek to ensure fish passage is maintained and any potential for a blockage to result in flooding and erosion is avoided.

A number of conditions that currently apply to Rules 70 and 71 have been retained. It is considered appropriate that there shall be no disturbance of any part of the riverbed covered by water between 1 May and 31 October. Although extraction is limited to the drybed beach of the river, disturbance encompasses a broad range of activities and associated effects. Importantly the relevant condition protects against any potential vehicle movements or unforeseen circumstances in which the wetted part of the bed could be disturbed during a period when there is a high probability the channel is occupied by fish. Other conditions retained ensure extraction is carried out with the minimal necessary disturbance required to carry out the works and that sediment disturbance shall not conspicuously change the visual clarity of water beyond a zone of reasonable mixing.

Existing conditions should be deleted where they are difficult to interpret and apply or are inconsistent with the more permissive approach to managing gravel extraction this report seeks to promote. Currently as a condition of Rule 71 there shall be no significant adverse effects on aquatic life or instream habitat. This condition has proved to be difficult and impractical to apply when processing consents, for this reason, it is proposed that it be removed. Other conditions will help ensure that adverse effects on aquatic life are minimised.

Rule 71 also requires that the Council will be informed that works involving gravel extraction for river and flood control purposes are going to occur at least two working days prior to the commencement of works. While notification of the commencement of works is considered necessary, its inclusion in the Freshwater Plan is not, instead notification should be noted as correct Council procedure. To ensure work is carried out appropriately, it is proposed that this condition is replaced with a one that requires an officer from the Council to oversee any works associated with the extraction and placement of sand, gravel, aggregate or rocks for river and flood control purposes.

It is proposed that Rule 72 be amended and simplified to allow applications for activities that do not meet the standards, terms and conditions of Rules 70 or 71 to be considered by the Council as a discretionary activity. Rule 73 is too restrictive and should be deleted.

## 6. Summary and conclusion

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When the Freshwater Plan was originally adopted it applied a cautionary approach to riverbed gravel extraction based on the past localised extraction from some rivers in the region at a rate greater than the natural rate of supply.

Since 2001, Council studies and experiences have demonstrated that this cautionary approach, together with natural events in the upper reaches of streams flowing from Mt Taranaki, have resulted in the aggradation of river channels, which, in turn, is accelerating erosion, increasing the incidence of flooding and threatening instream and river bank infrastructure.

The aggradation of river channels in Taranaki is clearly an issue of concern. However, it is a natural process and there is little in a regulatory sense that can be done to address the issue. Nevertheless, through the review of the Freshwater Plan, there is an opportunity to review and, if necessary, amend the Plan to improve its efficiency and effectiveness.

This report recommends that relevant sections in the Freshwater Plan be amended to promote appropriate riverbed gravel extraction. The amendments sought are relatively minor but do involve the adoption of a more permissive approach for gravel extraction when the size and scale of that activity will have less than minor adverse effects. In particular, the proposed amendments outlined in Section 5.4 of this report would permit increased volumes of gravel to be extracted from riverbeds and a more permissive approach be promoted in regard to the purpose of extraction. This approach seeks to encourage riverbed gravel extraction in an effort to arrest the natural process of aggradation, helping to avoid, remedy and mitigate natural hazards.

It is important to recognise that proposed amendments are not prioritising riverbed gravel extraction, but aim to promote a better balance between the natural rate of supply and extraction. The Council is satisfied that through the changes proposed in this report, Taranaki will be promoting a more efficient and effective management response for riverbed gravel extraction.

## References

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Betts H, Neall V, Proctor J., 2010. Erosion Monitoring in the upper Stony River catchment, Egmont National Park Taranaki. Report to the Taranaki Regional Council.

Kelly, D., Mckerchar, A., Hicks, M., 2005. *Making concrete: Ecological impacts of gravel extraction in New Zealand rivers*, Water and Atmosphere, 13, 1.

Ministry of Economic Development, 1991. *Crown Minerals Act*, Wellington, New Zealand.

Ministry for the Environment, 1991. *Resource Management Act*, Wellington, New Zealand.

Ministry for the Environment, 2011. *National Policy Statement Freshwater Management 2011*, Wellington, New Zealand.

Surian, N., Wyzga, B., Rinaldi, M., 2005. *Sediment mining in the alluvial channels: Physical effects and management perspectives*, River Research and applications, 21.

Taranaki Regional Council, 2008. *Effectiveness and efficiency of the Regional Fresh Water Plan for Taranaki*, June 2008.

Taranaki Regional Council, 2001. *Regional Fresh Water Plan for Taranaki*. October 2001. 299p.

Taranaki Regional Council, 2011. *Regional Policy Statement for Taranaki*. July 2011.

Taranaki Regional Council, 2011. *Aggradation in rivers and streams of the Taranaki Ring Plain*. July 2011.

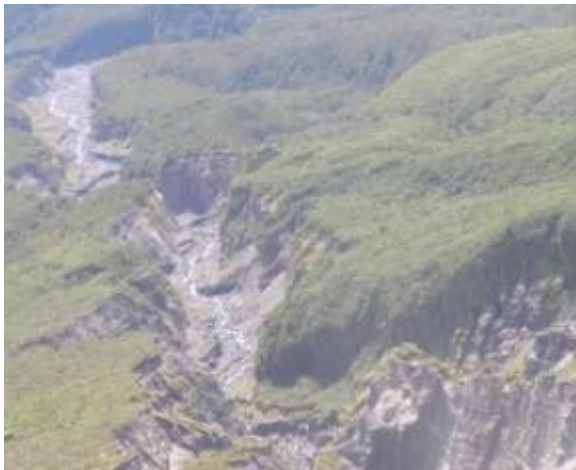
## **Appendix I: Case studies demonstrating examples of aggradation**

### **Environmental effects of riverbed aggradation – case studies**

There are a number of rivers in Taranaki where aggradation is promoting erosion and increasing the potential for flooding. However, two rivers in particular demonstrate the environmental effects of river aggradation.

The Mangatete Stream channel, between its confluence upstream to about Saunders Road, has very high volumes of gravel bedload mobilised during flood events. The mobilised bedloads significantly restrict channel capacity and discharges into the Kaihihi Stream. Bedload added to the Kaihihi Stream impacts on channel efficiency, which has led to flooding and erosion upstream and downstream of State Highway 45.

The Stony (Hangatahua) River is the most extreme example of a catchment experiencing severe, and apparently worsening erosion in its headwaters, presenting consequent aggradation problems to farming and infrastructure on the Taranaki ring plain. This resulted from accelerated erosion and expansion of the large gully system in the Pyramid Stream sub-catchment, which dumped approximately 14.3 million cubic metres of debris into the channel system between 1995 and 2007, consequently promoting the aggradation of the Stony River.



**Photo 1** Pyramid Stream. Erosion in upper catchment which discharges into Stony River within Egmont National Park



**Photo 2** Stony River – combined effects of deposition and erosion



## **Appendix II: Proposed rules**

## Other uses of river and lake beds (continued)

Activity	rule	standards/terms/conditions	classification	notification	Control/discretion	Policy reference
Extraction of sand and gravel from the bed of a river.	70	<ul style="list-style-type: none"> <li>• <i>The entitlement to extract sand or gravel up to a volume of 50m<sup>3</sup>/yr per property is limited to the occupier or those acting on behalf of the occupier of the property adjoining the riverbed from which the gravel or sand is to be extracted;</i></li> <li>• <i>Disturbance of the bed shall be the minimum necessary to carry out the required works;</i></li> <li>• <i>Sand or gravel is extracted from an area of the river bed not covered by water at the time of extraction;</i></li> <li>• <i>Any extraction of sand or gravel in a river channel commences at the edge of the flowing water and moves progressively towards the bank across the drybed beach of the river channel;</i></li> <li>• <i>The area from which sand or gravel is extracted is left with a natural beach contour rising gently from the river edge to the channel banks. No mounds or depressions shall remain on the beach following completion of the extraction;</i></li> <li>• <i>Between 1 may and 31 October there shall be no disturbance of any part of the bed covered by water;</i></li> <li>• <i>Machinery used to excavate gravel shall not operate on the parts of the river bed that are covered by water;</i></li> <li>• <i>The extraction shall not cause erosion or instability to the banks or bed of a river;</i></li> <li>• <i>The activity shall not result in any damage to or destruction of any archaeological, historic, or waahi tapu site listed in Appendixes XYZ and XYZ;</i></li> <li>• <i>The activity shall immediately cease should any archaeological or historic site be discovered as a result of the activity, until any necessary authorisation is received under the Historic Places Act 1993.</i></li> </ul>	Permitted			

Activity	rule	standards/terms/conditions	classification	notification	Control/discretion	Policy reference
Extraction of sand, gravel, aggregate or rocks from a river or lake bed and where necessary it's placement on a river or lake bed for river and flood control purposes carried out by or on behalf of the Taranaki Regional Council.	71	<ul style="list-style-type: none"> <li>• An officer from the Taranaki Regional Council will oversee works associated with the extraction and placement of sand, gravel, aggregate or rocks;</li> <li>• Sand or gravel is extracted from the area of a river or lake bed not covered by water at the time of extraction;</li> <li>• Any extraction of sand or gravel from a river or lake bed commences at the edge of the main body of water and moves progressively towards the bank across the drybed beach;</li> <li>• The area from which sand or gravel is extracted is left with a natural beach contour rising gently from the waters edge to the banks of the water body. No mounds or depressions shall remain on the beach following completion of the extraction;</li> <li>• Between 1 may and 31 October there shall be no disturbance of any part of the bed covered by water;</li> <li>• Extraction or placement must not restrict the passage of fish;</li> <li>• Sediment disturbance shall not conspicuously change the visual clarity of water beyond a zone of reasonable mixing;</li> <li>• Disturbance of the bed shall be the minimum necessary to carry out the required works;</li> <li>• The extraction shall not cause erosion or instability to the banks or bed of a river or lake;</li> <li>• The extraction or placement of gravel shall not obstruct the free flow of water in such a manner that it results in a blockage, the flooding of a river or erosion of the banks of any water body;</li> <li>• The activity shall not result in any damage to or destruction of any archaeological, historic, or waahi tapu site listed in Appendixes XYZ and Xyz;</li> <li>• The activity shall immediately cease should any archaeological or historic site be discovered as a result of the activity, until any necessary authorisation is received under the Historic Places Act 1993.</li> </ul>	Permitted			
Extraction of sand, gravel, aggregate or rocks from the bed of a river or lake that does not comply with the standards, terms and conditions in Rules 70 and 71.	72		Discretionary			
Extraction of sand gravel, aggregate or rocks from the bed of a river for purposes other than those specified in Rules 70 and 71	73		Prohibited			

