

Nature-related Disclosures

Prepared October 2024

2024

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Disclaimer

This report is the first published example of a nature-related disclosures report in New Zealand and demonstrates one way to describe the impacts or dependencies a business has on the local ecosystems, and the risks and opportunities that arise to the business from these. This report reflects Lyttelton Port Company's own perspectives on impacts and dependencies using the Taskforce on Nature-related financial Disclosures (TNFD) framework. With time, we hope to include indigenous Māori knowledge to help in our understanding and management of nature-related impacts, dependencies, risks and opportunities. Lyttelton Port Company commits to continual refinement of our disclosures and collaborating with others.

The data used to compile this report is from published literature, public data, spatial data generated for the assessment, resource consent-related monitoring data, Lyttelton Port Company staff workshops and technical expert review. The Whaka-Ora Catchment Management Plan [Te Hapū o Ngāti Wheke et al., 2018] has been used as the basis for the future aspirational state of nature and the actions required to regenerate a healthy harbour ki uta ki tai (from the mountains to the sea).

Message from the Board and CEO

Lyttelton Port Company (LPC, the Port) operations are vital to the success of various exporters and importers, making it the second-largest export hub in New Zealand. LPC facilitates the movement of billions of dollars' worth of exports and imports annually, supporting thousands of jobs and contributing significantly to the local economy. The Port is also a key part of the domestic supply chain, supporting the distribution of consumer goods and food throughout the South Island.

Our business and local communities rely on natural capital, which includes assets, resources and other benefits provided by nature. LPC's dependency on natural capital is evident through revenue from imports and exports, infrastructure longevity, raw material provisioning, freshwater supply, operational conditions and maintaining cultural, recreational and aesthetic values in Whakaraupō/Lyttelton Harbour.

At a time before human occupation, Whakaraupō/Lyttelton Harbour had rich forests and clear streams. The harbour was abundant with fish, shellfish and aquatic vegetation. Today, habitats on the land and in the harbour are only fragments of what they once were. The condition of nature is impacted by sedimentation, pollution, marine heat waves and the encroachment of invasive pests. The Whaka-Ora Catchment Management Plan (Te Hapū o Ngāti Wheke et al., 2018) describes a future aspirational state of nature for Whakaraupō/Lyttelton Harbour. The five partners committed to Whaka-Ora Healthy Harbour are Te Hapū o Ngāti Wheke (mana whenua and mana moana), Te Runanga o Ngāi Tahu, Environment Canterbury, Christchurch City Council and LPC.

Alongside our Whaka-Ora partners we are taking steps to improve the health of the harbour. LPC has a biodiversity positive ambition, with the goal to ensure positive actions for nature outweigh negative impacts.

This first nature-related disclosures report focuses on LPC's impacts, dependencies, risks and opportunities and identifies and addresses where Port activities have contributed to habitat change since the beginnings of a commercial Port in 1875. Through collaboration with others and guidance that is being developed for New Zealand's businesses and ecosystems, we can improve our future nature-related disclosures and business response to risk and opportunity. To meaningfully address our biodiversity positive ambition, we will develop a roadmap that sets metrics and targets for our continued commitment and tracking progress.

Understanding how our business relies on nature and how our activities impact the state of nature allows us to operate as an integral part of the ecosystem within Whakaraupō/Lyttelton Harbour – not separate from it. We will continue to implement biodiversity positive solutions by avoiding and reducing our impacts on nature and increasing restoration initiatives. Through collaboration we aim to transform our relationship with nature.

Signed for on behalf of the Board



Barry Bragg
Chair



Graeme Sumner
CEO

LPC operations are vital for the success of various exporters and importers, making it the second-largest export hub in New Zealand.



Definition of terms

Area of influence

The extent of Lyttelton Port Company’s disclosures for the Lyttelton Port location. Includes operational activities on land, undeveloped and non-operational Port-owned land, land set aside for and undergoing restoration, reclaimed seabed, navigation channel, Port operational area within the marine environment and dredge spoil disposal extents, including historical (no longer used), currently used and rarely used.

Baseline

This report refers to a baseline date of 1875 to estimate the overall magnitude and severity of impacts to habitats and species and assess our net position relating to biodiversity positive.

Biodiversity

A diverse or wide range of native species. This includes diversity within species and between species.

Biodiversity positive

A state of nature in which there is a net positive outcome for biodiversity as measured through robust metrics and targets. Biodiversity positive is when the sum of activities undertaken by and for Lyttelton Port Company, combined with the activities in the wider catchment demonstrate a positive outcome on biodiversity of Whakaraupō/Lyttelton Harbour when measured from a baseline date of 1875.

Ecosystem services *(also known as nature’s contribution to people)*

The contributions of ecosystems to the benefits used in economic and other human activity. These are generalised by provisioning, regulating and cultural/recreational services.

Global Biodiversity Framework (GBF)

The Kunming-Montreal Global Biodiversity Framework was adopted by 196 countries at the Convention of Biodiversity in Montreal on 19 December 2022. It commits nations to halt and reverse nature loss by 2030. The agreement consists of four long-term goals and 23 immediate action-oriented targets. It is not (yet) legally binding, but countries are expected to align the goals and targets of the framework with their national biodiversity action plans.

GRI

Global Reporting Initiative – an independent, international organisation that has developed standards in a modular system providing advice for businesses on specific sector and topics of materiality. GRI 101 is a Biodiversity Topic Standard that states that a topic is material when impacts affect economy, environment and people. The TNFD recommends companies use the GRI definition of impact materiality.

ISSB

International Sustainability Standards Board – a global standards-setting organisation. In June 2023, two voluntary sustainability standards were developed, IFRS S1 and S2. The ISSB standards state that companies are required to disclose all sustainability-related risks and opportunities that have financial implications for the business and/or investors. TNFD recommends that companies apply the ISSB’s definition of materiality as a baseline.

Iwi

Extended kinship group, tribe.

LEAP

An integrated approach used in the TNFD framework for the assessment of nature-related issues. There are four phases in the approach: Locate, Evaluate, Assess and Prepare.

Mahinga kai

Mahinga kai is a term that is used by mana whenua to represent their customary harvesting practices, but it also speaks about things done by everyone who calls Whakaraupō/Lyttelton Harbour home. Taking action to preserve experiences in nature for future generations through only taking what you need, supporting species to breed or regenerate, and being aware of your own impact on the environment is an important part of mahinga kai.

Mana whenua / mana moana

The local indigenous people who hold tribal authority over a location based on ancestry and occupation. For Whakaraupō / Lyttelton Harbour, Te Hapū o Ngāti Wheke are mana whenua and mana moana, holding intergenerational responsibility to act as kaitiaki (guardians) for the catchment and harbour. (Te Hapū o Ngāti Wheke et al., 2018, p. 44)

Mana Whenua Advisory Group (MAG)

A regular forum for conversations between LPC and Te Hapū o Ngāti Wheke recognising and providing for the shared vision for Whakaraupō. The core function of the MAG is to identify and work together on strategic issues of mutual interest.

Mātaimai

Customary fishing area established under the Fisheries Act 1996. In 1998 Te Hapū o Ngāti Wheke established the first mātaimai reserve in the country, The Rāpaki Mātaimai. Extensions to this reserve now cover the whole harbour marine area excluding the operational area of the Port, called the Lyttelton Harbour / Whakaraupō Mātaimai plus extension. (Te Hapū o Ngāti Wheke et al., 2018, p. 44)

Natural capital

The stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible and allow businesses to exist and make profit.

Natural Capital (Kaitiakitanga)

One of LPC’s five capitals. Kaitiakitanga relates to LPC’s commitment to protecting the natural environment through addressing climate change, delivering a positive effect on biodiversity and waste minimisation and avoidance.

Port Liaison Committee (PLC)

A forum for conversations between LPC and local harbour communities to communicate issues of mutual interest where Port activities could have relevance or effects on local communities. The committee has elected representative members from the harbour communities, local councils and LPC.

Quality hectares

A methodology for assessing the future condition of habitat compared to its baseline condition and multiplying by the area or extent of habitat effected.

SBTs

Science-based targets – technical guidance for companies in establishing targets specific to the realms of land, freshwater, ocean and biodiversity. The TNFD recommends the use of SBTs in setting targets, taking action and measuring progress.

Tangata tiaki

Legally appointed person responsible for managing fisheries resources for customary food gathering within a mātaimai. (Te Hapū o Ngāti Wheke et al., 2018, p. 44)

TNFD

Taskforce on Nature-related Financial Disclosures. A framework for businesses to assess, disclose and manage nature-related issues and opportunities.

Terrestrial

Existing on the land, land-based.

Whaka-Ora

Whaka-Ora refers to both the partnership between five organisations and the Catchment Management Plan (Te Hapū o Ngāti Wheke et al., 2018). The partners Te Hapū o Ngāti Wheke, Environment Canterbury, Christchurch City Council, Te Rūnanga o Ngāi Tahu and LPC work together under a collaboration agreement to implement actions in the plan with the goal for a healthy harbour and mahinga kai ki uta ki tai (from the mountains to the sea).

SECTION 1

Introduction

At home on the intertidal mudflats of Whakaraupō/Lyttelton Harbour, this pāpaka/mud crab (*Austrohelice crassa*) digs elaborate tunnels under the sediment. Photo: Adobe Stock

LPC's biodiversity positive journey

A port has operated within the Whakaraupō/Lyttelton Harbour since 1849 and more commercially after 1875 when the Harbour Board was established. Helping to establish the city of Christchurch and support the growth of industry of Canterbury from its colonial beginnings, Lyttelton Port now serves as the largest international and domestic trade gateway in the region.

Following the Canterbury earthquake sequence of 2010 and 2011, Lyttelton Port suffered extensive damage. The Lyttelton Port Recovery Plan (Canterbury Earthquake Recovery Authority, 2015) process facilitated the Port's rebuild and planned for Port expansion to support regional growth over the next 30 years. It also committed LPC to a collaborative catchment management approach to a healthy harbour along with mana whenua and local authorities.

A catchment partnership was formed between Te Hapū o Ngāti Wheke, Te Rūnanga o Ngāi Tahu, Christchurch City Council, Environment Canterbury and LPC. The Whaka-Ora Catchment Management Plan (Te Hapū o Ngāti Wheke et al., 2018) (Whaka-Ora) emerged as a vision to restore the ecological and cultural health of Whakaraupō/Lyttelton Harbour from the mountains to the sea. Whaka-Ora identifies four key focus areas for action within the harbour including sedimentation, pollution and terrestrial and marine biodiversity. An action plan guides landowners, stakeholders and community on how to achieve the plan's long-term vision. Each of the five partners contributes to Whaka-Ora through representation at the governance and senior management level and through resource support. LPC commits financial and in-kind support to Whaka-Ora annually to support action projects.

	2015	2017	2018	2019	2022	2023	2024
LPC progress	Lyttelton Port Recovery Plan – including Mana whenua and community expectations	Port Saddle and Banks Peninsula Conservation Trust partnership	Whaka Ora Catchment Management Plan	LPC Board approved Sustainability Strategy containing a net biodiversity positive goal	Nature disclosures assessment begins	Gollans Bay lizard restoration Conservation Covenant	Nature-related disclosures report
Global milestones				Global Biodiversity Framework adopted at UN Biodiversity Conference COP15 Mission: halt and reverse biodiversity loss to put nature on a path to recovery	Countries must revise and update national biodiversity strategies and action plans & encouraged to adopt as policy/regulations		

LPC's Sustainability Strategy was adopted by the LPC Board of Directors (Board) in 2019 and contained a biodiversity positive ambition. Our aim is to undertake our activities in a way in which positive outcomes for nature outweigh the negative impacts. LPC allocates operational budget to projects contributing to this goal and has two areas of non-operational land set aside for restoration. While there is still a way to go to be on track, LPC is fully committed to achieving this goal. Through these disclosures, we aim to be transparent about both positive and negative impacts on nature as a result of our activities.

For LPC, our business and working relationships with nature needs to be transformed so that we see ourselves and our activities as part of our environment rather than separate from it. Though this will take time, we are already on the path

towards this transformation. Through Whaka-Ora, we have locally specific guidance to key impacts and opportunities for the health of the harbour and its catchment.

The [Whaka-Ora] Partners have committed that the plan will aim to “restore the ecological and cultural health of Whakaraupō/Lyttelton Harbour as mahinga kai”, whilst also addressing “other environmental, cultural and social concerns, including the needs of recreational users, as well as the needs of a working port”.

Te Hapū o Ngāti Wheke et al., 2018, p. 6

Key projects



Port Saddle restoration

The Port Saddle is 17 ha of LPC owned publically accessible land that has been under native restoration since 2017. To date, approximately 4,000 plants have been planted and over 4,600 hours of volunteer work have contributed to planting, weeding and maintenance. LPC also uses contractors for weed and pest management.



Gollans Bay Covenant

An 11 ha area above Gollans Bay Quarry has been permanently set aside for restoration through a Conservation Covenant. This dry rocky ecosystem provides important habitat for native lizards including grass skinks and geckos. LPC undertakes weed and pest control and will establish habitat to enhance the lizard and gecko populations.



Harakeke/flax is one of New Zealand's most ancient plant species, providing shelter and an abundant food resource for many animals.

SECTION 2

TNFD general requirements

Scope of disclosures

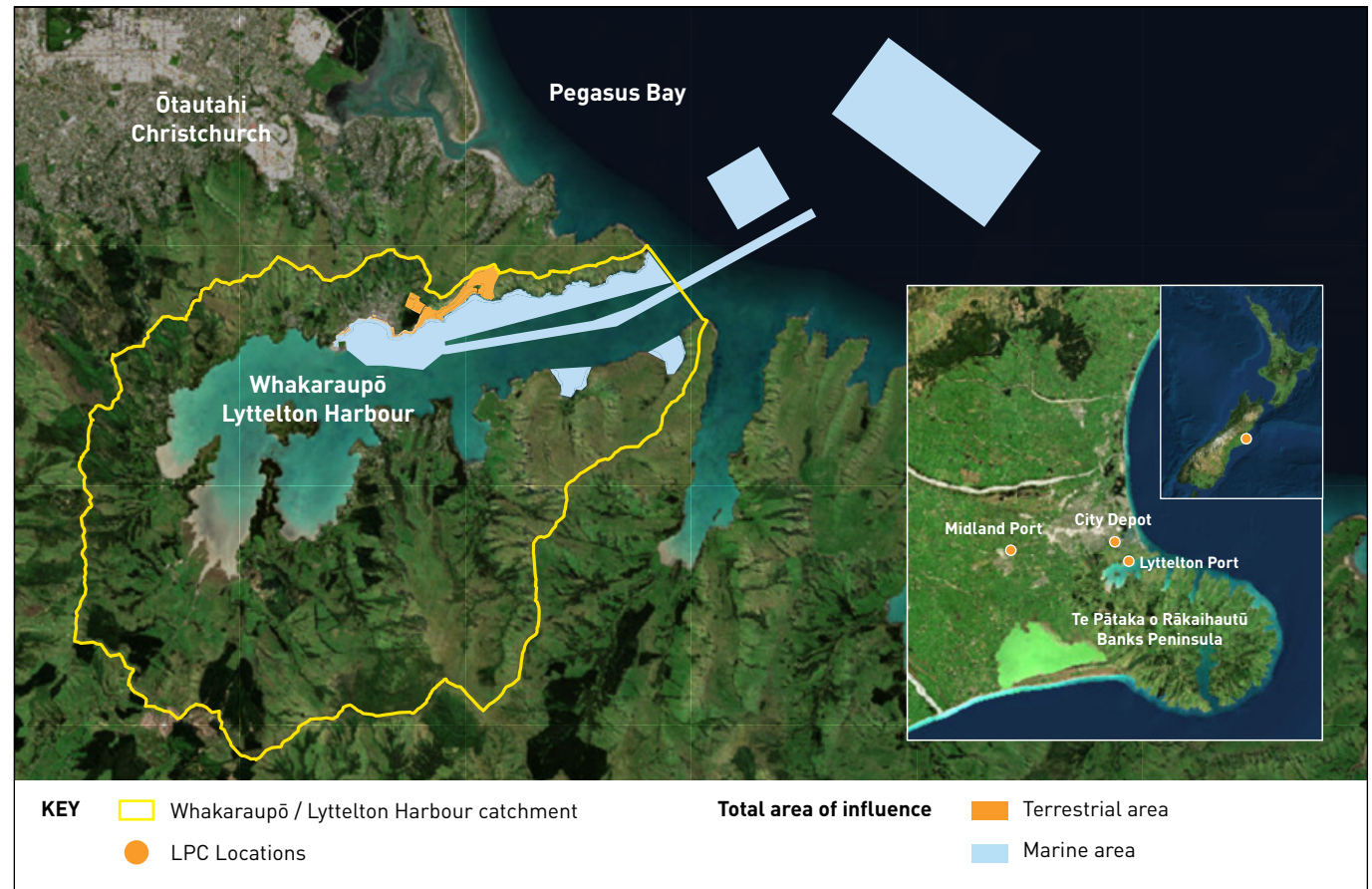
LPC operates across three locations in the Christchurch and Selwyn Districts of Canterbury, New Zealand (Figure 1). The scope of this disclosures report is the direct operations at our Lyttelton Port location. Of our three locations, land ownership extent and operations at Lyttelton Port intersect with the most ecologically and culturally significant locations. LPC’s dependencies and risks relating to nature are also greatest at Lyttelton Port. We intend in future disclosures to expand the scope to cover all three locations and a more complete assessment of our value chain.

Our area of influence for this disclosure report encompasses Port owned land and operational extent in the marine environment, including non-operational areas of land and historical dredge spoil disposal locations that are no longer used. Our assessment includes Port operations on land, reclamation of the seabed, vessel movements, stormwater runoff, dredging of the navigational channel and dredge spoil disposal both within Whakaraupō/Lyttelton Harbour and beyond the harbour heads into Pegasus Bay.

This report follows the Taskforce on Nature-related Financial Disclosures recommendations (TNFD, 2023) and incorporates the Science Based Targets Network approach to the nature impact mitigation hierarchy. This report and the biodiversity positive actions already under way by LPC to meet Target 11¹ and Target 15² of the Global Biodiversity Framework.

For the scope outlined above, we aim to address all 14 disclosure recommendations of the TNFD. However, information is not complete in all aspects. LPC is applying concepts in the science-based targets (SBTs) for nature guidance on nature recovery actions metrics and targets.

Figure 1: Lyttelton Port’s area of influence distinguishing between activities intersecting with terrestrial and marine habitats. The locations of all three of LPC’s operating areas are shown for context.



There are limitations with the information available and the analysis undertaken and New Zealand does not yet have guidance or standards for nature-related disclosures. LPC aims to refine the methodology and accuracy of information over time.

¹ Restore, maintain and enhance nature’s contributions to people.
² Businesses assess, disclose and reduce biodiversity-related risks and negative impacts.

Approach to materiality

LPC has followed the TNFD LEAP (locate, evaluate, assess, prepare) approach, applying double materiality (considering impacts on nature from Port activities as well as the financial materiality of LPC’s dependencies on nature). The values that mana whenua and the community place on nature, including biodiversity, ecological and cultural health, are inherent to LPC’s assessment of impacts and dependency materiality.

By aligning with the TNFD framework, LPC has also aligned with the materiality lenses of stakeholders as per the Global Reporting Initiative (GRI) and capital providers as per International Sustainability Standards Board (ISSB) standards (IFRS1). We will align with the SBTs for nature to set targets and develop a Biodiversity Positive Roadmap.

An integrated reporting approach has been adopted by LPC since 2022 with Natural Capital (Kaitiakitanga) as one of the five capitals for reporting. A materiality assessment for the business was conducted by thinkstep-anz in 2022 and approved by LPC’s Board and has been reviewed each year since. A materiality assessment is widely used in business to identify and prioritise the sustainability topics (environmental, social and governance) that matter most to an organisation and its stakeholders. The tool helps LPC to confirm, review and future-proof the business strategy. Of the top 15 material topics, nine relate to nature-related impacts and dependencies demonstrating the fundamental relationship our business has with nature (Figure 2).

Figure 2. LPC’s materiality assessment established in 2022 and reviewed each year. Material topics related to nature are highlighted in orange.



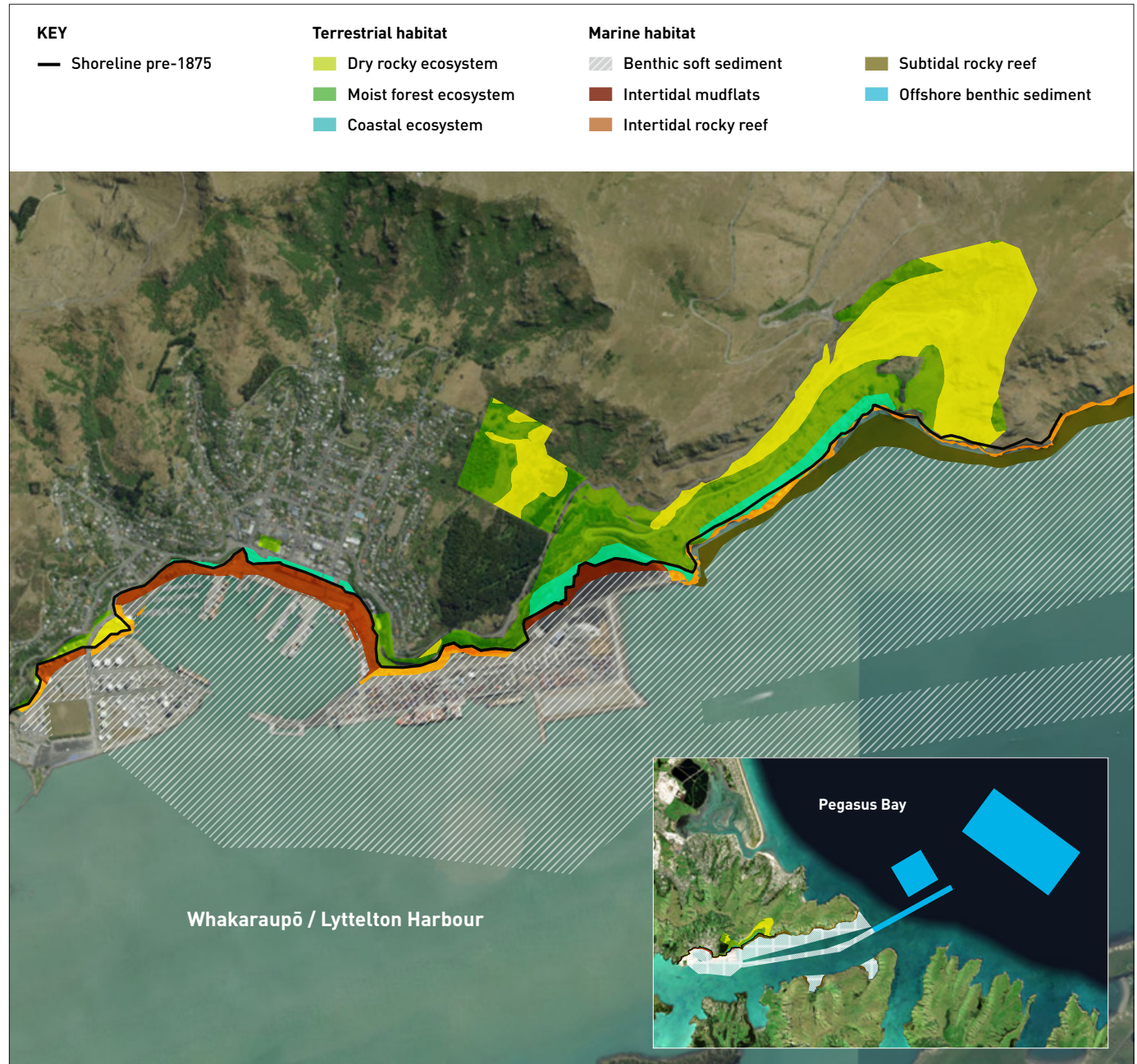
Location of nature-related issues

We have defined Lyttelton Port's direct area of influence as 2,658 ha. The extent assessed in this report covers historical and current land ownership and operational footprint. We have mapped naturally occurring (pre-human) habitat types for the Whakaraupō/Lyttelton Harbour catchment and use these as a basis for intersections with our area of influence (Figure 3). For the purposes of this assessment, Lyttelton Port's area of influence intersects with 116 ha of terrestrial habitat and 933 ha of marine habitat within Whakaraupō/Lyttelton Harbour and 1,608 ha of marine habitat offshore in Pegasus Bay. Refer to Appendix 1 for a detailed description of habitat types and Appendix 2 for business activities assessed.

Our area of influence includes the following extents:

- Footprint of operational activities on land and in the marine environment.
- Reclaimed areas of the marine environment.
- Non-operational and undeveloped land within Port ownership, including areas set aside for restoration.
- Vessel navigation channel, including an extension area beyond the harbour heads in Pegasus Bay that has only been dredged once in 2018.
- Dredge spoil areas within the harbour, including historical disposal areas that have not been used since the 1960s.
- Dredge spoil disposal areas beyond the harbour heads in Pegasus Bay, including a disposal location that has only been used once in 2018.

Figure 3. Lyttelton Port's area of influence overlaid with habitat types that would have occurred naturally within the Whakaraupō/Lyttelton Harbour catchment.



Link between climate and nature-related disclosure reports

Nature and climate are integrally linked. Risks relating to the loss of nature and a changing climate are both material to LPC. Equally, the restoration of nature has benefits in reducing LPC's exposure to the impacts of land management practices and climate change.

LPC is reporting climate-related disclosures in alignment with the New Zealand Climate Standards (1, 2 and 3) issued by the Aotearoa New Zealand External Reporting Board. The section relating to nature-related risk management in this report references some of the overlaps identified with climate-related risks.

Engagement with indigenous peoples, local communities and affected stakeholders

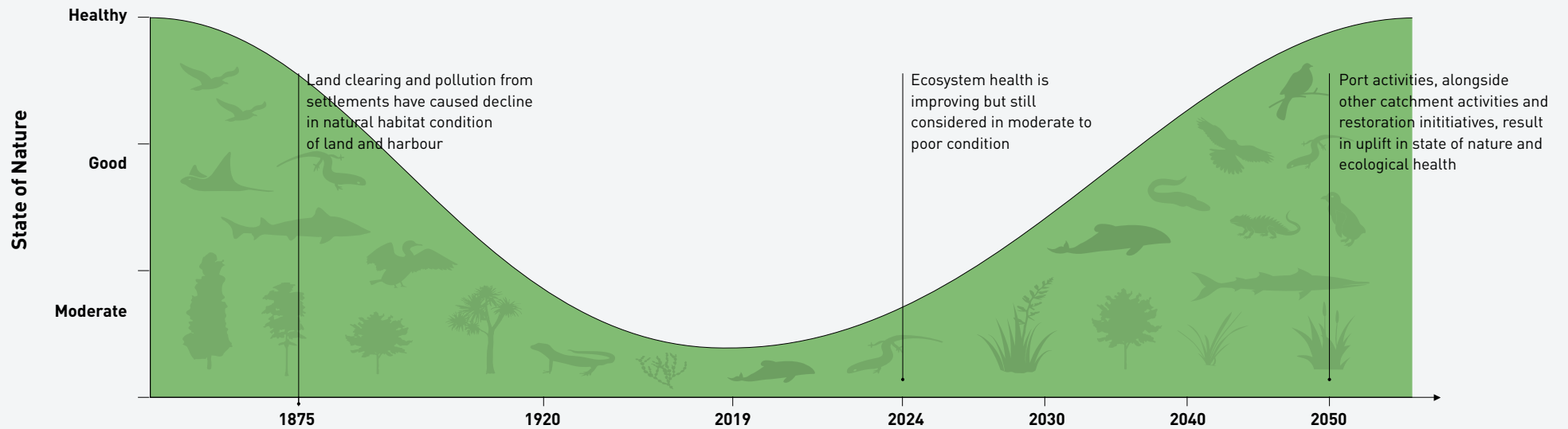
Refer to *Strategy* section D for more information on how LPC engage with these groups.



Time horizons considered

We considered various time horizons when making assessments throughout this report (Figure 4). We utilised locally relevant time horizons first, then aligning with global frameworks second.

Figure 4. A theoretical state of nature for Whakaraupō over the time horizons considered in this report.



Impacts

1875	BASELINE: The date before the Harbour Board was established and the beginnings of a commercial port. This is our baseline date for assessing impacts of activities on nature. Information exists on the habitat types and condition at this time.
2024	CURRENT: Our first disclosure report date for our Lyttelton Port location. We have mapped Port activities and assessed the state of nature of underlying habitats.
2050	FUTURE: This time horizon aligns with the Global Biodiversity Framework future time horizon. This date is where we expect our aspirational targets from the current time horizon will be met and when we expect to see a positive shift in biodiversity for Whakaraupō.

Dependencies

2024	CURRENT: LPC's dependency on nature in the current time period. We assessed financial risk to the business by changes in nature that we have been exposed to this year.
2050	FUTURE: how LPC will be dependent on nature in 2050. This time period assumes a future state of operations, policy, social and climate scenarios.

Risks and opportunities

2024-2030	SHORT-TERM: Physical, transitional and systemic risks and opportunities identified as likely in the next 1-5 years
2030-2035	MEDIUM-TERM: Physical, transitional and systemic risks and opportunities identified as likely in the next 5-10 years
2035+	LONG-TERM: Physical, transitional and systemic risks and opportunities identified as likely 10 or more years



SECTION 3

Governance

A section of the northern shoreline of Whakaraupō/Lyttelton Harbour with thick rimu kakauroa/Giant kelp (*Macrocystis pyrifera*) beds and intertidal rocky reef. Photo: LPC

Board oversight

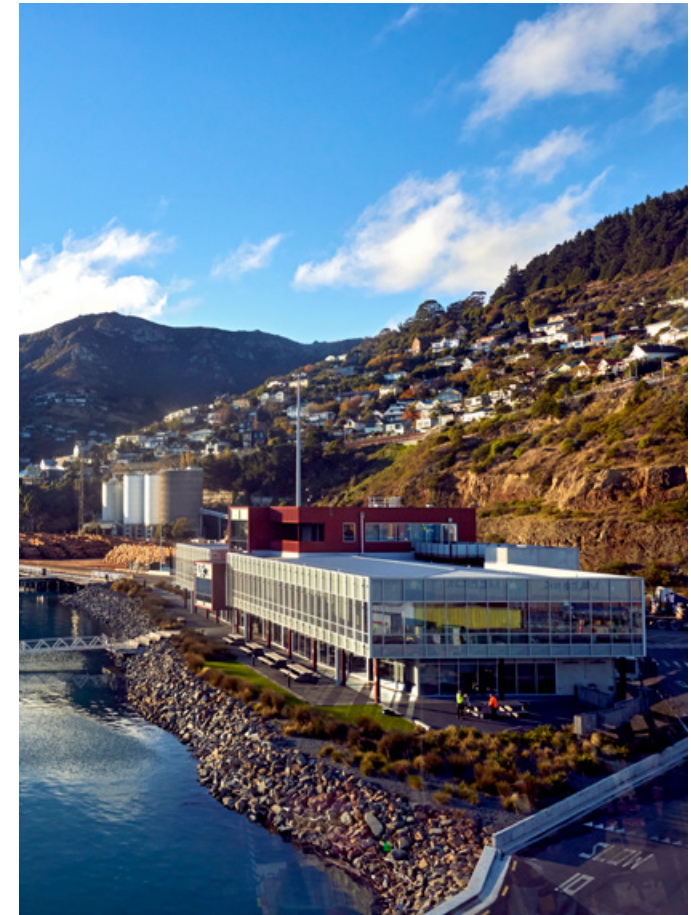
LPC's business strategy has five capitals, one of which includes the company's recognition of Natural Capital (Kaitiakitanga) and the commitments to biodiversity and environmental protection. The biodiversity positive ambition in LPC's Sustainability Strategy and inclusion of TNFD disclosures in LPC's Statement of Intent demonstrate Board support for the company's early adoption of nature-related disclosures. Through the Board's oversight of these first disclosures, greater awareness has been raised around the nature-related impacts, dependencies, risks and opportunities of the Port's activities, particularly in the marine environment.

The Board approves annual funding and resources for biodiversity positive work streams, conservation sponsorship and Whaka-Ora. In FY23, the Board approved 11 ha of Port-owned land to be placed under a Conservation Covenant to be set aside for perpetual ecological restoration..

The Board remains informed of LPC's nature-related dependencies, impacts, risks and opportunities through monthly reporting and presentations. The Board is aware of and has oversight of LPC's Sustainability Strategy and Environmental Policy, including LPC's commitment to meet environmental management standards, protection of ecological values, preventing pollution and continual improvement.

In 2024, LPC added a new critical risk to LPC's Critical Risk Assurance Programme. The new risk – loss of licence to operate – relates to aspects of environmental management and performance across the business that require immediate action and management. This critical risk requires oversight by the Board and actions to be taken throughout various levels of the business.

Management of risk spans all levels of governance, leadership and operations and falls under the LPC Risk Management Policy and Framework. The framework considers risks relating to environment, reputation and community as well as financial risk, delivering a robust decision-making process. While risks are actively managed in the various business units across LPC, the Board delegates responsibility to the Audit and Risk Committee (ARC), which communicates key risks and management responses to the Board, reviewing LPC's strategic risks annually.

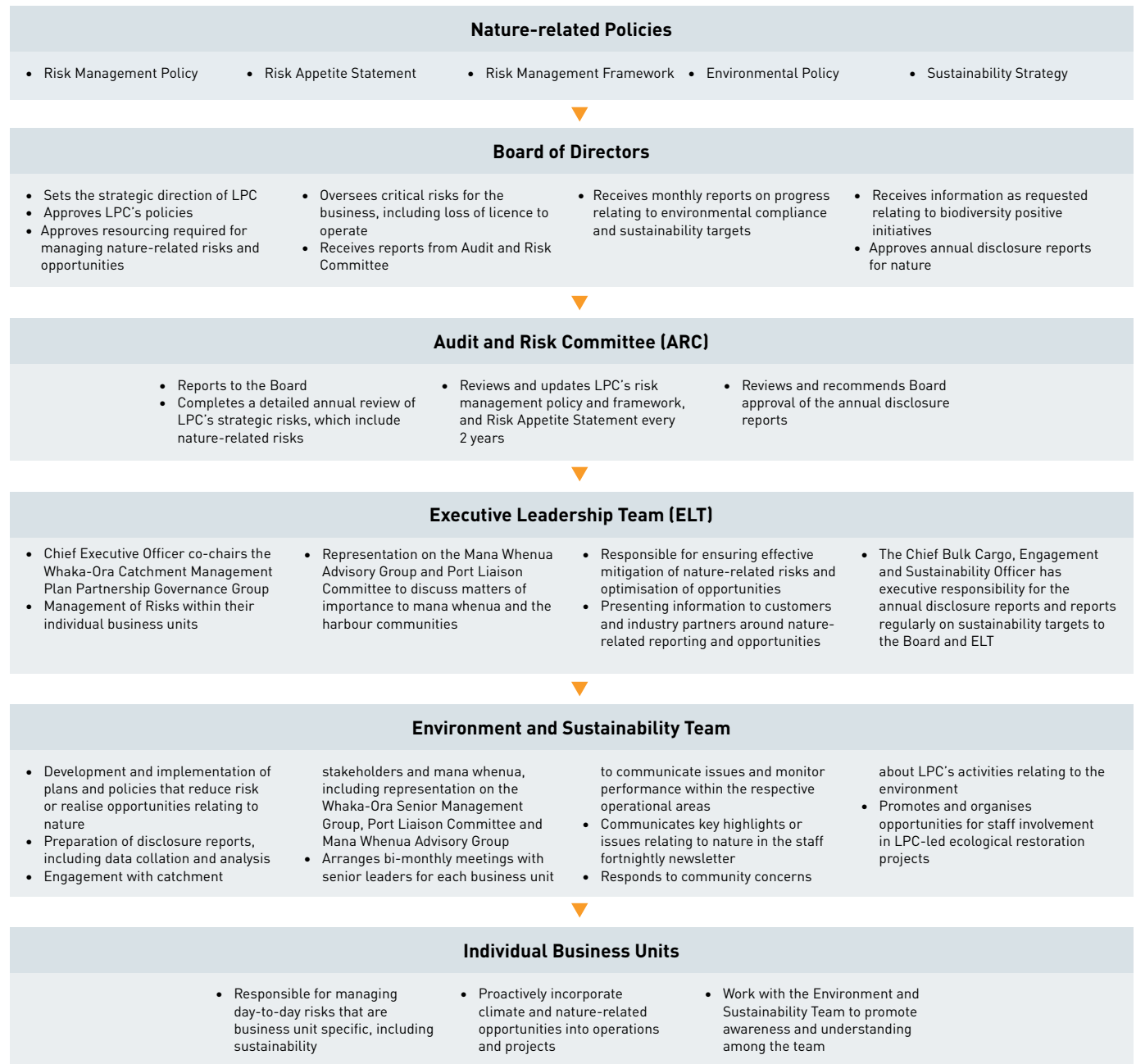


Management's role

The Chief Executive Officer (CEO) and Executive Leadership Team (ELT) members have day-to-day responsibility for the assessment and management of risks and opportunities within their respective business units, including those related to nature. The Chief Bulk Cargo, Engagement and Sustainability Officer has overall responsibility for the development of LPC's Sustainability Strategy, oversight of the preparation of the TNFD and providing updates relating to key environmental risks and nature-related strategic initiatives in the monthly Board report.

The Environment and Sustainability Team is responsible for identifying nature-related risks and opportunities and implementing environmental and sustainability initiatives across the business. The team maintains a risks and impacts register and complies with ISO 14001 standards for environmental management systems. The table on this page outlines the key responsibilities relating to management of nature-related dependencies, impacts, risks and opportunities.

The CEO has initiated upskilling specific to nature-related issues, including briefing the ELT around environmental, social and governance reporting requirements of international markets and directors' duties when it comes to foreseeable and material risks relating to nature impact and loss. An interview by the NZ Institute of Directors' Chapter Zero initiative (Prentice, 2024) demonstrates the CEO's awareness and understanding of the TNFD and LPC's nature-related impacts and dependencies. ELT members participated in three workshops to determine LPC's material dependencies on nature, raising awareness of the value of natural capital for the business..



Human rights policies and engagement

With respect to indigenous people, local communities and other stakeholders

Ethical policy and statements

LPC has [policies and standards in place](#) relating to ethical procurement, human rights and inclusion. We are undergoing a review of these documents to understand how we might align with the UN Declaration on the Rights of Indigenous Peoples and the UN Guiding Principles on Business and Human Rights.

Engagement with indigenous peoples

Te Rūnanga o Ngāi Tahu manages the collective assets of 18 Papatipu Rūnanga, providing support and recognition as kaitiaki, mana whenua and rangatira of the natural resources within their boundaries. LPC's operations occur within the traditional boundaries of Te Hapū o Ngāti Wheke, the Papatipu Rūnanga representing the hapū Ngāti Wheke. Ngāti Wheke hold mana whenua and mana moana (traditional authority) over Whakaraupō and its catchment.

Te Rūnanga o Koukourāata is the Papatipu Rūnanga representing the hapū Ngāti Huikai and has interests in LPC's impacts beyond the heads of the harbour into Pegasus Bay (Jolly, 2014) where effects from Port activities may be experienced within Port Levy to the south-east of the mouth of the harbour.

LPC engages with Ngāti Wheke on matters relating to nature as part of the governance and senior management levels within Whaka-Ora.

LPC has an established Mana Whenua Advisory Group that meets bi-monthly with representatives from Ngāti Wheke. The meetings provide a platform for meaningful discussions from both parties' perspectives. The intention is to work together to promote and protect the value of Whakaraupō/Lyttelton Harbour as a mahinga kai and a Port.

LPC values the insights and knowledge of mana whenua when discussing historical conditions, future aspirations and restorative actions for a healthy harbour. The information contained in the Whaka-Ora Catchment Management Plan has informed many aspects of this disclosure report.

Local communities

Communities, landowners and organisations operating within Whakaraupō/Lyttelton Harbour are already working collaboratively to improve the ecological and cultural health of the harbour. The relatively small close-knit communities value the aesthetic, cultural and recreational aspects of the harbour and its catchment. As outlined in our Annual Report, LPC provides sponsorship to a wide range of community groups and initiatives.

The Port Liaison Committee consists of members representing local communities as well as local and regional council representatives. The committee meets quarterly to discuss matters of interest from the community relating to Port activities.

Stakeholder engagement

Stakeholders include government and non-government organisations, community groups, recreational user groups of the harbour and local businesses and tourism operators. LPC meets with regulatory agencies around topics relating to pollution, consents and invasive species and works collaboratively across organisational spheres of influence.

We provide ongoing annual sponsorship and/or support to conservation organisations as referred to in our Annual Report. LPC is the principal sponsor of the Banks Peninsula Conservation Trust, which has a 2050 vision for the unique Ecological Region and biodiversity hotspot of Banks Peninsula (Banks Peninsula Conservation Trust, 2023) within which Whakaraupō/Lyttelton Harbour sits. The ecological goals set out by this vision aim to achieve thriving biodiversity across ecosystems in the Region. LPC supports this vision, and actions we take within our area of influence contribute to the wider biodiversity gains for the peninsula.

Industry engagement

LPC is an industry facilitating the trade of goods within New Zealand and around the world. As the South Island's largest port and the third largest in New Zealand, it is important that the company recognises nature-related impacts and dependencies of its direct operations as well as those within its value chain. We will work with industry partners, customers and suppliers to promote awareness and aligning of reporting metrics where relevant.



SECTION 4

Strategy

Sunrise over the entrance to Whakaraupō / Lyttelton Harbour taken from the top of the Port Saddle, one of LPC's designated restoration areas. Photo: Kirsty Brennan

Impacts, dependencies, risks and opportunities

This section provides a summary of the material impacts, dependencies, risks and opportunities identified through the TNFD LEAP process. Details about the process can be found in *Risk and impact management*.

Impacts on nature

Using the locate and evaluate steps of the TNFD LEAP process as a guide, LPC has identified the locations of business activities and where they interface with nature across three of the five drivers of nature change (Table 1).

Table 1. TNFD five drivers of nature change, explanations of use in this report or reasons why they have not been included.






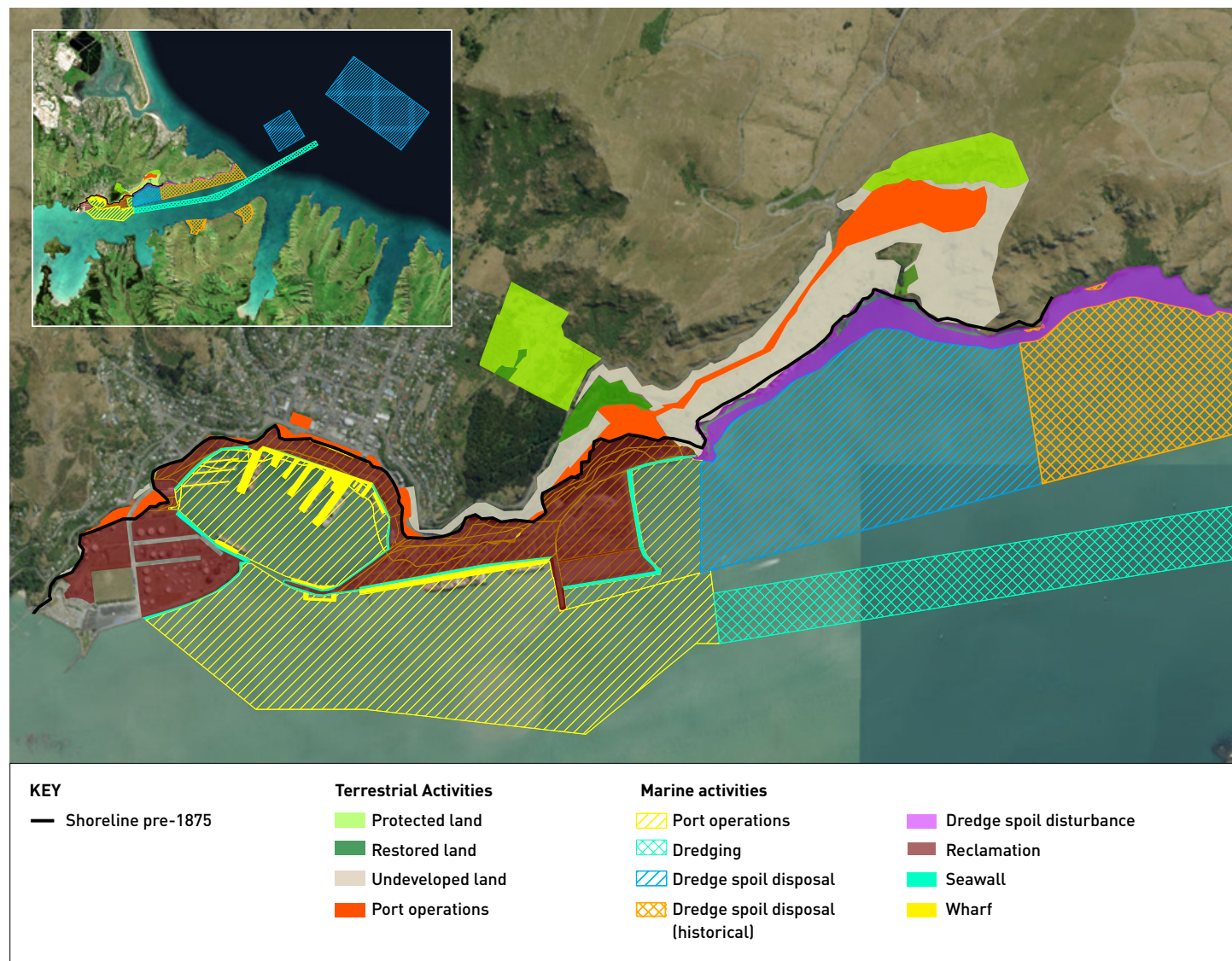
	Climate change	Land/marine/ freshwater use change	Pollution	Invasive species	Resource use
Examples of activities included					
Reasons not included	Nature loss driven by climate change is not well quantified for our location and has not been included. Aspects relating to business impacts of climate change have been addressed in LPC's Climate-related Disclosures Report 2024.	Lyttelton Port's area of influence does not intersect with any permanently flowing streams, with only a small overlay extent where ephemeral streams meet the harbour. The watercourses of the Lyttelton township are all highly modified and piped. LPC does not consider freshwater change to be a material impact for our business activities.	Stormwater discharges, sediment contamination, vessel movements, light pollution, underwater noise.	Pathways for invasive species movement across the land and in the water.	Inadequate information for assessment of impact at this time. Some metrics relating to resources have been included in this report such as water use.

Figure 5. Port business activities mapped for assessment of impacts on habitats. The inset map shows the wider extent of activities within Whakaraupō/Lyttelton Harbour and into Pegasus Bay. Activity descriptions can be found in Appendix 2.

Business activities have been mapped across Lyttelton Port’s area of influence (Figure 5). A more detailed description of the activities can be found in Appendix 2. Each activity has been specifically assessed for the magnitude of its impact on the habitat it intersects with (including factors such as extent, duration, permanence, reversibility and severity) and how it relates to the background trends in drivers of nature change.

The impact assessment collates impact of activities over time and space between 1875 and 2050 across Lyttelton Port’s area of influence. Impacts are related to drivers of nature change and habitat type. The assessment does not place significance weighting on particular habitat types. Future assessments may include weighting of certain habitats or locations of highest ecological, conservation or cultural significance.



The outputs of our assessment (Figure 6) describe LPC's impacts on nature in terms of net change in habitat extent and condition (expressed in 'quality hectares') over time (between 1875 and 2050). A no net loss impact score occurs when there is estimated to be no net change in habitat condition between the baseline date (1875) and future date (2050). Activities causing net degradation of nature over time will show as having a net negative impact. Alternatively, if an activity is likely to lead to habitat in 2050 being in a better net state than baseline, it will equate to a net positive impact.

Port operations, reclamation, dredge spoil disposal and dredging are the activities that have the biggest negative impacts on nature. For some activities, the net impact score relates more to the magnitude or severity of impact, but for others the net impact score relates to the area/extent of activity. At baseline date, habitat condition on land is considered to be poor due to the extensive land that was cleared prior. The restoration of land parcels (including the land the Port has protected under a Conservation Covenant) mean that for these terrestrial activities the future state of nature is forecast to be better than the baseline state.

Overall LPC's activities have a net negative impact on the habitats and species they intersect with. However, adverse impacts on biodiversity within Whakaraupō/Lyttelton Harbour are not solely the result of the Port's activities, and a wider catchment perspective needs to be considered for future restoration. LPC's assessment provides a reference to the scale of impact magnitude and a focus on Port activities to inform discussions and development of targets and strategy for our Biodiversity Positive Roadmap.

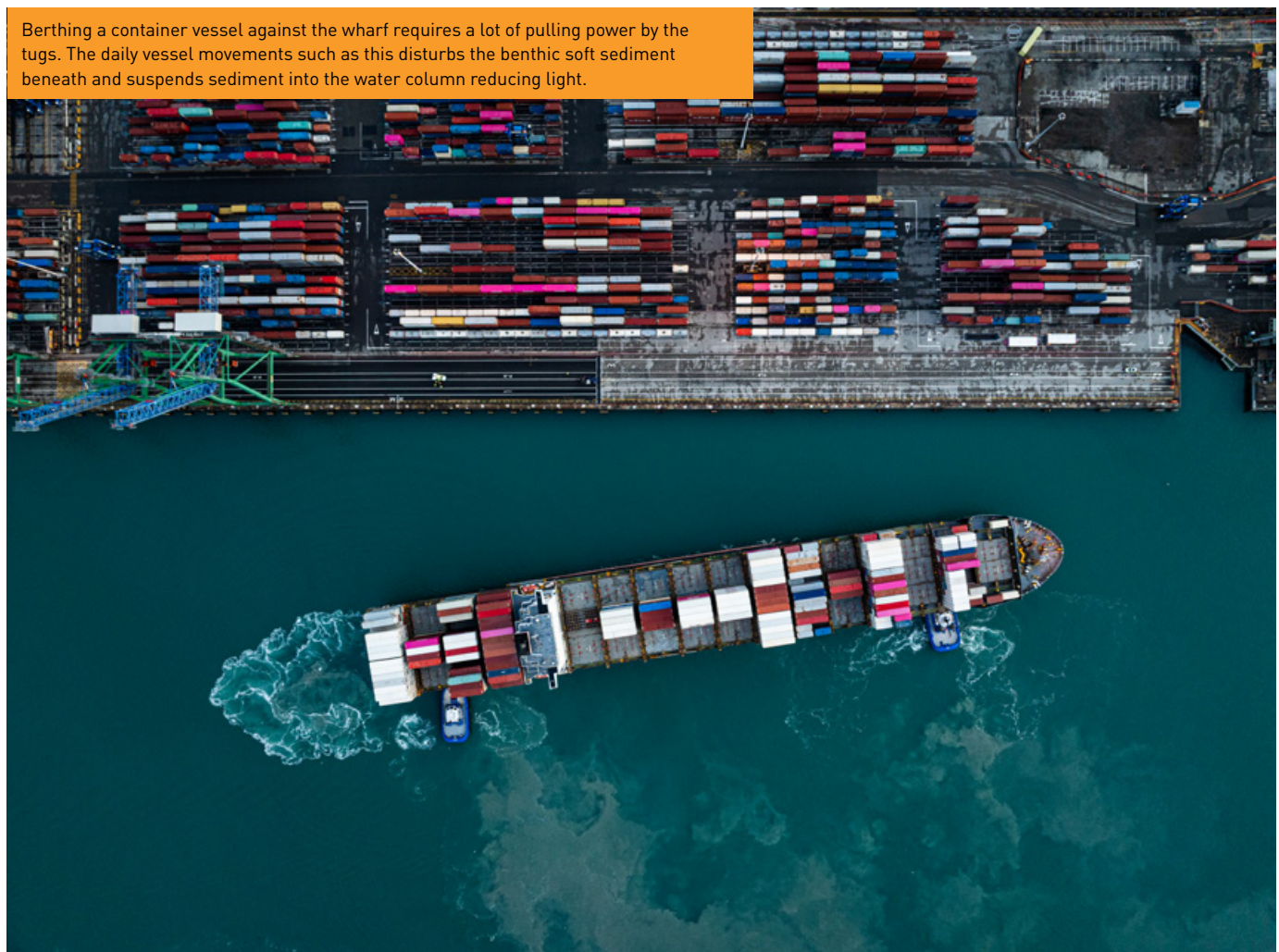
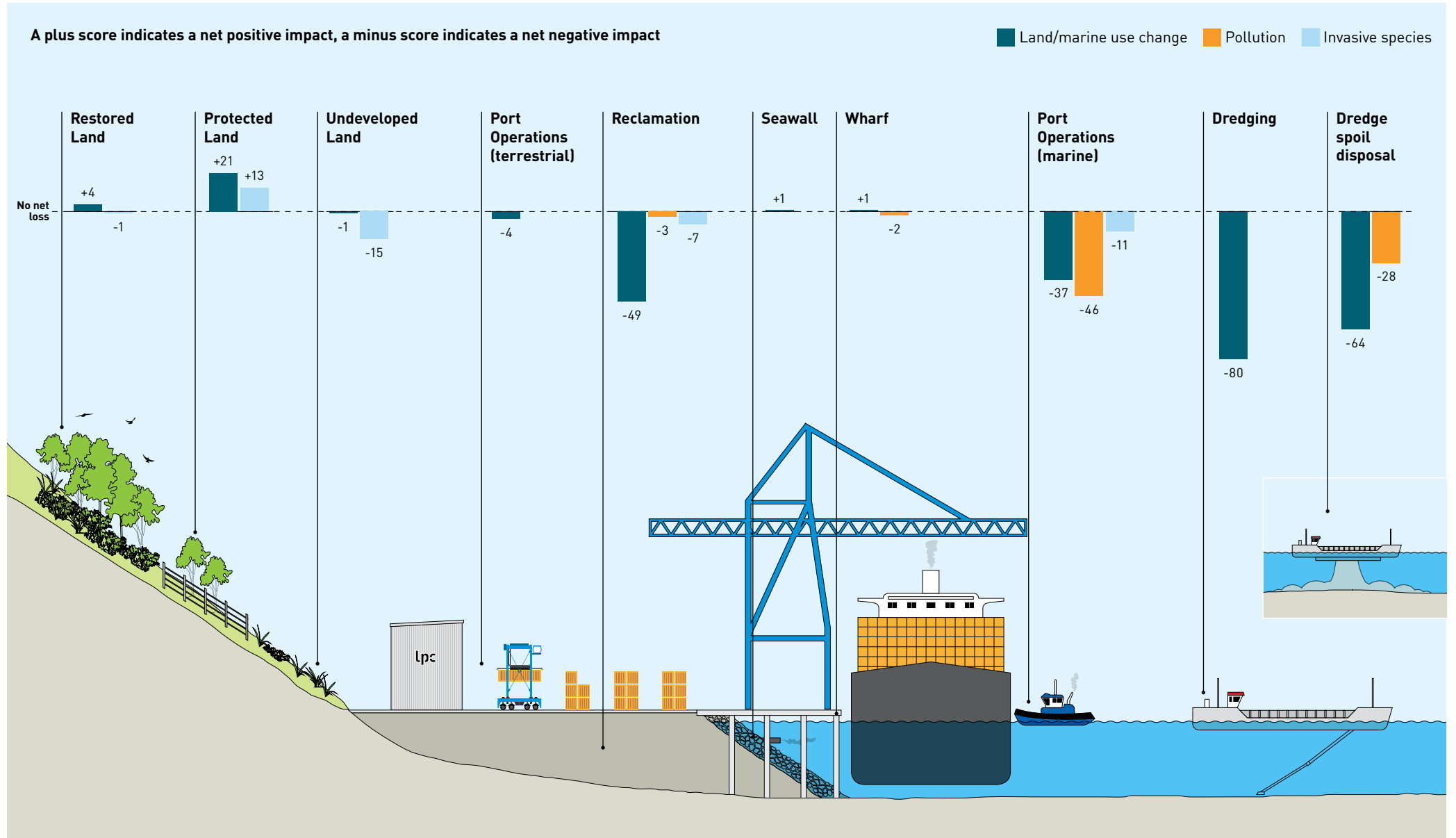


Figure 6. Net impacts of Lyttelton Port business activities on nature for three drivers of nature change (land/marine use change, pollution and invasive species). Impact scoring (net negative, no net loss and net positive) is based on accounting for changes in habitat extent and condition ('quality hectares') over time (between 1875 and 2050).



Dependencies on nature

Healthy nature is necessary for healthy people and a healthy economy and is a key underpinning of New Zealander[s] wellbeing. Department of Conservation (2016)

In FY24, LPC handled \$6.31 billion worth of imports and \$7.56 billion worth of exports to support the trade and supply of New Zealand’s South Island. LPC’s operations are deeply intertwined with nature. The Port relies on natural resources such as raw materials (rubber, timber and rock) for its infrastructure and operations. Additionally, the health of the harbour is crucial for diluting stormwater pollution and maintaining access for recreational activities, which helps sustain community relationships and operational consents. The recreational value, amenity and mahinga kai of Whakaraupō/Lyttelton Harbour is important for mana whenua, communities, businesses and visitors.

Following three workshops involving LPC staff, 10 of the most financially material dependencies on nature were selected for risk analysis. The classification from Brauman et al. (2019) has been used to identify the top 10 dependencies for nature’s contribution to people relating to LPC’s business. The business risk relating to these 10 key dependencies was estimated for current (2024) and future (2050) time periods by combining likelihood and consequence through the process described in *Risk and impact management* (Figure 7).

Key findings

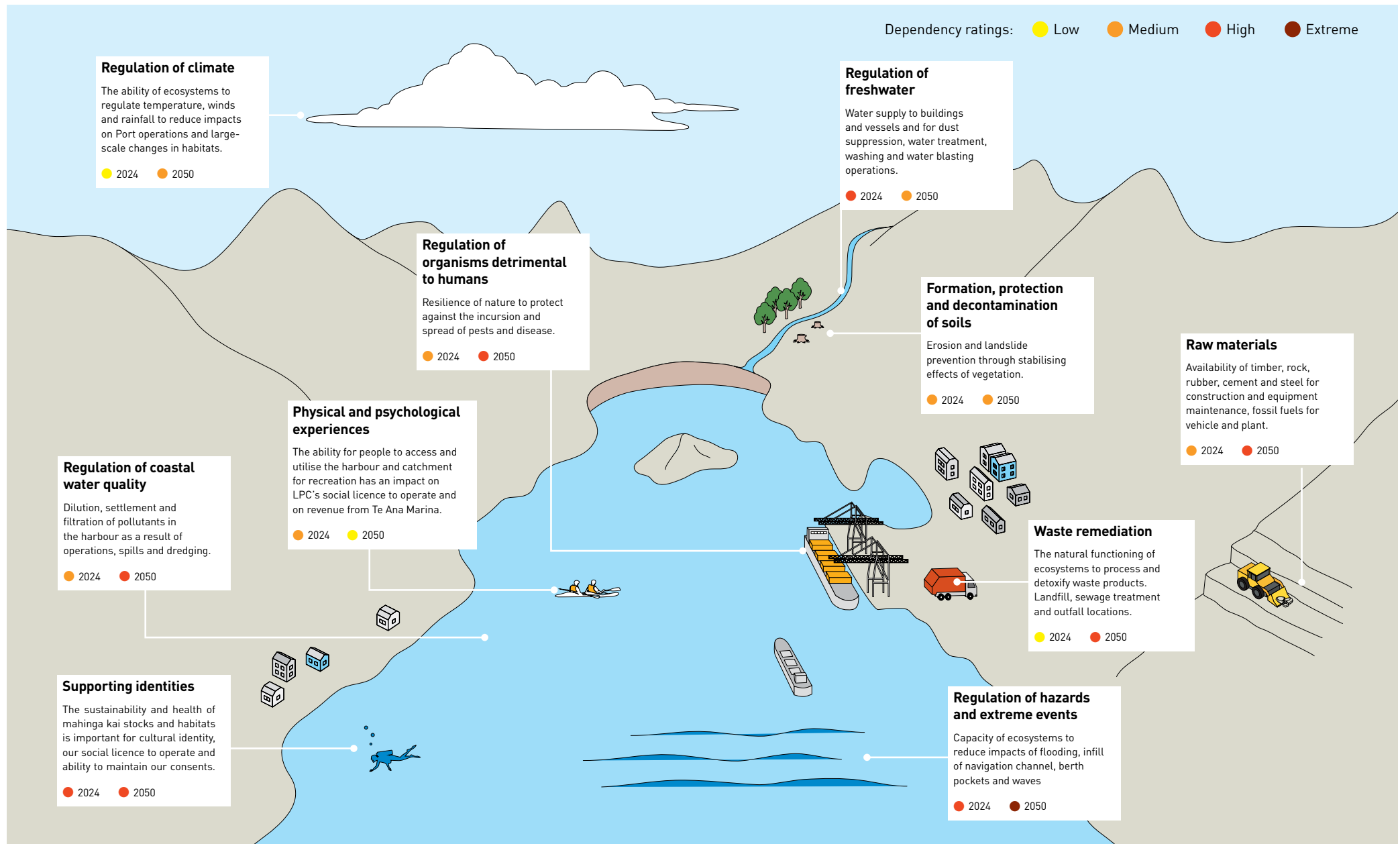
- **Current dependency rating (2024):** The highest dependency ratings are related to extreme weather events, availability of freshwater and the ability of the harbour to support mahinga kai. Extreme weather events are already having an impact on LPC’s business, including more frequent high wind events causing operational delays and large storm system events causing channel infill of sediments and damage to infrastructure. Nature’s contribution to healthy ecosystems is high today and into the future. Including the importance of the harbour to maintain cultural significance identity. Our social licence to operate and our ability to maintain consents relies on the health of the harbour and ecosystem function.
- **Future dependency rating (2050):** As a result of increased pressures on nature, including from climate change, the majority of dependencies LPC has on nature are predicted to shift to a higher dependency rating in the future. Weather events, availability of raw materials, waste removal costs and risk of pest and disease occurrence are likely to increase dependency-related risks for LPC’s operations in the future.

Scenario analysis has yet to be incorporated into the dependency assessment and will provide a more detailed analysis on the associated costs relating to the loss of nature’s services or remediation costs and how these might affect LPC.



Every business has a level of dependency on the services provided by nature. These ecosystem services are referred to as nature’s contributions to people. These contributions take various forms, including material (provisioning) contributions, regulating services and other non-material contributions including spiritual and cultural connection and identity.

Figure 7. LPC's material dependencies on nature with current (2024) and future (2050) dependency ratings.



Risks and opportunities

At a broad level, LPC has identified business risks relating to impacts and dependencies on nature and highlighted where LPC's activities contribute to risk factors. Our Climate-related Disclosures Report 2024 outlines in detail the risks to the business of different climate scenarios and will not be repeated in this report. Here, we describe the physical risks associated with weather events and climate patterns over short, medium and long time periods causing nature loss and damage and disruption to business operations (Table 2). Transitional risks relating to nature have been identified for policy and legal, reputational, market and technology categories (Table 3). There is also a transitional risk in the ability to obtain financial capital, which can either limit resources for mitigation projects (i.e. those that avoid and minimise effects on biodiversity or improve and enhance ecosystems) or limit sources of revenue or income if biodiversity targets are not being met. We have identified one systemic risk over the long term relating to marine ecosystem collapse (Table 3).

LPC has significant potential nature-related financial risk within its supply chain (directly through Port resource use and indirectly through customer industry-specific risks) but the likelihood of this manifesting significantly within the near future is uncertain. As an import/export business, LPC's revenue is linked with the viability of primary industries (such as agriculture, forestry and aquaculture) that are heavily reliant on nature. Physical and transitional risks inherent to our upstream supply chain and downstream value chains will be assessed in future disclosures.

Opportunities to reduce risk to the business and reduce impacts on nature have been identified, some of which are already under way. Using the mitigation hierarchy, LPC is aligning actions and targets with the SBTs for nature (Figure 8). We are also using our local frameworks to incorporate local biodiversity goals and aspirations as outlined in Whaka-Ora and the Banks Peninsula 2050 Ecological Vision (Banks Peninsula Conservation Trust, 2023). A Biodiversity Positive Roadmap to be developed following stakeholder engagement will provide more certainty around actions for nature that will include opportunities to mitigate LPC's impacts, dependencies and risks.

LPC staff contributing to restoration at the Port Saddle with support from the Banks Peninsula Conservation Trust.



Table 2. LPC’s physical risks and opportunities relating to nature loss. Timeframes for risks to be realised are defined as short (1–5 years), medium (5–10 years) or long (10+ years).









Description	Timeframe	Risk to business	LPC and external factors influencing risk	Mitigation/opportunity
Acute and chronic				
 <p>Extreme weather events, including high winds, intense rain events, flooding, cyclones</p>	Short	<ul style="list-style-type: none"> • Disruption to Port operations and supply chain, including shutdown periods and transport interruptions. • Greater infill of sediment into navigation channel and corresponding dredging costs. • Port unable to respond to weather events and effectively mitigate leading to breach of consent conditions and/ or incidents. 	<ul style="list-style-type: none"> • Port infrastructure does not absorb wave energy or allow rainfall to permeate, resulting in exacerbated effects of extreme weather events on infrastructure. • Harbour-wide conversion of coastal edge vegetation (e.g. saltmarsh) and terrestrial catchment-wide vegetation has reduced the ability of the harbour to buffer extreme weather. 	<ul style="list-style-type: none"> • LPC is aware of risks associated with extreme weather events on operations and incorporates these into planning. • Nature-based solutions in infrastructure and eco-engineering. • Restoration of habitat that buffers the impact of extreme weather, including saltmarsh and kelp habitat. • Restoration of native vegetation across the catchment.
 <p>Incursion of invasive species</p>	Short	<ul style="list-style-type: none"> • Cost of management of invasive species • Loss of revenue from recreational vessels who consider the risk of marine pest incursion too high. 	<ul style="list-style-type: none"> • Biosecurity control and management undertaken at the Port to reduce the introduction and spread of invasive species. • Catchment and regional management of invasive species. 	<ul style="list-style-type: none"> • Monitoring and management of targeted invasive species. • Restoration of native biodiversity to increase resilience against invasive species. • Support the need for a haul out facility for recreational vessels. • Consult on policy and planning to ensure resource available for pest management
 <p>Changing weather patterns and sea temperature/ acidity causing rapid and wide-spread decline of native biodiversity leading to degradation of harbour health</p>	Long	<ul style="list-style-type: none"> • Inability to operate due to the poor state of nature and the loss of ecosystem services such as harbour water quality. 	<ul style="list-style-type: none"> • Input of pollution and sediment that increases the decline of native species. 	<ul style="list-style-type: none"> • Restoration initiatives in terrestrial and marine environments to improve resilience of ecosystems. • Research and innovation relating to the adaptation of natural ecosystems and ways to improve resilience. • Avoid and reduce pollution into the harbour.
 <p>Reduction in the availability of freshwater</p>	Medium	<ul style="list-style-type: none"> • Breaching of consent conditions due to the inability to mitigate dust. 	<ul style="list-style-type: none"> • Cumulative water needs of LPC, businesses and communities. 	<ul style="list-style-type: none"> • Monitor water use and implement solutions for reducing and reusing.

Table 3. LPC’s transitional and systemic risks and opportunities relating to nature. Timeframes for risks to be realised are defined as short (1–5 years), medium (5–10 years) or long (10+ years).

Description	Timeframe	Risk to business	LPC and external factors influencing risk	Mitigation/opportunity
TRANSITIONAL				
Policy and legal				
 <p>Changes in regulations/legislation placing increased restrictions and controls on Port activities, including consents, Resource Management Act and coastal policy</p>	Short	<ul style="list-style-type: none"> Increased capital expenditure and compliance costs associated with improving environmental outcomes. 	<ul style="list-style-type: none"> Incidents that lead to negative impacts on nature. Biodiversity positive outcomes are not considered in planning and decision making. Stormwater pollution from catchments outside the Port that lead to pollution of the harbour. 	<ul style="list-style-type: none"> Improved standards and practices of environmental management. Stormwater treatment. Investing in solutions to reduce pollution.
 <p>Regulators and communities have a reduced tolerance to Port activities having a negative impact on nature</p>	Short	<ul style="list-style-type: none"> Greater costs associated with LPC obtaining new consents. Greater difficulty in maintaining existing consents 	<ul style="list-style-type: none"> Incidents that lead to negative impacts on nature. 	<ul style="list-style-type: none"> Ecological restoration initiatives focused on the health of mahinga kai. Community engagement initiatives. Maintain access to important areas for recreation.
 <p>Increased restrictions on water consumption</p>	Short	<ul style="list-style-type: none"> Increased cost of water use. Limitations around the quantities of water used at the Port, impacting our ability to mitigate dust. 	<ul style="list-style-type: none"> High reliance on freshwater use on dust mitigation and freshwater supply. High water use needs in the community. Water infrastructure in Lyttelton unable to meet needs. 	<ul style="list-style-type: none"> Develop strategies around water reduction, reuse and recycling.
Reputational				
 <p>Damaged reputation from negative impacts on nature</p>	Short	<ul style="list-style-type: none"> Loss of social licence to operate. Loss of business opportunities with customers including Te Ana Marina berth holders 	<ul style="list-style-type: none"> Incidents that lead to negative impacts on nature. The need for LPC to obtain new consents. 	<ul style="list-style-type: none"> Partnership with Whaka-Ora continuing to resource biodiversity positive projects in the catchment. Meeting consent conditions with improved environmental management.





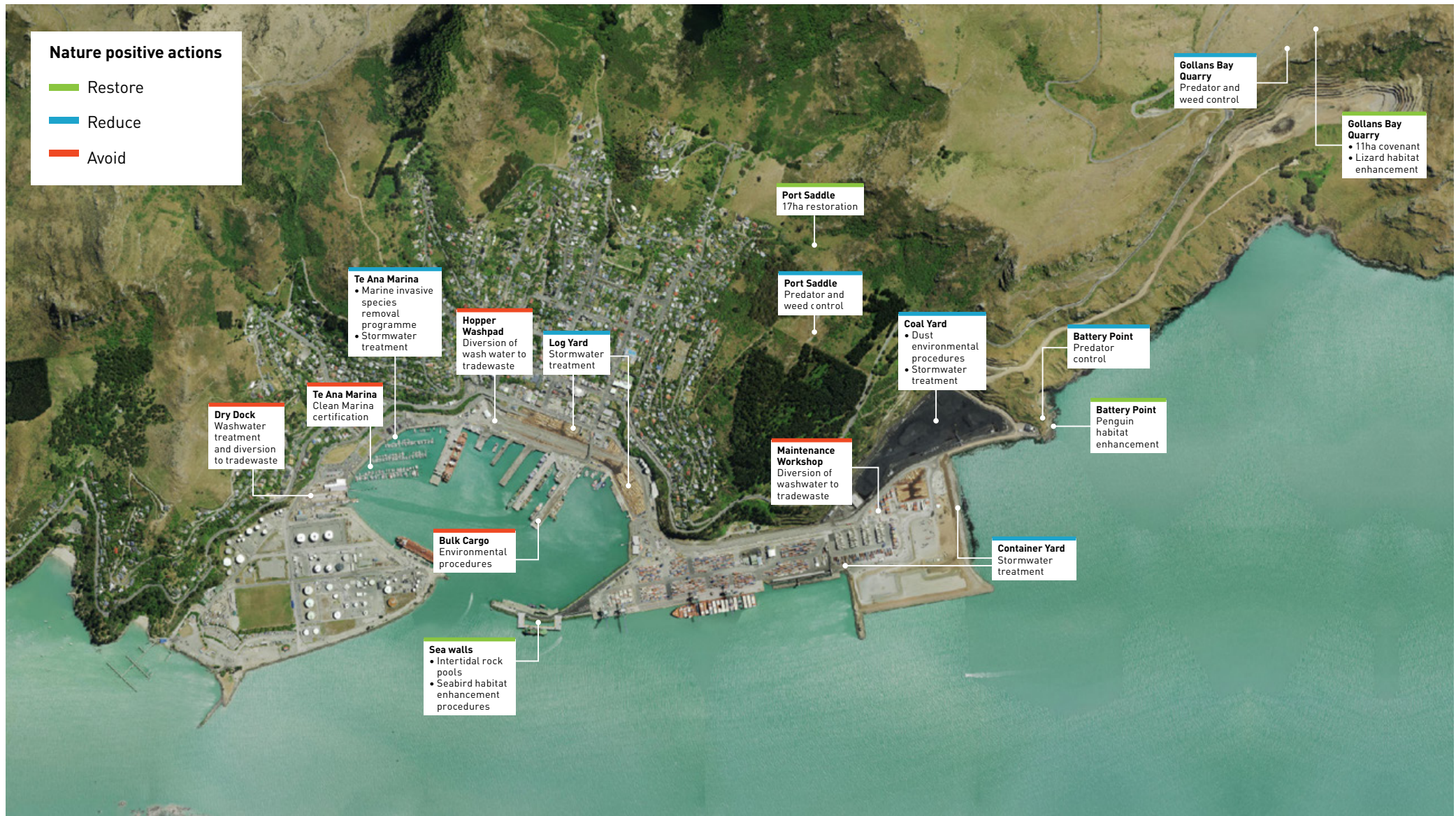
Description	Timeframe	Risk to business	LPC and external factors influencing risk	Mitigation/opportunity
Market				
 <p>Reduced availability of raw materials due to suppliers transitioning to alternatives, and market divestment in activities having a negative impact on nature.</p>	Medium	<ul style="list-style-type: none"> Increased cost of materials, reduced availability of materials, reliance on alternatives. 	<ul style="list-style-type: none"> Other users contribute to the reduction of availability of resources or the increased cost. Suppliers of raw materials unable to obtain new consents for operating. 	<ul style="list-style-type: none"> Keep abreast of market transitions and ensuring LPC is able to adapt to use of alternative materials or the change in goods through the Port.
Technology				
 <p>New technologies that deliver reduced impacts on nature becoming a requirement for activities at the Port, including pest detection, waste reuse, dust mitigation and freshwater reuse.</p>	Long	<ul style="list-style-type: none"> Increased capital and compliance costs associated with new technology improving environmental outcomes. 	<ul style="list-style-type: none"> Lack of knowledge and awareness of technology to deliver improved outcomes for nature and business. 	<ul style="list-style-type: none"> Keeping abreast of new technologies available that reduce the negative impacts of activities on the environment. Technology that increases the rate of detecting invasive species to improve management. Waste minimisation technology that diverts waste from landfill.
Financial capital				
 <p>Funding for biodiversity projects is reduced or re-prioritised</p>	Medium	<ul style="list-style-type: none"> Inability to meet biodiversity positive targets and commitments. 	<ul style="list-style-type: none"> Limited progress on biodiversity positive goals leading to reduced mitigation of nature-related risks. 	<ul style="list-style-type: none"> Roadmap planning and adequate financial forecasting. Working in partnership with others. Solutions that incorporate both climate and nature risk mitigation.
SYSTEMIC				
Ecosystem stability				
 <p>Marine ecosystem function collapses causing widespread die-off of species and degradation of habitat.</p>	Long	<ul style="list-style-type: none"> Impacts to consents to operate as the receiving environment no longer able to buffer the impacts from Port activities. 	<ul style="list-style-type: none"> Climate-driven changes leading to ecological tipping points and associated feedback loops driving ecological decline 	<ul style="list-style-type: none"> Projects to enhance resilience of habitats and ecosystems at a catchment scale.

Figure 8. Action on the ground relating to LPC’s direct contributions towards achieving biodiversity positive. The actions have been categorised by mitigation hierarchy terminology, specifically the SBTs for nature Action Framework steps of avoid, reduce and restore.



Business model and strategy

A new vision statement for LPC was developed in FY24: “To be New Zealand’s most sustainable and innovative maritime gateway, enriching our communities and driving economic prosperity.” The commitment to environmental and financial sustainability sits alongside the intention to maintain and enhance the key role of the Port as the South Island’s trade gateway. LPC already undertakes Integrated Reporting, and with greater understanding of nature-related risks, we expect our business model to become more robust.

Nature-related risks and opportunities will look to be incorporated into LPC’s financial planning. The company is identifying critical risks related to nature loss such as the availability of raw materials and the harbour’s ability to manage pollution. By publicly reporting on nature-related issues, LPC aims to enhance transparency and accountability. This disclosure report is the first step to embedding natural capital within business reporting and planning.

Scenario analysis and resilience

Changes, developments and uncertainties relating to nature have not been specifically scoped and should be assessed at a regional or catchment scale. We will progress scenario analysis with the input of stakeholders and affected parties to disclose the implications on business strategy and financial planning in the future.



A view from the hill top looking over Lyttelton, the Port and Whakaraupō. Photo: Charlotte Jones

Locations of assets and/or activities

In LPC's direct operations that meet the criteria for priority locations

Criteria met for priority location for Lyttelton Port

Of LPC's three operational locations, Lyttelton Port meets the TNFD's criteria for a priority location due to intersecting and connecting with ecosystems of high ecological and cultural significance, areas of high biodiversity conservation importance and areas where Port activities have significant impacts and dependencies.

Significant ecosystems

With extensive land clearing throughout Banks Peninsula, only 1% of the natural vegetation remained by the 1920s (Hart, 2013). This denuding and fragmentation of the landscape has led to increased sedimentation in the streams and coastal areas and increased pressure on indigenous vegetation. Within the catchment of Whakaraupō/Lyttelton Harbour, high-integrity remnants of original ecosystems are now being supported by restoration action across the catchment both on the land and in the sea. Lyttelton Port's area of influence intersects with some of these significant ecosystems, including dry rocky ecosystems that support skinks and geckos and intertidal habitat supporting kelp forests and productive marine environments.

Areas of high biodiversity and conservation importance

Whakaraupō/Lyttelton Harbour is part of the Port Hills Ecological District and specifically the Banks Ecological Region (Wilson, 1992; Harding 2009). Banks Peninsula is recognised for its unique geologic features and as a biodiversity hotspot (Banks Peninsula Conservation Trust, 2023). The waters in and around Whakaraupō/Lyttelton Harbour are also of high conservation importance.


The coastal waters surrounding Banks Peninsula are part of the Banks Peninsula Marine Mammal Sanctuary to provide protection against activities that may threaten Hector's dolphins/upokohue (*Cephalorhynchus hectori*). Port operations in the marine area intersect with this sanctuary. The marine waters of Whakaraupō/Lyttelton Harbour are part of the three mātaihai reserves to improve the fisheries within the harbour. The bylaw for the reserve manages harvest of some shellfish and seaweed species and sets limits on numbers of fish and shellfish.

Many plants and animals found in this region are endemic to the area, New Zealand and the world including the white-flipped penguin/kororā (*Eudyptula minor ssp. albosignata*) and the Banks Peninsula blue tussock (*Festuca actae*). Whakaraupō/Lyttelton Harbour supports habitat for several threatened and vulnerable species according to both the New Zealand Threat Classification System and the global IUCN Red List, including the Canterbury/Waitaha gecko (*Woodworthia brunneus*) and Hector's dolphin.

Whakaraupō/Lyttelton Harbour is an ancestral landscape for Te Hapū o Ngāti Wheke. There are specific locations of cultural significance that have been impacted by Port activities, some of which are irreversible. A number of businesses are reliant on the health of the natural ecosystems within Whakaraupō/Lyttelton Harbour for their businesses, including small-scale aquaculture, ecotourism and native seed banks and nurseries.

Potential significant dependencies and impacts

A port has operated within the harbour for almost 150 years and has contributed to impacts relating to pollution, land and marine use change and invasive species introduction or spread. LPC is also significantly dependent on the services provided by nature in Whakaraupō/Lyttelton Harbour for its business financial stability and resilience.



Sun shining through a bed of rimu kakauroa/Giant kelp (*Macrocystis pyrifera*) in the waters of Whakaraupō/Lyttelton Harbour. Photo: Tommaso Alestra

SECTION 5

Risk and impact management

Impacts on nature

Our process for identifying and assessing impacts on nature was undertaken at a detailed scale since we are disclosing on one location and had access to credible data sources. Our impacts assessment is based on internal analysis conducted by LPC, verified by technical experts. Our intent is to build on this assessment in future years through engagement with others and include indigenous Māori knowledge and community perspectives.

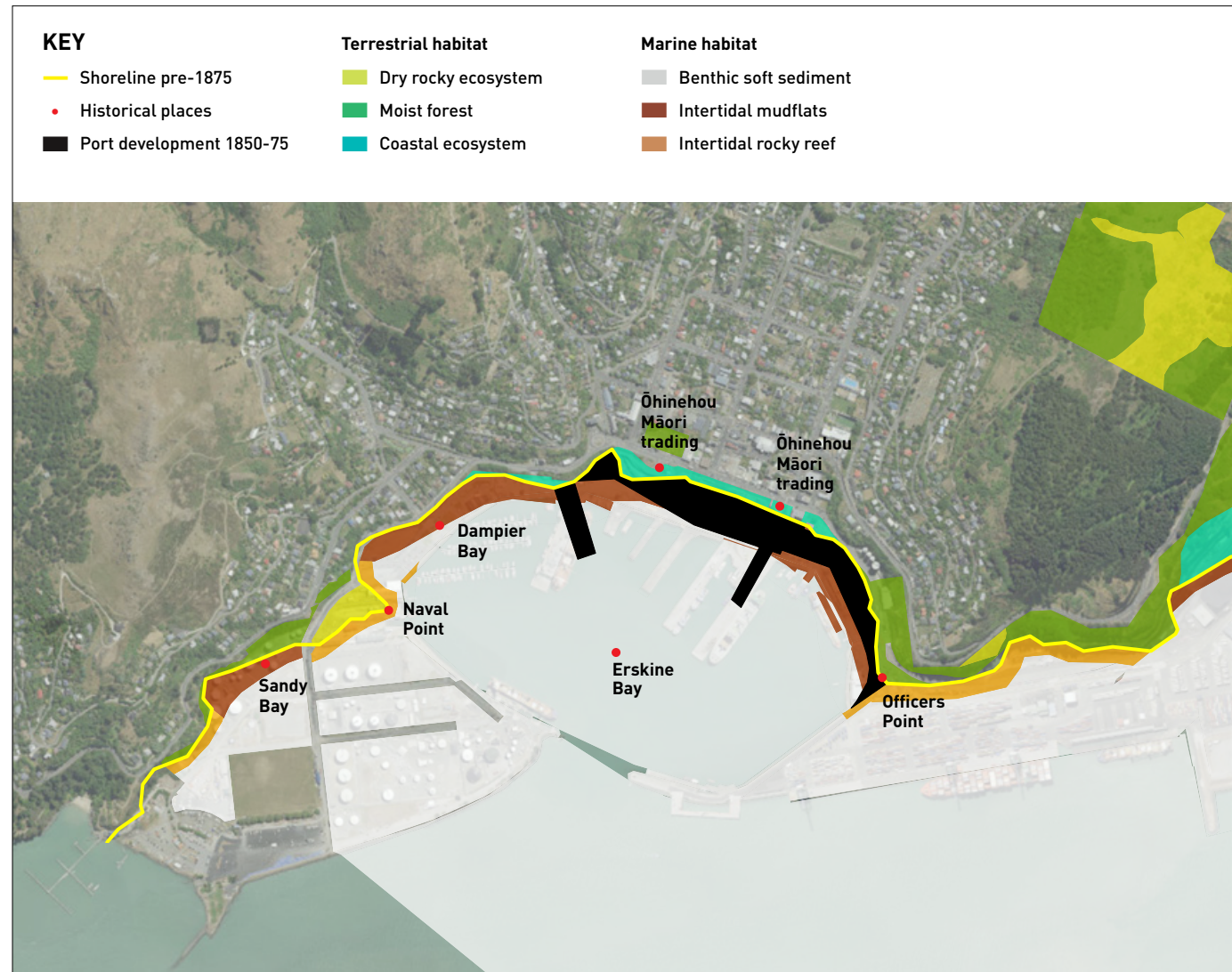
We undertook a stepped approach to impact analysis provided in detail below

1. Baseline date, habitat typology and distribution
2. Business activities
3. Habitat condition
4. Impact magnitude

Step 1: Baseline date, habitat typology and distribution

We assessed the impacts of our business activities on nature occurring from a baseline date of 1875. This baseline year was the year before the Harbour Board was established and the year from which imports and exports started to increase due to the growing agriculture on the Canterbury Plains and settlement in Christchurch. Prior to 1875, the Port's main function was facilitating the immigration of colonial settlers to Christchurch. Using archaeological reports and photos from this period, we are able to create a relatively accurate estimate of Port developments, habitats and conditions at this baseline date (Figure 9). We have used a local habitat typology corresponding to data that relates to locations within the catchment and harbour and the health of these habitats and species. Appendix 1 provides a description of these habitats types and the relative Global Ecosystem Type it fits within.

Figure 9. Baseline year of 1875 shoreline location and Port development. Habitat types for Lyttelton Port's area of influence have been overlaid, showing alignment with historical photos (Figure 10).



Our assessment used a pre-1875 shoreline delineation to distinguish terrestrial and marine habitats. Overlaying LPC's area of influence with natural habitat types, we can distinguish the relative extent of activity per habitat (Table 4). Of LPC's area of influence, benthic soft sediment within Whakaraupō/Lyttelton Harbour and off shore in Pegasus Bay is the habitat type that our activities intersect with the most. However, when considering the habitat types across the entire catchment (Figure 13), the extent of LPC's area of influence has the greatest proportional impact on the subtidal rocky reef.

Mapping of subtidal rocky reef extent is inaccurate due to the uncertainty inherent in mapping habitats under the water. Nevertheless, LPC considers rocky reef habitat (both intertidal and subtidal) to be highly significant from an ecological and cultural perspective and will have a particular focus on impact mitigation and enhancement of this habitat type.

Table 4. Area of naturally occurring habitat types within LPC's area of influence and within the Whakaraupō/Lyttelton Harbour catchment. Refer to Figure 3 and Figure 13 for a spatial representation of this data.

	Natural habitat extent within LPC's operational area of influence (hectares)	Total area of natural habitat within catchment (hectares)	Percent of the total catchment area that LPC operational area intersects with
Terrestrial habitat within Whakaraupō catchment	116	20,410	0.6%
Dry rocky ecosystem	55	5,663	1.0%
Moist forest ecosystem	50	10,121	0.5%
Coastal ecosystem	10	1,261	0.8%
Marine habitat – within Whakaraupō harbour	933	4,374	21%
Benthic soft sediment	854	3,493	24%
Intertidal rocky reef	17	67	25%
Intertidal mudflats	13	686	2%
Subtidal rocky reef	49	128	38%
Marine habitat – within Pegasus Bay beyond the heads of Whakaraupō			
Offshore benthic soft sediment	1,609	73,828	2%

Figure 10. Inner harbour of Lyttelton circa 1850–1870. Images show the original shoreline and indicate habitat type and condition of terrestrial and marine environments at the 1875 baseline year.

Step 2: Business activities

Our impact assessment used the mitigation hierarchy as a framework to assess the net impact of LPC’s activities over time and space. The method accounts for net changes in habitat condition and spatial extent over a time period. Habitat condition scores were based on information in technical reports and monitoring data available to LPC that describe the ecological health of habitats and presence or abundance of indicator species within a location. More development is required to improve the rigour of habitat condition assessments, including to incorporate the relative cultural and ecological significance among habitat types.

Business activities assessed across Lyttelton Port’s area of influence include a variety of activity types (see Figure 5 and Figure 6). Activities are separately assessed for the different drivers of nature change, meaning that some areas of activity were assessed for land/marine use change and then for pollution and then for invasive species.



<https://winsomegriffin.com/Guilford/Lyttelton.html>



Sandy Bay. Lyttelton Museum ref 14625.109



Lyttelton. Dobson, E J : Photographs. Ref: 1/2-065776-F. Alexander Turnbull Library, Wellington, New Zealand

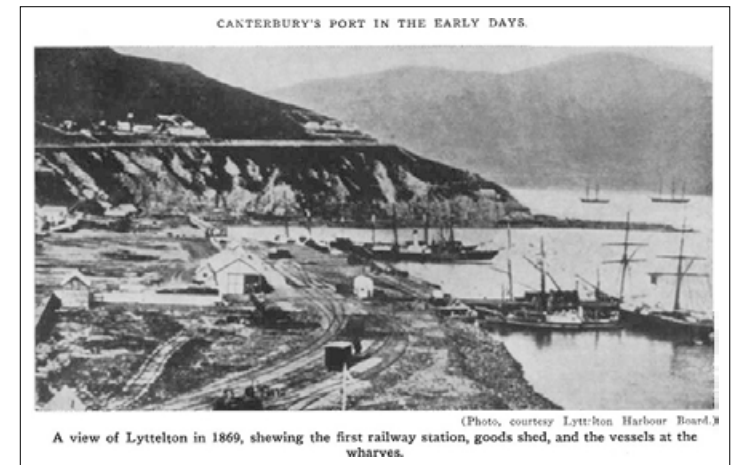


Photo: Lyttelton Harbour Board

Step 3: Habitat condition

Photos, archaeological reports and files from the baseline date of 1875 provided a basis for mapping of location of habitats and interpreting the historical condition of these habitats (Figure 10). Along with the pre-1875 deforestation of the catchment (de Vries, 2007; Harding, 2009; Banks Peninsula Conservation Trust, 2023), the development of the township of Lyttelton and the initial reclamation of the foreshore had already altered the natural state of marine habitats within Whakaraupō/Lyttelton Harbour.

LPC’s impact assessment utilised a semi-quantitative approach when determining habitat condition using a mix of empirical data and technical expert opinion. This approach enables cumulative and collective impacts from activities to have results along an ordinal scale which can also be compared and summed among habitats. The scoring classes allow for uncertainties in the classification as a result of limitations and assumptions in the data. A habitat condition rating system was developed for LPC’s impact assessment to describe the habitat condition for each of the three time periods (1875, 2024 and 2050) within a particular location (Table 5).

Habitat condition scoring was based on the ecological information available to LPC at the time of assessment. No weighting for relative habitat significance was applied in this assessment. However, this will be a future consideration following engagement with key stakeholders.

For the impact drivers of land/marine use change and pollution, baseline habitat condition was estimated to be good (0.75) for habitats in the marine environment and poor (0.25) for habitats in the terrestrial environment. This is due to the land being largely cleared of natural vegetation, established settlements within the town of Lyttelton and the early effects of marine disturbance by vessels and sedimentation or pollution from land activities. The introduction of invasive species to this location is estimated to be post-1875. Hence, the habitat condition at baseline relating to this driver of nature change is considered reference condition.

Table 5. Habitat condition rating scores applied to LPC’s impact assessment of Port activities at baseline (1875), current (2024) and future (2050) time periods.

Condition rating score	Rating type	Habitat condition definition
1.0	Reference	A resilient ecosystem of high ecological integrity (in the modern context considering irreversible historic changes) supporting healthy populations of representative species that can sustainably support mahinga kai. Pest species eradicated or controlled to abundances that do not significantly affect natural ecological function or diversity.
0.75	Good	Representative habitats and species found in the location with high ecological integrity. Pest species under management.
0.5	Moderate	Habitats, communities and species populations show evidence of stress caused by impacts. However, basic ecological functions within the habitat are maintained
0.25	Poor	Patchy habitat, fragmentation and low species diversity leading to degraded habitat condition. Ecological integrity and function are low. However, there is still potential for restoration through assisted natural regeneration.
0	Highly modified	Habitat completely lost or modified with no ability for assisted natural regeneration possible (restoration only viable through complete re-creation).

Step 4: Impact magnitude

Business activities were split by the habitat types they intersect with, and each activity-habitat linkage was assessed for specific impact drivers. If an activity had multiple impact drivers, it was counted separately for each driver. For example, dredging extent overlays with both benthic soft sediment and offshore benthic soft sediment habitats and causes impacts from two impact drivers – marine area change and pollution. This results in four distinct extents being assessed for dredging activity - each with baseline, current and future condition scores.

An adaptation of the quality hectares method (also known as condition adjusted area or habitat hectares) was used to assess impact magnitude. This approach is based on multiplying the degree of change in habitat condition between the future and baseline time periods by the extent of each habitat type it applies to in hectares. LPC’s approach was to compare the semi-quantitative habitat condition rating scores (Table 5) between the baseline and future periods based on business activities under way and confirmed Port operations or mitigation and regeneration activities. The results can be presented by activity (Figure 6), by habitat type (Figure 11) or by location (not included in this report).

The visualisations of LPC’s first nature impact assessment provide a starting point to determine activities that have the biggest negative impacts on nature across multiple impact drivers and the extent of habitat types negatively affected by activities. LPC can use this assessment to prioritise mitigation actions.

Impact assessment limitations and assumptions

This impact assessment is currently limited by a number of factors:

- No significance weightings have been applied to habitat types leading to the analysis largely indicating total magnitude of impacts per habitat rather than the consequence or significance of impacts to biodiversity or cultural and ecological health.
- Some impacts from activities have not yet been assessed, including light pollution on bird nesting around the harbour or changes to the harbour hydrodynamics due to Port infrastructure.
- Mapping of some marine habitats is at low resolution.
- Habitat condition estimations at baseline date have low accuracy.

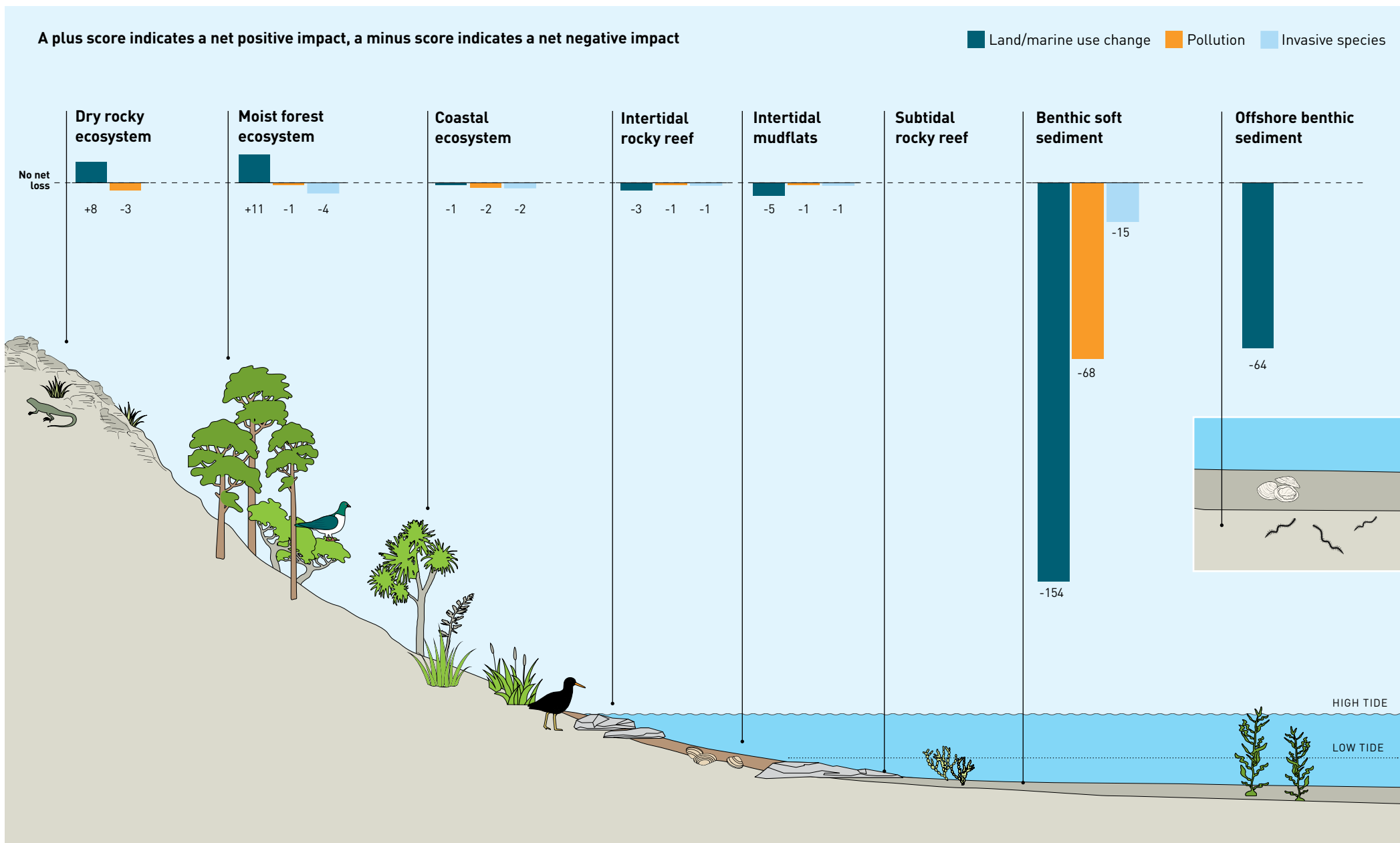
Impact magnitude in quality hectares (QH) for this assessment is calculated as follows:

$$QH = \text{Area of habitat type intersecting with the activity (ha)} \times \left(\text{Future habitat condition} - \text{Baseline habitat condition} \right)$$

Future habitat condition: Semi-quantitative condition score predicting the future 2050 state of nature following LPC’s currently active or planned business and catchment activities and investments in nature such as restoration activity, predator control and stormwater improvements.

Baseline habitat condition: Semi-quantitative condition score assumed for habitats in the baseline year of 1875.

Figure 11. The net impact score (quality hectares) of LPC’s operational activities on habitat types they intersect with, categorised by drivers of nature change. Habitat significance weightings have not been applied.



Dependencies on nature

LPC's dependencies have been aligned with the framework adopted by Brauman et al. (2019) based on Díaz et al. (2018). The dependencies in this framework refer to nature's contribution to people, which is a revised set of what was previously described as ecosystem services. LPC's initial workshop sessions were based on the ecosystem services categories described in Hanson et al. (2012).

Three workshops held for LPC staff representing various business units were conducted to first list all foreseeable risks relating to nature for LPC's direct operations and then to categorise a list of the top 10 most financially material (directly or indirectly) to LPC. These disclosures focus first on LPC's direct dependencies on nature with an acknowledgement that the business is also highly dependent on its supply chain's dependencies on nature. LPC's standard business risk management framework was used to evaluate the risk of nature loss to the business relating to the 10 most important dependencies on nature.

A summary of the ecosystem services scoping from the first workshop in May 2024 highlights foreseeable dependencies on nature, 15 relating to LPC's direct operations and 21 relating to LPC's supply chain (Appendix 3).

The main emphasis of the risk evaluation of dependencies was to determine material risk in terms of the potential financial impact on LPC's business. This was evaluated as direct capital or operational costs or indirect through the risk of legal costs, fines or increased cost of consent compliance. LPC has zero appetite for risks associated with a number of categories, including social licence to operate and compliance. For this first assessment of dependencies, a qualitative approach has been taken to highlight to management and the Board how LPC's business is dependent on nature's contributions and how this is likely to change over time. Financial consequence quantification of some of the higher-priority risks will be considered for future nature-related risk assessments.

Risks and opportunities

LPC recognises the risks posed by both nature loss and climate change on its core business. This report does not comprehensively address risks associated with the value chain but will develop understanding of these over time.

In lieu of region-specific scenarios for nature or Port-specific guidance, LPC has predicted some of the risks foreseeable in the short (1–5 years), medium (5–10 years) and long (10+ years) time horizons. Risks are categorised as physical risks, transition risks or systemic risks following climate-risk typology and can result from dependencies and impacts on nature either separately or synergistically.

Opportunities to avoid and reduce impacts on nature combined with natural regeneration can lead to a situation where no net loss of nature is occurring for some activities and habitats. In order to achieve a net positive outcome for nature, residual adverse impacts need to be addressed through restoration of nature and the transformation of business models or value-chains. This approach follows the recommendations by the Science Based Targets Network. We will continue to collaborate with others to consider catchment-scale opportunities that to address key nature-related impacts and benefit nature at the scale it operates.

Managing dependencies, impacts, risks and opportunities

LPC's Environmental Policy outlines the process for managing nature-related impacts and risks. There is no current process to directly manage nature-related dependencies. However, a number of dependencies relate to compliance, sustainability and social licence that are referred to in the Environmental Policy. We have a Sustainability Strategy that sets targets around waste, emissions reduction and biodiversity.

Environmental aspects of LPC's operations are managed under an Environmental Management System (EMS) certified under the Toitū enviromark gold standard (equivalent to ISO 14001:2015 Environmental management systems). A similar EMS exists for construction projects – a comprehensive system for contractors to understand and follow while undertaking work at the Port.

The EMSs set out processes to manage impacts on the environment relating to dust, discharges to water, waste, contamination of land and wildlife. There is a process to document consent compliance, incidents and complaints. Each business unit at LPC has specific operational controls and procedures to manage impacts on the environment, including resource consents with requirements.

The Environment and Sustainability Team implement the EMS and supports operational staff. Alongside the EMS, the Environment and Sustainability Team looks after the three streams of the Sustainability Strategy – waste minimisation, carbon emissions reduction and biodiversity positive. Bi-monthly meetings with senior leaders for each business unit are established to discuss all aspects of environmental management and progress on the sustainability targets.

LPC's opportunities relating to nature are managed through our own annual operational budgets, capital projects and through Whaka-Ora. Opportunities can be categorised under the mitigation hierarchy and will now be accounted for in this and future nature-related disclosures. Opportunities implemented through Whaka-Ora and implemented by others are not accounted for in our disclosures. However, these non-LPC delivered activities will assist with the long-term management of nature-related dependencies and risks identified in this report.

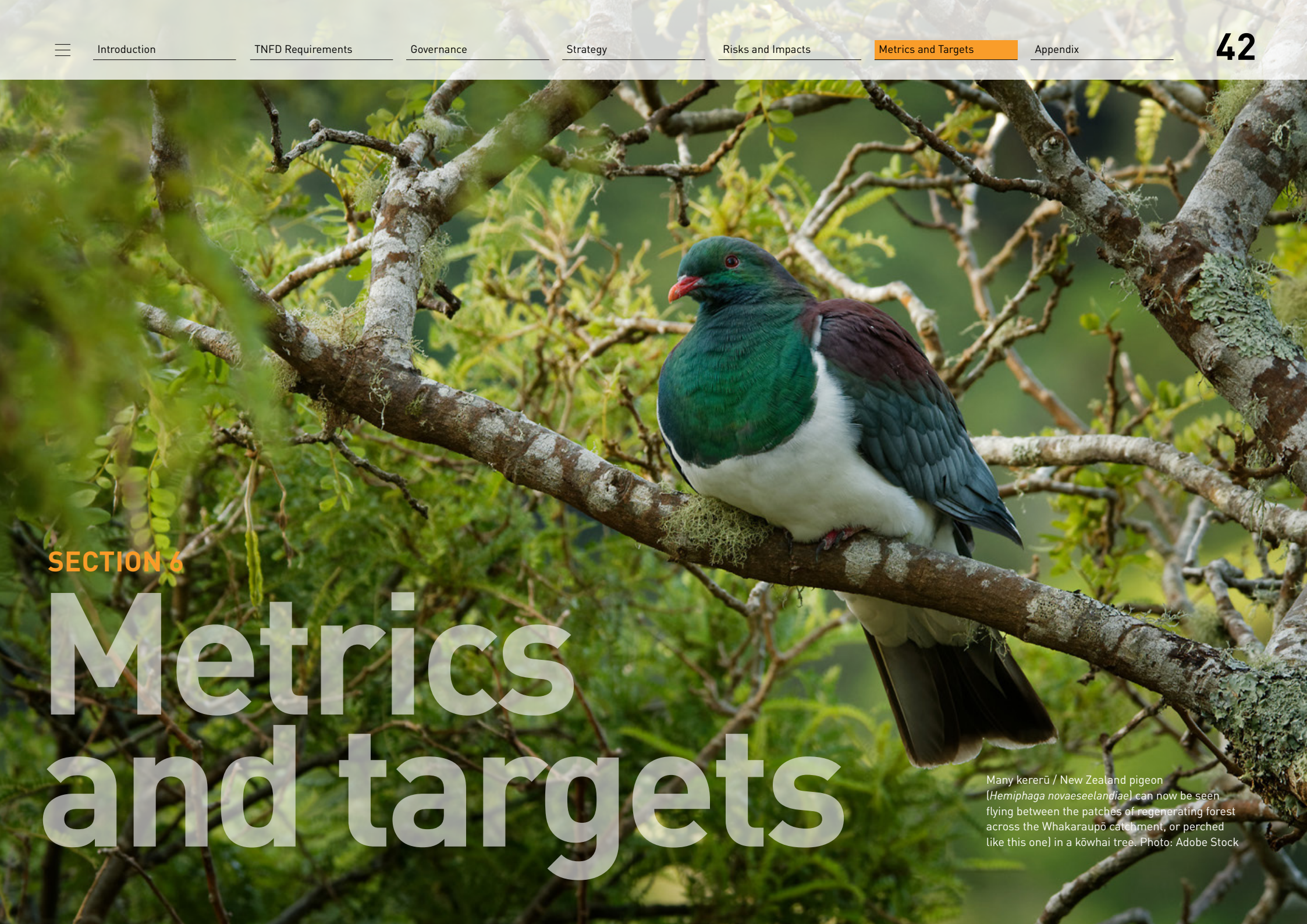
Integration of management processes

LPC manages risk at all levels of governance, leadership and operations. The risk appetite summary in our Annual Report defines risk categories and LPC's tolerance in accepting certain risks. LPC has zero to low tolerance for risks associated with our reputation, social licence and compliance, and there is varied tolerance to risks relating to environmental sustainability (situation dependent).

To manage risk relating to our impacts and dependencies on the environment, LPC has identified a critical control risk around loss of licence to operate. This critical risk for the business identifies areas of the Port and activities that compromise LPC's ability to operate due to poor environmental management. LPC has risk associated with loss of consents or loss of social licence. Through this risk management process, aspects of equipment, process and training that are below standard or not fit-for-purpose are highlighted and prioritised for improvement.

SECTION 6

Metrics and targets



Many kererū / New Zealand pigeon (*Hemiphaga novaeseelandiae*) can now be seen flying between the patches of regenerating forest across the Whakaraupō catchment, or perched like this one) in a kōwhai tree. Photo: Adobe Stock

Metrics used

Assessing and managing risks and opportunities

Our assessment of nature-related risk has not yet developed to quantify the financial value of assets, liabilities, revenue and expenses that are vulnerable to nature-related risk.

LPC's operational and capital expenditure for FY24 included approximately \$0.7 million of voluntary spend towards biodiversity positive action. Specific business projects included native vegetation restoration, weed and predator control and enhancement of intertidal and penguin nesting habitats. Capital projects included upgrades to water treatment plants and improvements in stormwater treatment. Alongside this work, LPC provided sponsorship and support to four conservation organisations within the harbour and the annual financial contribution to Whaka-Ora. Unaccounted for at this time is the in-kind contribution of staff towards nature-related opportunities.

Assessing and managing dependencies and impacts

Measuring the state of nature will allow us to track progress against our biodiversity positive goal and to mitigate our nature-related dependencies and impacts. This report documents information available to LPC at the time of writing for the core metrics specified by the TNFD framework (Table 6). We anticipate that, with the development of global state of nature metrics and local stakeholder engagement for our Biodiversity Positive Roadmap, we will further develop metrics and monitoring methods for future reporting. We intend to expand this section following local and business input and guidance.

Understanding our impacts on nature requires environmental monitoring to assess the state of nature.

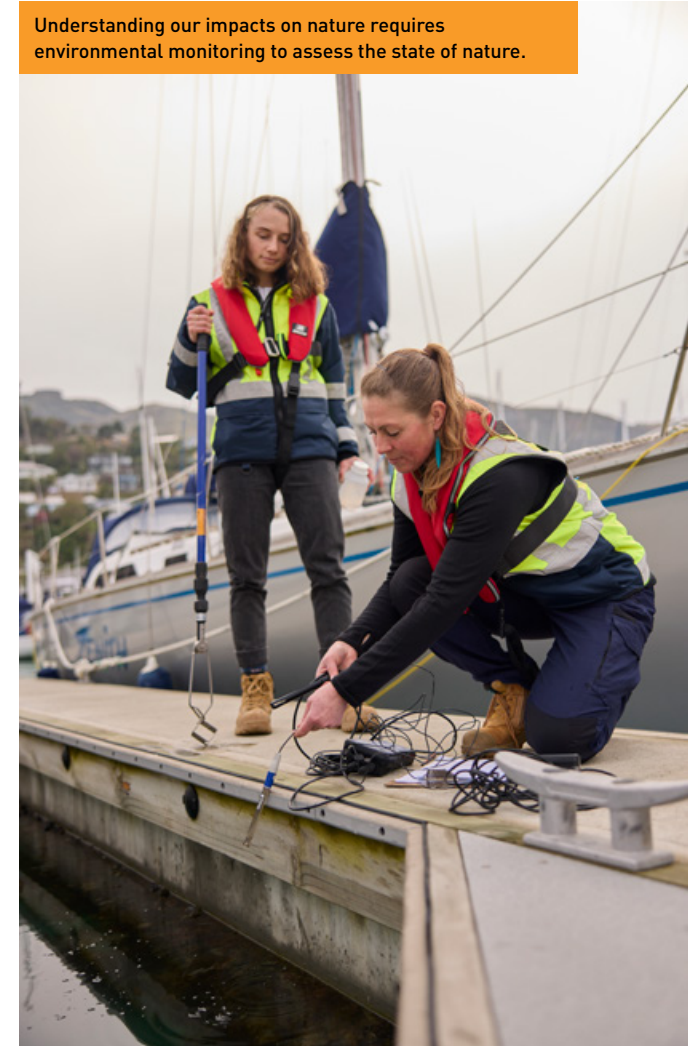


Table 6. Core metrics (where data available) recommended by the TNFD to assess Lyttelton Port’s direct nature-related dependencies and impacts. An LPC indicator and description describes the metric relative to our assessment. The impact refers to whether the metric indicates a positive or negative impact on nature or where there is potential for opportunities.

Driver of nature change	TNFD indicator	LPC indicator	Indicator category	Impact	Metric	Proportional value (where relevant)		
Climate change	GHG emissions	GHG emissions	Scope 1	Negative	8631.22 tCO ₂ e			
			Scope 2	Negative	992.57 tCO ₂ e			
			Scope 3 (Category 3, 4, 5 and 6 of ISO 14064-1:2018)	Negative	36,627.16 tCO ₂ e			
Land/marine use change	Total spatial footprint (area of influence)	Total land area by habitat type and proportion of this habitat within the Whakaraupō catchment	TOTAL	N/A	116 ha	0.6%		
			Dry rocky ecosystem	N/A	55 ha	1%		
			Moist forest ecosystem	N/A	50 ha	0.5%		
			Coastal ecosystem	N/A	10 ha	0.8%		
		Total marine area and proportion of this habitat within the Whakaraupō harbour	TOTAL	N/A	933 ha	21%		
			Benthic soft sediment	N/A	854 ha	24%		
			Intertidal rocky reef	N/A	17 ha	25%		
			Intertidal mudflats	N/A	13 ha	2%		
			Subtidal rocky reef	N/A	49 ha	38%		
		Total marine area and proportion of this habitat within Pegasus Bay	Offshore benthic soft sediment	N/A	1,609 ha	Not calculated		
		Extent of land/freshwater/ocean-use change	Extent of land use change	Area of land converted to Port activity and proportion of total land area	Area of land converted to Port activity and proportion of total land area	Negative	26 ha	22%
					Area of undeveloped land/land not converted/not protected	Potential	58 ha	50%
					Area set aside for restoration/conservation	Positive	28 ha	24%
Area restored	Positive				5 ha	4%		
Extent of marine use change	Area of marine habitat permanently converted to Port activity (reclamation)		Area of marine habitat permanently converted to Port activity (reclamation)	Negative	74 ha	6%		
			Area of marine habitat within area of influence disturbed by Port activities in 2024	Negative	329 ha (plus 255 ha in Pegasus Bay)	26%		
			Area of marine habitat within area of influence infrequently or no longer disturbed	Potential	457 ha (plus 1,353 ha in Pegasus Bay)	36%		
			Marine habitat (within areas of influence) enhanced	Positive	12 ha	1%		

Driver of nature change	TNFD indicator	LPC indicator	Indicator category	Impact	Metric	Proportional value (where relevant)
Pollution	Pollutants released to soil, by type	Pollutants released to soil	High and medium contamination risk of Port operational land area and proportion of total operational land area ** Note: The data is based on contaminated land risk mapping from 2014 and requires updating (Tonkin + Taylor, 2014).	Negative	High: 20 ha Medium: 51 ha	High: 20% Medium: 51%
	Wastewater discharged	Pollutants captured before discharge to the harbour	Area of sealed land used for LPC operations that has stormwater treatment before discharge to harbour and the percentage of this over total sealed operational land	Positive	119 ha	87% treated area
			Weight/volume of wastewater collected and removed (trade waste)	Positive	3,735 m ³	
	Waste generation and disposal	Hazardous waste	Weight of hazardous waste disposed to landfill and percent of total hazardous waste	Negative	42 tonnes	
			Weight of hazardous waste diverted from landfill (recycled) and percent of total hazardous waste	Positive	10 tonnes	
		Non-hazardous waste	Weight of non-hazardous waste disposed to landfill and percent of total hazardous waste	Negative	345 tonnes	
			Weight of non-hazardous waste diverted from landfill (recycled) and percent of total non-hazardous waste	Positive	687 tonnes	
	Non-GHG air pollutants	PM ₁₀ monitoring	Coal – consent limit monitoring.		No dust exceedances over 100 µ/m ³ * NOTE only six months of data available	100%

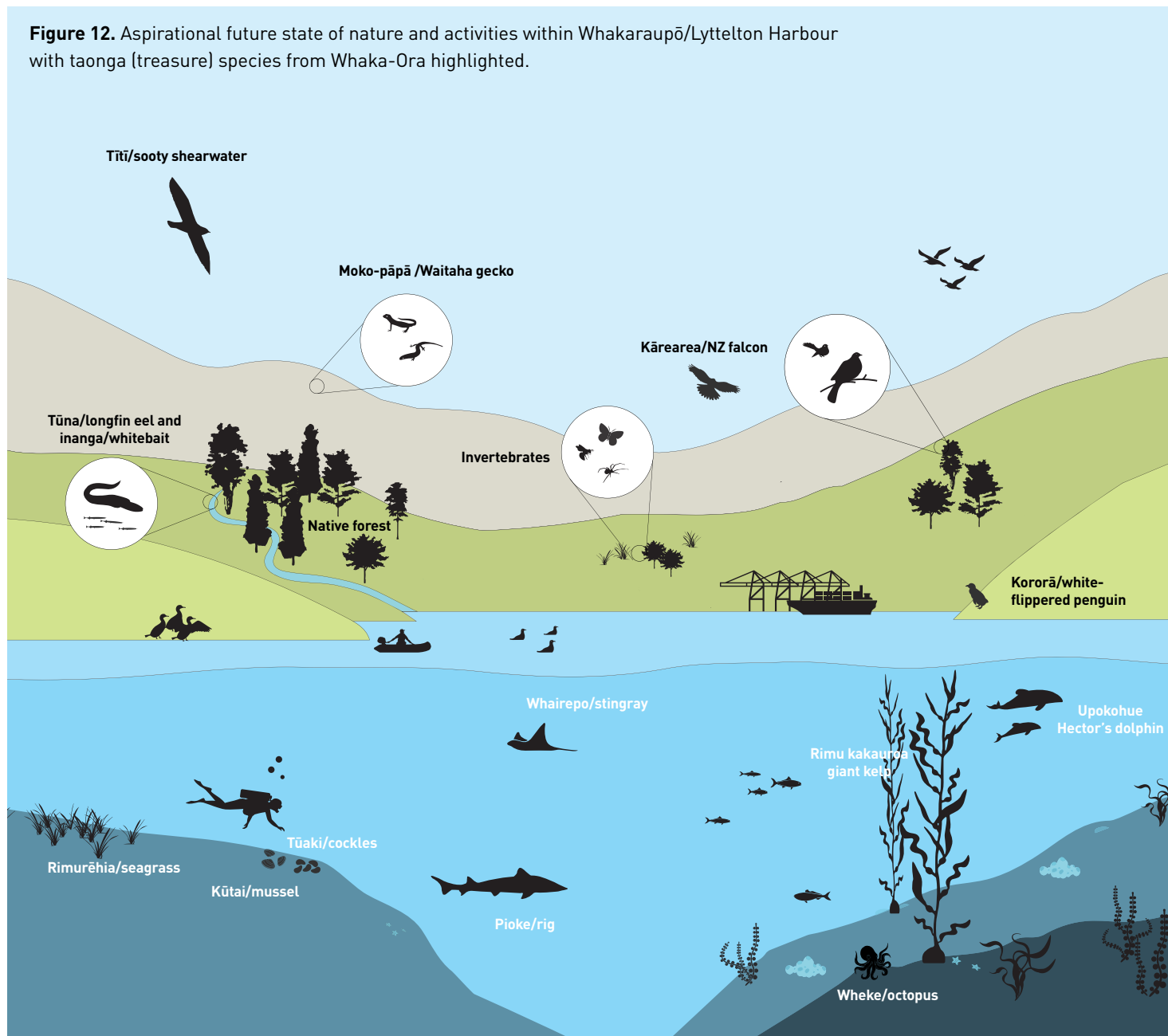
Driver of nature change	TNFD indicator	LPC indicator	Indicator category	Impact	Metric	Proportional value (where relevant)
Invasive species	Measures against unintentional introduction of invasive alien species (IAS)	Port operational areas protected by measures that prevent invasive species (on land)	Landside Port of First Arrival (PoFA)	Positive	Current certification for Lyttelton Port	
			Landside Transitional Facility	Positive	Two certified locations within Lyttelton Port	
			Pest management	Positive	107 bait stations within operational area; mosquito trap management	
			Weed management	Positive	To standards required for PoFA	
		Port operational areas protected by measures that prevent invasive species (in the marine environment)	Marine biosecurity risk prevention: Te Ana Marina – recreational vessel entry requirements implemented	Positive	20 incoming vessels vetted. Daily visual checks completed for 180 vessels.	
			Marine biosecurity risk detection: number of target species found by six-monthly Marine High Risk Site Surveillance within the Lyttelton Port area of influence.	Negative	0 primary target species 2 secondary target species 13 non-target non-indigenous species	
			Marine biosecurity risk protection: Targeted marine pest management programme implemented within the Lyttelton Port area of influence	Positive	One – inner harbour, implemented by Environment Canterbury.	
		Port non-operational areas protected by measures that prevent invasive species	Landside pest trap numbers	Positive	75 pest traps and 30 bait stations on non-operational land.	
			Weed management	Positive	11 ha actively managed by contractor and volunteers	
		Resource use	Water withdrawal and consumption from areas of water scarcity	Volume of water used for Port activities, including dust mitigation, vessel supply and building supply	Water usage total FY23	Negative
State of nature	Ecosystem condition	Consensus on ecosystem condition to be developed in collaboration with others				
	Species extinction risk	Indicator species to be determined in collaboration with others				

Biodiversity Positive Roadmap

In Whakaraupō/Lyttelton Harbour, there is already work under way by many to restore the ecological and cultural health of the harbour. We acknowledge this work and want to work collaboratively with others, adding support to the work already being undertaken and contribute positively to additional projects where appropriate. LPC will utilise SBTs for nature and the mitigation hierarchy framework as a tool to track progress towards our biodiversity positive goal and the healthy harbour goals. The next stage is to develop a Biodiversity Positive Roadmap with aspirational targets and robust metrics for measuring progress over time.

A collaborative effort will be taken to determine the goals and targets for nature recovery in Whakaraupō/Lyttelton Harbour. The future state of nature will allow for business operations and other human activities in the catchment to take place while ecosystems, habitats and species thrive. Figure X depicts what a future healthy state might look like alongside human activities and a working Port. LPC can use targets as a basis for planning, management and contributing towards positive actions that are relative to negative impacts caused by our activities.

Figure 12. Aspirational future state of nature and activities within Whakaraupō/Lyttelton Harbour with taonga (treasure) species from Whaka-Ora highlighted.



Acknowledgements

LPC would like to acknowledge the work undertaken by Whaka-Ora and partner organisations alongside community and conservation organisations towards restoring the health of Whakaraupō. LPC would like to thank the following contributors to the development of the report. Dr. Robin Mitchell of Nature Positive for providing technical advice, facilitating workshops and review; Tom Nation of Collaborations for assisting with digitisation of datasets and spatial analysis; Ross Sneddon of Cawthron Institute for providing technical review of impacts assessment for activities in the marine environment; and Di Lucas of Lucas Associates for providing maps and verification of terrestrial habitat condition.

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SECTION 7

Appendix



Fish such as this leather jacket (*Parika scaber*) are found all around New Zealand's coasts including the subtidal rocky reefs in Whakaraupō/Lyttelton Harbour towards the heads, especially where there is kelp cover. Photo: Cawthron Institute

Appendix 1

Naturally occurring habitat types

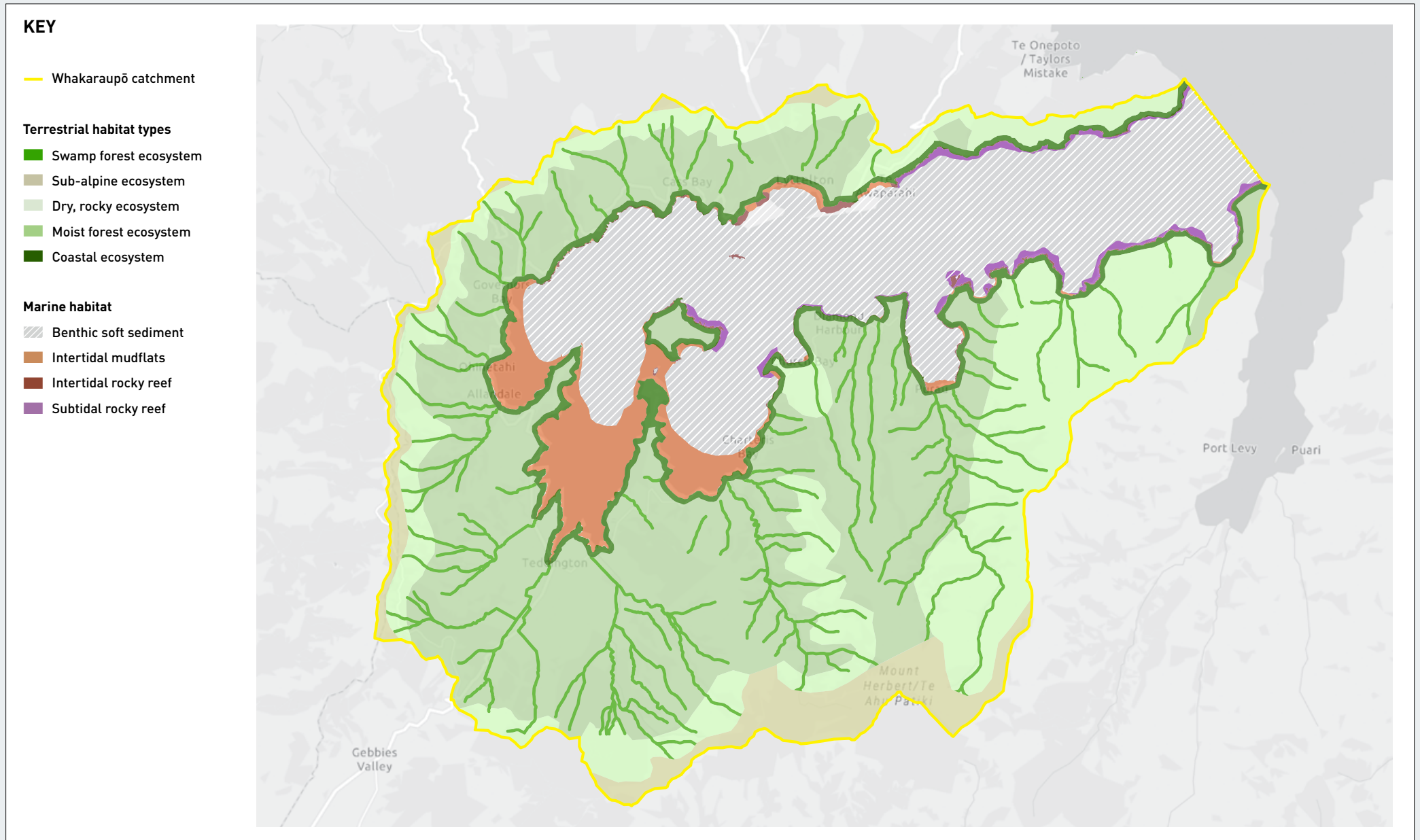
Whakaraupō/Lyttelton Harbour lies within the Port Hills Ecological District (Harding, 2009) and specifically classed as the Banks Ecological Zone (Wilson, 1992). The land within the Whakaraupō catchment was likely once entirely forested with mixed podocarp-hardwood forest (tōtara, mataī and kahikatea) with tall tussockland and kānuka shrubs and areas of wetland, rockland and coastal herbfield present (Wilson, 1992; Harding, 2009).

The habitat types intersecting with Lyttelton Port’s area of influence have been described using the naturally occurring habitats and species described by Lucas Associates et al. (2005) and Department of Conservation and Ministry of Fisheries (2011) (see Table 4). Using spatial software (ArcGIS), we digitised terrestrial habitats from the 2005 printed publication and accessed the publicly available marine habitat spatial dataset (Figure 13). To improve the accuracy at a more detailed scale, intertidal habitats were refined using aerial imagery and scientific reports. The subtidal rocky reef habitat area is the least accurate due to the lack of visibility using visual analysis given the naturally high sediment load of coastal waters in the region. Descriptors for each habitat type describe the geographic features as referenced in the literature (Table 7). Future analysis and the Biodiversity Positive Roadmap will expand these descriptors to include species indicators.

Table 7. Habitat type categorisation used in LPC’s assessment of nature-related impacts for Whakaraupō/Lyttelton Harbour. Species indicators for each habitat type will be described in the Biodiversity Positive Roadmap to be developed. Habitat types have been classified at a regional scale to match the scale of data. A column has been added that provides the corresponding Global Ecosystem Type for Marine habitats. Alignment between terrestrial habitats is still required. (Keith et al., 2020).

	Habitat type	Description	Global Ecosystem Type.
Terrestrial	Moist forest ecosystem	Sub-humid to humid, gently undulating to rolling fans and toe slopes, rolling ridges and moderately steep to steep hill slopes with imperfectly to moderately well drained reworked loess colluvium or mixed loess and volcanic colluvium, or well drained volcanic soils. The soil sequence represents a moisture gradient from wet/poorly drained in winter to well-drained shallower soils. (Lucas Associates et al., 2005)	To be confirmed
	Dry rocky ecosystem	Sub-humid to humid easy rolling summits and shoulders and steep to very steep rocky ridges and bluffs with excessively drained to well-drained volcanic soils and minor loess. Rocky areas: bluff communities consisting of lichens and mosses among vegetation including grasses and herbaceous species. (Lucas Associates et al., 2005)	To be confirmed
	Coastal ecosystem	Sub-humid, flat to gently undulating harbour margin mudflats of poorly drained, saline, silts and clays and/or flat to gently sloping valley floors and toe slopes of poorly drained mixed loess and volcanic colluvium and alluvium; steep rocky cliffs with volcanic soils. (Lucas Associates et al., 2005)	To be confirmed
Marine	Benthic soft sediment	Fine sediments (silt and clay) dominate with sediments becoming finer from east to west along the central axis of the harbour towards its upper reaches while clays also increased in concentration south to north across the harbour. Coarse sediments (gravel and sand) dominated the harbour ‘neck’ area south of the dredged channel and in pockets within the upper harbour and around Quail Island. (Hart et al. 2008)	Subtidal mud plains
	Intertidal rocky reef	Rocky shores in the inner and central harbour are mostly narrow, gently sloping volcanic bedrock benches with some sites covered by large boulders. The central to outer harbour tends to have a similar habitat but with some larger bench reefs and steep vertical cliffs. Intertidal reefs feature numerous small to medium-sized rock pools, extending up to 25 m intertidally. (Johnston, 2021)	Rocky shores
	Intertidal mudflat	Intertidal mudflats are the extension of the benthic soft sediment habitat in the intertidal zone between mean high and mean low water springs. Mudflats in Whakaraupō are characterised by silt/clay sized particles with increased particle sizes seaward. (de Vries, 2007)	Muddy shores
	Subtidal rocky reef	Substrates recorded were dominated by bedrock and boulder reefs with only minor variation across the areas surveyed. Reef habitats are restricted to the shoreline fringe and have noted a compressed zonation pattern, with macroalgae restricted to between 1 m and 2 m depth. (Johnston, 2021)	Shellfish beds and reefs
	Offshore benthic soft sediment	The benthic zone of Pegasus Bay. Uniform semi-consolidated muds with mixed proportions of silt/clay/sand particulates. Benthic substrate and habitat is effectively uniform.	Subtidal mud plains and epipelagic ocean waters

Figure 13. Natural habitat types in the terrestrial and marine environments of Whakaraupō/Lyttelton Harbour.



Appendix 2.

Descriptions of LPC's business activities

To identify and assess LPC's impacts on nature, we need to understand the activities we undertake for our business and overlay these with the habitats they intersect with. The activity descriptions in this table provide descriptions of what has been assessed for impact. These areas have been mapped in Figure 4.

Realm	Activity category	Activity descriptor
Land	Port operations	Land converted for Port operations including log yard, coal operations, leased areas and quarry haul road. Some of the areas within this category have the potential for future restoration while some do not.
	Undeveloped land	Land not currently used for Port operations. Generally these areas are steep and unsuitable for Port activities and therefore hold potential for restoration. Undeveloped land is in poor condition and not managed for weeds or pests.
	Protected land	The two land areas designated for restoration, including the Port Saddle (publicly accessible reserve) and Gollans Bay (protected by a Land Conservation Covenant).
	Restored land	The areas undergoing active restoration, including native tree planting, weed maintenance and predator control.
Marine	Reclamation	Area of the seabed reclaimed for Port activities.
	Dredging	Consented area for navigational channel dredging. The entire area consented does not get dredged every year, only what is needed to obtain the required depth, and therefore the area has been overestimated in impact assessment. The dredge footprint beyond the harbour heads into Pegasus Bay is the channel extension consented dredge area for navigation of larger and deeper vessels. This section of channel has only been dredged once in 2018 and has not been required to be dredged since.
	Dredge spoil disposal	Consented area for the disposal of dredge spoil disposal. There are three distinct areas delineated for dredge spoil disposal. <ol style="list-style-type: none"> 1. The area within Whakaraupō/Lyttelton Harbour out from Gollans Bay is disposal grounds for the inner harbour berth pockets, which are dredged at a frequency of every 5 years and have a relatively small volume of contaminated material (approximately 6,000m³). 2. The smaller area beyond the harbour heads in Pegasus Bay is the area delineated for spoil disposal of the annual maintenance dredging of the navigation channel. 3. The larger area within Pegasus Bay is the consented area for capital dredge works. This area has only been used once in 2018 and will only be required if the additional navigational channel width, depth and length is required for larger and deeper vessels. The impact of this activity has been overestimated in this assessment.
	Dredge spoil disposal – historical	Three areas within the harbour that were previously used to deposit dredge spoil material have not been used by the Port since the 1960s. These areas are likely to still retain sediments from the Port dredging activities but decreasing in concentration over time.
	Dredge spoil disturbance	The inner shore areas along the coastline that may be impacted by the dredging and the disposal of dredge spoil. Data accuracy for this activity is low but has been included due to the habitats here being important.
	Port operations	Represents frequent and sometimes concurrent activities in the marine environment that could lead to cumulative impacts and should be assessed together. Activities include stormwater pollution, vessel movements, light pollution, contaminated sediment deposition and underwater noise. The effects from these activities combined can only be assumed, leaving the data accuracy for this activity as low.
	Seawall and wharf	Different to reclamation, these areas represent the interface between Port infrastructure and the marine environment. These structures have ecological benefits providing additional habitat for a diverse range of species including intertidal invertebrates, macroalgae and penguin nesting.

Appendix 3

Dependencies assessment

Outputs of the dependencies assessment workshop held with LPC staff identified LPC and supply chain dependencies on nature, highlighting the top 10 most important for detailed risk assessment and analysis (Table 11). The dependencies most material to LPC are highlighted as bold text. Refer to Figure 7 for a visual representation of these.

Ecosystem services		Considered a dependency for LPC	High importance to LPC	Likely high value chain dependency	
Provisioning	The goods or products obtained from ecosystems				
	Food	Crops, livestock, aquaculture	No	No	Yes
	Raw materials	Timber, rubber, fossil fuels, coal (steel making), metals, rock	Yes	Yes	Yes
	Freshwater	Freshwater quantity and quality	Yes	Yes	Yes
	Genetic resources	Genes and genetic information used for animal breeding	No	No	Yes
	Biochemicals	Natural medicines and pharmaceuticals	No	No	No
Regulating and supporting	The benefits obtained from an ecosystem's control of natural processes				
	Maintenance of air quality	Extracting and filtering particles from the air	Yes	Yes	Yes
	Global climate regulation	Absorption of greenhouse gas emissions	Yes	No	Yes
	Regional/local climate regulation	Regional/local temperature, precipitation regulation	Yes	No	Yes
	Regulation of water timing and flows	Water runoff, flooding, water storage, aquifer recharge	Yes	No	Yes
	Erosion control	Retaining and replenishment of soil	Yes	Yes	Yes
	Water purification (Maintenance of water quality)	Dilution and filtration of pollutants in water	Yes	Yes	Yes
	Waste treatment (Solid and liquid waste remediation)	Filtration and decomposition of organic and inorganic waste and hazardous waste	Yes	Yes	Yes
	Disease and pest mitigation	Incidence and abundance of human pathogens and disease and pests that impact livestock and crops	Yes	Yes	Yes
	Maintenance of soil quality	The health of soils	No	No	Yes
	Pollination	Ability for plants to reproduce from the role of pollinators	No	No	Yes
	Natural hazard mitigation	Damage reduction from natural disasters, storms and fire	Yes	Yes	Yes
	Habitat creation and maintenance	Supporting the spaces that maintain species populations and ecological functioning	Yes	No	Yes
Primary production	Formation of biological material through photosynthesis	No	No	Yes	
Nutrient and water cycling	Flow of water and nutrients through ecosystems	No	No	Yes	
Cultural	The non-material benefits obtained from ecosystems				
	Recreation and ecotourism	Recreational pleasure people derive from natural or cultivated ecosystems	Yes	Yes	Varied
	Ethical and spiritual values	Spiritual, religious, aesthetic, intrinsic, existence or similar values people attach to ecosystems, landscapes or species	Yes	Yes	Varied
	Educational and inspirational values	Information derived from ecosystems used for intellectual development, culture, art, design and innovation	Yes	No	Varied

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