

Annotated Bibliography

Allen & Clarke. (2021). *Evaluation of the Provincial Growth Fund*. [Evaluation of the Provincial Growth Fund \(mbie.govt.nz\)](https://mbie.govt.nz)

The Provincial Growth Fund (PGF) was established in late 2017 to invest \$1 billion per annum over three years in projects that were intended to raise the productivity potential of regional New Zealand.¹ The PGF was particularly targeted towards towns and sub-regions that are “less affluent”² and where there are pockets of above average unemployment and of people not in employment, education or training (NEETs), as well as low productivity performance. Māori are also strongly represented in these areas. The six PGF ‘surge’ regions were: Tai Tokerau (Northland); Te Moana-a-Toi (Bay of Plenty); Tairāwhiti (East Coast); Te Matau-a-Māui (Hawke’s Bay); Manawatū-Whanganui, including Horowhenua; and the Te Tai Poutini (West Coast).

Amishev, D., Basher, L., Phillips, C., Hill, S., Marden, M., Bloomberg, M., & Moore, J. (2014). *New Forest Management Approaches to Steep Hills*. MPI Technical Paper No. 2014/39, prepared for the Ministry for Primary Industries. [New Forest Management Approaches to Steep Hills \(researchgate.net\)](https://researchgate.net)

The objectives of the project were the identification of silvicultural and harvesting techniques to manage post-harvest erosion impacts from landslides and debris flows on high-risk sites.

Apgar, J. M., Argumedo, A., & Allen, W. (2009). *Building Transdisciplinarity for Managing Complexity: Lessons from Indigenous Practice*. *International Journal of Interdisciplinary Social Sciences*, 4(5), 255–270. [Microsoft Word - BuildingTransdisciplinarityforManagingComplexity \(learningforsustainability.net\)](https://learningforsustainability.net)

In this paper the authors reflect on examples from the Kuna peoples of Panama and the Quechua peoples of Peru to show how indigenous systems can help improve transdisciplinary approaches. Indigenous collective processes for facilitating dialogue between knowledge systems, and their use of holistic frameworks can support transdisciplinary inquiry for management of complex societal problems. Our examples come from indigenous systems where a historical relationship between communities and the ecosystems they inhabit is ongoing, creating a rich biocultural systems context (Maffi, 2005).

Australian Institute for Disaster Resilience. *Handbook 2: Community Recovery*. Australian Government Department of Home Affairs. [community-recovery-handbook.pdf \(aidr.org.au\)](https://aidr.org.au)

The Australian Disaster Resilience Handbook Collection provides guidance on national principles and practices for disaster resilience. The Handbook Collection: provides an authoritative and trusted source of knowledge about disaster resilience principles in Australia; aligns national disaster resilience strategy and policy with practice, by guiding and

supporting jurisdictions, agencies and other organisations and individuals in their implementation and adoption; highlights and promotes the adoption of good practice in building disaster resilience in Australia; builds interoperability between jurisdictions, agencies, businesses and communities by promoting use of a common language and coordinated, nationally agreed principles

Barnard, T., Velarde, S. J., Warmenhoven, T., Pohatu, P., Edwards, P., Dunningham, A. G., & Wreford, A. (2016). Restoring the health of the Waiapu catchment. Partnership with Māori. Integrating science and mātauranga Māori for a more sustainable future. Rotorua Daily Post, 11.

This article explores the integration of Western science and mātauranga Māori for a more sustainable future particularly around the management of the Waiapu catchment.

Basher, Les R. (2013). Erosion processes and their control in New Zealand. In Dymond JR ed. Ecosystem services in New Zealand – conditions and trends. Manaaki Whenua Press, Lincoln, New Zealand. [Erosion processes and their control in New Zealand \(mwpress.co.nz\)](http://mwpress.co.nz)

This paper reviews the characteristic types and distribution of erosion in New Zealand, temporal trends in erosion and the influence of land cover on erosion before summarising recent research on erosion control in an ecosystem services context.

Basher., L., Lynn, I. H., & Page, M. (2015). Update of the Erosion Susceptibility Classification (ESC) for the proposed National Environmental Standard for Plantation Forestry – Revision of the ESC. MPI Technical Paper No. 2015/13, prepared for the Ministry of Primary Industries.

The Erosion Susceptibility Classification (ESC) developed by Bloomberg et al. (2011), based on Land Use Capability (LUC) unit mapping, is a critical input into the proposed NES as it underpins the level of control for different plantation forestry activities. This report describes work completed for reclassify those ESC units/polygons that were clearly misclassified as High or Very High under the current ESC (Bloomberg et al. 2011).

Basher, L., Harrison, D., Phillips, C., & Marden, M. (2015). What do we need for a risk management approach to steep-land plantation forests in erodible terrain? New Zealand Journal of Forestry, 60(2), 7–10. [DBE6A790-57DD-43cc-BCFo-F6850B5009A1.pdf \(nzjf.org.nz\)](https://www.nzjf.org.nz/DBE6A790-57DD-43cc-BCFo-F6850B5009A1.pdf)

This article acknowledges the on-site and off-site effects of landslides in erodible steep-lands remain a significant issue for plantation forestry management. And notes that the Erosion Susceptibility Classification (ESC) developed for the proposed National Environmental Standard (NES) for Plantation Forestry provides a coarse screening tool, but improved tools are needed for risk analysis at the scale of forestry operations.

BDO Gisborne Limited. (2021). Report on the Impact of Permanent Carbon Farming in Te Tairāwhiti Region. Commissioned by Trust Tairāwhiti, 44pp. [Impacts-of-permanent-carbon-farming-on-the-Tairawhiti-region-July-2021.pdf \(trusttairawhiti.nz\)](https://www.trusttairawhiti.nz/Impacts-of-permanent-carbon-farming-on-the-Tairawhiti-region-July-2021.pdf)

The report considers the potential social, economic, and environmental impacts of permanent carbon farming in Tairāwhiti. It highlights challenges for our region, including the potential for significant job losses. It provides a regionally specific addition to the research into the impacts of permanent carbon farming under New Zealand's Emissions Trading Scheme (ETS).

Bendikson, H. (2023). *Tackling slash: A biodiversity credits scheme for Tairāwhiti Business Desk.* <https://businessdesk.co.nz/article/primary-sector/tackling-slash-abiodiversity-credits-scheme-for-tairawhiti>.

This article explores the hypothesis of whether biodiversity credits could cut hill country erosion and forestry slash.

Blaschke, P., Hicks, D., & Meister, A. (2008). *Quantification of the flood and erosion reduction benefits, and costs, of climate change mitigation measures in New Zealand.* Prepared for the Ministry for Environment. Prepared by Blaschke and Rutherford Environmental Consultants. [Quantification of the flood and erosion reduction benefits, and costs, of climate change mitigation measures in New Zealand | Ministry for the Environment](#)

This work is a technical contribution to the development of appropriate New Zealand policies for climate change mitigation. Reductions in erosion and flooding are only two examples of the 'co-benefits' potentially available through certain climate change mitigation measures.

Bloomberg, M. (2015). *Erosion susceptibility classification and analysis of erosion risks for plantation forestry—Response to Marden et al.* *New Zealand Journal of Forestry*, 60(2), 25–28. [2D40A47E-87A4-4dc3-A608-E2131BD01BD9.pdf \(nzjf.org.nz\)](#)

This Paper was written in response to a Paper titled 'Should detailed terrain stability or erosion susceptibility mapping be mandatory in erodible steep lands?' (Marden et al., 2015). The author agrees with most of what they say, but in his opinion they did not provide enough explanation of why the ESC developed by Bloomberg et al. (2011) has limitations. They also devote most of their paper to an explanation and justification of detailed erosion susceptibility mapping, and do not adequately place this in the context of erosion risk management, whether for plantation forestry or rural land use generally. Without this risk management context, the rationale for improvements to erosion susceptibility mapping is not clear.

Bloomberg, Mark., Cairns, Eric., Du, Denny., Palmer, Harriet., Perry, Chris. (2019). *Alternatives to clear-felling for harvesting of radiata pine plantations on erosion-susceptible land.* *NZ Journal of Forestry*, Vol. 64, No. 3. http://www.nzjf.org.nz/free_issues/NZJF64_3_2019/5D9ABDDD-40ED-494f-BE1F-BE5BE4AF5A64.pdf

This article looks at alternative options to clear-fell harvesting of radiata pine including small coupe harvesting, continuous cover forestry and target diameter harvesting.

Boothroyd, I. K. G., Quinn, J. M., Langer, E. R. (L), Costley, K. J., & Steward, G. (2004). Riparian buffers mitigate effects of pine plantation logging on New Zealand streams: 1. Riparian vegetation structure, stream geomorphology and periphyton. *Forest Ecology and Management*, 194(1–3), 199–213. <https://doi.org/10.1016/j.foreco.2004.02.018>

The results presented in this paper form part of a larger multi-disciplinary study of the influence of riparian vegetation on afforested streams and includes macroinvertebrate (Quinn et al., 2004) and fish studies (Rowe et al., 2002). In the present paper, they tested their expectation that stream lighting, bank erosion and stream geomorphology would be strongly correlated with characteristics of the riparian management regime and vegetation community structure and the forest harvest cycle. They hypothesised that harvested sites lacking a buffer of protected woody vegetation in their riparian zone would have highest periphyton levels and greater stream channel widths. Furthermore, they hypothesised that riparian vegetation community type and canopy height would influence stream lighting and thus periphyton biomass.

Brown, I. C., Black, R. D. (1988). Sustainable Land use After Cyclone Bola. [Sustainable landuse after Cyclone Bola.pdf \(sharepoint.com\)](#)

This paper sets out the main soil and water issues which have arisen post-Bola. Background data to support these issues is given together with recommended policy approaches.

Carr, R. – Chair, NZ Climate Change Commission. (2022). Dr. Rod Carr: Advice on the role of forestry. Speaking at Ō Tātou Ngāhere Conference. [Dr. Rod Carr: Advice on the role of forestry](#)

In his speech, the Chair of the Climate Change provides advice on the role of Forestry.

Cave, M., Davies, N., & Langford, J. (2017). *Cyclone Cook Slash Investigation*, 106pp. Gisborne District Council. [cyclone-cook-slash-investigation-2017-report.pdf \(gdc.govt.nz\)](#)

A key finding of this study is the degree to which woody debris becomes distributed within the catchments outside the forest boundary. Such slash is obvious where it has been pulled from rivers at locations such as Wigan but concentrations of woody debris is present elsewhere but is less visible. Traverses of the Mangaheia River, in particular, demonstrated that considerable woody debris; largely abraded and weathered pine logs, remained in the river system at flood height level. This material will mobilise in any future significant weather event. By implication, a slash event may occur without any debris flows occurring within a forest, because the flood levels required to move this material may be less than that needed to trigger a significant debris flow.

Cave, M. (2022). *Downstream Impacts of sediment and woody debris Inundation in the Mangaheia sub-catchment Uawa Catchment during the Queens Birthday Storm 2018*, 34pp. Gisborne District

Council. https://www.gdc.govt.nz/_data/assets/pdf_file/0024/48147/Downstream-impacts-Mangaheia-v.3.2_sm.pdf

This Paper explores the impacts of the failures in Uawa Forest on downstream communities are as follows: deposition of sediment on land as a result of landslides from within the forest boundary; woody debris discharged from consent boundary onto downstream properties, and the beaches at Tolaga Bay; damage to fences, crops and pasture, and flood spread.

Coffin, Antoine. (2016). *Barriers to the Development of Maori Freehold Land*, prepared for the CSG Māori Land Sub-Group 2016. Coffin-A-2016.-Barriers-to-the-Development-of-Maori-Freehold-Land.-Prepared-for-the-Maori-land-sub-group.-Provided-to-CSG-at-workshop-25-4-5-April-2016.-Document-3751561.pdf (waikatoregion.govt.nz)

This paper identifies key barriers to the development of land that have been referenced in research. This paper supports policy being developed for addressing potential limitations and constraints on Maori land in the Waikato as a result of the Healthy Rivers/Waiora Plan Change.

Conway, Paul., Orr, Adrian. (Accessed 2023). *The Process of Economic Growth in New Zealand*. Reserve Bank of New Zealand: Bulletin Vol. 63 No. 1 [The process of economic growth in New Zealand; Reserve Bank of New Zealand Bulletin; Volume 63 No. 1, March 2000 \(rbnz.govt.nz\)](https://www.reservebank.govt.nz/bulletin/vol63no1)

In this article the authors discuss various factors that facilitate economic growth and outline their respective contributions to New Zealand's growth experience over recent decades. They also discuss the role of price stability, which is seen largely as an important, although not sufficient, condition for enabling sustained economic growth.

Coombes, Dr Brad. (2000). *Ecological Impacts and Planning History*. The University of Auckland. [G:\tairawhiti_illustrations\EPSs\PovBay_classification.eps \(coastalrestorationtrust.org.nz\)](https://www.coastalrestorationtrust.org.nz/G:\tairawhiti_illustrations\EPSs\PovBay_classification.eps)

As indicated in the title of the report – Ecological impacts and planning history – there are two principal objectives for this research project. In the first instance, the report concentrates on environmental transformation rather than an account of the historical and present resources of the Gisborne district. The second objective for the report is to ascertain the extent to which Treaty principles have influenced the management of resources spaces of importance to Māori. Local case studies of the confrontation between tangata whenua and the European system of resource and environmental management are provided.

Courtney, M. (2022). *What role does the Māori Land Court have in modern Aotearoa New Zealand's legal system?* (Thesis, Master of Laws). University of Otago. Retrieved from <http://hdl.handle.net/10523/12965>

This thesis therefore investigated the role of the Māori Land Court in modern Aotearoa New Zealand's legal system. The research draws on publicly available material since 1980 to understand how landowners, the judiciary and legislators conceive the role of the modern Māori Land Court. From my preliminary reading of sources three initial conceptions were identified: facilitator, protector and adjudicator. The research investigated these three conceptions both in a historical

and contemporary context and considered how the Court performed these roles in response to the legislative regime that was set in place. The Court's 'land taking' role was dominant in the early Native Land Court era and whilst protective measures were in place, these too could be circumvented to enable further alienation. The outcome of the Native Land Court's adjudicative role, meant early judicial decisions continue to impact on the current work of the current Māori Land Court.

Chappell, P. R., National Institute of Water Atmospheric Research, issuing body, DSIR Marine Freshwater, & DSIR Physical Sciences. (2016). *The climate and weather of Gisborne* / P.R. Chappell.

This report covers the climate and weather of the Gisborne region including key statistics and data.

Cheever, F., & Campbell-Mohn, C. I. (2004). *Principles of environmental law*. In Britannica (online). [Environmental law - Principles of environmental law | Britannica](#)

This article explores the principles of environmental law including the "polluter pays" principle and the preventative principles.

D. L. Fellows, N. Barker. (2021). *Slope Failures, Scour And Infrastructure Damage: – Tairāwhiti Road Network Response To Multiple Severe Weather Events*. NZGS Symposium. [Slope failures, scour and infrastructure damage: - Tairāwhiti road network response to multiple severe weather events - New Zealand Geotechnical Society \(nzgs.org\)](#)

This paper covers the impact of the five storm events which resulted in widespread damage to the Tairāwhiti roading network. It also suggests that by developing tools and systems and working collaboratively the Network Operations Contract and Gisborne District Council will be able to respond to future events with promptly and prepare better funding applications.

Di Girolami, E., Kampen, J., & Arts, B. (2023). *Two systematic literature reviews of scientific research on the environmental impacts of forest certifications and community forest management at a global scale*. *Forest Policy and Economics*, 146, 102864.

<https://doi.org/10.1016/j.forpol.2022.102864>

This paper aims to fill this knowledge gap by providing a detailed synthesis of the peer reviewed literature on the environmental impacts of FCs and CFM. The research questions to be addressed by this systematic review are:

- 1) *What are the environmental impacts of FCs and CFM at a global scale, as reported in the academic literature?*
- 2) *What are the governance mechanisms and contextual factors identified in the academic literature that facilitate the achievement of positive impacts?*
- 3) *How do these environmental impacts compare between the two forest governance interventions analysed?*

Eco Works New Zealand. (2023). *Waimatā River Flooding: Slash Debris Summary February 2023*. [Waimata Pine Slash Impacts Feb2023 \(2\)-1.pdf \(sharepoint.com\)](#)

A report featuring permanent photo points which were established along the Waimatā River to document the tree species debris which were translocated and deposited within the recent (February 13th – 15th 2023) cyclone which passed through the east coast, known as ‘Cyclone Gabrielle’.

Edwards, P, Sharma-Wallace, L, Barnard, T, et al. (2019). *Sustainable livelihoods approaches to inform government-local partnerships and decision-making in vulnerable environments*. N Z Geog. 2019; 75: 63– 73. <https://doi.org/10.1111/nzg.12214>

This article explores sustainable livelihoods approaches used in international development which are applied to a vulnerable New Zealand catchment. The case-study is the Waiapu Catchment has a high proportion of indigenous residents and is one of the most remote and deprived areas in the country. Linear and centralised approaches to indigenous development have failed to bring about desired changes.

Fairweather, John R., Langer, E. R., McNab, Nicola., et al. (2001). *Sustainable Forest Management Technical Report No. 1: Community Visions, Values and Preferences for Development in the Gisborne/East Coast Region*. New Zealand Forest Research Institute Limited. [East Coast Survey-1st final.PDF \(sharepoint.com\)](#)

The primary research of the report is to identify a baseline of urban and rural awareness and attitudes concerning land use change and development generally.

Fischer, E. (2021). *Pasture on the Pumice*. NZ Farm Life. <https://nzfarmlife.co.nz/pasture-on-the-pumice/>

This article provides a case-study on the Formerly Landcorp Farming Limited, now Pāmu Farms who is New Zealand’s largest corporate farmer and is one of Wairakei Estate’s close partners. Pāmu Farms, in a further move to meet environmental standards, manage four of the estate’s dairy units are organically with one having completed full organic certification and three more in the conversion stage.

Forest Owners Association., Forest Industry Contractors Association., New Zealand Farm Forestry Association. (2020). *Forest Practice Guide - Non-Regulatory: Harvest Slash 6.2 Managing Cut-over Slash on High Risk Slopes*. [6-2_harvest-slash_managing-cut-over-slash-on-high-risk-slopes-2-0.pdf \(nzfoa.org.nz\)](#)

This section of the Forest Practice Guide covers managing cut-over slash on high risk slopes. It sets the general behaviour expected and details some key information when managing this issue.

Forbes Ecology. (2022). *Review of Actual Forest Restoration Costs 2021*. Contract Report Prepared for Te Uru Rakau – New Zealand Forest Services. [Review of Actual Forest Restoration Costs 2021 \(mpi.govt.nz\)](#)

Te Uru Rākau - New Zealand Forest Service engaged Forbes Ecology Limited to undertake a review of actual costs of the main native forest establishment methods. Forbes Ecology undertook a national survey of restoration practitioners seeking empirical costs from actual restoration projects. This report presents the results of this review.

Forme Consulting Group Ltd. (2021). *Eastland Port: Review of Regional Log Availability*. [Eastland Port FCG WAF 2021 FINAL DRAFT 05082021\[81\].pdf \(sharepoint.com\)](#)

The review has adopted the study catchment parameters used in the 2019 review and updated forest estate status within that, whilst also considering recent harvesting, export trends, domestic processing trends and planting trends of brown and greenfield forests. Other points considered included researching forest and export manager views of known potential supply chain changes that could influence trade patterns and therefore log uplift from Gisborne. These include amongst other points, updating the collective view of the status of Methyl Bromide (MeBr) without a formally recognised legitimised replacement yet, and possible reactions from owners/managers considering installation of Debarking or other facilities. The review considers harvest age trends and impacts of carbon forestry investment, pruned/unpruned harvest ratios, harvesting crew capacity and sensitivity analysis by flexing key variables.

Fox, A. (2023). *Forestry waste inquiry: Pine forests by far biggest source of East Coast beach slash after Cyclone Hale—Gisborne council study*. NZ Herald. [Forestry waste inquiry: Pine by far biggest source of East Coast beach slash after Cyclone Hale - Gisborne council study - NZ Herald](#)

This article covers the damages incurred by pine slash during Cyclone Hale in Gisborne.

Future for Local Government Review Panel. (2022). *He mata whāriki, he matawhānui: Draft report*. Wellington: New Zealand. [Draft report – He mata whāriki, he matawhānui \(futureforlocalgovernment.govt.nz\)](#)

Through the Panel's research and engagement, it is clear that significant change is required to many aspects of the local government system to maximise the wellbeing and resilience of communities now and into the future and strengthen local democratic decision-making.

Ganesh, Dr Nana., Robertson, Nick., Hurren, Konrad., Groom, Merewyn. (2019). *Tai Rāwhiti community, people, and economy*. BERL. [14.6 Tai Rāwhiti community, people, and economy.pdf \(berl.co.nz\)](#)

This report outlines the current situation [as of August 2019] in the districts of Gisborne and Wairoa with respect to the community, people, and the economy. The purpose of describing the districts in this way is to provide an evidence base.

Gisborne District Council. (2017). Annual Plan.

https://www.gdc.govt.nz/__data/assets/pdf_file/0026/9575/2016-17-annual-report.pdf.

This Annual Report tells the story of GDCs performance over the financial year from 1 July 2016 to 30 June 2017. It's an important way of informing communities about how they spent their rates. It also highlights the areas they performed well in, the areas they need to improve and provides context for where they need to head in the future.

Gisborne District Council. (n.d.). *Te Arotakenga o te Mahere Whakahaere Rauemi o Te Tairāwhiti—Review of the Tairāwhiti Resource Management Plan*. [Review of the Tairāwhiti Resource Management Plan | Gisborne District Council \(squiz.cloud\)](#)

This webpage covers the Gisborne District Council's review of the Tairāwhiti Resource Management Plan.

Gisborne District Council. (2015b). *Minutes of the Environmental Planning & Regulations Committee—9 September 2015*

https://www.gdc.govt.nz/__data/assets/pdf_file/0018/11538/minutesenvironmental-planning-regulations-september-2015.pdf

Gisborne District Council - Te Kaunihera o Te Tairāwhiti. (2018). *Downstream Impacts of sediment and woody debris Inundation in the Mangaheia sub-catchment Uawa Catchment during the Queen's Birthday Storm*. [Downstream-impacts-Mangaheia-v.3.2_sm.pdf \(gdc.govt.nz\)](#)

A technical report on the impacts at place in Te Tairāwhiti which includes the inundation of sediment and woody debris in the Mangaheia sub-catchment. Contains some useful imagery including aerial images.

Gisborne District Council - Te Kaunihera o Te Tairāwhiti. (2019). *Tairāwhiti 2050 Background Information*. [tairawhiti-2050_background-information-spatial-plan.pdf \(gdc.govt.nz\)](#)

Tairāwhiti 2050 is Gisborne District Council's vision for the region for the next 30 years. Forestry Slash - During a severe storm event woody debris from commercial forestry operations can cause mobilisation of logs in the catchments of the region. The effects of woody debris mobilisation include significant clean-up costs to debris caught in bridges and washing up on beaches. Transfer of soil and silt into the river system has amenity impacts on aquatic systems and water quality. Increases in storm intensity.

Gisborne District Council - Te Kaunihera o Te Tairāwhiti. (2020). *State of Our Environment 2020 Te Āhuatanga o te Taiao*. [state-of-our-environment-2020-report.pdf \(gdc.govt.nz\)](https://www.gdc.govt.nz/state-of-our-environment-2020-report.pdf)

The five sections of this report cover's Tairāwhiti's environment. Relevant sections include: *Land use in area (pp 7-11)*. *Erosion – regional info, Cyclone Bola, Sustainable Hill Country Project, Erosion Control Funding Programme (pp13-17)*. *Case study Tauwhareparae (p 18)*. *Forestry, erosion risk (pp19-21)*. *Cyclone Cook (p 24)*. *Tolaga Bay burn-off 2018 (p 127)*.

Gisborne District Council. (2020). *Regional Freshwater & Waipaoa Catchment Plan Review*. [Regional Freshwater & Waipaoa Catchment Plan Review | Gisborne District Council \(gdc.govt.nz\)](https://www.gdc.govt.nz/Regional-Freshwater-Waipaoa-Catchment-Plan-Review)

This webpage explains the Gisborne District Council's Regional Freshwater Plan that is designed to apply rules and conditions on activities around freshwater, particularly around how clean the water is, and how much people can take for activities irrigation. This catchment planning process was to commence in April 2023.

Gisborne District Council. (2021). *Te Mahere Waka Whenua o Te Tairāwhiti 2021-2031 Te Tairāwhiti Regional Land Transport Plan 2021-2031*. [Draft Te Tairāwhiti Regional Land Transport Plan 2021-2031 \(gdc.govt.nz\)](https://www.gdc.govt.nz/Draft-Te-Tairāwhiti-Regional-Land-Transport-Plan-2021-2031)

Te Tairāwhiti Regional Land Transport Plan (RLTP) sets out the current state of our transport network, the challenges they face, and the priorities for future investment. This plan has been developed in partnership with Waka Kotahi New Zealand Transport Agency (Waka Kotahi) and the Regional Transport Committee (RTC).

Gisborne District Council. (2023b). *Breach of RMA - Sentencing Decisions (Forestry companies 2018 prosecutions and 2018 forestry prosecutions reports)*. [Breach of RMA - Sentencing Decisions | Gisborne District Council \(gdc.govt.nz\)](https://www.gdc.govt.nz/Breach-of-RMA-Sentencing-Decisions)

Gisborne District Council has initiated prosecutions for the breach of the Resource Management Act (RMA) following the investigation of compliance issues associated with resource consents and the Tairāwhiti Resource Management Plan rules.

Gisborne District Council. (2023). *Road Information*. [Road Information | Gisborne District Council \(gdc.govt.nz\)](https://www.gdc.govt.nz/Road-Information)

This webpage covers current road information for the Tairāwhiti district including closures and other events.

Gisborne District Council. (Retrieved 2023). *Sustainable Hill Country Project*. [Sustainable hill country project | Gisborne District Council \(gdc.govt.nz\)](https://www.gdc.govt.nz/Sustainable-hill-country-project).

The Gisborne region is prone to hill country erosion. The Sustainable Hill Country (SHC) programme aims to increase protection of highly erodible land.

Guild, Dennys., Dudfield, Murray. (2009). *A history of fire in the forest and rural landscape in New Zealand Part 1, pre-Maori and pre-European influences*. NZ Journal of Forestry, May 2009 Vol. 54 No. 1. [5C127D1A-CDFF-4cde-B272-23362D00A078.pdf \(nzjf.org.nz\)](https://doi.org/10.1080/0048017090323362000A078)

This article explores the history of fire in the forest and rural landscape of New Zealand. The article covers the timeline of such instances from New Zealand pre-Māori arrival through to pre-European settlement.

Giuntoli, J., Barredo, J. I., Avitabile, V., Camia, A., Cazzaniga, N. E., Grassi, G., Jasinevičius, G., Jonsson, R., Marelli, L., Robert, N., Agostini, A., & Mubareka, S. (2022). *The quest for sustainable forest bioenergy: Win-win solutions for climate and biodiversity*. Renewable and Sustainable Energy Reviews, 159, 112180. <https://doi.org/10.1016/j.rser.2022.112180>

In this study, the authors review the impacts on biodiversity and carbon emissions of specific bioenergy pathways that may be used to supply additional forest-based energy. They then synthesize our findings in a nexus matrix, plotting the pathways along a gradient of benefits through to detriments on the two dimensions to highlight win-win and lose-lose options.

Green, M.O., Walker, J., & Nicol, S. (2021). *Steering our waka through turbid waters: Research priorities over the next 5 years for sediments in the coastal marine area of Aotearoa New Zealand*. Prepared for the Department of Conservation, 69pp. RMA Science. [research-priorities-for-sediments-in-the-coastal-marine-area-of-aotearoa-new-zealand.pdf \(doc.govt.nz\)](https://www.doc.govt.nz/assets/Uploads/research-priorities-for-sediments-in-the-coastal-marine-area-of-aotearoa-new-zealand.pdf)

This report has been prepared for the Department of Conservation (DOC) to identify research priorities in the coastal marine area (CMA) of Aotearoa New Zealand over the next 5 years. The research priorities were informed by consideration of supporting information (including values relating to the CMA; the adverse ecological effects of sediments; the degree to which Aotearoa New Zealand's CMA is currently stressed by sediments; legislation; management approaches; mātauranga Māori; management needs and opportunities; and current research of relevance to the CMA of Aotearoa New Zealand) combined with consultation with a range of stakeholder groups (Crown Research Institutes, universities, central government management agencies, regional councils and unitary authorities, non-governmental organisations, and private businesses and individuals).

Gresh, J. M., & Courter, J. R. (2021). *In Pursuit of Ecological Forestry: Historical Barriers and Ecosystem Implications*. *Frontiers in Forests and Global Change*, 4(571438), 9. [Frontiers | In Pursuit of Ecological Forestry: Historical Barriers and Ecosystem Implications \(frontiersin.org\)](https://doi.org/10.3389/ffgc.2021.571438)

The objective of this perspective is to describe the historical development of ecological forestry in Europe and the United States, and to propose research adjustments to help America pursue broader ecological forestry application and reverse forest ecosystem degradation. By understanding historical precedents that influence forestry perceptions and the differences in contemporary approaches among forestry leaders, forestry scientists may be better equipped to design research and promote practices that change industry behavior for better ecosystem implications.

Hawke's Bay Regional Council. (2022). Annual Report 2021-2022. [HBRC_2021-2022_HBRC_Annual_Report_WEBSITE](#)

This report describes the work Hawke's Bay Regional Council have undertaken between 1 July 2021 and 30 June 2022. It focuses on actual performance against what was planned in the first year of our Long-Term Plan 2021-2031. It covers both the service and financial performances against our targets.

Hawke's Bay Regional Council. (Retrieved 2023). Wairoa & North Coast Catchment. [Wairoa & Northern Coast Catchment | Hawke's Bay Regional Council \(hbrc.govt.nz\)](#)

The Wairoa and Northern coast catchments includes the catchments of Wairoa and the smaller catchments of Whakakī, Nuhaka and Mahia. The catchments include Wairoa River – the biggest river in Hawke's Bay – as well as the Waiiau, Waikaretaheke, Mangaaruhe, Ruakituri, Hangaroa and Mangapoike rivers. These catchments also includes Te Urewera, which was previously a National Park.

Hancock, F. (2018). Govt measures weaken local forest rules. Newsroom. <https://www.newsroom.co.nz/govt-officials-weakened-local-forest-rules>.

This article explores the new national rules (as at 2018) governing plantation forestry are in some cases weaker than district rules, causing concern for communities living close to erosion-prone land.

Harmsworth, G. R., & Warmenhoven, T. (2002). The Waiapu project: Maori community goals for enhancing ecosystem health. Project description, 10pp. (PDF) [Harmsworth, G.; Warmenhoven T. 2002: The Waiapu project: Maori community goals for enhancing ecosystem health. Broadsheet, New Zealand Association of Resource Management \(NZARM\). 11 p. \(researchgate.net\)](#)

This Paper details the FRST-funded "Waiapu" project began in 1998. It has involved collaborative research between Ngati Porou and Manaaki Whenua-Landcare Research. The project is unique because it is one of the first projects funded through public good science funding (PGSF) that has resulted in a true partnership between scientists, iwi researchers, Maori elders, and the Maori community within and outside the Waiapu catchment and has contributed to an iwi/hapu research capability.

Harmsworth, G. R., & Awatere, S. (2012). Review and evaluation of cultural monitoring approaches in New Zealand. Landcare Research Factsheet. [Review and evaluation of cultural monitoring approaches in New Zealand. Fact sheet \(landcareresearch.co.nz\)](#)

This article covers environmental monitoring as a concept, framework, methodology, and contains indicators and a set of applications that follow international approaches and agreements to monitor and report on the state of the environment (SOE). In New Zealand, in line with these concepts, the development of environmental indicators began in the early

to mid-1990s. Reasonable progress has been made on the development of approaches, information systems, national and regional networks, and datasets to support state-of-the-environment assessment and reporting at local, regional and national levels.

Harmsworth, G. R., Awatere, S., & Pauling, C. (2013). Using mātauranga Māori to inform freshwater management. Policy Brief, 5pp. Landcare Research Manaaki Whenua. [Policy Brief 7: Using mātauranga Māori to inform freshwater management \(landcareresearch.co.nz\)](#)

This Paper recommends 6 steps for integrating mātauranga Māori into freshwater management – 1. Mana Whakahaere: A Treaty-based planning framework is used for engagement and policy development 2. Whakamāramatia ngā Pou Herenga: Tāngata whenua values are defined and reflected in engagement processes 3. Whakamāramatia ngā Huānga: Outcomes are defined at the beginning of the engagement process 4. Whakamāramatia ngā Uaratanga: Goals and objectives are established 5. Whakamāramatia ngā Aroturukitanga: Monitoring approaches are developed and implemented 6. Whakamāramatia ngā Mahi: Actions on the ground that demonstrate kaitiakitanga and progress iwi/hapū towards their goals/objectives/aspirations through tangible projects.

Hendy, J., Ausseil, A.-G., Bain, I., Blanc, É., Fleming, D., Gibbs, J., Hall, A., Herzig, A., Kavanagh, P., Kerr, S., Leining, C., Leroy, L., Lou, E., Monge, J., Reisinger, A., Risk, J., Soliman, T., Stroombergen, A., Timar, L., van der Weerdan, T., White, D., Zammit, C. (2018). Land use modelling in New Zealand: Current practice and future needs. Motu Working Paper No. 18–16, 64pp. Motu Economic and Public Policy Research. <https://doi.org/10.29310/WP.2018.16>.

As the foundation for more strategic development of New Zealand’s modelling capability, this paper profiles the main land-sector and farm- and production-related models and datasets currently applied in New Zealand. It also explores priority policy areas where modelling is needed, such as achieving emission reduction targets; managing freshwater, biodiversity and soil quality; and understanding the distributional impacts of policy options as well as climate change.

Hon. Shane Jones (2018) National Environmental Standards for Plantation Forestry commence. [National Environmental Standards for Plantation Forestry commence | Beehive.govt.nz](#)

This media release details the enactment of the National Environmental Standards for Plantation Forestry in 2018.

Hon. David Parker. (2022). How the Future RM Reform System will better protect the environment. [How the future RM Reform system will better protect the environment | Beehive.govt.nz](#)

Environment Minister David Parker’s address on how the future resource management system will protect the environment.

Hungerford, R. (2022). *Insights into Farmer Behaviour Responses to Emissions Pricing*. Prepared for He Waka Eke Noa Primary Sector Climate Action Partnership, 34pp. Momentum Research & Evaluation Ltd.

This report presents the results of a literature scan and selected key informant interviews into possible farmer behaviour responses to different emissions pricing options. It was commissioned by He Waka Eke Noa Primary Sector Climate Action Partnership and carried out by Momentum Research and Evaluation Limited in November 2021.

Integral. (2020). *Forecaster*. <https://integral.co.nz/forecaster/>.

Forecaster provides forest managers with tools to create and explore alternative forest management plans.

IPCC. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*. H.-O. Pörtner, D. C. Roberts, M. Tignor, E. S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Lösschke, V. Möller, A. Okem, & B. Rama (Eds.). *Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, 3056pp. Cambridge University Press. doi:10.1017/9781009325844.

This Working Group II contribution to the IPCC's Sixth Assessment Report contains important new scientific, technical and socio-economic knowledge that can be used to produce information and services for assisting society to act to address the challenges of climate change. The timing is particularly significant, as this information provides a new impetus, through clear assessment findings, to inform the first Global Stocktake under the United Nations Framework Convention on Climate Change

Journeaux, Phil., van Reenen, Erica., Manjala, Tafi., Pike, Sam., Hanmore, Ian. (2017). *Analysis of Drivers and Barriers to Land Use Changes*. Independent Agriculture & Horticulture Consultant Network. [ANALYSIS OF DRIVERS AND BARRIERS TO LAND USE CHANGE REPORT \(mpi.govt.nz\)](#).

This report discusses the drivers and barriers to land use change as they currently exist, as well as potential drivers/barriers starting to emerge. Within the report, "land use change" is defined as a change from one specific use to another, rather than intensification within a similar system.

J. Velarde, Sandra., Sharma-Wallace, Lisa., Warmenhoven, Tui., et al. (2019). *Policy design lessons from the Erosion Control Funding Programme – afforestation through an adaptive governance lens*. NZ Journal of Forestry, Vol. 64, No. 1.

http://www.nzjf.org.nz/free_issues/NZJF64_1_2019/FB1D57E6-25BF-472f-A24E-7EF84A4F8F17.pdf

Article focuses on lessons for policy design learnt from the Erosion Control Funding Programme. This programme started in 1992, and its evolution and results provide invaluable knowledge on barriers to afforestation and potential avenues to address these barriers. Recommended that institutions implementing afforestation programmes should

more quickly incorporate lessons learnt in their operations and follow adaptive governance principles from the outset in their design to increase policy uptake and engagement with local communities.

Kimberley, M., Bergin, D., & Silvester, W. (2021). *Carbon Sequestration by Native Forest—Setting the Record Straight*. Prepared for Tāne's Tree Trust, 16pp. Pure Advantage. [Carbon Sequestration by Native Forest - Setting the Record Straight - Pure Advantage](#)

This research is a first for planted native forest using methodology comparable to that used for planted radiata pine forest in New Zealand (mean annual increment is 21 to 27 tCO₂ ha⁻¹ yr⁻¹ for radiata pine at age 50 years).

King, D. N., Penny, G., & Severne, C. (2010). *The climate change matrix facing Māori society*. In R. A. C. Nottage, D. S. Wratt, J. F. Bornman, & K. Jones (Eds.), *Climate Change Adaptation in New Zealand: Future scenarios and some sectoral perspectives* (pp. 100–111). New Zealand Climate Change Centre. [\(PDF\) The climate change matrix facing Māori society \(researchgate.net\)](#)

This paper attempts to make some sense of how the environmental, economic, social and cultural elements of Maori society are likely to be impacted by climate change this century; and further considers the diverse vulnerability, risks, coping capacity, and adaptation options available to Maori across key sectors, systems and groups.

Kōrero Tairāwhiti. (2019). *Tairāwhiti 2050 Gisborne's Spatial Plan*. [tairawhiti-2050-spatial-plan-factsheets.pdf \(gdc.govt.nz\)](#)

This factsheet details information on the Resilience aspect of the Tairāwhiti 2050 – Gisborne's Spatial Plan. This includes planning for natural hazards and climate change and infrastructure.

Kohere, Keita. (2020). *Tairawhiti Resource Management Plan (TRMP)*. Report to SUSTAINABLE TAIRĀWHITI Committee for decision. [Tairawhiti Resource Management Plan \(TRMP\) \(gdc.govt.nz\)](#)

The purpose of this report is to seek this committee's decision to support a full review of the Tairāwhiti Resource Management Plan.

Lambie, S., Awatere, S., Daigneault, A., Kirschbaum, M., Marden, M., Soliman, T., Spiekermann, R., & Walsh, P. (2021). *Trade-offs between environmental and economic factors in conversion from exotic pine production to natural regeneration on erosion prone land*. *New Zealand Journal of Forestry Science*, 51(14), 19. [NZJFS+51_14+2021+Lambie.pdf](#)

To facilitate informed decision-making by landowners and regulatory authorities, the authors assessed the viability of converting erosion-prone land currently planted in pines to natural regeneration using high-resolution erosion susceptibility modelling, biophysical

modelling of mānuka–kānuka shrubland, and an ecosystem services cost-benefit model. The cost-benefit model included scenarios with varying levels of erosion susceptibility and with and without honey production to assess economic viability of a range of scenarios.

Land Air Water Aotearoa (LAWA). Uawa River. [Land, Air, Water Aotearoa \(LAWA\) - Uawa River](#)

This webpage contains information of the 7 monitored sites in the Uawa River Catchment.

Langer, Lisa., Barnard, Tim. (2003). *Local Community Attitudes to Plantation Forestry, Gisborne / East Coast Region.* [Local community attitudes to plantation forestry_ Gisborne East Coast region \(1\).pdf \(sharepoint.com\)](#)

This article surveys and discusses the attitudes that people in Gisborne / East Coast community have towards plantation forestry.

Larsen, J. B., & Nielsen, A. B. (2007). *Nature-based Forest management—Where are we going?* *Forest Ecology and Management*, 238(1–3), 107–117. <https://doi.org/10.1016/j.foreco.2006.09.087>

This experience pinpointed that a common understanding of the nature-based management principles and long-term goals for stand development had to be created before any changes in the forest management towards more nature-based principles could be initiated successfully. This task necessarily implied the development of concepts for organising, describing and communicating these whole new management principles and desirable stand structures and dynamics to the professionals and other stakeholders.

Local Government Act 2022. [Local Government Act 2002 No 84 \(as at 13 April 2023\), Public Act Contents – New Zealand Legislation](#)

The purpose of this Act is to provide for democratic and effective local government that recognises the diversity of New Zealand communities.

Macfie, Rebecca. (2023). *Forestry waste inquiry: Workers fearful of fallout over cyclone slash probe.* NZ Herald. [Forestry waste inquiry: Workers fearful of fallout over cyclone slash probe - NZ Herald](#)

This article discusses the fear experienced by Forestry workers over the introduction of the Ministerial Inquiry into Land Use associated with the mobilisation of large woody debris in the Tairāwhiti and Wairoa regions.

Manaaki Whenua – Land Care Research. (2018). *Best options for land use following radiata harvest in the Gisborne District under climate change: Spatial analysis of erosion susceptibility in plantation forests, East Coast Region.* MPI Technical Paper No: 2018/47.

*In this report, experts use their knowledge and spatial data on the extent and types of erosion initiated during previous storms as the basis for assessing the erosion susceptibility for the current exotic forest estate in the East Coast region and – in more detail – for four currently forested study sites in the likely event that they will be subjected to episodic storms at some stage during the rotation cycle of *P. radiata* (~27–30 years).*

Manaaki Whenua – Landcare Research. (2020). *Biophysical performance of erosion and sediment control techniques in New Zealand: a review*. [Microsoft Word - Review_NZ_effectiveness_RA1.2_Final.docx \(landcareresearch.co.nz\)](#)

This review aims to bring together information (scientific understanding, practical user experience and knowledge, and best practice) to establish guidance at both the regional and national scales for erosion and sediment control in New Zealand... and is aimed primarily at regional councils and those involved in managing land to deliver freshwater outcomes in New Zealand.

Manley, Bruce., Xu, Xong (Vega), Visser, Rien., et al. (2022). *Evaluation of alternative carbon accounting categories for forestry in Gisborne District under the Emissions Trading Scheme*. NZ Journal of Forestry, Vol. 67, No. 3. [Evaluation of alternative carbon accounting categories for forestry in Gisborne District under the Emissions Trading Scheme.pdf \(sharepoint.com\)](#)

This paper presents summary results for a Management Case Study that was undertaken on a small-scale forest in Gisborne District, the proportion of that area that is likely to be harvested and the likelihood for afforestation.

Marden, M. (1994). *Value of environmental-impact monitoring to forest management under the Resource Management Act: Mangatu Forest*. New Zealand Journal of Forestry, 39(1), 39–41. [FC47102D-109C-418B-9813-DF031A1FD1C4.pdf \(nzjf.org.nz\)](#)

This article outlines the value of a monitoring programme designed to record and report on environmental impacts of harvesting operations at Mangatu Forest; a programme initiated voluntarily by forest management. The responsibility of providing an independent assessment of the environmental impacts of harvesting operations was contracted to Manaaki Whenua - Landcare Research. Monitoring began on day-one of harvesting.

Marden, Mike. (2004). *Future-proofing erosion-prone hill country against soil degradation and loss during large storm events: have past lessons been heeded?*. NZ Journal of Forestry. http://www.nzjf.org.nz/free_issues/NZJF49_3_2004/AF09E1DE-5A79-430A-B488-C1645DB32D4B.pdf

This article presents examples where reforestation of previously eroded pastoral land has successfully mollified those factors that contribute to the risk of land sliding, gully erosion and earthflow movement and poses the question: why have we not future-proofed more of our hill country against inevitable soil degradation and soil loss in future storms?

Marden M., Betts H., Arnold G., Hambling R. (2008). Gully erosion and sediment load: Waipaoa, Waiapu and Uawa rivers, eastern North Island, New Zealand. In: *Sediment dynamics in changing environments 2008*. pp.339-350 ref.28, Proceedings of the 2008 Symposium of the International Commission on Continental Erosion, Christchurch, New Zealand, 1-5 December 2008.

In this paper, experts combine data derived from DEM analyses in the two previous studies with that from DEMs constructed for 11 medium to large gullies and derive a new degradation model for gullies in each of the two-contrasting geologic/tectonic terrains. They use this model to: (i) calculate the volume of sediment excavated from individual gullies; (ii) assess the relative amounts and rates of sediment production from each terrain; and (iii) calculate the equivalent contribution of gully-derived sediment to the average annual suspended sediment yield of the Waipaoa, Waiapu and Uawa rivers.

Marden, Michael., Mazengarb, C., Palmer, Alan S., Berryman, Kelvin. (2008). Last glacial aggradation and postglacial sediment production from the non-glacial Waipaoa and Waimata Catchments, Hikurangi Margin, North Island, New Zealand. *Geomorphology*. 99. 404-419. 10.1016/j.geomorph.2007.12.003. [Last glacial aggradation and postglacial sediment production from the non-glacial Waipaoa and Waimata Catchments, Hikurangi Margin, North Island, New Zealand | Request PDF \(researchgate.net\)](#)

In this paper the authors present a catchment-wide representation of the Waipaoa-1 aggradation terrace, and based on this, attempts for each major tributary of the Waipaoa catchment and for the Waimata catchment (Fig. 1) a first-order calculation of the postglacial sediment flux generated by channel incision. Although a separate catchment, they include the Waimata catchment because it also flows into Poverty Bay, and at times sediment discharged from it probably contributed to the same postglacial wedge of sediment located on the shelf offshore of Poverty Bay. They also briefly discuss uncertainties in attempting to quantify this postglacial sediment flux, assess the importance of Poverty Bay Flats as a sediment sink, and attempt to reconcile differences between estimated volumes of onshore sediment generation and storage versus offshore shelf accumulation.

Marden, M., Herzig, A., & Arnold, G. (2011). Gully degradation, stabilisation and effectiveness of reforestation in reducing gully-derived sediment, East Coast region, North Island, New Zealand. *Journal of Hydrology (New Zealand)*, 50(1), 19–36. <http://www.jstor.org/stable/43945012>

Gully stabilisation was modelled by measuring the change in 'active' gully area before planting with exotic pines and at the end of a -40-year reforestation period. A degradation model based on DEMs of gullies at differing stages of development was used to calculate sediment production from reforested gullies in both Cretaceous and Tertiary geological terrains. The total volume of gully-derived sediment was calculated at catchment-scale by combining the gully degradation and stabilisation models with GIS-based mapped distributions of gullies in 1957 and 1997, and then expressed as an equivalent percentage of the average annual suspended sediment yield for each of the three largest and heaviest sediment-laden rivers within the East Coast region, North Island.

Marden, Mike. (2011). *Sedimentation History of Waipaoa Catchment: Envirolink project 1015-GSDC95*. Prepared for Gisborne District Council. [LandCare Report \(envirolink.govt.nz\)](#).

Gisborne District Council requested a literature review of the pre- and post-human settlement erosion and sedimentation rates in Waipaoa catchment. By assessing the proportion of sediment derived by erosion processes considered to be part of the natural background erosion rates versus that induced essentially since the clearance of indigenous forest for pastoral farming, the Council seeks to better understand where and how improved land management and remediation practices could potentially result in a reduction in sedimentation.

Marden, M., Herzig, A. Basher, L. (2014). Erosion process contribution to sediment yield before and after the establishment of exotic forest: Waipaoa catchment, New Zealand. *Geomorphology*, Vol. 226, 1 December 2014, Pages 162-174. [Erosion process contribution to sediment yield before and after the establishment of exotic forest: Waipaoa catchment, New Zealand - ScienceDirect](#)

This study found that a greater or similar level of success could be achieved within three decades of forest establishment elsewhere in the East Coast region by specifically targeting gully-mass movement complexes—particularly in high sediment-yielding river systems such as the Waiapu Catchment.

Marden, M., Lambie, S., & Phillips, S. (2018). Biomass and root attributes of eight of New Zealand's most common indigenous evergreen conifer and broadleaved forest species during the first 5 years of establishment. *New Zealand Journal of Forestry Science*, 48(9), 26. <https://doi.org/10.1186/s40490-018-0113-y>.

The aim of this study was to provide allometric equations for total above- and below-ground biomass and total root biomass and length for eight common evergreen conifer and broadleaved species.

Marden, Michael., Seymour, Ann. (2022). Effectiveness of vegetative mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60 years, East Coast region, North Island, New Zealand. *New Zealand Journal of Forestry Science*. [View of Effectiveness of vegetative mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60 years, East Coast region, North Island, New Zealand \(nzjforestryscience.nz\)](#)

In this paper the authors evaluate the effectiveness of attempts to remediate gully erosion over the last 20-year (1997–2017) period and review successes and failures since gully remediation began 60 years ago (1957–2017). They present our findings in the context of the scope and scale of future remediation efforts required to minimise the initiation of new gullies, the treatment of existing gullies and the requirement for strategies better suited to preventing the re-activation of gullies located within existing areas of exotic production forests, after forest removal.

Marutani, Tomomai., Brierley, Gary J. Trustrum, Noel A., Page, Mike. (2001). Source to Sink Sedimentary Cascades in Pacific Rim Geo-Systems. Matsumoto Sabo Work Office, Ministry of Land, Infrastructure and Transport, Japan. [005_Hokuriku_26.pdf \(sharepoint.com\)](#)

This book outlines source-to-sink sedimentary cascades in differing geosystems around the Pacific Rim. Case studies were presented from... New Zealand... showing the differing nature of sediment source, transfer and sink zones in these different environmental settings.

Matike Mai Aotearoa. (2016). *He Whakaaro Here Whakaumu Mō Aotearoa—The Report of Matike Mai Aotearoa—The Independent Working Group on Constitutional Reformation*. [MatikeMaiAotearoa25Jan16.pdf \(nwo.org.nz\)](https://nwo.org.nz/MatikeMaiAotearoa25Jan16.pdf).

This report is the result of 252 hui between 2012 and 2015. The Working Group was established at a meeting of the Iwi Chairs' Forum in 2010 with Terms of Reference:

“To develop and implement a model for an inclusive Constitution for Aotearoa based on tikanga and kawa, He Whakaputanga o te Rangatiratanga o Niu Tirenī of 1835, Te Tiriti o Waitangi of 1840, and other indigenous human rights instruments which enjoy a wide degree of international recognition”.

Menzies, D., & Paul, J. (2023). *Understanding Accountability for Māori*. Housing Inquiry Discussion Paper, 61pp. Te Kāhui Tika Tangata New Zealand Human Rights Commission. [Housing Inquiry Discussion Paper: Understanding Accountability for Māori - A Decent Home is a Human Right \(hrc.co.nz\)](https://hrc.co.nz/HousingInquiryDiscussionPaper:UnderstandingAccountabilityforMāori-ADecentHomeisHumanRight)

This discussion paper explores ideas for how accountability could be strengthened, Te Tiriti o Waitangi upheld, and housing outcomes for Māori improved with a system based on tikanga Māori.

Mercer, Leo. (2021). *Beyond the dollar: Carbon farming and its alternatives for Tairāwhiti Māori landowners*. [Beyond the dollar: Carbon farming and its alternatives for Tairāwhiti Māori landowners \(vuw.ac.nz\)](https://vuw.ac.nz/BeyondtheDollarCarbonFarmingandItsAlternativesforTairāwhitiMāoriLandowners)

This research explores landowner preferences for various land use options suitable for Māori land in Te Tairāwhiti, on the East Coast of the North Island of Aotearoa-New Zealand (henceforth Aotearoa). A particular emphasis is placed on the applicability and feasibility of native forest carbon farming within the New Zealand Emissions Trading Scheme (NZ ETS) and opportunities, barriers and risks associated with this land use. Alongside this focus, is a wider investigation into the socio-cultural, environmental and economic co-benefits Māori landowners associate with traditional and emerging land uses in Te Tairāwhiti. This study uses a transformative research approach that is rooted in the spirit of kaupapa Māori research.

Miller, D. (2023). *A Submission to the Inquiry into Forestry Related Impacts of Cyclone*

Gabrielle. Newshub. [Cyclone Gabrielle: Ministerial inquiry into forest slash announced | Newshub](https://www.newshub.co.nz/story/cyclone-gabrielle-ministerial-inquiry-into-forest-slash-announced/2023-01-10)

This article details the announcement of the ministerial inquiry into land use associated with the mobilisation of large woody debris and sediment in the Tairāwhiti and Te Wairoa regions.

Miner, R. (2010). *Impact of the global forest industry on atmospheric greenhouse gases*. Commissioned by the Food and Agriculture Organization of the United Nations FAO, Forestry Paper 159, 71pp. <https://www.fao.org/3/i1580e/i1580e00.pdf>.

This book examines the influence of the forest products (roundwood, processed wood products and pulp and paper) value chain on atmospheric greenhouse gases. Forests managed for natural conservation, for protection of soil and water resources or for nonwood forest products may also have a considerable role in the global carbon balance, but these are beyond the scope of this publication.

Ministry of Business, Innovation and Employment. (2019). *Cabinet Paper: Unlocking Tairāwhiti's Economic Potential - Tairāwhiti Roothing Package*. [Unlocking Tairāwhiti's Economic Potential - Tairāwhiti Roothing Package \(mbie.govt.nz\)](https://www.mbie.govt.nz/cabinet-papers/unlocking-tairāwhiti-economic-potential-tairāwhiti-roothing-package)

This paper seeks approval from Cabinet to provide up to \$151.7 million from the Provincial Growth Fund (PGF) to support the Tairāwhiti Roothing Package (the Package). Cabinet approval is required as the amount of funding sought is more than \$20 million.

Ministry for Primary Industries. (n.d). *Hill Country Erosion Programme for councils*. [Hill Country Erosion Programme for councils | NZ Government \(mpi.govt.nz\)](https://www.mpi.govt.nz/erosion-programme-for-councils)

The Hill Country Erosion Programme (HCE) helps protect erosion-prone hill country. It provides leadership and targeted support to regional councils and unitary authorities. Find out how the programme works and why it's needed.

Ministry for Primary Industries. (2013). *Target Land and Land Use Capability Classes*. <https://mpi.govt.nz/dmsdocument/3719-target-land-and-land-use-capability-classes>

This paper describes the differences and limitations between Land Use classes 1-8 in the Land Use Capability System.

Ministry for Primary Industries. (2015). *Submissions: Read the submissions on the proposed National Environmental Standard for Plantation Forestry*. [Submissions | NZ Government \(mpi.govt.nz\)](https://www.mpi.govt.nz/submissions)

MPI consulted on the subject matter of a proposed National Environmental Standard for Plantation Forestry (NES-PF) from 17 June 2015 until 11 August 2015. During consultation, MPI held 18 public meetings and hui on the proposed NES-PF. Feedback received at these meetings has been considered alongside formal submissions. A range of other feedback is also being considered as MPI revise the proposal to address issues raised through consultation. A total of 18,732 formal submissions were received. These submissions are available to download on this page. They have been grouped by submitter group.

Ministry for Primary Industries. (2018). *Best options for land use following radiata harvest in the Gisborne District under climate change: Literature review*. SLMACC 405415 MPI Technical Paper No: 2018/46. [Best options for land use following radiata harvesting in the Gisborne district under climate change: Literature review \(mpi.govt.nz\)](https://www.mpi.govt.nz/best-options-for-land-use-following-radiata-harvesting-in-the-gisborne-district-under-climate-change-literature-review/)

This report contains the literature review and will focus on the possible benefits and limitations of land-use options on long-term erosion control under climate change. The review will summarise current national and international (where appropriate) literature, identify knowledge gaps, and recommend parameters for modelling.

MPI. (2021). *2021-2025 Strategic Intentions*. Ministry for Primary Industries -Manatū Ahu Matua. [direct \(mpi.govt.nz\)](https://www.mpi.govt.nz/2021-2025-strategic-intentions/).

This document sets out MPI's role in the food and fibre sector and their strategy for meeting these challenges and delivering better outcomes for the sector and New Zealand over the next four years.

Ministry for Primary Industries. (2021). *Wood Availability Forecast – New Zealand 2021 to 2060*. [Wood Availability Forecast – New Zealand 2021 to 2060 \(mpi.govt.nz\)](https://www.mpi.govt.nz/wood-availability-forecast-new-zealand-2021-to-2060/)

This report is issued by Margules Groome Consulting Ltd (Margules Groome) to the Ministry for Primary Industries (MPI), for their own use. The reports contain the regional and national wood availability forecasts for New Zealand plantation forestry estates.

Ministry for Primary Industries., New Zealand Forest Owners Association., New Zealand Farm Forestry Association. (2021). *National Exotic Forest Description as at 1 April 2021*. [National Exotic Forest Description 2021 \(canopy.govt.nz\)](https://www.canopy.govt.nz/national-exotic-forest-description-2021/)

This report provides information that describes New Zealand's planted production forests. It consists of summarised statistics on: exotic planted production forest area by age class and territorial authority for key exotic species. For radiata pine, the area by age class tables are also provided by silviculture regime; standing volume (see Appendix 1); national harvesting volume estimates; planting estimates for forests larger than 40 ha; and forest ownership for forests larger than 40 ha.

Ministry for Primary Industries. (2022). *Managing Permanent Exotic Afforestation Incentives – Regulatory Impact Statement*. [Managing Permanent Exotic Afforestation Incentives: Regulatory Impact Statement \(mpi.govt.nz\)](https://www.mpi.govt.nz/managing-permanent-exotic-afforestation-incentives-regulatory-impact-statement/)

This document is the Regulatory Impact Statement to support policy decisions on: whether and how permanent forests using exotic tree species (exotic forests) are restricted in the permanent forest category of the New Zealand Emissions Trading Scheme (NZ ETS) and whether to adjust how averaging accounting in the NZ ETS applies to forests on remote and marginal-to-harvest land.

Ministry for Primary Industries. (2022). *National direction for plantation and exotic carbon afforestation*. [National direction for plantation and exotic carbon afforestation | NZ Government \(mpi.govt.nz\)](https://www.mpi.govt.nz/national-direction-for-plantation-and-exotic-carbon-afforestation/)

This is the consultation site for the review of the national direction for plantation and exotic carbon afforestation, the consultation period of which concluded on 18 November 2022.

Ministry for Primary Industries., New Zealand Forests Owner Association., New Zealand Farm Forestry Association. (2023). *National Exotic Forest Description as at 1 April 2022*. [National Exotic Forest Description 2022 \(mpi.govt.nz\)](https://www.mpi.govt.nz/national-exotic-forest-description-2022/).

This report provides information that describes New Zealand's planted production forests. It consists of summarised statistics on: exotic planted production forest area by age class and territorial authority for key exotic species. For radiata pine, the area by age class tables are also provided by silviculture regime; standing volume (see Glossary: Appendix 1); national harvesting volume estimates; planting estimates for forests larger than 40 ha; and forest ownership for forests larger than 40 ha.

Ministry for Primary Industries. (2023). *One Billion Trees Progress Chart*. [Tracking planting for the One Billion Trees Programme | NZ Government \(mpi.govt.nz\)](https://www.mpi.govt.nz/one-billion-trees-programme/)

This chart developed by the Ministry for Primary Industries tracks planting for the One Billion Trees Programme by collecting data on the sale and distribution of exotic and native tree seedlings.

Ministry for the Environment. (2008). *Climate Change Effects and Impacts Assessment: A Guidance Manual for Local Government in New Zealand (2nd edition)*. Ministry for the Environment - Manatū Mō Te Taiao. [ClimateChange_Effects and Impacts Assessment_FINAL \(environment.govt.nz\)](https://www.environment.govt.nz/ClimateChange_Effects_and_Impacts_Assessment_FINAL)

This Guidance Manual is designed to help local governments identify and quantify opportunities and hazards that climate change poses for their functions, responsibilities and infrastructure. This is the second edition of the Guidance Manual, and it supersedes the first edition published in 2004. It follows the updated assessment of the science of climate change produced by the Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment in 2007.

Ministry for the Environment. (2020). *National Policy Statement for Freshwater Management 2020*. [National-Policy-Statement-for-Freshwater-Management-2020.pdf \(environment.govt.nz\)](https://www.environment.govt.nz/national-policy-statement-for-freshwater-management-2020.pdf).

This National Policy Statement replaces the National Policy Statement for Freshwater Management 2014 (as amended in 2017), which came into force on 7 September 2017. This version of the National Policy Statement incorporates the following amendments:

1. amendments made by the Minister for the Environment under section 53(1) of the Resource Management Act 1991 and notified in the New Zealand Gazette on 8 December 2022 as the National Policy Statement for Freshwater Management 2020 Amendment No. 1
2. amendments made by the Minister for the Environment under section 53(2)(a) of the Resource Management Act 1991 to correct a minor error to Appendix 6 and Appendix 7 on 23 February 2023

Ministry for the Environment and Stats NZ. (2021). Our Land: New Zealand's Environmental Reporting Series. [our-land-2021.pdf \(environment.govt.nz\)](#)

This report focuses on a single issue: how intensively we are using and managing our land. Relevant sections of the report include: *Land use and changes in land use in NZ* (p 18), *Case study Tolaga Bay 2018 with focus on whānau impacts, aftermath of Bola, interaction with the local environmental sustainability strategy* (pp 36-7).

“It’s really hard for the community – families like Taylah’s have lost so much. Some people want to get rid of forestry altogether while others are focussed on the benefits. There wouldn’t be one household here that isn’t touched directly or indirectly by forestry. Many of us are concerned that if we didn’t have forestry at the current level, we would be faced with higher unemployment, a proliferation of issues associated with unwellness, and the anti-social behaviour that comes with a loss of purpose, income, and positive busyness.”

Ministry for the Environment and Stats NZ. (2022). Our marine environment 2022. [Our-marine-environment-2022.pdf](#)

Our marine environment 2022 is the latest in a series of environmental reports produced by the Ministry for the Environment and Stats NZ. It is the third report in the series dedicated to the marine environment, following the 2016 and 2019 reports, and is part of the third cycle of reports released under the Environmental Reporting Act 2015.

Ministry for the Environment and Ministry for Primary Industries. (2022). National direction for plantation and exotic carbon afforestation: Consultation document. [National direction for plantation and exotic carbon afforestation - Discussion paper \(mpi.govt.nz\)](#).

This consultation document focuses on the regulatory controls available under the Resource Management Act 1991 (RMA). The proposals largely involve changes to national direction made under the RMA: the Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 (NES-PF). The consultation also touches on forest management covered under other legislation such as the Biosecurity Act 1993.

Ministry for the Environment. (Updated 2022). Key Components of our Future Resource Management System. [Key components of our future resource management system | Ministry for the Environment](#)

This page provides an overview of the new legislation and how the proposed future resource management system will work.

Ministry for the Environment. (Updated 2023). *Transitioning to our Future Resource Management System*, [Transitioning to our future resource management system | Ministry for the Environment](#)

Transitioning to our future resource management system covers the \$179 million to be used over the next four years for the transition to a new resource management system and its implementation.

Ministry for the Environment. (2022). *Spatial Planning Bill*. [Spatial Planning Bill 187-1 \(2022\), Government Bill Contents – New Zealand Legislation](#)

This Bill provides for the development and implementation of long-term, strategic spatial planning across New Zealand through the development of regional spatial strategies (RSS). RSS will set out a vision and objectives for a region's development and change over a 30-year-plus time span and integrate planning across different legislative frameworks associated with the management of the natural and built environment.

Muda, R. S. P. E. (2022). *An exploration of knowledge development, dissemination, and resource mobilisation within New Zealand's forestry innovation system*. MSc thesis, Massey University, 115pp. <https://mro.massey.ac.nz/handle/10179/17697>.

This thesis critically assesses the governance of knowledge development, dissemination, and resourcing in the New Zealand forestry sector. It focuses on Māori and small-to-medium forest owners (SMFOs), who hold a large proportion of the national forest stock (Ministry for Primary Industries, 2020; New Zealand Forest Owners Association, 2019).

Neilson, Michael. (2019). *Ruatoria timber yard owner gives meth addict burglar a job and a second chance*. NZ Herald. [Ruatoria timber yard owner gives meth addict burglar a job and a second chance - NZ Herald](#)

This article covers the opportunities that employment in the Forestry Sector can bring for struggling members of society, with a focus on the Tairāwhiti.

Newton, Kate. (2023). *New LINZ satellite imagery shows the extent of Gabrielle's devastation*. (Ser. Stuff, March 7) [New LINZ satellite imagery shows the extent of Gabrielle's devastation | Stuff.co.nz](#)

Shows aerial views of cyclone-affected land. Brief discussion of forestry slash.

New Zealand Institute of Surveyors, 2009, Maori Land Committee Report, Attachment (surveyspatialnz.org).

The Institute's Maori Issues Working Group has analysed the many and varied issues relating to the use and enjoyment of Maori land in the context of well established cadastral principles which apply to a functional land tenure.

New Zealand Trade and Enterprise (NZTE). (2016). Forestry in Tairāwhiti-Gisborne. [Gisborne-investment-profile.pdf \(forestenterprises.co.nz\)](#)

This document outlines the economic state of Tairāwhiti-Gisborne. The Tairāwhiti-Gisborne region has significant industry strengths in sheep, beef and grain farming as well as horticulture and forestry and wood product manufacturing. Tairāwhiti-Gisborne's growing forest harvests provide significant business development and investment opportunities for processing in the region over the long term

New Zealand Government. (Updated 2020). Ngāi Tāmanuhiri Deed of Settlement Summary. Ngai Tāmanuhiri Deed of Settlement summary | New Zealand Government ([www.govt.nz](#))

The Ngai Tāmanuhiri Deed of Settlement is the final settlement of all historical Treaty of Waitangi claims of Ngai Tāmanuhiri resulting from acts or omissions by the Crown prior to 21 September 1992, and is made up of a package that includes: an agreed historical account and Crown acknowledgements, which form the basis for a Crown Apology to Ngai Tāmanuhiri; cultural redress; and financial and commercial redress. The benefits of the settlement will be available to all members of Ngai Tāmanuhiri, wherever they live.

New Zealand Government. (Updated 2020). Ngāti Porou Deed of Settlement summary. [Ngāti Porou Deed of Settlement summary | New Zealand Government \(www.govt.nz\)](#)

The Ngāti Porou Deed of Settlement is the final settlement of all historical Treaty of Waitangi claims of Ngāti Porou resulting from acts or omissions by the Crown prior to 21 September 1992, and is made up of a package that includes: an agreed historical account and Crown acknowledgements, which form the basis for a Crown Apology to Ngāti Porou; cultural redress; and financial and commercial redress. No private land will be transferred as redress, only Crown assets. The benefits of the settlement will be available to all members of Ngāti Porou, wherever they live.

Ngai Tāmanuhiri and Trustees of the Tāmanuhiri Tutu Poroporo Trust and the Crown. (2011). Deed of Settlement of Historical Claims. [Ngai Tāmanuhiri Deed of Settlement 5 Mar 2011 \(www.govt.nz\)](#)

The Ngai Tāmanuhiri Deed of Settlement is the final settlement of all historical Treaty of Waitangi claims of Ngai Tāmanuhiri resulting from acts or omissions by the Crown prior to 21 September 1992, and is made up of a package that includes: an agreed historical account and Crown acknowledgements, which form the basis for a Crown Apology to Ngai Tāmanuhiri; cultural redress; and financial and commercial redress.

Ngati Porou and Te Runanganui o Ngāti Porou Trustee Limited as a trustee of Te Runanganui o Ngati Porou and the Crown. (2010). *Deed of Settlement of Historical Claims*. [Ngāti Porou Deed of Settlement 22 Dec 2010 \(www.govt.nz\)](http://www.govt.nz)

Section on ‘Waiapu – Erosion and Flooding’ covers local geology, land use, afforestation project (the East Coast Project) and effects of Cyclone Bola. (Including acknowledgement: ‘The Crown acknowledges that deforestation in the late nineteenth and early twentieth centuries fuelled significant acceleration of erosion and flooding that has had a devastating impact on Ngati Porou rohe wide. It also acknowledges that the measures it adopted to address this problem failed to effectively resolve it.’)

Nightingale, M. (2023). “It’s disgusting”: Family mourns death of “very loving” 11yo on beach. NewstalkZB. [‘It’s disgusting’: Family mourns death of ‘very loving’ 11yo on beach \(newstalkzb.co.nz\)](http://newstalkzb.co.nz)

This article recounts the tragic accident that occurred at Waikanae Beach that saw the loss of an 11-year old boys life.

NIWA. (2016). *The Climate and Weather of the Gisborne District*. [Climate and weather of Gisborne.pdf \(sharepoint.com\)](http://sharepoint.com)

This report explores the fact that in comparison with regions exposed to the west, Gisborne experiences a greater number of weather and climatic extremes. Its position as the easternmost region of New Zealand often results in differing weather conditions from those elsewhere, in that synoptic features over the ocean to the east of New Zealand sometimes affect Gisborne alone among New Zealand regions. The climate is generally congenial with a large number of sunshine hours per year and a low mean wind speed. However, rainfall is unevenly distributed throughout the year with a prominent winter maximum. The shortage of spring rainfall often affects growth and limits some types of agricultural activity. The climate has been found to be generally suitable for sheep, beef cattle, viticulture, and forestry, and there are smaller areas of high productivity of fruit, vegetables, and dairy produce.

NIWA. (2019). *Updated sediment load estimator for New Zealand*. Prepared for the Ministry for the Environment. [NIWA Client report \(environment.govt.nz\)](http://environment.govt.nz)

As part of a broad call for up-to-date information to support Government aims of improving water quality and flows to improve the health of New Zealand’s freshwater environments, the Ministry for the Environment (MfE) commissioned NIWA to develop and apply a new empirical model that estimates mean annual river suspended sediment load¹ at the national scale. The model seeks to improve on a previous generation of similar models by utilising an updated dataset of observed sediment loads. The workstream also included developing a simple, uncalibrated model to estimate the trap efficiency of river/stream sediment in coastal hydro systems (which include estuaries, coastal lakes, and coastal embayment’s).

NIWA. (2020). *Climate Change Projections and Impacts for Tairāwhiti and Hawke's Bay*. Prepared for Envirolink, Gisborne District Council and Hawke's Bay Regional Council. [NIWA Client report \(hbrc.govt.nz\)](https://www.hbrc.govt.nz)

Envirolink, Gisborne District Council and Hawke's Bay Regional Council commissioned NIWA to undertake a review of climate change projections and impacts for the Tairāwhiti and Hawke's Bay regions. This report addresses expected changes for 11 different climate variables out to 2100 and draws heavily on climate model simulations from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report.

Nixon, Chris., Peterson, Richard., Grierson, Harrison. (2015). *Plantation forestry economic analysis: A further revised assessment of proposed National Environmental Standards*. MPI Technical Paper No: 2015/14 Prepared for MPI by NZIER and HG. [Plantation forestry economic analysis: A further revised assessment of proposed National Environmental Standards \(mpi.govt.nz\)](https://www.mpi.govt.nz).

This report revises the costs and benefits of a proposed National Environmental Standard (NES) for plantation forestry in the light of new information, further work by the Ministry for Primary Industries, and in response to feedback from the forestry working group established by the Ministry for Primary Industries. It follows the structure of the two initial studies done by NZIER and Harrison Grierson in August 2011 and January 2012.

Park, Geoff, 1995. *Nga Uruora: The Groves of Life - Ecology and History in a New Zealand Landscape*, 1995. Te Herenga Waka University Press.

Office of the Auditor-General. (2011). *Government Planning and Support for housing on Māori land: Performance Audit Report*. [Government planning and support for housing on Māori land \(oag.parliament.nz\)](https://www.oag.parliament.nz)

This report lists the various initiatives to support Māori housing during the last 80 years. We audited the three current initiatives: Kāinga Whenua loans, the Māori Demonstration Partnership fund, and Special Housing Action Zones.

Office of the Parliamentary Commissioner for the Environment. (1988). *Inquiry into Flood Mitigation Measures Following Cyclone Bola*. [inquiry-into-flood-mitigation-measures-following-cyclone-bola-december-1988-small.pdf \(sharepoint.com\)](https://www.oce.parliament.nz)

An investigation at the request of the Planning and Development Select Committee to evaluate those policies and management practices designed to prevent or ameliorate the effects of major flood events prior to Cyclone Bola (March 1988).

Page, M., Reid, L. M., & Lynn, I. H. (1999). *Sediment production from Cyclone Bola landslides, Waipaoa catchment*. *Journal of Hydrology (NZ)*, 38(2), 289–308. [Sediment production from Cyclone Bola landslides, Waipaoa catchment on JSTOR](https://www.jstor.org/stable/4092122)

This Paper presents a method for assessing sediment production from landslides was applied in the Waipaoa catchment to quantify landsliding which occurred during Cyclone Bola in 1988, and to assess the contribution landslides made to the suspended sediment load of the Waipaoa River during the storm. Relationships between storm rainfall and landslide frequency, defined for different landslide-prone terrains, were used with a geographic information system containing data on the distribution of landslide terrain, vegetation and storm rainfall, to estimate landslide density in the Waipaoa catchment.

Page, M., Trustrum, N., & Gomez, B. (2000). *Implications of a Century of Anthropogenic Erosion for Future Land Use in the Gisborne-East Coast Region of New Zealand*. *New Zealand Geographer*, 56(2), 13–24. <https://doi.org/10.1111/j.1745-7939.2000.tb01571.x>

This paper uses the results of a decade of geomorphic research into the controls and processes of landscape change to illustrate some of the likely future impacts on the landscape and its land use, and to identify some still unanswered questions. This increasing understanding, together with changing community attitudes, provides the opportunity to maximise the benefits of reforestation and other management interventions.

Page, Mike., Trustrum, Noel., Gomez, Basil. (2008). *Implications of a Century of Anthropogenic Erosion for Future Land Use in the Gisborne-East Coast Region of New Zealand*. <https://doi.org/10.1111/j.1745-7939.2000.tb01571.x>. [Implications of a Century of Anthropogenic Erosion for Future Land Use in the Gisborne-East Coast Region of New Zealand - PAGE - 2000 - New Zealand Geographer - Wiley Online Library](#)

This paper uses the results of a decade of geomorphic research into the controls and processes of landscape change to illustrate some of the likely future impacts on the landscape and its land use, and to identify some still unanswered questions. This increasing understanding, together with changing community attitudes, provides the opportunity to maximise the benefits of reforestation and other management interventions.

Parkner, T., Page, M., Marden, M., & Marutani, T. (2007). *Gully systems under undisturbed indigenous forest, East Coast Region, New Zealand*. *Geomorphology*, 84(3–4), 241–253. <https://doi.org/10.1016/j.geomorph.2006.01.042>

This paper reports on recent gully development within areas of undisturbed indigenous forest as a result of a high magnitude rainfall event on the East Coast of New Zealand's North Island. This region, through a combination of crushed and sheared rock types, steep topography, and tectonic and climatic setting, has high natural rates of erosion, exacerbated by European deforestation in the late 19th and early 20th centuries.

Parliament. (1989). *Government response to the report of the Primary Production Committee on The Inquiry into Government Assistance to The East Coast Region in The Wake of Cyclone Bola*. https://ministryforenvironment.sharepoint.com/sites/MFE-EXT-TairwhitiWairoaInquiry/_layouts/15/DocIdRedir.aspx?ID=MIMWD-452268616-4

Government response to the report of the Primary Production Committee on the inquiry into government assistance to the East Coast region in the wake of Cyclone Bola.

Payn, T., Phillips, C., Basher, L., Baillie, B., Garrett, L., Harrison, D., Heaphy, M., & Marden, M. (2015). *Improving management of post-harvest risks in steep-land plantations*. *New Zealand Journal of Forestry*, 60(2), 3–6.

This overview paper introduces the topic of interrotational management of steep-land forests and is the first of a series of short papers on post-harvest steep-land forest management.

Phillips, C. J., & Watson, A. J. (1994). *Structural Tree Root Research in New Zealand: A Review*. Landcare Research Science Series No. 7, 71pp. Manaaki Whenua Landcare Research. [Structural tree root research in New Zealand: a review - Landcare Research Science Series - Manaaki Whenua Landcare Research Digital Library](#)

New Zealand research on tree roots, with emphasis on the larger (>5 mm) structural roots, is reviewed. Both indigenous and exotic tree species are discussed. Relationships between above-ground characteristics such as diameter at breast height (dbh) and root biomass and root tensile strength are also covered, as well as the contribution of roots to slope stability. Many of the studies and results reported here have not been previously published, and most contain only limited sample numbers owing to the laborious nature of excavating tree root systems. The main intention of this report is to document what had been done, by whom, on what, and where. Documenting these studies will also form a basis for planning future research directions.

Phillips, C.J., Rey, F., Marden, M. et al. (2013). *Revegetation of steep-lands in France and New Zealand: geomorphic and policy responses*. *N.Z. j. of For. Sci.* 43, 14. <https://doi.org/10.1186/1179-5395-43-14>

In this paper, two areas of similar geology, geomorphology and types of erosion processes (shallow landsliding and gullyng) – the Southern Prealps region in France and the East Coast North Island region of New Zealand – were used to compare past and current revegetation efforts to address steep-land degradation. An earlier assessment in which human-induced modifications of vegetation cover were assessed in terms of their geomorphic responses is built upon (Liebault et al. 2005; Cohen and Rey, 2005). The interventionist policies and resultant landscape responses between the two countries are compared, lessons learnt highlighted, and the implications for future policy development discussed.

Phillips, Chris., Marden, Michael., & Basher, Les R. (2015). *Forests and erosion protection – getting to the root of the matter*. *NZ Journal of Forestry*, Vol. 60, No. 2. http://www.nzjf.org.nz/free_issues/NZJF60_2_2015/11F10343-7013-41f7-8C7A-DEAAoDB32C73.pdf

In this short opinion piece, the focus is on what we know about the below-ground aspects of the tree – its root system – and how it relates to issues of inter rotational forest management and erosion protection

Phillips, C., Basher, L., & Marden, M. (2016). *Research and monitoring advice on environmental impacts of forestry in the Gisborne-East Coast Region*. Landcare Research Contract Report LC2466 prepared for Gisborne District Council, 30pp. Manaaki Whenua Landcare Research. [LandCare Report \(gdc.govt.nz\)](https://www.landcare.govt.nz/research-and-monitoring-advice-on-environmental-impacts-of-forestry-in-the-gisborne-east-coast-region/)

Gisborne District Council (GDC) approached Landcare Research to provide input and advice to develop a 'research and investigation programme' to meet a range of Council, community, central government and forestry needs. This need has arisen due to increasing community pressure on Council to respond to the effects of storm-induced, post-harvest landslide and debris flow activity that have in recent events mobilised large amounts of woody debris ultimately depositing this on local beaches or properties adjacent to plantation forests. In addition, the council as part of its statutory responsibilities is required to report on the environmental effects of land use activities and plantation forestry is under-represented in GDC's environmental sampling network.

Phillips, Chris., Marden, Michael., & Basher, Les R. (2018). *Geomorphology and forest management in New Zealand's erodible steeplands: An overview*. *Geomorphology*, Vol. 307, pp 107-121.

<https://www.sciencedirect.com/science/article/pii/S0169555X17301320?via%3Dihub>

This paper outlines how geomorphological understanding has underpinned forest management in New Zealand's erodible steeplands, where it contributes to current forest management, and suggests where it will be of value in the future with a focus on the East Coast region of the North Island.

Phillips, Chris., Marden, Michael., Lambie, S. (2020). *Potential effectiveness of low-density plantings of manuka (Leptospermum scoparium) as an erosion mitigation strategy in steeplands, northern Hawke's Bay, New Zealand*. [Potential effectiveness of low-density plantings of manuka \(Leptospermum scoparium\) as an erosion mitigation strategy in steeplands, northern Hawke's Bay, New Zealand | New Zealand Journal of Forestry Science \(nzforestryscience.nz\)](https://www.nzforestryscience.nz/potential-effectiveness-of-low-density-plantings-of-manuka-leptospermum-scoparium-as-an-erosion-mitigation-strategy-in-steeplands-northern-hawkes-bay-new-zealand/)

This article investigates the potential effectiveness of low-density plantings of manuka (Leptospermum scoparium) as an erosion mitigation strategy in steeplands, northern Hawke's Bay, New Zealand.

Pierce, Janine. (2022). *Forests-A Socio-Ecological Perspective*. *Journal of the Commonwealth Human Ecology Council* Spring 2022 Issue 32. [CHEC-Human-Ecology-Journal-32-Forests.pdf](https://www.jceh.org.au/journal/32-forests.pdf)

This article overviews the state of forests today, reinforcing the fact that we are now both at the global heating tipping point and at a crossroads for the world's forests and the Earth System as a whole. Destructive forestry practices are discussed. It also addresses the lessons to be learned from indigenous forest dwellers, emphasising the importance of both

documenting and passing on traditional indigenous knowledge about caring for forests. A general plea is made that we need to create a better future for forests and through that for all humans and other living creatures.

Pizzirani, Stefania., et al. (2019). Exploring forestry options with Māori landowners: an economic assessment of radiata pine, rimu, and mānuka. New Zealand Journal of Forestry Science. [View of Exploring forestry options with Maori landowners: an economic assessment of radiata pine, rimu, and manuka \(nzjforestryscience.nz\)](#)

This analysis demonstrates the importance of strategically considering what tree species to plant, what slope of land to plant them on, and what forest management technique to utilise. Furthermore, this analysis highlights the importance of choosing appropriate discount rates and the effect of other inherent assumptions, such as opportunity cost.

Pohatu, Pia., O'Brien, Sophie., Mercer, Leo. (2020). Challenges and opportunities with native forestry on Māori land. Motu Working Paper 20-13. Motu Economic and Public Policy Research. [Challenges and opportunities with native forestry on Māori land \(motu.org.nz\)](#)

The purpose of this paper is to explore the decision-making processes of a sample of Māori landowners in Te Tairāwhiti to understand the extent to which funding programmes and ETS-related incentives for afforestation enable them to meet their own aspirations for their land. This will be achieved by identifying what motivates Māori landowners to participate in afforestation funding programmes, and with Māori cultural values in mind, assess whether current policies are well attuned to the circumstances and needs of Māori landowners. We also seek insights from examining the specific experiences of landowners within a localised context (such as the Waiapu catchment), in the hope of improving the ability of government policy makers to predict the uptake of afforestation opportunities, particularly involving native species.

Post-Cyclone Gabrielle Large Woody Debris Assessments. (2023). [Cyclone Gabrielle LWD assessment \(sharepoint.com\)](#)

This document assesses the discharge of woody debris from forests across different locations in the Tairāwhiti.

Potter, David, Paul, Cletus Maanu., Paterson, Andre. (2016). Wai 2607, #1.1.1. Ministry of Justice. [Wai 2607, 1.1.001.pdf \(justice.govt.nz\)](#)

The Claimants bring this claim on behalf of Māori in the Mataatua District Māori Council district and elsewhere in Aotearoa/New Zealand. The Claim is that the New Zealand Government's response to the threat of global climate change represents a breach of the Crown's Treaty of Waitangi obligations towards Māori and Māori have and will continue to suffer prejudice as a result.

Primary Production Committee. (1988). Report of the Primary Production Committee Inquiry into Government Assistance to The East Coast Region In The Wake Of Cyclone Bola. https://ministryforenvironment.sharepoint.com/sites/MFE-EXT-TairwhitiWairoaInquiry/_layouts/15/DocIdRedir.aspx?ID=MIMWD-452268616-5

The Primary Production Committee resolved on 31 March 1988 to undertake an inquiry into the after-effects of Cyclone Bola within the East Coast area... The Committee report begins with a description of Cyclone Bola and the extent of the damage which occurred within the East Coast / Northern Hawkes Bay region because of the cyclone. It discusses the way in which the Government assistance is being used and the need for assistance to other groups and individuals within the community. Finally, the report aims to assess the long-term effects of the cyclone on the region and the need for investment and preventative measures to reduce the risk of future catastrophes within the East Coast region.

Quinn, J. M., Boothroyd, I. K. G., & Smith, B. J. (2004). Riparian buffers mitigate effects of pine plantation logging on New Zealand streams: 2. Invertebrate communities. *Forest Ecology and Management*, 191(1–3), 129–146. <https://doi.org/10.1016/j.foreco.2003.11.013>.

*The influences on forest stream invertebrate communities of riparian forest type (native/exotic *Pinus radiata*) and logging, with or without native forest riparian buffers, were investigated at 28 stream sites on Coromandel Peninsula, New Zealand. Stream reaches were surveyed under summer, baseflow conditions in six riparian/forest vegetation types: native forest, mature pine plantations with pines planted to the stream edge, mature pine plantations with native forest in the riparian area, clearcut pine plantations, and logged pine plantations with patch buffers of native forest vegetation (upstream areas clearcut) or continuous buffers along the perennially flowing stream length. Multivariate analyses showed that clearcut reaches differed in invertebrate community structure from pine and native forested reaches, and from logged reaches with continuous riparian buffers.*

Raymond, Keith., Bawden, Ross. (2019). Forest Industry management practices to minimise the incidence of debris flows. *NZ Journal of Forestry*, Vol. 63, No. 4. http://www.nzjf.org.nz/free_issues/NZJF63_4_2019/A81FFE77-3971-4961-B6A3-ECA9FCADBf29.pdf

Many of the issues related to recent events in places like Tasman Bay in February 2018 and Tolaga Bay in June 2018 were addressed in a ground-breaking forest management plan for the Pokairoa catchment in the Northern Boundary of Kaingaroa Forest in 1993. The authors were both Harvest Planning Managers for the Forestry Corporation of New Zealand Ltd back in the 1990s, and this paper reminisces about the lessons learned from that exercise 25 years ago and its relevance to recent events.

Reid, L. M., Page, M. J. (2003). Magnitude and frequency of land sliding in a large New Zealand catchment. *Geomorphology*, Vol. 49, Issues 1–2, 2003. [https://doi.org/10.1016/S0169-555X\(02\)00164-2](https://doi.org/10.1016/S0169-555X(02)00164-2). Pages 71-88. [https://doi.org/10.1016/S0169-555X\(02\)00164-2](https://doi.org/10.1016/S0169-555X(02)00164-2). [Magnitude and frequency of landsliding in a large New Zealand catchment - ScienceDirect](https://www.sciencedirect.com/science/article/pii/S0169555X02001642)

The result of this study suggest that shallow landslides currently contribute about 15±5% of the suspended sediment load in the Waipaoa River above the Kanakanaia gauging station, and that 75% of the sediment production from the landslides occurs during storms with recurrence intervals of less than 27 years. Reforestation of 6.3% (93 km²) of the slide-prone lands in the catchment between 1990 and 1995 resulted in a calculated decrease in slide-derived sediment of 10%. Calculations suggest that reforestation of an additional 3% (66 km²) of the catchment in areas with the most sensitive combinations of land system and storm regime could decrease the total sediment inputs from land sliding by about 20%.

Regional Economic Activity Tool. Deprivation Index in New Zealand. [Regional economic activity report \(mbie.govt.nz\)](#)

This interactive tool is used to explore the deprivation index across New Zealand.

Resource Management Act 1991. [Resource Management Act 1991 No 69 \(as at 13 April 2023\), Public Act Contents – New Zealand Legislation](#)

The Resource Management Act 1991 is the primary piece of legislation in the management of New Zealand's built and natural environments.

Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017, [Resource Management \(National Environmental Standards for Plantation Forestry\) Regulations 2017 \(LI 2017/174\) \(as at 01 May 2018\) – New Zealand Legislation.](#)

The National Environmental Standards for Plantation Forestry (NES-PF) provide nationally consistent regulations to manage the environmental effects of forestry. Find out more about the NES-PF.

Resource Management Review Panel. (2020). *New Directions for Resource Management in New Zealand*, pp 16-22. [rm-panel-review-report-web.pdf \(environment.govt.nz\)](#). [rm-panel-review-report-web.pdf \(environment.govt.nz\)](#)

This report focuses on new directions for Resource Management in New Zealand and made a number of recommendations that are currently underway.

Robertson, Murray. (2023). *Cyclone Gabrielle damage to Tairāwhiti farms estimated at \$80m*. Gisborne Herald. [Cyclone Gabrielle damage to Tairāwhiti farms estimated at \\$80m - NZ Herald](#)

This article describes the extent of the financial damages incurred by Cyclone Gabrielle.

Roche, Michael. (2015). (Re)Interpreting Exotic Plantation Forestry in 1920's New Zealand. *International Review of Environmental History: Volume 1, 2015*. [International Review of Environmental History: Volume 1, 2015 \(anu.edu.au\)](#), pp 147-173.

This article grows out of some of the differences in, emphasis on, and interpretations of New Zealand's forest history that exist in the publications of New Zealand historians and my own writing as an historical geographer working in the field typically labelled 'environmental history'. This mostly rests on the significance of scientific forestry and of exotic afforestation in New Zealand in the 1920s.

Rongowhakaata including Nga Uri o Te Kooti Rikirangi and the Trustees of the Rongowhakaata Settlement Trust and the Crown. (2011). *Deed of Settlement of Historical Claims*. [Rongowhakaata Deed of Settlement 30 Sep 2011 \(www.govt.nz\)](http://www.govt.nz)

Section on Environmental Issues including deforestation between 1890 and 1920, and establishment of the Poverty Bay Catchment Board in 1944, Waipaoa Flood Control Scheme in 1953.

Roper, Mark & Dr. Bramley, Gary. (2023). *Cyclone Gabrielle Woody Debris Species Composition Assessment*. Submitted to Hawke's Bay Regional Council. [Post-Cyclone-Gabrielle-2023-large-woody-debris-assessment-31.03.2023-FINAL-v1.pdf \(hbrc.govt.nz\)](http://hbrc.govt.nz)

Hawke's Bay Regional Council engaged Ecological Solutions Limited to assess Large Woody Debris at a number of locations across the Hawke's Bay region, including at a number of damaged infrastructure assets. The aim of the assessment was primarily to determine the species composition, and if possible, gain insight as to the likely origins of Large Woody Debris mobilised during Cyclone Gabrielle to help inform future land use planning objectives and outcomes.

Roper, Mark. (2023). *Cyclone Gabrielle – Woody Debris Species Composition Assessment*. Developed by Ecological Solutions Limited, Submitted to Hawkes Bay Regional Council.

[Post Cyclone Gabrielle 2023 large woody debris assessment 15.03.2023 - Draft v1.pdf \(sharepoint.com\)](http://sharepoint.com)

Hawke's Bay Regional Council engaged Ecological Solutions Limited to assess Large Woody Debris at a number of locations across the Hawke's Bay region, including at a number of damaged infrastructure assets. The aim of the assessment was primarily to determine the species composition, and if possible, gain insight as to the likely origins of LWD mobilised during Cyclone Gabrielle to help inform future land use planning objectives and outcomes.

Rosenberg, Matthew. (2023). *Fortifying Gisborne's main water pipeline*. [Fortifying Gisborne's main water pipeline \(gisborneherald.co.nz\)](http://gisborneherald.co.nz)

This article discusses the damage to infrastructure that occurred as a result of Cyclone Gabrielle, including direct quotes from local residents and cost estimates for recovery.

Rosenberg, Matthew. (2023). Cyclone Gabrielle: Forest waste 'critical factor' in rupture of Gisborne water pipe. [Cyclone Gabrielle: Forest waste 'critical factor' in rupture of Gisborne water pipe - NZ Herald](#)

This article discusses the damage to infrastructure that occurred as a result of Cyclone Gabrielle, including images of the damage and cost estimates for recovery.

Rowe, D. K., Smith, J., Quinn, J., & Boothroyd, I. (2002). Effects of logging with and without riparian strips on fish species abundance, mean size, and the structure of native fish assemblages in Coromandel, New Zealand, streams. *New Zealand Journal of Marine and Freshwater Research*, 36(1), 67–79. <https://doi.org/10.1080/00288330.2002.9517071>.

This study formed part of a broader, multidisciplinary investigation into the effects of riparian buffer strips on stream environments in exotic forest plantations.

Ryan, P. A. (1991). Environmental effects of sediment on New Zealand streams: A review. *New Zealand Journal of Marine and Freshwater Research*, 25(2), 207–221. <https://doi.org/10.1080/00288330.1991.9516472>

This literature review examines the effects of sediments on freshwater ecosystems and gives the results of some of the more important overseas work and relevant New Zealand studies. It should be stressed that because the literature is so voluminous (over 3000 references to suspended sediment were picked up during a computer search) this can be no more than an overview.

Salmond, A. (13 October 2022). Dame Anne Salmond: Seeing the wood for the trees. Newsroom. [Dame Anne Salmond: Seeing the Wood For the Trees | Newsroom](#)

In this authoritative survey, the scientists sounded a clarion call, warning that the fate of forests and human beings are inextricably tied together. As they point out, indigenous forests provide around three quarters of the world's accessible freshwater, regulating surface and groundwater flows, maintaining high water quality through filtration and reducing water-related risks such as floods and droughts.

SCION. (2012). Summary of the Waiapu River Catchment Study: Final Report. MPI Information Paper No: 2012/09. Ministry for Primary Industries. [MAF Technical Paper Template \(sharepoint.com\)](#)

This report confirms that rates of natural erosion and sedimentation are high in the Waiapu catchment and afforestation is the most effective method of controlling erosion. The total area of the catchment is approximately 174,000 hectares. The report estimates that effective treatment of up to a maximum of 28,000 hectares of highly erodible land (as at 2008) within the catchment is still required to address the erosion problem in the catchment and move toward achieving a desired state as envisaged by Ngāti Porou. This includes approximately 19,000 hectares grassland with a very severe to extreme erosion potential and approximately 8,000 hectares of the catchment areas surrounding gullies.

Scion. (2023). *New approach to predict growth of forestry tree species*. Scion Connections, 42, 54–55. [Scion - New approach to predict growth of forestry tree species \(scionresearch.com\)](https://scionresearch.com)

This research explores the modelling approach, known as limited machine learning, is highly suitable for modelling tree species where there is limited available data. It can be used to forecast more precise forest growth and carbon sequestration to help understand how different forest types and species are affected by the changing climate.

Sheppard, J. P., Chamberlain, J., Agúndez, D., Bhattacharya, P., Chirwa, P. W., Gontcharov, A., Sagona, W. C. J., Shen, H., Tadesse, W., & Mutke, S. (2020). *Sustainable Forest Management Beyond the Timber-Oriented Status Quo: Transitioning to Co-production of Timber and Non-wood Forest Products—a Global Perspective*. *Current Forestry Reports*, 6(1), 26–40. <https://doi.org/10.1007/s40725-019-00107-1>.

This review provides perspectives and insights of forest researchers from four continents representing a range of geo-regions, with examples from diverse and dynamic use of forest products that are undervalued and often misrepresented. A comprehensive discussion of the subject provides special attention to property, tenancy, public goods and access rights to non-wood forest products (NWFP), seen as forest ecosystem services in a framework for forest management decisions. The overall purpose is to provide a logical argument for transitioning to sustainable management of forests for timber and NWFP.

Smale, Aaron. (2023). *East Coast farmland crumbles after carbon group takes over*. Newsroom. [East Coast Farm Crumbles after Carbon Group Takes Over | Newsroom](#)

This article covers a case-study of a company looking to cash in on the Emissions Trading Scheme in which they have left a farm on the East Coast prone to significant erosion within months of taking over.

Stats NZ. (2013). *Iwi individual profile: Te Aitanga-a-Māhaki*. [52-iwi-profiles-Te-Aitanga-a-Mahaki.pdf \(stats.govt.nz\)](#)

A report based on the 2013 Census of Population and Dwellings held on March 5, 2013, that covers key information on the iwi of Te Aitanga-a-Māhaki including population, iwi affiliation, where iwi members live and age and sex.

Stats NZ. (2018). *Estimated long-term soil erosion*. [Estimated long-term soil erosion | Stats NZ](#)

Presents key findings and statistics on long-term soil erosion in Aotearoa.

Stats NZ. (2022). *Regional gross domestic product: Year ended March 2022*. [Regional gross domestic product: Year ended March 2022 | Stats NZ](#)

Regional gross domestic product (GDP) is a geographic breakdown of national-level GDP, which is New Zealand's official measure of economic activity. Figures are expressed in nominal terms, which means they are not adjusted for price effects.

Swan, N., & Lampitt, A. (2023). Summary of NZ Director duties to manage nature-related risk and impact on natural capital—Legal Opinion 2023. Prepared for the Aotearoa Circle, 1p. Chapman Tripp. [the-aotearoa_circle_tnfd_opinion.pdf \(chapmantripp.com\)](https://www.chapmantripp.com/the-aotearoa_circle_tnfd_opinion.pdf)

This opinion seeks to highlight current and anticipated regulatory and market trends to allow New Zealand directors seeking to stay “ahead of the curve” to enable businesses that are particularly reliant on natural capital to anticipate and adapt to nature-related constraints, risk and opportunities.

Tait-Jamieson, W. (2023). NES - Plantation Forestry: Development and workability analysis to support Mana Taiao Tairāwhiti submission to the Ministerial Inquiry into Land Use. 28pp. Jamieson Consulting.

This report was commissioned by Te Weu Charitable Trust to provide an analysis of the development of, and a summary of stakeholder submissions, on the National Environmental Standards for- Plantation Forestry since its inception to the present day to support a submission by Mana Taiao Tairāwhiti on the Ministerial Inquiry into Land Use in Te Tairāwhiti, Tūranganui-ā-Kiwa and Te Wairoa regions.

Tātau Tātau o Te Wairoa. (Retrieved 2023). Kāhui, Hapū and Marae. [Kāhui, Hapū and Marae - TĀTAU TĀTAU \(ttotw.iwi.nz\)](https://www.ttotw.iwi.nz/Kāhui_Hapū_and_Marae_TĀTAU_TĀTAU)

This webpage features the specificities of the kāhui, hapū and marae affiliated to the rohe of Te Wairoa.

Taylor, G. (2022). Forestry needs an urgent reset. Newsroom. <https://www.newsroom.co.nz/forestry-needs-an-urgent-reset>.

This article covers key topics including the review of the NES-PF, and other issues facing the forestry sector in New Zealand.

Te Aitanga-ā-Māhaki. (2021). Our Marae. <https://mahaki.iwi.nz/ourmarae/>

This webpage covers each marae belonging to the iwi of Te Aitanga-ā-Māhaki, including specific details such as, contact information, location and pepehā.

Te Puni Kōkiri. (Updated 2022). Whenua Māori Fund. [Whenua Māori Fund \(tpk.govt.nz\)](https://www.tpk.govt.nz/whenua-maori-fund)

The Whenua Māori Fund supports whenua Māori based economic, cultural, social and environmental projects which help strengthen whānau, communities, regions and the New

Zealand economy. It assists Trustees and owners of whenua Māori to explore the potential of their whenua and to investigate the means of lifting productivity, either through improving and growing existing operations, diversification, or preparing for new ventures.

Te Puni Kōkiri. (2022). *Tahua 2022 – A Secure Future*. [Tahua 2022 - A Secure Future \(tpk.govt.nz\)](https://www.tpk.govt.nz)

Budget 2022's investment in whānau Māori will lead to economic security for all of Aotearoa. This year's Māori Budget package builds on the Government's previous investments in areas like health, education, employment, economic development, tamariki, and whānau wellbeing.

Te Rūnanganui o Ngāti Porou. (Retrieved 2023). *Kaitiakitanga | Environment*. [Kaitiakitanga | Environment | Ngati Porou](https://www.kaitiakitanga.govt.nz)

This article recounts Te Rūnanganui o Ngāti Porou's interpretation and implementation of their understanding of the concept of Kaitiakitanga regarding the environment.

Te Uru Rākau. (2021). *Report on the Year One Review of the National Environmental Standards for Plantation Forestry*, 69pp. Te Uru Rākau - Forestry New Zealand. [44914-Report-on-the-Year-One-Review-of-the-National-Environmental-Standards-for-Plantation-Forestry \(mpi.govt.nz\)](https://www.mpi.govt.nz)

In December 2018, Forestry Ministers asked Te Uru Rākau and the Ministry for the Environment to carry out a review of the NES-PF that considered the matters agreed in the Terms of Reference (Appendix One). They have found that, overall, the NES-PF is effective, but some changes could be made to improve environmental outcomes in some areas.

The FSC Forest Stewardship Standard for New Zealand (2023). *The FSC Forest Stewardship Standard for New Zealand - FSC-STD-NZL-02-2023 Plantations EN*. Forest Stewardship Council. [FSC-STD-NZL-02-2023 Plantations EN The FSC Forest Stewardship Standard for New Zealand.pdf](https://www.fsc.org)

This standard sets out the required elements against which FSC accredited Certification Bodies shall evaluate forest plantation management practices in New Zealand within the scope of the standard.

The Iwi and Hapū of te rohe o Te Wairoa. (2016). *Deed of Settlement of Historical Claims*. [Te Wairoa Iwi and Hapū Deed of Settlement \(www.govt.nz\)](https://www.govt.nz)

Relevant sections of this Deed of Settlement of Historical Claims: 'Rivers and streams, in Te Rohe o Te Wairoa have been adversely affected by many factors since the beginning of European settlement. The district contains much steep hill country that is more susceptible to erosion when cleared, and the clearing of forest cover for farm development has consequently increased runoff, decreased water quality and made flooding more likely.' The damage caused by introduced species, such as possums, deer and goats, has reduced the capability of remaining bush areas to absorb water' (P26) and Flooding at Whakakī 1950s (pp 27-8).

The Royal Society. (2021). *Biodiversity and Climate change —Interlinkages and policy options*.

14pp. [Biodiversity and climate change: interlinkages and policy options | Royal Society](#)

The Royal Society has compiled evidence in a [briefing \(PDF\)](#) which highlights how climate change and biodiversity are interlinked and sets out the key actions and principles to guide a UK response that addresses the climate and the biodiversity crises together.

The Treasury - Te Tai Ōhanga. (2022). *Overseas Investment Act 2005: Forestry Review*.

<https://www.treasury.govt.nz/news-and-events/reviews-consultation/overseas-investment-act-2005-forestry-review>

The Overseas Investment (Forestry) Amendment Act came into force on 16 August 2022.

The key change is the removal of forestry conversions from the Overseas Investment Act 2005's 'special forestry test', and to instead apply the 'benefit to New Zealand' test to these investments. This ensures that forestry conversions by overseas investors continue to bring broad benefits to New Zealand. The Amendment Act also makes several minor changes and technical clarifications to improve the Overseas Investment Act 2005's existing forestry provisions.

Thorrold, B. S. (2010). *The future landscape of New Zealand agriculture*. Proceedings of the New Zealand Grassland Association, 72, LXIII–LXV. <https://doi.org/10.33584/jnzg.2010.72.2803>

The purpose of this paper is to examine some of the trends and drivers of land use change both in the past and the future.

Timar, Levente., White, Dominic., Hendy, Jo. (2018). *Land-use modelling in New Zealand: current practice and future needs*. Motu Economic and Public Policy Research. [Land-use modelling in New Zealand: current practice and future needs \(motu.org.nz\)](#)

As the foundation for more strategic development of New Zealand's modelling capability, this paper profiles the main land sector and farm- and production-related models and datasets currently applied in New Zealand. It also explores priority policy areas where modelling is needed, such as achieving emission reduction targets; managing freshwater, biodiversity and soil quality; and understanding the distributional impacts of policy options as well as climate change.

Timar, L. (2022). *Modelling private land-use decisions affecting forest cover: The effect of land tenure and environmental policy*. Motu Working Paper No. 22–12, 44pp. Motu Economic and Public Policy Research. [Modelling private land-use decisions affecting forest cover: the effect of land tenure and environmental policy | Motu](#)

The author uses geographic data and discrete choice modelling to investigate private land-use decisions in the context of prominent New Zealand land institutions and environmental policies.

Tran, D. X., Pearson, D., Palmer, A., Dominati, E. J., Gray, D., & Lowry, J. (2023). Integrating ecosystem services with geodesign to create multifunctional agricultural landscapes: A case study of a New Zealand hill country farm. *Ecological Indicators*, 146, 109762. <https://doi.org/10.1016/j.ecolind.2022.109762>.

This study aims to propose a solution to overcome these challenges by utilising a geodesign framework and EBM approach to plan and design a sustainable multifunctional agricultural landscape at the farm scale.

Van Delden, Aaron. (2019). Multimillion-dollar repair bill for Wairoa in storm's wake. Local Democracy Reporting. [Multimillion-dollar repair bill for Wairoa in storm's wake | Scoop News](#)

This article describes the extent of the financial damages incurred by recent severe weather events.

Velarde, S. J., Sharma-Wallace, L., Warmenhoven, T., Pohatu, P., Edwards, P., & Barnard, T. (2019). Policy design lessons from the Erosion Control Funding Programme—Afforestation through an adaptive governance lens. *New Zealand Journal of Forestry*, 64(1), 11–16. [FB1D57E6-25BF-472f-A24E-7EF84A4F8F17.pdf \(nzjf.org.nz\)](#)

The authors focus on lessons for policy design learnt from the Erosion Control Funding Programme. This programme started in 1992, and its evolution and results provide invaluable knowledge on barriers to afforestation and potential avenues to address these barriers. They track the progression of the programme from its inception until 2017, and highlight that at the core of its slower-than-expected uptake are issues of indigenous co-development of forest systems and lagging learning cycles.

Visser, Prof. Rien., et al. (2018). Best practices for reducing harvest residues and mitigating mobilisation of harvest residues in steep-land plantation forests. School of Forestry, University of Canterbury, Christchurch, IV ALSA, CNR, Italy. [1879-GSDC152-Best-practices-for-reducing-harvest-residues-and-mitigating-mobilisation-of-harvest-residues-in-steep-land-plantation-forests2.pdf \(envirolink.govt.nz\)](#)

The report focusses on the relationship between harvesting, harvest residues, and the best practices that help mitigate debris flow events and or the delivery of harvest residue. It was prepared for the Gisborne District Council.

Visser, R. & Harvey, C. (2020). Design of Debris Slash Traps: Considerations for NZ Plantation Forestry Operating. [Forestry Slash Traps UC Visser Harvey 2020 Final \(gdc.govt.nz\)](#)

This report, prepared for Gisborne Regional Council, discusses slash traps as an option to ameliorate the issue of mobilised woody debris in the Tairāwhiti. The report includes academic references supporting recommendations, visual depictions of their implementation as well as other key information on slash traps or 'debris traps'.

Wairoa District Council. (2005). Wairoa District Plan.

<https://www.wairoadc.govt.nz/assets/Document-Library/District-Plan/Full-Operative-District-Plan.pdf>

This District Plan is a statement on how sustainable management of natural and physical resources is to be promoted in the Wairoa District. Under Section 73 of the Act, the District Council must undertake a full review of the District Plan not later than 10 years after the Plan becomes operative.

Wairoa District Council. (2005). District Plan. [Operative District Plan | Wairoa District Council \(wairoadc.govt.nz\)](#)

At its meeting on 14 June 2005, the Wairoa District Council approved the Proposed Wairoa District Plan prepared under the provisions of the Resource Management Act 1991. Council resolved that the Plan be made operative from 25 June 2005, pursuant to Clause 20 of the First Schedule.

Wairoa District Council. (2022). Annual Plan 2022-2023. [Annual-Plan-2022-23-single-pages.pdf \(wairoadc.govt.nz\)](#)

This annual plan sets the direction and describes the outcomes that Wairoa District Council aim to achieve for the next year. Every year Council develops an Annual Plan which sets the budget and rates requirement for the upcoming year and describes the activities and community outcomes it hopes to achieve for the district.

Wairoa District Council. (2023). Weather & Climate. [Weather & Climate | Wairoa District Council \(wairoadc.govt.nz\)](#)

Wairoa has a Mediterranean-style climate with long, fine summers with temperatures in the mid 20s (°C) and short, mild winters. Its high sunshine hours and favourable winter and summer temperatures help make it the largest producer of pip and stone fruit and the second largest producer of wine grapes.

Wairoa District Council. (Accessed 2023). Wastewater. [Stormwater & Wastewater | Wairoa District Council \(wairoadc.govt.nz\)](#).

This webpage provides an overview of the infrastructure that the Wairoa District Council provides around the district to deal with Storm and Wastewater.

Waitangi Tribunal. (2004). *Turanga Tangata Turanga Whenua: The Report on the Turanganui a Kiwa Claims (Wai 814)*. Vol 1. [GisborneZZQ.vp \(justice.govt.nz\)](#)

Details of this claim may be found in the body of this report. The Tribunal set out in summary form here their key findings of fact and Treaty principle in respect of these events. They rely generally on the primary chapter headings in this report to structure this summary (some of the smaller claim issues are not covered here). This is no more than a summary. Their actual findings, and the analysis that underpins them, are to be found in the body of this report.

Waitangi Tribunal. (2004). *Turanga Tangata Turanga Whenua: The Report on the Turanganui a Kiwa Claims (Wai 814)*. Vol 2. Legislation Direct: Wellington. [Turanga Tangata Volume 2 \(justice.govt.nz\)](#)

This Waitangi Tribunal report is on the Tūranganui-ā-Kiwa claims. Relevant sections cover erosion-prone land, impacts of clearing indigenous forest, land degradation and flood control. Refers to the evidence of Dr Brad Coombes and Ashley Gould on geology, removal of forestry cover, the beginnings of national soil conservation programme, Waipaoa River flood control scheme, Mangatū afforestation. Evidence that may contribute: Coombes (A20, A47, A70, A73, B11), Gould (G7, F1), Hill (A20, F1), John Ruru (A55, B14).

Waitangi Tribunal. (2013). *The Mangatū Remedies Report: Pre-publication Version (Wai 814)*. [The Mangatū Remedies Report: Pre-publication Version \(waitangitribunal.govt.nz\)](#)

This Waitangi Tribunal Report relates to the Mangatū Crown forest licensed (CFL) lands. The Mangatū Incorporation claim concerns the Crown's 1961 purchase of 8,522 acres (3,448 hectares) of land north of Gisborne. The Crown purchased 'the 1961 land' from the incorporation to establish a forest to prevent and control hill country erosion and downstream flooding. The forest would be managed partly for protection and partly for commercial production. The 1961 land remains Crown forest land, as part of the Mangatū forest. The incorporation's claim is that they sold the 1961 land unwillingly, having been misled by the Crown into believing that they could not profitably use it, and having been given no option by the Crown but to sell. The incorporation's application to the Tribunal seeks recommendations that would compel the Crown to resume (return) the 1961 land to them.

Wangui, J. C., Kenyon, P. R., Tozer, P. R., Millner, J. P., & Pain, S. J. (2021). Bioeconomic Modelling to Assess the Impacts of Using Native Shrubs on the Marginal Portions of the Sheep and Beef Hill Country Farms in New Zealand. *Agriculture*, 11(10), 1019. <https://doi.org/10.3390/agriculture11101019>

Therefore, the objective of this study was to develop a native shrub sub-model to add to the existing model developed by and use it to assess the impacts on:

- (i) farm feed supply,*
- (ii) flock dynamics, and*
- (iii) farm economics of converting 10% of a North Island hill country sheep and beef farm from only pasture production to native shrubs with understory grazing.*

Warmenhoven, T., Barnard, T., Pohatu, P., Garrett, L., Porou, T., Fitzgerald, G., Harrison, D., Barry, L., & Ruru, W. (2014). *Climate Change and Community Resilience in the Waiapu Catchment*. MPI Technical Paper No. 2014/25, prepared for the Ministry for Primary Industries. [Climate Change and Community Resilience in the Waiapu Catchment \(mpi.govt.nz\)](#)

The Ministry for Primary Industries (MPI) Sustainable Land Management and Climate Change (SLMACC) programme provides funding for research into the impacts of a changing global climate on New Zealand. The programme described in this report is part of the SLMACC investment priorities for 2012/13 that addresses the impacts of climate change on community resilience in the Waiapu Catchment.

Watson, A., Phillips, C., & Marden, M. (1999). Root strength, growth, and rates of decay: Root reinforcement changes of two tree species and their contribution to slope stability. *Plant and Soil*, 217(1), 39–47. <https://doi.org/10.1023/A:1004682509514>.

In this paper the authors present data on live root-wood strength, rates of root decay and root growth of both radiata pine and kanuka. A comparative model of rates of root reinforcement changes that occur between clear-felling and regrowth of vegetation is also presented. The implications for slope stability in relation to the probability of an extreme storm event occurring on slopes covered by an undisturbed naturally regenerating tree species (kanuka) and three planting regimes of a plantation forestry species (radiata pine) are evaluated and discussed.

Weaver, Sean. (2022). *Investment barriers to indigenous forest climate solutions*. *NZ Journal of Forestry*, Vol. 67, No. 1. [Investment barriers to indigenous forest climate solutions.pdf \(sharepoint.com\)](#)

This article explores the investment barriers to carbon-financed indigenous reforestation which are plentiful. They include slow carbon credit production rates (and consequent low-carbon revenues), expensive forest establishment costs, bureaucratic delays, and now a government policy proposing to ban the use of exotic species in the permanent forest category of the New Zealand Emissions Trading Scheme (NZETS), including exotic species used to fund indigenous reforestation in private investment models. This article explores these investment barriers through the lens of a climate emergency.

Weaver, Sean. (2023). *Carbon economics of natural regeneration at scale*. *NZ Journal of Forestry*, Vol. 67, No. 4. [Carbon economics of natural regeneration at scale.pdf \(sharepoint.com\)](#)

This paper presents a practitioner's perspective on these two aspects (natural regeneration on eligible post-1989 land and managing natural regeneration on existing pre-1990 indigenous scrub and forest land) of natural regeneration for carbon management, with a particular emphasis on operating at a scale that has a meaningful impact on national carbon sequestration goals.

West, T. A. P., Monge, J. J., Dowling, L. J., Wakelin, S. J., Yao, R. T., Dunningham, A. G., & Payn, T. (2020). Comparison of spatial modelling frameworks for the identification of future afforestation in New Zealand. *Landscape and Urban Planning*, 198, 103780. <https://doi.org/10.1016/j.landurbplan.2020.103780>.

The authors identified spatially-explicit drivers of forest gain and the locations most likely to experience afforestation in the country using two distinct spatial modelling frameworks: logistic regressions and artificial neural networks (ANN). Five of the eight most significant drivers of forest gain that have influenced past afforestation patterns according to our logistic regressions (i.e., erosion potential, distance from exotic forests, woody grasslands, grassland productivity, and slope) were also ranked among the ten most influential drivers by the ANN model.

Wilson, T. P. (2022). *The identification of unproductive hill country for planting carbon farmed vegetation and the economics of doing so*. MSc thesis, Massey University, 112pp. <https://mro.massey.ac.nz/handle/10179/17675>.

The purpose of this literature review is to investigate the nuanced differences between government policy and current practice. The effect that climate change legislation has upon the landscape of New Zealand hill country is investigated. Whether the use of forestry as a tool for controlling pollutants from agricultural runoff/mass movements, has had a 10 compounding effect is analysed. The degree of common ground between these widespread changes and resource management legislation is critiqued. During the process, areas which require further research are identified. Findings and research are kept within the scope of New Zealand's hill country.

Woolley, J.-M., Eager, C., Jozaei, J., Paul, V., Paulik, R., Pearce, P., Sood, A., Stuart, S., Vincent, A., Wadhwa, S., & Zammit, C. (2020). *Climate change projections and impacts for Tairāwhiti and Hawke's Bay*. Hawke's Bay Regional Council Publication Number: 5531, prepared for Envirolink, Gisborne District Council and Hawke's Bay Regional Council, 247pp. NIWA.

Envirolink, Gisborne District Council and Hawke's Bay Regional Council commissioned NIWA to undertake a review of climate change projections and impacts for the Tairāwhiti and Hawke's Bay regions. This report addresses expected changes for 11 different climate variables out to 2100 and draws heavily on climate model simulations from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report.

Yao, R., Palmer, D., Hock, B., Harrison, D., Payn, T., & Monge, J. (2019). *Forest Investment Framework as a Support Tool for the Sustainable Management of Planted Forests*. *Sustainability*, 11(12), 3477. [Sustainability | Free Full-Text | Forest Investment Framework as a Support Tool for the Sustainable Management of Planted Forests \(mdpi.com\)](https://doi.org/10.3390/s11123477)

This study provides evidence of a spatial economic tool that quantifies the economic, environmental, and social values of the planted forest ecosystem which is valuable in informing land management decisions for maintaining and enhancing the provision of market and non-market ecosystem services to society.