

Waitaha Hydro Scheme

The role of the Waitaha Hydro Scheme in climate change mitigation
and reducing climate related impacts on New Zealand's natural
environment

Prepared for Westpower Limited

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Boffa Miskell







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Executive Summary

Westpower are seeking concessions under the Conservation Act 1987 to construct and operate a run-of-the-river hydro scheme on the Waitaha River, located north of Harihari on the South Island West Coast. The proposed scheme is primarily located within the Upper Waitaha Catchment, on Stewardship Conservation Land managed by the Department of Conservation.

The application was previously declined in August 2019 by the Minister for the Environment, shortly before the passing of the Zero Carbon Act. The previous decision did not consider the broader benefits of the scheme, including the Scheme's contribution toward meeting the Government's Emission Budgets, Emissions Reduction Plan, renewable energy targets, and reducing the impacts of climate change.

This report describes the benefits of the Scheme in supporting New Zealand's climate change response, the role of renewable energy generation in mitigating climate change impacts on the natural environment and explains why in deciding the Scheme's concession application, the Minister should consider these benefits.

Increasing the supply of low emission, renewable energy is a keystone in New Zealand's climate change response. If emission reduction targets and commitments are to be met, a rapid transition towards increased renewable energy generation is required to support the decarbonisation of our society and to set the country on track for accelerated emission reductions in future years. Should this not be achieved, and global emission reduction targets are over-shot, the natural environment will be exposed to the most severe effects of unmitigated climate change.

As such, decisions pertaining to renewable energy generation projects located on Public Conservation Land are so material to both the achievement of New Zealand's climate change commitments and the conservation of the natural environment, that the climate change impacts or benefits of a proposed project need to be taken into account during the decision-making process.

Through contributing to the reduction of greenhouse gas emissions to mitigate the severity of climate change impacts on the natural environment, the proposed Waitaha Hydro Scheme will indirectly provide positive outcomes in terms of climate change mitigation and therefore for conservation values.

Prior expert assessments on the environmental effects of the Scheme on local conservation values, including ecological values, were assessed to be negligible to minor. This means the Scheme poses only a low risk of exacerbating existing biodiversity threats or restricting the ability to implement climate change adaptation strategies. Meanwhile, through the provision of renewable electricity generation, the proposed Scheme would deliver the important benefit of supporting New Zealand to meet its emission reduction targets. Applying a long-term view to environmental management, any minor adverse effects of the Scheme on the local environment would be outweighed by the positive outcomes that the Scheme will have on mitigating the impacts of climate change. In our view, applying a net-benefit approach, the Scheme would generate net-positive outcomes for the natural environment in the long term.

In light of the declared "climate emergency", along with the actions and intent detailed in the Emission Reduction Plan, it is our view that the Minister should take the Scheme's contribution toward mitigating the impacts of climate change on the natural environment into account and place significant weight on the Scheme's net-positive outcomes in deciding Westpower's concession application.

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1.0 Introduction

1.1 Background and Role

Boffa Miskell was engaged by Westpower Limited (Westpower) in relation to its application for reconsideration under section 17ZJ of the Conservation Act 1987 of its application for a lease, licence, and easement concession (Concession) for the Waitaha Hydro Scheme (the Scheme).

Boffa Miskell was commissioned by Westpower to provide an independent expert opinion on the implications of climate change on New Zealand's Public Conservation Land and the opportunities that renewable electricity generation projects provide to mitigate the impacts of climate change on Public Conservation Land.

The authors of this report are Sam Parsons (Climate Change Specialist at Boffa Miskell) and Stephen Fuller (Partner at Boffa Miskell and principal ecologist with expertise in sustainable energy projects). Qualifications and experience of each author relevant to this report is provided in Appendix A.

In preparing this report we have read the key relevant technical information which supports Westpower's application for the Concession for the Scheme as well as the key decision documents in so far as they relate to ecology and the initial decision on Westpower's Concession application.¹

1.2 Scope of Report

This report seeks to discuss the benefits of renewable energy generation in supporting New Zealand's climate change commitments and mitigating the likely impacts of continued climate change on the natural environment, including on Public Conservation Land, and the need for the Minister to place significant weight on these benefits in reconsidering Westpower's concession application.

The purpose of this report is to:

1. Discuss the Government's climate change response targets and commitments;
2. Discuss the impact of climate change on Public Conservation Land and resources if emission targets and commitments are not achieved, including impacts on biodiversity;
3. Discuss the role New Zealand's Public Conservation Land and resources in New Zealand's climate change response;
4. Discuss the role of renewable energy generation projects in making an invaluable contribution toward achieving the Government's emission targets and commitments to mitigate the impacts of climate change, including on Public Conservation Land and resources.

¹ Key decision reports include:

- (i) the Officer's report dated 19 August 2016 approving in principle the grant of the Concession for the Scheme;
- (ii) Hearing committee report dated June 2017;
- (iii) Final departmental report dated 12 June 2019; and
- (iv) Final Minister's decision dated 27 August 2019;

2.0 New Zealand's Response to Climate Change

New Zealand is fundamentally committed to reducing its greenhouse gas emissions and responding to the impacts of climate change.

Unless significant reductions are made in greenhouse gas emissions in the next three decades, global warming of 1.5°C and 2°C will be exceeded during this century, with dire consequences to the natural environment and human society.² New Zealand, and the world, must take action to reduce emissions as quickly as possible to hold global warming to well below 2°C and mitigate the severity of climate change impacts.

As a participant in the Paris Agreement under the United Nations Framework Convention on Climate Change, New Zealand has committed to strengthen its response to climate change. The Climate Change (Zero Carbon) Amendment Act 2019 (the Zero Carbon Act) which, came into effect after the Minister's Decision, provides the framework by which New Zealand will develop and implement clear and stable climate change policies that:

- Contribute to the global effort under the Paris Agreement to limit the global average temperature to 1.5°C above pre-industrial levels; and
- Allow New Zealand to prepare for, and adapt to, the effects of climate change

2.1 Emission Reduction Targets

New Zealand has two key emission reduction commitments that guide its climate change mitigation efforts:

- Under the Paris Agreement, New Zealand is committed to a Nationally Determined Contribution (NDC) to reduce net greenhouse gas emissions. Prior to COP26 in 2021, New Zealand announced an increased NDC target to reduce net emissions by 50% below gross 2005 levels by 2030 and;
- Under the Zero Carbon Act, New Zealand is committed to reaching net-zero emissions of long-lived greenhouse gases by 2050, and to reduce biogenic methane emissions between 24-47% by 2050.

To achieve the Zero Carbon Act 2050 target, the Government has set the first three Emission Budgets for New Zealand and prepared the first Emission Reduction Plan. This sets the direction for New Zealand's climate mitigation action, informing the policies, strategies, and direct actions for meeting the emissions budget across a range of areas including energy, transport, land use, and construction. The first Emissions Budget (2022-2025) is set at 290 megatonnes of CO₂e, averaging out to 72.4 megatonnes per year, which is 2 megatonnes less per year than the 2017-2022 average.³ As far as possible, emission budgets will be met through actions that domestically reduce and remove emissions.

The Emission Reduction Plan, published 16 May 2022, recognises that one of the most significant emission reductions must occur in the energy sector as a vital step towards achieving New Zealand's first Emissions Budget.⁴ The Plan sets a short-term focus to reduce energy emissions, in large through

² IPCC, 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press

³ Beehive.govt.nz Media Release. 2022. Aotearoa sets course to net-zero with first three emissions budgets.

⁴ Ministry for the Environment. 2022. Te hau mārohi ki anamata, Towards a productive, sustainable, and inclusive economy: Aotearoa New Zealand's First Emission Reduction Plan (2022-2025)

accelerating the development and uptake of new renewable energy generation. Building on the Government's target of 100% renewable electricity by 2030, the Plan also introduces an additional target of 50% of total final energy consumption coming from renewable sources by 2035.

2.2 Adaptation Targets

In response to the current and unavoidable future impacts of climate change that New Zealand will continue to experience over the coming decades, under the Zero Carbon Act, the Government must undertake a National Climate Change Risk Assessment (NCCRA) and prepare a National Adaptation Plan.

The National Adaptation Plan, due to be released in August 2022, will seek to address the most significant climate change risks identified in the recent NCCRA published August 2020.⁵ Taking into account the environmental, economic, social, health, and cultural effects of climate change, the NCCRA has identified 43 priority climate change risks across five value domains New Zealand must adapt to.

2.3 Zero Carbon Act Section 5ZN

As stated in section 5ZN of the Climate Change Response Act 2002, New Zealand's emission budgets and 2050 targets may be taken into consideration by public decision makers.⁶

5ZN 2050 target and emissions budget are permissive considerations

If they think fit, a person or body may, in exercising or performing a public function, power, or duty conferred on that person or body by or under law, take into account –

- (a) the 2050 target; or
- (b) an emissions budget; or
- (c) an emission reduction plan.

As such, a public decision-maker may consider the impact of their decision on climate change. The Ministry for the Environment is yet to issue guidance to departments on how to take the 2050 target or an emissions budget into account in the performance of their functions, powers, and duties as required under the Zero Carbon Act.⁷ However, we consider that if the climate change impact is obviously material to a Department's decision, failure to consider it would not be in accordance with the intention of the Zero Carbon Act.

As New Zealand's 1.5°C target and Emission Reduction Plan actions are obviously material to decisions concerning increasing renewable energy generation, it is an imperative that the climate change impacts of a proposed project are taken into account during the decision-making process. Our view is that in reconsidering the Waitaha Concession the Minister must take into account the impacts and benefits of the Scheme on climate change.

⁵ Ministry for the Environment. 2020. National Climate Change Risk Assessment for Aotearoa New Zealand: Main report – Arotakenga Tūraru mō te Huringa Āhuarangi o Āotearoa: Pūrongo whakatōpū. Wellington: Ministry for the Environment.

⁶ As amended by the Climate Change Response (Zero Carbon) Amendment Act 2019.

⁷ As required pursuant to section 5ZO of the Climate Change Response Act 2002.

3.0 Impacts of Climate Change on New Zealand's Natural Environment

3.1 Risks of Climate Change on the Natural Environment

New Zealand's unique biodiversity has been in a state of crisis for a number of decades triggering the first 'New Zealand Biodiversity Strategy' in 2000.⁸ This continues to be a pervasive environmental issue today.⁹ A variety of changes are already measurable and accelerating. Following global trends, habitat loss through changes in land and sea use, pollution, and invasive species are all placing increasing pressures on indigenous species and ecosystems – all of which can interact with and be exacerbated by the impacts of climate change. The various direct and indirect threats to climate change are summarised in Figure 1 below.

Now, in addition to these existing threats, widespread and severe climate change impacts on ecosystems and species are now evident across New Zealand. Climate change trends and extreme weather events combine with existing pressures to cause significant impacts for many ecological systems, with some causing irreversible changes. Unless New Zealand, alongside the rest of the world, meet the Paris Agreement targets to limit global warming to 1.5°C and mitigate the most severe impacts of climate change, the biodiversity crisis will only intensify.

As indicated in Figure 1, climate change is also a significant driver of human induced threats to the natural environment through maladaptation to climate change.¹⁰ Without adequate planning and environmental assessments, land use changes and use of natural resources for climate change mitigation have the potential to cause cascading risks to the natural environment. The Emission Reduction Plan addresses the need for 'working with nature' in pursuit of climate change mitigation to ensure New Zealand's response improves the resilience of native ecosystems to climate change impacts, whilst not furthering their destruction. As such, low impact renewable energy generation must be sought to avoid risks to the natural environment.

⁸ Ministry for the Environment. 2000; The New Zealand biodiversity strategy. February 2020. ISBN O-478-21919-9

⁹ Department of Conservation. 2020. Biodiversity in Aotearoa an overview of state, trends and pressures.

¹⁰ Christie, J. 2014. Adapting to a changing climate: a proposed framework for the conservation of terrestrial native biodiversity in New Zealand. Department of Conservation

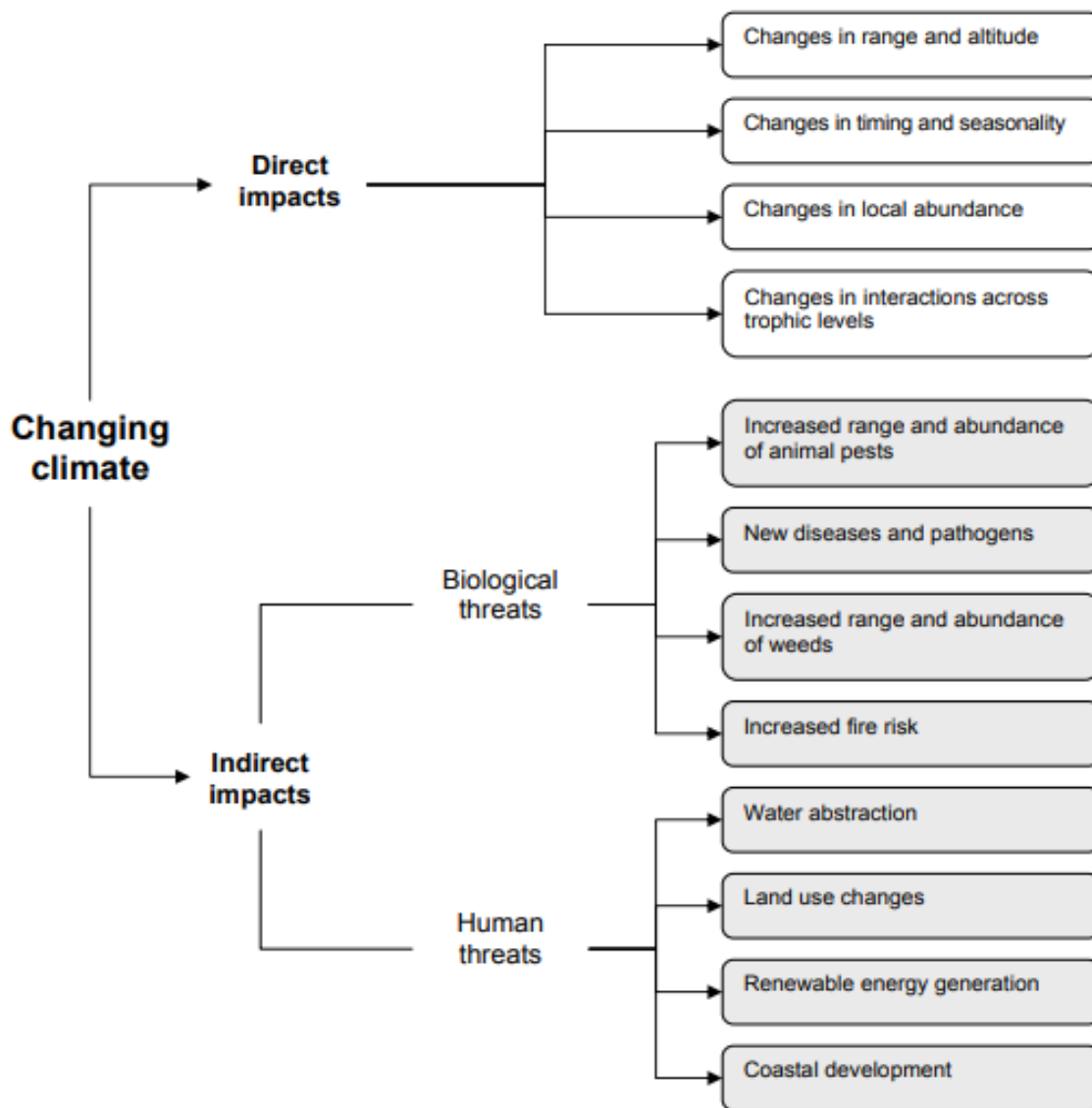


Figure 1: Examples of both new (white) and existing (light grey) threats to biodiversity, and their relationship to direct and indirect climate change impacts (from Christie. 2012)

3.2 Climate Change Effects in the Natural Environment

New Zealand’s, and the global community’s, ability to meet the Paris Agreement obligations and locally set Emission Budgets will determine the magnitude of climate change risks to the natural environment.

There are significant information gaps in the understanding of exactly how climate change will impact and interact with New Zealand’s natural environment, particularly on biodiversity. A lack of long-term data on the factors that influence the distributions and abundances of many New Zealand species and ecosystems, along with the difficulty of assessing resilience and adaptive capacity makes predicting the impacts of climate change on ecological systems problematic.¹¹ Any such assessment can be further confounded by the ongoing effects of invasive species, habitat degradation, and the ability of climate change to indirectly exacerbate these pressures.

¹¹ Christie, J. 2014. Adapting to a changing climate

However, the growing body of regional New Zealand evidence, combined with strong and consistent global trends make it very likely that many observed changes in range, phenology, physiology, and morphology of terrestrial and freshwater species can be attributed to regional and global climate changes.¹² An increasing number of changes to New Zealand biodiversity are already being observed that are consistent with these observations.

The percentage of species at high-risk of extinction increases steeply with rises in global temperatures as demonstrated in Figure 2 below. It is predicted that the percentage of species at high risk of extinction globally will increase from 9% (max 14%) at 1.5°C warming to 15% (max 48%) at 5°C warming. The cascading impacts of species loss on ecosystem integrity further reduces environmental resilience and substantially increases the risk of carbon stored in the biosphere being released into the atmosphere due to processes such as widespread tree mortality, wildfire, and declining pollination.

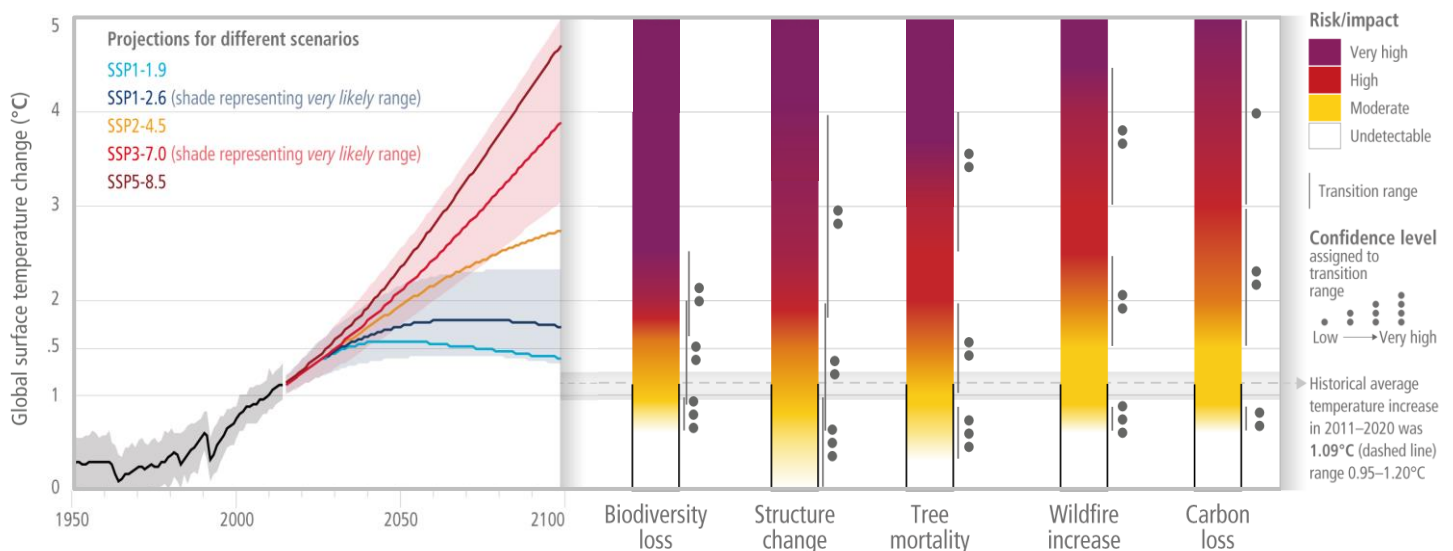


Figure 2: Risks for increasing global warming to terrestrial and freshwater ecosystems (from IPCC Working Group II).

Observed climate change impacts on New Zealand biodiversity includes:

- Declines in seabird populations such as red-billed gulls,¹³ yellow-eyed penguins,¹⁴ and sooty shearwaters;¹⁵
- Changes in tuatara sex ratios to increasingly male dominant, threatening small and isolated populations;¹⁶

¹² IPCC, 2022: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [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.)]. Cambridge University Press. In Press.

¹³ Mills, J.A.; Yarell, J.W.; Bradford-Grieve, J.M.; Uddstrom, M.J.; Renwick, J.A.; Merila, J. 2008: The impact of climate fluctuation on food availability and reproductive performance of the planktivorous red-billed gull *Larus novaehollandiae scopulinus*. *Journal of Animal Ecology* 77: 1129–1142.

¹⁴ Peacock, L.; Paulin, M.; Darby, J. 2000: Investigations into climate influence on population dynamics of yellow-eyed penguins *Megadyptes antipodes*. *New Zealand Journal of Zoology* 27: 317–325.

¹⁵ Scott, D.; Scofield, P.; Hunter, C.; Fletcher, D. 2008: Decline of Sooty Shearwater, *Puffinus griseus*, on the Snares, New Zealand. *Papers and Proceedings of the Royal Society of Tasmania* 142: 185–196.

¹⁶ Mitchell, N.J.; Kearney, M.R.; Nelson, N.J.; Porter, W.P. 2008: Predicting the fate of a living fossil: how will global warming affect sex determination and hatching phenology in tuatara? *Proceedings of the Royal Society B—Biological Sciences* 275: 2185–2193

- Changes in quality pāua shell characteristic (etching and thinning) at lower pH levels;¹⁷
- Loss of bull kelp populations in southern New Zealand;¹⁸
- Increased invasive animal species abundance and predation on native species;¹⁹
- Increased invasive plant species abundance and range.²⁰

Whilst some climate change impacts on New Zealand biodiversity may be countered by increased management interventions such as invasive pest control and habitat restoration, other impacts (e.g., tuatara sex ratios, pāua shell thinning) will be dependant on reducing the severity of climate change in the long-term.

Adapting to the emerging and increasing risks that climate change is having on New Zealand's biodiversity (i.e., Climate Change Adaptation) is critical to conservation efforts. However, as global warming continues, risks to the natural environment grow, adaptation pathways become limited, and adaptation costs increase. As such, the severity of climate change risks on the natural environment can be reduced substantially by rapid, large-scale, and effective emission reduction (i.e., Climate Change Mitigation). This interdependence is recognised in Te Mana o te Taiao, Aotearoa New Zealand Biodiversity Strategy (ANZBS), where 'joined up efforts that tackle biodiversity loss and climate change together' is a key priority to addressing the drivers of biodiversity loss and restore at-risk ecosystems and species.²¹

The NCCRA identified 12 priority climate change risks for the Natural Environment domain, all rated 'major consequence' under a high emission scenario, where Paris Agreement targets are not met. The two most significant risks identified that must be addressed in the National Adaptation Plan are:

N1. Risks to coastal ecosystems, including the intertidal zone, estuaries, dunes, coastal lakes, and wetlands, due to ongoing sea-level rise and extreme weather; and

N2. Risks to indigenous ecosystems and species from the enhanced spread, survival, and establishment of invasive species, due to climate change.

The significant risks identified for the Natural Environment domain highlight how human societies and the natural environment can conflict to further exacerbate climate change risks. For N1, the adaptive capacity of coastal ecosystems to retreat in-land from sea-level rise is often constrained due to urban development or linear infrastructure. Whereas, for N2, the exposure of indigenous ecosystems to the enhanced spread of invasive species is increased by efforts to plant more exotic forestry to sequester carbon as part of mitigation efforts.²²

¹⁷ Cummings, V. J. et al., 2019: Effect of reduced pH on physiology and shell integrity of juvenile (pāua) from New Zealand. PeerJ, 7, e7670

¹⁸ Salinger, M. J. et al., 2020: Unparalleled coupled ocean-atmosphere summer heatwaves in the New Zealand region: drivers, mechanisms, and impacts. Climatic Change

¹⁹ Tompkins, D. M., A. E. Byrom and R. P. Pech, 2013: Predicted responses of invasive mammal communities to climate related changes in mast frequency in forest ecosystems. Ecol. Appl., 23 (5), 10

²⁰ Macinnis-Ng, C. et al., 2021: Climate change impacts exacerbate conservation threats in island systems: New Zealand as a case study. Frontiers in Ecology and the Environment, 19 (4), 216-224

²¹ Department of Conservation. 2022. Te Mana o Te Taiao – Aotearoa New Zealand Biodiversity Strategy

²² Ministry for the Environment. 2020. National Climate Change Risk Assessment for New Zealand – Arotakenga Tūraru mō te Huringa Āhuarangi o Aotearoa: Technical report – Pūrongo whaihanga. Wellington: Ministry for the Environment.

4.0 The Role of New Zealand's Public Conservation Land

4.1 Climate Change Response on Public Conservation Land

It is unequivocal that anthropogenic climate change has warmed our atmosphere, ocean, and land, influencing widespread changes in our natural environment. New Zealand's changing climate is already affecting nearly every aspect of the Department of Conservation's (DOC) responsibilities in the management of Public Conservation Land (PCL).²³

As outlined in the DOC's Climate Change Adaptation Action Plan and identified in the NCCRA, the magnitude of direct and indirect climate change impacts on the natural environment will depend on actions taken to reduce greenhouse gas emissions over the next decade. As such, in an effort to meet New Zealand's 2050 emission targets and mitigate the most severe impacts of climate change on PCL, climate resilient development is required.

This need to meet emission reduction targets is reflected in the Te Mana o te Taiao – ANZBS, where the effective delivery of New Zealand's Emission Reduction Plan and contribution to the Zero Carbon Act targets are listed as key actions to achieve Te Mana o te Taiao – ANZBS 2025 goals.²⁴ The Emission Reduction Plan recognises the “inextricably linked” climate and biodiversity crisis, acknowledging that aligning work on emission reduction and conservation is a significant opportunity to take strong action in both areas.

With over 8.6 million hectares of land containing a diversity of natural and historic resources, PCL must play a critical role in mitigating and adapting to the impacts of climate change to meet New Zealand's climate change and biodiversity commitments. The natural capital contained within PCL presents significant opportunities for New Zealand to reduce greenhouse gas emissions to achieve its 2050 emission targets – the two key opportunities being:

1. Removing and storing carbon from the atmosphere through the protection and enhancement of natural ecosystem carbon sinks; and
2. Preventing carbon emissions into the atmosphere by utilising the natural resources where appropriate to generate renewable energy.

How PCL is used and managed to support New Zealand's climate change response must be carefully considered to conserve the ecosystem services and biodiversity, while delivering on climate change response commitments. The pursuit of emission reductions without recognition of the interdependencies between climate, the natural environment, and human societies can limit the ability to adapt to climate change and drive maladaptation. These perverse outcomes further exacerbate climate change impacts and risks under continued climate change as illustrated in Figure 3a.

Through integrating adaptation measures with mitigation, harnessing synergies, and minimising trade-offs between adaptation and mitigation, climate resilient development considers the coupled systems of climate, the natural environment, and human society to advance sustainable development, as illustrated in Figure 3b. This approach aligns with the intent of the Emission Reduction Plan to ‘work with nature’, where actions to reduce emissions improve resilience of native ecosystems to climate change by mitigating the severity, whilst not directly or indirectly furthering the destruction of the local environment.²⁵

²³ Department of Conservation. 2020. Department of Conservation Climate Change Adaptation Action Plan

²⁴ Department of Conservation. 2022. Te Mana o Te Taiao – Aotearoa New Zealand Biodiversity Strategy Implementation Plan

²⁵ Ministry for the Environment. 2022. Emission Reduction Plan



Figure 3: From climate risk to climate resilient development.

(a) Main interactions and trends of climate change risks and impacts for continued global warming. Arrows colours represent principle human society interactions (blue), ecosystem interactions (green), and the impacts of climate change and human activities, including losses and damages, under continued climate change (red).

(b) Climate resilient development to reduce climate risk and limit global warming. Arrow colours represent human system interactions (blue), ecosystem interactions (green) and reduced impacts from climate change and human activities (grey). (From IPCC Working Group II)

4.2 Renewable Energy Generation on Public Conservation Land

Under the Conservation Act 1987, one of the core functions of the DOC is ‘to promote the benefits to present and future generations of the conservations of natural and historic resources generally and the natural and historic resources of New Zealand in particular’.²⁶ In light of the significant effects climate change is already having, and will continue to have, on New Zealand’s natural and historic resources, to fulfil the duties in the management of PCL, a balanced approach to climate change adaptation and mitigation must be enabled on PCL. This means resilience to the present and unavoidable impacts of climate change on the natural environment is increased, whilst emissions are reduced to mitigate the future impacts on the natural environment.

While in many cases, the emission reduction benefits of renewable energy generation do not directly impact regional conservation outcomes, the overall climate change mitigation offered by renewable energy generation do provide indirect benefits. Therefore, in considering the impacts of renewable energy generation on PCL values, a net-benefit approach should be considered.

In the case of the proposed Waitaha Hydro Scheme, the construction and operational effects of the proposed Scheme were agreed to be negligible to minor on the local environment values, including ecological values. Whereas the effects of continued climate change under a high-emission scenario on the natural environment are rated ‘major’ in the NCCRA.²⁷ Applying a net-benefit approach to the outcomes of the proposed Scheme, the indirect benefits of supporting New Zealand to meet its climate change targets and mitigate climate change risks are assessed as outweighing any adverse impacts it may have on the local environment. In other words, when viewed in the context of benefits to ‘present and future generations’, the Scheme is assessed to generate net-positive outcomes for the natural environment.

Whilst, in isolation the emission reduction benefits of any particular renewable energy generation project cannot prevent continued climate change alone, such projects contribute to the cumulative step change needed to bridge the implementation gap and get New Zealand’s emission trajectory on track to meet the 2050 commitments.

Given the scale of PCL in New Zealand, particularly in the West Coast region where it covers approximately 84% of region’s total area, PCL has an important role in supporting a fair and equitable transition to a low-emissions economy and environment. To achieve an equitable transition on the West Coast, the Government’s Emission Reduction Plan outlines key actions including supporting regions and communities to proactively plan and supporting local initiatives that boost transition-aligned growth and provide jobs in low-emissions industries. The Government’s commitment to an equitable transition is further recognised as a signatory of the ‘Supporting the Conditions for a Just Transition Internationally’ declaration at the 26th UN Climate Change Conference of the Parties.²⁸ Through working with nature on PCL to generate renewable energy with negligible to minor environmental impacts, the proposed Waitaha Hydro Scheme provides an opportunity to support the West Coast to make a equitable transition through the expansion the low-emission economy locally.

²⁶ Conservation Act 1987 section 6.

²⁷ Ministry for the Environment. 2020. National Climate Change Risk Assessment

²⁸ UN Climate Change Conference UK (COP 26 Glasgow). 2021. Supporting the Conditions for a Just Transition Internationally.

5.0 Role of Renewable Energy Generation in Mitigating Climate Change Impacts

5.1 Renewable Energy Generation in New Zealand's Climate Change Response

Low emission, renewable energy generation is a keystone of New Zealand's climate change response. To meet its climate change targets and transition to a low emission, climate resilient future requires changes to how people work and travel, the communities they live in, how food is produced, and how natural resources are managed.

Energy is a necessity within New Zealand's modern society. It is a critical input into all goods and services, and a fundamental enabler of everyday life. In 2019, energy use in New Zealand produced 34 MtCO_{2e}, 42% of New Zealand's gross emissions. Of this, only 30% of total energy consumption was renewable and the remaining 70% was from oil, gas, and coal.²⁹

As stated in the recent IPCC Working Group III report, in climate change mitigation scenarios likely to limit global warming to 2°C and below (and mitigate the most severe climate impacts to biodiversity), the transition of the energy sector to a low-carbon or carbon-zero state must be rapid.³⁰ It is an essential part in the transition of displacing fossil fuels with electricity and allows other sectors to reduce emissions.

As advised by the Climate Change Commission, without major expansion to the electricity system, the ability to electrify buildings, transportation, and industry will continue to be constrained. As the number of electric vehicles on New Zealand roads continues to increase and large buildings and process heat move away from fossil fuels, renewable energy generation needs to rapidly expand in the 2030's and beyond to meet this increased demand.

New Zealand is not on track to meet its climate change targets. The transition to a low-emissions, climate resilient New Zealand can begin in earnest. However, opportunities to reduce emissions with the tools available today needs to be realised immediately to set the country on track for accelerated emission reductions in future years.

The Emission Reduction Plan states the vision for a highly renewable, resilient, and reliable energy system as a critical component of achieving New Zealand's Emission Budgets. Action 11.2.1 to 'accelerate development of new renewable electricity generation across the economy' will help ensure the electricity system is ready to meet the future needs and enable other industries and sectors to transition away from fossil-fuels. The Plan recognises the vital role the energy sector presents to make immediate emission reductions and a key step to 'seize the opportunities of the transition' – one of the Government's five emission reduction overarching objectives.

²⁹ Ministry for the Environment. 2021. New Zealand's Greenhouse Gas Inventory 1990–2019. Wellington: Ministry for the Environment

³⁰ IPCC, 2022: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA

5.2 The Role of Waitaha Hydro Scheme in Climate Resilient Development

Multiple renewable energy options are available today to reduce emissions over the next decade and mitigate the long-term impacts of climate change. The technologies are mature, the natural capitals required are available, and the cost of implementation is quickly decreasing more than many other mitigation options.

If the New Zealand Government is to meet its emission reduction commitments whilst enabling the natural environment to adapt to the impacts of climate change, new renewable energy generation projects should consider climate resilient development principles (Figure 3b) to ensure outcomes deliver the greatest net benefit. When delivering these projects on PCL, the core consideration should be to minimise the trade-offs between emission reduction outcomes and the ability of biodiversity values to adapt to climate change. The proposed Waitaha Hydro Scheme appears to achieve the requirements of a climate resilient development of renewable energy generation on PCL.

Through the assessment of potential effects on the benthic aquatic ecology,³¹ fish,³² in-stream habitat,³³ Whio/Blue Duck,³⁴ lizards,³⁵ invertebrates,³⁶ indigenous vegetation,³⁷ and other terrestrial fauna,³⁸ the construction and operational effects of the Scheme were all assessed to be negligible to minor. As such, the risk that the Scheme would contribute to or exacerbate climate change impacts on the local environment or restrict adaptation pathways are low.

As a result, the proposed Waitaha Hydro Scheme would support meeting emission reduction requirements through the provision of renewable energy generation, whilst having only a negligible to minor risk of exacerbating existing biodiversity threats or limiting the ability to implement climate change adaptation strategies. Furthermore, with a long-term view to environmental management, any minor adverse effects of the Scheme on the local environment would be well offset by the positive impact mitigating climate change that the Scheme will have.

As stated in Erik Westergaard's Economic Viability Report, to meet the Government's emission reduction and decarbonisation targets, a total generation build of 3077MW of new capacity is required by 2030.³⁹ To achieve this almost all the proposed renewable energy generation projects must get built. With PCL covering approximately one third of New Zealand's land mass and around 84% of the West Coast region's total area, this unprecedented step-change will be unachievable on private land alone.

³¹ Proposed Waitaha Hydro Scheme Assessment of Environmental Effects: Benthic Ecology of the Waitaha Catchment

³² Proposed Waitaha Hydro Scheme Assessment of Environmental Effects: Fish of the Waitaha Catchment

³³ In-Stream Habitat Flow Assessment for the Waitaha River: Morgan Gorge to Douglas Creek

³⁴ Assessment of Environmental Effects of the Proposed Waitaha Hydro Scheme on Whio/Blue Duck

³⁵ An Assessment of the Potential Effect of the Propose Waitaha Hydro Scheme on the Lizard Fauna of the Lower Waitaha River, Westland

³⁶ Potential Effects of the Waitaha Hydro Scheme on Terrestrial Invertebrates

³⁷ Waitaha Hydro Scheme Terrestrial Flora Description and Assessment of Effects

³⁸ Assessment of the Potential Effects of the Proposed Waitaha Hydro Scheme on Vertebrate Fauna (Birds and Bats).

³⁹ Erik Westergaard report for Westpower Limited. 2022. New Zealand's electricity demand and supply scenarios, and electricity required to meet renewable electricity targets.

6.0 Conclusion

To conserve the natural and historical resources found on PCL and tackle New Zealand's biodiversity crisis, emission reductions must be pursued alongside adaptation efforts. This supports a holistic reduction to climate change risks to the natural environment, whereby resilience to climate change impacts can be enhanced whilst the magnitude of the risk exposure in the long-term is mitigated as far as possible.

Should New Zealand, alongside the rest of the world, fail to hold climate change to 1.5°C above pre-industrial levels, the severity of impacts on New Zealand biodiversity will be significant. Whilst some at-risk species and ecosystems may be adequately conserved through increased management intervention, there will remain many changes that conventional conservation tools and practices are unable to counter.

If the species and ecosystems present in the Waitaha catchment are to be protected and enhanced for future generations then all practicable efforts must be made to meet New Zealand's domestic and international climate change commitments. Opportunities to utilize PCL in a sustainable, low impact way cannot be delayed in hope of a 'silver bullet' technological advancement, it cannot be ignored in the expectation it will be achieved elsewhere, and the benefits it could indirectly provide to the natural environment cannot be overlooked.

Based on the negligible to minor environmental impacts the proposed Waitaha Hydro Scheme's construction and operation will have on environmental values, coupled with its important contribution toward meeting New Zealand's renewable energy generation requirements, the Scheme is assessed to generate net-positive outcomes for the natural environment. Through supporting the achievement of New Zealand's emission reduction targets and Te Mana o Te Taiao 2025 implementation plan, strategically the Scheme is a ready action in a 'joined up effort' to address the interdependent crises of climate change and biodiversity loss.

Appendix 1: Qualifications and Experience



SAM PARSONS

KAIHANGARAU | BUSINESS SERVICES, CLIMATE CHANGE SPECIALIST
SAM.PARSONS@BOFFAMISKELL.CO.NZ | +64 27 536 6826

TOHU MĀTAURANGA | EDUCATION

Bachelor of Applied Science,
Environmental Management,
University of Otago, New
Zealand,

NGĀ PUKENGA O MUA | EXPERIENCE 8 Years

NOHOANGA KA TIKI | SUITABILITY FOR THE ROLE

Sam is a climate change adaptation and mitigation specialist with experience in climate change response planning and delivery across New Zealand Government and the private sector.

Sam has experience in the development and application of innovative climate change impact assessment methodologies, creation of practical adaptation and mitigation action plans, and delivery of dynamic adaptive pathway planning processes. Previously holding the role of Climate Change Adaptation Programme Manager at the Department of Conservation (DOC), Sam specialises in working collaboratively with a diversity of community stakeholders for the delivery of climate change response initiatives in the natural and built environment.

With a background in conservation, outdoor recreation, and project management, Sam takes a strong outcomes-based approach to climate change response to support projects to deliver greatest net benefits. Sam emphasises the need for robust processes that clearly communicate climate change response requirements to inform practical mitigation actions that makes a difference.

Sam is currently based in Dunedin, leading Boffa Miskell's climate change response strategy.

PUKENGA WHAKARITE | MANAGEMENT SKILLS

Prior to joining Boffa Miskell, Sam led a team of climate change scientists and policy analysts in the development and implementation of DOC's Climate Change Adaptation Action Plan. In this role, he was responsible for the strategic implementation of adaptation action across DOC's portfolio including biodiversity, historic heritage, recreational values, and regulatory functions of Public Conservation Lands and Water.

PUKENGA HANGARAU | TECHNICAL SKILLS

- Analysis of climate change projections and impacts on sectors and values.
- Assessment of project outcomes in relation to national climate change targets and emission reduction commitments.
- The application of dynamic adaptive pathway planning processes in multi-hazard environments.
- The delivery of fit for purpose climate change risk and vulnerability assessment methodologies, aligning with international standards.
- Development of holistic climate change strategies and action plans.
- Facilitating stakeholder engagement in climate change response initiatives.
- Effective climate change communication, both written and verbal.
- Strong climate change policy and national planning awareness.
- Fostering collaborative partnerships and account management.

TŪMAHI WHEAKO | PROFESSIONAL EXPERIENCE

PROGRAMME MANAGER, CLIMATE CHANGE ADAPTATION ACTION PLAN, DEPARTMENT OF CONSERVATION, JUNE 2020: Programme Manager for the development of DOC's Climate Change Adaptation Action Plan, a comprehensive action plan to guide DOC's management activities to increase resilience across their portfolio. This involved leading the climate change writing team, facilitating a cross-discipline technical advisory group, and leading external engagement to socialise and refine adaptation actions.

PROGRAMME MANAGER, CLIMATE CHANGE RISK ASSESSMENT & ADAPTATION PLAN FOR TASMAN GLACIER HUTS, DEPARTMENT OF CONSERVATION, APRIL 2021: Programme Manager, leading the climate change risk assessment and adaptation action planning for alpine huts located on the Tasman Glacier, Aoraki Mount Cook National Park. The project involved engaging a wide range of internal and external stakeholder to participate in an innovative climate change vulnerability assessment and facilitating a workshop to co-design dynamic adaptive pathway plans (DAPP). The project was one of the first applications of DAPP for informing adaptation action for alpine infrastructure.

STAKEHOLDER REPRESENTATIVE, NATIONAL CLIMATE CHANGE RISK ASSESSMENT & NATIONAL ADAPTATION PLAN, CENTRAL GOVERNMENT, NOVEMBER 2019 – DECEMBER 2021: Leading representation for the Department of Conservation in the development and writing of the National Climate Change Risk Assessment and the subsequent National Adaptation Plan. This included participation in cross government workshops and planning forums and provided technical expertise for risk assessment and adaptation planning concerning the natural environment domain.

PROGRAMME MANAGER, CLIMATE CHANGE RISK ASSESSMENT & ADAPTATION GUIDANCE FOR SOUTH WESTLAND DESTINATION MANAGEMENT, DEPARTMENT OF CONSERVATION, JUNE 2021 : Programme Manager, leading the climate change risk assessment and development of adaptation guidance for a range of visitor destinations located between Haast and Hokitika, including Franz Josef and Fox Glacier destinations. The project involved leading a technical advisory team in the delivery of a climate change risk assessments for selected sights along the South Westland 'visitor journey', analysis for assessment results, and development of practical adaptation guidance and recommended next steps.

MAHINGA O MUA | BACKGROUND

2022 to present

Climate Change Specialist, Boffa Miskell, Dunedin

2019 - 2022

Climate Change Programme Manager, Department of Conservation, Dunedin

2017 - 2020

Commercial Partnerships Manager, Department of Conservation, Christchurch/Dunedin

2015 - 2017

Project Manager, Department of Conservation, Queenstown



STEPHEN FULLER

KAIHAUROI | ECOLOGIST, PARTNER

STEPHEN.FULLER @BOFFAMISKELL.CO.NZ | +64 27 2225741

TOHU MĀTAURANGA | EDUCATION

Bachelor of Science (Terrestrial Ecology), Victoria University, 1983

Diploma of Applied Science (Botany, Pedology), Victoria University, 1987

NGĀ PUKENGA O MUA | EXPERIENCE

30 Years +

PROFESSIONAL AFFILIATIONS

Member, Environmental Institute of Australia and NZ

Member, NZ Botanical Society

Certified Environmental Practitioner with the Environment Institute of Australia and New Zealand

AREAS OF EXPERTISE

Biological Survey and Resource Inventory

Ecological Impact Assessment

Design Collaboration and Consultation

Ecosystem Research and Monitoring

Reserve Design, Feasibility, and Management.

Project Management

NOHOANGA KA TIKI | SUITABILITY FOR THE ROLE

Stephen is a senior ecologist and Partner with Boffa Miskell Limited (BML). He has worked as an ecologist since 1983 including early employment as a scientist with the Department of Lands and Survey, and Botany Division of DSIR. From 1992 to 1997 he ran his own ecological consultancy. From 1997 to 2002 he was the general manager of the Karori Wildlife Sanctuary (now Zealandia). In November 2002 he joined Boffa Miskell.

While at Boffa Miskell, Stephen has specialised in developing ecological impact assessments for large scale infrastructure projects including the determination and design of mitigation requirements and ecological restoration. A key focus for this work has been the assessment, consenting and post construction monitoring of wind farms.

His projects usually require working collaboratively with planners, stormwater and civil engineers, landscape architects and urban designers to integrate community services, physical works, and public open space with protection of significant natural areas, rare and threatened flora and fauna, the creation of conservation corridors, and sensitive treatment of stormwater.

PUKENGA WHAKARITE | MANAGEMENT SKILLS

From 1995 to 2002 Stephen was first the Project Manager, and later the General Manager for the Karori Wildlife Sanctuary Trust (Zealandia) responsible for the design and construction of Zealandia in Wellington.

While at BML Stephen has been project manager for many projects coordinating large field teams across multiple ecological disciplines.

Much of Stephens work has required the design and implementation of scientifically robust biological monitoring programmes both as part of the assessment of effects, and to monitor ecological systems during and post construction to confirm the outcomes of his assessments, and the effectiveness of his recommended mitigation. For some complex projects, this has required coordination of large field teams and the management and analysis of large data sets.

PUKENGA HANGARAU | TECHNICAL SKILLS

Stephen has extensive experience in conducting biological and ecological surveys for inventory purposes; mapping and describing vegetation, soils and freshwater systems; surveying avifauna, bats, terrestrial invertebrates and freshwater fish; preparing descriptions of natural values and threats; assessing ecological and biodiversity significance; and designing and developing practical management and mitigation strategies.

MAHINGA O MUA BACKGROUND

2002 to present

Partner, Senior Ecologist,
Managing Principal Boffa Miskell
Ltd, Wellington

1993 - 2002

General Manger, Karori Wildlife
Sanctuary Trust (Inc), Wellington

1991 - 1997

Established S.A. Fuller &
Associates, Ecological Consultants,
Wellington

1989 - 1991

National Executive Officer,
Federated Mountain Clubs of NZ,
Wellington

1986 - 1988

Post Graduate Research, Victoria
University, Pedology & Plant
Ecology, Wellington

1984 - 1986

Scientist, DSIR. Kapiti Island
Vegetation Mapping and
publication, Wellington

1983 - 1984

Scientist, Department of Lands &
Survey. Scenic Reserve Surveys,
Wellington

1980 - 1983

Graduate Degree, Victoria
University of Wellington; Animal
Ecology

TŪMAHI WHEAKO | PROFESSIONAL EXPERIENCE

BIOLOGICAL INVESTIGATIONS: Stephen has prepared biological inventories and carried out biological surveys of scenic reserves in the lower and central North Island. He also surveyed areas of vacant Crown Land to assess their potential for reserve status. His surveys included soil and vegetation mapping, streams, and various fauna studies (birds, terrestrial invertebrates, mammalian pests, freshwater fish and macro-invertebrates).

SUSTAINABLE ENERGY: Stephen has prepared the ecological assessments and presented evidence at Council consent hearings for eight commercial wind farms, including the Te Apati Wind Farm, Project West Wind, Titokura Wind Farm, Te Waka Wind Farm, Project Mill Creek, Taharoa Wind Farm, Project Central Wind and Waverley Wind Farm.

Stephen has presented regularly at the national Wind Energy Conference on windfarm – avifauna and bat interactions. In 2008 he reviewed EECA guidance for windfarm projects and in 2011 assisted in the development of national guidance for windfarm consenting for NZWEA. In 2012 he presented on the use of radar for windfarm avifauna assessments at the AUSWEA conference in Melbourne. In 2014 he co-authored a paper in the NZ Journal of Zoology on the results of post construction mortality monitoring at West Wind Windfarm.

RESTORATION ECOLOGY: Stephen has advised a number of groups and agencies on major restoration projects, assisting in the preparation of restoration strategies and restoration plans.

He has designed significant restoration projects as part of the remediation and mitigation of effects identified as part of Ecological Impact Assessments, for example creating 40 ha of new wetland and freshwater habitat, and rehabilitation of 6.3km of lowland stream for the M2PP Expressway, and a 600ha retirement and restoration project for Transmission Gully Expressway which has restored 32km of perennial and intermittent streams.

Stephen has also provided advice on a number of fenced sanctuary proposals, most recently contributing to a feasibility study for the Puketaha Wainuiomata Ecosanctuary project in Wellington.

ENVIRONMENTAL POLICY & PLANNING: Stephen has regularly appeared as a witness at council, Environment Court and Board of Enquiry hearings on ecological impact assessment, significance assessment and implications of plan changes for various nationally and regionally significant activities, acting as both a reviewer for the statutory agency or providing expert advice for a submitter. This has typically involved causing with other experts.

In 2018 Stephen co-authored the 2nd Edition of the “Ecological Impact Assessment (EclA) guidelines for use in New Zealand: terrestrial and freshwater ecosystems” for the Environmental INstitut5e for Australia and New Zealand.

Stephen has also participated in the development of guidelines on biodiversity offsetting.



About Boffa Miskell

Boffa Miskell is a New Zealand owned professional services consultancy with offices in Whangarei, Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin, and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping.

www.boffamiskell.co.nz

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