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**Reviewing the implementation of stringency in the National
Environmental Standard for Plantation Forestry (NES-PF) to protect
sensitive environments**

A dissertation
submitted in partial fulfilment
of the requirements for the Degree of
Master of Planning

at
Lincoln University
by
Mawardah Nur Hanifiyani

Lincoln University

2021

Abstract of a dissertation submitted in partial fulfilment of the
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by

Mawardah Nur Hanifiyani

The National Environmental Standard for Plantation Forestry 2017 (NES-PF) aims to provide nationally consistent standards for plantation forestry. NES-PF classify plantation forestry's activity as a permitted activity unless it states otherwise. Regulation 6 of NES-PF provides the option for local authorities to put a more stringent rule in their resource management plans, including to give effect to the National Policy Statements for freshwater (NPS-FM) and coastal environments (NZCPS).

This study examines whether the regional and unitary councils have implemented stringency for regulating excessive sedimentation of waterways and coastal environments and under what circumstances. An in-depth case study of the Northland Regional Council is presented. Information was collected using the Local Government Information and Meeting Act 1987 (LGOIMA) and the Official Information Act 1982 (OIA). GIS analysis was carried out to find more information about the case study's location.

Only seven regional councils have applied stringency to meet NPS-FM's objective and only four councils used a stringent rule for NZCPS. Possible explanations for the patchy implementation of greater stringency are discussed; this includes the process in exercising greater stringency. This study provides insights into the issues around implementing national directions. Based on the findings, Te Uru Rākau, Regional and Unitary Councils should consider several things for improving the NES-PF and strengthening the implementation of stringency to protect sensitive environments, including strengthening compliance monitoring, better alignment of NES-PF with NPS-FM and NZCPS, and encouraging the use of stringency to protect sensitive environments.

Keywords: NES-PF, National Direction, Plantation Forestry, Receiving Environment, Erosion, Sedimentation

Acknowledgements

I would like to express my gratitude to my supervisor, Dr Steve Urlich, for his never ending support and encouragement of me in completing this dissertation. His patience and guidance have helped me through out the ups and downs of the pandemic year. Through your sharing of knowledge I gained a lot of new insights regarding integrating land use, catchment and coastal management, especially in New Zealand.

I also thank my parents and my family back in Indonesia for their support. As well, all my friends who keep reminding me that I'm not alone in this journey. This past year was very hard, but thank you for all the support.

I give huge thanks for the New Zealand Scholarship that helped me achieve one of my dreams to continue my studies. Thank you to Dr Suzanne Vallance for hearing me and providing insights regarding my study plan. Huge thanks also for all the lecturers who have shared a lot of their knowledge on environmental issues and management. I would like to say my gratitude for Dr R R Scot as my copy editor.

Lastly, I express my gratitude to my late supervisor in my undergraduate years, dr Nana Mulyana Arifjaya. I could not deliver my last goodbye to you, but you will always be remembered. Thank you for continuing to believe in my dreams, introducing me to the 'catchment management world' and for becoming my discussion buddy.

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Chapter 1

Introduction

Forest plantations in New Zealand have contributed excessive sedimentation to receiving environments (Ministry for the Environment & Stats NZ, 2020). According to Visser et al. (2018), 40% of forest plantations in New Zealand are situated on steep slopes and erodible terrain. The number of prosecutions of forest companies under the Resource Management Act (RMA) 1991 demonstrates that there is poor management practice in steep hill country and erosion-prone soils. Poor management has caused environmental damage from such things as excessive sedimentation. For example, harvesting activities conducted by Laurie Forestry Services Ltd in South East Bay, Pelorus Sound, were found by the District Court to breach the RMA, following a skid failure that led to a debris flow into the coastal marine area¹.

The deposition of sediment in New Zealand has increased quite significantly since European settlement compared with the earlier Māori settlement period. Although sedimentation is a natural process, change of land use has increased the sediment rate flowing into the coastal environment (Handley et al., 2017; Ulrich & Handley, 2020b). Gibb and Cox (2009) calculated that the net average sediment deposition from 1974-2009 increased to 5.7 mm/year in Onepoto Arm and 9.1 mm/year in Pauatahanui Inlet, near Wellington. This rate is much higher than the average sedimentation accumulation per year before widespread land clearance, which was approximately only 2 mm/year (Townsend & Lohrer, 2017).

Under the RMA 1991 section 5, all adverse impacts to the environment must be managed effectively, safeguarding the life-supporting capacity of air, water, soil and ecosystems. This clause has become the foundation for the management of environmental effects caused by human activity, including forest plantation activities. There has been a historical lack of consistency in forestry regulatory regimes between regions because forest management is high in operational costs and complexity. There are at least 200 forest owners who have forest blocks in two or more regions (New Zealand Government, 2017a).

¹ Marlborough District Council v Laurie Forestry Services Ltd [2019] NZDC 2602 at [6] argued that the sedimentation was increasing and “It was estimated that visible sediment extended for about 400 metres”.

Therefore, in 2017, the government established the Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 (NES-PF) to manage various forest plantation activities in a relatively consistent manner across the country. Those activities include pruning and thinning to waste, earthworks, river crossings, forestry quarrying, harvesting and mechanical land preparation. In managing adverse effects, the NES-PF also introduced risk management tools (i.e., the Erosion Susceptibility Classification tool, the Wilding Tree Risk calculator and the Fish Spawning indicator). The regulation came into force on 1 May, 2018. Consequently, all regional and unitary councils are required to revise their planning provisions on forest plantations to avoid duplication and inconsistency (Ministry for Primary Industries, 2018d).

The new standard also recognizes the particular needs of each jurisdiction in managing its environment. The NES-PF regulation 6 has facilitated councils to implement more stringent rules in managing their environment related to forest plantations to give effect to other national directions (Ministry for Primary Industries, 2018e). The stringency rule, especially, is relevant if the activities are related to, or affect, the objectives of the National Policy Statement for Freshwater Management 2020 (NPS-F) and the New Zealand Coastal Policy Statement 2010 (NZCPS). Although each council has been given room to make stricter rules for managing its environment, the next question is whether the local government has exercised stringency and whether the effort is enough to tackle the excess sedimentation. Ulrich (2020) argued that the implementation of stringency in the Proposed Marlborough Environment Plan (PMEP) (2020) hasn't touched the root of the sedimentation problems in the Marlborough Sounds. Rather than having stricter rules on harvesting and replanting activities to manage point-source sediment, the PMEP is more focused on setbacks from the coastal margin to deal with diffuse overland sediment sources.

This study aims to examine the implementation of stringency related to the management of excessive sedimentation in regional council and unitary body plans and to understand the reasons behind the decisions. This study will also review whether the exercise of stringency is sufficient to meet the objectives of the NPS-FM and NZCPS.

1.1 Research Aims and Questions

This dissertation primarily examines how regional councils and unitary authorities are managing the intersection of the NES-PF, NPS-FM and NZCPS, with a particular focus on matters of national

importance. The study is aimed at reviewing the current implementation of sedimentation management in relation to the NES-PF by answering the following questions:

- 1) What is the current application by regional councils and unitary authorities of the NES-PF's stringency for managing the adverse effects of sedimentation in their plans and policies?
- 2) How does the 'stringency' to reduce sedimentation impacts being implemented by the regional councils and unitary authorities relate to the NPS-FM and NZCPS objectives?

Chapter 2

Literature Review

This chapter explains the regulatory framework for managing sediment impacts from forestry plantations in New Zealand. The chapter briefly characterises the forestry industry then discusses the role of local authorities in relation to forest plantation management. The legislative and policy settings for forestry plantations and the management of environmental effects are explained. The last section explains the relationship between forest plantations and the erosion and sedimentation impact in sensitive receiving environments.

2.1 Plantation Forestry

2.1.1 Plantation forestry governance in New Zealand

New Zealand has a long history of forest plantations. In the early stages of the forest industry, timber production was used as the major material for settlement development (Roche, 2002). Roche (2017) argue that most of the timber extraction was extracted from indigenous forest. In Marlborough region the indigenous forest had been extracted for its timber from 1864 to 1915 (Paton 1982 in Ulrich & Handley, 2020a). Although New Zealand had tried to implement sustainable timber harvesting in 1920s, but this industry face challenges since the indigenous forest had slow growth rates. This challenge was answered by the establishment of plantation forestry from 1925-1934 (Roche, 2017). The timber industry in New Zealand began expanding at the beginning of the 20th century (Goulding, 2013). For example, in the Marlborough Sounds, the first commercial forest plantation was planted in the 1930s. The forest was predominantly radiata pine (*Pinus radiata*) (Ulrich & Handley, 2020b). Meanwhile, in the East Coast of North Island, the growth of plantation forestry was one of the results from East Coast Forestry Project in 1992 (Cocklin & Wall, 1997). This program provides subsidies to the land-owner for land preparation and forest planting activities.

Forest plantation governance in New Zealand has evolved since 1980s. Forest plantation management started in 1897 with the establishment of the Forestry Branch of Lands and Survey. Later, in 1921, after World War I, the government established the State Forest Service (SFS) for managing the forest plantation estate (New Zealand Institute of Forestry, 2005), as well as developing the Forest Act 1921-22 (Roche, 2002). However, in 1980 and early 1990s, Roche (2017) argued that neoliberalism changed the forest governance, marked by the disestablishment of New

Zealand Forest Service and Department of Lands and Survey. The commercial function was then taken by the Forestry Corporation, which was later privatised as part of the restructuring programme in 1984 (Walker et al., 2000). Walker et al. added that during this period large proportion of harvesting rights were bought by the private company. The role of government has been limited to ensure the “competitive trading environment and facilitating market access for the industry” (Walker et al., 2000, p. 285). The East Coast Forestry Project (ECFP) is one of the case where the government seems withdraw from solving the disagreement between the involved actors regarding the design of the programmes (Cocklin & Wall, 1997).

Currently, plantation forestry is governed by Te Uru Rākau – New Zealand Forest Service under the Ministry for Primary Industries. Their role is to provide policy, regulating forestry sectors, and managing forestry sectors (Ministry for Primary Industries, 2021). In general, the forestry sector is regulated under the Resource Management Act 1991 (see Chapter 3). Therefore, in carrying out their role, Te Uru Rākau and the Ministry for the Environment are intertwined entities. Both ministries need to work together to administer the RMA. After years of the absence of forest policy, Te Uru Rākau launched the National Environmental Standards of Plantation Forestry (NES-PF) in 2017 (see Chapter 3) with the main aim to provide a consistent forest plantation regulation across the nation.

2.1.2 Forestry in New Zealand

Forest plantations have become a primary industry that is economically beneficial to New Zealand. In 2019, forestry exports contributed \$6.32 billion in export revenue (New Zealand Forest Owners Association, 2020a). As of 2019, 95% of forest plantations were owned by private industry (Figure 2.1), with 70% classified as privately owned over 1000 ha (Ministry for Primary Industries et al., 2019) (Figure 2.1).

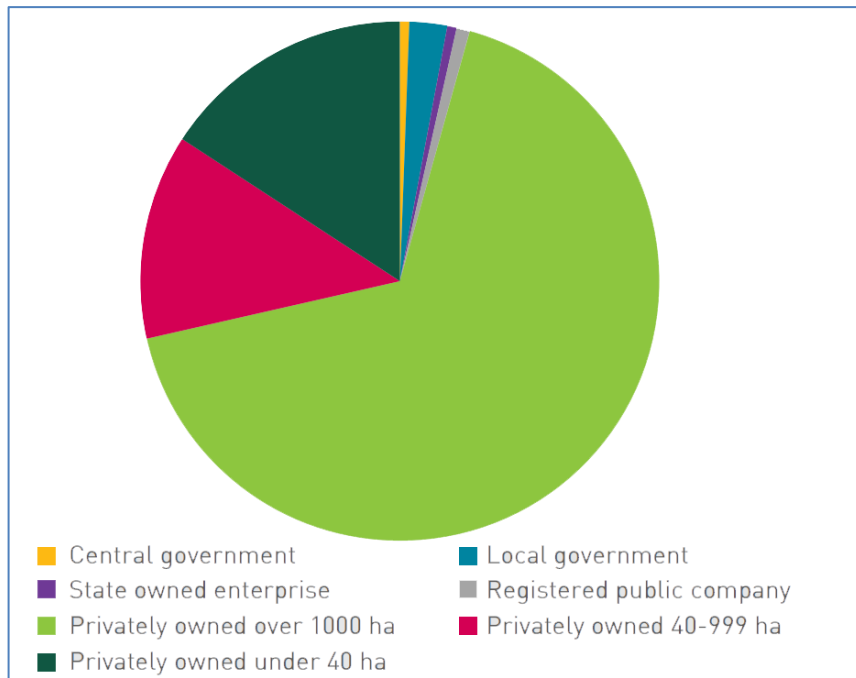


Figure 2.1: New Zealand forest ownership (Ministry for Primary Industries et al., 2019)

Forestry plantations are predominantly planted in radiata pine² because of its ability to grow in different habitats and its ability to produce high-quality wood (New Zealand Forest Service, 1964). Several other species also can be found in forest plantations in New Zealand, e.g., Douglas-fir (*Pseudotsuga menziesii*), softwoods [redwood (*Sequoia sempervirens*), cypress (*Cupressus* sp.)], indigenous species [beech (*Fuscospora* spp.), kauri (*Agathis australis*)], poplars (*Populus* sp.), acacia (*Acacia* sp.) and eucalypts (*Eucalyptus* spp.) (New Zealand Forest Owners Association, 2020a). Although earlier eucalypts were not attractive because of their lack of adaptability and wood condition (hard to process) (New Zealand Forest Service, 1964), new investment by the New Zealand Dryland Forest Initiative (NZDFI) is trying to promote the commercialization of eucalyptus (Millen et al., 2019). The NZDFI claims that planting eucalypt forest could promote a sustainable hardwood industry and reduce dependency on radiata pine (Millen et al., 2019). The initiative has selected white stringybark (*E. globoidea*) that has class 1 and 2 status according to the Australian timber durability class (Salekin, 2020).

² In this dissertation 'plantation' will refer to radiata-dominated plantations.



Figure 2.2: A pine forest in the Nelson District on 8 February 2021. Photo: Author.

In its full cycle, a forest plantation starts with propagation in the nursery and ends with harvesting for industrial or export needs (Figure 2.3). However, the NES-PF excludes propagation from the full cycle. The NES-PF regulates management activities such as afforestation, pruning, thinning, earthworks, harvesting, mechanical land preparation and replanting. Each species has a different rotation period; the shortest harvest age is eucalyptus, which needs only 21 years to reach harvestable trees, followed by radiata pine (~29.1 years), cypress (~34 years), and Douglas-fir (~40 years) (New Zealand Forest Owners Association, 2020a).



Figure 2.3: The plantation forest life cycle [summarised from (Eastland Wood Council, 2018)]

Table 2.1 shows that the three highest coverages of exotic forest and harvested forest are in the Waikato Regional Council, Bay of Plenty Regional Council and Northland Regional Council (Landcare Research (2020)). In those regions, plantation forestry collectively contributes approximately 75% of forestry’s share of the national Gross Domestic Product (GDP) (Figure 2.4). Although at the national level Waikato Region contributes a significant amount to the national GDP (20%), in terms of proportion per region, the percentage is different. Among all territorial authorities, forest plantations appear to be significant to the Gisborne District’s GDP (>5%). Forest plantations were also noted as significant regional GDP contributors by more than 1-4% in the combined Tasman District Council/Nelson City Council area and in the administrative boundaries of Northland Regional Council, Marlborough District Council and the West Coast Regional Council (Nixon et al., 2017).

Table 2.1: The forest plantation area of regional councils and unitary authorities (Landcare Research, 2020; Stats NZ, 2020)

| Local Council | Type | Area of Exotic Forest (km ²) | Area of Forest Harvested (km ²) |
|------------------------------------|----------|--|---|
| Northland Regional Council | Regional | 1,584 | 266 |
| Auckland Council | Unitary | 468 | 44 |
| Waikato Regional Council | Regional | 2,792 | 270 |
| Bay of Plenty Regional Council | Regional | 2,569 | 231 |
| Gisborne District Council | Unitary | 1,603 | 188 |
| Hawke's Bay Regional Council | Regional | 1,436 | 118 |
| Taranaki Regional Council | Regional | 271 | 27 |
| Manawatu-Wanganui Regional Council | Regional | 1,427 | 132 |
| Wellington Regional Council | Regional | 718 | 82 |
| Marlborough District Council | Unitary | 792 | 91 |
| Nelson City Council | Unitary | 104 | 9 |
| Tasman District Council | Unitary | 919 | 120 |
| West Coast Regional Council | Regional | 333 | 64 |
| Canterbury Regional Council | Regional | 1,114 | 142 |
| Otago Regional Council | Regional | 1,395 | 118 |
| Southland Regional Council | Regional | 830 | 92 |
| Total | | 18,383.10 | 1,994.83 |

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Figure 2.4: The regional proportion of economic contribution from forest plantations (Nixon et al., 2017)

2.2 Erosion and Sedimentation

2.2.1 Erosion and sedimentation impacts on the environment

Erosion and sedimentation are greatly affected by the human activity and land use. Alexandridis et al. (2015) describe erosion as one of the most dangerous forms of soil degradation. For example, (Pennock et al., 2019) noted that erosion might reduce 0.4 percent per year of global crop yields. However, the threat possesses from erosion is not only affected the main site where erosion occurs. Erosion could also causing the off-site impact such as sedimentation, and eutrophication of waterways and reservoirs (FAO, n.d.). In the long run, the sedimentation and the change in water turbidity might alter the sensitive habitat such as salmon spawning habitat (Pennock et al., 2019). However, understanding the link between the soil erosion and the off-site impact is a complex process (Duan et al., 2016) which might hinder the soil erosion management implementation (Pennock et al., 2019).

In New Zealand, Basher (2013) argued that the most common erosion in New Zealand is shallow landslides triggered by rainfall. Other erosion types, such as earthflows and slumps, gully, sheet, rill, wind and streambank erosion are common locally. Land use conversion from native forest has been one reason behind the increasing incidence of accelerated erosion (Gibb & Cox, 2009; Ministry for the Environment & Stats NZ, 2019a; Thrush et al., 2004). In Marlborough District for example,

deforestation can be dated from 1860s with the main conversion to pastoral agriculture and to pine planting starting from 20th century to present (Handley et al., 2017).

Each stage of the forestry cycle has a varied level of erosion risk. The afforestation/replanting has been claimed to reduce by 50-80% sedimentation in a small catchment and improve water quality 4-6 years after the planting (Baillie & Neary, 2015). During the mature stage, a plantation can help maintain slope stability. O'Loughlin (2005) argued that the root network has a significant influence on maintaining soil and slope stability. Earthworks such as road construction, tracks and log landings have been considered activities that contribute to surface erosion (O'Loughlin, 2005).

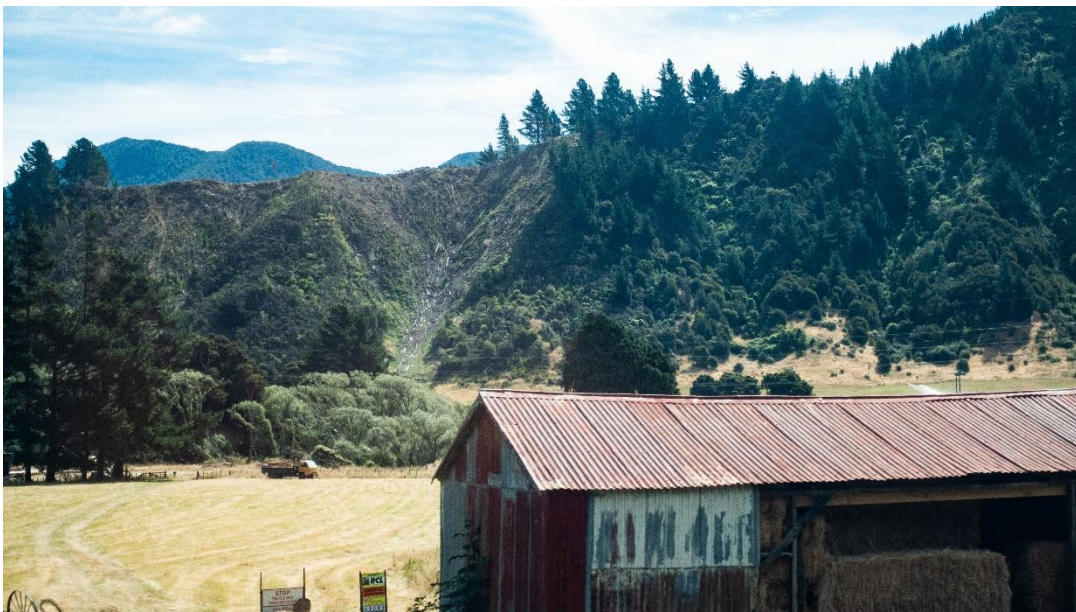


Figure 2.5: A trace of gully erosion and wood debris in the Nelson District 7 February 2021. Photo: Author.

Erosion and sedimentation risk increases during harvesting (Phillips et al., 2012; Visser et al., 2018). Clear felling on steep slopes, land-use change to pastoral, and forest fires can lead to environmental damage. The clear-felling system has caused an increasing trend in soil erosion, increased runoff, and flooding in lowland areas (New Zealand Forest Service, 1964). Forest harvesting with a clear-felling system can exacerbate sedimentation production (Marden & Rowan, 2015; Ministry for the Environment & Stats NZ, 2020). Visser et al. (2018) argued that, in New Zealand, around 10%-20% (75 m³/ha) of wood residues from 500 m³/ha of harvesting a stand were left on-site and could cause potential damage to the lower catchment if washed away by intense rainfall.

The risk of sedimentation is especially greater during the ‘window of vulnerability’ time (Figure 2.6). It is the period after the harvesting until the newly planted tree roots are properly functional (Ohlmacher, 2000). O’Loughlin (2005) argued that the most vulnerable period is 2 – 8 years after felling until the new root network is properly developed. Root decay causes an increase in sedimentation and landslides after clear-felling because tree roots are important to maintain soil stability (O’Loughlin & Watson, 1979), especially since one third of New Zealand plantation forests is located on erodible land (Amishev et al., 2014; Phillips et al., 2012; Visser et al., 2018). According to O’Loughlin and Watson (1979), radiata pine root strength ranges from 37,500 kPa to 7,700 kPa; after cutting, the root strength declines at a rate of approximately 500 kPa/month. A rise in sedimentation was found in a Hawke’s Bay catchment after harvesting (Baillie & Neary, 2015).

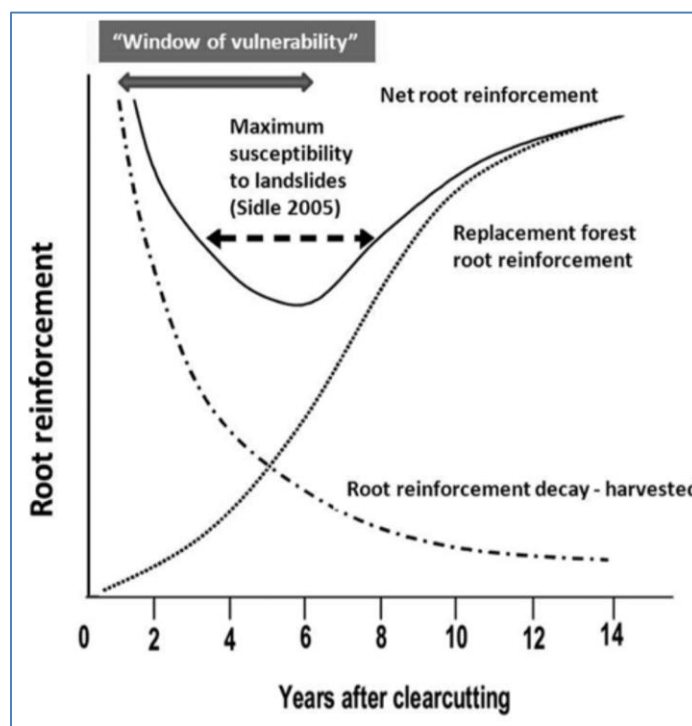


Figure 2.6: Forest plantation root strength (Phillips et al., 2012)

The impacts of excessive sedimentation loads can be seen in the receiving environment, especially coastal areas. It is important to note that erosion and deposited sedimentation to the receiving environment is a natural process (Phillips et al., 2012; Ulrich & Handley, 2020b). However, recently, there have been changes in the magnitude of the sedimentation effect on the receiving environment that potentially impacted sensitive species in the marine environment (Thrush et al., 2004). Forest activities were one environmental pressure in estuaries in two of five case studies examined in the ‘Managing Our Estuaries’ report (Parliamentary Commissioner for the Environment, 2020). Excessive sediment deposition in coastal areas has caused changes in the ecosystem processes in a number of estuaries. Several reports show increased mangrove distribution because of an increase in

sedimentation in coastal areas in northern New Zealand (Lundquist et al., 2014; Win et al., 2015). The accumulation of sediment also damages the habitat of kuku, green-lipped mussels (*Perna canaliculus*) (Ministry for the Environment & Stats NZ, 2019b) and tuangi, cockles (*Austrovenus stutchburyi*) (Anderson et al., 2019). Excessive sedimentation can smother coastal benthic environments and river beds, which disturbs and displaces species such as fish and invertebrates, and disrupts ecological functions (Ministry for the Environment & Stats NZ, 2019b; Thrush et al., 2004).

Sediment impacts because of forest plantation activities have pressured the forest sector to show more concern for environmental protection and waste disposal management (New Zealand Institute of Forestry, 2005). Forest plantation management becomes important to protect the state of catchments. The Ministry for the Environment and Stats NZ (2020) identified that different management practices result in different freshwater conditions. Baillie (2020) argued that well-planned riparian zones could prevent some sediment and runoff from forest activities from entering waterways. Several activities have been proposed to local governments to reduce the sedimentation risk in the receiving environment. Ulrich (2020) suggested that, to reduce the erosion, several activities need to be taken such as setbacks from the shoreline, setbacks from streams coupled to the coast, slope controls on replanting, and more stringent harvest and earthwork controls.

2.2.2 Sedimentation monitoring

In controlling sedimentation and erosion, the New Zealand government has set a limit on total sediment loads in waterways. These are embedded on the NPS-FM in Appendix 2A for attribute limits and Appendix 2B for an attribute requiring an action plan (Figure 2.7). For Appendix 2A, Table 8, local authorities should monitor the suspended fine sediment by measuring its visual clarity (metres) in the river. Local governments may use turbidity as an indicator and convert it to measure the clarity. However, Bright and Mager (2017) argued that turbidity is not a reliable enough measure to suspended sediment concentration in the presence of dissolved and particulate organic material. In Appendix 2B Table 16, the attribute measured is deposited sediment for wadable rivers on the streambed with the unit percentage of fine sediment cover. The percentage of fine sediment is measured using visual assessment of the surface area of the streambed (Clapcott et al., 2011). However, this method required highly skilled operators for reproducibility (Latulippe et al., 2001).

| Value (and component) | Ecosystem health (Water quality) | | | |
|--|---|-----------------|-----------------|-----------------|
| Freshwater body type | Rivers | | | |
| Attribute unit | Visual clarity (metres) | | | |
| Attribute band and description | Numeric attribute state by suspended sediment class | | | |
| | 1 | 2 | 3 | 4 |
| A Minimal impact of suspended sediment on instream biota. Ecological communities are similar to those observed in natural reference conditions. | ≥1.78 | ≥0.93 | ≥2.95 | ≥1.38 |
| B Low to moderate impact of suspended sediment on instream biota. Abundance of sensitive fish species may be reduced. | <1.78 and ≥1.55 | <0.93 and ≥0.76 | <2.95 and ≥2.57 | <1.38 and ≥1.17 |
| C Moderate to high impact of suspended sediment on instream biota. Sensitive fish species may be lost. | <1.55 and >1.34 | <0.76 and >0.61 | <2.57 and >2.22 | <1.17 and >0.98 |
| National bottom line | 1.34 | 0.61 | 2.22 | 0.98 |
| D High impact of suspended sediment on instream biota. Ecological communities are significantly altered and sensitive fish and macroinvertebrate species are lost or at high risk of being lost. | <1.34 | <0.61 | <2.22 | <0.98 |

The minimum record length for grading a site is the median of 5 years of at least monthly samples (at least 60 samples).

Councils may monitor turbidity and convert the measures to visual clarity.

See Appendix 2C Tables 23 and 26 for the definition of suspended sediment classes and their composition.

The following are examples of **naturally occurring processes** relevant for suspended sediment:

- naturally highly coloured brown-water streams
- glacial flour affected streams and rivers
- selected lake-fed REC classes (particularly warm climate classes) where low visual clarity may reflect autochthonous phytoplankton production.

(a)

| Value (and component) | Ecosystem health (Physical habitat) | | | |
|---|---|-------------|-------------|-------------|
| Freshwater body type | Wadeable rivers | | | |
| Attribute unit | % fine sediment cover | | | |
| Attribute band and description | Numeric attribute state by deposited sediment class | | | |
| | 1 | 2 | 3 | 4 |
| A Minimal impact of deposited fine sediment on instream biota. Ecological communities are similar to those observed in natural reference conditions. | ≤7 | ≤10 | ≤9 | ≤13 |
| B Low to moderate impact of deposited fine sediment on instream biota. Abundance of sensitive macroinvertebrate species may be reduced. | >7 and ≤14 | >10 and ≤19 | >9 and ≤18 | >13 and ≤19 |
| C Moderate to high impact of deposited fine sediment on instream biota. Sensitive macroinvertebrate species may be lost. | >14 and <21 | >19 and <29 | >18 and <27 | >19 and <27 |
| National bottom line | 21 | 29 | 27 | 27 |
| D High impact of deposited fine sediment on instream biota. Ecological communities are significantly altered and sensitive fish and macroinvertebrate species are lost or at high risk of being lost. | >21 | >29 | >27 | >27 |

The indicator score is percentage cover of the streambed in a run habitat determined by the instream visual method, SAM2 as defined in p. 17-20 of Clapcott JE, Young RG, Harding JS, Matthei CD, Quinn JM, and Death RG. 2011. *Sediment Assessment Methods: Protocols and guidelines for assessing the effects of deposited fine sediment on in-stream values*. Cavthron Institute: Nelson, New Zealand. (see clause 1.8)

The minimum record length for grading a site is the median of 60 samples taken over 5 years of monthly monitoring, or longer for sites where flow conditions only permit monthly monitoring seasonally.

See Tables 24 and 26 in Appendix 2C for deposited sediment classes and their composition.

This attribute does not apply in river environment classes shown in Table 25 in Appendix 2C, or where clause 3.25 requires freshwater habitat monitoring.

(b)

Figure 2.7: The attribute table of (a) suspended fine sediment; (b) deposited sediment for river and wadeable river in the National Policy Statement for Freshwater Management 2020 (New Zealand Government, 2020a)

Monitoring will be carried out on each Freshwater Management Unit (FMU). According to the NPS-FM 2020, FMU:

means all or any part of a water body or water bodies, and their related catchments, that a regional council determines under clause 3.8 is an appropriate unit for freshwater management and accounting purposes; and part of an FMU National Policy Statement for Freshwater Management 2020 7 means any part of an FMU including, but not limited to, a specific site, river reach, water body, or part of a water body. (New Zealand Government, 2020a, pp. 6-7)

The methodology to determine a FMU is not clearly defined in the NPS-FM. However, the NPS-FM specifies that the regional council should identify monitoring sites, primary contact sites, threatened species habitat, outstanding waterbodies, and natural inland wetlands within each FMU. According to NPS-FM Subpart 2 (3.20), if an FMU or part of FMU is degraded or degrading, local authorities should take any measure to counter the degradation as soon as practicable. In NPS-FM (1.4), 'degraded' defined as:

in relation to an FMU or part of an FMU, means that as a result of something other than a naturally occurring process:

- (1) *a site or sites in the FMU or part of the FMU to which a target attribute state applies:*
 - (a) *is below a national bottom line; or*
 - (b) *is not achieving or is not likely to achieve a target attribute state; or*
- (2) *the FMU or part of the FMU is not achieving or is not likely to achieve an environmental flow and level set for it; or*
- (3) *the FMU or part of the FMU is less able (when compared to 7 September 2017) to provide for any value identified for it under the NOF*

'Degrading' defined as:

in relation to an FMU or part of an FMU, means that any site or sites to which a target attribute state applies is experiencing, or is likely to experience, a deteriorating trend (as assessed under clause 3.19).

Therefore, to determine whether degradation is occurring, monitoring should be undertaken. As in effect-based planning, planning's key components are the desired end results and how to measure them (Johnston, 2016). Local authorities are required to develop a target attribute and action plan. The plan needs to be notified by 31 December, 2024.

To meet the target, councils need to monitor the target attribute states of the NPS-FM implementation (Ministry for the Environment, 2020b). The state of environmental monitoring is mandated under Section 35 of RMA. Section 35 of the RMA requires local government to monitor the efficiency and effectivity of policies, rules, and the methods stated in its plan and policy documents. Local governments are also required to monitor the exercise of resource consents. In terms of monitoring for the implementation of the standards, RMA S43A (8) allows councils to charge the monitoring activities. The NES-PF has given councils the ability to monitor all the restricted discretionary activities and charge monitoring fees for permitted forest plantation activities in section 106. Foresters also need to provide a proposed monitoring routine in the forestry earthwork management plan and harvest plan as prescribed under schedule 3 NES-PF.

Monitoring is important to provide data for determining the action taken to minimise or avoid potential environmental impacts. Despite the availability of a monitoring mechanism, it is argued that comprehensive monitoring of the erosion is still weak (Basher, 2013; Bright and Mager, 2017). Current monitoring sites for planted forests are usually situated to monitor large catchments with mixed land use. Baillie and Neary (2015) argued that large catchment monitoring sites cannot depict the sedimentation impact caused by forest plantation activity. Thus, the regional councils should ensure that monitoring sites are located to identify the contribution of forest plantation areas to

overall water quality and not be mixed with other land uses. By doing so, monitoring data will be valuable enough to be used as data for developing mitigation strategies (Bright and Mager, 2017).

2.2.3 The mitigation of the adverse effects of excess sedimentation

Every impact on the environment must be managed as dictated in RMA S17. The Act mandated every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment. Basher and Painter (1997) argued that there are three approaches to mitigating the potential hazard of erosion. They are reduce the causative factors, enhance the land resistance to the erosion, and reduce the unwanted impact of erosion.

High rainfall intensity, hill country topography, and high wind speed are the main factors behind New Zealand's high erosion rates (Basher, 2013). Pearson and Rissmann (2020) argued that soil type and topography also influence sedimentation rates in catchments. Marden and Rowan (2015) concluded that a storm event in 1995 and other factors in the Coromandel Region contributed a large share to sedimentation and erosion. Furthermore, climate change is predicted to necessitate an increase in future mitigation efforts (Basher et al., 2020). Modelling of the Manawatū–Whanganui region using SedNetNZ showed that, despite mitigation efforts through land management, they could only help offset sedimentation risk to 2043 but not be effective in 2090 because of climate change impacts (Basher et al., 2020).

New Zealand has made various efforts to mitigate and avoid the impacts of erosion and sedimentation. In hill country, the Ministry for Primary Industries, together with councils and landowners, has established the Hill Country Erosion (HCE) programme to manage the risk of erosion (Ministry for Primary Industries, 2020). The programme includes afforestation projects at the regional level. In the 2018 round (July 2019-June 2023), the available funding for the HCE was \$34 million (Ministry for Primary Industries, 2018b).

The government also has provided several standards and national policies that allow councils to more effectively manage erosion and sedimentation risks, such as NZCPS, NES-F, NPS-FM and NES-PF³. NES-PF specifically regulates plantation forestry activity. It also requires a management plan for earthworks, quarries, and harvesting activities to identify any potential environmental risk. NES-PF mostly provides stricter rules for forestry activity in the Land Use Capability Class 8e and Erosion Susceptibility Classification (ESC)'s Red Zone. According to NES-PF, Land Use Capability Class 8e is an area that is prone to severe and extreme erosion limitation and hazards that make it unsuitable for

³ See Chapter 3 for the detailed explanation

arable, pastoral or commercial forestry use. Such land is mainly located on very steep high elevation areas, but very steep slopes can be found at low elevations and highly erodible areas (Lynn et al., 2009). ESC is a tool under the NES-PF to determine erosion risk. It consists of four classes that are symbolised by the unique colours. The ESC classifies erosion risks as low (green), moderate (yellow), high (orange) and very high (red). In addition, the policy allows local government to tailor-make rules and standards in their planning document to be more stringent.

Managing erosion and sedimentation from the forest plantation activity in erosion prone areas is necessary to reduce impacts on any sensitive coastal and freshwater receiving environments. For example, in a plantation forest that is prone to gully erosion, runoff management during the harvesting and earthwork phases is essential. Thus, the bare land needs to be replanted as soon as possible (Basher et al., 2016). New Zealand Forest Owners Association (2020b) recommends hiring a highly skilled forestry geotechnical engineer to construct the forestry roads in difficult terrain because they require complex assessments of geological, soil and slope stability conditions. Management is also important especially during the post-harvest period; Marden et al. (2015) argued that the chance of a landslide increases during the post-harvest period.

Chapter 3

The Regulatory Framework for Plantation Forestry

This chapter explains the framework that regulates plantation forestry activities in New Zealand. The provision of plantation forestry is regulated under the Resource Management Act 1991 (RMA). The RMA sets the basic foundation in developing the national direction, i.e., the National Environment Standard for Plantation Forestry (NES-PF), that provides national consistency in standards for implementation at the regional and local level.

3.1 Resource Management Act 1991

The Resource Management Act 1991 (RMA) sets the basis for environmental management in New Zealand, including protection from the adverse effects of forestry. The RMA has streamlined the central government agency and local government responsibilities in governing land, air and water resources (Freitas & Perry, 2008). Under Section 5, the RMA aims to promote sustainable resource management of natural and physical resources. Therefore, to manage these resources, the RMA has set several imperatives under section 6 to recognize matters of national importance. National importance includes: preserving the natural character of the coastal environment, wetlands, lakes, and rivers; protecting indigenous vegetation and wildlife habitat; and managing significant risk from natural hazards.

There is a three-tier structure for planning (Johnston, 2016). Central government is responsible for providing policy statements and environmental standards (national direction). Regional councils and unitary authorities are responsible for developing regional policy statements and plans. District plans are made by district councils as territorial authorities. Implementation of the RMA is primarily done by local authorities, comprising separate regional and district councils within a large geographic area, or unitary authorities. According to Section 5 of the Local Government Act 2002 (LGA 2002), a unitary authority is a territorial authority (city council or district council) that has the same responsibilities, duties, and powers as a regional council.

The responsibility for soil conservation and water quality falls under regional council jurisdiction, whereas district councils manage land-use activities. In Section 30 (1c) RMA, regional councils should control land use for soil conservation, water quality maintenance, the maintenance and

enhancement of aquatic ecosystems, biodiversity, and the management of natural hazards. This includes the need to manage contaminants, such as excessive sedimentation.

According to the RMA Section 2, 'contaminant' is defined as:

contaminant includes any substance (including gases, odorous compounds, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat—

(a) when discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or

(b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto or into which it is discharged

Regional councils follow the boundaries of catchments rather than following the population distribution (Figure 3.1), reflecting the regional council's role in managing the environment (Freitas & Perry, 2008). The RMA has given many responsibilities to local government to manage environmental resources, while considering community and cultural needs and gaining economic benefit from the resources (Johnston, 2016).

To help administratively manage the activities under the RMA, local government under the Local Government Act (LGA) 2002 (S76A) has been given the ability to develop long term plans to manage and calculate their capital assets for accounting and financial reporting. The long-term plan is for 10 years and can be reviewed every 3 years (McNeill, 2016). Section 10 of the LGA promotes social, economic, environmental, and cultural well-being. Local governments, therefore, develop their plans and policies based on their communities' social, economic, and well-being; enhancement and maintenance of the quality of the environment; and future generation needs. To achieve this, local government has been given the full rights, power, privilege, and capacity to carry out those activities.

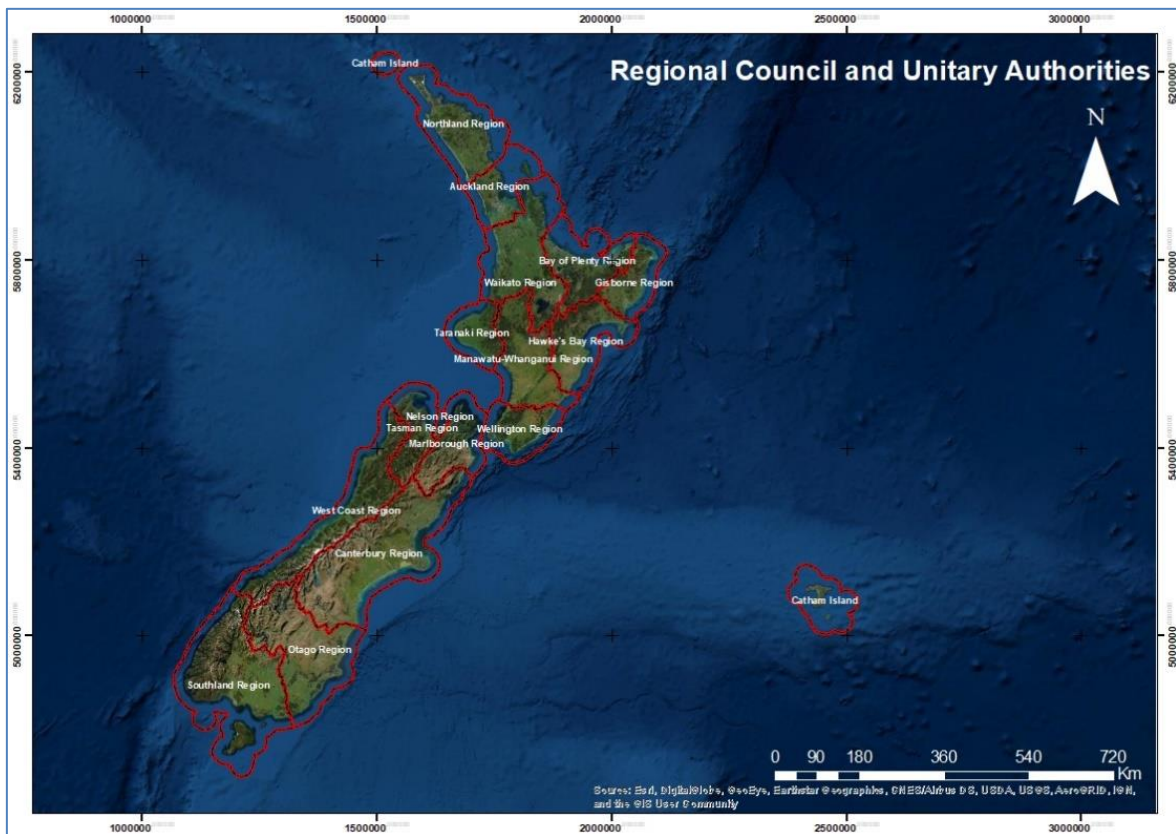


Figure 3.1: Regional council and unitary authority boundaries (ESRI; Stats NZ, 2020)

The long-term plan (LTP) is beneficial for the local governments to describe their activities and provides integrated decision-making and co-ordination of resources (LGA S93). Local governments are required to develop a LTP to achieve immediate and long-term outcomes by consulting with the community (Freitas & Perry, 2008). Moreover, the LTP should also inform the budget allocated for fulfilling local government's responsibilities and meeting agreed community aspirations. For example, the budget for science and monitoring of sedimentation caused by forest plantation activity is set under the LTP to give effect to Section 35 of RMA. However, the Environmental Defence Society (2016) argued that local authority funding arrangements depend on political will. This leads to a systemic issue that can cause councils to be unable to achieve their outcomes because of a lack of information on the state of the environment. National directions under the RMA can compel councils to undertake such activities.

3.2 National Directions

3.2.1 National Environmental Standards for Plantation Forestry (NES-PF)

The NES-PF regulate several activities in plantation forests, including: afforestation; pruning and thinning to waste; earthworks; river crossings; forestry quarrying; harvesting; mechanical land preparation; replanting; ancillary activities; and discharges, disturbances, diversions, noise, dust, indigenous bird nesting, and fuel storage and refuelling (regulation 5). The responsible authority for NES-PF is Te Uru Rākau – New Zealand Forest Service, under Ministry for the Primary Industries. The regulation provides provision for managing these forest plantation activities, including managing sedimentation’s impact. Provision for sediment discharges is included in regulations 26, 56, 65, 74(6) and 90 (Bright, 2021). Under the RMA, sedimentation is classified as a contaminant (see section 3.1 for the definition of a contaminant).

In Regulation 3 of NES-PF, sedimentation defined as:

solid material that—

- (1) is mineral or is mineral and organic; and*
- (2) is in suspension, is being transported, or has been moved from the site of origin by air, water, gravity, or ice and has come to rest on the earth’s surface, either above or below water*

In developing the plan to align with NES-PF, the local authority can implement a more stringent rule, as stated in regulation 6. The “stringency” rule can be applied based on the national instruments, matters of national importance, and unique and sensitive environments. The full wording of regulation 6 NES-PF is:

National instruments

- (1) A rule in a plan may be more stringent than these regulations if the rule gives effect to—*
 - (a) an objective developed to give effect to the National Policy Statement for Freshwater Management:*
 - (b) any of policies 11, 13, 15, and 22 of the New Zealand Coastal Policy Statement 2010.*

Matters of national importance

- (2) A rule in a plan may be more stringent than these regulations if the rule recognises and provides for the protection of—*

(a) outstanding natural features and landscapes from inappropriate use and development; or

(b) significant natural areas.

Unique and sensitive environments

(3) A rule in a plan may be more stringent than these regulations if the rule manages any—

(a) activities in any green, yellow, or orange zone containing separation point granite soils areas that are identified in a regional policy statement, regional plan, or district plan:

(b) activities in any geothermal area or any karst geology that are identified in a regional policy statement, regional plan, or district plan:

(c) activities conducted within 1 km upstream of the abstraction point of a drinking water supply for more than 25 people where the water take is from a water body:

(d) forestry quarrying activities conducted over a shallow water table (less than 30 m below ground level) that is above an aquifer used for a human drinking water supply

The section above sets out the circumstances where a local government can implement greater stringency. Under regulation 6, local authorities should consider two national instruments in implementing greater stringency: the NZCPS and NPS-FM. However, this raises concern over its effective implementation. This is because, as Wright et al. (2019) argued, although NES-PF has put the stringency for policy 11 NZCPS, only a few councils have identified marine significant natural areas under section (6)(c) of the RMA. They added that this potentially could become the barrier for imposing sedimentation protection through regional rules. Ulrich (2020) argued that stringency in the Proposed Marlborough Environment Plan (PMEP) 2020 should also cover harvesting and replanting plans to manage major sources of sediment delivery to estuaries and inshore waters. The Parliamentary Commissioner for the Environment (2020) found that local governments find it hard to implement stringency. However, the Commissioner did not explain further the reasons for this.

Besides the stringency provision, local governments may also charge for monitoring forest plantations. Regulation 106, NES-PF, gives local authorities the right to charge for monitoring permitted activities. Those activities include earthworks (regulation 24), river crossings (regulation 37), forestry quarrying (regulation 51), and harvesting (regulation 63(2)).

3.2.2 The New Zealand Coastal Policy Statement (NZCPS)

Sedimentation and erosion have been considered as important issues in the NZCPS. There are seven objectives of the NZCPS, of which two can be related to coastal environmental protection from excessive sedimentation. In Objective One, the NZCPS aims to safeguard the integrity of the coastal environment's functioning and resilience and sustain its ecosystems. Objective Two aims to preserve the natural character of the coastal environment and protect natural features and landscape value.

NES-PF provides for provision to be more stringent than the standards to manage the impact of forest activity on the coastal environment. According to the NES-PF, the standards can be more stringent to give effect to NZCPS policy 11 (Indigenous Biodiversity, 13 (Preservation of Natural Character), 15 (Natural Features and Natural Landscapes), 22 (Sedimentation). The exact wording for the policies can be seen in Appendix A.

Policy 11 sets out biodiversity management. The aim of policy 11 is to protect indigenous biological diversity in the coastal environment. As a receiving environment, the coastal zone is subject to environmental damage and habitat degradation. Therefore, according to policy 11, all activities should avoid significant effects and manage impact on coastal environment habitats.

In policy 13, local government is required to identify the natural character and preserve the natural character of the coastal area. Natural character is different from the outstanding natural features and landscapes (policy 15); and is not defined under the RMA. Natural character includes the natural elements and natural processes of the coastal environment (biophysical, ecological, geological and geomorphological), as well as natural landforms (Department of Conservation, 2013).

Policy 15 mandates local government to manage any adverse effects on natural features and landscapes. Local government is also instructed to identify the natural features and landscapes in its region. Policy 15 was designed to give effect to RMA Section 6(b) regarding the protection of outstanding natural features and landscapes, and section 7, to protect amenity value and to enhance the quality of the environment.

Policy 22 explicitly describes the objectives to manage sedimentation. Under policy 22, local authorities should assess and monitor sedimentation levels and impacts on coastal environments. Local authorities should also control vegetation removal impacts, including from harvesting activity of plantation forests. Moreover, the authorities should reduce the sediment load in runoff and stormwater through controls on the activities.

However, in implementing those four policies, the Department of Conservation (DOC) has listed the key relevant policy in NZCPS implementation guidelines. For example, both policies 11 and 22, listed policy 21 (Enhancement of Water Quality) as one key related policy (Department of Conservation, 2018, 2019). The enhancement of water quality includes identifying coastal water and water bodies that have deteriorating water quality and include the provision of a plan to improve and restore water quality (if applicable) in the regional coastal plan. For policy 11, the deterioration of water quality will cause adverse effects on threatened indigenous taxa, ecosystems and habitats. In relation to policy 22, the implementation of policy 21 is partially undertaken through policy 22(4), that requires local government to manage land use activity to reduce sediment loading in run-off and stormwater.

In addition to all policies listed above, policy 3 of NZCPS stipulates the precautionary approach in the absence of or insufficient information about the adverse effect caused by an activity. Local governments, in case-by case basis, can decide whether they want to restrict the activity or apply adaptive management. This will be based on the “a careful assessment and weighting of relevant matters” (Department of Conservation, n.d., p. 7).

3.2.3 The National Policy Statement for Freshwater Management (NPS-FM)

Water quality degradation because of human and land use activity has been a major concern in New Zealand (Ministry for the Environment & Stats NZ, 2019a, 2020). The availability and the quality of water has become important to support cultural and social values and the economy (Kaye-Blake et al., 2014). The conversion of native vegetation to pasture and plantation forests has increased soil erosion following earthworks and harvesting. The Ministry for the Environment and Stats NZ (2019a) estimated that the economic loss because of soil erosion and landslides was at least \$250–300 million a year. NPS-FM was established to provide national direction for managing the stressors on freshwater, including excess sediments. It was introduced in 2011 and has been replaced and amended in 2014, 2017 and 2020.

The objectives of NPS-FM 2020 are to maintain the health and well-being of water bodies, the health needs of people, and to provide for people and communities’ wellbeing. The hierarchy of objectives is:

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

- (1) first, the health and well-being of water bodies and freshwater ecosystems*
- (2) second, the health needs of people (such as drinking water)*
- (3) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.*

The NPS-FM emphasizes the importance of Te Mana o te Wai to the health of New Zealand, which is also mentioned in its Policy 1. The concept of Te Mana o te Wai has been used since NPS-FM 2014 to encourage an integrated approach in water management from mountain to the sea – ki uta ki tai (Smiler et al., 2019). Te Mana o te Wai emphasises the importance of balancing water management to restore and preserve water bodies' condition, wider environment and communities. The concept states that managing the impact of activities and land use should be considered on a larger scale, not only to the impact to the surrounding environment but also to the people who live on the land.

Therefore, to encourage holistic water management, policy 3 of the NPS-FM sets out the objective to manage the water in an integrated way on a catchment basis, including managing the effects on the receiving environment. Policy 5 describes the importance of maintaining the health and well-being of water bodies.

Local authorities should also consider how to regulate effectively to meet the NPS-FM's national target for improving the water quality as mentioned in policy 12. Therefore, as in policy 13, local authorities should regularly monitor the condition of water bodies and action should be taken if water bodies are degraded to achieve the national target. Monitoring results should be regularly reported and published (policy 14). Therefore, this policy should also prevail in freshwater bodies that have been degraded by excessive sedimentation from forestry activities.

The NPS-FM also states that, to maintain the water bodies' condition, local authorities should limit resource use by controlling land use activity. Hence, local authorities may set the long-term vision for each Freshwater Management Unit (FMU) on which to base such controls (New Zealand Government, 2020a, p. 12).

The NPS-FM also has another provision to manage sedimentation in the water bodies. Local authorities should identify if a riverbed is soft-bottomed or hard-bottomed. If identification shows that there is a change from hard-bottomed to soft-bottomed, then the local authority should monitor sedimentation using Sediment Assessment Method 2 (SAM2) at least annually; monitor the

freshwater habitat; identify the possibility of restoring the water's conditions; and prepare to restore the conditions if the results suggest that this is feasible (New Zealand Government, 2020a, p. 27).

However, despite its aim to improve the paradigm of managing freshwater, there is concern that it will be overlapped by the NES-PF. Fowler and Buddle (2020) argued that, to avoid confusion in forest plantation management, the NES-PF and NPS-FM should be integrated. For example, high-risk areas and environmental features identification, which is dictated in NPS-FM, can be used as one risk assessment that should be integrated into regional maps. Identification will include threatened species habitats, outstanding water bodies, natural inland wetlands (Part 3, 3.8) and the waterway values (Part 3, 3.9) in each FMU. These regional maps could provide a spatial database that can help councils identify site-specific risks for forestry activity, so they could meet the objectives of NPS-FM. Therefore, Fowler and Buddle (2020) suggested revising the NES-PF by including the new NPS-FM regional map risk assessment that has been integrated with the NES-PF. This recommendation is aligned with the recommendation provided by the Resource Management Review Panel (2020), that aims to integrate in the resource management reform all the existing national direction instruments to avoid potential conflict.

3.2.4 The National Environmental Standards for Freshwater (NES-F)

The NES-F was amended in 2020 to provide better provisions on managing freshwater use. In general, NES-F puts more emphasis on controlling agricultural activity. However, several provisions overlap between the NES-F and NES-PF, such as vegetation clearance in wetland and earthworks within or adjacent to wetlands (Ministry for the Environment, 2020a). Under regulation 7 of NES-F, it is regulated that where there is an overlapping provision between the two standards, then the NES-PF will prevail over the NES-F.

3.3 The NES-PF and Plan Alignment

Before gazetted of the NES-PF, the provision of regulation for forest plantations was managed by each local authority; there was no consistency in forest plantation regulations across the country. This has caused increasing operational cost and management complexity for the transboundary forest plantation areas (Fowler, 2017; New Zealand Government, 2017a; Strang et al., 2015). For example, in a draft of the Auckland Unitary Authority Plan before the commencement of NES PF,

Fordyce (2013) argued that there was lack of clarity over the definitions of some forestry activities. Therefore, NES-PF was made to provide consistent national guidance for local government. However, Rayonier Matariki Forests claimed that the standards are inconsistent with the NZCPS and NPS-FM. This could lead to confusion for the operator on the ground (Parliamentary Commissioner for the Environment, 2020).

All the existing regional planning and policy related to the NES-PF needs to be changed to align with the NES-PF as dictated in RMA S44A. Local government must remove all duplicated and conflicting rules with the NES-PF (RMA S44A(4)). Duplication means that the rule duplicates the provision in the NES-PF. Meanwhile, a conflicting rule is described in the RMA S44A(1) as:

Subsections (3) to (5) apply if a local authority's plan or proposed plan contains a rule that conflicts with a provision in a national environmental standard. A rule conflicts with a provision if—

(1) both of the following apply:

(a) the law is more stringent than the provision in that it prohibits or restricts an activity that the provision permits or authorises; and

(b) the standard does not expressly say that a rule may be more stringent than it; or

(2) the rule in the plan is more lenient than a provision in the standard and the standard does not expressly specify that a rule may be more lenient than the provision in the standard

As in regulation 6 of the NES-PF, a plan rule can be more stringent than NES-PF, so a regional council can impose any stringency for specific matters mentioned in the NES-PF. Any stringent rule that is not regulated by the NES-PF is conflicted and therefore needs to be removed (Ministry for Primary Industries, 2018d). However, a regional council cannot have a more lenient rule or plan than the NES-PF since it's not mentioned in the NES-PF. In RMA S44A, the removal of duplication and conflict can be carried out without following the Schedule 1 RMA process⁴ and as soon as the standard comes into force. If the regional council decides to have a more stringent rule as dictated in regulation 6 NES-PF, the regional council needs to comply with RMA s32 to justify its reasons (Ministry for Primary Industries, 2018d). The general process of plan alignment is shown in Figure 3.2.

⁴ Schedule 1 under RMA provides provision for preparation and change of policy statements and plans by local authorities, including consultation. The process of plan change is: plan notification, submission, hearing, decision, appeal.

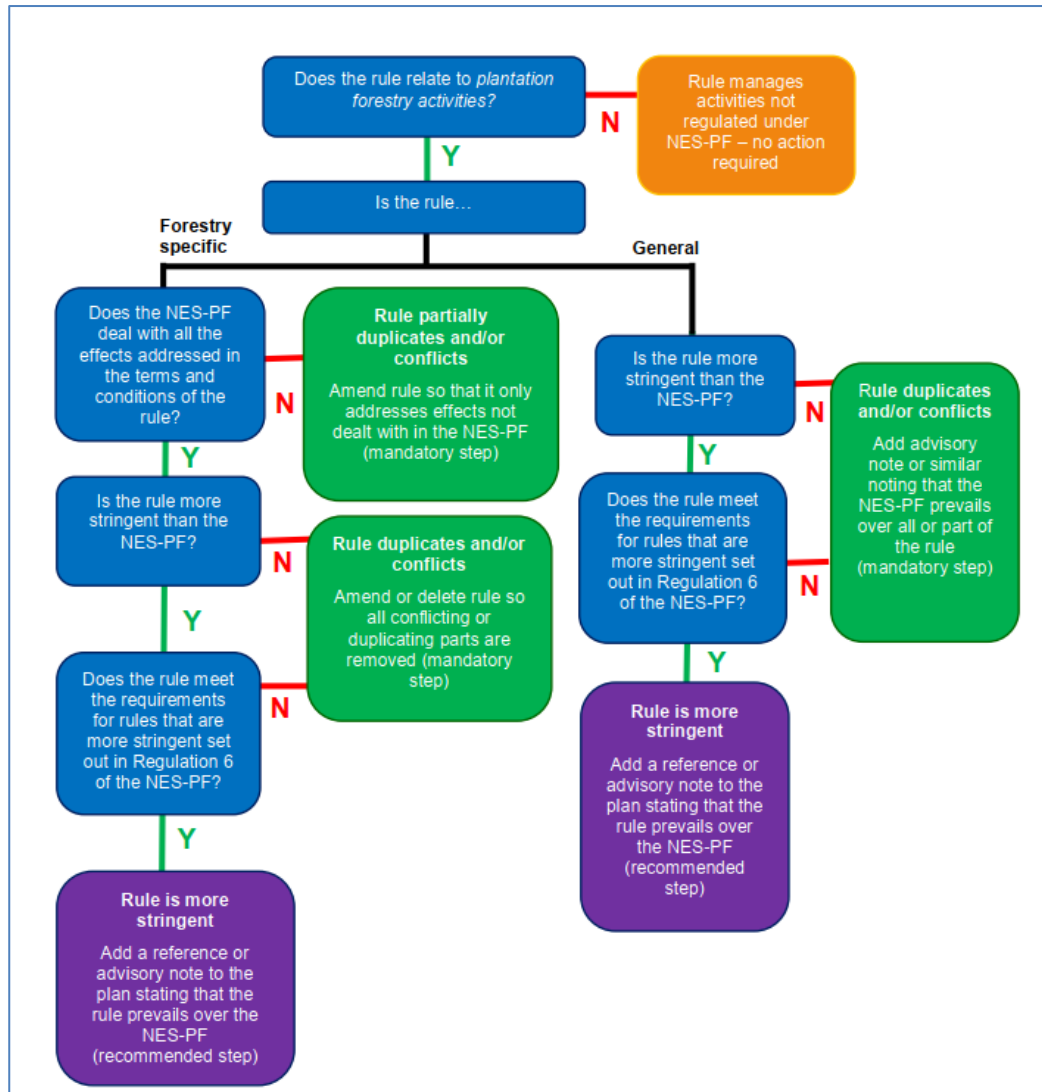


Figure 3.2: Regional council plan alignment with NES-PF (Ministry for Primary Industries, 2018d)

3.3.1 Triggers for consent status under NES-PF

In general, national standards may prohibit an activity, allow an activity, or put the restrictions on some activity (Palmer, 2012). In RMA s43A, if the activity will cause an adverse effect, the NES must not allow the activity unless a resource consent is required. According to RMA s87A, activities can be categorized as permitted activity (low risk), controlled activity, restricted discretionary activity, discretionary activity (high risk), non-complying activity, and prohibited activity.

Since the regulation is an effect-based regulation, the consent requirement is determined by assessing its risk. One tool that was introduced in the NES-PF to determine the environmental risk is the Erosion Susceptibility Classification (ESC). In a high-risk area classified as either orange or red zone, consent is needed for all types of forestry activities regulated under NES-PF (Ministry for

Primary Industries, n.d.). Since the impact of different forest activities varies among regions, the NES-PF also acknowledges each region's uniqueness. There are several steps to assess whether a forestry activity complies with the NES-PF or requires resource consent (Figure 3.3).

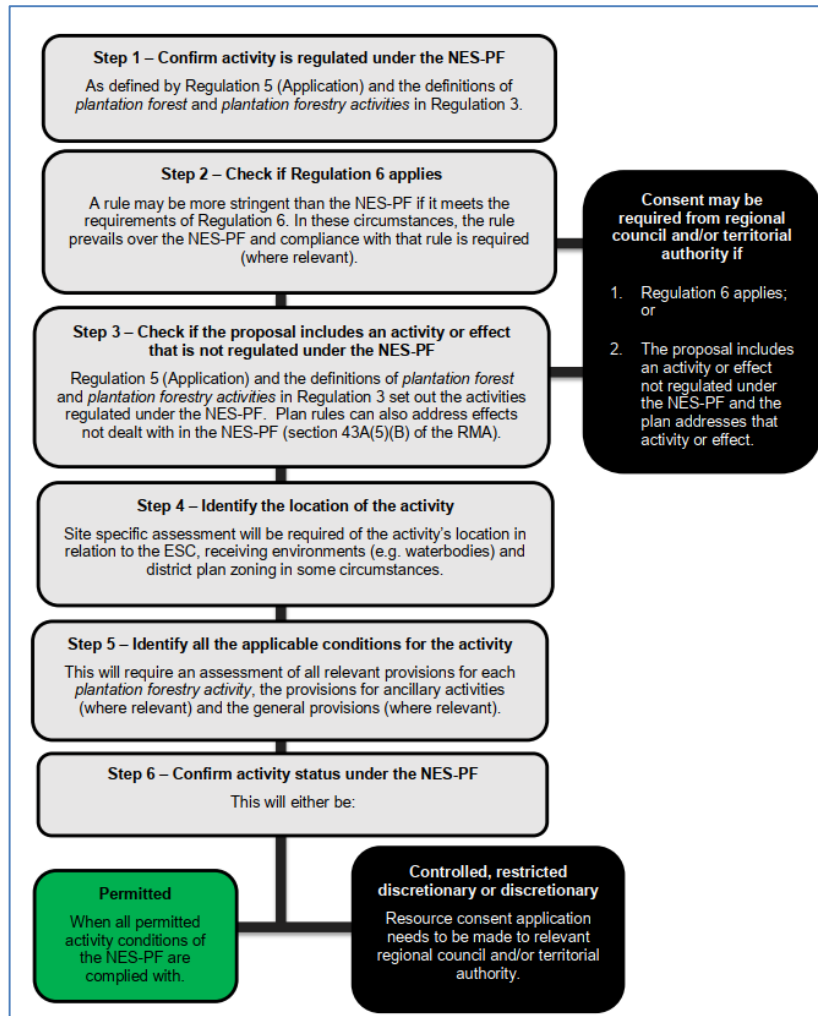


Figure 3.3: NES-PF resource consent assessment (Ministry for Primary Industries, 2018c)

3.3.2 Erosion Susceptibility Classification (ESC) under NES-PF

The ESC was introduced in 2011 and has been adopted to underpin erosion assessment in NES-PF (Bloomberg et al., 2011). The ESC classification was developed using the Land Use Capability (LUC) system. LUC is symbolized by Arabic numbers (I to VIII) (Figure 3.4). A higher LUC number means that land use has limited capability to be used for human activity (Lynn et al., 2009). Each LUC class is categorized into subclasses based on its dominant hazard: “e” (erosion), “w” (wetness), “c” (climate) and “s” (soil). There is a special treatment for land use in the NES-PF that is classified as LUC 8e.

Material removed due to copyright compliance

Figure 3.4: The land use classification system (Lynn et al., 2009)

ESC is a tool for risk assessment of the potential forest plantation activity impacts. It divided all New Zealand areas into four categories: low, moderate, high, and very high risk of erosion (Figure 3.5). It can help foresters and councils identify areas prone to erosion because of forestry activity such as afforestation, replanting, mechanical land preparation, harvesting, forestry quarrying, and earthworks (Ministry for Primary Industries, n.d.).

As part of the tools to reduce the impact of erosion and sedimentation, ESC has been criticised as not reliable enough to accurately identify erosion prone areas in all situations (Griffiths et al., 2020; Hendrickson, 2018; Ulrich, 2020). After its first publication, the ESC was revised in 2015 to improve the high and very high categories (Basher et al., 2015). Dominant erosion type information (earth flows, land sliding, tunnel gullyng, wind erosion, bank erosion, and deposition), rock type and topography were added to the classifications, resulting in 21 terrain classifications (Basher et al., 2016). In 2017, another revision was conducted that sought to improve the classification of LUC units (Basher & Barringer, 2017), increase the coverage for all New Zealand, improve precision in classification of LUC units, and create an overlay for specific erosion types and class 8e (Hendrickson, 2018).

Despite the changes, some still argue that the scale that is used for ESC is too coarse (Griffiths et al. 2020, Ulrich 2020). For example, research in the Tasman Region shows that that current ESC failed to

distinguish areas with high and landslide risk. Arguably this is because of the use of a 1:50,000 scale that is more undetailed to represent localities (1:10,000) (Griffiths et al., 2020). Marlborough District Council raised concern about the potential adverse effect for permitted activities and, therefore, it has conducted LiDAR mapping to increase the accuracy in its region. That map will be available this year (Urlich, 2020).

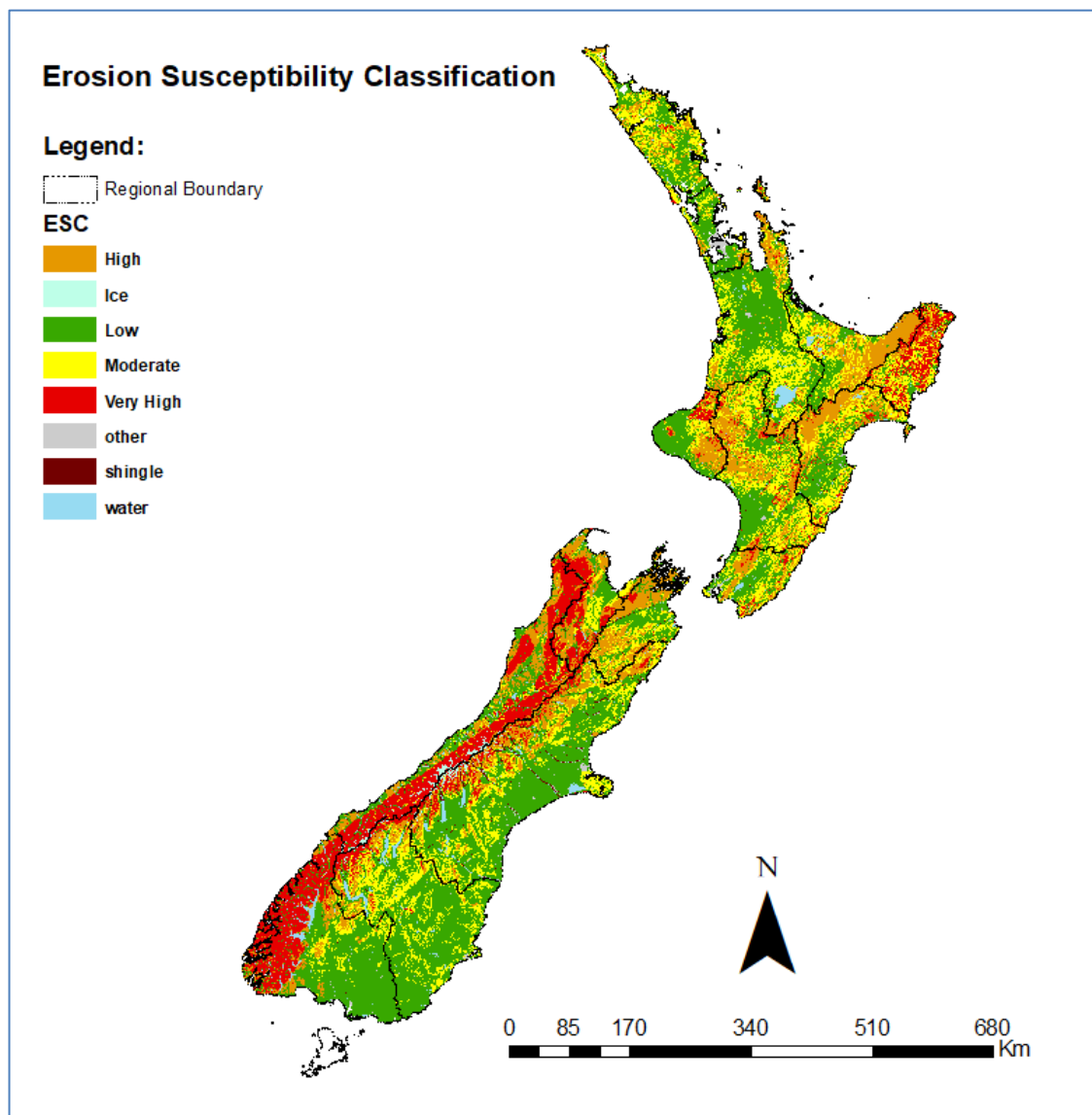


Figure 3.5: Modelled Erosion Susceptibility Classification in NES-PF (Ministry for Primary Industries, 2018a; Stats NZ, 2020)

Chapter 4

Methodology

This chapter explains the data needed to address the study's objectives and how the data were collected. To address objective 1, plan alignment documentation was sought from each regional planning document. For objective 2, stringency was assessed through regional planning and policy documents, section 32 reports, and other supporting documents (i.e., memoranda, minutes of meetings). There are two approaches to collect data: use questionnaires under the Local Government Information and Meeting Act 1987 (LGOIMA) and Official Information Act 1982 (OIA); and data collection from official government and council websites. The documents are analysed using qualitative methods to understand the implementation of NES-PF at the local level. Spatial analysis also was conducted to provide information for the case study section.

4.1 Data Collection

The Local Government Information and Meeting Act 1987 (LGOIMA) was used to collect information from regional councils and unitary authorities. Under regulation 10 of LGOIMA, any person can request specific information from the local authority. For this dissertation, information requests were sent to the 11 regional councils and 5 unitary councils. A formal request was made to the Ministry for Primary Industries to obtain the "One year review of the NES-PF". The request was made under the Official Information Act 1982 (OIA). The OIA is a statute similar to the LGOIMA, but for requests for information from central government agencies and Crown operated companies. Under LGOIMA and OIA, government has an obligation to respond to the request. A decision on the request should be made in no more than 20 working days, but both councils and ministries may ask for an extension.

The LGOIMA requests were sent to all councils on 16 and 17 March 2021 (Appendix B). Except for Manawatū-Whanganui, responses were received by 15 or 16 April 2021. Manawatū-Whanganui responded on 19 April, 2021. Additional follow-up e-mails were sent if any response required clarification. An LGOIMA request was lodged on 6 August with the Northland Regional Council (Appendix B); the answers were received on 6 September to clarify the case study results. The OIA request was lodged on 27 May (Appendix C) and the answer was received on 24 August 2021.

Data collection also involved searches of the official websites of the regional and unitary councils. The additional documentation was needed to complement the information given by the councils and/or to obtain additional information to meet the research objectives. All the website data were collected from March to August 2021.

In addition to the data collection for document analysis, spatial data were acquired from the local government official websites and by the LGOIMA. Spatial analysis was conducted for the case study analysis in Northland. The data sources were from the LGOIMA request that was lodged with Northland Regional Council and from the Northland Regional Council’s website. This information includes region wide catchments and priority catchment boundaries. State of Environment (SoE) monitoring sites were indicative only and were generated from SoE report in 2015 (Northland Regional Council, 2015b).

Other data sources were the Ministry for Primary Industries for Erosion Susceptibility Classification (ESC) shapefiles, Land Resource Information Systems (LRIS) for Land Cover Databases version 5 (LCDB v5), NIWA’s rivers map, regions’ administrative boundaries (LRIS), and the coastline (LRIS).

A summary of the collected data is shown in Table 4.1.

Table 4.1: Data collection and data sources for document and GIS analysis

| Analysis | Data Type | Data Source | Collected Data | Analysis | Data Type | Data Source | Collected Data | |
|-------------------|----------------|-----------------------------|------------------------|--------------|--------------|----------------|------------------------------|--------------------|
| Document Analysis | Primary Data | OIA | NES-PF review data | GIS Analysis | Primary Data | LGOIMA | Northland Region’s Catchment | |
| | | LGOIMA | Alignment report | | | Secondary Data | MPI | ESC |
| | Secondary Data | MPI’s Official websites | NES-PF one year review | | LRIS | | LCDB v5 | |
| | | Council’s Official websites | Regional/ Unitary Plan | | | | Regional Policy Statement | River |
| | | | Section 32 Report | | | | SoE Monitoring | NRC’s boundary |
| | | | Other document | | | | | Coastline |
| | | | | | | | | Priority Catchment |
| | | | | | | | | Monitoring sites |
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4.2 Data Analysis

The analysis was conducted using two methods: (1) document analysis; and (2) GIS analysis. For (1), the LGOIMA and OIA responses were analysed using content analysis by identifying the key

information based on the objectives of this study. In this dissertation, there are two complementary approaches to answer the study’s objectives. The first assessment was of 16 regional and unitary councils to generate a general understanding of the implementation of NES-PF’s plan alignment and stringency across New Zealand. This analysis includes analysing the results from the NES-PF one year review by MPI. The second approach was a finer regional scale analysis of the Northland Regional Council. The second part of the assessment is to generate a more in-depth understanding of NES-PF stringency implementation on the ground. The general flowchart of the study is shown in Figure 4.1.

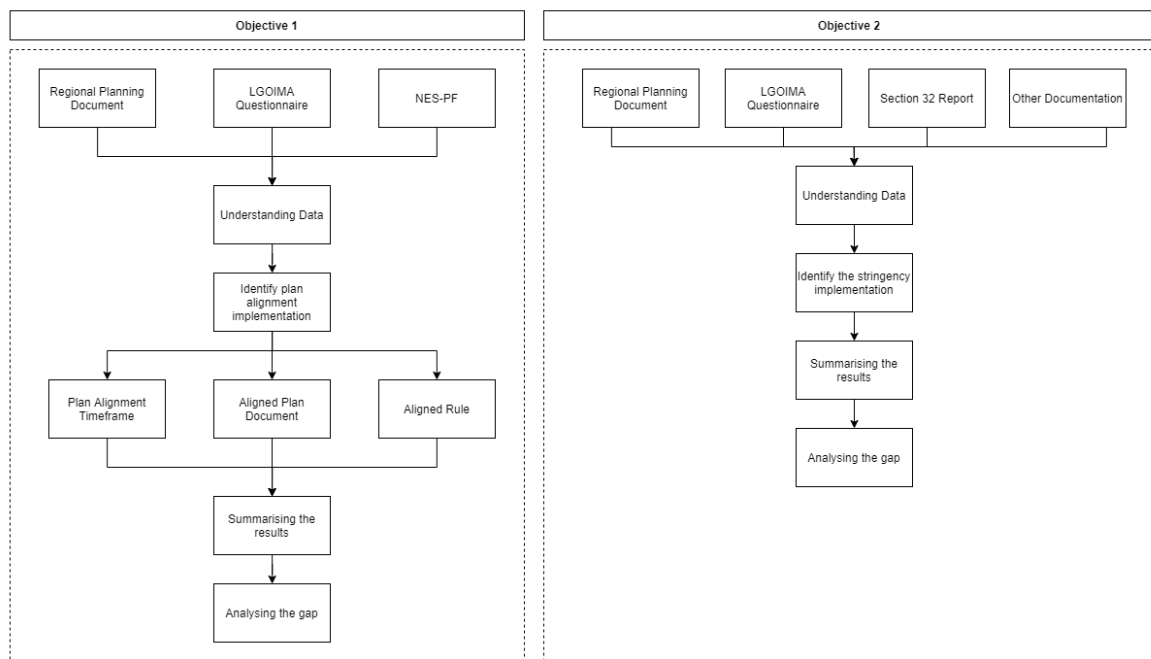


Figure 4.1: Methodology flowchart for the study

In addition, spatial analysis was carried out on the case study location. GIS analysis in this study used ArcGIS Pro software. GIS analysis in this study was used to answer objective two on stringency implementation. The main aim of the GIS analysis is to find the distribution of the plantation forestry locations and the distribution of erosion-prone areas in the Northland Regional Council’s administrative area. The analysis also was aimed at providing a visual presentation of the Northland Region’s plantation forestry extent and location.

The key information sought from document analysis and GIS analysis is summarised in Figure 4.2.

| Analysis | Research Objective | Source | Key Information |
|-------------------|--------------------|------------------|---|
| Document Analysis | Objective 1 | MPI | 1. How was the result from the one-year review report? |
| | | Local Government | 1. Did all councils complete the alignment of the plan? 2. When did the alignment completed? 3. What plan did the NES-PF align to? 4. What was the method for the plan alignment? |
| | | Northland Region | 1. What was the method for the plan alignment? |
| | Objective 2 | MPI | 1. How was the result from the one-year review report? 2. Did the report review the environmental outcome from exercising stringency? |
| | | Local Government | 1. Which council exercises the stringency? 2. Which provision of Section 8 of the NES-PF did the Council mainly use? 3. What is the reason for applying the stringency? 4. What method did the council use to identify the stringency rule? 5. Did the council consider to apply more stringent rule in the future? |
| | | Northland Region | 1. What is the stringency rule that is exercised by the council? 2. What was the argument for the stringency application in the Section 32 report? 3. What was the results for SoE monitoring? |
| GIS Analysis | Objective 2 | Northland Region | 1. How is the forest plantation distribution in Northland? 2. How is the distribution of the ESC? |

Figure 4.2: Key information that was collected for the analysis

4.3 Limitations

In the proposal, the regional case study was initially planned to be carried out for all regional and unitary councils. However, with time limitations, the case study in this dissertation was carried out only on the Northland Regional Council. Other councils' data were analysed only to gain information for the national overview of the NES-PF implementation.

Chapter 5

Results

This chapter discusses central and local governments' responses to the questionnaire. The analysis includes the regional planning and policy documents and the state of the environment (SoE) monitoring reports. Additional documents from the local governments' websites, such as publications regarding sedimentation were also collected to support the analysis. This chapter is divided into three main sections. The first section summarises the Ministry for Primary Industry NES-PF one-year implementation report on plan alignment and the stringency provision. The next section describes plan alignment implementation across regional and unitary councils and NES-PF regulation 6 implementation. The last part of the chapter discusses how stringency was applied by the Northland Regional Council.

5.1 Te Uru Rākau NES-PF One Year Review Report

As the primary responsible authority for the NES-PF, the Te Uru Rākau released the NES-PF implementation review to the public in May 2021 (Te Uru Rākau, 2021). The review, including plan alignment and stringency implementation, was produced in early 2019. In this review, the main focus was to review the national consistency of NES-PF implementation. Te Uru Rākau did not assess the effect of stringency implementation for improving the environmental condition (obtained under OIA request to Te Uru Rākau, August 24, 2021).

In the one year review, Te Uru Rākau highlighted that stringency was causing national inconsistency and was a possible burden to the private sector (Te Uru Rākau, 2021). Te Uru Rākau found that stringency caused two significant issues. First, there is an unclear linkage on how the stringency rule needs to be applied to achieve the national policy objective. Secondly, the report suggests that stringency could lead to inconsistency and an additional cost burden for foresters. These issues are because each council interprets NES-PF Regulation 6 differently, which led to national inconsistency.

Te Uru Rākau also reviewed the stringency implementation in planning documents based on activities under Regulation 5 of NES-PF. However, in the review, three regional councils were not included in the results. Nelson City Council and Marlborough District Council were not included because the assessment was not completed. The West Coast Regional Council was not aligned in its

plan with the NES-PF. Based on the activities, implementation of stringency can be divided into three groups: (1) councils that applied stringency for all activities (Gisborne District Council and Canterbury Regional Council); (2) councils that applied stringency for specific activities (Northland Regional Council, Auckland Council, Greater Wellington Regional Council, Tasman District Council, Otago Regional Council, and Southland Regional Council); and (3) councils that applied stringency for a specific area (Waikato Regional Council, Taranaki Regional Council, and Hawke’s Bay Regional Council).

In this review, Te Uru Rākau also highlighted that Northland Regional Council, Canterbury Regional Council, Greater Wellington Regional Council, Marlborough District Council conducted the plan alignment using the RMA Schedule 1 process. Under the RMA, a council needs to exercise the plan change process if they decide to change an existing rule or draft a new rule to apply the greater stringency to protect a sensitive environment. Greater Wellington Regional Council and Northland Regional Council decided to retain most of the NES-PF and apply stringency only for specific activities. The Canterbury Regional Council adopted the NES-PF structure and added regional standards. Te Uru Rākau (2021) argued that “these more stringent rules may have the limited environmental benefit or may not be determined except on a case-by-case basis (therefore limiting the benefit of consistency)” (p. 43). However, there was no evidence presented to substantiate this either in the one year review document or in the documents provided under the OIA.

5.2 A National Overview of NES-PF Alignment and Implementation from the LGOIMA

5.2.1 Plan Alignment

Plan alignment was assessed for 11 regional councils and 5 unitary authorities. As at August 2021, two regional councils have not performed their plan alignment either using section 44A of the RMA or plan change. Those councils are West Coast Regional Council and Southland Regional Council. In comparison, all unitary authorities have conducted the alignment process. All councils conducted their plan alignment mainly during 2017-2019. The overall plan alignment summary is shown in Table 5.1.

Table 5.1: A summary of local governments' plan alignment with NES-PF as of August 2021

| Council | Plan Alignment | Year Alignment Finished | Aligned Plan | Conflicted/Duplicated* |
|-------------------------------------|----------------|-------------------------|--|------------------------|
| Northland Regional Council | Yes | 2017 | Proposed Regional Plan | N/A** |
| Auckland Council | Yes | 2018 | Auckland Unitary Plan | Yes |
| Waikato Regional Council | Yes | 2018 | Proposed Waikato Regional Plan | Yes |
| | | | Waikato Regional Plan | Yes |
| | | | Waikato Regional Coastal Plan | Yes |
| Bay of Plenty Regional Council | Yes | 2018 | Regional Natural Resources Plan | Yes |
| Gisborne District Council | Yes | 2018 | Tairāwhiti Resource Management Plan | Yes |
| Hawke's Bay Regional Council | Yes | 2018 | Regional Resource Management Plan | Yes |
| | | | Regional Coastal Environment Plan | Yes |
| Taranaki Regional Council | Yes | 2018 | Freshwater Plan | Yes |
| | | | Soil Plan | Yes |
| | | | Coastal Plan | No |
| | | | Proposed Coastal plan | No |
| Manawatu-Whanganui Regional Council | Yes | 2018 | One Plan | Yes |
| Wellington Regional Council | Yes | 2018 | Proposed Natural Resources Plan | Yes |
| Marlborough District Council | Yes | 2019 | Proposed Marlborough Environment Plan | Yes |
| | | | Marlborough Sounds Resource Management Plan | Yes |
| | | | Wairau/Awatere Resource Management Plan | Yes |
| Nelson City Council | Yes | 2018 | Resource Management Plan | Yes |
| Tasman District Council | Yes | 2018 | Tasman Resource Management Plan | Yes |
| West Coast Regional Council | No | - | Land and Water Plan | Yes |
| Canterbury Regional Council | Partially Yes | - | Canterbury Land and Water Regional Plan Change 7 | Yes |
| | | | Canterbury Land and | No |

| | | | Water Regional Plan | |
|----------------------------|-----|------|--|-----|
| Otago Regional Council | Yes | 2018 | Regional Plan: Water | Yes |
| Southland Regional Council | No | - | Regional Air Plan | No |
| | | | Regional Coastal Plan | No |
| | | | Proposed Southland Water and Land Plan | Yes |

Note:

* Conflicted means that the rule in the region plan is conflicted with the NES-PF. While Duplicated means that the rule in the region duplicates the rule in the NES-PF

**N/A: Not applicable as the proposed regional plan was drafted after NES-PF gazetted.

According to the RMA 1991 s(44A), all councils need to conduct plan alignment as soon as practicable without using the Schedule 1 process. Most councils have undertaken alignment for their operative plans and their proposed plans.

Alignment using RMA s(44A)

Ten councils used provisions under RMA s(44A) to remove any duplication or conflict without using Schedule 1 of the RMA. Nine councils aligned their plans with all their operative plans. Otago Regional Council aligned NES-PF only with the Regional Plan for Water.

“The Otago Regional Council responded to the National Environmental Standards for Plantation Forestry, on 30 June 2018, by the introduction of Schedule 17, and various other associated amendments to the Regional Plan: Water for Otago (Water Plan)”. – (obtained under the LGOIMA request to Otago Regional Council, April 12, 2021)

The Taranaki Regional Council, after the alignment assessment, decided there was no duplicated or conflicted provisions for the Regional Coastal Plan and the Proposed Coastal Plan. Therefore, the amendment to the provisions was performed only for Taranaki’s Regional Air Quality Plan, Regional Freshwater Plan and Regional Soil Plan.

“The operative and proposed coastal plans contain no rules relating to forestry activities as their rules apply to the coastal marine area only”. – (obtained under the LGOIMA request to Taranaki Regional Council, March 23, 2021)

The Waikato Regional Council, for both the operative and proposed plan, had duplicated and conflicted provisions:

“A review and alignment process was undertaken by staff and it has been determined that to give effect to the NESPF:

- There are 52 instances (including all glossary terms) where amendments will be needed to the Waikato Regional Plan (WRP)*
- Nine instances (including two glossary terms) where amendments will be needed to the Waikato Regional Coastal Plan (RCP)*
- Two instances where an amendment will need to be made to Waikato Regional Proposed Plan Change 1 - Waikato and Waipa River Catchments*
- There are no consequential amendments to the Waikato Regional Policy Statement (RPS)” - (obtained under the LGOIMA request to Waikato Regional Council, April 14, 2021)*

Five councils (Bay of Plenty Regional Council, Tasman District Council, Gisborne District Council, Auckland Council, and Nelson City Council) have undertaken alignment with their operative combined plans. Some of their comments on the plan alignment process are as follows:

“Yes, at the time of the NESPF, we made changes to the TRMP [Tasman Resource Management Plan] and referenced where the rules were more stringent than the NESPF or where the NESPF prevailed over our rules. Notes to this effect have been inserted into the Plan”. - (obtained under the LGOIMA request to Tasman District Council March 31, 2021)

“The AUP [Auckland Unitary Plan] was updated on 11 May 2018 to insert a reference to the NES-PF at relevant chapters, including a note to clarify where the AUP rules may be more stringent than the NES-PF regulations. The Auckland Council District Plan – Hauraki and Gulf Islands Section was amended on the same date” - (obtained under the LGOIMA request to Auckland Council, April 8, 2021)

“The NRMP [Nelson Resource Management Plan] currently duplicates standards in the NESPF across a number of rules including vegetation clearance, earthworks, freshwater, setbacks, and hazardous substances. These provisions are proposed to be amended with an advisory note to refer the Plan user to the NESPF. As noted, small scale forestry (less than 1.0ha) is not covered by the NESPF. Therefore, small scale operations will still be subject to general NRMP requirement”. - (obtained under the LGOIMA request to Nelson City Council, April 15, 2021)

Horizon Regional Council (Manawatū-Whanganui Regional Council) hired a consultant company to review the One Plan provisions. The review by BECA includes assessment for stringency. The recommendation to align the plan was outlined in the Rural Regulatory Management and Council’s Activity Report - February to March 2018. The report stated that:

“It is proposed that an advisory note directing One Plan users to the NES-PF be added to Chapter 13 of the One Plan, along with cross-references to One Plan schedules or parts of schedules that will be used as references for terms used in the NES-PF such as significant natural areas, outstanding freshwater bodies and outstanding natural features and landscapes in the Manawatū-Whanganui Region”. - (obtained under the LGOIMA request to Manawatū-Whanganui Regional Council, May 18, 2021)

Alignment using Schedule 1

Wellington Regional Council, Marlborough District Council, Canterbury Regional Council and Northland Regional Council used schedule 1 to streamline the NES-PF provisions with their regional plans. Comment regarding the plan alignment process is as follows:

“During the hearings, it became evident that these forestry rules, Rules R102 and R103, were not compatible with the new regulations. It was recommended to the Hearing Commissioners that Rules R102 and R103 be deleted to give effect to the regulations”. - (obtained under the LGOIMA request to Wellington Regional Council, April 8, 2021)

“Council undertook an alignment exercise for the Proposed Marlborough Environment Plan (PMEP). The results of this exercise were published on 1 February 2019. The exercise was partly undertaken to resolve a situation whereby people had submitted on provisions of the PMEP that could not remain in the PMEP due to the fact that they conflicted or were more lenient than the NES”. - (obtained under the LGOIMA request to Marlborough District Council, April 21, 2021)

Canterbury Regional Council has partially aligned NES-PF with its Land and Water Regional Plan Change 7. Some duplicated and conflicted provisions will not be amended during the plan change process. The changes for the plan will be conducted after the plan schedule1 process.

“The changes proposed through PC7A [Plan Change 7A] will result in some conflict or duplication in the content of Rules 5.137, 5.148, 5.163, 5.167, 5.168, 5.169, 5.170, 5.171 and 5.175. PC7A does not propose amendments to address that conflict through this planning process. Once the PC7A provisions are made operative, Environment Canterbury will make consequential amendments to the identified rules to remove conflict or duplication without using the Schedule 1 process, as required by section 44A”. - (obtained under the LGOIMA request to Canterbury Regional Council, April 12, 2021)

Northland Regional Council took a different approach to incorporate the NES-PF into its plan. At the published date of the NES-PF, Northland had started the plan change process. The council decided to draft their combined Proposed Regional Plan based on the NES-PF. Therefore, no plan alignment was

needed according to the council because there was no duplicated and conflicted provisions in the Proposed Regional Plan.

“We have two relevant plans: (1) The Proposed Regional Plan for Northland August 2020 Appeals Version (Proposed Plan); and (2) The Regional Water and Soil Plan for Northland operative since 2004 (Water and Soil Plan). The Proposed Plan was drafted to avoid duplication of the NES-PF regulations and replace the Water and Soil Plan”. - (obtained under the LGOIMA request to Northland Regional Council, March 26, 2021)

Plan alignment not yet undertaken

West Coast Regional Council and Southland Regional Council haven't finished the alignment process. Those councils have different reasons: West Coast Regional Council said it was mainly because of resourcing constraints, whereas Southland's reasons were because of its current plan change process.

The West Coast Regional Council explained that it had started plan alignment in 2018, but it was delayed. The reason for the lengthy process was that the workload was beyond the capacity of the staff. The council intended to finish all plan alignment by 30 June 2021. However, from a communication on 19 July 2021, the council mentioned that the draft was not finished because the Regional Council was occupied with other important tasks, including ones related to RMA reform.

“Work on this started in 2018/19, however it has been delayed where other work has a higher priority, for example, completing the RMA Schedule 1 plan review process for the West Coast Regional Policy Statement, completing a plan change to the Land and Water Plan to correct errors in the mapped boundaries of significant wetlands on private land, and progressing the proposed Regional Coastal Plan review. Additionally, considerable staff time has been spent responding to proposed national policy and regulation which has a significant impact on the West Coast Region, including the Essential Freshwater Package, the Draft National Policy Statement for Indigenous Biodiversity, and changes to the National Environmental Standard for Air Quality, amongst others. New planning staff have recently joined the Council, and they need training which takes time. We have a small planning team with a high workload so careful prioritisation of workstreams is very important”. - (obtained under the LGOIMA request to West Coast Regional Council, March 29, 2021)

Southland Regional Council has assessed the conflicted and duplicated provisions in the proposed Southland Water and Land Plan (pSWLP), Regional Air Plan, and the Regional Coastal Plan for Southland. However, as per August 2021, the council has not aligned the pSWLP since the plan is under appeal. The plan contains several provisions that are duplicated or in conflict with the NES-PF. These include but are not limited to culverts, wetlands, and activity setbacks from waterways. For the remaining plans, the council stated that Regional Air Plan and the Regional Coastal Plan don't regulate any forestry matters; hence no alignment was needed.

“Council has the option to review the pSWLP [proposed Southland Water and Land Plan] to ensure full alignment between it and the NES-PF, however, the pSWLP is currently under appeal and being considered by the Environment Court, and therefore a full alignment process is not appropriate at this time”. - (obtained under the LGOIMA request to Southland Regional Council, April 16, 2021)

5.2.2 NES-PF Regulation 6 implementation

In plan alignment guide, published by Ministry for Primary Industries, it is mandatory to conduct the stringency test (Ministry for Primary Industries, 2018d). NES-PF allows the rule to be more stringent as long as it meets the NES-PF regulation 6 conditions. Councils have different ways to exercise stringency. Table 5.2 summarises the stringency approach across all councils. In general, 12 of the 16 councils have exercised stringency. Stringency was exercised using two types of approach: aligning the plan pursuant to RMA section 44A; or, secondly, by using the Schedule 1 process to add greater stringency for the proposed plan or plan change.

Table 5.2: A summary of the application by regional councils and unitary authorities of the NES-PF's stringency provisions as of August 2021

| Council | Stringency | S (6)(1) | | S (6)(2) | | S (6)(3) | Remarks |
|------------------------------------|------------|----------|-------|----------|-----|----------|--|
| | | NPS-FM | NZCPS | ONF/ ONL | SNA | Other | |
| Northland Regional Council | Yes | Yes | No | No | No | No | Stringency is applied to outstanding freshwater bodies |
| Auckland Council | Yes | No | Yes | Yes | Yes | No | The stringency is applicable for Significant Ecological Areas Overlay, Outstanding Natural Character Overlay, High Natural Character Overlay, Outstanding Natural Landscapes Overlay, Outstanding Natural Features Overlay, and Activities generating sediment that impact the coastal environment |
| Waikato Regional Council | Yes | No | No | No | No | Yes | Stringency for Significant Geothermal Features |
| Bay of Plenty Regional Council | No | No | No | No | No | No | - |
| Gisborne District Council | Yes | Yes | Yes | Yes | Yes | No | The stringency applied to outstanding water bodies, significant natural area, outstanding natural features, coastal overlay |
| Hawke's Bay Regional Council | Yes | Yes | No | No | No | No | Tukituki River Catchment is an outstanding freshwater body (chapter 3 RRMP) |
| Taranaki Regional Council | Yes | No | No | Yes | Yes | No | Stringency is for outstanding natural feature and landscape and Significant Natural Areas (wetlands) |
| Manawatu-Wanganui Regional Council | Yes | Yes | No | Yes | Yes | No | Protections for outstanding freshwater bodies, outstanding natural features and landscapes, significant natural areas, and water conservation orders |
| Wellington Regional Council | Yes | Yes | No | No | Yes | No | Stringency is applied for Beds of Lakes and Rivers and Significant Natural Wetlands |
| Marlborough District Council | Yes | No | Yes | No | Yes | Yes | The stringency was exercised to 6(1)(b) re Policy 22 of the NZCPS; NESPF 6(2)(b); NESPF 6(3)(c) |
| Nelson City Council | No | No | No | No | No | No | - |

| | | | | | | | |
|-----------------------------|-----|-----|-----|-----|-----|-----|---|
| Tasman District Council | Yes | No | Yes | Yes | No | Yes | Some regulation is stringent to protect coastal, ONF/ ONL, and Karst |
| West Coast Regional Council | | | | | Yes | | - |
| Canterbury Regional Council | Yes | Yes | No | No | No | No | More stringent in suspended sediment management, inanga spawning habitats, wetland disturbance, afforestation in sensitive catchment, and fuels storage |
| Otago Regional Council | Yes | Yes | No | No | No | No | stricter rules apply that give effect to Objective A1 of the NPS-FM |
| Southland Regional Council | | Yes | | | | | - |

Stringency implementation

From the data in Table 5.2, the implementation of stringency was categorised based on the NES-PF regulation 6 provision. Seven of 11 councils have applied stringency to meet the NPS-FM's objective [S(6)(1)(a)] to protect Significant Natural Areas [regulation 6(2)(a)]. Stringency also has been used for protecting Outstanding Natural Features or Outstanding Natural Landscapes. It is noted that five councils have applied stringency using the regulation (6)(2)(a) provision. As for the regulation (6)(1)(b), four councils have applied stringency but for regulation (6)(3) only three councils used the provision to exercise stringency.

National Policy Statement for Freshwater Management

Seven councils exercised greater stringency under regulation (6)(1)(a). These were related to outstanding freshwater bodies (Northland Regional Council, Gisborne District Council, Hawke's Bay Regional Council, and Manawatu-Wanganui Regional Council); protecting river and lake beds (Wellington Regional Council); NPS-FM's objective in general (Canterbury Regional Council, and Otago Regional Council). The areas in which stringency is exercised are shown in Table 5.3.

Table 5.3: Implementation of regulation (6)(1)(a) by local government

| | Council | Applied Stringency | Remarks |
|---------------|-------------------------------------|--|---|
| NPS-FM | Northland Regional Council | Poutō catchment | Dune lakes in Northland are considered a unique ecosystem. Poutō lake in Poutō catchment has been identified as an outstanding waterbody following the requirement of NPS-F 2014 Objective A2(a) and Policy B4 |
| | Gisborne District Council | Schedule G15 Aquatic Ecosystem Waterbodies, | Protecting the aquatic ecosystem. Including significant habitats and migratory habitats, protection for Long finned eel habitat, threatened indigenous flora and fauna habitat, whitebait spawning sites, trout habitat |
| | | Schedule G18 Outstanding Waterbodies (Waipaoa Motu and Wairoa catchment) | To achieve the objectives for freshwater |
| | | Schedule G21 Protected Watercourses | To protect the riparian area and to retire the protected watercourses area as part of vegetation clearance, resource consents |
| | Hawke's Bay Regional Council | Tukituki River Catchment | Significant native water bird populations and their habitats |
| | Manawatu-Whanganui Regional Council | Natural state river (Mangahao River, Tokomaru River and Mangaore Stream) | To protect rivers that have sources in, and flow within, the Public Conservation Land |
| | | Trout Fishery value | To protect the habitat and migratory habitat of trout |

| | | | |
|--|-----------------------------|---|---|
| | | Rangitikei River, Manganuioteao River | To give effect for the water conservation order |
| | Wellington Regional Council | Schedule F2a (Ruamahānga River upper and lower section, Waiohine River) | To protect threatened bird habitat |
| | | Significant Natural Wetland | No setback for the SNA in earthwork, harvesting, and mechanical land preparation |
| | Canterbury Regional Council | Flow Sensitive catchment | Managing surface water flow |
| | | Spring-fed river, Banks Peninsula rivers, or to a lake | To give effect to NPS-FM (control the TSS discharges) |
| | | Any other river | To give effect to NPS-FM |
| | | Freshwater species habitat Wetland | To give effect to NPS-FM |
| | Otago Regional Council | Any lake, river, wetland or the coastal marine area | To control discharges and local sedimentation; protect indigenous non-migratory fish (some fish sensitive to sedimentation) |
| | | Regionally Significant Wetland (schedule 9) | To control sediment to the lake or river; protect indigenous non-migratory fish (some fish sensitive to sedimentation) |

New Zealand Coastal Policy Statement

Four councils (Table 5.4) implemented greater stringency under regulation 6)(1)(b). These changes were related to sedimentation issues in the coastal environment (Auckland Council, Marlborough District Council), and give effect to policy 13 (Auckland Council, Gisborne District Council), and the coastal environment in general (Gisborne District Council and Tasman District Council).

Table 5.4: Implementation of regulation (6)(1)(b) by local government

| | Council | Location | Remarks |
|--------------|---------------------------|--|--|
| NZCPS | Auckland Council | Significant Ecological Areas (schedule 3 – terrestrial; Schedule 4 - Marine) | To protect the indigenous and native habitat and the habitats of threatened species. For the Marine SEA, it is also to give effect to NZCPS policy 11. |
| | | Outstanding Natural Character Overlay (Schedule 8) | To give effect to policy 13 NZCPS |
| | | High Natural Character Overlay (Schedule 8) | To give effect to policy 13 NZCPS |
| | | Outstanding Natural Landscapes Overlay (Schedule 7) | To give effect to give effect to Policy 15(a) |
| | | Outstanding Natural Features Overlay (Schedule 6) | To give effect to give effect to policy 15(a) |
| | Gisborne District Council | Coastal Environment Overlay | The objective of the coastal |

| | | | |
|--|------------------------------|--|---|
| | | (covers all the coastal environment overlay in Gisborne as detailed on TRMP's map) | environment rule is to give effect to section 6(a) RMA regarding national significance. |
| | Marlborough District Council | Coastal environment zone. The coastal environment includes coastal environment, coastal marine, the extent of the coastal environment, and coastal significance area (mostly located in the northern part/ sound area) | To give effect to Policy 22 NZCPS |
| | Tasman District Council | Coastal Environment Area, includes Coastal marine area | To protect coastal environment from the adverse effect that comes from human activities |
| | | Whanganui Inlet | To protect the important ecosystem/ habitat from the disturbance |

Outstanding Natural Features and Landscapes

Five councils (Table 5.5) exercised greater stringency for outstanding natural features and landscapes [regulation (6)(2)(a)]. The implementation of the stringency is for the identified outstanding natural features and landscapes in their region.

Table 5.5: Implementation of regulation (6)(2)(a) by local government

| | Council | Location | Remarks |
|-----------------|---------------------------|---|---|
| ONF/ ONL | Auckland Council | Outstanding Natural Landscapes Overlay (Schedule 7) | To give effect to Policy 15(a) NZCPS |
| | | Outstanding Natural Features Overlay (Schedule 6) | To give effect to Policy 15(a) NZCPS |
| | Gisborne District Council | Outstanding Landscape Areas (in the coastal environment) | To protect and preserve the natural value of the landscape. The area includes coastline, rivers, wetlands and their margins, native forest, areas of regenerating native forest and, in places, and some areas of native forest in the Raukumara Ranges |
| | Taranaki Regional Council | Stony (Hangatahua) River catchment | To protect natural, ecological and amenity values. |
| | Tasman District Council | Important natural ecosystem values (Schedule 25D includes Kahurangi Point, Waimea Inlet, Golden Bay North, and Farewell Spit) | To protect the important ecosystem/ habitat from the disturbance |

| | | | |
|--|-------------------------------------|--|--|
| | Manawatu-Whanganui Regional Council | Outstanding Natural Features and Landscapes (schedule G) | To preserve the natural character of the coastal environment, wetlands, rivers, lakes, and their margin. |
|--|-------------------------------------|--|--|

Significant Natural Areas

Six councils (Table 5.6) implemented stringency for Significant Natural Area [regulation (6)(2)(b)]. These were related to significant ecological areas (Auckland Council), wetlands (Taranaki Regional Council, Wellington Regional Council and Marlborough District Council), and SNAs in general (Gisborne District Council and Manawatu-Whanganui Regional Council).

Table 5.6: Implementation of regulation (6)(2)(b) by local government

| | Council | Location | Remarks |
|------------|-------------------------------------|--|---|
| SNA | Auckland Council | Significant Ecological Areas Overlay (schedule 3 – terrestrial; Schedule 4 - Marine) | To protect the indigenous and native habitat and the habitats of threatened species. |
| | Gisborne District Council | Schedule G17 Regionally Significant Waterbodies, | The stringency is applied for the wetlands that have a high value. This includes (but is not limited to) a high degree of naturalness, diversity of indigenous fauna and flora, and significant hydrological values |
| | Taranaki Regional Council | Wetlands (scheduled in Appendices IIA, IIB) | To protect the important ecosystem, species, and habitat from the disturbance |
| | Manawatu-Whanganui Regional Council | Indigenous Biological Diversity (Schedule F) | To protect rare habitat, threatened habitat or at-risk habitat. This includes forest and tree land habitat, forest, tree land, scrub or shrubland habitat, tussock land habitat, wetland habitat, and naturally uncommon habitat. |
| | Wellington Regional Council | Significant Natural Wetlands (Schedule F3) | To protect the wetlands from degradation. |
| | Marlborough District Council | Significant Wetland | To avoid avoiding significant adverse effects on wetlands and to protect indigenous biodiversity |

Unique and sensitive environments

Three councils (Table 5.7) exercised stringency for unique and sensitive environments. These were related to the geothermal area (Waikato Regional Council), karst geology (Tasman District Council), and activities within 1 km upstream of abstraction point (Marlborough District Council).

Table 5.7: Implementation of regulation (6)(3) by local government

| | Council | Location | Remarks |
|--------------|------------------------------|---|---|
| Other | Waikato Regional Council | Significant Geothermal Features | To sustainably manage and use the geothermal energy and water |
| | Marlborough District Council | Rural and Coastal Environment Zones | To protect the water supply |
| | Tasman District Council | Separation Point Granite (Motueka gravel aquifer, Kaiteriteri) | To protect the area from erosion |
| | | Karst (Takaka valley, Motueka River catchment, Te Waikoropupu Springs, Riuwaka River flows, Owen River) | To prevent the degradation of the landscape. This includes protection from erosion and sedimentation. |

Additional stringency

The limitation of alignment under RMA S44A is that the councils cannot add more stringency without having undergone the plan change process. Five councils expressed their intention for greater stringency once they conduct their plan changes. Those councils are: Tasman District Council, Gisborne District Council, Hawke’s Bay Regional Council, Northland Regional Council, and Waikato Regional Council.

Tasman District Council will review the Tasman Environment Plan for a future plan change. There is a possibility of added stringency according to the issues and options review and public engagement. In the LGOIMA answers, Tasman District did not specifically mention what objective of stringency that it will pursue.

“Further opportunity for consideration of the use of the NESPF provisions for stringency will be reviewed throughout the proposed Tasman Environment Plan change process which is at the beginning of the Plan change process. . . . We have not yet completed the public engagement, issues and options reports which will consider options for stringency”. - (obtained under the LGOIMA request to Tasman District, March 31, 2021)

National Policy Statement for Freshwater Management

Three councils expressed their intention to put a more stringent measure to affect the NPS-FM. The stringency is to achieve the implementation target of NPS-FM 2020 (Hawke’s Bay Regional Council, Gisborne District Council) and to protect specific outstanding freshwater bodies (Northland Regional Council).

“HBRC [Hawke’s Bay Regional Council] intends to review both the RRMP [Regional Resource Management Plan] and the RCEP [Regional Coastal Environment Plan] over the next few years via a programme of works we’re calling ‘Kotahi.’ Kotahi would result in a combined RPS and regional plan (incl coastal plan) for the whole HB region. In terms of timing, the work programme is being largely driven by the new RMA requirement for regional councils to implement the 2020 National Policy Statement for Freshwater Management in proposed regional plans and regional policy statements no later than 31 December 2024”. - (obtained under the LGOIMA request to Hawke’s Bay Regional Council, April 8, 2021)

We are also reviewing the freshwater planning provisions in light of the new NPS Freshwater Management and will be considering whether additional stringency with regard to the NES-PF is required as part of that review. Changes to the freshwater provisions will be publicly notified by 31 December 2024”. - (obtained under the LGOIMA request to Gisborne District Council, April 7, 2021)

Although Northland has conducted a plan change recently, it expressed the possibility of more stringency to affect the NPS-FM in a future plan change.

“Poutō Peninsula that have been identified in the Proposed Regional Plan as outstanding freshwater bodies in accordance with the direction of the National Policy Statement for Freshwater Management 2014 (NPSFM)”. - Northland Regional Council”. - (obtained under the LGOIMA request to Northland Regional Council, March 26, 2021)

New Zealand Coastal Policy Statement

Two councils expressed their intention to put more stringency to give effect to the NZCPS. Gisborne District Council stated that the decision to put in stringency would be based on a full review of TRMP. Waikato Regional Council will review the compliance monitoring implementation results to justify a need for more stringency.

“We are about to embark on a full review of our TRMP [Tairāwhiti Resource Management Plan], which will include careful consideration of whether we need to include additional stringency, for example to give effect to New Zealand Coastal Policy Statement 2010”. - (obtained under the LGOIMA request to Gisborne District Council, April 7, 2021)

Waikato Regional Council is considering putting in additional stringency for NZCPS if additional monitoring data require the council to be more stringent.

“No Waikato Regional Plan or Regional Coastal Plan rules have been recommended to be more stringent as it is understood compliance monitoring will identify a greater understanding of the need for more stringent rules and if so, where. If there is a justification for more stringent rules, these amendments will go through the Regional Plan Review (Healthy

Environments) process and the subsequent Schedule 1 process". - (obtained under the LGOIMA request to Waikato Regional Council, April 14, 2021)

Significant Natural Areas

One council has expressed its intention to put stringency in for Significant Natural Areas. This intention related to significant natural wetlands (Wellington Regional Council).

"With the wetland rules a similar assessment was followed, and Officer's recommended that further stringency in the form of additional setbacks from significant natural wetlands, be applied for earthworks, harvesting machinery, and mechanical land preparation". - (obtained under the LGOIMA request to Wellington Regional Council, April 8, 2021)

Have not exercised stringency

The summary shows that only two councils have not exercised the stringency. They are Nelson City Council and Bay of Plenty Regional Council. The latter argues that it did not find any more stringent provision in the Bay of Plenty Regional Natural Resources Plan than is in the NES-PF. However, the council considering putting in more stringency to meet the NPS-FM's objective.

"At the time the alignment exercise was undertaken, there was an awareness by staff that future plan changes may result in stringency provisions being utilised. In particular, the implementation of the NPS-FM requirements and associated plan change processes and the review of the geothermal chapter of the Regional Natural Resources Plan. Any new provisions more stringent than the NES-PF are to be incorporated into council plans via a schedule 1 process at the time of these plan changes.". - (obtained under the LGOIMA request to Bay of Plenty Regional Council, April 14, 2021)

As for Nelson City Council, stringency has not been exercised because the council is conducting a plan change review. Greater stringency will possibly be added to the proposed Nelson Resource Management Plan. The council is also considering the possibility of having stringency to give effect to NPS-FM.

"This is because the Council was (and still currently is) in the process of undertaking a whole-plan review. The need for greater stringency was considered as part of this review process. The Draft Nelson Plan was made available for public feedback between October and December 2020". - (obtained under the LGOIMA request to Nelson City Council, April 15, 2021)

Plan not yet aligned

West Coast Regional Council, Canterbury Regional Council and Southland Regional Council have not conducted plan alignment. However, West Coast Regional Council expressed that it will have a more stringent rule for provisioning Schedule 1 wetlands. West Coast Regional Council is also assessing whether its Schedule 2 wetlands rules can be more stringent under NES-PF.

“The main Plan rules that are more stringent than the NES-PF are for earthworks and vegetation clearance in a Schedule 1 wetland, which. These are wetlands identified as having significant ecological values and would be classed as a Significant Natural Area (SNA) under the NES-PF. Plantation forestry activities within a Schedule 1 wetland are non-complying under the Plan, whereas under the NES-PF plantation forestry activities within a SNA are restricted discretionary. Schedule 2 wetlands are those which are likely to be significant but have not been confirmed, so they may or may not be a SNA in terms of the NES-PF. For plantation forestry activities in a Schedule 2 wetland, the NES-PF or the Plan rules may apply, and this would be determined on a case-by-case basis”. – West Coast Regional Council LGOIMA

Southland Regional Council stated in its LGOIMA answer that the plan has a more stringent rule. The rule is more stringent to give effect to NPS-FM’s objective.

“As the pSWLP [proposed Southland Water and Land Plan] was developed to give effect to the objectives in the NPS-FM (regulation 6(1)), any rule in the pSWLP could be more stringent than the NES-PF (as outlined above, not all of them are)”. - Southland Regional Council LGOIMA

5.3 Case study of Northland Regional Council

5.3.1 Plantation Forestry Land Cover

Northland has the third-highest exotic forest coverage in the country. GIS analysis for the percentage of land use in the Northland Region is shown in Figure 5.1. Exotic forest is the third largest land use in Northland, with an area of 158,315 ha (12.68%). The highest land use in Northland is high producing exotic grassland, with an area of 583,560 ha (46.73%). The second highest is the indigenous forest, with 247,222 ha (19.8%). Manuka and kanuka and harvested forest are the fourth and fifth largest land uses in the region. Other land uses account for only 8.83% throughout the region.

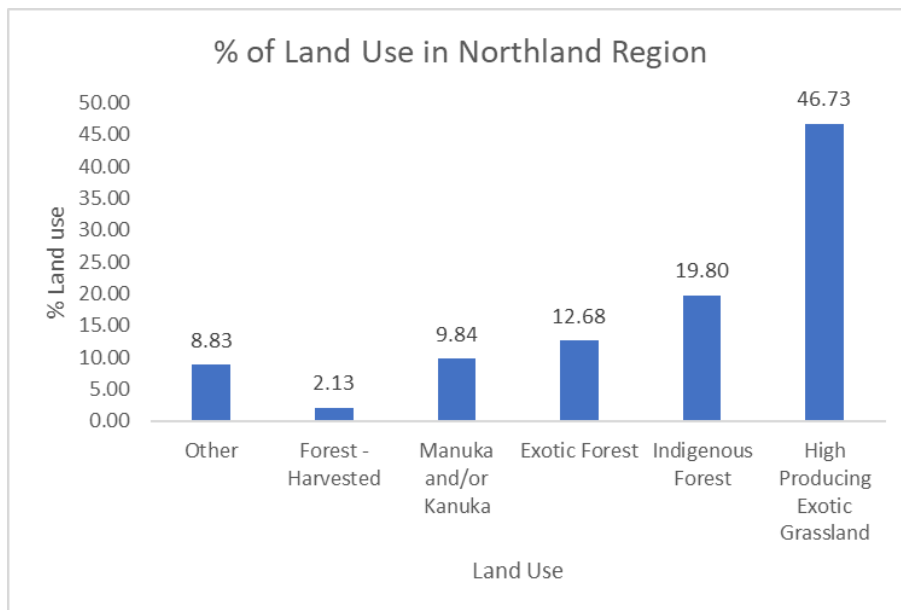


Figure 5.1: Land use percentage in the Northland Region (Landcare Research, 2020)

According to the Land Cover Database version 5, plantation forest is scattered in all of the Northland Region (Figure 5.2). Most plantation forestry is located outside priority catchments (82.20%). The largest plantation forest is located on the Aupouri Peninsula; it accounts for 18.82% of the region. In Northland's priority catchments, the percentage of exotic forestry from the largest to smallest is: Poutō (6.13%), Doubtless Bay (4.84%), Whangārei (2.57%), Waitangi (2.48%), Ngunguru (1.73%) and Mangere Catchment (0.03%). Based on GIS analysis, around 151 ha of the existing exotic forests intersect with the 30 m coastal buffer as required in the NES-PF for quarry, mechanical land preparation, replanting and afforestation. Most of the intersected existing plantation forest is located outside priority catchments (125 ha). In priority catchments, intersected exotic forest can be found in Ngunguru (9 ha), Poutō (7 ha), Doubtless Bay (7 ha), Whangarei (3 ha), and Waitangi Catchment (0.4 ha).

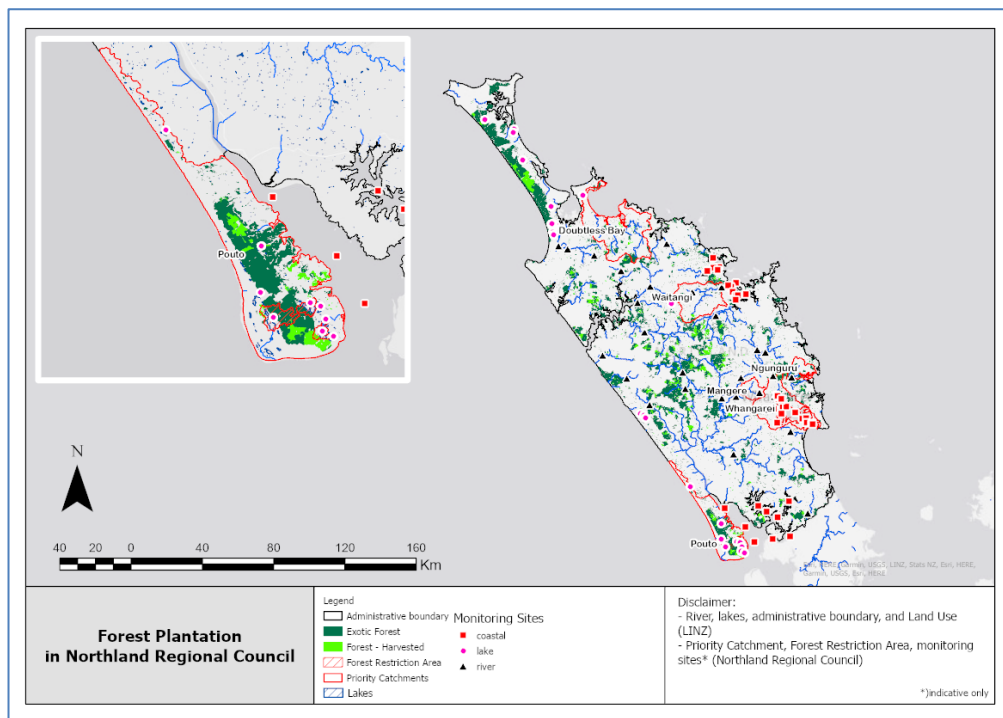


Figure 5.2: Pine plantations in Northland Regional Council and in the Poutō catchment, and monitoring sites for state of environment monitoring (Landcare Research, 2020; Stats NZ, 2020)

5.3.2 ESC map (MPI 2018)

Figure 5.3 shows the erosion susceptibility classification of the Northland Region; 43.34% of the area was mostly classified as low (534,860 ha). Overall, the ESC in the Northland is: very high 2.31% (28,481 ha), high 14.68% (181,232 ha), and moderate 39.67% (489,583 ha). Around 6,372 ha of very high ESC classification can be found in the Poutō Peninsula. It comprises 22.37% of very high classification in the Northland Region. Poutō Peninsula is mostly in ESC's moderate classification class with 18,598 ha (55.54% of Poutō Peninsula).

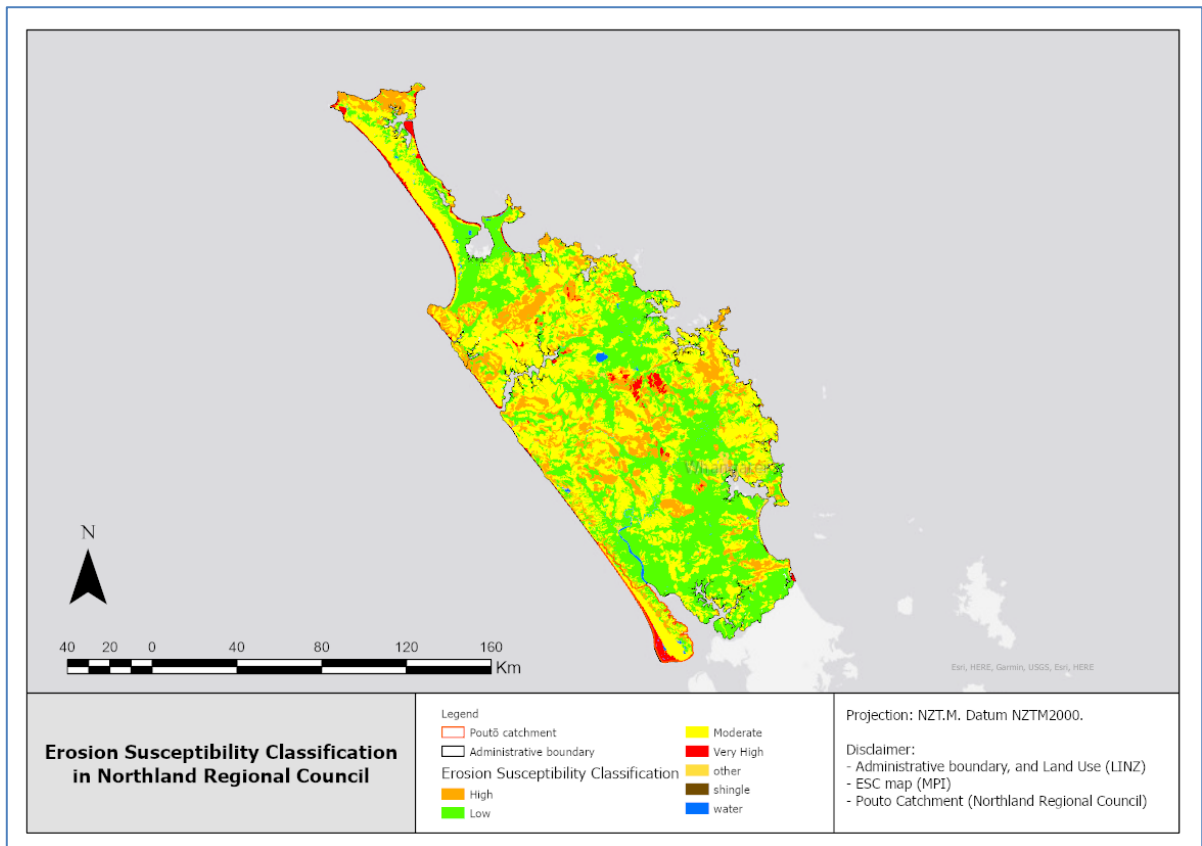


Figure 5.3: Erosion Susceptibility Classification of the Northland Regional Council area (Ministry for Primary Industries, 2018a; Stats NZ, 2020)

5.3.3 The location of areas with greater stringency applied

The stringency was applied for section E.3.2 Poutō catchment. In the Proposed Plan, Northland Regional Council introduced a new provision to protect one outstanding freshwater body, the Poutō Catchment. Poutō and four other catchments, Mangere, Waitangi, Doubtless Bay and Whangārei, were classified as five priority catchments (Northland Regional Council, 2020). However, NES-PF stringency is applied only in the Poutō Catchment. In the Poutō Catchment, especially Poutō Peninsula, several dune lakes have outstanding or high ecological value. They are Karaka, Humuhumu, Mokeno, Rotokawau, Kanono and Kahuparere.

Poutō Catchment is located on the Poutō Peninsula on the West Coast of the Northland Region (Figure 5.4). According to Northland Regional Council (2017c), there are at least 50 dune lakes with an area greater than 1 ha on the Poutō Peninsula. Farming and forestry were considered as the main pressures on the lakes (Northland Regional Council, 2017c).

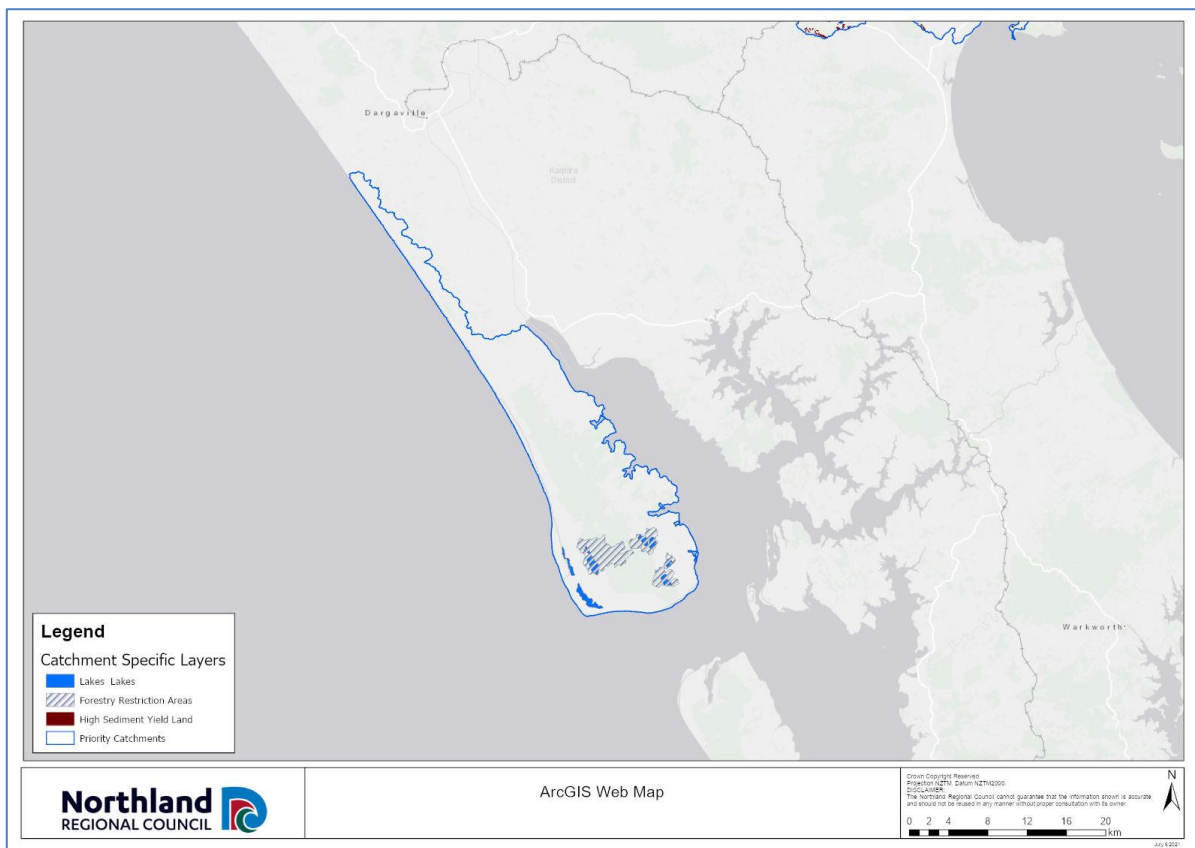


Figure 5.4: Forestry Restriction Areas in the Poutō Catchment (Northland Regional Council, 2021)

5.3.4 Reasons for greater stringency

Stringency was implemented to protect the dune lakes in the Poutō Catchment. However, during preparation of the proposed plan, the council had not fully implemented the NPS-FM’s water quality requirement either for 2017 or 2020. The stringency provision applies only to outstanding waterbodies. A plan change for the current proposed plan is to be notified in 2023, including the decision on whether a more stringent measure under NES-PF s(6) is needed to meet the NPS-FM 2020’s objective.

The Section 32 report argued that “Northland is one of the few places in the world where dune lakes are found and is particularly unusual for the number and diversity of the lakes” (Northland Regional Council, 2017d, p. 515). It was argued that plantation forestry could reduce the water amount that comes to the lakes and reduce the water quality because of fertilizer use and sedimentation from harvesting activities. Davie and Fahey (2005) argued that 30-80% water yield was decreasing because of afforestation of pasture.

Section 32 reports require councils to provide an evaluation to choose the best available policy. There were several options to support the current provision in the proposed Northland Regional Plan. Those options were: (1) Afforestation is allowed, except not within a 10 m riparian setback

(regional plan approach); (2) Manage afforestation by limiting new forestry to areas of 5 ha per property and implement a 20 m setback; and (3) Prohibit afforestation.

The options were evaluated against the desired objective and criteria. The criteria were minimising administrative costs to resource users, minimising opportunity costs to the landowner, minimising adverse effects on aquatic ecosystems and other uses and values of water. The administrative criteria were measured by looking at the change in the number of resource consents. The opportunity cost was measured by measuring the potential change in opportunity cost for the land owner. Opportunity cost means the loss of benefit that the land owner might receive if the rule is in place. The effect on the aquatic ecosystem was measured using the level of the council's ability to control the activity.

Based on this assessment, option two was chosen with the considerations as follows: (1) forestry activities will clearly affect the water quality of lakes; (2) the Regional plan rules (10 m setback) do not manage the impact of forestry on the water yield and the water quality of the lakes; (3) 20 m is considered more appropriate to protect margins of the outstanding Poutō lakes; (4) forestry does not depend on irrigation for its water intake, therefore, this situation will be considered on a case by case basis in the consent process; and (5) although administrative and opportunity costs will be moderately affected by controlling forestry, the effect on the lakes will last longer, therefore, precautionary steps should be taken. The council noted that if option two were adopted, then the rule would be more stringent than the NES-PF. On this matter, the council argued that stringency was necessary because it can protect the unique ecological/cultural values of the outstanding Poutō dune lakes using a precautionary approach. Moreover, dune lakes are sensitive to forest plantation activity. Council noted several existing plantation forests in the catchment and NES-PF was evaluated as being inadequate to achieve catchment protection as required in the Poutō Catchment plan.

5.3.5 Changes in the proposed plan

The implementation of stringency was incorporated into the new Proposed Regional Plan. During the plan change process, the Northland Regional Council took into account the NES-PF provision and, therefore, the Proposed Regional Plan did not have any duplicated or conflicting provisions. The plan replaced the Regional Coastal Plan, Regional Water and Soil Plan, and Regional Air Quality Plan, that had been used over 10 years. The proposed Regional Plan was notified in September 2017. At the same time, the Section 32 report was published to support the plan change process as required in the RMA.

The proposed plan consists of the rules, policies, and objectives of the plan. This is different from the previous plan that contained the issues, policies, method of implementation, and principal reason for adopting the objectives, policies, methods, and anticipated environmental results, which are not mandatory content under the RMA S(67)(2)(a-h). The proposed plan also does not include procedures for monitoring the efficiency and effectiveness of the policies and methods.

The proposed rules include the provision for: (C1) managing coastal activities; (C2) activities in the bed and diverting water; (C3) damming and diverting water; (C4) land drainage and flood control; (C5) taking and the use of water; (C6) discharges to land and water; (C7) discharge to air; and (C8) land use disturbance. The proposed plan also contains specific provisions for the priority catchment (E3).

The added provision was included under Section E3 regarding catchment provisions. In the previous Regional Water and Soil Plan, sands inland of the west coast foredunes from Poutō to the west of Te Kopuru and from Ahipara to the Te Paki Stream were said to be prone to wind erosion. The area that has been stabilised now can be used for plantation forestry activities with careful management during harvesting and replanting (Northland Regional Council, 2004).

The rules in this provision E3 aim to recognise the value of the Doubtless Bay, Waitangi, Poutō, Mangere and Whāngarei Harbour catchments. Of all the catchments, stringency applied only to the Poutō Catchment. The other catchments cover only provision for high sediment yield in from pasture. That is recognised as the highest contributor to sediment yield in the catchments (Northland Regional Council, 2017a, 2017b, 2017e, 2017f). The values included in the plan's objective are: (1) cultural and recreational uses associated with fresh and coastal water; (2) the ability to gather mahinga kai; (3) the natural character of waterbodies and their margins; (4) the quality of habitat for aquatic species; and (5) access to freshwater for productive uses.

The change to using the stringency provision under the NES-PF is found only in the Poutō Catchment provision (E3). Stringency is in Sections E.3.2.2 (New plantation forestry in the Poutō Forestry Restriction Area – restricted discretionary activity) and E.3.2.3 (New plantation forestry within 20 metres of outstanding Poutō Lakes – restricted discretionary activity). Section E.3.2.2 limits new plantation forestry that exceeds 5 ha per property in the forestry restriction area (Figure 5.4). Section E.3.2.3 regulates plantation forestry within 20 metres of Poutō Lakes.

5.3.6 Monitoring

State of environmental (SoE) monitoring

According to the Northland Regional Council, it did not have any specific state of environmental (SoE) monitoring related to sedimentation from plantation forestry activity (obtained under the LGOIMA request to Northland Regional Council, March 26, 2021). The last SoE report was published in 2015. According to that SoE report, sedimentation was one key pressure on marine biodiversity and was considered the most widespread water quality issue in Northland (Northland Regional Council, 2015b). This has also been identified in the Regional Policy Statement of Northland Regional Council (Northland Regional Council, 2016c). SoE monitoring consists of chapters on Health Communities, Our Biological Heritage, Our Land, Our Freshwater, and Our Coast.

In the Our Biological Heritage chapter, increased sedimentation was claimed to be negative for marine biodiversity. Despite having the highest diversity of fish and invertebrates of any region in New Zealand, there is still a limited understanding of Northland's coastal biodiversity. The reason is mainly because of the coastal environment's size, complexity, and inaccessibility (Northland Regional Council, 2015b). The report points out that sedimentation could limit the light and smother marine plants and animals. To understand the sedimentation accumulation rates, the council has undertaken studies in the Bay of Islands (2012) and Whāngārei Harbour (2013) that built on an earlier study (2011) in the Kaipara Harbour.

In the Our Land chapter, erosion and sedimentation are mainly discussed in the land cover section. It is noted that 65% of Northland's area was classified under land use capability classes 6-8 (Northland Regional Council, 2015b) that have moderate to very severe limitation hazards (Ministry for Primary Industries, 2017).

For freshwater quality, SoE monitors river, lake, and coastal water quality. For river quality monitoring, 35 monitoring sites were shown on the report. An additional 29 monitoring sites in the priority catchments (Whāngārei Harbour, Mangere, Waitangi and Doubtless Bay) were added during the SoE reporting year. In the report, only one year's data were available for the 29 monitoring sites, therefore, these data were not included in the report. For lake water quality, there were 26 monitoring sites. Finally, for coastal water quality, there were three monitoring areas: Whāngārei Harbour (17 sites), Bay of Islands (16 sites) and Kaipara Harbour (9 sites). The indicative location of the monitoring sites is shown in Figure 5.2.

Assessment of freshwater quality in the rivers and lakes was against the national objective framework of NPS-FM 2014 and against the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines. In the report, sedimentation was assessed using ANZECC

because NPS-FM 2014 did not have an attribute for sedimentation for both rivers and lakes (Northland Regional Council, 2015b). In the Northland's SoE, sedimentation was measured by looking at water's turbidity (water clarity). The turbidity value was then compared against Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines or New Zealand lowland rivers (5.6 NTU).

Three sites have exotic forestry land cover. They are Mangahahuru at Main Road (Wairua Catchment, Kaipara Harbour), Opouteke at Suspension Bridge (Wairua Catchment, Kaipara Harbour), and Utakura at Rangiahua Road (Waihou Catchment, Hokianga Harbour)⁵. From the data from 2012-2014 for the sites that have exotic forestry land use, two sites (Mangahahuru at Main Road and Utakura at Rangiahua Road) had turbidity values above 5.6 NTU. For the Opouteke at Suspension Bridge monitoring sites, despite having values under the ANZECC value, the 10 year trend showed that the sites' turbidity level was increasing. Similar results on the Land, Air, and Water Aotearoa (LAWA) website show the degrading trend in Opouteke at Suspension Bridge in the median value for five years' monitoring using a black disc. The black disc method measures water clarity by measuring the horizontal visibility of the black disc under the water (LAWA, 2013). These monitoring sites are also classified as in the 50% worst of all monitored sites (LAWA, n.d.-c). The website also reports Mangahahuru at Main Road, which is situated in a pasture area, but the river flow starts in a pine forest. This site was also recorded as in the 50% worst of all sites using the black disc method and 25% worst of all sites using turbidity (LAWA, n.d.-b).

For the monitoring of the lakes, there was no sedimentation attribute recorded in any of the 26 monitoring sites. According to the section 32 report, the NPS-FM 2014 only requires the region to at least safeguard aquatic ecosystems' life-supporting capacity and human health (Northland Regional Council, 2017d). However, the updated NPS-FM, and both NPS-FM 2017 and NPS-FM 2020, still do not have attributes for lake sedimentation. In SoE (2015), the recorded data based on the NOF NPS-FM 2014 were ammoniacal nitrogen (toxicity), total nitrogen, total phosphorus and phytoplankton (chlorophyll-a). According to the report, one dune lake, Mokeno Lake in the Poutō peninsula, has the lowest water quality among all monitored sites.

In the coastal area, assessment of sedimentation was carried out by looking at water clarity. According to the SoE report, all study sites' water clarity fall under the ANZECC guideline value. In Whāngārei Harbour, 93% of the sites were under the 10 NTU. One of four sites (Mair Bank) shows a declining turbidity trend from 2009-2014. The highest median levels were in Waikare Inlet, the Kawakawa River and Tapu Point in the Bay of Islands. Those sites were located near the Kawakawa

⁵ In the river water quality and ecology in Northland 2012-2016, this monitoring site was not monitored. The monitoring sites in Utakura were changed to Utakura River at Okaka Road with pastoral land use.

River outlet, which is the major contributor to the bay. In the Kaipara Harbour, the highest median turbidity was found in Wahiwaka Creek, which is located in the upper part of the Ōtamatea River. The data from 2010-2014 showed a decreasing trend in turbidity levels in the Ōtamatea Channel.

In addition to the coastal water quality monitoring, the council also cited several other monitoring studies for their coastal environment and estuaries. Northland Regional Council has estuary monitoring programmes (EMP) in the Whāngārei Harbour, Kerikeri Inlet, Ruakaka Estuary, Whangaroa Harbour and Kaipara Harbour. An EMP is an approach to assess the current state of the estuary to establish the baseline as a benchmark for further monitoring activity (Robertson et al., 2002). There are 13 sites monitored in those estuaries. This programme monitors intertidal habitats, physical characteristics (sediment particle size), and sediment metals. Annual monitoring was conducted from 2008-2011 to develop the baseline for monitoring. Currently, data are recorded every two years. The results of the estuary monitoring were shown in other documentation. Table 5.8 presents the sediment properties with a significant correlation ($p < 0.05$) with the intertidal ecological community structure.

Table 5.8: Northland intertidal and/or subtidal community structure correlation with sediment properties

| Estuary | Monitoring Period | Monitored Sites | Significance Sediment Properties | Sources |
|--|-------------------|-------------------------------------|--|-------------------------------------|
| Ruakaka Estuary | 2008 - 2011 | 2 | All sediment parameter | (Northland Regional Council, 2011) |
| Whāngārei Harbour | 2012 | 25 intertidal; 16 subtidal sites | Intertidal: mud, lead, nitrogen, copper, zinc, phosphorus, total organic carbon (TOC), medium sand, nickel, chromium Subtidal: copper, phosphorus, zinc, lead, mud, nickel, medium sand, nitrogen, chromium | (Northland Regional Council, 2012) |
| Waitangi Estuary | 2013 | 10 | Fine sand, nitrogen, mud | (Northland Regional Council, 2013) |
| Kaipara Harbour | 2014 | 44 | Mud, TOC, lead, medium sand, nitrogen, fine sand, zinc, phosphorus, copper, chromium, nickel | (Northland Regional Council, 2014) |
| Mangonui Estuary (Doubtless Bay Catchment) | 2016 | 17 | Mud, nitrogen, fine sediment, medium sand, coarse sand | (Northland Regional Council, 2016a) |
| Ngunguru Estuary | 2016 | 21 | Zinc, Lead, mud, medium sand, TOC | (Northland Regional Council, 2016b) |

Northland Regional Council Coastal Water Quality Monitoring 2010-2014

Besides the SoE monitoring, Northland Regional Council published the Coastal Water Quality Monitoring, which contains more detailed information on the monitoring methodology and results. The report stated that the council monitors the turbidity and total suspended sediment (TSS) in the coastal area (Northland Regional Council, 2015a). New monitoring sites for TSS in Whāngārei Harbour and the Bay of Islands were added in 2014, but the results were not included in the report since there was only one year of data. A summary of the monitoring rationale, location and guidelines is presented in Table 5.9.

Table 5.9: Turbidity and total suspended sediment monitoring adopted by Northland Regional Council (2015a)

| Water Quality Parameter | Programme | Guideline Value | Method | Reason for Monitoring |
|--------------------------------|--|------------------------|--|---|
| Turbidity (water clarity) | Kaipara Bay of Islands Whangārei | ANZECC (<10 NTU) | Samples collected from the top 0.5 m of the water column. The sample was sent to the council's laboratory which used a nephelometer. | <ul style="list-style-type: none"> • Indicator of the quantity of suspended material in the water column. • Indicator of ability to support aquatic life. • Affects primary production. • Affects predator-prey relationships |
| Total suspended solids | Kaipara | None | Measures water volume in pre-weighed filter of specified pore size, then re-weigh the dried sample (to remove the water) | <ul style="list-style-type: none"> • Indicator of the quantity of suspended material in water column. • Indicator of ability to support aquatic life. • Affects primary production. • Affects predator-prey relationship |

Since there are no guidelines for a turbidity baseline, the programme uses the ANZECC baseline of 10 NTU. The report suggests that no turbidity's median value exceeds the ANZECC value at the monitored sites. However, the maximum turbidity value for 28 of 41 monitored sites ranging from 10.4 NTU to 112.8 NTU had a maximum value exceeding the ANZECC baseline, The highest turbidity was found in the Otaika Creek (Whāngārei Harbour). However, the report did not provide any information on the cause for the extreme turbidity level.

As for the TSS in the Kaipara Harbour, there is no guideline that can be used for comparison. The results for Kaipara Harbour showed that Wahiwaka Creek had the highest median of 18 g/m³ and an

average of 21.6 g/m³. The lowest TSS value was recorded in the Five Fathom Channel, with a median of 7.5 g/m³ and a mean of 8.5 g/m³. The overall results of TSS are presented in Figure 5.5.

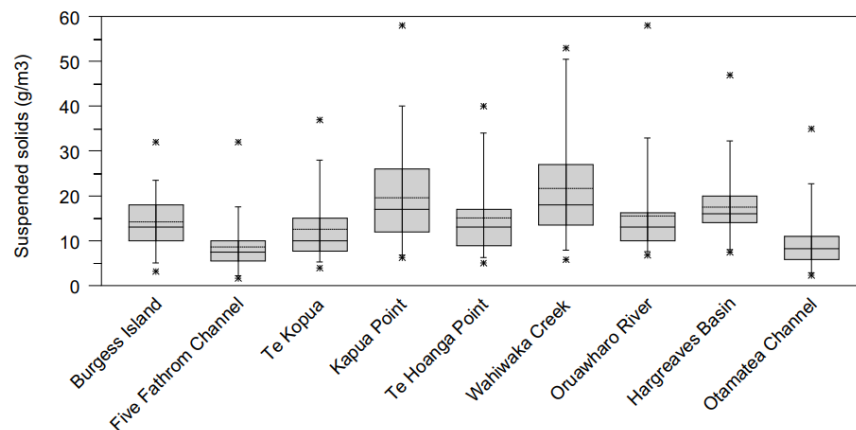


Figure 5.5: Total suspended sediment records in the Kaipara Harbour from 2010-2014 monitoring (Northland Regional Council, 2015a)⁶

River water quality and ecology in Northland 2012-2016

In 2018, Northland Regional Council published river water quality and ecology results (Nicholson & Perquin, 2019). The Water Quality Index (WQI) shows that most monitored sites were degraded, with 41% graded as 'fair', 26% 'poor', 18% 'good', and 15% 'excellent'. Two of 34 sites of the river water quality monitoring network (RWQMN) represented exotic forest. These RWQMN sites are monitored on the river that runs into Kaipara Harbour. The WQI for these sites are classified as excellent (Opouteke River at Suspension Bridge) and fair (Mangahahuru River at Main Rd). Among all WQI parameters, turbidity was not elevated. However, the report suggests that the data might be unrepresentative since they were taken on only a monthly basis and occasionally during/after heavy rainfall. Compared with the rest of New Zealand, most monitoring sites' turbidity level fell under the worst 50% (LAWA, n.d.-a). The rest of the sites were classified under worst 25% and best 50%.

However, several limitations are mentioned for the Northland Regional Council's State of Environment Monitoring for river water quality. Current monitoring is still based on spot samples; continuous monitoring is needed to understand the variability of the data. Better integration of river, lake, coastal and groundwater quality monitoring programmes is also needed to understand the water quality issues in Northland. The monitoring has not recorded some important parameters, such as fish community condition, macrophyte cover and composition, and deposited sediment, that are valuable for analysis.

⁶ Quoted from Northland Regional Council (www.nrc.govt.nz)

For plantation forestry, the report recommends establishing a mandatory setback for forestry harvesting to protect waterways from sedimentation. The setback is also necessary to protect from contamination by nutrients, increased oxygen demand from rotting instream debris, and increased temperatures because of reduced coverage (Nicholson & Perquin, 2019). However, the report did not mention the recommended distance for the setback. A follow up question using LGOIMA⁷ was asked regarding their intention to put the setback provision in their plan. Currently Northland Regional Council is still reviewing the water quality requirements of the NPS-FM and might include a more stringent rule for setback distance, if the reason behind the stringency can be justified.

Sediment Accumulation Rates - NIWA

To understand the sedimentation accumulation rate (SAR) in Northland, the council and NIWA worked together to study the SAR using analysis of compound-specific stable-isotopes (CSSI). This method was used to understand the sedimentation history as well as its source (Gibbs, 2008). However, this method can only identify the percentage of certain land uses' soil in the total sediment. It was not able to identify the amount of sediment and the time when the sediment was deposited (Northland Regional Council & NIWA, 2015, p. 84). An exception is the Kaipara Harbour since the study objective did not include analysis for sedimentation sources from historical land use. The results of the study are presented in Table 5.10

Table 5.10: A summary of the sedimentation accumulation rates report for Northland

| Study Site | Average ²¹⁰ Pb SAR | Historical Sedimentation Source | Project | Source |
|-----------------|-------------------------------|---|---|--------------|
| Kaipara Harbour | 6.7 mm/yr | - | 2010/11 NIWA Capability Fund research project | (NIWA, 2011) |
| Bay of Islands | 2.4 mm/yr | Pine plantation clear-felling was reportedly the main source of deposited sediment for Te Puna (36.7%) and Kawakawa inlets (27.5%) (NIWA, 2012). In Waitangi Inlet, the mainland use contributor for the sedimentation was pasture (42.4% in 2009). The percentage of sedimentation from plantation forestry was under 1% in 2009. However, in 2014, the percentage rose to 3.7% (Northland Regional Council & NIWA, 2015). | 2010 Land Information New Zealand (LINZ) Oceans 20/20 | (NIWA, 2012) |

⁷ Obtained under the LGOIMA request to Northland Regional Council, September 6, 2021).

| | | | | |
|-------------------|-----------|---|---|--------------|
| Whāngārei Harbour | 3.4 mm/yr | The sediment source was analysed for three catchments: Hatea River, Otaika River, and Mangapai River (NIWA, 2013). The highest sedimentation from pine forest was in the Hatea River (24% from all land use). The percentages of sedimentation from pine plantations in the Otaika and Mangapai River were only 4% and 10%. | - | (NIWA, 2013) |
|-------------------|-----------|---|---|--------------|

5.3.7 Analysis

The stringent rule has been applied to Poutō Catchment. The rule categorised the new plantation in the Poutō Forestry Restriction Area and within 20 m from Poutō Lakes as a restricted discretionary activity. In NES-PF, afforestation is classified as a permitted activity with certain standards that need to be met (NES-PF s(2)). The standards prohibited afforestation only within significant natural areas and outstanding features and landscapes (NES-PF s(12)). Both NES-PF and the proposed plan have the same resource consent type if afforestation occurs in the setback of an outstanding waterbody, restricted discretionary. However, Northland Regional Council has a more stringent rule with the 20 m setback; in NES-PF the setback for an outstanding waterbody in the region is 10 m (NES-PF s(14)(3)(b)). The 20 m setback was chosen because it is considered the most appropriate setback for the Poutō Lakes. Moreover, most Poutō Lakes already have a 20 m strip of crown land that prevents any company from operating in those margins (Northland Regional Council, 2017d).

Compared with other councils, Northland Regional Council can draft a more stringent rule in its proposed plan since it used a plan change process to incorporate the NES-PF in its plan. However, the current stringency provision in Northland Region is currently limited to protecting the Poutō Catchment. The council argued the absence of a stringency provision to achieve the water quality target is because the plan was drafted before the implementation of NPS-FM 2017 and 2020. Moreover, during the submission period, the hearing committee did not recommend applying greater stringency other than to the Poutō Catchment (obtained under the LGOIMA request to Northland Regional Council, September 6, 2021).

Several reports (Ministry for the Environment, 2017; Northland Regional Council, 2015b, 2016c) have identified sedimentation as one contaminant that affects coastal and freshwater. Historically, the erosion and sedimentation regime in the rivers and estuaries increased because of large scale deforestation (Nicholson & Perquin, 2019). Currently, the dominant land use contributor to sedimentation is pasture activity. However, at some sites, plantation forestry also contributes to sedimentation. For example, in the Whāngārei Catchment, pastoral erosion accounts for 43% of total erosion, but the average annual total erosion rate from pine forest land-use was highest (Northland

Regional Council, 2017f). SedNetNZ erosion modelling results estimated that the erosion was more than 1.2 t/ha/y for plantation forest cover. This is arguably because of plantation forestry located on the steepest, most highly erodible soils in catchments. Another example is the Mangakahia Valley, west of Whangarei, that had a problem with wood debris in the river during a flood event (Williams, 2017). Several years ago, built-up sedimentation in the Ngunguru Estuary caused a massive shellfish die-back (Williams, 2017).

With the underlying issues, Northland Regional Council may be able to exercise more stringency in the further plan changes in the NES-PF to protect sensitive environments. In the River Water Quality report released after the proposed plan draft, Nicholson and Perquin (2019) recommend putting a mandatory setback for forest harvesting. The current NES-PF provides a setback provision for quarrying, earthwork, mechanical land preparation, replanting, and afforestation (i.e., 30 m from the coastal). Northland Regional Council argued that justification under Section 32 will be required to apply stringency for the setbacks (obtained under the LGOIMA request to Northland Regional Council, September 6, 2021).

However, study regarding setback for plantation forestry in New Zealand is still limited (Yao et al., 2017). A study by Yao et al. (2017) compares setbacks of 30, 100 and 200 m in the Marlborough District Council based on a study by Ulrich (2015). The authors found that a greater the setback distance will result in better environmental protection but, conversely, it is likely to cause an economic burden to the companies that will likely reduce revenue and employment opportunities. However, the study was conducted in Marlborough. Therefore the Northland Regional Council should consider requesting expert assistance to measure the effectiveness of setbacks and their impact on sensitive environments since robust data for setback effectiveness in managing sedimentation is still limited (Yao et al., 2017). Arguably, this could include different setback based on the ESC classification and the existing condition of the receiving environment.

Nevertheless, a setback provision should not be seen as the only option in applying stringency to protect sensitive environments, especially in erosion-prone areas. Marden and Phillips (2015) argue that setback is unlikely to be effective in mitigating mass movement but might be effective for non-point source sediments. Therefore, retirement of a plantation forest might be an option if the area is prone to mass failure (Ulrich, 2015). In the Ngunguru estuary, some communities raised concern over erosion and sediment discharge (Baker, 2014).

However, the council might require evidence to propose a more stringent measure. Despite having various issues regarding sedimentation and erosion in the region, the number of monitoring sites in areas dominated by exotic forestry cover is still limited. Currently, there are only two monitoring

sites located in exotic forestry cover. This number decreased from three sites in the SoE 2015 report to two sites in the River Water Quality and Ecology Monitoring Report 2016.

Based on the NIWA report (Table 5.10), the highest sediment accumulation rate was found in Kaipara Harbour. It has been known that Kaipara Harbour is one of the significant habitats for snapper (*Pagrus auratus*), especially on North Island. Parsons et al. (2014) argued that the post-settlement juvenile snapper is highly associated with certain benthic habitats. Research from Radford et al. (2012) also showed that snapper has a high preference for their habitat. However, those habitats mostly suffer from land activity effects, such as forestry sedimentation (Morrison et al., 2009). Morrison et al, also added that the sedimentation could cause the reduction of foraging abilities and reducing the carrying capacity for snapper. Arguably it might cause a population decline in the next 100 years (Morrison et al., 2009). The concern regarding the sedimentation accumulation on Kaipara Harbour has also become a national concern. The government also launched Kaipara Moana Remediation Programme, allocating at least \$200 million (Ministry for the Environment, 2021a).

However, despite its significance, stringency under the NES-PF was not applied for protecting the Kaipara harbour as part of sedimentation mitigation from plantation forestry activity. Northland Regional Council is involved in the Kaipara Harbour sedimentation mitigation remediation programme. In 2018, Green and Daigneault (2018) developed a sediment mitigation study⁸. The sediment load was generated based on the SedNetNZ model. The sedimentation source from the model was 53% from sheep and beef farms, dairy (24%), plantation forestry (10%), and native bush (6%). However, this study was limited to mitigation from the remediation implementation such as re-planting and did not call for a change in plan and policy of Northland Regional Council.

According to Northland Regional Council, to change the rule, then the justification of the rule and the need to undertake the plan change is required⁸. However, the river that flows in Poutō peninsula to Kaipara Harbour was not monitored despite having plantation forestry adjacent to Kaipara Harbour (Figure 5.2) and several flows in Kaipara Harbour (Northland Regional Council, 2017c). Therefore, understanding the effect might be difficult due to the unavailability of data (Northland Regional Council, 2017c). However, Northland Regional Council can still justify to applied stringency by using Policy 3 – precautionary approach of NZCPS. Although, NES-PF doesn't mention policy 3 as a requirement to apply the stringency, but under the NZCPS Policy 3 and Policy 22 are related with each other (Department of Conservation, 2018). The precautionary approach does have a burden of proof, which means that the council might be required to proof the environmental effect from plantation forestry activity (Magallanes & Severinsen, 2015). However, at the same time the

⁸ obtained under the LGOIMA request to Northland Regional Council, September 6, 2021

'reversal' burden of proof can be occur too. Therefore, Magallanes and Severinsen (2015) argue that if the evidence is balanced then the environmental issues should be prioritised.

The availability of the monitoring sites is crucial to provide evidence in developing policy, especially since Section 32 of RMA requires the council to assess the environmental impact scale and significance and its cost and benefit. Moreover, uncertainty in using NES-PF stringency to meet other national policy objectives (Te Uru Rākau, 2021) such as NPS-FM and NZCPS should be able to be addressed if there are enough data. Although forest plantation's sediment contribution is not as dominant as pasture activity, it is important to note that Policy 3 of NPS-FM 2020 obliges the council to manage freshwater in an integrated way that considers the effect of the use and development of the whole catchment. On the other hand, Policy 3 of the NZCPS requires a precautionary approach to protect sensitive environments.

The availability of SoE monitoring sites is important to understand the effect of plantation forestry on the receiving environment. In addition, frequent monitoring, especially during high rainfall events, is necessary to understand the temporal erosion and sedimentation pattern to develop regulatory and non-regulatory approaches. Bright and Mager (2017) argued that the hillslope erosion analysis should be undertaken to identify suitable monitoring sites. This is especially so since compliance monitoring in 2011 showed that the permitted activity was frequently non-compliant with the required conditions (Baker, 2014). The establishment of a permanent monitoring network of sites could help the council better understand the real effects of plantation forestry.

5.4 Summary

The one-year NES-PF review report by Te Uru Rākau provided a national overview of NES-PF implementation. However, the report did not specifically indicate statistics on NES-PF implementation for the entire nation. The NES-PF provides the ability for councils to have their own stringent rules to protect sensitive sites in the environment. However, the report said that even though the stringent rules allow more control, they argued that the link between environmental benefit and stringency is hard to define. On the contrary, the stringency might give rise the inconsistency according to Te Uru Rākau and cause more additional cost to resource users as some of the forest owners have land in two or more regions. There was no specific review on how the current NES-PF can be used to meet the objectives of the NPS-FM and NZCPS in NES-PF one year review.

From the LGOIMA and document analysis, 12 regional and unitary councils have aligned their plan with the NES-PF. There are several reasons why the other two councils have not yet aligned their plan. Plan alignment has not been conducted for the West Coast Regional Council since there is a lack

of staff resources to carry out the alignment. Currently, the plan alignment report is still being prepared. Finally, the Southland Regional Council argued that its plan is currently under appeal and, therefore, plan alignment will occur after it has finished the plan change process.

Of the 14 councils (excluding West Coast Regional Council and Southland Regional Councils) that have implemented the NES-PF, only two councils have not used the stringency option. Those councils are the Bay of Plenty Regional Council and the Nelson City Council. Seven of 11 councils have applied stringency to meet NPS-FM's objective and to protect SNA; five councils applied stringency for Outstanding Natural Feature/Outstanding Natural Landscape; four councils applied stringency to meet NZCPS's objective; and three councils applied to protect unique and sensitive environments.

Detailed analysis was carried out to analyse the implementation of the NES-PF by the Northland Regional Council. Northland Regional Council is the only council that aligned with NES-PF using the Schedule 1 process since the early stage of the plan change. The council has provisions by mostly avoiding plantation forestry provision in the region. Stringency can be found only in the Poutō Catchment (to protect the dunes lakes that are classified as outstanding water bodies). Other than stringency for NPS-FM's objective, no other stringency provisions have been implemented.

However, despite the current state of Kaipara Harbour, which is currently degraded due to excessive sedimentation, there is no stringency put in place to protect the Kaipara Harbour under the NES-PF. Moreover, despite the abundance of exotic forestry land cover in the Poutō Peninsula which is located near the Kaipara Harbour, there is no monitoring put in place to monitor the sedimentation from plantation forestry in those areas. From the analysis presented in this dissertation, Northland Regional Council can exercise more stringency under the NES-PF to meet the objective of NPS-FM and NZCPS. The lack of plantation forestry monitoring sites does not provide data certainty to establish any stringency to protect sensitive environments. However, where the data is uncertain council could use the NZCPS Policy 3 regarding the precautionary approach to protect coastal environment.

Chapter 6

Discussion

This study was aimed at reviewing the implementation of the NES-PF's stringency for managing sedimentation, particularly the stringency to meet the objectives of NPS-FM and NZCPS. The discussion was drawn from a literature review (Chapter 2), the regulatory framework (Chapter 3), and the questionnaire and document analysis results (Chapter 5). The discussion will be covered by:

1. a review of Plan Alignment with the NES-PF;
2. a review of the NES-PF stringency implementation; and
3. a review of improvement by NES-PF in protecting the sensitive receiving environment

6.1 A Review of plan alignment with the NES-PF

NES-PF was commenced in 2017 and was made operative in May 2018. The RMA s(44A)(4) obliged councils to remove any duplication or conflict without using Schedule 1 and as soon as practicable after the standards came into force. In this study, only Northland Regional Council has undertaken the alignment without using the s(44A) provision. The Northland Council's Proposed Regional Plan was made after the gazetting of the NES-PF on 1 May, 2018. Therefore, all the planning provisions have been adjusted to avoid duplication or conflict with the NES-PF.

However, there is no time restriction on plan alignment. Despite it having been three years since the NES-PF came into force, two councils (West Coast Regional Council and Southland Regional Council) still have not finished their plan alignment. Both councils provide guidelines for the user to understand the connection between the plantation forestry rule under the NES-PF. According to the RMA s 43A(5)(c), if terms or conditions for certain activity effects in the plan are similar to the standards, it will be superseded by the standards.

In this study, limited resources in the local authorities is a key issue that is slowing plan alignment. Competing resources will likely force local governments to prioritise the task. The West Coast Regional Council, for example, started the plan alignment review in 2018, but finalising the report has been pushed out because of another 'important task'. Unclear national direction prioritisation has left local governments confused about determining which activity needs to be prioritised (Environmental Defence Society, 2018).

MPI did provide the option to address these issues in its one-year review document. The report said that, to counter issues with the plan alignment, it is necessary to ensure plan alignment is conducted. However, the report did not provide information on how this recommendation could be incorporated and implemented at the local government level. Therefore, MPI should consider developing a strategic roadmap with clear desired technical and environmental outcomes.

6.2 A Review of the NES-PF stringency implementation

The application of stringency was varied across the country, which resulted from the alignment process results. Though councils like Gisborne District Council have exercised stringency for almost all conditions under regulation 6, no use of the stringency rule was found in the Bay of Plenty Regional Council's plan. For the Bay of Plenty Regional Council, this means that the operative plan does not have a more stringent rule than the rule provided under the NES-PF.

Four councils (Gisborne District Council, Hawke's Bay Regional Council, Manawatu – Whanganui Regional Council, and Otago Regional Council) used stricter rules to manage plantation forestry to give effect to the NPS-FM. In the results, during plan alignment (RMA s(44A)) with the NES-PF these rules were retained as more stringent ones that applied under the regulation 6 condition.

This also implies that before the commencing of the NES-PF only four councils (Auckland, Gisborne District, Marlborough District and Tasman District Council) had rules which are more stringent than the rule under the NES-PF. A visual screening of the map produced by Ministry for Primary Industries (Te Uru Rākau, 2020) shows that several plantations can be found adjacent to the coastal area, such as in Otago, Bay of Plenty, Greater Wellington, Manawatu – Whanganui, Gisborne, Auckland, Waikato, West Coast, Marlborough, Nelson and Tasman. This implies that, of 11 councils that have plantation forestry adjacent to coastal areas only seven did not have any more stringent rules to give effect to NZCPS compared with NES-PF. However, this evaluation was based on the visual assessment of the MPI's map; GIS analysis is needed to check the distribution of plantation forestry in coastal areas at the national level.

Although using a plan change seems preferable to develop a stringency provision, but changes are resource exhausting. The time needed for a plan change is also quite long. For example, in the Northland Region, the proposed plan was notified in 2017 and the decision became available in 2019. Currently, the document is still under appeal.

Four councils did use the plan change process to draft more stringent rules to give effect to NPS-FM and NZCPS. Councils that have used the plan change process to align and streamline NES-PF with

their plan are the Canterbury Regional Council, Greater Wellington Council, Marlborough District Council and Northland Regional Council. Northland Regional Council, despite having the ability to exercise more stringent rules to give effect to NPS-FM and NZCPS, has not fully used that ability. Councils argued that this was because they have not conducted a plan review to give effect to NPS-FM 2020. The NPS-FM 2020 contains water quality attributes for sediment that were absent from NPS-FM in 2014 and 2017. Wright et al. (2019) argued that to implement the stringency, the councils are required to conduct a full review of the plan and objectives to give effect to the NPS-FM. A similar condition can be found in the Canterbury Regional Council plan. The Canterbury Regional Policy Statement still has not adjusted to give effect to NZCPS 2010 (Environmental Defence Society, 2021). The change will be notified in 2023/2024. Although, it is important to note that the plan change for the Canterbury Regional Council was applied only for Canterbury Land and Water Plan (CLWP); its coastal plan has not undergone any plan change.

However, under the RMA s(67)(3)(4), a regional plan must give effect to any national policy statement and NZCPS. This matter was addressed under the *Aratiatia Livestock Ltd v Southland Regional Council* [2019] NZEnvC 208 judgement. Therefore, based on this judgement, the regional plan must give effect to the policy statement, the NZCPS, and any regional policy statement. It is expected that all councils must give effect to NPS-FM 2020 and NZCPS during the next plan change.

However, it is important to highlight that the Resource Management Act is currently undergoing a reform process. Although it is still too early to say, several clauses on the Natural and Built Environments Bill might become an enabling factor for improving stringency implementation in the future. For example, one of the recommendations from the one-year review by Te Uru Rākau is to provide guidance for stringency. If the new bill is passed, the clause regarding the environmental limits and environmental outcomes can help in drafting the guidance for stringency. For example, the government can use this to determine “maximum amount of harm or stress” (Ministry for the Environment, 2021b, p. 33) from plantation forestry activity that could deteriorate the environment. In addition, the clause regarding the precautionary approach is described explicitly in the new bill, unlike in the current RMA. Although it is argued that the precautionary approach is inherent in the current RMA (Magallanes & Severinsen, 2015). Moreover, the current NZCPS also has precautionary approach in Policy 3. The next question is on how the precautionary can be fully utilised and encouraged in the Natural and Built Environments Act, after the bill pass.

6.3 A Review of NES-PF improvements in Protecting Sensitive Receiving Environments

6.3.1 Strengthening compliance monitoring

Most of the stringency under the NES-PF was the result of the alignment process. This could mean that, before the NES-PF came into force, some councils had more stringent rules than the NES-PF. For example, Gisborne District Council required consent for all forestry activities but, under the NES-PF, only high ESC classification requires a resource consent. The council noted there were 1,177 permitted forest harvesting activities in 2018 but none in the previous years. In total, there were 10,718 granted consents in 2018 compared with 3,538 in 2017, and 7,718 in 2016. The permitted activity was still required to provide notification 20 – 60 days before the harvesting. A similar condition also can be found on Banks Peninsula. Most of Banks Peninsula is classified as moderate ESC, which means forestry plantation is a permitted activity. Before NES-PF commencement to protect the environment, the rules categorised plantation forestry in the rural zone as a restricted discretionary activity and required resource consent (Environmental Defence Society, 2021). For the outstanding natural feature and outstanding natural landscape, plantation forestry is categorised as non-complying activity.

However, this means that, to protect the receiving environment from the potential sedimentation and erosion from the harvesting activity, councils are required to strengthen compliance monitoring for all forestry activity, especially permitted activity. The Ministry for the Environment (2016) in the compliance, monitoring, and enforcement (CME) in the RMA review reported that several factors that influence the prioritisation of CME are lack of resources, lack of political will to effectively implement the RMA and penalise the non-compliance activity, lack of understanding by the local government about the importance of CME, and stricter statutory requirements for other RMA and non-RMA activities. One example of these issues is the very little or no monitoring of plan rules for a permitted activity. In the Ngunguru Catchment, Northland Region, for example, despite having the compliance monitoring that shows a lot of non-compliant activity for the required conditions, enforcement was considered inadequate (Baker, 2014).

In addition, to exercise compliance monitoring, councils will require enough funding to pay their operational costs. However, there is no provision in the RMA for a permitted activity's cost recovery even if non-compliance is found (Resource Management Review Panel, 2020). This issue was considered under the NES-PF by providing the regulation 106, which enables councils to charge the applicant for costs incurred for compliance monitoring for regulation 24 (earthwork), 37 (river crossing), 51 (forest quarrying), and 63(2) (harvesting). However, this study did not investigate

application of regulation 106. Further research is needed to look at the effectiveness of regulation 106 in strengthening compliance monitoring to protect sensitive environments.

A number of prosecutions have been lodged regarding the impact of plantation forestry on the environment. For example, in *Canterbury Regional Council v Sharples Logging Ltd* [2018] NZDC 11367, a site inspection was carried out by the Canterbury Regional Council to assess the earthwork and erosion measures. The harvesting was conducted in the Port Hills that are an erosion-prone area during winter. Surface water was seen running down gullies during the inspection and Sharples Logging agreed to cease operations. However, in the afternoon, a complaint was lodged regarding sediment entering Hoon Hay Valley Stream, which is a significant ecological area supporting aquatic species such as long fin eels and inanga. This case shows that, despite having the site inspections, breaches of conditions might still happen. Similar discharge incidents because of forest harvesting after the NES-PF commenced have been recorded in the *Manawatu-Whanganui Regional Council v NZL Forestry Group Limited* [2020] NZDC 22557 and in *Gisborne District Council v PF Olsen Limited* [2020] NZDC 19089. Strengthening compliance is required to protect the receiving environment, but this should not be pursued as the main solution.

It is also important to note that, commonly, plantation forests are located on steep hills. Historically exotic plantations have been used and encouraged for erosion control programmes (Gisborne District Council, 2020). Although plantation forestry might be able to reduce erosion and sedimentation risk, the benefits of a plantation forest apply only at a mature age. Moreover, if harvesting is not carried out carefully, it might lead to a high risk of sedimentation and slope failure (Marden & Rowan, 2015). The current NES-PF does not directly deal with exotic forestry that was planted for an erosion control programme. In future, to avoid the risk of sedimentation and mass failure, NES-PF should provide more stringent measures in that area, including retiring the erosion-prone areas under the erosion control programme.

6.3.2 Improvement of the Erosion Susceptibility Classification

NES-PF uses a risk assessment tool in determining the activity class for resource consents. To determine an erosion-prone area, NES-PF uses the Erosion Susceptibility Classification (ESC). The activity status for ESC under the NES-PF is as shown in Table 6.1.

Table 6.1: Plantation forestry activities based on the ESC [modified from (Strang et al., 2015)]

| Activity | ESC | | | |
|-----------------|-------|--------|----------|----------|
| | Green | Yellow | Orange | Red |
| Mechanical Land | P | P | P (<25°) | P (<25°) |

| | | | | |
|-----------------------------|---------------------|---------------------|-----------------------|--------------------|
| Preparation | | | RD | RD |
| Afforestation | P | P | P | P (<2 ha) |
| Earthwork | P | P | P (<25°) RD (>25°) | P (3 months) RD |
| Forestry Quarrying | C RD (earthflow) | C RD (earthflow) | C RD (earthflow) | RD |
| River Crossings | P | P | P | P |
| Pruning & thinning to waste | P | P | P | P |
| Harvesting | P | P | P | P RD (LUC 8e) |
| Replanting | P | P | P | P (<2 ha) C |

P: permitted; C: controlled; RD: restricted discretionary.

From Table 6.1, a higher level of control, such as controlled activity and restricted, can be found for the orange or red erosion susceptibility zone. However, most activities are classified under the permitted activity with some conditions applying. NES-PF does indeed not encourage activity in the red zone (Fowler, 2017), but permitted activity can be found including in some earthwork and harvesting, in the orange and red zones.

The accuracy of predicting in an erosion prone area is crucial to manage the possible environmental impact of plantation forestry activity. However, current ESC maps don't have high enough resolution, so might be unreliable for measuring an erosion-prone area (Griffiths et al., 2020; Hendrickson, 2018; Ulrich, 2020). NES-PF requires applicants to re-interpret ESC maps with the scale no less than 1:10,000 (NES-PF Schedule 3 Clause 2(a)) to develop a forestry earthworks management and harvest plans. However, harvesting and earthwork activities are plantation forestry activities that are prone to resulting in sediment discharge entering the receiving environment. Therefore, a high level of control from the council is needed. For example, in the Manawatu-Whanganui Region, a breach of NES-PF was found at Druce Road, near Woodville. The sediment discharge resulting from harvesting activity was entering Awapikopiko Stream causing an increased level of suspended sediment (Manawatu-Whanganui Regional Council v NZL Forestry Group Limited [2020] NZDC 22557).

In addition to the resolution improvement of ESC, other additional information can be considered to improve the ESC. The information such as potential debris flow hazard in the recent study by Bloomberg and Palmer (2021), can be added to enhance the information for the decision maker in implementing the stringency for forest plantation. By including this information, the decision maker could consider potential impact from the debris flow or debris flood in drafting the rule related to the plantation forestry to avoid any adverse impact to the environment and community.

6.3.3 Alignment among NES-PF, NPS-FM and NZCPS

NES-PF holds a significant role in managing the environmental effect of plantation forestry on the receiving environment. For example, the ability to implement NPS-FM for forestry activities is regulated under NES-PF whereas other land uses are regulated under NES-F. To achieve the NPS-FM objectives, councils can implement stringency. The same also applies to protecting the coastal area from the forestry activities. NZCPS under policy 3 requires councils to apply the precautionary approach. The precautionary approach should be applied where there is a lack of information on the impact of the activity on the coastal environment. On a case-by-case basis, the local governments can decide whether to restrict the activity or apply adaptive management (Department of Conservation, n.d.). Adaptive management allows authorities to decide the management on a complex system in the coastal environment when the information is uncertain or incomplete (Department of Conservation, n.d.). However, this process involves monitoring and review, which is why monitoring will be necessary to implement this approach. Although policy 3 is not included in regulation 6 of NES-PF, according to the NZCPS guidance notes, to give effect to policies 11, 13, 15, and 22, councils should consider policy 3 (Department of Conservation, n.d.). Although no provision in the RMA explicitly addresses the precautionary approach, Milne and Grierson (2008) argued that the precautionary approach is inherent in the RMA.

However, in a one-year review of NES-PF, Te Uru Rākau (2021) argued that how stringent rules can affect the national policy objective is unclear since the linkage of the rule and the objective is ambiguous. Therefore, clear guidance from the government is needed (Resource Management Review Panel, 2020) to reconnect the correlation between the national direction to achieve the desired environmental outcomes.

Currently, at the national level, the reform of RMA is being discussed. The reform includes the improvement for better alignment of the national direction. In the Natural and Built environments Bill, the national direction will become National Planning Framework (NPF). Moreover, an independent body might be established in the new system to ensure consistency across the national direction (Ministry for the Environment, 2021b). The connection between NES-PF, NPS-FM, and NZCPS should be well defined to improve the implementation of NES-PF to protect sensitive receiving environments. The alignment includes incorporating a suggestion by Fowler and Buddle (2020) to align the NES-PF with the NPS-FM by requiring councils to provide risk assessment tools under the NPS-FM in Schedule 2 of NES-PF. This includes identifying outstanding waterbodies, freshwater management units, freshwater attributes and values, and threatened aquatic species (Fowler & Buddle, 2020). The risk assessment tools have the same function as the Erosion Susceptibility Classification (ESC) to provide clarity for managing an area that is prone to adverse effects from

plantation forestry activity. Arguably, a similar approach could be used to give effect to the NZCPS by providing a risk assessment tool. This includes identification of high natural character (Policy 13, 14) sedimentation accumulation level (Policy 22) and high biodiversity area (Policy 11) in the coastal environment in each region.

6.3.4 Encouraging protection of sensitive environments

Based on the study, two main improvements are needed to protect sensitive receiving environments from the negative impact of plantation forestry activities. Those are strengthening the NES-PF rules and standards for the high erodible land and encouraging the use of stringent rules at the local level. These can be applied by limiting the activity in the erodible terrain, especially where the plantation forestry activities can potentially worsen the degraded receiving environment. This includes retiring the plantation forestry activities and mandatory replanting in the steeper slope, as recommended by Urlich (2015, 2021). This is necessary as despite having a lot of technical evidence that plantation forestry on a steeper slope could cause harm to the receiving environment, the rules are still too permissive (Urlich, 2021).

New Zealand government cabinet paper (2020) noted that 31% of monitored waterways did not meet the proposed bottom lines of NPS-FM 2020. Historically, plantation forestry has been recorded as a sediment contributor in New Zealand (NIWA, 2011, 2012, 2013, 2015). Although plantation forestry is not the main land use in most regions, most plantation forestry activities are situated on erodible terrain. In the Whangarei Catchment, for example, plantation forestry covers 10% of catchment land use but, proportionally, it was the highest average annual total erosion rate by land-use (Northland Regional Council, 2017f). Another example is in Pelorus Sound where it was found that, even though plantation forestry was not the major sedimentation contributor, if the sedimentation impact was not managed it hindered other efforts that were put in place to protect coastal biodiversity (Handley et al., 2017).

Another option to improve the application of NES-PF is by considering an integrated and holistic approach to protect the environment. For example, in Nguguru Catchment, the accumulated sedimentation, including from plantation forestry during the high rainfall event, caused a massive shellfish die-back in the estuaries (Williams, 2017). This case shows that the plantation forestry in the upper catchment could add more burden to the receiving environment and cause harm to the ecology in the estuary or lower catchment.

Several documents have encouraged councils to view the environmental issues in a more holistic approach. For example, Policy 3 of the NPS-FM 2020 requires all persons to exercise an integrated

management approach, which requires councils to adopt a 'ki uta ki tai' approach. This includes recognising the interconnectedness of mountains, lakes, rivers, lagoons, estuaries and the sea. New Zealand Biodiversity Strategy 2000 also encouraged the ecosystem management approach that requires councils to have a holistic approach and consider current, past and future patterns of natural resource use and ecological processes (Department of Conservation, 2000). In the new version of the New Zealand Biodiversity Strategy 2020, the document also mentioned that one of the reasons for biodiversity loss is indirect pressure, including not having the right system (i.e. policy, legislation, resources) and disconnection between people and nature (Department of Conservation, 2020). Therefore, the use of stringency rule should be viewed as part of system to protect the whole ecosystem instead of viewed as a discretionary tool within a fragmented sectoral regulatory framework. For example, a stringent rule should be used as a mandatory approach where the receiving environment is degraded, especially if the sedimentation could cause a potential threat to the biodiversity or ecological condition. This approach could potentially be applied for protecting Kaipara Harbour which sedimentation is one of the causes of environmental degradation to the coastal environment. If the holistic approach were applied, the sedimentation risk from the land to the estuary might be foreseen and thus the risk better anticipated.

To move forward, the right question for councils to protect the receiving environment is not about whether to implement the stringent rule, but to find evidence to develop the appropriate stringent rule. For example, Yao et al. (2017) argue that the study for the setback is still limited for New Zealand context. The study, for example, can be directed to find the appropriate setback to protect the receiving environment.

However, to determine which activity needs stringency, continuous monitoring will be required to foresee the pattern of the sedimentation impact from plantation forestry at the local level. For example, in the Northland Region, currently, only two state of environment monitoring sites are situated on plantation forestry land use, and they are sampled monthly (Nicholson & Perquin, 2019). The sites were one each on Wairua Catchment and Mangakahia Catchment; both catchments end up in the Kaipara Harbour. Under the NES-PF, sedimentation must not result in change after reasonable mixing (Fowler, 2017). Therefore, councils must ensure that monitoring sites are enough to satisfy this requirement. Moreover, as each of plantation forestry activity has different impacts on the environment and is heavily influenced by the weather, more frequent sampling is needed to better represent the impact of plantation forestry on sensitive environment.

Chapter 7

Conclusion

This study aimed to look at the implementation of the NES-PF and the stringency provision under the NES-PF by regional and unitary councils. Overall, the NES-PF has been aligned by 14 regional and unitary councils. Among all councils, only West Coast and Southland Regional Councils have not finished their plan alignment process. The main cause of the prolonged plan alignment for the West Coast is limited human resources. For the Southland Regional Council, the council has listed 'more stringent' rules in its proposed plan, but plan alignment cannot be conducted yet because the plan is still undergoing an appeal so the council considers not an appropriate time to conduct full alignment.

In conducting plan alignment with NES-PF, councils are required to conduct it as soon as practicable without using Schedule 1 as mandated in Section 44A of the RMA. During plan alignment, councils are required to remove any duplicated or conflicting rules. However, since the NES-PF enables councils to have a more stringent rule, councils can retain a more stringent rule. In the process, councils can only remove any duplication/conflicted rules or retain the more stringent rule. If the council decides to add a more stringent rule, then the council must undergo the plan change process. According to the collected data, councils have used stringency under NES-PF for various reasons. Eleven councils used stringent rules to give effect to NPS-FM's objective, whereas four councils used it to give effect to NZCPS.

Most councils exercised stringency as the result of the alignment process. This means most regional or unitary planning documents contain a provision that is more stringent than the NES-PF. Only four councils used the plan alignment process to exercise stringency. In general, to enable a council to implement a stringent provision to give effect to NPS-FM and NZCPS, it needs to conduct a plan review for both national directions. Currently, most councils have not reviewed their plan with the NPS-FM 2020. However, this seems not to be the case for the NZCPS. Although most councils have reviewed their plan under NZCPS, the use of NZCPS for stringency is less than for NPS-FM.

Therefore, based on the study's findings, several things should be addressed to implement NES-PF and the stringency provision. Improvements include strengthening compliance monitoring, improving ESC, aligning NES-PF with NZCPS and NPS-FM, and encouraging the use of stringency to protect sensitive environments. As the main regulation for controlling water quality for plantation forestry to achieve NPS-FM's and NZCPS's objectives, improving NES-PF and the stringency provision under the regulation 6 is necessary. However, in the implementation of stringency, councils still see issues in a fragmented way rather than using a holistic approach as suggested under NPS-FM 2020,

Biodiversity Strategy 2000, and 2020. In addition, the distribution of monitoring sites under the state of environment monitoring (SoE) is still not able to effectively portray the impact of plantation forestry to the receiving environment. Currently, plantation forestry is not a major land use in most council areas and is not the major sediment contributor. These facts are often used as reasons for not exercising stringency. However, if plantation forestry is not managed properly, it will hinder current efforts to reduce sedimentation in catchments and coastal areas.

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Appendix A

Regulatory Framework

A.1 New Zealand Coastal Policy Statement (NZCPS)

Table 7.1: Exact wording for NZCPS (New Zealand Government, 2010)

| | |
|---|--|
| <p>Policy 3 Precautionary approach (p. 12)</p> | <p><i>(1) Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse.</i></p> <p><i>(2) In particular, adopt a precautionary approach to use and management of coastal resources potentially vulnerable to effects from climate change, so that:</i></p> <ul style="list-style-type: none"> <i>a. avoidable social and economic loss and harm to communities does not occur;</i> <i>b. natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and</i> <i>c. the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations.</i> |
| <p>Policy 11 Indigenous biological diversity (biodiversity) (p. 16)</p> | <p><i>To protect indigenous biological diversity in the coastal environment:</i></p> <p><i>(a) avoid adverse effects of activities on:</i></p> <ul style="list-style-type: none"> <i>(i) indigenous taxa that are listed as threatened or at risk in the New Zealand Threat Classification System lists;</i> <i>(ii) taxa that are listed by the International Union for Conservation of Nature and Natural Resources as threatened;</i> <i>(iii) indigenous ecosystems and vegetation types that are threatened in the coastal environment, or are naturally rare;</i> <i>(iv) (iv) habitats of indigenous species where the species are at the limit of their natural range, or are naturally rare;</i> <i>(v) areas containing nationally significant examples of indigenous community types; and</i> <i>(vi) areas set aside for full or partial protection of indigenous biological diversity under other legislation; and</i> <p><i>(b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on:</i></p> <ul style="list-style-type: none"> <i>(i) areas of predominantly indigenous vegetation in the coastal environment;</i> <i>(ii) habitats in the coastal environment that are important during the vulnerable life stages of indigenous species;</i> <i>(iii) indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable to modification, including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass and saltmarsh;</i> <i>(iv) habitats of indigenous species in the coastal environment that are important for recreational, commercial, traditional or cultural purposes;</i> <i>(v) habitats, including areas and routes, important to migratory species; and</i> <i>(vi) ecological corridors, and areas important for linking or maintaining</i> |

| | <i>biological values identified under this policy.</i> |
|---|--|
| <p>Policy 13 Preservation of natural character (p. 17)</p> | <p>(1) <i>To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:</i></p> <p>(a) <i>avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and</i></p> <p>(b) <i>avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment;</i></p> <p><i>including by:</i></p> <p>(c) <i>assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and</i></p> <p>(d) <i>ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions.</i></p> <p>(2) <i>Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as:</i></p> <p>(a) <i>natural elements, processes and patterns;</i></p> <p>(b) <i>biophysical, ecological, geological and geomorphological aspects;</i></p> <p>(c) <i>natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;</i></p> <p>(d) <i>the natural movement of water and sediment;</i></p> <p>(e) <i>the natural darkness of the night sky;</i></p> <p>(f) <i>places or areas that are wild or scenic;</i></p> <p>(g) <i>a range of natural character from pristine to modified; and</i></p> <p>(h) <i>experiential attributes, including the sounds and smell of the sea; and their context or setting</i></p> |
| <p>Policy 15 Natural features and natural landscapes (p. 18-19)</p> | <p><i>To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development:</i></p> <p>(a) <i>avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and</i></p> <p>(b) <i>avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment;</i></p> <p><i>including by:</i></p> <p>(c) <i>identifying and assessing the natural features and natural landscapes of the coastal environment of the region or district, at minimum by land typing, soil characterisation and landscape characterisation and having regard to:</i></p> <p>(i) <i>natural science factors, including geological, topographical, ecological and dynamic components;</i></p> <p>(ii) <i>the presence of water including in seas, lakes, rivers and streams;</i></p> <p>(iii) <i>legibility or expressiveness—how obviously the feature or landscape demonstrates its formative processes;</i></p> |

| | |
|---|---|
| | <ul style="list-style-type: none"> <i>(iv) aesthetic values including memorability and naturalness;</i> <i>(v) vegetation (native and exotic);</i> <i>(vi) transient values, including presence of wildlife or other values at certain times of the day or year;</i> <i>(vii) whether the values are shared and recognised;</i> <i>(viii) cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Māori; including their expression as cultural landscapes and features;</i> <i>(ix) historical and heritage associations; and</i> <i>(x) wild or scenic values;</i> <p><i>(d) ensuring that regional policy statements, and plans, map or otherwise identify areas where the protection of natural features and natural landscapes requires objectives, policies and rules; and</i></p> <p><i>(e) including the objectives, policies and rules required by (d) in plans.</i></p> |
| <p>Policy 21 Enhancement of water quality (p. 21)</p> | <p><i>Where the quality of water in the coastal environment has deteriorated so that it is having a significant adverse effect on ecosystems, natural habitats, or water based recreational activities, or is restricting existing uses, such as aquaculture, shellfish gathering, and cultural activities, give priority to improving that quality by:</i></p> <ul style="list-style-type: none"> <i>(a) identifying such areas of coastal water and water bodies and including them in plans;</i> <i>(b) including provisions in plans to address improving water quality in the areas identified above;</i> <i>(c) where practicable, restoring water quality to at least a state that can support such activities and ecosystems and natural habitats;</i> <i>(d) requiring that stock are excluded from the coastal marine area, adjoining intertidal areas and other water bodies and riparian margins in the coastal environment,</i> <i>(e) within a prescribed time frame; and</i> <i>(f) engaging with tangata whenua to identify areas of coastal waters where they have particular interest, for example in cultural sites, wāhi tapu, other taonga, and values such as mauri, and remedying, or, where remediation is not practicable, mitigating adverse effects on these areas and values.</i> |
| <p>Policy 22 Sedimentation (p. 22)</p> | <ul style="list-style-type: none"> <i>(1) Assess and monitor sedimentation levels and impacts on the coastal environment.</i> <i>(2) Require that subdivision, use, or development will not result in a significant increase</i> <i>(3) in sedimentation in the coastal marine area, or other coastal water.</i> <i>(4) Control the impacts of vegetation removal on sedimentation including the impacts</i> <i>(5) of harvesting plantation forestry.</i> <i>(6) Reduce sediment loadings in runoff and in stormwater systems through controls on</i> <i>(7) land use activities</i> |

A.2 National Policy Statement for Freshwater Management (NPS-FM)

Table 7.2: Wording for relevant NPS-FM policies

| Policy | Wording |
|-----------|--|
| 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 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 8 | The significant values of outstanding water bodies are protected. |
| Policy 9 | The habitats of indigenous freshwater species are protected. |
| Policy 10 | The habitat of trout and salmon is protected, insofar as this is consistent with Policy 9. |
| Policy 12 | The national target (as set out in Appendix 3) for water quality improvement is achieved. |
| Policy 13 | The condition of water bodies and freshwater ecosystems is systematically monitored over time, and action is taken where freshwater is degraded, and to reverse deteriorating trends. |
| Policy 14 | Information (including monitoring data) about the state of water bodies and freshwater ecosystems, and the challenges to their health and well-being, is regularly reported on and published |

Appendix B

LGOIMA 1987 Request Letter

B.1 Request Letter on 16 March and 17 March 2021

Tēnā koe

Dear Sir or Madam,

Local Government Official Information and Meetings Act (LGOIMA) 1987
Official information request: National Environmental Standard for Forest Plantation (NES-PF)
Section 6 application

Pursuant to LGOIMA, please supply the following information with the statutory timeframe:

- 1) Has your council undertaken the process of the alignment between the Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 (NES-PF) and your plans or proposed plans (as per Section 44A Resource Management Act (RMA) 1991)?
 - a. If yes, please specify all the plans and policies that an alignment process has been undertaken. Please also provide the documentation associated with the alignment.
 - b. If no, please provide the reason(s) for this. Please also provide details of the process and timeline for undertaking the alignment.
- 2) Please describe how your council has considered the implementation of stringency under Section 6 of the NES-PF.
 - a. Please advise any and all reports that expressly consider the need for greater stringency and please provide the formal written decision.
 - b. If your council has yet to consider the implementation of more stringency, please explain why this has yet to occur, and details of the timeline and process for doing so.
- 3) Please describe the state of the environment monitoring (as per Section 35 RMA) for sedimentation rates and environmental effects in freshwater and coastal environments, in relation to activities undertaken under the NES-PF.

In addition:

- a. Please explain the monitoring method(s) that are used.
- b. Please advise how the monitoring site(s) were selected
- c. Please outline the frequency and duration of the monitoring.
- d. Please outline the budget for this monitoring
- e. Please explain how the results been incorporated into the planning process.

I am happy to be contacted to discuss the logistics of this request. If you need any more information from me please let me know as soon as possible.

Please acknowledge this request by return email.

Ngā mihi

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B.2 Request Letter on 6 August 2021 to Northland Regional Council

Tēnā koe

Dear Sir or Madam,

Local Government Official Information and Meetings Act (LGOIMA) 1987

Pursuant to LGOIMA, I would like to seek the following information related to a document provided in your official website. Please supply the following information with the statutory timeframe:

- 1) In regards to the Northland Regional Council open data
 - a. Please provide all the major catchment boundaries (in shapefile) for the Northland Regional Council
 - b. Please provide the high-resolution ESC maps (as mentioned in the Physiographic Controls over Water Quality State for the Northland Region report) in a standard GIS format (i.e. shapefile, GRID, TIFF, etc)
- 2) In regards to the “Freshwater Improvement Fund: Northern Wairoa Freshwater Improvement Project”
 - a. Please provide any progress or outcome reports for Freshwater Improvement Fund: Northern Wairoa Freshwater Improvement Project
 - b. If there are no such reports, please provide the description of the project terms of reference, scope and implementation plan
- 3) In regards to the catchment management plan (Mangere Catchment Plan, Whangarei Catchment Plan, Doubtless Bay, and Waitangi Catchment Plan) and and the National Environmental Standard for Plantation Forestry (NES-PF). According to the catchment management plan SedNETNZ modeling, (1) there are several harvested areas of exotic forestry that exceed the high sediment yield (as recorded in the ‘High Sediment Yield Land - Proposed Regional Plan (Decisions Version) open data’); (2) In the Whangarei Catchment Management Plan (page 22), pine forests have the highest average annual total erosion rate by land-use.
 - a. Did you consider more stringent rules under NES-PF S(6)(1)(a) to meet relevant NPS-FM objectives? If so, please supply the decision papers.
 - b. If not, please explain the reason for not considering more stringency rules.
- 4) In regards to the recommendation 4) section (page 26) in the “River water quality and ecology in Northland 2012-2016” reports and the NES-PF.
 - a. Please explain the reason for not putting stringency on forestry plantations with respect to harvesting setbacks.
- 5) In regards to the environmental state of Kaipara Harbour and Wairoa Catchment,
 - a. Has the Council considered implementing stringency for forestry plantations under Regulation 6 NES-PF to reduce the sedimentation and erosion issues in the catchment and the coastal environment? If so, please supply the decision papers. If not, please explain why not.

I am happy to be contacted to discuss the logistics of this request. If you need any more information from me please let me know as soon as possible.

Please acknowledge this request by return email.

Ngā mihi

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Appendix C

OIA 1982 Request Letter

Tēnā Koe

Dear Sir or Madam,
Official Information Act (OIA) 1982

Official information request: Underlying data for the National Environmental Standard for Forest Plantation (NES-PF) One Year Review Report (the 'report').

Pursuant to the OIA, please supply the following information within the statutory timeframe:

1. Please provide all the data to support the information for councils plan alignments (section 8 of the report); which includes (but is not limited to):
 - List of the regional or territorial councils reviewed.
 - Data to support the arguments on the analysis and key findings in section 8.3 of the report.

2. Please provide all the data to support the analysis and findings on the exercise of stringency (section 9 of the report); which includes (but is not limited to):
 - List of the regional or territorial councils reviewed.
 - Data to support the analysis and findings of Section 9.2 (*Stringency is seen as a major cause of inconsistency and additional cost by resource users*).
 - All data and/or examples to support the analysis and the key findings in Section 9.3 of the report.

I am happy to be contacted to discuss the logistics of this request. If you need any more information from me, please let me know as soon as possible.

Please acknowledge this request by return e-mail.

Thank you

Kind Regards,

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