BAY OF PLENTY REGIONAL COUNCIL
TOI MOANA

River Gravel Management Guidelines

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Contents

Introduction

Gravel has been removed from rivers in the Bay of Plenty for over 70 years and is an important operational tool in managing flood risk. The extraction of excess river gravel helps maintain the capacity of river channels for flood flows and preserves the integrity of major flood control schemes in the region, such as the Rangitāiki-Tarawera, Whakatāne-Tauranga, and Waioeka-Otara river schemes.

Without well managed and targeted gravel removal, riverbeds can aggrade to the point where critical community assets such as roads and bridges are unnecessarily damaged due to increased erosion pressures caused by loss of channel capacity. Flood protection assets such as stopbanks and erosion protection structures may be similarly threatened or damaged, resulting in undue risk to the community and increased costs for ratepayers in maintaining flood defences. Productive agricultural and horticultural land that supports our region's economy can be flooded causing loss of productivity and damage to property.

Additionally, the sand and shingle components of gravel serve as valuable resources for construction and road aggregate materials. In areas where riverbeds are accumulating and sediment and gravel removal is needed, it benefits both the Bay of Plenty Regional Council (BOPRC) and gravel users.

At times, gravel removal may be required even when there is limited demand for the material. Conversely, in cases where riverbeds are eroding, gravel removal becomes undesirable. Enabling and sustaining gravel demand is important, however, priority is given to the management of the river system in a way that seeks to maintain natural processes and gravel beds at desirable levels.

This guideline document provides information on the obligations of, and requirements for, people undertaking gravel removal in the Bay of Plenty. The guidelines set out measures which ensure that the potential effects of gravel extraction activities on natural, cultural and recreational values are preferably managed in accordance with the effects management hierarchy.

Purpose of the guidelines

The purpose of these guidelines is to support the sustainable management of river gravel extraction for natural hazard management purposes. The guidelines support community safety, well-being, and sustainable economic development while upholding cultural, social, and environmental outcomes and values. They provide reference material on gravel management that can be used for education, regulation, and environmental improvement.

The guidelines are intended to complement the regulatory controls contained in regional plans and provide gravel excavators with best practice measures for planning and undertaking gravel extraction activities to minimise adverse environmental effects.

The guidelines:

- Outline the reasons for, and principles of, well managed gravel excavation.
- Provide information on gravel sources and processes, and the effects that excavating gravel has on these.
- Detail the statutory and administrative framework for gravel management in the Bay of Plenty.
- Outline data collection and survey methods used to monitor, and consequently understand, the movement of gravel down rivers, and the effects of excavation on rivers and the surrounding environment.

- Set out guiding principles and operating procedures to avoid, remedy or mitigate the adverse environmental effects of gravel excavation.

Scope of the guidelines

The guidelines are designed to address the extraction of gravel from the bed of rivers. Other activities involving the movement or redistribution of gravel within the beds of rivers and streams as part of river management activities (e.g. river channel management) are addressed through the Environmental Code of Practice for Rivers and Drainage Maintenance Activities.

The guidelines intentionally avoid specific discussion on the current rules applying to gravel extraction in district and regional plans as rules are subject to change. The Bay of Plenty Regional Natural Resources Plan (RNRP) is currently being amended to implement the National Policy Statement for Freshwater Management 2020 (NPSFM). These changes may impact on the rules, standards and conditions applying to gravel extraction activities. These guidelines are intended to sit alongside and complement the regulatory controls in regional and district plans including the requirements of the NPSFM.

These guidelines are informed by and align with national guidelines for works in waterways[1] produced by the Ministry for the Environment (MfE) and guidance prepared by BOPRC for activities in or near waterways, including the Environmental Code of Practice for Rivers and Drainage Activities.

[1] Ministry for the Environment. 2021. *National works in waterways guideline*. Prepared for the Ministry for the Environment by Boffa Miskell Limited. Wellington: Ministry for the Environment

Part 1:
River gravel extraction in the Bay of Plenty

1.1 What is gravel extraction?

For the purposes of this document, it is important to define gravel and distinguish gravel extraction from other river management activities undertaken by BOPRC. These river management activities include the removal of sediment and debris from rivers where they pose a natural hazard, which are subject to separate controls in the RNRP.

Gravel is not defined in the RNRP or the National Planning Standards, but for the purposes of these guidelines, the definition provided in the Regional River Gravel Management Plan has been adopted, as follows:

Gravel: *A collective term for the material in a bed of a river. It includes sand, silt, shingle, rocks and boulders.*

In the context of these guidelines, gravel extraction involves the excavation of gravel from riverbeds and removal from the river system. In most cases, extracted gravel is used as aggregate in roading or construction activities and may be stockpiled outside the river bed prior to removal for processing.

The bed of a river is defined[2] as the extent of the river at full flow without overtopping the banks and includes dry gravel beaches, which is where gravel extraction activities are primarily undertaken.

Other definitions relevant to gravel extraction activities are included at the end of this document.

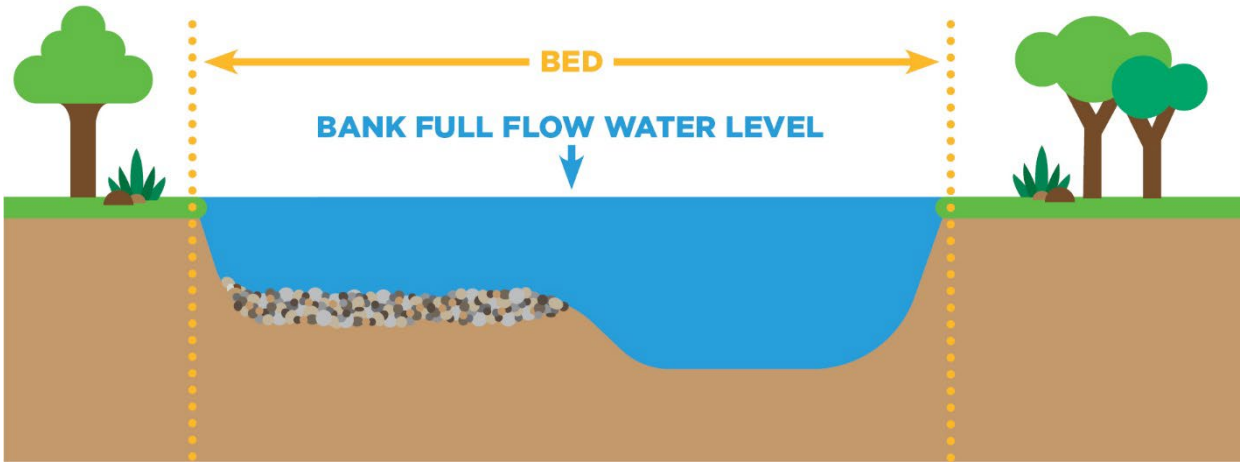


Figure 1 RNRP diagram illustrating definition of riverbed.

[2] Section 2 Resource Management Act 1991

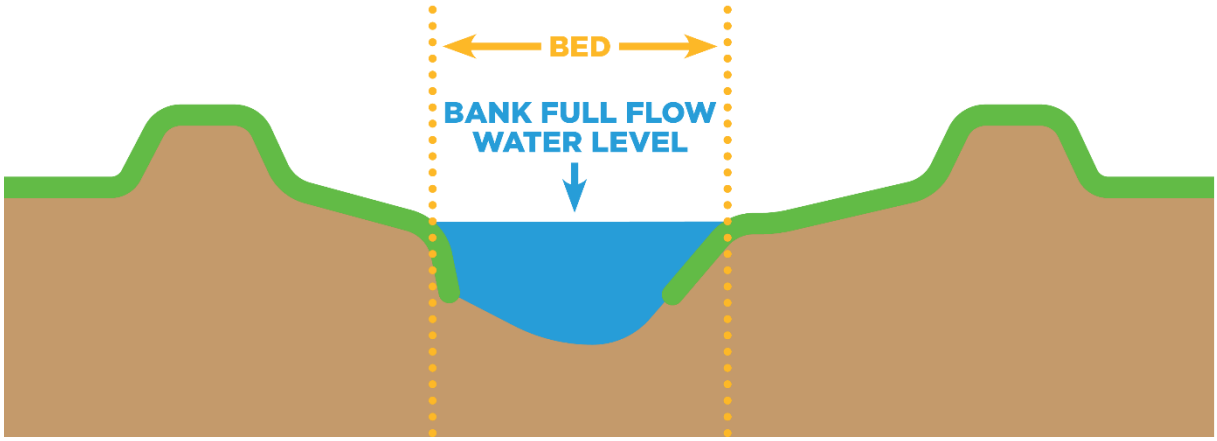


Figure 2 RNRP diagram illustrating definition of riverbed with stopbanks.

1.2 Gravel sources and processes

Rivers transport sediment (including gravel) that is produced by erosion in their catchments and channels. The amount of gravel entering a river system depends on river catchment factors such as area and topography, geology, climate, vegetative cover and land use.

The distance travelled by gravel within a river system before settling is influenced by the size of the particles and the speed of the water. Larger particles tend to settle in the riverbed when the river's slope decreases, particularly as it transitions from hilly areas to flatter plains. As the river's slope flattens, its velocity decreases, leading to the deposition of finer materials. Some of the gravel is carried all the way to the coast, contributing significant amounts of sand and silt that feeds the natural cycles of beach erosion and deposition. This interplay between particle size, water velocity, and geological processes shapes the distribution of gravel along the river and its supply to coastal areas.

During a flood, the dynamics of a river system change and gravel that has previously been deposited can be reworked from the riverbed or eroded from its banks and transported by floodwater further downstream. Typically, the transportation and deposition of gravel is a complex process and the riverbed itself acts as both a storage area and a supply source.

The deposition of gravel on the inside of river bends increases the erosion pressure on the outside of the river bends and this causes the river to gradually change course. Although these changes are negligible where rivers flow through hard rock, it is likely that there will be significant changes where rivers flow through alluvial deposits. As a result, in these areas the river course can change significantly with each flood event.

Excessive erosion in the catchment of a river can cause a cycle of riverbank erosion. This cycle will occur when natural gravel supply exceeds a river’s ability to transport it through the river system. Where a river is actively fed with material from erosion in its catchment the excessive supply of material will cause riverbanks to erode as typically water carrying sediment has greater erosive power than clean water. In this situation, the riverbed builds up with gravel deposits on river beaches leading to the formation of islands. This in turn forces the river water to flow towards the banks which increases bank erosion.

In other rivers, where erosion in the catchment is minimal, there is no measurable significant source of supply. The gravel that exists in the bed has either been there for a very long time or is being supplied from the bed and banks further upstream (i.e. from previous deposition).

When gravel is extracted from a riverbed, the river responds by attempting to restore its original slope by transporting gravel material. If sufficient material from the catchment is not supplied quickly enough, erosion of the upstream bed will occur. This, in turn, triggers bank erosion, which can extend upstream over considerable distances. Additionally, when the riverbed is lowered, the channel becomes capable of accommodating a larger volume of water compared to when the river is flowing bank full. The resulting increased energy will make downstream bank erosion more likely. Over time, a new state of equilibrium may be reached, with the bed returning to its original slope. However, during this process, the river channel itself may undergo significant changes. In cases where an insufficient supply of gravel is available from the catchment, equilibrium is likely to be restored through increased bank erosion, driven by heightened flow velocities.

In the Bay of Plenty there is a major division between sedimentary (greywacke) and volcanic (mainly ignimbrites) lithologies (*Figure 3*). This results in significantly different gravel regimes between the western and eastern parts of the region. Catchments in greywacke characteristically have steep slopes and erosion is predominantly debris avalanches, which supply relatively large sized rock material into watercourses. However, the structural characteristics of greywacke (its jointing and, where it was in the vicinity of a fault line, its crush fractures) means that the debris is easily broken into smaller material by water action. Thus, rivers draining greywacke usually have rock or shingle beds and carry a significant bedload of shingle, sand and silt.

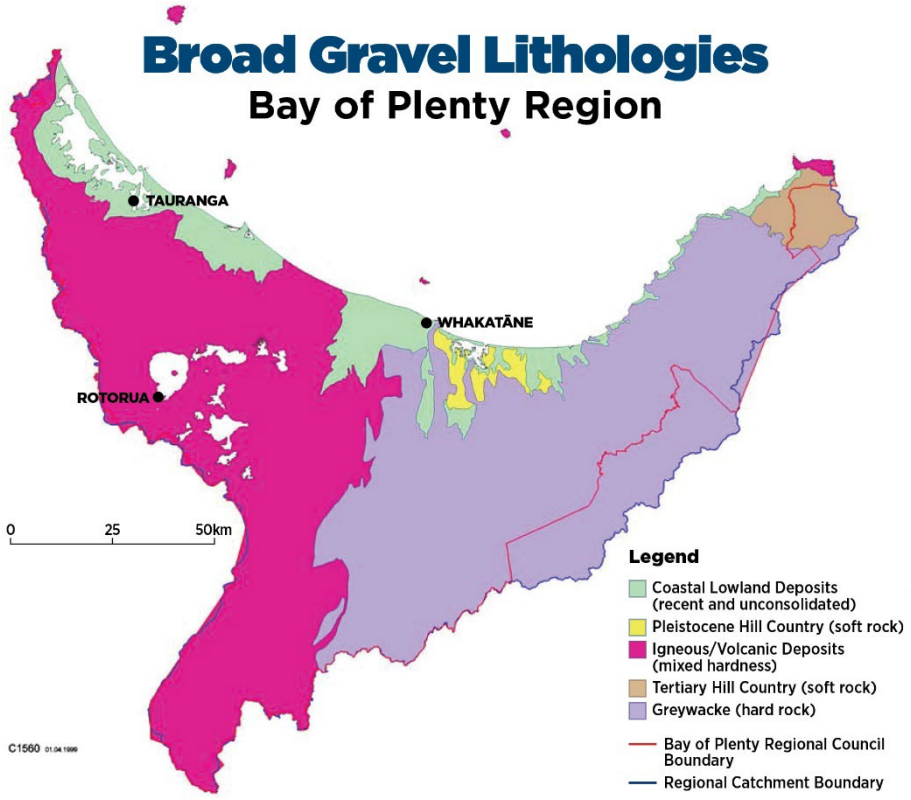


Figure 3 *Riverbed lithology within the Bay of Plenty.*

Catchments characterized by volcanic lithologies display distinct erosion characteristics. Despite frequently featuring steep slopes adjacent to watercourses, these slopes tend to remain relatively stable. In the event of erosion, it typically involves surface erosion of the upper layers of volcanic ashes, which primarily contribute sand-sized particles to the watercourses. As a result, rivers draining volcanic lithologies generally exhibit sandy riverbeds, with the bedload mainly comprising sand particles.

Human activities have had a notable impact on both the pace and significance of various river processes. One example is the alteration of erosion rates, often driven by a decrease in vegetation within catchments. Land clearance for pasture development, animal grazing, and trampling are common factors leading to reduced vegetative cover in river catchments. Additionally, animal pests contribute to the degradation of protective bush cover and hinder the revegetation of eroded areas.

Changes in the significance of river processes can also arise from developments alongside rivers, channelisation of riverbeds, and increased water usage for domestic and irrigation purposes. While rivers naturally undergo erosion and deposition, these processes become significant when they adversely affect human interests. Settlements and infrastructure located near river channels are particularly susceptible to the impacts of both natural and human-induced changes in river courses. It is crucial to maintain a stable pattern that preserves aquatic habitats and aligns with human values.

Vegetative cover within river channels may suffer depletion due to a cycle of stock grazing and gradual bank erosion, often referred to as "creeping bank erosion." During flood events, these sites become highly vulnerable to extensive bank erosion, leading to significant vegetation and land loss. This issue is particularly prevalent in the middle reaches of several major rivers within the region.

1.3 Coastal processes

Rivers supply significant volumes of sand and silt to the coast and these materials are important elements of the cycles of coastal erosion and deposition. Gravel excavation can affect the natural supply of river gravel to coastal beaches and a decrease in the supply of gravel may cause increased vulnerability to coastal erosion. The dynamics of particular coastal systems such as the existence of longshore drifts, mean that the effects of such interference may not necessarily show in the local environs.

Coastal dynamics are typically very complex and therefore take time to identify. This means that excavation levels established now may need to be reviewed in the light of future findings.

Flood control works on rivers such as stopbanking, prevent the normal deposition of gravel and the smaller-sized sands and silts. In this situation, gravel which in a natural river system would have been deposited over flood plains, may now be channelled down to the coast and into estuarine environments. For example, around 2 million cubic metres of sand and silt was transported through the Whakatāne River mouth during the floods of July 1998. This can have a beneficial effect providing a supply of sand to beaches and thus reducing coastal erosion.

1.4 Reasons for gravel extraction

Most of the river management challenges in the Bay of Plenty stem from two main issues: riverbed aggradation and riverbank erosion. These problems primarily affect the flood plains of the major river systems in the eastern region, leading to significant economic implications.

Riverbed aggradation happens when the amount of gravel entering a river surpasses the amount being lost from it. Although aggradation may occur in specific sections of a river, its consequences extend beyond those areas, causing instability and erosion along extended stretches of the riverbed, particularly on flood plains.

Any option for managing aggrading rivers must address one or more of the following aspects:

- Reducing gravel supply to the river.
- Relocating gravel from aggrading reaches to those parts of the river that are eroding or degrading.
- Controlling river location, flood flows and bank or bed erosion through the use of flood banks, protection structures and vegetative buffers.
- Increasing gravel transport through the river.
- Removing gravel directly from the river system.

Bay of Plenty Regional Council uses a combination of these methods to manage the region's rivers and gravel excavation is considered one of the most efficient approaches, offering substantial benefits at a reasonable cost.

Many lower sections of the rivers are protected by stopbanks, which not only serve as valuable investments but also safeguard essential assets such as energy and transportation routes, farms, marae, residences, and settlements. The integrity of these stopbanks relies on river channel changes being controlled within managed areas. Additionally, structures like bridges can face threats from bank erosion, weakening bridge abutments, and sediment build-up, reducing the waterway area beneath them. Both scenarios pose potential risks to these structures during floods.

Climatic cycles can also have a significant impact on river dynamics. Periods of adverse weather conditions, such as cyclones or storms, coupled with increased rainfall, can accelerate erosion and deposition rates within the river catchment and the river itself. These periods of inclement weather can persist for several years, with intermittent periods of relatively minor erosion and deposition. Major storms can continue to cause significant problems even years later.

These natural cycles and changes in river morphology, including shifts in the river's course and meander pattern, whether driven by natural processes, accelerated changes in the catchment, or human-induced channel modifications, are of utmost importance.

The significance of protecting private property, important infrastructure and productive land is a key reason for legislation that provide BOPRC's statutory function to manage rivers. Therefore, managing the course of a river within reasonable limits can be crucial in protecting private property, community infrastructure and valuable assets.

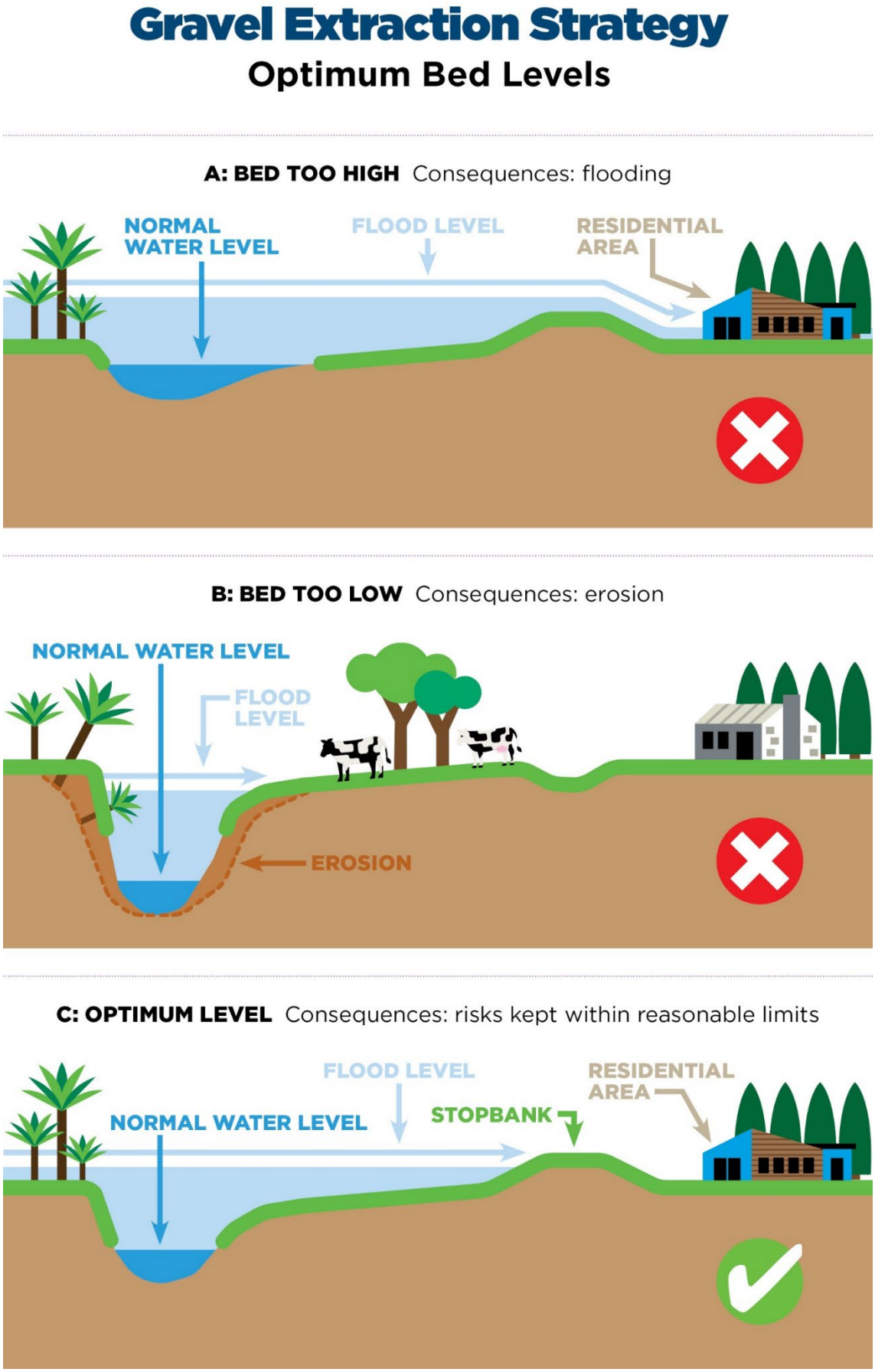


Figure 4 Gravel extraction strategy – optimum bed levels.

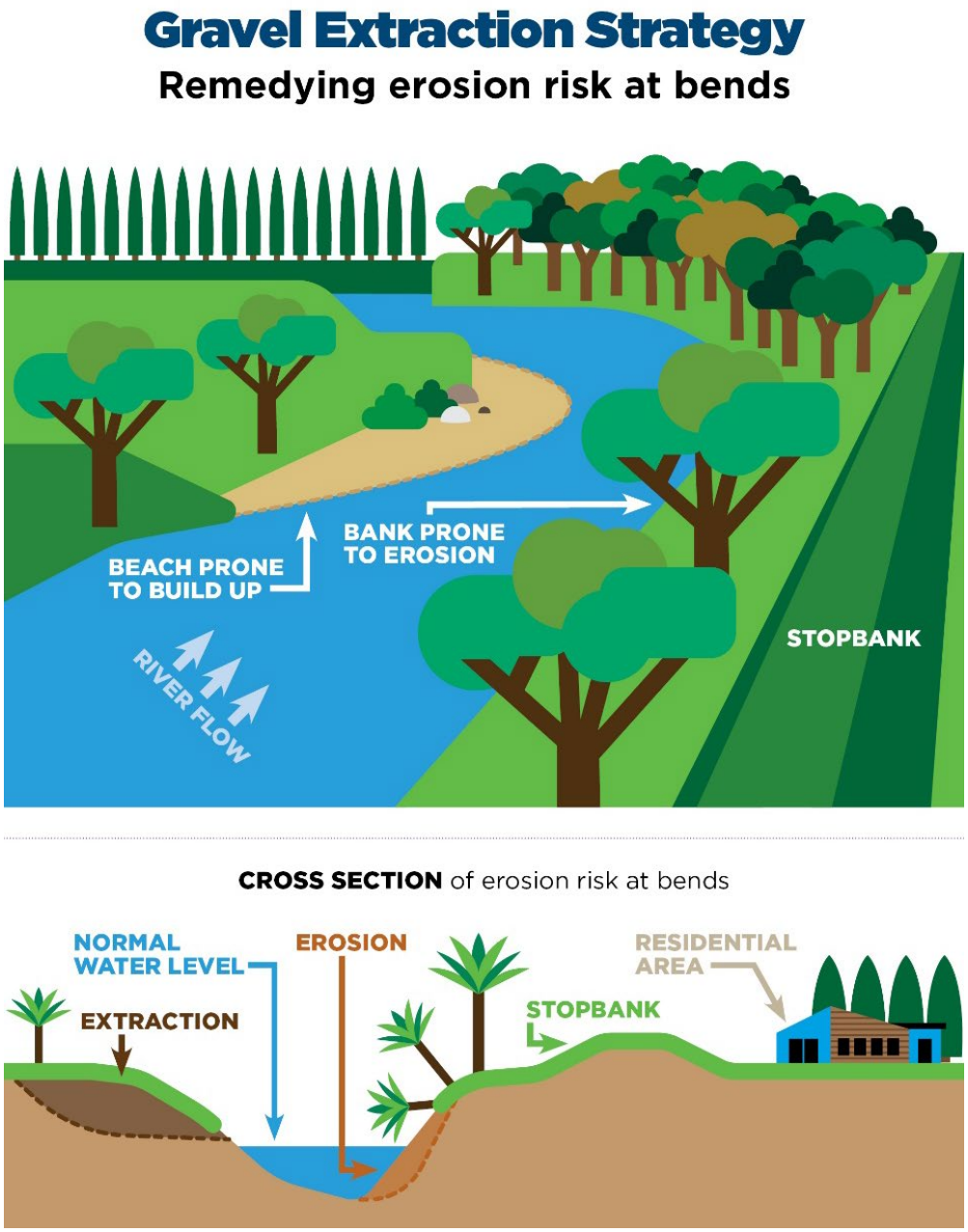


Figure 5 Gravel extraction strategy – remedying erosion risk at bends.

1.5 Use of gravel

The shingle and sand components of gravel hold significant commercial value, serving as essential industrial aggregates for construction and road development. Rivers serve as vital sources of these materials for aggregate supply firms, district councils for their own road construction needs, as well as large landholding entities such as forestry companies, which utilise gravel for their operations. Additionally, farmers often extract relatively smaller quantities of gravel for their specific requirements.

It is important to acknowledge that gravel excavation activities are influenced by factors such as access, demand, and economics. As a result, these operations typically concentrate on sites located in close proximity to markets and offering convenient access. The quality of gravel also plays a crucial role, with extractors prioritising the best available quality. Consequently, there can be a tendency for excessive excavation demand at specific locations rather than achieving more balanced extraction along the river or at actively aggrading sites. To address this concern, strict controls have been implemented

in the Bay of Plenty region to ensure that extraction remains within desirable limits (see sections 2.4 and 2.5).

Whenever possible, BOPRC leverages the commercial demand for gravel to facilitate the excavation of surplus gravel when desirable for river management. This is achieved by directing contractors in need of gravel to specific sites. However, if there is insufficient commercial demand due to quality or accessibility issues, BOPRC may need to undertake the gravel excavation itself, incurring additional costs to the river scheme and rate payers.

1.6 The extent of gravel extraction in the Bay of Plenty

Gravel extraction primarily takes place in the eastern Bay of Plenty, specifically from the Rangitāiki River east to the Raukōkore River, encompassing river systems that drain the greywacke ranges. The approval of sites for extraction is based on the need for its removal. While BOPRC holds various permissions to undertake gravel extraction, it generally does not engage in gravel extraction activities itself. Instead, commercial operators and district councils are allowed to carry out gravel extraction through an allocation process. Resource consents for gravel extraction may also be held by external parties if applications align with river management objectives.

Part 2:
Legislative framework for gravel management

Gravel management activities are regulated under several Acts, including the Soil Conservation and Rivers Control Act (1941), the Resource Management Act (1991) and the Crown Minerals Act (1990).

2.1 Soil Conservation and Rivers Control Act (SCRCA)

The purpose of the SCRCA is to provide for the conservation of soil resources, the prevention of damage by erosion and the protection of property from damage by floods. This includes a statutory function for BOPRC, as the successor of the Catchment Board, to "minimise and prevent damage within its district by floods and erosion" (s126(1)).

Section 126(2) of the SCRCA contains wide powers that allow Bay of Plenty Regional Council to, among other things, excavate gravel for the purpose of managing erosion, controlling the flow of water and preventing or lessening overflow of riverbanks. The major river control schemes in the Bay of Plenty were established under this section of the SCRCA, and gravel is excavated as one means of maintaining them.

It is noted that the SCRCA is subservient to the Resource Management Act 1991.

2.2 Resource Management Act (RMA)

The Resource Management Act 1991 is the principal statute governing the management of potential environmental effects of gravel excavation. Under this Act, regional councils are required to ensure the sustainable management of natural and physical resources (including existing flood control schemes), and particular functions to achieve integrated management, to control the use of land for the purpose of soil conservation, maintenance and enhancement of water quality and the avoidance or mitigation natural hazards (including flooding)[3].

In addition, all persons exercising functions and powers under the Act are required to recognise and provide for the management of significant risks from natural hazards as a matter of national importance[4].

There are a range of planning documents prepared under the RMA that are relevant to gravel management activities in the Bay of Plenty. The RMA establishes a hierarchy whereby regional plans must give effect to the Regional Policy Statement, which in turn must give effect to any national policy statements. A similar hierarchy applies to district plans which must give effect to any national policy statements or regional policy statements and cannot be inconsistent with any regional plans[5]. In addition to these planning documents, there are national environmental standards which impose regulations controlling activities affecting freshwater, including earthworks in or near inland wetlands.

[3] Sections 5 and 30

[4] Section 6(h)

[5] For matters of regional significance or matters which the regional council has primary responsibility

The planning documents relevant to gravel extraction activities are discussed in Appendix 1 of the guidelines.

2.3 Agency roles and responsibilities

Various central government departments and agencies have different degrees of involvement in gravel extraction depending upon their role as legislator, regulatory authority, land manager, affected party or end-user.

Department of Conservation (DOC)

The Department of Conservation has responsibilities under section 6 (a) and (b) of the Conservation Act 1987 and the Freshwater Fisheries Regulations 1983 that are of relevance to gravel extraction activities. These sections require DOC to preserve as far as practicable all indigenous freshwater fisheries, and to protect recreational fisheries and freshwater fish habitats.

Also of relevance to gravel extraction is DOC's responsibilities for the management of marginal strips, as set aside under section 24 of the Conservation Act. The Act establishes the purposes of these strips as including the maintenance of adjacent watercourses and water quality, the maintenance of aquatic life, protection of natural values and enabling public access and recreational use. The Act also advocates the protection of natural and historical resources.

The Department of Conservation has a role in the management of riverbeds through the Wildlife Act 1953 in relation to protected wildlife and a coastal management role under the RMA and the New Zealand Coastal Policy Statement (NZCPS).

District Councils

District councils are responsible for controlling activities on the surface of rivers. District councils also have responsibility for controlling the effects of activities taking place on land which may be associated with gravel excavation such as processing. These effects include for example, those relating to transport, noise, heritage (cultural and natural), dust, visual (landscape), amenity values, recreation and public access.

The principal district responsibilities that may be relevant to gravel excavation are:

<u>Activities on the surface of rivers</u>

Activities like jetboating can be affected by gravel excavation and can also have an impact on gravel excavation. Excavating gravel can lead to activities such as river diversions, vehicle crossings, or the creation of wide shallow water channels, which can have negative impacts on surface activities on rivers.

<u>Public access along rivers</u>

The provision of access along rivers is a matter of national importance and is a responsibility that applies equally to both regional and district councils. However, district councils, being the local authority governing land use, are better positioned to facilitate public access. Through their planning process, district councils could also be involved in making provision for areas for gravel stockpiles and processing.

Noise

It is mainly the duty of district councils to manage and mitigate noise emissions. The emission of noise can result from various activities related to gravel extraction such as processing sites, depots, and truck movements, not just the excavation process.

Infrastructure and utility requirements

District councils are responsible for providing and maintaining several (but not all) structures such as bridges and utilities (for example pipelines) across and along rivers. Although some river management, including gravel excavation, is undertaken to protect these assets, too much, too little, or inappropriate excavation can damage them.

District councils' control of the subdivision of land adjacent to rivers and inappropriate subdivision can also affect the future ability to provide machinery access for the construction and/or maintenance of flood protection works and gravel extraction activities. Additionally, increased housing adjacent to rivers can make managing bed levels through gravel extraction more critical given the higher potential consequence of flooding areas with infrastructure as opposed to open farmland.

Ministry of Business, Innovation and Employment (MBIE)

Where gravel is in riverbeds owned by the Crown, it is considered a Crown-owned mineral and is subject to the Crown Minerals Act 1991. However, the ownership of gravel in riverbeds with private titles can be more complicated. If the riverbed is in private ownership, the gravel may still be considered Crown-owned. In such cases, extraction rights to the gravel would be governed by the Crown Minerals Act and administered by the Ministry of Business, Innovation and Employment (MBIE).

The presumption of the Crown Minerals Act 1991 is that no person may prospect or explore for, or mine Crown owned minerals unless they hold a permit (s. 8(1)). However, in the case of natural materials in the beds of rivers, lakes or the coastal marine area, there are no restrictions within the Crown Minerals Act unless otherwise specified in a minerals programme. There is no specific Crown Minerals Programme for gravel under the Crown Minerals Act 1991.

Even if a Crown Minerals Programme was prepared for gravel, the environmental effects of gravel extraction would continue to be controlled through the Resource Management Act 1991 and regional plans.

Eastern Region Fish and Game Council

Fish and Game are responsible for managing and enhancing sport fish and game bird resources and for looking after the recreational interests of anglers and hunters. These responsibilities are relevant to gravel extraction because trout habitat (particularly food supply and spawning sites) and the angling experience can be adversely affected.

Heritage New Zealand

Heritage New Zealand is a Crown entity with a statutory responsibility under the Heritage New Zealand Pouhere Taonga Act 2014 to promote the identification, protection, preservation, and conservation of New Zealand's cultural and heritage resources. This includes historic places, historic areas, wāhi tapu (sacred places), and other taonga (treasures) that have significance to New Zealand's history and cultural heritage. It is illegal for anyone to destroy, damage, or modify any archaeological site without prior authority from Heritage New Zealand. Rivers were the foci of many historic settlements and transport routes. Therefore, rivers are likely to have historic places in their vicinities,

which may be at risk from gravel excavation or associated activities such as building access roads.

2.4 Determining the need for gravel extraction

Optimal management of gravel in riverbeds requires a comprehensive understanding of the movement of gravel down rivers. To achieve this, BOPRC uses various methods, such as cross-section measurement, analysis of gravel extraction records, aerial photography, drone survey, and benchmark locating. This information is used in gravel extraction decision making to ensure riverbeds are appropriately managed to avoid aggradation (increased risk of flooding adjoining properties) or degradation (increased risk of bank erosion). However, these methods are only as good as the data they rely on. Therefore, reliable data is critical to making sound decisions when managing gravel.

Having accurate data ensures that river managers can make informed decisions about how much gravel can be extracted from a particular area, how to manage the actual and potential adverse effects of gravel excavation on the environment, and how to monitor changes to the river system over time. Accurate data can also help predict potential environmental effects of gravel extraction, such as erosion, sedimentation, and changes in water flow. Without reliable data, decision-makers may make uninformed decisions that can have long-lasting negative impacts on the river system and surrounding environment.

2.5 Natural Environment Regional Monitoring Network (NERMN)

The Bay of Plenty Regional Council Natural Environmental Regional Monitoring Network (NERMN) monitors river and stream channels across the region and has been recording this data since 1993/94. The programme assesses and surveys the gravel and sand resources of the Bay of Plenty region and monitors the effects of gravel extraction on the river systems.

The river and stream channel monitoring programme provides the Bay of Plenty Regional Council with:

- Reliable data to identify the quantity of gravel available for extraction and the present extraction rates in the Bay of Plenty region.
- Data to allow setting maximum annual extraction rates available based on river control and river maintenance criteria.
- Data with which the Bay of Plenty Regional Council can meet its statutory obligations under the Resource Management Act, and more effectively manage the region's resources.

Cross section surveys are carried out regularly on 15 rivers and streams, with occasional additional surveys (e.g. following a major flood event). The data is entered into the BOPRC's cross-sections archive system, which is used as the main tool to store and analyse the data. The results of the analysis of these surveys are checked against gravel extraction records to develop an understanding of the movement of gravel in the river systems of the Bay of Plenty region. BOPRC periodically prepares a report summarising the data recorded and providing recommendations on gravel extraction activities within the monitored river systems.

The cross-section survey programme includes the following rivers and streams:

- Otara River
- Waioeka River
- Tauranga (Waimana) River
- Whakatāne
- Ohutu
- Mangamate
- Ruarepuae
- Horomanga

- Rangitāiki (Lower)
- Rangitāiki (Waiohau)
- Rangitāiki (above Aniwaniwa)
- Whirinaki
- Tarawera
- Kopuriki
- Kaituna (below Te Matai)
- Mangorewa
- Waiotahē

The distance between cross sections on these rivers varies between 100 m and 1,200 m. This distance is determined based on what is needed to effectively monitor the river system. In general, it will depend on the size of the river. For long-term monitoring, it is more important to be comparing new data with as long a record as possible, so existing sites are maintained. The frequency of surveys varies between one to five years.

2.6 Gravel extraction records

As part of the gravel allocation process administered by BOPRC, gravel extractors are required to record volumes extracted and the location. As this information plays an important role in decision making regarding gravel management, it is important that the information supplied is accurate and reflects the total volume removed, not just the commercial component once it has been screened or processed.

In future, BOPRC's allocation process will consider the adoption of measures that provide additional assurance regarding the accuracy of gravel returns. Such measures include undertaking topographical or drone surveys before and after gravel extraction activities or the use of weighbridges to measure gravel volumes.

2.7 Aerial photography and LIDAR

Aerial photography is regularly undertaken on river systems throughout the Bay of Plenty and this enables visual evaluations of gravel accumulations to be made. Aerial photography enables BOPRC to identify and direct gravel excavation to these areas.

LIDAR (Light Detection and Ranging) is a remote sensing technology that uses laser pulses to create highly accurate and detailed topographic maps of the land surface. When used for surveying cross sections of riverbeds, LIDAR technology can provide several benefits. It provides highly accurate measurements of cross-sections of riverbeds, allowing for precise mapping and monitoring of changes in river morphology and sediment deposition. LIDAR can also cover large areas quickly and efficiently and can be used to survey areas that are difficult or dangerous for people to access.

Part 3:
Managing the potential effects of gravel extraction

3.1 Effects on river ecology and habitat

Gravel extraction activities have the potential to adversely affect the ecology and habitat of rivers. These effects include:

- The potential for large amounts of sediment to be discharged into the surface water. Such discharges can adversely affect water quality and smother instream biota.
- Causing variations in channel morphology which can impact instream habitats.
- Discharge of contaminants such as fuels impacting freshwater plants and animals and habitat.
- Noise and vibration affecting freshwater fauna.
- Impact on migration and spawning of fish, including blocking fish passage.
- Introduction of unwanted pest plant species.
- The disturbance of various riverbed bird species during nesting.
- Bed disturbance including extraction in water and vehicles crossing braids which can impact spawning habitat.
- Adversely affecting the amenity values of the river by generating machinery noise, fumes and dust, and by disturbing the natural character of the riverbed.
- Recreational use can be adversely affected by a loss of public access by increased hazards in the riverbed and by sediment discharge into waterways, which may impact on recreational fisheries.

3.2 Cultural values

Tangata whenua have an intrinsic connection and relationship with rivers and waterways and gravel extraction activities have the potential to impact this adversely. Wāhi tapu (sacred places) and mahinga kai (food gathering areas) can occur in river environments and gravel extraction activities must be sympathetic to these values.

3.3 Influence on coastal processes

The extraction of gravel from the beds of rivers has the potential to affect the supply of gravel delivered to the coastal system. While the effects of bed load on coastal processes is relatively unknown, there are some New Zealand examples of situations where excessive river gravel extraction is believed to have been a contributing factor to coastal erosion[6]. This has not, however, been identified as an issue in the Bay of Plenty region to date.

[6] Hicks, D. M. (August 2017). Assessing the effects of river gravel extraction on coastal erosion. Prepared by NIWA for West Coast Regional Council.

3.4 Natural character landscape values and recreation

Natural river systems are often a significant component in defining the natural character and landscape values of an area. Recreational and aesthetic values of riverbeds are also important to the community and can be impacted by gravel extraction. Key considerations include:

- changes in the natural patterns and systems of rivers as a result of gravel extraction activities,
- the visual impact of works and machinery,
- site rehabilitation post works to restore natural gravel beach profiles, and
- maintaining access to riverbeds for recreational activities.

These matters are considered in the operational guidelines set out in later sections of this document.

Part 4:
Managing gravel extraction activities

Gravel extraction is a routine river management activity, and the potential adverse environmental effects it may pose are well understood and manageable. By employing established practices and effective mitigation measures, these effects can be avoided, minimised or remedied/offset.

The management of the effects of gravel extraction activities follows the general approach outlined in the effects management hierarchy, which is set out below:

1 adverse effects will be avoided where practicable,

2 where adverse effects cannot be avoided, they will be minimised where practicable,

3 where adverse effects cannot be minimised, they will be remedied where practicable,

4 where the residual adverse effects (effects that cannot be avoided, minimised, or remedied) are more than minor, offsetting will be provided where possible,

5 if offsetting of more than minor residual adverse effects is not possible, compensation will be provided, and

6 if compensation is not appropriate, the activity itself will be avoided.

The potential effects of gravel extraction activities will typically be appropriately managed through the adoption of measures which avoid, minimise, or remedy adverse effects. The regulatory framework applied to gravel extraction activities anticipates that the adoption of these standard controls will be sufficient in most instances to ensure that residual environmental effects will be no more than minor.

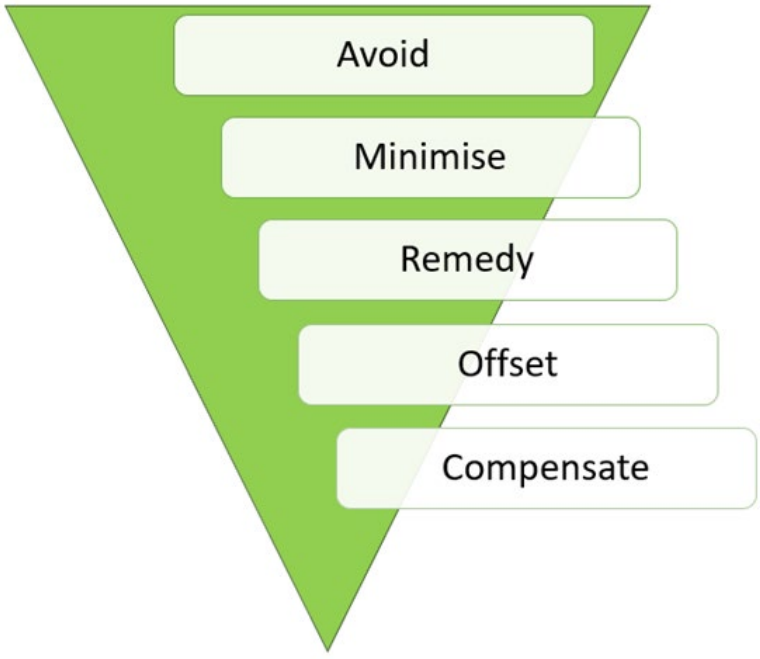


Figure 6 Effects management hierarchy

Offsetting

Offsetting refers to a process that seeks to counter-balance the unavoidable adverse effects (typically effects on biodiversity) of an activity by undertaking environmental improvements elsewhere. The goal of offsetting is to achieve no net loss or preferably a net gain in biodiversity.

The use of offsetting is a developing field in New Zealand and needs to be considered on a case by case basis. The Stream Ecological Valuation (SEV) method is one approach which is generally accepted by freshwater ecologists as an appropriate method of determining freshwater habitat values and offset compensation requirements and may be appropriate for assessing offsetting gravel extraction activities where necessary.

The SEV method was developed by a group of expert freshwater ecologists for Auckland Regional Council in 2006. With an SEV approach the scores calculated from the SEV field assessment are used to estimate and quantify the amount of offset required to balance the stream loss or modification to achieve a no-net-loss outcome.

Compensation

Environmental compensation can be used to address remaining biodiversity losses that cannot be offset due to ecological, technical, or social reasons, but is considered the last option in the effects management hierarchy and carries the highest level of risk. While it may result in socially acceptable positive outcomes and significant biodiversity benefits, there is currently no universally accepted system for objectively measuring the benefits of environmental compensation, especially when involving non-equivalent exchanges.

Both offsetting and compensation are management tools which need to be carefully evaluated in the context of specific proposals and the environmental values affected through consenting processes. For this reason, this document does not provide specific guidance on offsetting or compensation measures for gravel extraction activities.

4.1 Best practice principles for gravel extraction activities

The operational guidelines outlined in this document aim to promote environmental best practices by adhering to the following guiding principles. These principles are consistent with national guidelines for works in waterways produced by MfE.

1. **Avoid in-stream works as far as practicable –** keep machinery out of the water unless necessary for the work or access.
2. **Critically assessing the operational methodology** – for example, always use the correct type of machinery to complete the work effectively, efficiently and with minimal environmental impact.
3. **Avoid as far as practicable impacts on threatened, at-risk, taonga and mahinga kai species and their habitats** – plan and implement the works to avoid areas of significant ecological value. Avoid instream works during critical fish spawning and migration periods. Avoid operations during bird nesting seasons where habitats have been identified within the works area. Works should not commence in these areas until nesting and/or rearing is complete.
4. **Avoid as far as practicable effects on water quality and sediment** – plan and implement the works so that the discharge of sediment into the stream channel is avoided as far as practicable.
5. **Avoid as far as practicable the potential for spread and/or establishing pest plants** – Ensure all machinery used is cleaned and checked prior to arriving on site to avoid the introduction of plant pests.

6 **Avoid as far as practicable disturbing archaeological or wāhi tapu (sacred) sites** – adequate planning and consultation should be undertaken to ensure that archaeological and/or wāhi tapu sites are avoided. Consultation with tangata whenua should follow any procedures agreed with each iwi/hapū group. The procedure for protection of archaeological sites is set out in Appendix 4. Note that disturbing an archaeological site requires an archaeological authority from Heritage New Zealand Pouhere Taonga Act 2014.

7 **Consider and prepare for emergency contingencies** – in case of flood or other emergencies during the works, consider factors such as access to the site, notification of appropriate personnel and security of equipment.

8 **Avoid as far as practicable altering natural hydrology patterns** – on completion of the works the stream bed should be left in a natural profile to avoid adversely affecting hydrology or impeding fish passage.

9 **Implement robust erosion and sediment control measures** – All erosion and sediment control measures should be designed and installed to appropriate standards (see BOPRC Erosion and Sediment Control Guidelines for Land Disturbing Activities) and maintained for the duration of the works.

10 **Avoid discharge of contaminants onto riverbeds or into waterways** – avoid oil and fuel discharges or spillage, particularly onto streambeds or into water. Maintain machinery so that leakage from hoses and pipes are unlikely. Dispose of fuel containers safely off-site.

The following table sets out the methods to be applied to manage the potential effects of gravel extraction activities in the format of the effects management hierarchy (noting previous comments regarding offsetting and compensation).

Avoid	Mitigate/minimise	Remedy
Keep machinery out of the water where practicable. Plan and implement works to avoid the discharge of sediment to the stream channel to the extent practicable. Avoid works in areas of significant ecological value. Avoid instream works during critical fish spawning and migration periods. Avoid bird nesting seasons within bird nesting habitats. Avoid oil and fuel discharges or spillage, particularly onto streambeds or into water. Avoid damage to any riverbanks, protection works, access or any other works relating to the control of the river. Avoid impeding public access to and along the river except for temporary restrictions necessitated by operational health and safety requirements. Ensure all machinery used is checked and cleaned prior to arriving on site to avoid the introduction of plant pests. Engagement with tangata whenua to identify significant cultural values and measures required to avoid or minimise effects on cultural values.	Appropriate machinery shall be used to carry out work as efficiently as possible, with minimal track movement and/or pushing of material within flowing water. In situations where instream works are required (including access routes), operators are required to notify both the Department of Conservation and Fish and Game New Zealand prior to any vehicles or equipment crossing the stream. Where necessary, stream crossings must be limited to a maximum of five consecutive days during the whitebait migration season (15 August to 30 November) in any year. Temporary stockpiles shall be limited to the minimum size practicable to prevent any obstruction or diversion of flood flows. All erosion and sediment control measures should be designed and installed to appropriate standards. Gravel excavation activities shall cease immediately, should any archaeological or historic site be discovered. Excess vegetation, soil, slash or other debris shall be disposed off-site where practicable, and not placed where it could readily enter the watercourse or floodway.	The stream bed shall be left in a natural profile to avoid adversely affecting hydrology or impeding fish passage. On completion of the works, the excavation site must be restored in a manner that maintains the natural character, landscape and amenity values of the surrounding environment. Access tracks to the river that existed prior to gravel excavation commencing shall be left undisturbed or where that is not possible, be reinstated once gravel excavation activities have been completed

4.2 Operational procedures

4.2.1 Before commencing gravel extraction

Prior to commencing any gravel extraction activities, gravel extractors must possess the appropriate authorisation and adhere to the following procedures:

4.2.2 Gravel allocation process

Unless otherwise permitted by regional/district plans, gravel extractors are required to apply to BOPRC for an allocation. The purpose of the allocation process is to ensure that gravel extraction activities are sustainable and align with BOPRC's gravel management objectives. An allocation allows a gravel extractor to operate under authorisations held by BOPRC through either permitted activity Regional Plan rules or a resource consent held by BOPRC. In some cases, a gravel extractor may need to obtain a separate resource consent (in addition to an allocation).

The guiding principles and operational procedures in this document have been developed to ensure that potential adverse effects of gravel extraction are managed in accordance with the effects management hierarchy, so it is important to ensure compliance with those principles. It is the gravel extractor's responsibility to make sure they are operating in accordance with their Gravel Allocation conditions and these guidelines.

Non-compliance with the allocation and the guidelines can mean that the activity is not covered by permitted activity status or existing resource consent. Consequences of non-compliance may include any or all of the following:

(i) Requirement for a resource consent (if not otherwise authorised)

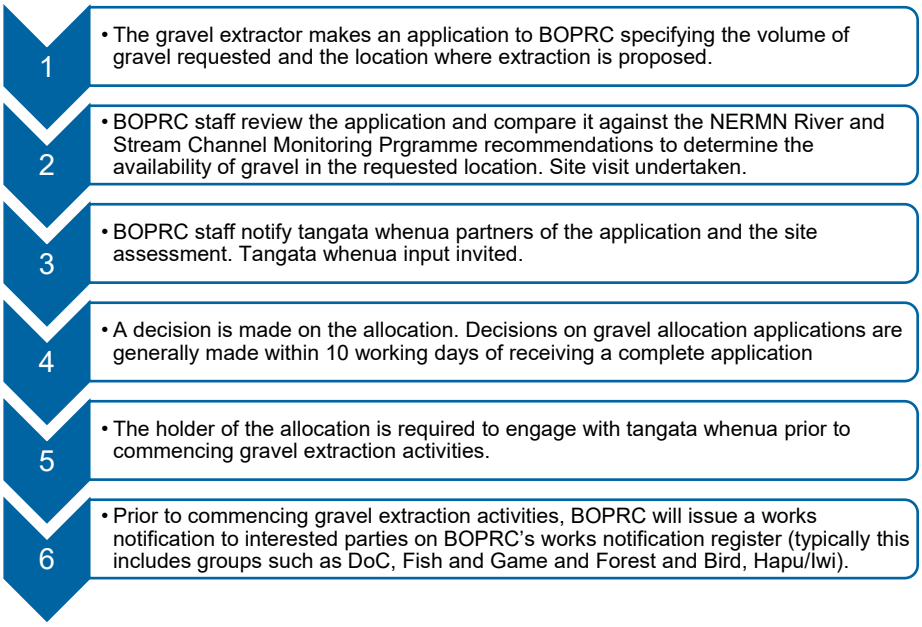
(ii) Increased compliance monitoring and therefore increased monitoring costs

(iii) Cancellation of Allocation

(iv) An infringement fine or prosecution.

Non-compliance with allocation rules may also affect ability to obtain future allocations.

The gravel allocation process:



4.2.3 Tangata whenua engagement

As part of the planning for any gravel extraction activity, engagement with tangata whenua is required and the process for this engagement will depend on the individual kaitiaki, hapū and iwi involved. The process may involve a site visit to help determine whether any sites of cultural significance may be affected by the works and any measures that may need to be adopted to avoid or minimise effects on cultural values. Engagement will be undertaken in a manner that provides tangata whenua adequate time and information to duly consider and respond to the proposal.

4.2.4 Consent requirements

Determine whether the proposed gravel extraction activity complies with the permitted activity rules within the relevant regional and district plans or requires resource consent.

If the activity is permitted, the allocation holder must make themselves familiar with, and comply with the permitted activity conditions set out in the relevant rules.

If the gravel excavation activity is not a permitted activity, an applicant will need to obtain a resource consent (land use) from BOPRC and/or the relevant District Council. Operators must be familiar with the conditions of any resource consent granted for the activity and comply with these requirements.

Note: Failure to comply with the conditions specified in either the permitted activity rules or the resource consent can render the excavator liable for prosecution.

4.2.5 Timing of works

The gravel extractor shall avoid operations during bird nesting seasons where habitats have been identified. Instream activity shall avoid fish spawning and hatching periods within areas of spawning habitat.

Gravel excavation must not take place on Saturdays, Sundays or public holidays, unless special circumstances arise, such as the need for emergency works.

4.2.6 Landowner approvals

Other important considerations are:

- Obtaining approval from the owner of the gravel (if located on private land).
- Obtaining permission from the relevant landowners for both access to the site and gravel transportation.

4.2.7 Notification to BOPRC

Notification in writing is required to be made to BOPRC at least five working days prior to the commencement of each period of works. This notification should include a statement containing the location of the site from where the gravel is to be excavated, the quantity of gravel to be excavated and the dates when the excavation activity is to be undertaken.

Inspection of the proposed work area by BOPRC staff is required at least three working days before the commencement of any gravel excavation activities. This is necessary to ensure that the excavation work will not have any adverse impacts on the river's banks, bed, or any significant flora, fauna, or habitats.

4.2.8 Site access and signage

If the activity poses or may pose a risk to the public, it is the gravel extractor's responsibility to install warning signs at the excavation site, which should be removed once the operation is complete or no longer poses a threat to the public.

In cases where appropriate vehicle or equipment access is not available, access tracks should be located on the dry parts of the riverbed and placed to minimize earthworks or vegetation removal. If significant earthworks or vegetation disturbance cannot be avoided, a land use consent may be required.

To prevent the contamination of stormwater with sediment, appropriate erosion and sediment controls must be installed on access tracks. Please refer to the "Erosion and Sediment Control Guidelines" provided by BOPRC.

4.2.9 Health and Safety

All activities related to gravel management must comply with health and safety at work laws, which include (but are not restricted to):

- The Health and Safety at Work Act 2015
- The Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016

This will include, but is not limited to; identifying and appropriately managing risks and hazards; safety planning; PPE and training for workers; machinery well maintained.

If the activity poses a risk or has the potential to pose a risk to the public, the contractor is required to take all reasonably practicable steps to avoid, eliminate or manage the risk.

4.3 During gravel extraction

4.3.1 Machinery use

The gravel extractor shall avoid machinery entering water unless it is necessary for access to the work site.

Machinery or trucks shall avoid crossing streams whenever possible. In situations where alternative access is not available, operators are required to notify both the Department of Conservation and Fish and Game New Zealand prior to any vehicles or equipment crossing the stream. Stream crossings or travel along wet parts of the bed are allowed as long as they do not take place during the trout spawning and hatching season (1 May to 31 October) or low flow conditions in RNRP Schedule 1D waterways. Additionally, stream crossings must be limited to a maximum of five consecutive days during the whitebait migration season (15 August to 30 November) in any year.

The gravel extractor is required to take all necessary measures to prevent refuelling activities or fuel storage on the riverbed or within 20 metres of the flowing water's edge. Any spillage of these contaminants that could enter waterways must be avoided or minimised. The gravel extractor, who is also the consent holder, is responsible for employing effective methods to ensure that spillage of fuel or other contaminants is prevented. This may include the provision of appropriate security and containment measures.

The gravel extractor is required to ensure that all machinery and materials are removed to a secure site above flood level at the conclusion of each working day, or when the site is left unattended.

4.3.2 Stockpiles

Gravel extractor's are required to keep temporary stockpiles to the minimum size practicable to prevent any obstruction or diversion of flood flows. Stockpiles must be orientated parallel to water flows at all times.

Stockpiles shall be at least 20 metres from the flowing water's edge and located on sites at least 0.3 metres above the level of the adjacent river.

4.3.3 Site management

Gravel excavation shall not cause damage to any riverbanks, protection works, access or any other works relating to the control of the river.

Excess vegetation, soil, slash or other debris shall be disposed off-site where practicable, and not placed where it could readily enter the watercourse or floodway.

4.3.4 Public access

Gravel excavation activities shall not impede public access to and along the river except for temporary restrictions necessitated by operational health and safety requirements.

4.3.5 Heritage values

Gravel excavation activities shall cease immediately, should any archaeological or historic site be discovered as a result of the activity. Excavation activities can only resume once appropriate authorisation is received. The extractor shall advise both Heritage New Zealand and BOPRC when any archaeological or historic site is discovered and follow the measures set out in any Accidental Discovery Protocol agreement with tangata whenua. This is to ensure the protection of archaeological, historic, or wāhi tapu sites.

It is unlawful for any person to destroy, damage, or modify, or cause to be destroyed, damaged, or modified, the whole or any part of an archaeological site (known or unknown) except with a prior authority. Section 61 of the Heritage New Zealand Pouhere Taonga Act 2014 requires that any person who knows that an unauthorised act is being carried out on or in relation to a listed heritage place, wāhi tapu or historic area must immediately inform Heritage New Zealand Pouhere Taonga.

4.3.6 Resource consent conditions

All operations conducted under a resource consent must comply with the conditions specified in the consent, which may include additional measures specified above. Where any conflict arises, the conditions of a resource consent prevail.

4.3.7 Best Practicable Option (BPO)

It is expected that gravel extractor's implement a BPO approach by utilising equipment and techniques that minimise the negative effects of gravel excavation while still adhering to the conditions of the resource consent.

For example:

(a) When carrying out instream work, appropriate machinery for the job shall be used to carry out work as efficiently as possible, with minimal track movement and/or pushing of material within flowing water.

(b) Where excavation is required below normal water level, the excavation site shall be separated from the flowing water by a bund of at least one metre in height and one metre in width.

4.3.8 Once works are completed

On completion of the works, the excavation site must be restored in a manner that maintains the natural character, landscape and amenity values of the surrounding environment. This restoration work must meet be completed to the satisfaction of the BOPRC authorised representative.

All plant, machinery, equipment, stockpiles and other material associated with gravel excavation activities is to be removed from the stream/riverbed/floodplain at the completion of the operation.

At the completion of works there shall be no depressions or holes left on the excavation site that may trap fish during higher flow conditions.

Access tracks to the river that existed prior to gravel excavation commencing shall be left undisturbed or where that is not possible, be reinstated once gravel excavation activities have been completed.

4.3.9 Monitoring, recording and reporting

The consent holder shall keep adequate records of all materials removed from the riverbed, which shall be available on request.

The extractor/consent holder shall submit to the Group Manager Regulation & Resource Management (BOPRC), a record of the volume of material removed from the riverbed during the period of operation, together with the appropriate management fee. The record shall be supplied in accordance with:

(i) the requirements of a consent condition,

(ii) the requirements of any rule specified in a regional plan, or

(iii) within 10 working days after the end of each month.

Definition of terms

Where *italics* are used in this definition of terms, the definition is from section 2 of the Resource Management Act 1991 or other legislation where specified.

Aggradation: The building up of the land surface by the deposition of fluvial or marine deposits.

Aggregate: Crushed rock or gravel screened to sizes for use in road surfaces, concrete, or bituminous mixes.

Amenity Values: *Those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.*

Archaeological Site: means, (subject to section 42(3) of the Heritage New Zealand Pouhere Taonga Act 2014):

(a) any place in New Zealand, including any building or structure (or part of a building or structure), that—

(i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and

(ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and

(b) includes a site for which a declaration is made under section 43(1). (Section 6, Heritage New Zealand Pouhere Taonga Act 2014)

Beach: In relation to any river, stream or lake, refers to the zone of unconsolidated material that extends landward from the waterline to where there is a marked change in material or physiographic form, or to the line of permanent vegetation.

Bed:

(a) In relation to any river—

(i) For the purposes of esplanade reserves, esplanade strips, and subdivision, the space of land which the waters of the river cover at its annual fullest flow without overtopping its banks:

(ii) In all other cases, the space of land which the waters of the river cover at its fullest flow without overtopping its banks; and

(b) In relation to any lake, except a lake controlled by artificial means,—

(i) For the purposes of esplanade reserves, esplanade strips, and subdivision, the space of land which the waters of the lake cover at its annual highest level without exceeding its margin:

(ii) In all other cases, the space of land which the waters of the lake cover at its highest level without exceeding its margin; and

(c) In relation to any lake controlled by artificial means, the space of land which the waters of the lake cover at its maximum permitted operating level; and

(d) In relation to the sea, the submarine areas covered by the internal waters and the territorial sea.

Bund: A bank or structure (usually shallow) built to contain or hold fluid discharges.

Catchment: The total area from which a single river collects surface runoff.

Channel – the portion of a river down which water flows during times of normal to low flows.

Coastal Marine Area: *The foreshore, seabed, and coastal water, and the air space above the water—*

(a) Of which the seaward boundary is the outer limits of the territorial sea:

(b) Of which the landward boundary is the line of mean high water springs, except that where that line crosses a river, the landward boundary at that point shall be whichever is the lesser of—

(i) One kilometre upstream from the mouth of the river; or

(ii) The point upstream that is calculated by multiplying the width of the river mouth by 5.

Construct: Includes create or build, alter, reconstruct, extend, remove and demolish.

Cross-sections: Vertical profiles of the surface contour across rivers and streams.

Erosion: The process of the wearing away of the land's surface by natural processes and human activities, and the transporting of the resulting sediment.

Excavation: The physical act of digging/removing gravel from riverbeds for extraction purposes.

Extraction: Excavation of gravel from riverbeds and removal from the river system.

Flood level: The vertical height reached by flood water at a particular site.

Floodplain: The surface of relatively smooth land built of alluvium, adjacent to a river channel, and covered with water during flooding of the river.

Floodway: An artificial passage for flood water.

Flow path: The land area between the bed of a river or drain and the crest of a stopbank.

Gravel: A collective term for the material in a bed of a river. It includes sand, silt, shingle, rocks and boulders.

Greywacke: An indurated, poorly sorted sandstone or mudstone.

Heritage Place: A place of special interest by having special cultural, architectural, historical, scientific, ecological, or other interest (refer to section 189(2) of the Act).

Heritage Values: Includes natural character, outstanding natural features and landscapes, indigenous vegetation and habitat of indigenous fauna, Māori cultural values, heritage values and places, and ecosystem, landscape and amenity values.

Historic Area: An area of land that –

(a) Contains an inter-related group of historic places; and

(b) Forms part of the historical and cultural heritage of New Zealand; and

(c) Lies within the territorial limits of New Zealand.

(Section 2, Historic Places Act 1993.)

Historic Place:

(a) Means:

(i) Any land (including an archaeological site); or

(ii) Any building or structure (including part of a building or structure); or

(iii) Any combination of land and a building or structure – that forms part of the historical and cultural heritage of New Zealand and lies within the territorial limits of New Zealand; and

(b) Includes anything that is in or fixed to such land.

Infrastructure: Networks, links and parts of facility systems, as in transport infrastructure (roads, rail, parking, etc) or water system infrastructure (the pipes, pumps and treatment works, etc).

Intrinsic Values: *In relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including (a) their biological and genetic diversity; and (b) the essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience.*

Kaitiakitanga – Means the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; and includes the ethic of stewardship.

Natural Character: The qualities of the environment that give recognisable character to an area. There are varying degrees of natural character. Natural character relates to:

(a) Natural systems – landscapes, physical processes and ecological systems.

(b) Landform.

(c) Landcover.

(d) Waterscapes – seascapes, harbours, estuaries, wetlands, lakes and rivers.

(e) Natural habitats of fauna.

Natural Environmental Regional Monitoring Network (NERMN): A monitoring programme initiated by Environment Bay of Plenty in 1990 for the analyses of the Regions freshwater, coastal and estuarine ecology, water quality and water quantity.

Rehabilitation: To restore to a former level or state.

River: Means a continually or intermittently flowing body of fresh water, and includes a stream and modified water course; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and far drainage canal).

Sediment: Unconsolidated particulate material deposited, from a suspension, by physical, chemical or biological processes. In particular this refers to mud, silt, sand and gravel that has been deposited in the bed of a flowing river or stream.

Sedimentation: The settling out of particles (sediment) that have been transported by water.

Siltation: Infilling with silt.

Spillway: A passage in or about a hydraulic structure for escape of surplus water.

Stockpile: A pile of gravel that has been obtained from a river.

Stopbank: Barrier or embankment constructed near or alongside a river, and designed to contain flood flows and prevent high river flows flooding onto adjacent land.

Structure: *Any building, equipment, device, or other facility made by people and which is fixed to land; and includes any raft.*

Surface Waterbody: Means freshwater in a river, lake, stream, pond, wetland or drain that is not located within the coastal marine area.

Stream crossing: Any structure supporting a path, road or track over a streambed including culverts, fords and bridges.

Temporary Stockpile: A stockpile that only exists while the site is being actively worked.

Territorial Authority: A district council or a city council (as defined in the Local Government Act 2002).

Wāhi tapu: A place sacred to Māori in the traditional, spiritual, religious, ritual or mythological sense.

Watercourse: The natural path that water in any river or stream follows over the land surface.

Water Body: Means *fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area*.

Water's edge: The boundary between the water in a river or stream and the adjoining dry land.

Appendix 1
Relevant planning documents

National Environmental Standards for Freshwater (NES-F)

The Resource Management (National Environment Standards for Freshwater) Regulations (NES-F) (2020) accompanies the NPSFM and is focused on controlling certain farming practices, providing for fish passage, preventing the loss of the extent and values of rivers and managing activities in and around wetlands.

The activities controlled by the NES-F that are relevant to gravel management include extraction in or near wetlands, the reclamation of the bed of any river and avoiding the loss of the extent and values of rivers.

Earthworks and land disturbance for natural hazard works[1] is permitted[2] by the NES-F within 10 m of a natural inland wetland. The diversion of water is also permitted[3] within 100 m of a wetland if it is for the purpose of natural hazard works. The conditions applying to these permitted activities are set out at Regulation 51(5), and are replicated in Appendix 2 for convenience.

National Policy Statement for Freshwater Management (NPSFM)

The NPSFM provides national direction to local authorities on the management of freshwater resources to provide for all values that are important to New Zealanders. At the core of the NPSFM is the concept of Te Mana o Te Wai.

There is a hierarchy of obligations in Te Mana o te Wai that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems

(b) second, the health needs of people (such as drinking water)

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

The NPSFM requires freshwater to be managed in a way which gives effect to Te Mana o te Wai through involving tangata whenua, developing long term visions in the regional policy statement and policy and rule frameworks in the regional plan, all aimed towards prioritising the health and wellbeing of waterbodies, followed by the essential needs of people and then other uses.

The NPSFM contains some provision for gravel management activities which may result in loss of extent or values of natural inland wetlands when necessary for the maintenance and operation of natural hazard works.

The NPSFM also requires regional councils to include a policy in regional plans stating that the loss of river extent and values is avoided unless the council is satisfied that there is a functional

[1] In the regulations, natural hazard works means works for the purpose of removing material, such as trees, debris, and sediment, that—

(a) is deposited as the result of a natural hazard; and

(b) is causing, or is likely to cause, an immediate hazard to people or property.

[2] Regulation 51(3)

[3] Regulation 51(4)

need[4] for the activity in the location and the effects are managed by applying the effects management hierarchy. Gravel management activities will not necessarily always be able to avoid[5] effects on river extent and values but have a functional need to occur in riverbeds.

The operational principles and guidelines set out in this document have been aligned with the effects management hierarchy approach to provide consistency with the requirements of the NPSFM.

The relevant objectives and policies of the NPSFM are set out in Appendix 3.

National Policy Statement for Indigenous Biodiversity

The National Policy Statement for Indigenous Biodiversity (NPS-IB) came into force on 4 August 2023. The NPS-IB has a single objective to maintain indigenous biodiversity across Aotearoa New Zealand to achieve at least no overall loss in indigenous biodiversity. This objective is supported by 17 policies which collectively aim to ensure areas of significant indigenous vegetation and habitats are identified and protected[6]. The restoration of indigenous vegetation is also promoted and provided for[7].

The NPS-IB sets out an implementation process for local authorities to give effect to the document in partnership with tangata whenua. The NPS-IB specifically recognises that the protection, maintenance and restoration of biodiversity does not preclude development in appropriate places and forms along with the role of landowners as stewards of indigenous biodiversity[8].

The requirements of the NPS-IB will be addressed through the provisions of regional and district planning documents and will be assessed as part of resource consent applications for gravel extraction activities.

National Works in Waterways Guidelines

The Ministry for the Environment released the "National Works in Waterways Guideline" in 2021. The document provides best practice guidance and recommendations on conducting works in waterways. It aims to promote environmentally responsible practices and ensure the protection of New Zealand's water resources.

The document emphasises the importance of considering environmental factors and minimising potential adverse effects on water quality, ecosystems, and aquatic life during construction and maintenance works in waterways. It offers practical advice on assessing and managing risks, mitigating erosion, managing sediment, and maintaining the ecological integrity of rivers, streams, and wetlands.

The best practice principles identified in the National Works in Waterways Guidelines are encompassed in these operational guidelines for gravel extraction.

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[4] **Functional need** is defined in the NPSFM as: *"the need for a proposal or activity to traverse, locate or operate in a particular environment because the activity can only occur in that environment."*

[5] **Avoid** means "prevent the occurrence of; not allow". *See Environmental Defence Society Inc v The New Zealand King Salmon Co Ltd [2014]* NZSC 38.

[6] Policies 6 and 7

[7] Policy 13

[8] NPS-IB Section 3.5

Bay of Plenty Regional Policy Statement

The Bay of Plenty Regional Policy Statement (RPS) addresses regionally significant issues in relation to the management of land, air, fresh and coastal water, infrastructure and biodiversity. The RPS is a statutory policy document that must be given effect to by regional and district plans.

The Natural Hazards section of the RPS supports river gravel management activities through the promotion of measures which reduce natural hazard risks. The river schemes managed by BOPRC play a critical role in managing and reducing flood risk and gravel management is a necessary tool to maintain the effective functioning of these schemes.

The RPS[9] directs regional, city and district plan provisions to provide a high degree of certainty for establishing and maintaining essential risk reduction works and other measures. A key means of achieving this certainty includes ensuring that river gravel management activities are provided for as permitted or controlled activities within district and regional plans.

Regional Plans

Gravel extraction is currently regulated by the Bay of Plenty Regional River Gravel Management Plan. As part of the proposed changes to the Regional Natural Resources Plan (RNRP) to implement the NPSFM it is anticipated that the provisions currently contained in the Regional River Gravel Management Plan will be incorporated into the RNRP.

Gravel management activities undertaken within the Coastal Environment are subject to the objectives and policies contained in the Bay of Plenty Regional Coastal Environment Plan as well as the rules within the Regional River Gravel Management Plan / RNRP. The Regional Coastal Environment Plan gives effect to the New Zealand Coastal Policy Statement in the Bay of Plenty region and contains rules which apply to the coastal marine area.

Tangata whenua

Tangata whenua, through their iwi, hapū, or whanau, are the traditional kaitiaki of land, air, and water, which are taonga tukuiho of special significance. Māori environmental resource management is based on the integrity and restoration of the mauri of natural resources. It relies on traditional as well as modern knowledge systems, hui and collective implementation by the community beginning at the marae level.

The RMA identifies the relationship of Māori and their culture and traditions with their ancestral lands and water as being a matter of national importance that needs to be recognised and provided for (section 6(e)). “Ancestral” lands and water are not necessarily still in Māori ownership, but the relationship with those must still be recognised and provided for.

Co-Governance

Iwi and hapū are increasingly involved in decision making and management of rivers through co-governance groups. These groups are partnerships between iwi and local government which are typically established through Treaty of Waitangi settlement legislation. There are currently three co-governance groups in the Bay of Plenty region.

<u>Te Maru o Kaituna River Authority</u>

Te Maru o Kaituna River Authority is a co-governance partnership mandated to restore, protect and enhance the environmental, cultural and spiritual health and well-being of the Kaituna River. It is made up of iwi representatives from Tapuika Iwi Authority Trust, Te Kapu Ō Waitaha, Te Pumautanga o Te Arawa Trust, Te Tāhuhu o Tawakeheimoa Trust and Te Komiti Nui o Ngāti

[9] Policy NH 12A

Whakaue, and council representatives from the Bay of Plenty Regional Council, Rotorua Lakes Council, Western Bay of Plenty District Council and Tauranga City Council. It is a permanent joint committee of the four councils.

The Authority has prepared the Kaituna River Document – Kaituna ha taonga tuko iho which sets out an iwi and community vision, objectives and desired outcomes for the Kaituna River and its tributaries. The document influences councils' planning documents and local government decisions relevant to the awa (river).

Rangitāiki River Forum

The Rangitāiki River Forum is a co-governance entity mandated to promote the protection and enhancement of the environmental, cultural, and spiritual health and wellbeing of the Rangitāiki River and its resources for the benefit of present and future generations. The membership of the forum includes representatives from Ngāti Whare, Ngāti Manawa, Ngāti Tūwharetoa (BOP), Ngāti Awa, Hineuru Iwi Trust, Tūhoe, Ngāti Tūwharetoa, Whakatāne District Council, Taupō District Council and BOPRC.

The Forum has prepared Te Ara Whānui o Rangitāiki – Pathways of the Rangitāiki to guide the management of the river into the future. The document sets out the vision, objectives and desired outcomes for the Rangitāiki Catchment. These matters have been recognised and provided for in the Bay of Plenty Regional Policy Statement.

Tarawera Awa Restoration Strategy Group

The Tarawera Awa Restoration Strategy co-governance forum was set up as part of the Ngāti Rangitihi Treaty settlement. The group recognises that the Tarawera River and its tributaries are a taonga of great spiritual and cultural importance. Members of the strategy group each contribute to restoring and enhancing the mauri of the awa.

Statutory Acknowledgements

A Statutory Acknowledgement is a formal acknowledgement by the Crown that recognises the particular cultural, spiritual, historical and traditional association an iwi has with a site of significance or resource identified as a statutory area. Statutory Acknowledgement Areas only relate to Crown-owned land and include areas of land, geographic features, lakes, rivers, wetlands and coastal marine areas. With respect to bodies of water such as lakes, rivers and wetlands, the Statutory Acknowledgement excludes any part of the bed not owned or controlled by the Crown.

Under the Resource Management Act 1991, Deeds of Settlement and Settlement Legislation achieved with each iwi, require regional, city and district councils to include statutory acknowledgments in relevant district and regional plans and policy statements, and to have regard to them in resource consent decision making.

Many of the rivers and streams within the Bay of Plenty are subject to statutory acknowledgements. Up to date maps of statutory acknowledgements are available on the BOPRC website and publicly available GIS maps. Major river systems subject to statutory acknowledgements include:

- Kaituna River
- Rangitāiki River
- Tarawera River
- Whakatāne River

Iwi Management Plans

Iwi Management Plans (IMP) are resource management plans prepared by iwi, iwi authority, rūnanga or hapū under the RMA to guide the management of natural and physical resources within their rohe (tribal area). These plans provide iwi with a formal means of input into resource management decision-making processes undertaken by local and regional councils. Iwi management plans are one of the tools available for iwi to exercise their role as kaitiaki (guardians) of ancestral taonga, including rivers, lakes, the seabed and foreshore, mountains, land, minerals, wāhi tapu and wāhi taonga, wildlife and biodiversity, and places of tribal significance.

Under the RMA, local authorities are required to take into account IMPs when preparing or changing regional policy statements and regional and district plans, and under the RPS they are to be taken into account in assessments of environmental effects (Method 12).

IMPs are an important tool for recognizing and providing for Māori cultural values and interests under the RMA and can be useful for understanding the potential effects of a proposed activity on these values when applying for resource consent.

Appendix 2
NES-F Regulations

National Environmental Standards for Freshwater Management (NES-F)

Regulations relevant to gravel extraction activities are set out below.

Natural wetlands

Regulation 45 - Discretionary activities

1 *Vegetation clearance within, or within a 10 m setback from, a natural wetland is a discretionary activity if it is for the purpose of constructing specified infrastructure.*

2 *Earthworks or land disturbance within, or within a 10 m setback from, a natural wetland is a discretionary activity if it is for the purpose of constructing specified infrastructure.*

3 *Earthworks or land disturbance outside a 10 m, but within a 100 m, setback from a natural wetland is a discretionary activity if it—*

(a) is for the purpose of constructing specified infrastructure; and

(b) results, or is likely to result, in the complete or partial drainage of all or part of the natural wetland.

4 *The taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland is a discretionary activity if it is for the purpose of constructing specified infrastructure.*

Regulation 46 - Permitted activities

1 *Vegetation clearance within, or within a 10 m setback from, a natural wetland is a permitted activity if it—*

(a) is for the purpose of maintaining or operating specified infrastructure or other infrastructure; and

(b) complies with the conditions.

2 *Earthworks or land disturbance within, or within a 10 m setback from, a natural wetland is a permitted activity if it—*

(a) is for the purpose of maintaining or operating specified infrastructure or other infrastructure; and

(b) complies with the conditions.

3 *The taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland is a permitted activity if it—*

(a) is for the purpose of maintaining or operating specified infrastructure or other infrastructure; and

(b) complies with the conditions.

Regulation 47 - Restricted discretionary activities

1 *Vegetation clearance within, or within a 10 m setback from, a natural wetland is a restricted discretionary activity if it—*

(a) is for the purpose of maintaining or operating specified infrastructure or other infrastructure; and

(b) does not comply with any of the conditions in regulation 46(4).

2 *Earthworks or land disturbance within, or within a 10 m setback from, a natural wetland is a restricted discretionary activity if it—*

(a) is for the purpose of maintaining or operating specified infrastructure or other infrastructure; and

(b) does not comply with any of the conditions in regulation 46(4).

3 *The taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland is a restricted discretionary activity if it—*

(a) is for the purpose of maintaining or operating specified infrastructure or other infrastructure; and

(b) does not comply with any of the conditions in regulation 46(4), but does comply with the conditions in subclause (5) of this regulation.

Natural hazard works

Regulation 51- Permitted activities

Meaning of natural hazard works

1 *In this regulation, natural hazard works means works for the purpose of removing material, such as trees, debris, and sediment, that—*

(a) is deposited as the result of a natural hazard; and

(b) is causing, or is likely to cause, an immediate hazard to people or property.

Permitted activities for purpose of natural hazard works

2 *Vegetation clearance within, or within a 10 m setback from, a natural wetland is a permitted activity if it—*

(a) is for the purpose of natural hazard works; and

(b) complies with the conditions.

3 *Earthworks or land disturbance within, or within a 10 m setback from, a natural wetland is a permitted activity if it—*

(a) is for the purpose of natural hazard works; and

(b) complies with the conditions.

4 *The taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland is a permitted activity if it—*

(a) is for the purpose of natural hazard works; and

(b) complies with the conditions.

RECLAMATION

Regulation 57 - Discretionary activities

Reclamation of the bed of any river is a discretionary activity.

Appendix 3
NPSFM Provisions

National Policy Statement for Freshwater Management (NPSFM)

Provisions relevant to gravel extraction activities are set out below.

Definitions

***Effects management hierarchy**, in relation to natural inland wetlands and rivers, means an approach to managing the adverse effects of an activity on the extent or values of a wetland or river (including cumulative effects and loss of potential value) that requires that:*

(a) adverse effects are avoided where practicable, and

(b) where adverse effects cannot be avoided, they are minimised where practicable, and

(c) where adverse effects cannot be minimised, they are remedied where practicable, and

(d) where more than minor residual adverse effects cannot be avoided, minimised, or remedied, aquatic offsetting is provided where possible, and

(e) if aquatic offsetting of more than minor residual adverse effects is not possible, aquatic compensation is provided, and

(f) if aquatic compensation is not appropriate, the activity itself is avoided.

***Functional need** means the need for a proposal or activity to traverse, locate or operate in a particular environment because the activity can only occur in that environment.*

***Loss of value**, in relation to a natural inland wetland or river, means the wetland or river is less able to provide for the following existing or potential values:*

(a) any value identified for it under the NOF process; or

(b) any of the following, whether or not they are identified under the NOF process:

- *(i) ecosystem health*
- *(ii) indigenous biodiversity*
- *(iii) hydrological functioning*
- *(iv) Māori freshwater values*
- *(v) amenity*

***Natural wetland** means a wetland (as defined in the Act) that is not:*

(a) a wetland constructed by artificial means (unless it was constructed to offset impacts on, or restore, an existing or former natural wetland), or

(b) a geothermal wetland, or

(c) any area of improved pasture that, at the commencement date, is dominated by (that is more than 50% of) exotic pasture species and is subject to temporary rain-derived water pooling.

***Natural inland wetland** means a natural wetland that is not in the coastal marine area.*

***Specified infrastructure** means any of the following:*

(a) infrastructure that delivers a service operated by a lifeline utility (as defined in the Civil Defence Emergency Management Act 2002),

(b) regionally significant infrastructure identified as such in a regional policy statement or regional plan,

(c) any public flood control, flood protection, or drainage works carried out: (i) by or on behalf of a local authority, including works carried out for the purposes set out in section 133 of the Soil Conservation and Rivers Control Act 1941, or

(d) for the purpose of drainage by drainage districts under the Land Drainage Act 1908.

Objective

(1) The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems

(b) second, the health needs of people (such as drinking water)

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

Policies

***Policy 1:** Freshwater is managed in a way that gives effect to Te Mana o te Wai.*

***Policy 3:** Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.*

***Policy 4:** Freshwater is managed as part of New Zealand's integrated response to climate change.*

***Policy 5:** Freshwater is managed through a National Objectives Framework to ensure that the health and well- being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved.*

***Policy 6:** There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.*

***Policy 7:** The loss of river extent and values is avoided to the extent practicable.*

***Policy 15:** Communities are enabled to provide for their social, economic, and cultural well-being in a way that is consistent with this National Policy Statement.*

Part Three - Implementation

3.22 Natural Inland Wetlands

(2) Subclause (3) applies to an application for a consent for an activity:

(a) that falls within any exception referred to in paragraph (a)(ii) to (vii) or (b) of the policy in subclause (1), and

(b) would result (directly or indirectly) in the loss of extent or values of a natural inland wetland.

(3) Every regional council must make or change its regional plan(s) to ensure that an application referred to in subclause (2) is not granted unless:

(a) the council is satisfied that the applicant has demonstrated how each step of the effects management hierarchy will be applied to any loss of extent or values of the wetland (including cumulative effects and loss of potential value), particularly (without limitation) in relation to the values of: ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity value; and

(b) any consent is granted subject to:

(i) conditions that apply the effects management hierarchy; and

(ii) a condition requiring monitoring of the wetland at a scale commensurate with the risk of the loss of extent or values of the wetland.

(4) Every regional council must make or change its regional plan(s) to include objectives, policies, and methods that provide for and promote the restoration of natural inland wetlands in its region, with a particular focus on restoring the values of ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity value.

3.24 Rivers

(2) Subclause (3) applies to an application for a consent for an activity:

(a) that falls within the exception to the policy described in subclause (1); and

(b) would result (directly or indirectly) in the loss of extent or values of a river.

(3) Every regional council must make or change its regional plan(s) to ensure that an application referred to in subclause (2) is not granted unless:

(a) the council is satisfied that the applicant has demonstrated how each step in the effects management hierarchy will be applied to any loss of extent or values of the river (including cumulative effects and loss of potential value), particularly (without limitation) in relation to the values of: ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity; and

(b) any consent granted is subject to conditions that apply the effects management hierarchy.

3.26 Fish Passage

(4) Every regional council must make or change its regional plan(s) to require that regard is had to at least the following when considering an application for a consent relating to an instream structure:

(a) the extent to which it provides, and will continue to provide for the foreseeable life of the structure, for the fish passage objective in subclause (1)

(b) the extent to which it does not cause a greater impediment to fish movements than occurs in adjoining river reaches and receiving environments

(c) the extent to which it provides efficient and safe passage for fish, other than undesirable fish species, at all their life stages

(d) the extent to which it provides the physical and hydraulic conditions necessary for the passage of fish

(e) any proposed monitoring and maintenance plan for ensuring that the structure meets the fish passage objective in subclause (1) for fish now and in the future.

Appendix 4
Protection of archaeological sites
(from Environmental Code of Practice for Rivers and Drainage Maintenance Activities)