Enhancing Blue Economy Tourism Management in the Marlborough Sounds:

The potential use of Marine Spatial Planning (MSP) for Disaster Risk Reduction (DRR) and Adaptation

By D. A. Early

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Abstract

This paper examines ways to enhance Blue Economy (BE) Tourism Management in the Marlborough Sounds by examining the potential use of Marine Spatial Planning (MSP) for Disaster Risk Reduction (DRR) and Adaptation. It reviews three Marlborough documents and explores the use of MSP with adaptative cycles for DRR. The findings suggest that MSP and DRR adaptive cycle approaches are complementary; the findings indicate urgent implementation requirements.

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Final version date: 10 October 2025

Introduction and Background

During the week 9-13 June, 2025, the UN Ocean Conference focused on action to conserve and sustainably use the ocean, developing the Nice Ocean Action Plan (UN, 2025). The Blue Economy (BE), part of the global economy (with Blue Tourism a further sub-category), depends on a healthy ocean and is based on marine activities (Auad & Fath, 2022). In 2020 the BE was valued at 1.5 trillion USD (Auad & Fath, 2022).

Climate change is a significant catalyst of ocean biodiversity loss; it impacts ocean health affecting human health and wellbeing (Talukder et al., 2022). Significant pressure is placed on the natural environment in Marlborough Aotearoa New Zealand with this impacting the tourism sector (Peart, 2024). There is an urgent need to address this (Peart, 2024). In order, to recover from future challenges both mitigation (reducing risk) and adaptation (adjusting to change) are required. The need for sustainable development in the BE is necessary to promote resilience (ability to recover from shock) with effective disaster risk reduction (DRR) (mitigation and adaptation responses during rapid climate change (Greenlees & Cornelius, 2021).

Globally, different tools, processes and frameworks have been explored to undertake responses. Marine Spatial Planning (MSP) is a process (series of linear steps) usually used to plan and allocate marine spaces sustainability according to social, ecological and economical objectives, including tourism, recreation and other industries (Wedding et al., 2024). Adaptive management, a framework (broad structure,) involves monitoring, evaluation and changing implementation method in response to change in a BE (Auad & Fath, 2022). This provides for a more resilient management enabling flexibility to changing conditions.

1. Problem Statement

Despite Marlborough having 20% of the country's coastline, relying heavily on Blue Tourism in the Marlborough Sounds, and a plethora of reports written over decades, there is ongoing degradation of the local marine environment with significant marine biodiversity loss and action inertia. Climate change is also affecting the region. Consequently, it is increasingly necessary to adapt to climate change-marine biodiversity loss, which affects human wellbeing. Marlborough's Tourism Management planning methods and assumptions do not adequately address and consider the risk, for Blue Tourism, of environmental collapse. As a result:

- The visitor's experience will be sub-optimal
- Meeting of carrying capacity will occur
- There will be little standardization of experience
- The hosts will be less able to provide optimal experience
- Host and Visitor wellbeing will be impacted

Final version date: 10 October 2025

Environmental and associated ecological collapse is often irreversible. Tourism management in the area will need to respond, and adapt, to these changes. However, the implications of biodiversity loss are not fully recognised and no detailed DRR process or framework has been identified for the local BE. Thus, this paper will examine enhancing BE Tourism Management in the Marlborough Sounds and the potential use of MSP for DRR and adaptation.

2. Research aims and Objectives

Aim: To Enhance Blue Economy Tourism Management in the Marlborough Sounds and the potential use of MSP for DRR and Adaptation.

The paper will:

Objective 1.

Undertake an initial review of selected Marlborough documents for mention of:

- Blue Tourism Management
- Biodiversity Loss/Climate Change/Ecosystem collapse
- Marine Spatial Planning
- Disaster Risk Reduction
- Social wellbeing/Resilience/Adaptation

The four key Marlborough Blue Tourism-related documents:

  - Restoring the Marlborough Sounds – An Ocean Reform Case Study (2024)
  - Marlborough Destination Management Plan (2022-2032)
  - Marlborough Economic Wellbeing Strategy (2022-2032)

Objective 2.

- Explore the potential use of MSP for DRR and adaptation, regarding process and frameworks.

3. Literature Review

a. Disaster Risk Reduction (DRR)

Climate change, geopolitical instability and ecosystem collapse bring uncertainty to destination management, which plans for, and reduces, risk i.e. unwanted situations with negative consequences. A disaster is an event which causes disruption of functioning of community with loss of ability to cope (UNDRR, n.d.) Examples include a pandemic, a cyber or biosecurity breach, biodiversity loss/ecosystem collapse or floods. DRR is comprised of preparation and action taken before, during and after a disaster (Abid et al., 2021) and may be an adaptive cycle (model of a complex system) (Holling, 1986), panarchy approach (nested adaptive cycles) (Greenlees & Cornelius, 2021) or a variation of the Sendai Framework (SF) for DRR, as described in the Marlborough Climate

Change and Action for Adaptation document. This paper focuses on adaptation, rather than mitigation.

4. Global Economic Risks

a. Pandemics, Natural and Human-induced Disasters

In the last five years the COVID 19 pandemic, and natural disasters such as flooding, have shown globally that governments and businesses are not sufficiently prepared to deal with, and bounce back from, complex risks. Governments and businesses are underinvesting financially in ways to build resilience and adaptation to these challenges. Globally the combination of insured losses from natural hazards and human - induced disasters combined in 2023 was estimated at $291 billion (Swiss Re Group, 2024).

In addition, locally the cost of 2021-2022 flood-related road repairs in Marlborough was estimated at $234m (Hart, 2024) with ongoing calculations for the June and July 2025 floods (Brunton, 2025; Daniels, 2025). Locally the 2022 floods in Marlborough showed that climate change impacts not only the environment residents live in but also residents' ability to offer services and maintain their own health and safety, affecting the productivity and wellbeing of Marlborough's business sectors (Economic Development Team, 2022). Climate change affects our health needs and services in multiple ways (Ministry of Health NZ, 2024).

The World Economic Forum, Global Risks Perception Survey 2022-2023 listed 10 top risks for 2 and 10 years. In the short-term (2-year) period cost of living crisis, natural disasters and extreme weather events, geoeconomic confrontation, failure to mitigate climate change, and erosion of social cohesion, were listed in the top five risks. For the 10-year period failure to mitigate climate change, failure of climate change adaption, natural disasters and extreme weather events, biodiversity loss and ecosystem collapse together with involuntary migration were listed as the top 5 risks. At number 8 for both the 2-year and 10-year risks is cybercrime and cybersecurity (World Economic Forum, 2025).

In 2025 we are now grappling with all the top 5 risks identified in the 2022-2023 survey (World Economic Forum, 2025). Cyber issues loom. The actions and inactions we take now will have consequences on the next 8 years where the top risks are associated with climate change, adaptation, natural disasters and biodiversity loss with ecosystem collapse. These will obviously impact Blue Tourism and destination management.

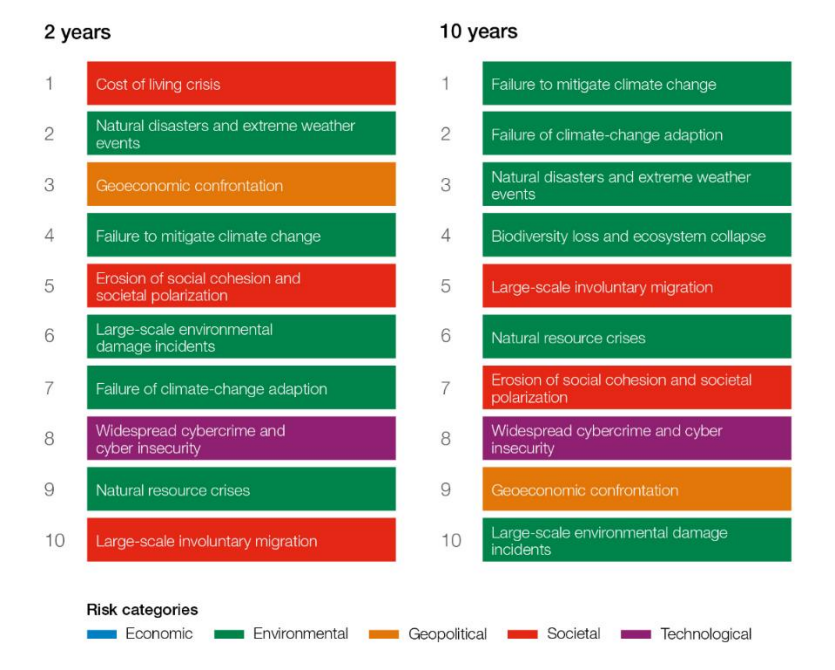

Table 1: Top 10 Global Risks (Source: World Economic Forum, 2023)

b. Cybersecurity and Sense of Place

The Metaverse challenges long-held perceptions of physical boundaries of place as well as sense of place and should be considered in destination management (7XSummit, 2023). Associated with this are the shifts in the locus of power associated with the metaverse and an opaque, digitized global network. In addition, manager's geographic narcissism (belief that urban knowledge is absolute with little regard for rural subjectivity) often plays an unconscious role (Fors, 2018; Brew, 2025). Little is known on how geospatial thinking conditions sense of place. These are complex and significant for destination management in a crisis-driven world (Higgins-Desboilles & Bianchi, 2024), but a deep dive is beyond the scope of this report.

c. Climate Change and Greenhouse Gases

The Paris Climate Agreement is based on pledges from almost 200 countries, including Aotearoa New Zealand. This aims to significantly reduce emissions of greenhouse gases (GHGs) which cause ocean warming contributing to biodiversity loss, climate change and reduced human wellbeing (Gössling & and Scott, 2018).

The 2007 Davos Declaration on Climate Change and Tourism (World Tourism Organization (UNWTO), 2007) urged "the entire tourism sector to face climate change as one of the greatest challenges to sustainable development, and to the Millennium Development Goals in the 21st Century" and underlined the need to reduce the sector's emissions.

Despite these climate change and biodiversity warnings, from almost twenty years ago, climate change and global ocean warming continues (Talukder et al., 2022). The global climate will continue to change due to feedback loops and already trapped GHG emissions (Gössling & and Scott, 2018). Mitigation efforts now will determine the scale of future climate change risks (Gössling & and Scott, 2018). Action inertia, influenced by leaders' perspective and "belief systems" will result affecting all society and the impacts will, in cases, be irreversible (Gössling & and Scott, 2018).

d. Ocean Health, Biodiversity Loss, Wellbeing

An understanding of the causes and effects of climate change and its impact are fundamental to any effective action. Understanding the impacts on the ocean, interconnection between marine biodiversity and planetary health (combined human and ecosystem health) is under recognised, but critical for effective preventive, restorative and sustainable actions to ensure a healthy ocean (Talukder et al., 2022). Greenhouse gases and associated climate change results in ocean acidification and marine biodiversity loss as well as stronger storms which can impact coastal communities reducing human and ecosystem wellbeing (Greenlees & Cornelius, 2021). Human-driven activity is changing life on earth and life in water threatening planetary health and future tourism (Talukder et al., 2022).

e. Blue Economy (BE)

Loss of ocean biodiversity does not occur in isolation from climate change and warming ocean temperatures. The loss affects natural and human systems including disease outbreaks, food security, human livelihoods, biomedical research, disaster risk management and destination management in the BE (The Lancet, 2024; Massey University, 2024). To reduce some of the impact of these negative effects on the BE and Blue Tourism, BE embeds ocean sustainability (UN sustainable goal #14 Life under water) and an approach that "what is bad for the ocean is bad for humans" (Auad & Fath, 2022).

f. Marine Spatial Planning (MSP)

The National Science Challenge/Sustainable Seas projects, with which Lincoln University was involved, identified MSP to inform the use of marine spaces for ecological, social and economic wellbeing, specifically through Te Ukaipo o Hinemoana in an Aotearoa New Zealand context (Lundquist, Bennion, & Brough, 2024).

More widely there is a practice of approaching marine planning as spaces, not places and confining it to Environmental Planning siloed from human health and wellbeing, and without DRR. Consequently, MSPs have often been implemented without consideration of place. At the core of the UN Sustainable Development Goals, and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is the relationship between people and natural world (IPBES Secretariat, 2024).

Due to significant knowledge gaps in sociocultural connections, people and their place-based perspectives and needs are often overlooked in the MSP process.

Using MSP in the Marlborough Sounds was suggested as far back as 2014 (Earle, 2014); which included research going back to 2004, i.e. over 20 years ago. Yet still no tool/process such as MSP has been implemented.

There is a plethora of literature on MSP to plan spaces and places, however, given the crisis of the times, and especially the predicted top economic global risks in the next 8 years, it is necessary to specifically explore whether MSP can be used for Blue Tourism DRR (specifically around climate change/biodiversity loss/ecosystem collapse/resilience/social wellbeing and adaptation) which is a gap in the current Marlborough planning literature.

5. Methodology

The method included:

- Use of secondary data (grey and academic literature); ethical approval was not available to conduct surveys.
- Incorporation of a voluntary Practical Application Component.
- Analysis and critique of knowledge from academic & grey literature.
- Final collation.

a. Process and Rationale

The author of this postgraduate report already had an understanding of the academic and grey literature regarding interconnection of biodiversity loss, climate change and nature-culture connection for wellbeing. She has a unique perspective with a background in biological and medical sciences and is a member of a public health professional organisation. Research was predominately undertaken spatially from “within” the Marlborough Sounds as a boat-access only resident, rather than a short-term visitor researching and writing “about” the Marlborough Sounds.

The author of this postgraduate report already had a copy of Marlborough Destination Plan since this had been open for public comment in 2024.

The author also already had a copy of the Marlborough Economic Wellbeing Strategy 2022-2032 as she has been involved in wellbeing in Marlborough.

Similarly, the author of this report had also already read the Health National Adaptation Plan 2024 – 2027 after personally been affected by the severe weather events in Marlborough in 2021 and 2022.

The author of this report had completed a marine conservation course in late 2024 and was notified of the Environmental Defence Society (EDS) Marlborough Sounds case study report by a previous marine collaborator.

The author of this postgraduate report had participated in Climate Action Week Marlborough Feb. 2025 (and affiliated groups) and subsequently heard of the draft Climate Change and Adaptation Action Plan 2024/25 – 2027/28

The documents above were included in this report due to their relevance to tourism and DRR management and planning for Marlborough's future.

b. Practical Application Component

Locally

The release of the EDS document, which called for urgent action and was authored by EDS Policy Director Raewyn Peart, generated the impetus for this Lincoln University postgraduate research project.

Raewyn Peart presented to the Marlborough District Council Environment and Planning Committee meeting on 30 Jan. 2025 (Public meeting part 1, See 16 minutes in). After watching this webinar the author of this current postgraduate report retrieved a copy of the Kotahitanga mō te Taiao Alliance-KMTT Strategy.

On 13 March 2025 the Marlborough Climate Change and Action Adaptation Plan 2024/25-2027/28 was presented to the Marlborough District Council Environment Planning Committee (Public meeting part 2, see 1.18 hr in)

On 8 May 2025 the author of this study attended the public AF8 Earthquake Roadshow in Picton. After this, a review was made of Marlborough's Civil Defence and the Marlborough Climate Change and Adaptation article referenced here was retrieved.

On 23 May 2025, the author of this study presented at Te Au Pūngao Innovation Hub. Preparation for this presentation prompted postgraduate research into the intersection of tourism with other Marlborough industries, including aquaculture and agriculture.

On 25 May 2025, the author of this study was a volunteer on the organising committee, and MC at the Marlborough Biodiversity Forum. Raewyn Peart, author of the above-mentioned ocean reform case study on the Marlborough Sounds presented as a keynote speaker. As a result of facilitating the event the author of this current postgraduate report undertook additional research around spatial planning and sense of place.

Nationally

On 12 May 2025, EDS held a one-day Ocean Symposium. After attending via video the author of this current postgraduate report retrieved the articles on ocean and planetary health, power-politics with tourism, inside/outside views and geographic narcissism. Some of which are referenced here.

Lincoln University TOUR603 Class tutorials encouraged reflection on the metaverse and broader destination management risks.

Globally

World Ocean Day was 8 June. On 9 June the UN World Ocean Conference began. Both have been highlighted globally with the release of David Attenborough's film Ocean. The conference is to catalyse urgent action to restore the ocean for future marine use and human wellbeing.

c. Search and Selection of Core Academic Articles with critical keywords

The author was familiar with lemniscate resilience and sought to investigate its relevance for the BE and DRR. A keyword search for "panarchy" on the New Zealand website: Sustainableseaschallenge/Project, tool & resource finder generated no results. Additional searches below were conducted.

- Keywords**: ocean, climate, biodiversity loss, health** - *Climate change-accelerated ocean biodiversity loss & associated planetary health impacts* (Talukder et al., 2022), selected for ocean change
- Keywords: **biodiversity, human health** - *Biodiversity: The unsung hero of human health and ecosystem resilience* (Massey University, 2024), selected for human impact
- Keywords: **adaptive cycles and panarchy, Blue Tourism** - *Towards a flourishing blue economy: Identifying obstacles and pathways for its sustainable development* (Auad & Fath, 2022), selected for BE
- Keywords: **adaptive cycle model/drr** *The promise of panarchy in managed retreat: converging psychological perspectives and complex adaptive systems theory* (Greenlees & Cornelius, 2021), selected for adaptation
- Keywords: **people and nature, marine spatial planning** - *Integrating the multiple perspectives of people and nature in place-based marine spatial planning* (Wedding et al., 2024), selected for MSP and socio-eco. angle
- Keywords: **global risks, 10 years** - *The World Economic Forum,* Global Risks Perception Survey 2022-2023, selected for future economic planning

Additional articles provided broader context. Data was grouped spatially and according to themes and framework patterns around BE, ocean changes and MSP with DRR and adaptation. Although widely used globally for DRR, an analysis of the SF is beyond the scope here. In addition, while Blue Tourism in Marlborough extends beyond The Marlborough Sounds, it is also beyond the scope here.

6. Findings and Discussion

<u>Specific Marlborough Document Keyword and Topic Review - Objective 1.</u>

An initial review of the destination management plan, economic wellbeing strategy, and Marlborough Sounds case study found:

- There is little to no reference of MSP and DRR for Blue Tourism Management in the Destination Management Plan or Economic Wellbeing Strategy. The former only appears in the EDS document.

Consequences of this:

- Marlborough's Tourism Management planning methods and assumptions do not adequately address and consider the risk, for Blue Tourism, of marine environmental collapse.
- The visitor's experience will be sub-optimal
- There is a meeting of environmental carrying capacity
- There is little standardisation of experience
- The hosts will be less able to provide optimal experience
- Host and visitor wellbeing will be impacted
- Environmental and associated ecological collapse is often irreversible

Potential use for process and frameworks - Objective 2.

a. Disaster Risk Reduction (DRR)

i. Marine Spatial Planning (MSP), Blue Economy (BE) and Adaptive Cycles

MSP has emerged as a tool to enable marine ecosystem-based management. The end results are to balance human demands for ocean space with environmental protection and to consider local sociocultural context. While Te Ukaipo o Hinemoana is proposed for Aotearoa New Zealand (Lundquist, Bennion, & Brough, 2024) the existing literature doesn't look at MSP for DRR, particularly regarding converging psychological perspectives and complex adaptive systems theory.

Wedding et al., 2024 encourage the inclusion of a distinct place-based characteristic in MSP. They propose a broader view by integrating geographic concepts of space and place. They offer five core considerations of place-based MSP that include: (1) sense of place; (2) social-ecological systems; (3) ocean and human health; (4) multiple ways of knowing; and (5) social knowledge. Effective MSP with a transdisciplinary approach will also consider interconnected social-ecological systems that integrate both the land and sea boundaries. Effective MSP will allow for the complex eco-cultural relationships between human health and wellbeing with the health of the ocean. It is beyond the scope of this report to examine all of these, however, #2 social-ecological systems and #3 ocean and human health are expanded according to this research paper themes of biodiversity loss, adaptation, Blue Tourism, DRR and adaptation. Resilience is also necessary for sustainability which is a focus in the BE (Auad & Fath, 2022).

The BE involves a complex system which is dynamic and changing from growth, conservation, crisis/collapse and reorganization. This is relevant for biodiversity loss and

ecosystem collapse. Many existing frameworks ignore change. The “seasonal” components make up fundamental phases of the adaptive cycle (Holling, 1986.) The fluid “seasons” show changes and flexibility in a socio-ecological system: 1) growth, 2) conservation, 3) collapse, and 4) reorganization. The cycle change restarts with a new growth phase. Effective reorganisation will depend on #3 not being a total collapse; a concern given local marine biodiversity loss in the Marlborough Sounds.

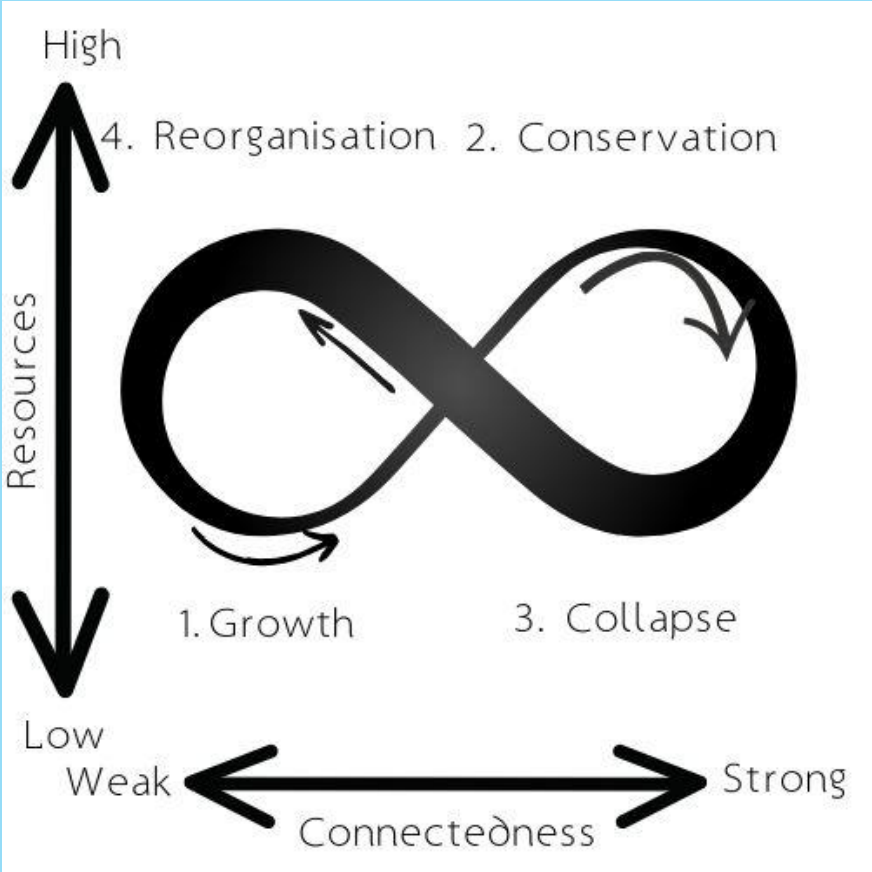

Fig. 1. The adaptive cycle (Adapted from Holling, 1986).

To enhance social resilience, strong community and economic connections and partnerships are needed (Auad & Fath, 2022). A sense of community and trust is critical to overcome the crisis stage of the adaptive cycle. This co-operation is encouraged across Marlborough stakeholders and industries such as the Department of Conservation with land mining (Brew, 2025) as well as aquaculture, fisheries, offshore energy, deep-seabed mining, water use, transportation, recreation/tourism and environmental stewardship.

ii. Panarchy

The adaptive cycle in Fig. 1 above can be part of a larger hierarchical system (Fig. 2 below). This “panarchy” approach is novel for Marlborough’s BE.

The X-axis represents increases over space, while the Y-axis represents increases over time. A “revolt and remember processes” (small double arrows) facilitates systemic

change. A “revolt” at small scale can results in larger reorganisation. A feedback loop is shown by the dotted arrow. Inter-related subsystems include environments, social, capital, risk perception and action. Positive adaptive patterns are beneficial and enhance wellbeing, while maladaptive patterns do not (Greenlees & Cornelius, 2021).

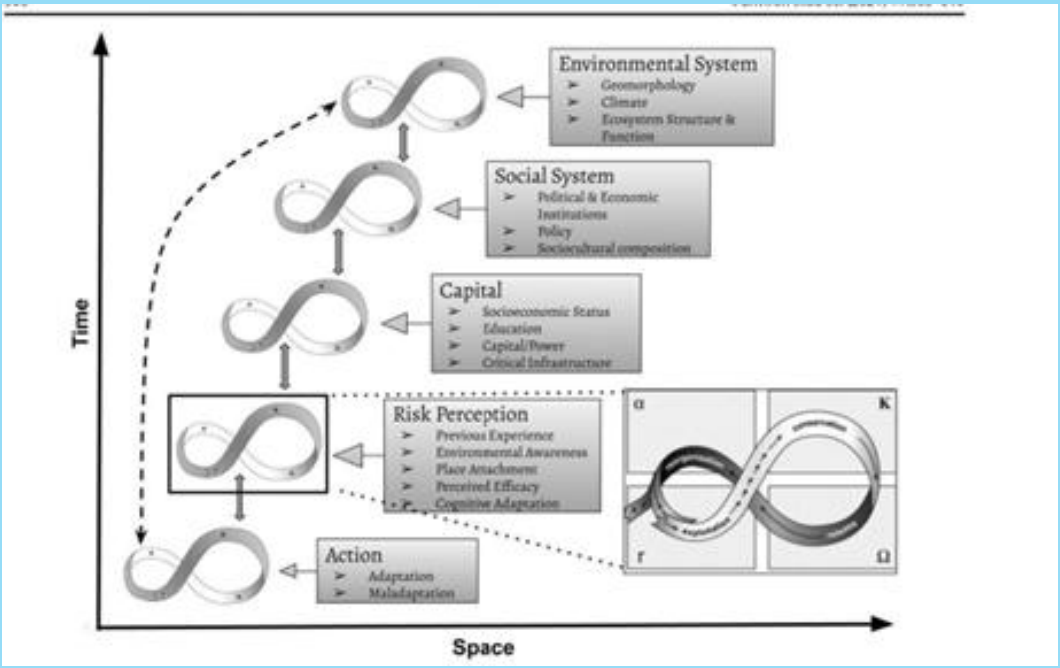

Fig.2 Panarchy model showing the adaptive cycle “nested” (layered) to represent resilience in a system (Greenlees & Cornelius, 2021; Figure used under Creative Commons Attribution 4.0 licence).

Connecting climate resilience and managed retreat with psychological processes like risk perception emphasizes the importance of implementing multi-scalar interventions to build community adaptive capacity (Greenlees & Cornelius, 2021). This is important for moving evidence-based research to practice and policy to solve destination management problems in The Marlborough Sounds. The model of panarchy, incorporating risk perception, introduces new insights around adaptation and resilience and is applicable to Blue Tourism. It provides a way to approach destination management planning incorporating the complex social, economic, political, and psychological processes that converge across space and time.

iii. Mitigation

An analysis of Marlborough businesses and local government meeting Climate Disclosure Standards in a circular economy in Marlborough, are beyond the scope of this particular report, but aviation, associated with tourism, is a high GHG emitter (Gössling, & Scott, 2018) as are other industries such as forestry and fishing, and would require mitigation as well as addressing leadership beliefs and action inertia, especially around biodiversity loss and climate change.

Final version date: 10 October 2025

This report focuses on adaptation with MSP and DRR with “nested” adaptative cycles, but MSP has a place in mitigation for biodiversity loss. Nevertheless, it is critical to highlight that attempting to restore marine biodiversity loss of the Marlborough Sounds with only non-urgent conservation efforts (e.g. Kotahitanga mō te Taiao Alliance-KMTT Strategy), as discussed at the January 30 Marlborough District Council Environment and Planning meeting (Environment & Planning, 2025), will be inadequate. The root of the problem, i.e. the impact of industries including tourism, need to urgently be addressed to avoid wasted time, effort and finances and to assist with mitigation efforts. As highlighted by Massey University and The Lancet last year (2024), failure to do so will result in significant, long-term negative economic, social, health and environmental consequences.

This research suggests a way forward and fills a gap for local BE. This innovative process and framework combination is a first for Blue Tourism Destination Management in Marlborough and Aotearoa New Zealand. This positions Marlborough as a potential national, and international, leader.

b. Limitations

This study has limitations including, but not limited to, a full analysis of economic implications, implications of any changes to the Resource Management Act (RMA) and Marine and Coastal Area (Takutai Moana) Act 2011, full mitigation implementation requirements and methods, understanding of mauri impacts and the homogenous-standardisation in the name “The Marlborough Sounds” - a culturally complex region.

7. Conclusion

To fully support social, economic and environmental wellbeing Marlborough’s Destination Management approach needs a more robust biodiversity-climate adaptation plan. This is necessary because of the significant risks climate change, interconnected with biodiversity loss, poses to Marlborough’s environment, economy, and community.

Future destination management planning, especially around any use of a process such as MSP with DRR, for the social, environmental and economic wellbeing of Blue Tourism in Marlborough requires integration of these aspects into the Marlborough Destination Management Plan, the Economic Wellbeing Strategy and the Climate Change and Adaptation Action Plan.

MSP arranges the spaces and places, but the adaptive cycle supports change in the BE e.g. the seasonal movement of dolphins which Blue Tourism visitors might wish to view, and local tour operators wish to share. The subsequent panarchy approach consider risk. Thus, MSP has a mitigation role supporting DRR, especially with the more advanced panarchy model.

With future-focused Blue Tourism planning it will be critical to urgently focus efforts in the Marlborough Sounds and broader Marlborough region on:

- streamlining bipartisan DRR efforts across destination management, community and climate adaption teams with specific processes such as MSP together with a "nested" adaptive cycle framework (panarchy)
- moving to "one health", recognising that biodiversity loss, especially at tipping point with ecosystem collapse, is driven by and drives climate change, is a potential public health crisis - not a subset of siloed environmental planning
- Exploring complementary use with SF to determine more effective and resilient DRR efforts

Moving from Blue Tourism destination management to "destination stewardship" effective collective efforts might also include:

- Looking carefully, and without delay, at overcoming long-standing power barriers and misinformation
- addressing leadership beliefs and geographic narcissism
- incorporating psychological processes (such as risk perception)
- working to create a cohesive, cooperating, resilient community

which, when unified, is better equipped to adapt and is resilient to face the significant anticipated challenges in the next 8 years and beyond.

Final version date: 10 October 2025

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