



**Evaluating Strategic Risks in the Pacific Islands:
An Analysis of Policies and Best Practices from the
United States Department of Defense and New
Zealand Defence Force to Achieve Operational and
Infrastructure Resilience**

Prepared by

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Nā,

Paul Holland
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Executive Summary

In 2018, the Pacific Island countries and territories identified climate change as the single greatest threat to their livelihoods, security, and wellbeing. As both New Zealand and the United States develop policy approaches to address the threat, this report outlines examples and opportunities to address climate security and resilience. This report identifies the following key problem statement: losing sight of the impacts of climate change could undermine the credibility of partner countries and create space for new actors to expand their influence within the region.

To address this problem statement, the report includes six focus areas. These areas generally align with the lines of effort for previously issued climate-related strategic plans and policy documents published by New Zealand's Ministry of Defence, the New Zealand Defence Force, and the United States Department of Defense. They are also informed by my research and professional experience. These focus areas include:

- Data
- Investment
- Infrastructure
- Engagement
- Policy and Guidance
- Education and Training

Within each of these focus areas, the report provides a high-level overview of the focus area, discusses the background and highlights specific examples from the United States and New Zealand, and includes recommendations for each focus area. Overall, the report includes 14 recommendations for consideration by the New Zealand Defence Force. Additionally, the report includes a set of six areas for future consideration by the New Zealand Defence Force. These areas, included in Section 7 of the report, are listed in priority order. Finally, the report includes a Strengths, Weaknesses, Opportunities, and Threats analysis in Appendix 1.

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Introduction

Climate change is a global challenge that will directly impact Aotearoa New Zealand and partner nations in the South Pacific. In 2018, leaders from across the region issued the Boe Declaration, which affirmed climate change as “the single greatest threat to the livelihoods, security, and wellbeing of the peoples of the Pacific.”¹ In 2022, the Pacific Islands Forum’s 2050 Strategy for the Blue Continent re-affirmed the 2018 Boe Declaration and urged collective action on climate change as an issue of significance.²

New Zealand’s climate security efforts follow a similar timeline. In 2018, the Ministry of Defence (MOD) and Te Ope Kātua o Aotearoa | New Zealand Defence Force (NZDF)³ jointly published the Climate Crisis: Defence Readiness and Response defence assessment, which concluded that NZDF needs to be positioned to respond to more frequent, possibly concurrent, and more complex security events because of climate change. The following year, in 2019, MOD and NZDF jointly published Responding to the Climate Crisis: An Implementation Plan, and New Zealand passed the Climate Change Response (Zero Carbon) Amendment Act. The Act provides a framework by which New Zealand can 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 increase to 1.5° Celsius above pre-industrial levels;
- Allow New Zealand to prepare for, and adapt to, the effects of climate change.

In 2023, the NZDF Defence Policy and Strategy Statement identified climate change and strategic competition as the two principal strategic challenges currently facing New Zealand and the Pacific Islands over the next 20 years. The statement reiterated the strategic impact of climate change, declaring “addressing the impacts of climate change will be one of the greatest global challenges of coming decades.”⁴ In 2024, NZDF published the Tauākī Whakamaunga Atu | Statement of Intent which covers the period FY 2024/25 to FY 2027/28. The Statement acknowledges that the intensifying impacts of climate change present direct environmental and human security risks.⁵ Most recently, the Defence Capability Plan, published in April 2025, reiterated climate

¹ Boe Declaration on Regional Security (5 September 2018)

² 2050 Strategy for the Blue Pacific Continent (5 August 2022)

³ A note on Māori and English language spelling. For Māori names, I have introduced these at the first mention, including for government agencies and published documents. For English language spelling, I use the New Zealand spelling where appropriate, such as New Zealand *Defence* Force and Climate Change Response *Programme*. I use the American spelling where appropriate, such as the Department of *Defense* or National Defense *Authorization* Act.

⁴ Defence Policy Review: Defence Policy and Strategy Statement 2023 (4 August 2023)

⁵ Tauākī Whakamaunga Atu | Statement of Intent for the Period Ending 30 June 2028 (August 2024).

change and strategic competition in the Pacific as key elements of regional security challenges.

The United States Department of Defense (DoD) has also long recognised the challenges associated with climate change. As early as the Nixon Administration (1969-1974), government officials and think tanks were considering the security implications of a range of environmental factors, including the accelerating impact of climate change. The last two decades have seen DoD issue a growing number of strategies and plans that highlight the increasing levels of concern about climate and the associated security risks.⁶

The DoD has long been committed to working with allies, partners, and like-minded nations in the Indo-Pacific region to uphold a free and open region founded on respect for internal rules, laws, and norms.⁷ Despite senior DoD leaders recently downplaying the security risks associated with climate change,⁸ consideration of the effects of climate change are a critical aspect of collaboration between the DoD and Indo-Pacific countries.

Report Thesis and Structure

Climate change, along with Strategic Competition,⁹ is one of the two principal security challenges facing New Zealand. To maintain influence among Pacific Island countries and territories, New Zealand should focus on climate policy and recognise the importance of the issues to the Pacific Islands.¹⁰ This report identifies the following key problem statement: *losing sight of the impacts of climate change could undermine*

⁶ Climate Change, Water, the Environment and National Security: An Annotated History of the US Defense, Intelligence, and Security Assessments (1 May 2025).

⁷ Indo-Pacific Strategy of the United States (February 2022). According to the United States Indo-Pacific Command (USINDOPACOM) there are 38 nations comprising the Asia-Pacific region. It encompasses 52 per cent of the earth's surface, home to 50 per cent of the world's population.

⁸ Hegseth Orders Elimination of Climate Defense Planning but Still Wants Extreme Weather Preparation (21 March 2025). Despite removing "references to climate change and related subjects," an 18 March 2025 memo issued by the Secretary of Defense, Pete Hegseth, made exceptions for climate-related efforts, including hardening US military installations against extreme weather, assessing weather-related impacts on operations, mitigating weather-related risks, or conducting environmental assessments.

⁹ Tauākī Whakamaunga Atu | Statement of Intent July 2024 - June 2028 (August 2024). The Statement of Intent loosely defines the term "Strategic Competition" as states "acting in ways counter to the recognised international rules and norms and advancing competing visions for regional and global orders that are at odds with New Zealand's values and interests."

¹⁰ The Pacific Islands Forum (n.d.). For the purposes of this report, I use the terms "Pacific Islands" or "Pacific Island countries and territories." I use the term "Pacific Islands" to refer to the broader region. I use the term "Pacific Island countries and territories" when I want to reference specific nations within the Pacific Islands region. These terms refer to the 18 member countries of the Pacific Islands Forum: Australia, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Kiribati, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

*credibility of partner countries and create space for new actors to expand their influence within the region.*¹¹

This report is the product of a combination of research methods. Over the course of five months, I conducted an extensive literature review, visited and met with local experts at five NZDF camps and bases, attended the Te Kōkiringa Taumata | New Zealand Planning Institute Annual Conference in Invercargill, and engaged with thematic experts across the defence and climate change fields in New Zealand and the United States. Finally, the report is informed by my two decades of professional experience as a land use planner supporting senior executives responsible for installation and infrastructure management across the DoD.

The report analyses six focus areas. These focus areas closely align with the “lines of effort” in the DoD Climate Adaptation Plan 2024-2027.¹² The focus areas were also informed by my professional experience and the research methods detailed above, including the literature review, site visits, and expert meetings. Each of the focus areas identified below includes an overview, discussion, and outcome-oriented recommendations:

- Data: Identifying cost-effective and consistent data and tools to inform current and future climate decision-making;
- Investment: Evaluating existing processes to prioritise climate resilience for operational and built infrastructure projects at NZDF bases and camps;
- Infrastructure: Ensuring climate resilient infrastructure assets that serve as “power projection platforms” from which NZDF operations are launched, and strategic objectives achieved;
- Engagement: Exploring opportunities for improved collaboration with local stakeholders on climate adaptation and resilience – this could include engagement with local government and Iwi and Hapū representatives;
- Policy and Guidance: Highlighting existing opportunities within strategy, policy, and planning governance structures to improve climate resilience;
- Education and Training: Advancing an appropriate and tailored approach to climate-related education and training.

In addition to these focus areas, the report provides six prioritised areas for future consideration by NZDF. Also, included in Appendix A of the report is a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. This SWOT analysis builds

¹¹ Cook Islands China Deal Riles Allies as West’s Grip Loosens (28 February 2025). This is one example of recent developments that could impact the strategic position of New Zealand and the United States.

¹² DoD Climate Adaptation Plan 2024-2027 (5 September 2024). This Plan identifies five major lines of effort. These lines of effort were prioritised by DoD and “enable the DoD to operate under changing climate conditions, preserve operational capability, and enhance the natural and man-made systems essential to the Department’s success.” The lines of effort are (1) climate-informed decision-making; (2) train and equip a climate-ready force; (3) resilient built and natural installation infrastructure; (4) supply chain resilience and innovation; and (5) enhance adaptation and resilience through collaboration.

off my research and report findings to provide a potential way ahead for NZDF to implement and prioritise the report's recommendations.

The recommendations proposed in this report include actions designed to address the report's key problem statement: losing sight of the impacts of climate change could undermine regional security and create space for new actors to expand their influence in the Pacific Islands. Given the importance of climate change to the Pacific Island countries and territories, New Zealand, and the broader region would benefit from a stronger commitment to addressing climate change. Such a commitment by NZDF, MOD, and other ministries across the New Zealand government, would strengthen regional stability, promote New Zealand's values and interests, and address the Pacific Islands Forum's greatest threat: climate change. Future collaboration between the United States and New Zealand on climate change could address strategic competition, reinforce New Zealand and United States credibility among the Pacific Islands, and reduce opportunities for new strategic competitors to emerge in the region.

1 Data

Overview: Utilising the best available and accessible climate data will support climate-informed decision-making across NZDF.

Discussion: Reliable and consistent data is critical for an effective climate change strategy. Without reliable data, government organisations in both New Zealand and the United States will struggle to establish a climate strategy, assess climate-management actions, track progress, and monitor current and future climate risks. Recent research has identified two key challenges with climate data: gaps in established data sets and 'missing' data.¹³

Policymakers in the United States have sought to address the reliability and consistency issue by standardising climate data across the DoD. Section 326 of the Fiscal Year (FY) 2020 National Defense Authorization Act directed the DoD to develop an extreme weather-vulnerability and risk-assessment tool. This tool, known as the DoD Climate Assessment Tool (DCAT), provides United States Military Departments, and their installation personnel with access to consistent exposure data across climate and extreme weather hazards. While DCAT only assesses exposure to climate hazards, and does not assess climate vulnerability,¹⁴ it is a consistent and reliable data source. The DoD has historically shared DCAT with key allies, including Australia, and the tool supports efforts to achieve climate resilience for military infrastructure.

Additional climate data resources exist within the military departments in the United States. The United States Department of the Air Force (DAF) 14th Weather Squadron (14th WS) is the DoD's only climate operations organisation and the owner of the DoD's sole climatological archive. 14th WS personnel provide weather and climate

¹³ Closing Climate and Disaster Data Gaps: New Challenges, New Thinking (2023).

¹⁴ Final Assessment of the Extreme Weather and Climate Change Vulnerability and Risk Assessment Tool (March 2021).

subject matter expertise to the strategic, operational, and tactical elements of warfighting. The Squadron's specialised data systems collect, control, and store 3 million global weather observations per day. 14th WS climate experts utilise this extensive data to provide tailored support, monitor near-term impacts that could affect normal weather patterns, and long-term projections that account for a changing climate. Data experts with the 14th WS are responsible for developing, operating, and safeguarding the tools, databases, and backups for this unique data.¹⁵

In New Zealand, Defence Science and Technology (DST) is a key climate data actor and provides technical and scientific advice to NZDF and MOD. DST's Information Warfare Division supports efforts to respond to a changing climate, decrease operational risk, and achieve compliance with legislation and regulation. Beyond NZDF and MOD, the National Institute of Water and Atmospheric Research (NIWA) maintains the national climate database for New Zealand. The data includes observational, derived, and spatial data types for three main categories: marine, freshwater, and climate. The Meteorological Service of New Zealand Limited (Met Service) is a state-owned enterprise that provides weather forecasts and related information services to both the public and private-sector clients. A merger between NIWA and the Met Service is anticipated to occur through legislation which will be introduced in mid-2025. Other potential partners within the New Zealand government include the Ministry of Foreign Affairs and Trade (MFAT) and the Climate Change Commission, which conducts research and analysis of the different factors that can affect New Zealand emissions and the potential impacts of climate change.

Recommendation 1: NZDF could engage with the 14th WS to increase awareness and understanding of existing climate and weather data sets and tools maintained by the DoD. This includes greater awareness of the data available to monitor climate impacts in the Pacific Islands. Such engagement could result in strengthened collaboration between the two organisations, and increased NZDF awareness of potential opportunities within NZDF data management systems to achieve climate data efficiencies and improve site-level data collection across the Force. Future engagement should also include DST, NIWA, and other New Zealand ministries.

Recommendation 2: NZDF could consider prioritising the development of the internal data management processes to track climate impacts across NZDF bases and camps. This could include a focus on opportunities for expanded domestic data management partnerships with NIWA. More localised data collection and monitoring would help widen awareness of climate impacts across NZDF and promote collaboration at the base and camp level. NZDF should also facilitate the data transfer process across IT systems. Given existing relationships and familiarity with climate data, DST could benefit from greater collaboration with NZDF Defence Estate and Infrastructure to advance these discussions.

¹⁵ 14th Weather Squadron Fact Sheet (August 2022).

2 Investment

Overview: Ensuring the climate resilience of NZDF camps and bases provides the foundation from which operations are launched, and strategic objectives achieved.

Discussion: The Defence Estate is maintained on behalf of the government by NZDF¹⁶ and provides training, working, and living environments that directly enable military operations.¹⁷ The estate covers 81,000 hectares across nine camps and bases, two large training areas, and various regional support facilities. It comprises more than 4,700 buildings.¹⁸ The land and building value of the NZDF defence estate, as of 2024, was estimated at \$4.777 billion NZ dollars.¹⁹ However the condition of the estate is a concern. It is estimated that over 70 per cent of the Defence Estate has less than 20 years remaining of useful life, and 10 per cent is already beyond its designated life. The age of the estate leaves it vulnerable to unplanned events, including climate-driven impacts, which then require a reactive response.²⁰ As NZDF has stated, “without continued investment in assets at camps and bases, regional facilities, and training locations, the Defence Force will need to reset expectations of its contribution to delivering the Government’s defence policy priorities.”²¹ To address these infrastructure challenges, the Defence Estate Regeneration Programme (DERP) is the overarching programme for managing the regeneration of the Defence Estate to ensure it is fit-for-purpose. DERP investments are focused on compliance, health, safety, security, and maintaining asset usefulness.²² This whole-of-government approach includes He Whakakaupapa mō Te Hanganga o Aotearoa | The New Zealand Infrastructure Action Plan, which highlights the role of DERP in renewing New Zealand’s infrastructure to protect and enhance the security of New Zealanders.²³

The New Zealand Infrastructure Action Plan also identifies NZDF as a key partner in the effort to reduce greenhouse gas emissions.²⁴ The Plan includes an action to realise

¹⁶ 2025 Defence Capability Plan (5 April 2025).

¹⁷ Pūrongo ā tau Annual Report 2024 (27 September 2024).

¹⁸ NZDF Defence Estate and Infrastructure Strategy: Defence Estate to 2025 (6 June 2019).

¹⁹ 2025 Defence Capability Plan (5 April 2025).

²⁰ Pūrongo ā tau Annual Report 2024 (27 September 2024).

²¹ First Principles Review Defence Estate, Investment Priorities and Future Naval Base (November 2022).

²² 2025 Defence Capability Plan (5 April 2025).

²³ He Whakakaupapa mō Te Hanganga o Aotearoa | The Infrastructure Action Plan (May 2023).

²⁴ NZDF Emissions Reduction Plan (30 November 2022). The NZDF Emissions Reduction Plan, published in November 2022, sets out a range of initiatives the NZDF is taking to reduce the emission of greenhouse gases. It was developed as a starting point and sets the ‘direction of travel’ for NZDF on the priority task of addressing the reduction of gross emissions.

cross-sector opportunities to reduce whole-of-life embodied carbon emissions²⁵ and opportunities to minimise waste or recovery during the building consent process.²⁶ The NZDF Emissions Reduction Plan calls for the organisation to continue application of the NZDF Sustainable Infrastructure Standards.²⁷ The standards operationalise NZDF's sustainability aspirations into practical, technical expectations which can be integrated into future building design and construction practices. The standards also have the opportunity to improve the quality of life for NZDF personnel and communities. NZDF's usage of the standards should result in emissions reductions in operational energy, electricity and waste emissions, and embodied material and construction emissions.²⁸

While the scale of the DoD is significantly larger than the NZDF²⁹, there are similar infrastructure management challenges in the United States. These challenges include aging infrastructure, deferred maintenance, and long-term asset management challenges. In 2023, staff from the United States Government Accountability Office testified before the United States Senate that the DoD has at least \$137 billion in deferred facility maintenance costs.³⁰ In response to these infrastructure challenges, the DoD issued the Resilient and Healthy Defense Communities (RHDC) Strategy and Implementation Plan, both published in 2024. These documents help inform DoD investment priorities and strengthen the link between resilient, climate-ready infrastructure and quality of life. The goals of the RHDC strategy include adopting human-centred requirements, optimising the DoD footprint, transforming portfolio management, and integrating installations with their nearby communities.³¹ The RHDC Implementation Plan establishes climate resilience as a key criterion in future investment decisions and identifies specific outcomes, timelines, lead organisations, and metrics for each level of effort.

²⁵ Whole-of-Life Embodied Carbon Emissions Reduction Framework (August 2020). The Framework defines whole-of-life embodied carbon emissions" as "all carbon emissions attributable to the building itself, i.e. the construction materials and products across the life cycle of the buildings. This includes emissions across the full supply chain of construction materials and products, construction processes (and the waste arising), repair and maintenance, and processes at the end-of-life of a building.

²⁶ He Whakakaupapa mō Te Hanganga o Aotearoa | The Infrastructure Action Plan (May 2023).

²⁷ NZDF Emissions Reduction Plan (30 November 2022).

²⁸ Ibid.

²⁹ Real Property and Infrastructure Data (n.d.). According to the Office of Real Property and Infrastructure Data in the Office of the Assistant Secretary of Defense for Energy, Installations, and Environment, DoD's real estate portfolio is the largest in the federal government. This includes more than 710,000 assets (buildings, structures, and linear structures) located on over 4,800 sites worldwide on more than 26 million acres (approximately 10.5 million hectares) of land.

³⁰ Testimony Before the Subcommittee on Readiness and Management Support, Committee on Armed Services, US Senate (19 April 2023).

³¹ Resilient and Healthy Defense Communities Implementation Plan (21 November 2024).

In December 2024, the DoD issued DoD Instruction 4715.28, Military Installation Resilience. This instruction directs the military departments to consider “all-hazard resilience” in design and construction when facilities are sustained, repaired, and modernized. To achieve climate resilience, the Instruction directs the prioritisation of materials that reduce carbon footprint, increase structural life cycle, reduce maintenance costs, and reduce energy demand.³²

Among the military services, the DAF published the Infrastructure Investment Action Plan (I2AP) in December 2024. The I2AP identifies a strategic approach to invest in mission-critical facilities, including airfields, water and energy systems, and other critical base facilities. Given the challenges associated with Strategic Competition, termed Great Power Competition by the DAF, the I2AP focuses efforts on DAF installations as the foundation of combat readiness and describes both enduring and expeditionary installations as “power projection platforms.”³³ The I2AP also identifies the operational impacts associated with chronic shortfalls in infrastructure investments. A key recommendation of the I2AP is leveraging partnership opportunities to reduce operating costs and increase resilience at Air Force installations.³⁴

Both NZDF and DoD have a shared challenge: aging infrastructure and increasing costs associated with maintaining that infrastructure. As future investments are prioritised, collaboration on climate resilience will assist both organisations in addressing this challenge.

Recommendation 1: NZDF could consider integrating climate resilience as a criterion for future acquisition and funding prioritisation processes. This includes both Multi-Criteria Decision Analyses for future funding priorities and the military capability components of PRICIE³⁵: personnel; research and development; infrastructure and organisations; concepts, doctrine, and training; information technology; and equipment, logistics, and resources. Specifically, NZDF could update the Multi-Criteria Decision Analysis set in the next iteration of the Defence Estate Regeneration Implementation Plan³⁶ to include climate resilience criteria, including the prioritisation of materials that reduce carbon footprint, increase structural life cycle, reduce maintenance cost, and reduce energy demand. The Capability Management System utilises Multi-Criteria

³² DoD Instruction 4715.28, Military Installation Resilience (17 December 2024).

³³ Air Force Installation and Mission Support Center – Strategic Plan 2023 (2023). Within the DAF, installations are viewed as vital power projection platforms that enable forces and weapons systems to fly, fight, and win from anywhere in the world.

³⁴ Infrastructure Investment Action Plan (November 2024). Additional details, including specific examples of successful community partnerships that support infrastructure and installations, can be found in the “Engagement” section of this document.

³⁵ New Zealand Defence Doctrine (November 2017). PRICIE represents the components of NZDF’s Capability Management Framework. As outlined in the New Zealand Defence Doctrine, the components of PRICIE enable a military force to successfully achieve an operational objective or task.

³⁶ Defence Estate Regeneration Implementation Plan: 2019-2035 (27 May 2019).

Decision Analysis and PRICIE matrix which would both benefit from the inclusion of climate prompts or climate consideration points.

3 Infrastructure

Overview: NZDF camps and bases serve as the “power projection platforms” for the Force’s operational activities. NZDF’s Defence Estate Climate Adaptation Planning (DECAP)³⁷ is an innovative tool to evaluate current impacts and planning at major NZDF sites and to address future climate risks.

Discussion: The DECAP is a tailored approach to adaptation planning which combines best practice process elements from Manatū Mō Te Taiao | Ministry for the Environment guidance and NZDF Defence Force Instruction (DFI) 0.81 – Risk Management. These documents provide the policy foundation to understand, describe, assess severity, and plan to adapt for risks posed by climate change hazards at each major NZDF camp, base, and training area. In the United States, the Department of the Air Force Instruction, DAFI 90-802, Risk Management, similarly establishes the framework to screen and assess the current and future risk to an Air Force installation. Through a risk assessment matrix, the probability and severity of risks are evaluated to determine the corresponding risk level.

In the United States, the Air Force is developing component plans for extreme weather events in response to legislative requirements established by the FY2020 and FY2022 National Defense Authorization Acts. The Act required the military services to include a Military Installation Resilience Component within the Installation Development Plan.³⁸ The Military Installation Resilience Components are the Air Force tool to avoid, prepare for, minimise the effect of, adapt to, and recover from extreme weather events.³⁹

When comparing the previously developed Military Installation Resilience Components and NZDF site-specific DECAPs, the DECAPs provide significant analytic detail. DECAP is the outcome of a clear and deliberate process to evaluate the exposure of NZDF sites to climate hazards, and potential consequences for the estate and NZDF operations. DECAP successfully integrates compelling visual graphics to establish the narrative around climate change at NZDF camps and bases. In particular, DECAP’s Dynamic Adaptive Pathway Plan (DAPP) methodology enables a flexible approach and assesses each pathway over time, including the ability to change course when options can no longer meet the stated objectives. In contrast, DAF installation

³⁷ Defence Estate Climate Adaptation Planning refers to the overall workstream to address climate impacts on the Defence Estate. Site-specific plans, which include Climate Change Risk Assessments and Adaptation Planning, are also referred to as DECAP in parts of this report.

³⁸ Department of the Air Force Instruction 32-1015, Integrated Installation Planning (11 April 2025) defines Installation Development Plans as the equivalent of a real property master plan, and is the primary planning product required, at minimum, for each military installation.

³⁹ Ibid.

planning could benefit from applying the additional analytical rigour of the DAPP methodology to evaluate future pathways and responses to extreme weather exposure.⁴⁰

Beyond domestic infrastructure considerations, as those discussed above, dual-use infrastructure development could directly impact strategic competition in the Pacific Islands. Recently, scholars have argued that actors looking to expand their influence in the Pacific Islands are funding and developing assets (including ports, fisheries, aviation, and digital infrastructure) that could be weaponised to achieve strategic objectives. Dual-use infrastructure could be utilised as a force multiplier and could disrupt joint mobilisation among regional actors.⁴¹

Recommendation 1: Pending the completion of site-specific DECAPs, NZDF could identify and aggregate the high-level recommendations across the Defence Estate and develop a DECAP Action Plan. For each specific recommendation identified in the DECAP Action Plan, the following information could be included: (1) desired recommendation outcome; (2) office/organisation of primary responsibility; (3) office/organisation of coordinating/secondary responsibility; (4) external partners; (5) specific actions with expected completion dates for each action; (6) performance metric(s); and (7) policy drivers and requirements.

Recommendation 2: Update NZDF strategy, policies, and plans to implement DECAP recommendations. This includes establishing metrics and action owners who will: implement DECAP monitoring recommendations, update Infrastructure Master Plans to reflect DECAP findings, and highlight the signals, triggers, and thresholds that will drive actions related to DAPP recommendations.

4 Engagement

Overview: Improved collaboration with external stakeholders, including communities, non-governmental organisations, and Iwi and Hapū, on adaptation and resilience projects will strengthen the NZDF response to the climate crisis.

Discussion: During my Axford Fellowship, I conducted five site visits to New Zealand Defence Force bases and camps. These included Devonport Naval Base, Waiouru Military Camp and Training Area, Burnham Military Camp, Royal New Zealand Air Force (RNZAF) Base Ohakea, and RNZAF Base Auckland Whenuapai. I also met with community leaders in Palmerston North, the host community for Linton Military Camp. Through these site visits and local expert meetings, NZDF staff and uniformed leaders discussed ongoing engagement efforts with local communities to manage the impacts associated with climate change. Within NZDF, this engagement function is often the purview of the Base or Camp Commander, in consultation with Defence Estate and Infrastructure experts. However, there is limited opportunity to brief Base or Camp Commanders on community engagement as they begin their command assignments.

⁴⁰ Preparing for Coastal Change: A Summary of Coastal Hazards and Climate Change Guidance for Local Government (1 December 2017).

⁴¹ China's Dual-Use Infrastructure in the Pacific (14 April 2025).

Existing resources from the DoD, such as the Commander's Guide to Community Involvement, could provide examples for NZDF to consider and develop tools and information about effectively working with communities to help protect and strengthen the military missions.⁴²

Within the DAF, the Air Force Community Partnership (AFCP) Program promotes collaboration between military installations and their host communities to address shared challenges. Through the AFCP program, leaders can leverage unique capabilities that enhance mission performance, reduce overall costs, and improve quality of life for DAF Airmen and their families. Recent success stories include a water conservation collaboration between Cannon Air Force Base, New Mexico, and surrounding communities to advance sustainable land use practices across forestry and agricultural lands while saving 12 billion gallons of water over three years. Another recent example includes a partnership among Ellsworth Air Force Base, South Dakota, the National Rural Electric Cooperative Association, and the West River Electric Cooperative Association, who entered into an agreement to install a \$1.2 million US dollars Battery Energy Storage System to provide redundant and resilient energy.⁴³ Through Inter-Governmental Support Agreements (IGSAs), established legislatively in 10 United States Code § 2679, military departments can enter into agreements with state and local governments to provide, receive, or share support services. Examples of successful IGSAs include shared refuse collection, landscape maintenance, and water/wastewater treatment plants.⁴⁴

NZDF also has successful examples of community partnerships. At Base Ohakea, the Sanson Playground was constructed in 2019 and is the result of a collaboration among the Sanson Community Committee, Manawātū District Council, and NZDF. As the host community for Ohakea, the Sanson community designed the playground to resemble the popular Air Force Skyhawk plane and Base Ohakea runway.⁴⁵ In Palmerston North, the recently developed He Ara Kotahi pathway and cycle trail is a mixed-use trail developed jointly by the Palmerston North council, Massey University, and Linton Military Camp. The trail connects Palmerston North with Linton Military Camp, providing safer and shorter access between these locations while reducing vehicle emissions. Another successful infrastructure partnership occurred at Waikourou Military Camp in 2011. The partnership, which was funded by the private sector and New Zealand's Energy Efficiency Conservation Authority, converted the Camp's coal-fired boiler to run on wood pellets. The project reduced the Camp's annual coal usage by

⁴² Commander's Guide to Community Involvement (February 2022).

⁴³ Air Force Awards Four Installations with 2024 Air Force Community Partnership Awards (28 Oct 2024).

⁴⁴ Partnership Playbook: Tools to empower installations and communities to turn shared challenges into shared solutions (January 2022). This Playbook includes numerous examples from the United States Department of the Air Force of successful community partnerships. In addition to the IGSA tool, there are examples related to services, education and training, health and public safety, and real estate, property, and utilities.

⁴⁵ Air Force-themed playground takes off in Sanson (1 Oct 2019).

5,300 tonnes and cut CO2 emissions by 10,500 tonnes per year.⁴⁶ These types of collaborations provide a template for future adaptation, emissions reduction, and climate resilience projects and can help build a foundation of trust between NZDF and local stakeholders.

According to academic research, creating synergies between Māori culture and military culture can enable a positive partnership with government entities, something that has been replicated within NZDF.⁴⁷ Successful examples of engagement include integrating the Māori warrior ethos as part of the Army ethos, creating Service Marae and Tūrangawaewae on NZDF camps and bases, instituting Māori cultural advisors, and developing the Te Waharoa app as the gateway to Māori language and protocols. In April 2023, NZDF published Kia Eke, the Māori Strategic Framework. This document commits NZDF to be a bi-cultural organisation and places Te Tiriti o Waitangi | The Treaty of Waitangi at the heart of NZDF efforts to strengthen engagement efforts, value Māori contributions to NZDF, and empower NZDF personnel. Kia Eke commits to creating a positive, healthy, and safe environment within NZDF and highlights the role NZDF can play, both internally and externally, to deliver mutually beneficial outcomes through the Iwi and Hapū where NZDF camps, bases, and places of work are located.⁴⁸

As a bi-cultural organisation⁴⁹, NZDF particularly prioritises the Māori connection to the land as important to the future of climate resilience. In Māori tradition, Māori self-define as tāngata whenua (people of the land), a status that is formally recognised in New Zealand legislation.⁵⁰ Māori culture, society, and spiritual domains are centred around land and natural resources, including the marine environment.⁵¹ Local Māori knowledge systems and centuries of environmental management can inform climate

⁴⁶ Case Study: 8MW Waiohuru Army Base Wood Pellet Fuelled Heat Plant (May 2017).

⁴⁷ Embracing Indigenous Culture in Military Organizations: The Experience of Māori in the New Zealand Military (2018).

⁴⁸ Kia Eke: He Rautaki Māori mō Te Ope Kātua o Aotearoa | Māori Strategic Framework for the New Zealand Defence Force (2023).

⁴⁹ Pūrongo ā tau Annual Report 2024 (27 September 2024). The report highlights several ongoing initiatives including enhancing te reo Māori's visibility. These include making all new infrastructure signage bilingual, providing resource material through the Pātaka Māori Resource Hub, and providing all new recruits and officer cadets with an introduction to te ao Māori concepts and te reo Māori during formal induction. Another success highlighted in the annual report is the development and launch of the Te Waharoa. Te Waharoa is the NZDF Māori language software application. It is the primary tool for NZDF members and their whānau wanting to grow their Māori language skills and understanding of kawa (protocol) and tikanga (custom).

⁵⁰ The Use of Tāngata Whenua and Mana Whenua in New Zealand Legislation: Attempts at Cultural Recognition (2010). Beginning with the passage of the Resource Management Act in 1991, tāngata whenua and mana whenua have gained significant prominence for their use in environmental and resource-related legislation.

⁵¹ To Be at One with the Land: Māori Spirituality Predicts Greater Environmental Regard (13 July 2019).

adaptation at a regional scale.⁵² This deep connection between Māori and the land could be reflected in future collaborative efforts to address climate change at NZDF bases and camps.

Recommendation 1: Encourage communities that host NZDF bases and camps to hold or continue to hold regular meetings to share ideas and best practices. This could be modelled off the Association of Defense Communities in the United States, which serves as a connection point for leaders on community-military issues, including climate resilience, through regular, facilitated engagements. A similar effort for idea-sharing could be explored in New Zealand, perhaps in collaboration with the New Zealand Planning Institute or other non-governmental organisation.

Recommendation 2: NZDF could explore developing a community partnership programme. Existing DoD resources, including the Partnership Playbook referenced above, could serve as a model and provide examples of potential partnerships that NZDF could pursue.

Recommendation 3: Future iterations of Kia Eke could be strengthened by including direct reference to climate change. This language would acknowledge the importance of land, natural resources, and the marine environment within Māori culture, society, and spiritual domains, as well as the impact that climate change will have on these domains within NZDF.

5 Policy and Guidance

Overview: NZDF should update existing strategy, policy, and planning governance structures to improve climate resilience.

Discussion: Both NZDF and DoD have established risk management processes that are applied to climate. The NZDF risk management process is outlined in NZDF Defence Force Instruction (DFI) 0.81 – Risk Management. Future operational assessments could utilise the same risk management framework. In the United States, the DAF Instruction 90-802, Risk Management, provides the policy framework and establishes the requirement to integrate and sustain risk management throughout the DAF as a risk reduction process.⁵³

Recent policy updates, including to New Zealand DFOs, incorporate climate change and resilience policy considerations. DFO 043 – Estate and Infrastructure, which was published in May 2024, requires the implementation of a sustainability framework that incorporates sustainability principles. Climate change is one such principle. For logistics, DFO 40 – Defence Logistics, addresses risk and resilience considerations related to climate change. These guidance documents establish leadership priorities and provide the foundation for integrating climate considerations across the organisation.

⁵² Māori Environmental Knowledge in Natural Hazards Management and Mitigation (June 2006).

⁵³ Department of the Air Force Instruction 90-802, Risk Management (19 September 2024).

NZDF also established the Climate Change Response Programme (CCRP) board in 2021,⁵⁴ which is chaired by a senior officer within NZDF. There is a similar governance board within the DAF. The Senior Leader Climate Forum, chaired by the Assistant Secretary of the Air Force for Energy, Installations, and Environment, was designated as the primary governance board for the climate. The DAF Senior Leader Climate Forum charter, which was approved in September 2022, established the scope, membership, roles and responsibilities, as well as a meeting schedule for the Forum. The Forum's responsibilities include:

- Providing oversight and monitoring of the DAF's climate efforts
- Ensuring climate actions are consistent with DAF policy
- Establishing direction and priorities for climate-related objectives
- Providing guidance to climate-focused working groups, and
- Assuring consistent climate-related communication

Like the Senior Leader Climate Forum, the CCRP Board provides oversight of climate programmes and plays a key role in advancing leadership priorities.

Recommendation 1: Explore revising DFOs and DFIs to match policy responses to climate resilience concerns across the NZDF. In addition to DFO 040 and 043, which already address climate, conduct a comprehensive review of existing DFOs and DFIs, complete a strategic climate change risk assessment, and develop a list of documents to be updated to incorporate climate policy requirements.

Recommendation 2: Consider updating the CCRP Board charter to ensure membership continuity, formalise board reporting processes, and establish action officer level working groups to advance programme objectives and budget activities related to climate.

6 Education and Training

Overview: Consider prioritising the expansion of climate-related education and training resources for NZDF personnel.

Discussion: To build and strengthen climate resilience, NZDF could focus on growing the knowledge, skills, and capabilities of its uniformed and civilian staff. Within the

⁵⁴ NZDF sets out ambitious plan to reduce carbon emissions (2 Feb 2023).

DoD, climate literacy⁵⁵ has been integral to climate adaptation efforts and directly linked with climate-informed decision-making.⁵⁶

Within NZDF, the New Zealand Defence College (NZDC) provides personnel with opportunities to gain skills, knowledge, and qualifications for military and post-military careers. However, there is currently no climate-specific training. NZDC oversees a centralised programme management system to provide a repository for programme development, lesson planning, and delivery resources.⁵⁷ NZDC recently developed a comprehensive learning management system which enables service personnel to engage with programmes in an online environment. These resources are available to personnel through the Defence Learning Management System. The online learning modules provide NZDF personnel with a general understanding of their roles and responsibilities related to a specific topic.

Similarly, in the United States, the DoD previously devoted significant resources to expanding climate literacy across the Department. In January 2022, the DoD established the Climate Literacy Sub-Working Group, which was tasked with integrating climate considerations into DoD education and training. The Working Group reached a consensus definition of climate literacy to inform DoD education, training, and engagement activities. Specific DoD efforts included educating both servicemembers and civilians, hosting focus groups to evaluate current knowledge levels, and utilising climate literacy when promoting workforce development and talent management.

Introducing a new topic, such as climate resilience, into professional military education curriculum can often present a capacity challenge. To successfully integrate climate into their military curriculum, the NZDF can achieve success by identifying the learning objectives and tailoring these objectives to specific roles and audiences to ensure relevance. Staff at the United States Naval Postgraduate School identified climate education as a critical component that strengthens military readiness, operational effectiveness, and strategic planning.⁵⁸ As detailed in the previous report section on Governance, DFOs and DFIs are being updated to incorporate climate language. Education and training modules could align with these updated policy and guidance documents to reflect leadership priorities. These modules can be tailored to the workforce to understand when, why, and how to apply climate considerations.

⁵⁵ Department of Defense Climate Adaptation Plan 2022 Progress Report (4 October 2022). This document defines climate literacy as: “understanding how the climate impacts DoD missions, how DoD operations impact the climate, and how to make climate-informed decisions.” Climate literacy is intended to inform DoD education, training, and engagement activities.

⁵⁶ DoD Climate Adaptation Plan 2024-2027 (5 September 2024). Examples of climate-informed decision-making include climate intelligence; strategic, operational, and tactical decision-making; and business enterprise decision-making. This includes integrating climate considerations in all relevant and applicable DoD decisions.

⁵⁷ External Evaluation and Review Report: New Zealand Defence Force (18 October 2022).

⁵⁸ Building Resilience: Closing the Climate Knowledge Gap in the US Military (12 Feb 2025).

Through a cost-sharing agreement with MFAT, NZDF established the Pacific Leader Development Programme in 2019. The Programme supports the military forces of Fiji, Tonga, and Papua New Guinea, and the Vanuatu Police Force, in the development of leadership frameworks and delivery of leadership training for their personnel.⁵⁹ Given the importance of climate to the Pacific Islands, this collaboration represents an opportunity to engage with leaders from across the Pacific Islands and raise awareness and knowledge of climate change impacts from a security perspective.

Recommendation 1: To improve awareness among the NZDF personnel, CCRP could work with content owners and sponsors to update existing training resources, including D06003 – Environmental Awareness. An update could include climate risks from the environmental stewardship perspective and utilise the 2024 Statement of Intent | Tauākī Whakamaunga Atu as the education and training source document. DECAPs could also be utilised to increase awareness and understanding of local risk projections at NZDF sites. The content could address strategic competition and climate change, the intensifying impacts of climate change within the Pacific Islands, the direct environmental and human security risks, and sustainability initiatives NZDF could utilise to mitigate the Force’s impacts on climate and the environment.

Recommendation 2: Conduct voluntary, climate-literacy focus groups with NZDF personnel. These focus groups, conducted virtually and without attribution, could help CCRP establish a baseline of current climate knowledge, identify existing knowledge gaps, and solicit recommendations for future climate-related training content across the Force.

Recommendation 3: In addition to updating existing training resources, NZDF could consider developing new training modules to support total Force climate literacy. A general climate education module, available online through Defence Learning Management System, would provide the benefit of awareness on one of the key strategic drivers within the Pacific Islands region. Such training could target individual members of the NZDF to ensure a climate-literate workforce that can prepare for, mitigate the effect of, adapt to, and recover from climate impacts to NZDF missions and operations. As an alternative, NZDF could explore partnering with an external learning organisation, such as a university, non-governmental organisation, or allied military partner, to develop the training.

Recommendation 4: Continue to promote climate innovation for developing leaders across the NZDF. This includes the active participation of rising NZDF leaders in climate governance activities and the annual NZDF Kaitiakitanga Award to promote stewardship for climate and sustainability. Such opportunities for leadership and recognition encourage continued awareness, spurs innovation, and highlights the value of new voices and perspectives on climate resilience within NZDF.

⁵⁹ Construction begins on NZDF/MFAT Leadership Centre in Tonga (22 Sep 2022).

7 Areas for Future Study

In addition to the six focus areas detailed above, this report identifies six “areas for future study” recommended for consideration by NZDF. These areas are listed below in priority order and could be considered by the CCRP Board for future action.

Emissions Tracking and Reduction: As part of Carbon Neutral Government Programme, NZDF established emissions reduction targets. The Programme established the goal that all government agencies, including the NZDF, aim to achieve carbon neutrality by 2025. It also requires agencies to measure their emissions and set emissions reduction targets and plans. As highlighted in the Data section of this report, there are significant challenges associated with external data tracking tools. However, failure to effectively measure emissions could place a future burden on NZDF operations, especially if an emissions tax or other regulatory tool is established through future legislation.

Regional Engagement: Continue coordination by MOD and NZDF to support climate-focused partnerships among Pacific Island countries and territories. These forums, including the Indo-Pacific Environmental Security Forum, the Association of Southeast Asian Nations (ASEAN) Defence Ministers’ Meeting (ADMM) Plus, and the South Pacific Defence Ministers Meeting, present essential regional engagement opportunities. Beyond the Pacific region, there are existing, climate-focused partnerships including the Global Air Forces Climate Change Collaboration (GAFCCC). In recent years, GAFCCC has brought together 40 air forces across six continents to share best practices, lessons learned, and ideas to address greenhouse gas emissions in the defence sector.⁶⁰ NZDF could explore opportunities for deeper engagement with GAFCCC.

Humanitarian assistance and disaster relief engagements remain a key opportunity for partnerships. The ADMM Plus Experts’ Working Group on Humanitarian Assistance and Disaster Relief, currently co-chaired by New Zealand and Singapore, represents an opportunity to expand and broaden partnerships to enhance operational efficacy during deployment and warfighting operations.

Wargaming⁶¹: Integrating climate and strategic risk variables into wargaming scenarios is a critical tool for increasing awareness and educating military personnel about climate risks. These variables can consider both regional-scale disruptions in the Pacific Islands, such as the increased frequency and severity of weather events, or more tactical considerations, such as the impact of singular storm events requiring a specific humanitarian assistance and disaster relief response. NZDF would benefit from continued engagement with medium-sized powers and other key allies in the Pacific Islands to develop wargame scenarios that consider climate variables.

⁶⁰ Why Western Air Forces are Taking Fresh Aim at Their ‘Carbon Problem’ (17 March 2023).

⁶¹ Wargaming (n.d.). Wargaming is defined by the Rand Corporation as: Analytical games that are used to examine warfighting concepts, train and educate commanders and analysts, explore scenarios, and assess how force planning affects military campaign outcomes.

Sustainable Aviation Fuel: The sustainable aviation fuel market is currently in its nascent stage and presents significant cost barriers. In 2024, the Rocky Mountain Institute estimated the cost of production for sustainable aviation fuel between \$6.40-\$19.01 US dollars per gallon.⁶² However, blended sustainable aviation fuel has been approved by Boeing for use in the P-8A Poseidon. In June 2024, Boeing provided guidance to defence customers which stated that company-built military aircraft can operate on a 50/50 sustainable aviation fuel-conventional fuel blend. Given the significant emissions-reduction benefits from sustainable aviation fuel, which according to the Carbon Offsetting and Reduction Scheme for International Aviation, can reduce lifecycle carbon emissions up to 84 per cent,⁶³ NZDF could benefit from continued monitoring of the sustainable aviation fuel market as prices may decrease in coming years.

Resourcing: The April 2025 Defence Capability Plan calls for a planned commitment of \$12 billion on capability and enablers, including a \$9 billion increase to baseline funding. To ensure proper allocation of resources, additional analysis of spending priorities will be considered annually and the Plan will be reviewed every two years. To the greatest extent possible, these future resourcing decisions could include climate considerations in the funding prioritisation methodology.

Mobility Incentives: NZDF could continue to pursue opportunities to incentivise carbon reduction in transit for employees. This could include creating a pilot process to subsidise e-bike and scooter ownership for NZDF personnel. NZDF could also continue to explore potential collaboration through WorkRide, New Zealand's ride-to-work benefit programme.

Conclusion

The 2018 Boe Declaration established climate change as the single greatest threat to the livelihoods, security, and wellbeing of the peoples of the Pacific Islands. This position was reaffirmed in 2022 through the 2050 Strategy for the Blue Continent.

In response to the climate threat, the New Zealand government and NZDF have highlighted the strategic role of climate change in the region. Both the 2024 Statement of Intent and the 2025 Defence Capability Plan, published in April 2025, highlight the regional importance of climate and how it could cause critical challenges for Pacific Island countries and territories and directly exacerbate other security issues. Given the importance of climate change to the Pacific Islands, New Zealand, and the broader region would benefit from a stronger commitment to addressing climate change. Implementing the recommendations outlined in this report would help strengthen regional stability, promote New Zealand's values and interests, and address the Pacific Islands Forum's greatest threat: climate change. Future collaboration between the United States and New Zealand on climate change could address strategic competition, reinforce

⁶² Unraveling Willingness to Pay for Sustainable Aviation Fuel (17 Sep 2024).

⁶³ Boeing Provides Guidance on SAF Usage for Defense Aircraft (20 Jul 2024).

credibility among the Pacific Islands, and reduce opportunities for new strategic competitors to emerge in the region.

Despite evolving political considerations, climate change remains an existential concern for the Pacific Islands. Losing sight of the impacts of climate change could result in the emergence of new actors and a rebalancing in the strategic competition dynamic within the region. Such a dynamic could directly impact both New Zealand and the United States and their status as key partners among Pacific Island countries and territories.

Appendix 1: SWOT Analysis

Strengths	• Infrastructure: Robust analysis of climate impacts at NZDF bases and camps through DECAPs • Engagement: Successful partnerships with local and district councils where NZDF bases and camps are located • Policy and Guidance: Senior leader support for climate change through the Climate Change Response Programme and Board • Education and Training: Existing engagement with Pacific Islands partners through Pacific Leader Development Programme
Weaknesses	• Data: Limited or missing climate data to inform decision-making; challenges with uniform data gathering • Investments: Infrastructure investments made without fully considering future climate change impacts • Engagement: Limited opportunities to educate new commanders on community engagement • Policy and Guidance: Political inconsistency on climate change policy at the national level • Policy and Guidance: Compliance with existing and future policies (DFOs and DFIs) by NZDF personnel
Opportunities	• Data: Improving internal and external relationships to strengthen climate • Investment: Applying the NZDF Sustainable Infrastructure Standards to achieve emissions reductions • Infrastructure: Adopting the concept of NZDF camps and bases as “Power Projection Platforms” • Engagement: Increased focus on climate change from a Māori perspective • Engagement: Establish a formal community partnership programme in collaboration with communities and Iwi that host NZDF camps and bases • Education and Training: Expanding climate-related curriculum for NZDF personnel
Threats	• Overall: Emerging third-party actors in the Pacific Islands whose interests are counter to those of New Zealand and its allies • Investments: Current investment decisions/execution threatened by future climate risks • Infrastructure: Rebalancing of strategic competition within the Pacific Islands region by the development of dual-use infrastructure • Policy and Guidance: Political leaders deprioritising climate change as a policy and security priority

Appendix 2: Acronyms

ADMM: ASEAN Defence Ministers' Meeting

AFCP: Air Force Community Partnership

ASEAN: Association of Southeast Asian Nations

CCPR: Climate Change Response Programme

DAF: United States Department of the Air Force

DAPP: Dynamic Adaptive Pathway Plan

DCAT: Defense Climate Assessment Tool

DECAP: Defence Estate Climate Adaptation Plan

DFI: Defence Force Instruction

DFO: Defence Force Order

DoD: Department of Defense

DST: Defence Science and Technology

FY: Fiscal Year

GAFCCC: Global Air Forces Climate Change Collaboration

IGSA: Inter-Governmental Support Agreements

I2AP: Infrastructure Investment Action Plan

MOD: Ministry of Defence

NIWA: National Institute of Water and Atmospheric Research

NZDC: New Zealand Defence College

NZDF: New Zealand Defence Force

RHDC: Resilient and Healthy Defense Communities

SWOT: Strengths, Weaknesses, Opportunities, and Threats

WS: Weather Squadron

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