Te Awa Ōtākou Issues & Opportunities

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Disclaimer Statement

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Figure 1 **Sunrise at Otago Harbour. Credit: DunedinNZ**

He Mihi

Tēnēi te ruru te koukou nei
Kīhai i māhitihiti
Kīhai i mārakaraka
Te upokonui o te ruru
TEREKOU
He po he po
He ao
Ka awatea

E tuku ana kā mihi o te raki nei ki te kaupapa nunui ake nei ko kā kōrero e pa ana Te awa Ōtākou, he tai timu he tai pari,

o kā ara tapuwae o rātou e heke ana mai, he pataka kai mo kā reanga i kā ra o mua, a, mo rātou angāwhakamua.

Ko Te awa Ōtākou he ara nui, he ara pai mo te tini me te mano
e haere ana ki etahi kokonga o te wahapū, ki kā wāhi nohoaka o etahi kaika huri noa te hapua,

mai Pukekura ki te wahapū tae noa ki Ōtepoti ki uta.

Kia hora te marino, kia whakapapa pounamu te moana
Kia tere te kārohirohi i mua i to huarahi.

This is the ruru (morepork) who calls
Whose head does not bow
From side to side, up and down
The head of the ruru is steadfast on its shoulders
As it calls us from the darkness
And into the world of light
To a dawn of new understanding

Many are the greetings on this special ocassion, heralding discussion on the sea river Ōtākou, the tide that ebbs and flows, plyed by the many past and present, sustainer of generations, past, present and for the future.

Ōtākou the sea river of many journeys, of many features, benefactor to the multitudes, of the many communities, from Pukekura at the mouth to Otepoti at the head of the harbour.

May peace be widespread

May the sea glisten like greenstone

and may the shimmer of light guide you on your way

Edward Ellison - Ūpoko, Te Rūnanga o Ōtākou

Figure 2 **Otakou_Awa Credit: Aukaha**

Contents

Glossary

Atua _ An ancestor or deity.

Awa _ River, in this context it is the harbour.

Hapū _ Large kinship group and the primary political unit in traditional Māori society.

Iwi _ Tribal groupings. A collection of whānau who share descent from a common ancestor.

Kāika _ Village, Home, Residence.

Kaimoana _ Seafood.

Kaitiaki _ Custodian, minder, caregiver, protector.

Kaitiakitaka _ The action of guardianship. Custodianship.

Koputai _ Port Chalmers.

Kou _ End point.

Mahi _ Work.

Mahika Kai _ Food Workings. Often associated with the traditional gathering traditions.

Mana whenua _ People of place, local authority.

Manu _ Bird.

Mātauraka _ Knowledge.

Mihi _ Acknowledgements.

Noa _ Unrestricted, void.

Ōtepoti _ Dunedin.

Pakakohi _ Taranaki Tribe.

Pūrākau _ Creation narratives that depict people, place and mythological beings of importance.

Rakatira _ Chief. A person of significance.

Rakiriri _ Goat Island.

Rongoā _ Traditional medicine and healing.

Rūnaka _ (Rūnanga). Iwi authority and council.

Tapu _ Sacred, Restricted, set apart.

Tauraka waka _ Waka landing sites.

Te Waipounamu _ The South Island of New Zealand.

Tikaka _ (tikanga) traditional practice, custom, procedure.

Tuaki _ Cockles, a New Zealand endemic shellfish.

Tūpuna _ Ancestors.

Waka _ Canoe.

Whakapapa _ Lineage. Genealogy.

Whare _ House, structure, dwelling.

Whata _ Raised platform.

Mātauraka Māori - Intellectual Property

This body of work contains mātauraka Kāi Tahu knowledge, which is intellectual property held collectively and represented by Aukaha and mana whenua. It is important to acknowledge the **Wai 262 Claim** which addresses the ownership and use of Māori knowledge, cultural expressions, indigenous species of flora and fauna, all known as taoka (treasure), and inventions and products derived from indigenous flora and fauna and/or utilised Māori knowledge.

Ownership of any work produced by Aukaha is retained by Aukaha, or by mana whenua as outlined above. Integration of cultural values, narrative and voice therefore cannot be subject to re-use, alteration, manipulation, removal without consultation with Aukaha and mana whenua.

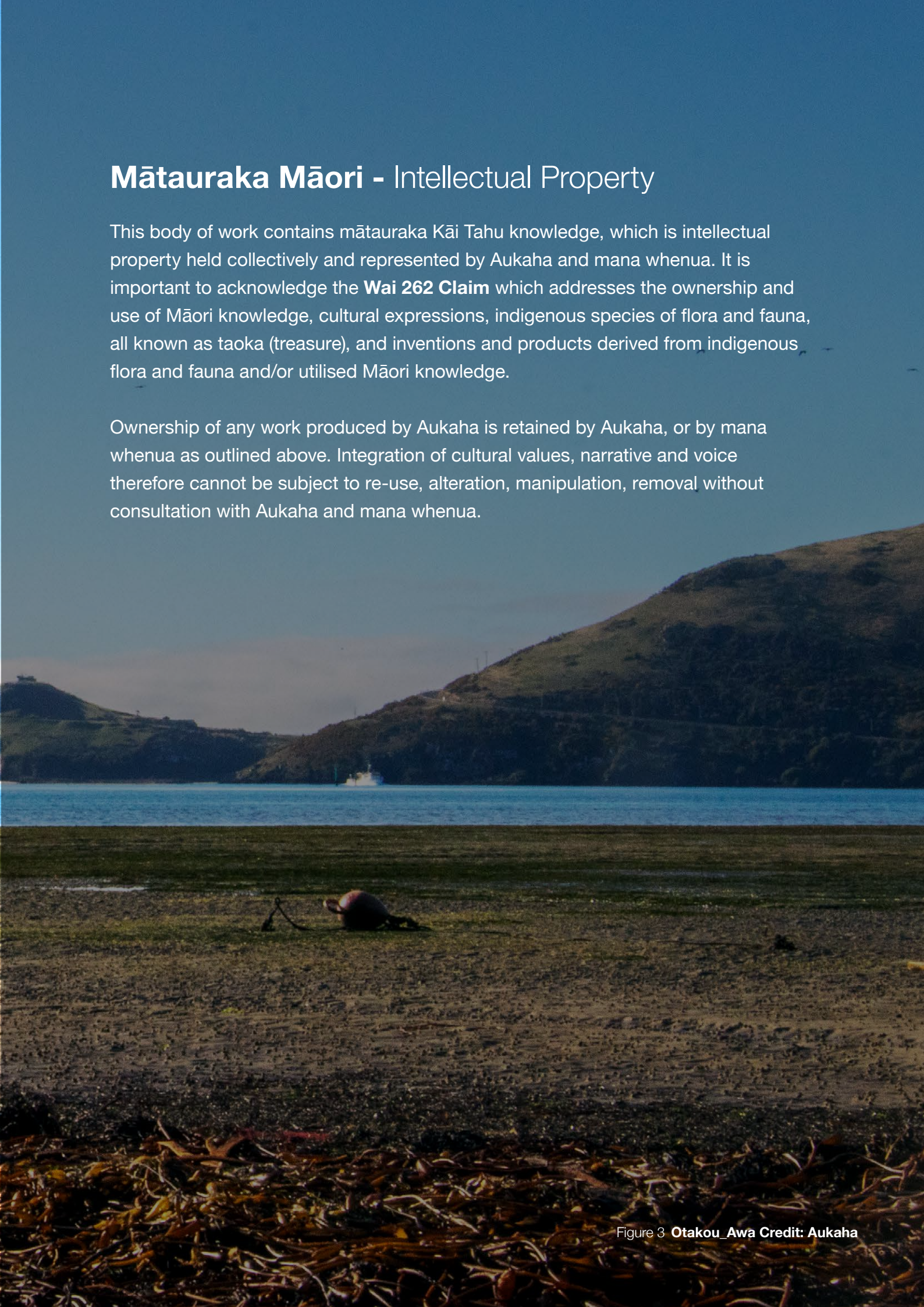


Figure 3 **Otakou_Awa Credit: Aukaha**

Executive Summary

Figure 4 **Port to Port Cruise. Credit: DunedinNZ**

Executive Summary

Te awa Ōtākou (Otago Harbour) has played and continues to play a critical role in the cultural, social, and economic wellbeing of Ōtepoti (Dunedin) and wider Otago. With its strategic location, the harbour supports commercial fisheries, trade access, and serves as a significant asset for both local and regional economies. Te awa Ōtākou is also highly valued for recreation and amenity, deeply embedded in the city and region's identity.

However, the health and sustained function of the harbour are under ongoing pressure. Human activities such as land development, roading, stormwater management, wastewater overflow, harbour dredging, land reclamation and fishing have led to habitat degradation, pollution, and the loss of ecological, recreational, and cultural values. Climate change - rising sea levels, changing rainfall patterns, and increasing temperatures - compounds these challenges, demanding decisive, long-term planning and action.

The Otago Regional Council (ORC) has commissioned this report in response to calls from the local community and mana whenua for sustained, collective action aimed at restoring the health of Te awa Ōtākou. This report lays the foundation for developing a way forward.

The approach to the work has been in line with that of the ORC's Integrated Catchment Management Programme: community led, non-regulatory, intergenerational, and solutions focussed – it seeks to build on and align existing community effort and local government work-programmes with an emphasis on demonstrating success and building momentum through action.

The report has been informed by a stakeholder mapping process, and engagement with upwards of 40 individuals and organisations representing the broad spectrum of user and interest groups across the system. This understanding was complemented by a review of key documents and information which was distilled in arriving at the seven primary themes under which issues and opportunities are reported, these being:

- Accessibility
- Environmental Health
- Tourism
- Arts and Culture
- Infrastructure Resilience
- Climate Resilience
- Governance.

The report is structured with a temporal lens, over three sections – Reflecting on the Past, Understanding the Present, and Looking to the Future. As a stocktake, it paints a rich picture of the history of Te Awa Ōtākou and documents the drivers of change in its health over time, including present issues and how climate change is amplifying these. The report is graphically rich in an effort to bring the value of this significant asset to life and stimulate the required response to restore and sustain its health and the associated values.

The overriding issue identified through the engagement and document review is that despite a shared purpose and multiple examples of cooperation between the wide variety of harbour users, much of the effort still happens in isolation of a common understanding of, and vision for, the harbour. There is also no harbour wide institutional mechanism to enable collective action at the harbour scale. There are also common challenges and barriers, best overcome through a collective response. Importantly the report is peppered with examples of the significant effort toward the common vision of a healthy and thriving harbour and in the region of 100 opportunities have been documented.

The ORC ICM approach provides the blueprint for achieving a common vision and coordinating actions towards this. The process commences with establishing an 'integrated catchment group' through which to initiate the development of an action plan comprising a vision and supporting objectives to inform the further refinement and prioritisation of the actions.

The ICM programme is being rolled out at a Freshwater Management Unit (FMU) scale with the harbour falling within the Dunedin and Coast FMU. However, given the highly developed nature of the catchment and the multiple uses/users and strategic importance of the harbour, for the approach to be successful, it is recommended that it is applied at the scale of the Harbour catchment.

A highlight of this process has been the effective partnership between mana whenua, the ORC and DCC, and involvement of staff and councillors from both organisations. This partnership serves as a solid foundation for taking this mahi forward.

1 Introduction

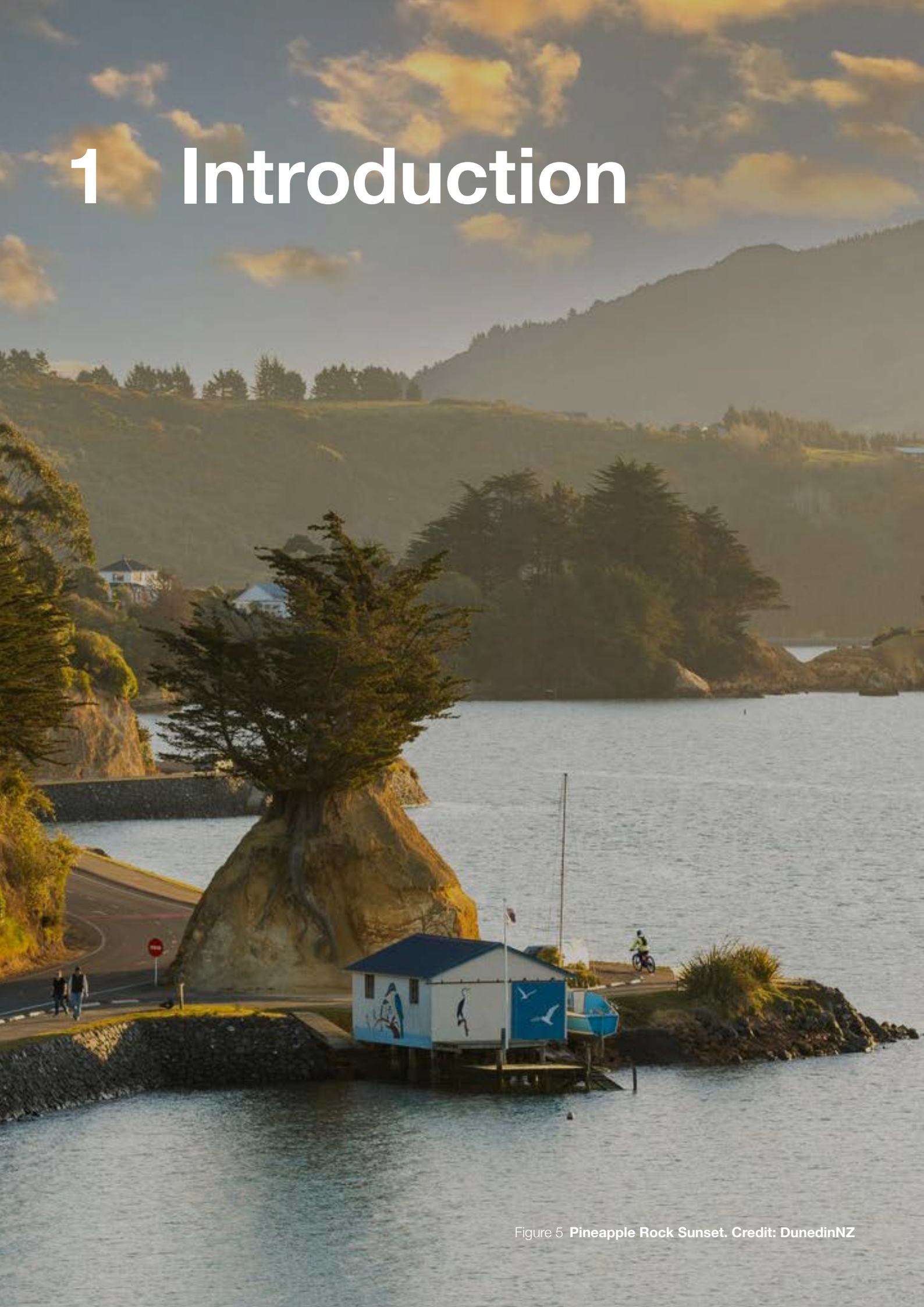


Figure 5 **Pineapple Rock Sunset. Credit: DunedinNZ**

1.1 Need for and Purpose of this Report

Te awa Ōtākou - The Otago Harbour has historically played and continues to play an important role in supporting the cultural, social and economic well-being of the people of Ōtepoti (Dunedin) and wider Otago. With a long and fascinating geological history which continues to unfold in the face of sea-level rise and climate change, Te awa Ōtākou has provided the region more than just its name. As a valuable source of mahika kai to tangata whenua, the tidal flats, coastal waters and open ocean beyond have for centuries sustained the community and provided deep cultural values. Given its scale and strategic position on the coast, it supports commercial fisheries and access to trade and is therefore a critical asset in the local and regional economy. The accessibility of Te awa Ōtākou to the community means it is highly valued for recreation and amenity, part of the city and region's identity.

The benefits from the many values provided by Te awa Ōtākou are dependent on its ecological health and sustained, resilient function. As a tidal inlet system, Te awa Ōtākou is influenced by the complex interactions of human land and water-uses, and terrestrial, coastal and marine processes.

The demand on Te awa Ōtākou and the resources it supports alongside the development of Ōtepoti has translated into innumerable pressures on the ecosystem. Access to the port is reliant on regular dredging, while the urbanisation and densification of Ōtepoti has resulted in altered stormwater flows, wastewater overflows and continued coastal encroachment. Meanwhile, recreational and commercial fisheries have depleted fish stocks. Combined, these human activities have resulted in degradation and loss of habitat, pollution, and degraded recreational, amenity and cultural values.

This context is overlain with the intensifying impacts of climate change including rising sea levels, increasing temperatures and changing rainfall patterns which demand immediate response framed by long-term thinking.

> **The health of the harbour reflects the health of our people.**
>
> *Donna Matahaere, mana whenua.*

It is important to note a study with essentially the same purpose as this work, though not the same approach[1], was undertaken in the early 1990s. It sought to address a fragmented response to the declining health of the harbour. It was comprehensive, involving working groups and technical reports and culminated in a wide array of recommendation actions for taking forward a proposed 'Phase 2'. As reflected in this report there has been substantive action by the wide array of stakeholders in relation to these recommendations. Despite this notable effort, only a portion of the recommendations have been implemented over the following 30 years and where so not always at the scale required to shift the trajectory. Hence, many of the issues noted in the earlier work are echoed in this report. Possibly the most significant reason for the outcomes of the 1990's work not being more fully acted on was the failure to establish a harbour 'forum' or body to give effect to a co-ordinated approach to

1 The Otago Harbour Planning Study Draft Issues and Options Report (ORC & DCC, 1991). The 1991 report explored detailed research on subject matter relevant to this report, which was supplemented by supporting knowledge generation studies (and reports) overseen and undertaken through working groups for the various themes.

implementing more of the many useful recommendations. There have been numerous subsequent calls for such a structure.

Failure to effectively build on the 1990's work has meant that planning and implementation of responses undertaken in terms of varying policy and mandates, all dealing with certain areas of the harbour or specific elements or aspects, have continued to happen somewhat in isolation and thereby not always considered the system as a whole. The interdependencies across the harbour mean that not all actions have proven successful in limiting the anticipated impacts. The lack of a comprehensive understanding of the harbour has also meant that some actions have had negative implications for other aspects, features, values and users.

The Otago Regional Council (ORC) is mandated to promote the sustainable management of resources in the coastal marine area. In giving effect to this responsibility and in response to a call by the people who call Te awa Ōtākou home, ORC has commissioned this review of issues, but more importantly identification of opportunities that will spur the sustained, collective action required to restore the health of the harbour and wellbeing of the people of Ōtepoti, and those connected to it.

Figure 6 **Otakou_Awa Credit: Aukaha**

1.2 Nature and Structure of the Report

This report seeks to lay the foundation for developing a collective solution in the next phase of work. The key concepts and principles underpinning the work are summarised below.

The current state of the harbour is the result of centuries of human intervention. Halting and altering the trajectory of the harbour's health will similarly take time. So, while there are quick wins to be had, substantive improvements across the broader system are more likely to be achieved in the longer term which requires factoring climate change into opportunities. The work has therefore taken an approach of **looking back to look forward through an intergenerational lens**. This highlights the involvement of the youth as the future custodians of this important asset and as an essential ingredient of a successful turnaround.

This is a **non-regulatory** process, which is important because it requires long-term thinking that transcends regulatory processes and political cycles. It also provides the freedom for people to be aspirational and innovative, aspects often curtailed by rules.

A final important lens taken in this work is that it is '**solutions-focussed**'. While the issues are acknowledged and gaps in understanding cause and effect need to be plugged, the report seeks to highlight and celebrate the many local successes. It suggests how they may be replicated and upscaled to achieve system-wide improvement, to build positive momentum rather than dissecting issues and apportioning blame.

The report is structured as follows, incorporating the approach and principles introduced above:

Introduction - Contextualising this mahi – this chapter introduces the need for the work, the nature of the report and additional outputs to support the next steps in the process (**Chapter 1**).

Reflection on Past – The history of Te awa Ōtākou is documented to remind ourselves of its origins, and the varied values and benefits it has provided over time, but also how and why these have been diminished or lost (**Chapter 2**)

Understanding the Present - The current state of play is explored with reflection first on the benefits currently provided by Te awa Ōtākou, and the value people place on it despite its diminished health. The report explores how historical and emerging issues including climate change are impacting on the wellbeing of the harbour and its communities (**Chapter 3**). Examples of success stories addressing these issues, driven by the significant efforts of the harbour's custodians, are also shared here.

Looking to the Future – Opportunities to enhance the wellbeing of Te awa Ōtākou (and in turn, its communities) are explored. These options are varied and include physical interventions, policy to incentivise change, financial instruments to enable ongoing mahi and upscale the effort, and research and monitoring to address gaps in understanding and track progress towards agreed objectives and outcomes (**Chapter 4**). Real change demands collective action that galvanises the effort of ORC, Dunedin City Council (DCC) and other agencies with that of the mana whenua, community, business, who all apply passion, resources, knowledge and energy towards the harbour and community health daily. Their contribution needs to be recognised, harnessed and supported. A major focus of **Chapter 4** is therefore the governance mechanisms required to support collective action.

Figure 7 **Otakou_Awa Credit: Aukaha**

The holistic understanding held by mana whenua and their sensitive approach to the protection and use of the harbour has not had adequate influence in recent history. Mana whenua's voice is woven throughout this report with an overarching statement introducing each chapter. The partnership between ORC, DCC and mana whenua in collectively guiding the scope, process and review of this work is a notable example of giving effect to the intent of Te Tiriti, and has established a solid foundation for taking this mahi forward.

The health of the harbour is at a pivotal point in its history, with unique local habitats at risk of being lost and local species heading for extinction. As collective custodians the community of the harbour cannot afford to again fail the harbour by not following through collectively on the aspirations and opportunities laid out in this report.

The good news that emerged in pulling this work together is that while people acknowledge the issues, they all have a common, deep passion for the harbour and its health, and are actively interested in identifying and bringing the solutions to life. In support of this positive perspective, the report is sprinkled with graphics, stories and quotes that bring the harbour to life, remind us of its intrinsic value and spur the call to action. Despite the overall negative trend, there are many success stories, and ongoing positive efforts to be celebrated and enhanced.

There is a solid foundation in place to build on - it's time to get stuck in. System-wide change will however take time, patience, and above, all, open collaboration and relationship building. Initial success will be measured by the mana whenua, community, councils and other mandated organisations getting started on quick-win actions in a cohesive and collective manner.

1.3 What has Informed this Report

There is wealth of information on all aspects of Te awa Ōtākou from geological information to dredging data, benthic surveys, and economic studies. There is similarly a long list of interested and affected people and organisations connected with the Harbour and each other in multiple ways. It is not the intention here, nor were there the time or resources to undertake an exhaustive literature review or engagement process.

Figure 8 **Stakeholder Workshop, July 2024.**

Figure 9 **Project Team at Aramoana for Sunrise, July 2024. Credit: Kate Blackburne**

The work has therefore drawn on key references which summarise the required understanding. These resources are referenced throughout and can be built on as required to support the ongoing generation of knowledge about Te awa Ōtakou over time. The identification of the key reference material was generated primarily through guidance provided by the project partners, ORC, DCC, and mana whenua. The list was supplemented by additional references identified in the engagement process.

Engagement was informed by a stakeholder mapping process that built on a database from the recent Dunedin City Council (DCC) processes to inform the harbour reserve management strategy. Organisations were categorised into their primary interest areas - social, economic, cultural and environmental, although many organisations have interests spanning more than one category. A list of organisations identified as representing interest groups was identified and approximately 40 meetings were held. These hui were semi-formal in structure with participants asked to:

- Reflect on their history and connection with the harbour
- Document current issues and challenges
- Provide insight into solutions in the form of existing, planned or blue-sky opportunities

The ORC also provided information on its website to generate awareness of the process and invited parties to register their interest. Responses will bolster the stakeholder database and further engagement beyond this first phase.

Those engaged also directed the team to relevant information to substantiate their picture of the status quo. The process culminated in two interactive working sessions, with ORC and DCC councillors. The purpose being to raise awareness of the project, and garner their input in terms of issues and opportunities.

A clear set of overarching themes and issues had emerged and were being repeated regardless of who was speaking. A level of confidence was therefore achieved that the approach had unearthed the majority of the major issues and opportunities.

The team then went through a process of analysing engagement feedback and reference material to distil the primary and associated sub-issues and opportunities under each main theme.

Engagement and writing have been a collaborative process, shared between an interdisciplinary team from Aukaha (1997) Ltd, Morphum Environmental, Studio Pacific Architecture, and the University of Otago Marine Sciences Department. The research team worked closely with a core group of officials from ORC and DCC who provided support with every aspect of the process, from identifying reference material to organising and facilitating engagement. There has also been oversight and final review from ORC, DCC Councillor , and Te Rūnanga o Ōtākou. It is collaboration of this nature that is required moving forward.

E mihi ana kā mihi maioha ki a koutou i whākai mai i ō tātou puna mātauraka kia ea ai tē mahi nei.

The team would like to acknowledge the organisations and people who contributed their time, knowledge, and reference material to inform the work. Your passion for a healthier harbour shone through above all else.

1.4 Study Area

The hydrological catchment of Te awa Ōtākou forms the focus area for this study. It includes the land, built environments and watercourses from the hilltops wrapping around the harbour, down into the awa, and out to the open coast between the Mole at Aramoana and Pukekura. With the intention to capture stormwater influences on the harbour, parts of South Dunedin which drain to the harbour have been included within the study area.

Whilst the focus is on the catchment with direct influence on the health of the awa, the integral connections Te awa Ōtākou holds to the wider landscape have been recognised. These connections form as biodiversity stepping stones and corridors, land and sea transport routes, access to oceanic fishing grounds, ancestral cultural landscapes, and community linkages between people and place across the wider Ōtepoti city, Otago and surrounding regions, and beyond. Te awa Ōtākou is influenced by many factors and valued by many people. Whilst this study does not aim to detail the richness of these linkages, it considers their implications in the assessment of current challenges and future opportunities.

Figure 10 **Study Area Map**

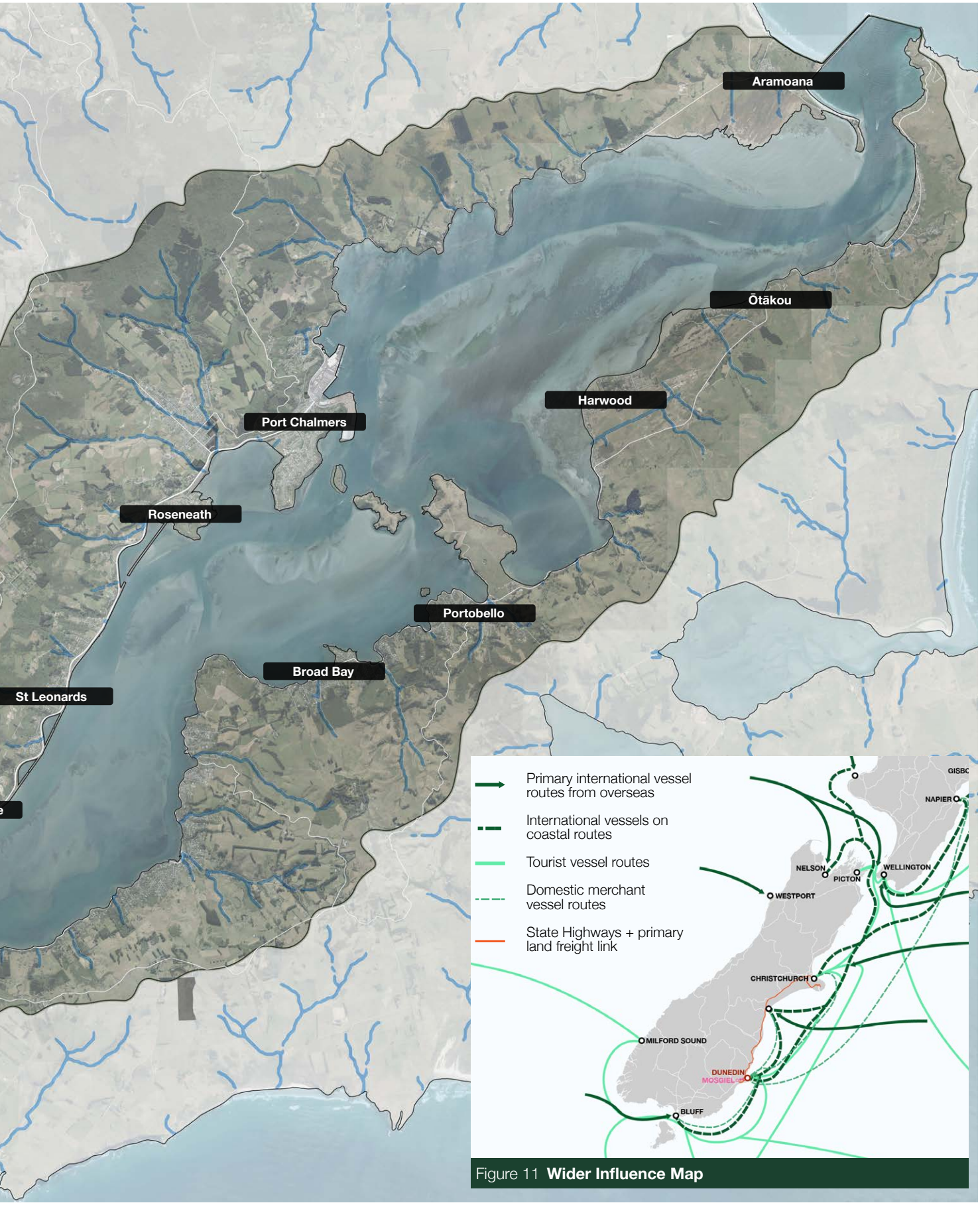


Figure 11 **Wider Influence Map**

2 Reflections on the Past

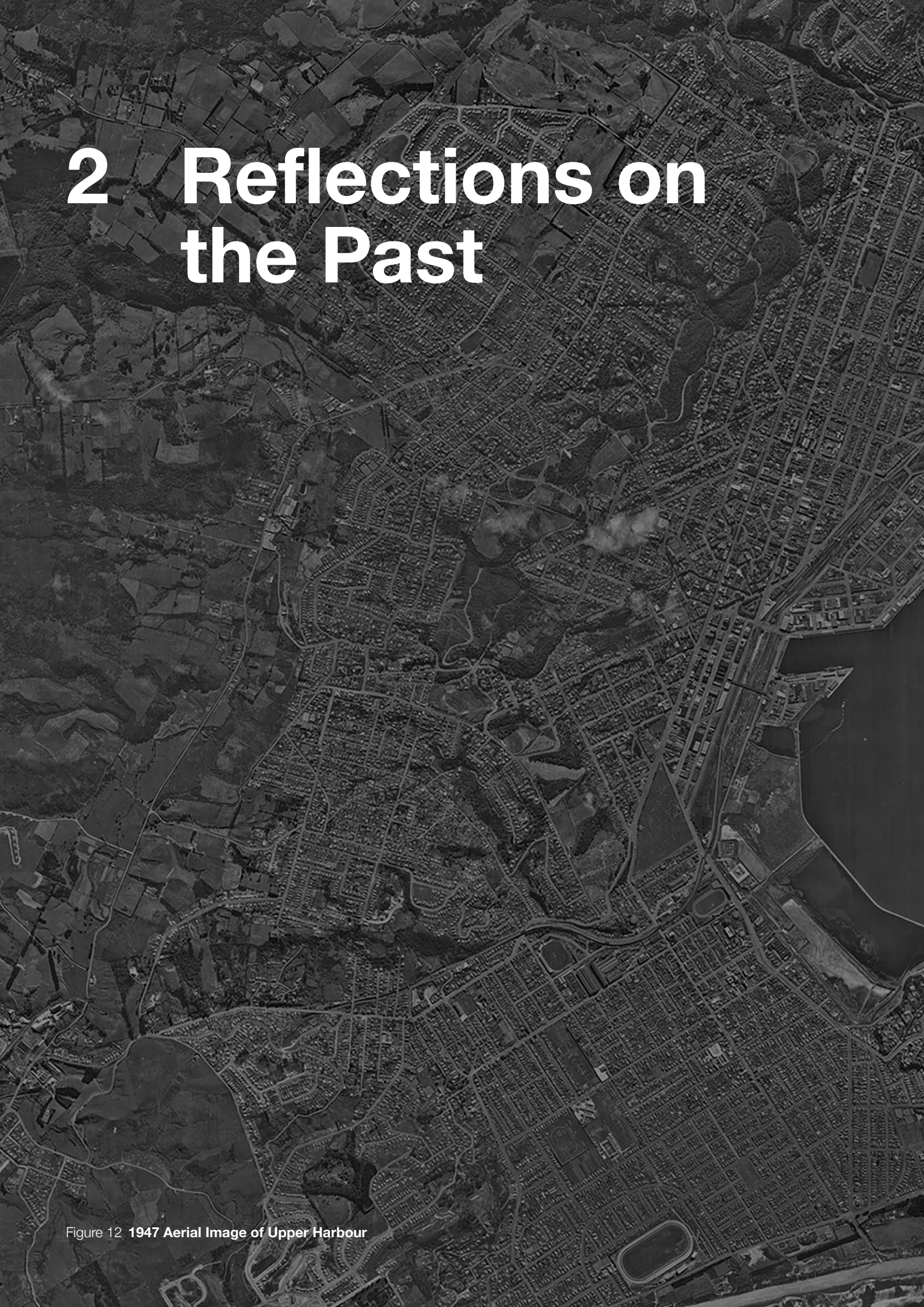


Figure 12 **1947 Aerial Image of Upper Harbour**

Te Awa o Ōtākou holds profound cultural, spiritual, and historical significance for Kāi Tahu and Kāti Māmoe hapū. The harbour has been integral to Māori life since the 13th Century and stands as a testament to the enduring relationships between Kāi Tahu and their ancestral and cultural landscapes. It is a living embodiment of cultural identity, spiritual significance and historical continuity.

The name Ōtākou, given by early Waitaha settlers, refers to a tidal flow within the harbour. Ōtākou is the name of the eastern channel, that flows from the mouth of the harbour, along the front of Ōtākou Marae at Ōmate, and ends as a ‘kou’ at Akapatiki.

Te Awa Ōtākou is an awa moana, a saltwater river, which once teemed with diverse marine life. Since the earliest human arrival on Otago Peninsula, it has supported numerous kāika along its shores, been a vital source of mahika kai, provided a transport route towards the northern coast and up-harbour, and remains a living symbol of connections to atua and tūpuna.

The harbour’s Māori history is layered with the stories of successive migrations - Waitaha, arriving in the late 13th Century, followed by Kāti Māmoe in the 16th Century, and finally, Kāi Tahu in the 17th Century. Each wave of people brought their own traditions, interweaving them with those of their predecessors, creating a complex cultural landscape that continues to exist to this day.

Tēnei te tai whakairo a Matamata

This tide is carved out by Matamata

2.1 Whakapapa

2.1.1 Te Timataka - Creation

Creation narratives are fundamental to human cultures worldwide, serving as cornerstones for understanding our place in the universe. For mana whenua, creation narratives are fundamental living knowledge systems that shape worldviews and relationships with the environment. They explain the interconnectedness of all things and inform kaitiaki responsibilities.

Southern Māori creation accounts, rooted in Eastern Polynesian tradition, describe how atua and their myriad offspring shaped the natural world, including Te awa Ōtākou.

Te Kore, the primordial void, gave rise to life through many evolving forms, eventually leading to the atua. In Kāi Tahu traditions, Papatūānuku's relationships with Takaroa, and later, Rakinui, are amongst the key narratives for mana whenua. Rakiriri (Goat Island) is the abode where Takaroa retreated to after his battle with Rakinui, after discovering his wife, Papatūānuku, had joined with Rakinui during one of his extended absences. Soon after, Aoraki, son of Rakinui and his first wife, Pokohāruatepō, visited his father's new wife with his brothers. Their attempted return to the heavens went awry, transforming them into the peaks of the Southern Alps.

Southern Māori creation stories intertwine with waka journeys that brought mythical beings and human tūpuna to Te Waipounamu. Te Waka Huruhurumanu and Te Waka a Raki introduced supernatural beings and left their mark on Otago's landscape. One such is Te Atua o Taiehu, named for the captain of Te Waka a Raki, which stands prominently to the east of Ōtākou Marae.

Maui, while travelling in his waka, named Kā Tiritiri ki te Moana and paused at Pukekura to repair a torn sail. Araiteuru's ill-fated journey to bring kumara to Te Waipounamu is remembered through placenames down the eastern coast, including the Moeraki Boulders. Rakaihautu, leading the Uruao waka, shaped inland lakes, and brought Waitaha to Te Waipounamu. Takitimu, captained by Tamatea, wrecked, becoming the Takitimu Ranges. Tamatea is the name of the whare at Ōtākou Marae.

Te Rakitauneke's taniwha, Matamata, shows the continuity of land-shaping into the human era, forming significant features around Te Awa o Ōtākou and the Taiari River.

Te Waka

The creation stories of southern Māori are woven with the journeys of various waka, each bringing mythical beings and human tūpuna to Te Waipounamu. Te Waka Huruhurumanu introduced legendary supernatural beings to Otago, while Te Waka a Raki, captained by Taiehu, is remembered in the landscape near Ōtākou Marae.

Te Waka a Raki

Captained by Taiehu, who cleaved the seas with his axe. He is remembered in the small rocky peaked hill immediately east of the Ōtākou Marae – Te Atua o Taiehu.

Kā Tiritiri ki te Moana

Maui, while travelling in his waka Mahunui/Mahutūkiteraki, named Kā Tiritiri ki te Moana and paused at Pukekura to repair a torn sail.

The Araiteuru

The Araiteuru's ill-fated journey to bring kumara to Te Waipounamu is remembered through placenames down the eastern coast and the Moeraki Boulders. Rakaihautu, leading the Uruao waka, is credited with discovering, digging out, and naming many inland lakes, along with bringing Waitaha to Te Waipounamu.

Takitimu

Takitimu, captained by Tamatea, journeyed south before wrecking and becoming the Takitimu Ranges, further illustrating how waka narratives are embedded in the landscape.

Matamata

The narrative of Te Rakitauneke's taniwha, Matamata, shows the continuity of land-shaping into the human era, forming significant features around Te Awa o Ōtākou and the Taiari River.

2.1.2 Wāhi Tūpuna

The landscape surrounding Te awa Ōtākou and its catchment was rich with sites of cultural, spiritual, and practical importance to mana whenua. These places reflect the deep connection Kāi Tahu and their predecessors had with the land and sea, serving various purposes from resource gathering to settlement and spiritual practices.

The highlighted wāhi tūpuna hold extensive historic, cultural and spiritual connections for mana whenua. The tupuna, activities, and events associated with these places form integral parts of a cultural landscape. This landscape, both temporal and spatial in nature, is a crucial element within the broader cultural tapestry of Te Waipounamu.

It is important to note that these are the more significant of wāhi tūpuna within the harbour catchment. Every landscape feature contained some form of cultural connection, whether it be for access to mahika kai, transport route, stone quarrying and resource gathering, or notable events.

Wāhi Tūpuna

1. **Koputai:** This significant tauraka waka provided access to the hills behind, including **Kapuketaumahaka** (Mt Cargill) and Mihiwaka.
2. **Aramoana:** Located at the harbour entrance, Aramoana was not only a tauraka waka but also the starting point of a well-worn track leading to kāika along the coast to Pūrakaunui. The name Aramoana, meaning "pathway of the sea," reflects its importance as a coastal route, and was formerly a tidal channel to the sea.
3. **Toitū:** Situated near the outlet of the Toitū stream, in the vicinity of the present-day Exchange, this tauraka waka was the starting point for overland routes to the Taiari Plains. It was also the site of an old kāika that tūpuna from Ōtākou used during their mahi kai expeditions.
4. **Te Umu Kurī**: More widely known in the present-day as Weller's Rock, a tauraka waka near Ōtākou Marae.
5. **Mataukareao**: Originally situated on the foreshore of the upper harbour, near current day lower Hanover Street, the tauraka waka at Mataukareao was also the site of a kāika.
6. **Rakiatea**: In the vicinity of St. Kilda, this was an integral place in the travel routes north and south via the harbour, or along coastal peninsula routes. Travellers on the way south would travel up the harbour, landing at the head of the harbour and cross the sand flats to Rakiatea, and from there south, either following tracks overland, or by waka.
7. **Te Atua o Taiehu**: A prominent peaked hill immediately east of Ōtākou Marae. The name remembers Taiehu, who captained Te Waka a Raki, a very early waka to visit Te Waipounamu.
8. **Kamautaurua (Quarantine Island)**: Kamautaurua was a favoured fish netting spot, highlighting its importance for food gathering.

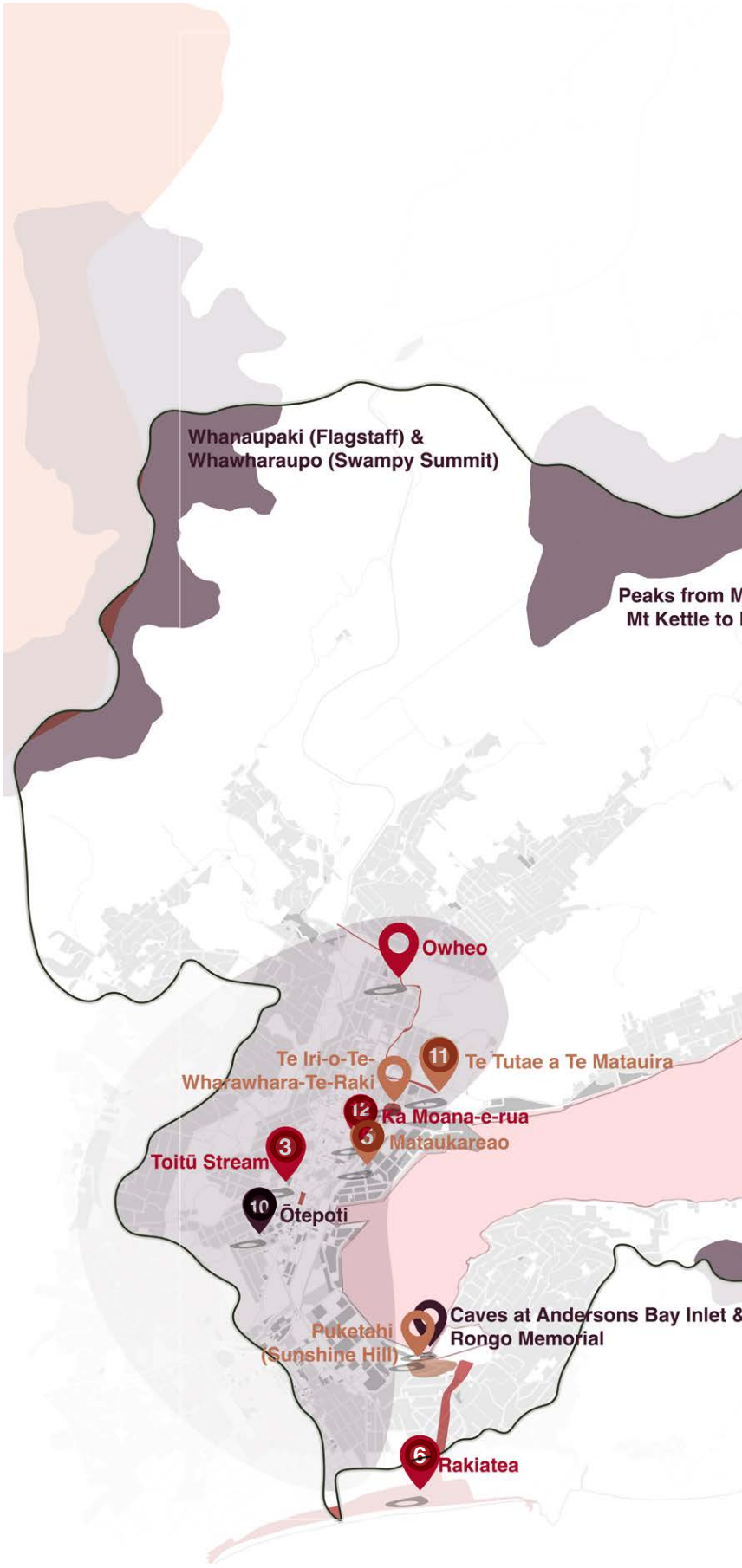
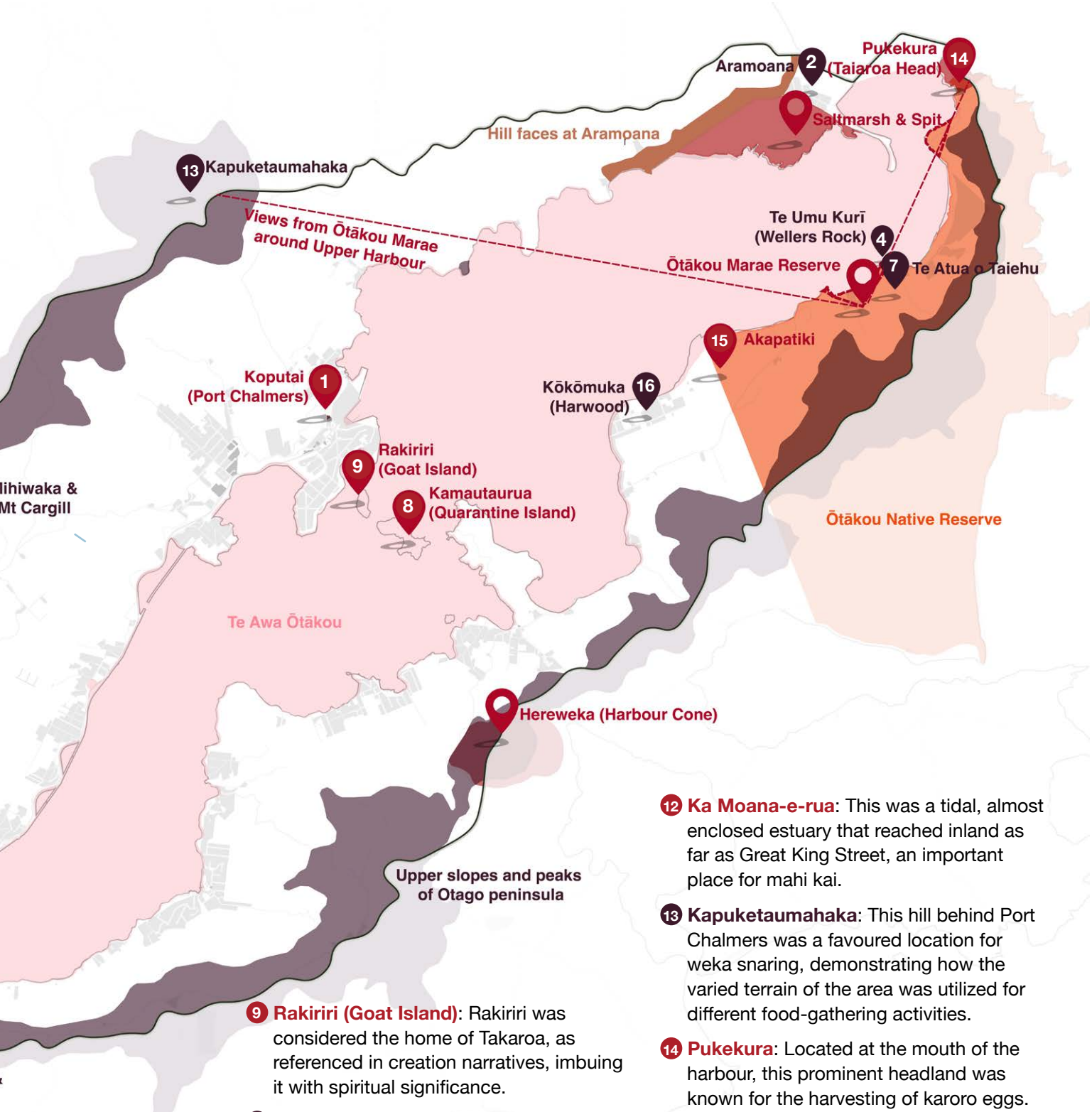


Figure 13 **Wāhi Tūpuna. Credit: Aukaha / DCC**



9 **Rakiriri (Goat Island)**: Rakiriri was considered the home of Takaroa, as referenced in creation narratives, imbuing it with spiritual significance.

10 **Ōtepoti**: The broader area now known as Dunedin contained several smaller settlements. The name Ōtepoti itself refers to a corner of a woven food basket, of which the shape of the former bay at the head of the harbour was similar in appearance to,and reflects the area's importance as a food source.

11 **Te Tutae a Te Matauira**: This kaika was located near the mouth of the Ōwheo, (Water of the Leith) strategically placed for access to both freshwater and marine resources.

12 **Ka Moana-e-rua**: This was a tidal, almost enclosed estuary that reached inland as far as Great King Street, an important place for mahi kai.

13 **Kapuketaumahaka**: This hill behind Port Chalmers was a favoured location for weka snaring, demonstrating how the varied terrain of the area was utilized for different food-gathering activities.

14 **Pukekura**: Located at the mouth of the harbour, this prominent headland was known for the harvesting of karoro eggs.

15 **Akapatiki**: Near the modern settlement of Harwood, the tidal flats at Akapatiki were popular for catching patiki (flat fish). The land area adjacent was where kokomuka, a plant used for medicinal purposes, was gathered. This highlights the area's importance not just for food but also for rongoā.

16 **Kōkōmuka (Harwood)**: A significant kāika inside the harbour, occupied by Waitaha.

2.2 Geological History

Te awa Ōtākou has been shaped by powerful geological forces over an extended timeframe. A period of eruption occurred 16 - 10 million years ago resulting in a large shield volcano named Rakiriri which is understood to have once risen 1000 m in the center of what is now the harbour. As the volcanic eruption subsided, the forces of water carved the landscape and formed two pronounced stream systems, one flowing east towards what is now Pukekura and another westward to a confluence with the Ōwheo discharging to the ocean where South Dunedin now sits. As the volcanic cone eroded and the sea level fell during the last ice age these streams carved out the deep cut through the landscape along the faultline which runs beneath the harbour.

As the planet warmed and the last ice retreated around 16,000 years ago the sea levels around our shores rose by approximately 120 m and the waterways flowing off Rakiriri flooded forming a drowned valley with Otago Peninsula remaining as an island. Over time sediment from the Mata-au / Clutha River travelled northwards up the coast depositing sand at the mouth of the western stream to form the low sand flats and wetlands on which South Dunedin was later built. The Ōwheo was forced to change its course and discharge into what was now the head of the 23 km long Te awa Ōtākou.

The Islands of Rakiriri and Kamautaurua / Quarantine Island still remain as the core of the once mighty volcano with the drowned rivers now forming the harbour channel with the western channel remaining distinctly shallower than the eastern reach. On average, the awa is now 2.3 km wide, with a narrow ~400 m wide mouth between the Aramoana sandspit and Harington Point. Through this evolution, Port Chalmers, Portobello and the inner islands now form the boundary between the inner (also referred to as upper) harbour, which spans south-west to Ōtepoti city, and the outer (or lower) harbour, extending north-east to the South Pacific Ocean between Pukekura and the mole.

Te awa Ōtākou has been and continues to be naturally shallow, with shifting sandbanks and channels – except for the >12 m deep shipping channel[2] It is still greatly influenced by sediment transport from the Clutha River and surrounds via the Southland Current, with the Aramoana Sandflats thought to originate some 6000-4000 years ago (ORC & DCC, 1991). The combined forces of the Southland Current and strong tidal regime within the harbour mean that the harbour is infilling through a net accumulation of sediment over time.

The surrounding hillsides of Te awa Ōtākou are a reflection of its eruptive past with basaltic volcanic bedrock overlain with variable deposits of ash, magma and more recent sedimentary deposits. This geological history has not only shaped the landform that defines Te awa Ōtākou today but also the variable clay soils which were prized for their pigments, and the mineral rich soils which supported the original surrounding forests and more recent gardens.

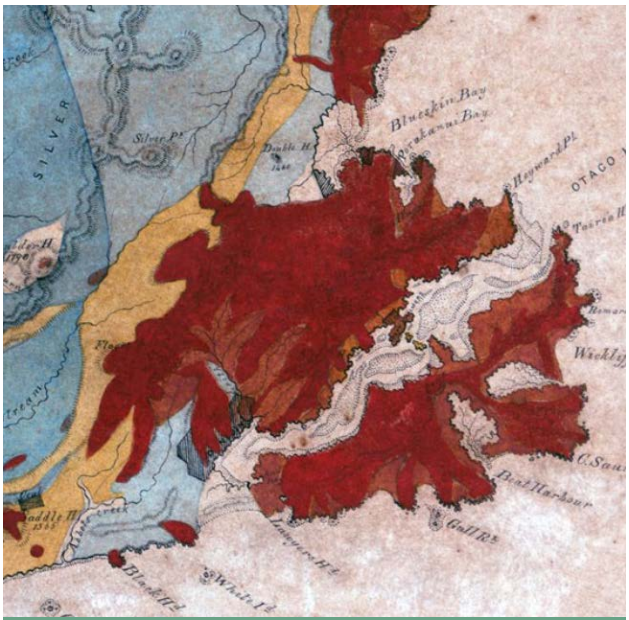
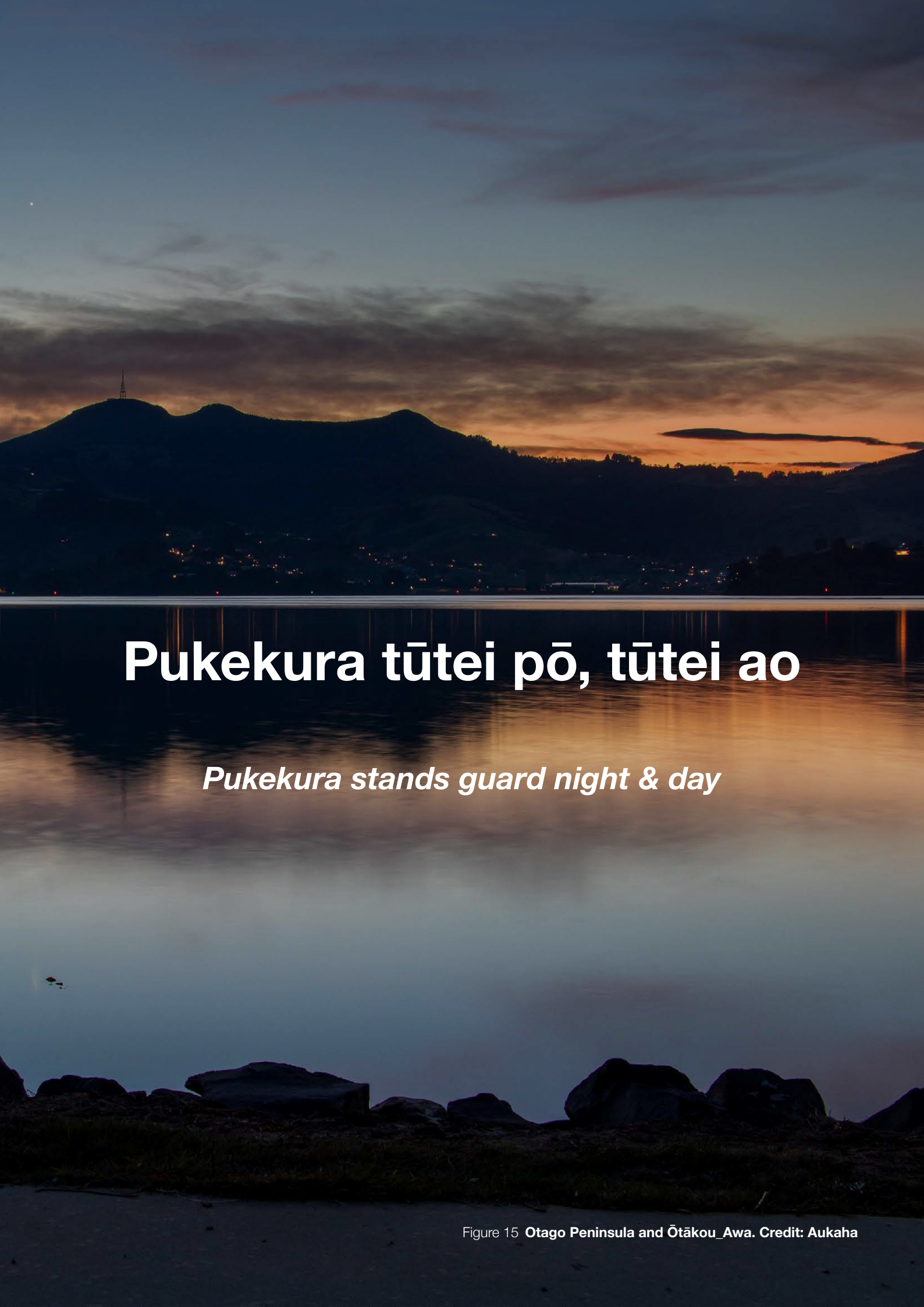


Figure 14 **Early geological map of the Province of Otago showing the Dunedin Volcano (red) with Rakiriri and Kamautaurua in the middle. Credit: https://www.otago.ac.nz/library/treasures/hector/idevice_map.html/**

2 Feary, T. M., & Smith, A. M. (2024). Changing bryozoan fauna in Otago Harbour reflects growing urbanisation and globalisation. New Zealand Journal of Marine and Freshwater Research, 1–22. https://doi.org/10.1080/00288330.2024.2377601



Pukekura tūtei pō, tūtei ao

Pukekura stands guard night & day

Figure 15 **Otago Peninsula and Ōtākou_Awa. Credit: Aukaha**

2.3 Human Histories + Connections to the Harbour

2.3.1 Human History

The story of mana whenua in Ōtepoti and the surrounding Otago Harbour is one of profound connection to the land and sea, rich cultural traditions, and sophisticated resource management. This history spans centuries, beginning with the Waitaha people in the early 1300s. Descendants of the Uruao waka, these first human inhabitants discovered a land of abundant resources, established a thriving culture based on mahika kai traditions, and developed a deep understanding of the natural world around them.

Waitaha strategically placed their kāika near moa hunting grounds and marine resources, including at Harwood, Papanui Inlet, and Anderson's Bay. They cultivated deep mātauraka about the land, its seasons, and its resources, passing this knowledge down through generations. Their legacy lives on in the place names still used today, etching their history into the very landscape of Otago.

The 16th century brought change with the arrival of Kāti Māmoe from the eastern North Island. Over several generations, they expanded their presence along the east coast of Te Waipounamu. Rather than displacing Waitaha, Kāti Māmoe integrated with them through strategic marriages with chiefly Waitaha women. This period of expansion and integration added new layers to the cultural landscape of the region.

The final wave of migration came in the 17th Century with the arrival of Kāi Tahu. Initially a collection of hapū, Kāi Tahu gradually coalesced into a unified tribe over the course of a century. This period was marked by both conflict and peace-making, as Kāi Tahu intermarried with Kāti Māmoe and absorbed the traditions and practices of their predecessors.

By the end of this migration and integration process, the principal people of Kāi Tahu carried the whakapapa of all three iwi - Waitaha, Kāti Māmoe, and Kāi Tahu. This intermingling of bloodlines and traditions created a robust and adaptable culture, deeply rooted in the landscapes of Te Waipounamu.

Figure 16 **Port Otago (1840), Le Breton, Louis, 1818-1866. Credit: Hocken Digital Collections**

Tai timu, Tai pari

Mana whenua and Otago Harbour in the 19th and Early 20th Centuries

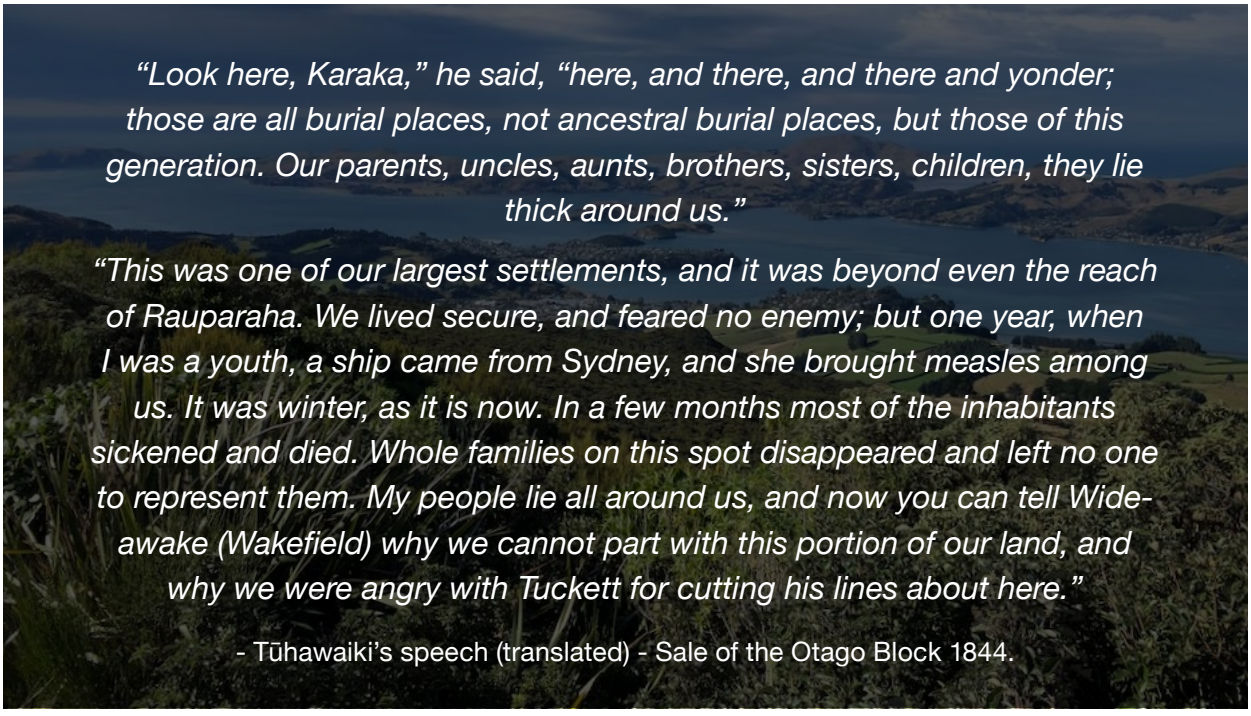
As the 19th century dawned, Otago Harbour was a vital and expansive centre of Kāi Tahu life. The significance of this area cannot be overstated - it was one of the largest and most important Māori settlements in southern New Zealand[3].

When European visitors first ventured into Te awa Ōtākou, they encountered a landscape containing a rich tapestry of mahika kai and kāika, forming the lifeblood of local hapū. Their lives were intricately woven into the fabric of the land and the sea, which in turn, supported a large and thriving population. However, this way of life was on the cusp of profound change.

European contact began sporadically in the early 19th Century. One of the earliest and most significant encounters occurred in 1817, when the crew of the British sealer ship, Sophia, led by Captain James Kelly, clashed with Māori at Whareakeake. The conflict arose from a misunderstanding and escalated rapidly, resulting in deaths in both sides, and the destruction of a fleet of waka and the kāika at Te Rauone.

The 1820s and 1830s brought a period of significant upheaval for Kāi Tahu. This era was marked by the southern campaigns of the formidable Ngāti Toa rakatira, Te Rauparaha. His incursions into Te Waipounamu, driven by a complex mix of revenge, conquest, and resource acquisition, had a profound impact on the socio-political landscape of Kāi Tahu.

Te Rauparaha's raids, which began in the early 1820s and continued into the 1830s, caused widespread disruption and loss of life among Kāi Tahu communities in Canterbury. The conflict forced many to flee their kāika, disrupted social structures, and led to significant population displacement. The Ōtākou communities found themselves in a unique position to counter Te Rauparaha's advances. Their access to European technology, particularly whaleboats and muskets, proved crucial in driving Te Rauparaha from Te Waipounamu, and established the reputations of both Te Matenga Taiaroa and Karetai. The aftermath of this conflict led to an influx of northern Kāi Tahu to Te awa Ōtākou, establishing themselves in kāika on the northern side of the harbour.



"Look here, Karaka," he said, "here, and there, and there and yonder; those are all burial places, not ancestral burial places, but those of this generation. Our parents, uncles, aunts, brothers, sisters, children, they lie thick around us."

"This was one of our largest settlements, and it was beyond even the reach of Rauparaha. We lived secure, and feared no enemy; but one year, when I was a youth, a ship came from Sydney, and she brought measles among us. It was winter, as it is now. In a few months most of the inhabitants sickened and died. Whole families on this spot disappeared and left no one to represent them. My people lie all around us, and now you can tell Wide-awake (Wakefield) why we cannot part with this portion of our land, and why we were angry with Tuckett for cutting his lines about here."

- Tūhawaiki's speech (translated) - Sale of the Otago Block 1844.

3 Anderson, A. (1987). Evidence for the Waitangi Tribunal Ōtākou claim (Wai 27)

Figure 17 **Ships in Otago Harbour, 1840. Louis Le Breton. Credit: Hocken Digital Collections.**

It was within this context of conflict and societal change that the Weller Brothers established their whaling station at Te Umu Kurī in 1831. The station would become one of the largest in New Zealand, marking the beginning of sustained European presence in the area. Edward Weller's marriages to two chiefly women, firstly Paparū, daughter of Tahatū, and later, Nikuru, daughter of Te Matenga Taiaroa, formed important alliances that enabled the station to operate.

June 13, 1840 marked a turning point when the Treaty of Waitangi was signed at Pukekura by Kāi Tahu rakatira Karetai and Korako. This event marked the beginning of formal British involvement in the area and would have far-reaching consequences for mana whenua. The Otago Purchase closely followed in 1844 - despite the local desire to retain the entire peninsula for mana whenua, only a small portion of land at the head of the harbour was excluded from the sale, becoming the Ōtākou Native Reserve. The sale agreement also included verbal promises to reserve 10% of all land sold, known as "*the tenths*", for Kāi Tahu, along with the provision of schools and hospitals. This promise, however, would remain unfulfilled, sowing the seeds of a grievance that would echo through generations.

Four years later, in 1848, the establishment of Dunedin heralded a new era. European settlers poured into the region, bringing with them a wave of transformation that would reshape the landscape. Forests fell to the axe, wetlands succumbed to drainage, and the natural environment that had sustained mana whenua for generations began to alter irrevocably. As the land changed, so too did the accessibility of traditional lifeways, forcing adaptation and change upon mana whenua communities.

The 1850s bore witness to demographic and economic shifts. By 1850, European diseases had taken a devastating toll, with the local Māori population plummeting to few than 200, compared to the 2000 reported at the turn of the century. The economy of mana whenua found itself pushed to the margins. Though there was initial prosperity from trade with settlers, it proved fleeting as the newcomers established their own farms and businesses, becoming self-sufficient.

Attempts to address the growing land issues came in the early 1850s. In 1852, land was set aside in Dunedin and Port Chalmers for visiting Māori, but these reserves proved woefully inadequate. In 1859, the Ōtākou Marae reserve was selected by Taiaroa, Karetai, and Korako, to provide a focal point for the community. The first building, a church, was opened in 1865, followed by a school in 1869, and finally the wharenui, Te Mahi Tamariki, in 1874. The name Te Mahi Tamariki reflected the understanding that the task of rectifying land-sale grievances would fall to future generations.

The 1860s brought a new chapter with the arrival of the Taranaki prisoners. Between 1869 and 1871, 74 men from Ngāti Ruanui were imprisoned in Dunedin for defending their land rights against the Crown. In 1879, Te Whiti's 'Ploughmen' from Parihaka were also brought to Dunedin. These men were subjected to hard labour, working on public projects around Dunedin, including the Anderson's Bay causeway. Local Kāi Tahu whānau, especially the Ellisons, extended support to the prisoners, forging lasting connections between Taranaki and Ōtākou.

The late 19th and early 20th Centuries saw ongoing land loss for mana whenua. The Otago Heads Native Reserve Road Act 1908 allowed for land acquisition for the Peninsula road. Land at Pukekura and Harington Point was commandeered for defence, while part of the Koputai Reserve fell to railway construction. Even the islands within Otago Harbour, which Kāi Tahu leaders such as H.K. Taiaroa insisted had never been sold, were claimed by the Crown.

Te Ao Hou
20th Century and Beyond

As the 20th century dawned, Kāi Tahu communities around Otago Harbour faced the enduring consequences of 19th-century land alienation. Their once-vast territories had been reduced to a small native reserve, primarily centred at Ōtākou. The harbour continued to play a crucial role in the economic and cultural life of mana whenua. Fishing, particularly for barracouta, emerged as a key economic activity. This persistence in traditional practices not only provided a means of livelihood but also helped maintain cultural connections to the harbour. However, the ability to fully utilize these resources was increasingly constrained by the loss of land and access to traditional fishing grounds.

The mid 20th Century brought significant social and economic changes for mana whenua. The foundation stone of the Ōtākou Marae Memorial Centennial Church, a national memorial to the signing of the Treaty of Waitangi and the establishment of the first Christian mission in the South, was laid in 1940. A new whare Tamatea, opened in 1946, symbolized cultural continuity. A pivotal development in the local economy was the establishment of Ōtākou Fisheries in 1946 by Raniera Ellison. This enterprise quickly grew from local markets to international trade, becoming the world's largest processor of crayfish tails in the 1950s. The success of Ōtākou Fisheries had profound implications for the local Māori community, providing employment opportunities close to home, allowing people to remain connected to their ancestral lands rather than seeking work in urban areas. The company enabled local people to buy boats and obtain fishing licenses, fostering a sense of economic empowerment and self-determination.

The late 20th Century marked an intensification of efforts to address historical injustices. The lodgement of the Ngāi Tahu Claim (WAI 27) in 1986 initiated a long process of negotiation for redress for the loss of land and mahika kai. This period also saw increased environmental advocacy, exemplified by the successful opposition to the proposed Aramoana aluminium smelter. As the new millennium approached, mana whenua involvement in resource management and environmental advocacy grew. The establishment of Kāi Tahu ki Otago (now Aukaha) in 1997 and the implementation of the Ngāi Tahu Settlement Act 1998 provided new avenues for participation in decision-making processes.

In recent years, focus has shifted towards sustainable practices aligned with cultural values. Key initiatives, such as the 2008 application for a Mātaitai Reserve over part of the Otago Harbour and the development of co-management agreements for significant reserves, signal a growing integration of the Kāi Tahu worldview into resource management. This holistic approach to development considers the long-term health of the harbour and its ecosystems, recognizing the interconnectedness of environmental, cultural, and economic well-being.

Figure 18 **Dunedin Otago Harbour, from above Highcliff (1866). Credit: Hocken Digital Collections.**

2.4 Tikaka / Values

Creation narratives and histories significantly influence Kāi Tahu tikanga and cultural values today in several interconnected ways:

Whakapapa (genealogy) connections

Creation narratives establish fundamental relationships between people, land, and natural resources. They influence tikanga by emphasizing interconnectedness and collective responsibility for environmental stewardship.

Manawhenua (territorial authority)

Traditional histories define Kāi Tahu's ancestral connections to Te awa Ōtākou, informing tikanga around land and harbour use, resource and environmental management, and decision-making processes within the region.

Mauri / Te Mana o te Taiao

These stories reinforce a view of the environment as a living, interconnected system. Natural features are seen not just as resources, but as ancestors and family members. This perspective informs modern conservation efforts and resource management practices.

Manaakitanga (hospitality)

Historical accounts of interactions between different groups inform cultural values of generosity and reciprocity, guiding tikaka in social and diplomatic contexts.

Kaitiakitanga (stewardship)

Knowledge passed down through generations shapes practices of environmental protection and sustainable resource use, influencing tikaka related to conservation and harvesting. The stories emphasize the responsibility to care for the environment, translating into active involvement in environmental protection and restoration projects. They also influence Kāi Tahu positions on resource consent applications and development proposals. The long-term perspective embedded in these stories encourages consideration of future generations in current decision-making.

Tuakiritaka

The narratives provide a strong sense of place and belonging. They connect current generations to their ancestors and the land, serving as teaching tools for passing down cultural knowledge. This connection strengthens cultural identity and resilience in the face of ongoing colonization impacts. As stories continue to inspire contemporary Kāi Tahu art, literature, and performance, they provide rich material for cultural revitalization efforts.

Tapu and noa (restricted and ordinary)

Creation narratives and traditional knowledge establish what is considered sacred or restricted, influencing tikaka around rituals, ceremonies, and daily practices.

Tikaka and a uniquely Kāi Tahu worldview, deeply rooted in whakapapa, pūrakau, and lived experiences, continue to shape mana whenua interactions with the harbour environs and its wider stakeholders. Tikaka grounds approaches and provides a distinct lens through which mana whenua engage with contemporary harbour issues, from climate change to policy.

2.5 Ongoing land use change and development

Ongoing land use change and development around Te awa Ōtākou is driven by a multitude of factors, which have changed through time, in line with global, national and local events and demands. Periods of significant development as a result of European settlement, the conversion of large areas of land for agriculture and forestry, early settlements and housing development, through to, more lately, further subdivisions to create smaller land parcels, lifestyle blocks, and additional housing have all played a part in shaping the land-use patterns across the harbour catchment today. The pressure to accommodate these uses collectively leads to competing interests, some of which are immediately visible in areas around the harbour, while others are more underlying, for instance, the balance of protected conservation land versus privatised land, and the position and scale of industrial development in an area is prime for recreation, tourism uses and public amenity.

The landscape character of the harbour edge is defined by a matrix of natural and human-modified environments, much of which is determined by the highly varied topography. Larger settlements occur at the more accessible and flatter locations with good access to the awa, particularly around Ōtepoti and Port Chalmers. In contrast, much of the Harbour's coast is characterised by steep rocky outcrops extending down to the awa. On the southern side of the Harbour, these slopes are punctuated by a series of freshwater streams flowing down to small bays and inlets, some with sandy beaches, with the land meeting the sea and creating a sheltered cove. Settlement on the south side of the harbour has generally occurred within these sheltered areas, including Portobello, Ōtākou, Broad Bay, Macandrew Bay, Company Bay and Harwood. On the peninsula itself, the landscape is predominantly rural, with areas of farmland and forestry, as well as a number of ecological reserves in conservation areas. On the northern side, the terrain is generally more gentle, with sections of rolling hillscape that slope gently down to the awa, creating larger, broader, flatter areas that have been more suitable for settlement and development, including Port Chalmers, Ravensbourne, Saint Leonards, Roseneath and Aramoana.

Much of the harbour coastline has been modified in some form, albeit to varying degrees, but most at the very least by the clearance of indigenous vegetation cover. Urban settlements feature along many sections of the harbour coastline, the largest being Ōtepoti Dunedin City itself, where the natural coast has been modified to the greatest extent – the rich marshland food basket of the past which would have supported an abundance of sheltered spawning habitat for freshwater and coastal species is now buried under reclaimed land. Historic connections to the awa for industry and trade have resulted in much of the harbour edge being dominated by significant industrial activity, shipping facilities and port infrastructure. Landform and topography have also resulted in roading and access infrastructure occurring close to the coastline, if not immediately adjacent to or beyond its natural position on reclaimed land.

Figure 19 **Dunedin City Aerial. Credit: Aukaha**

2.5.1 Reclamation of the harbour

Over 700 acres of productive estuarine environment were lost in the establishment of Ōtēpoti – Dunedin City. Key landscape features such as Bell Hill were excavated as a source of material to fill in the intertidal margins extending from Andersons Bay to what is now Logan Park, creating the flat land on which much of the city's economic activity now depends.

Culturally and ecologically valued awa including Toitu and Ōpoho were incarcerated in pipes and the Ōwheo (Water of the Leith) was significantly modified through channelisation, installation of weir structures and engineered reinforcement of edges. The loss of these once thriving freshwater awa has been at the expense of the important ecological processes that they supported, that in turn supported a healthy harbour.

Development of South Dunedin necessitated the 'drainage' of the natural wetlands through this broad sand flat resulting in the current situation whereby untreated stormwater is pumped into the inner harbour via the Portobello Road pump station. Development of the roads connecting Ōtepoti to Port Chalmers and Portobello also utilised the low-lying intertidal margins with a ribbon of reclamation now covering the ecologically important rocky coastal edges and flattening numerous bluffs and headlands.

Development (and recent redevelopment) of the coastal road has also resulted in the installation of numerous culverts which have both depleted the ecologically significant estuarine reaches of the awa and in many instances created barriers to fish passage between the harbour and headwaters.

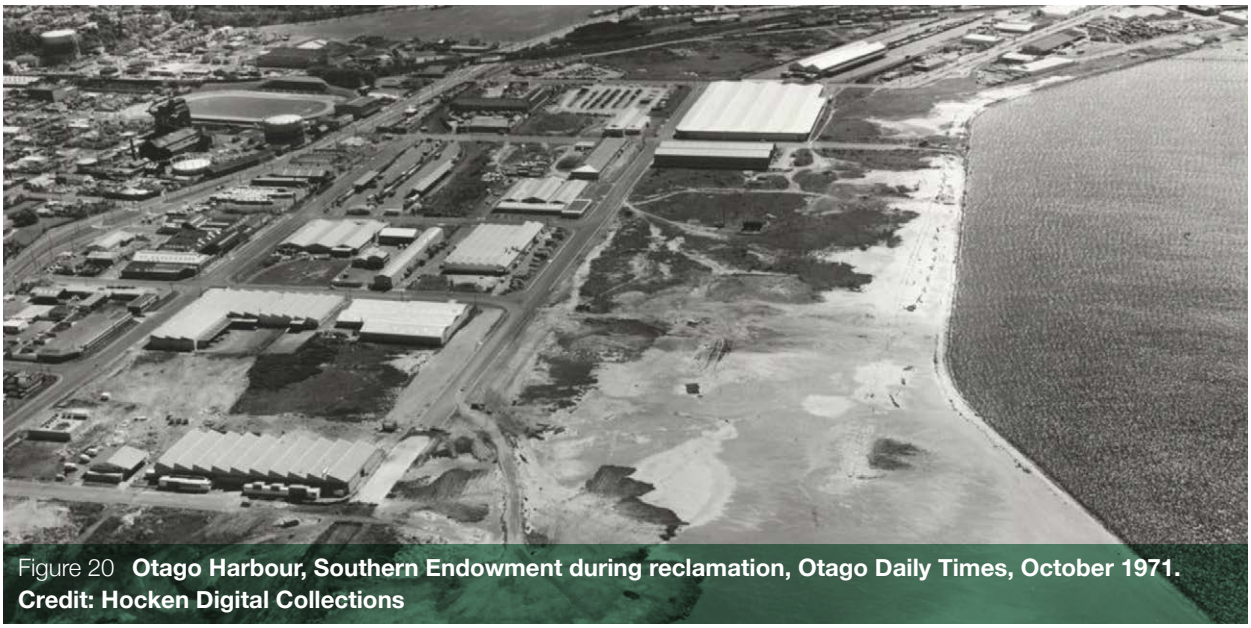


Figure 20 **Otago Harbour, Southern Endowment during reclamation, Otago Daily Times, October 1971. Credit: Hocken Digital Collections**

Figure 21 **Logan Park Today. Credit: Stu Farrant**

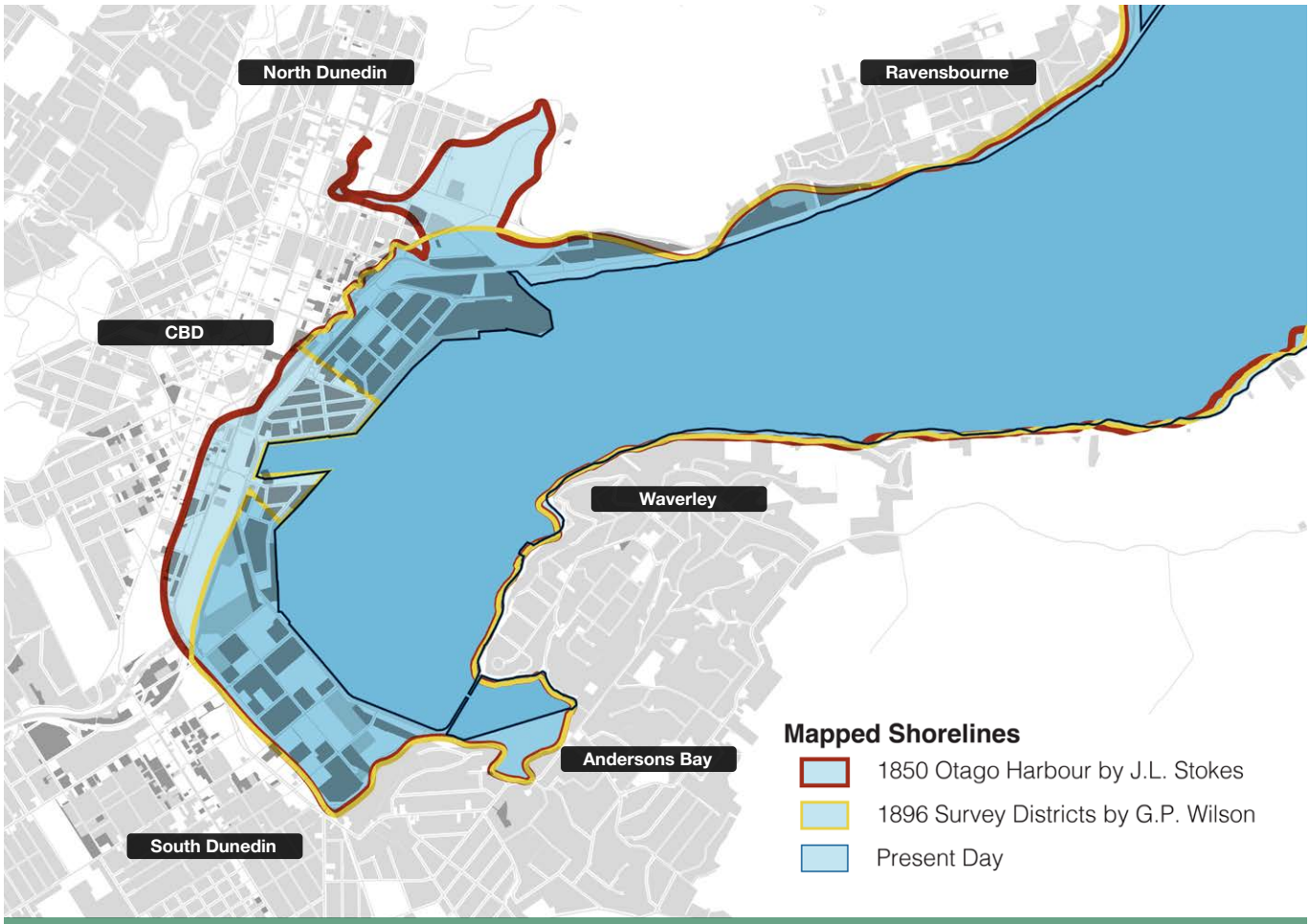


Figure 22 **Mapped Shorelines 1750, 1896, present day**

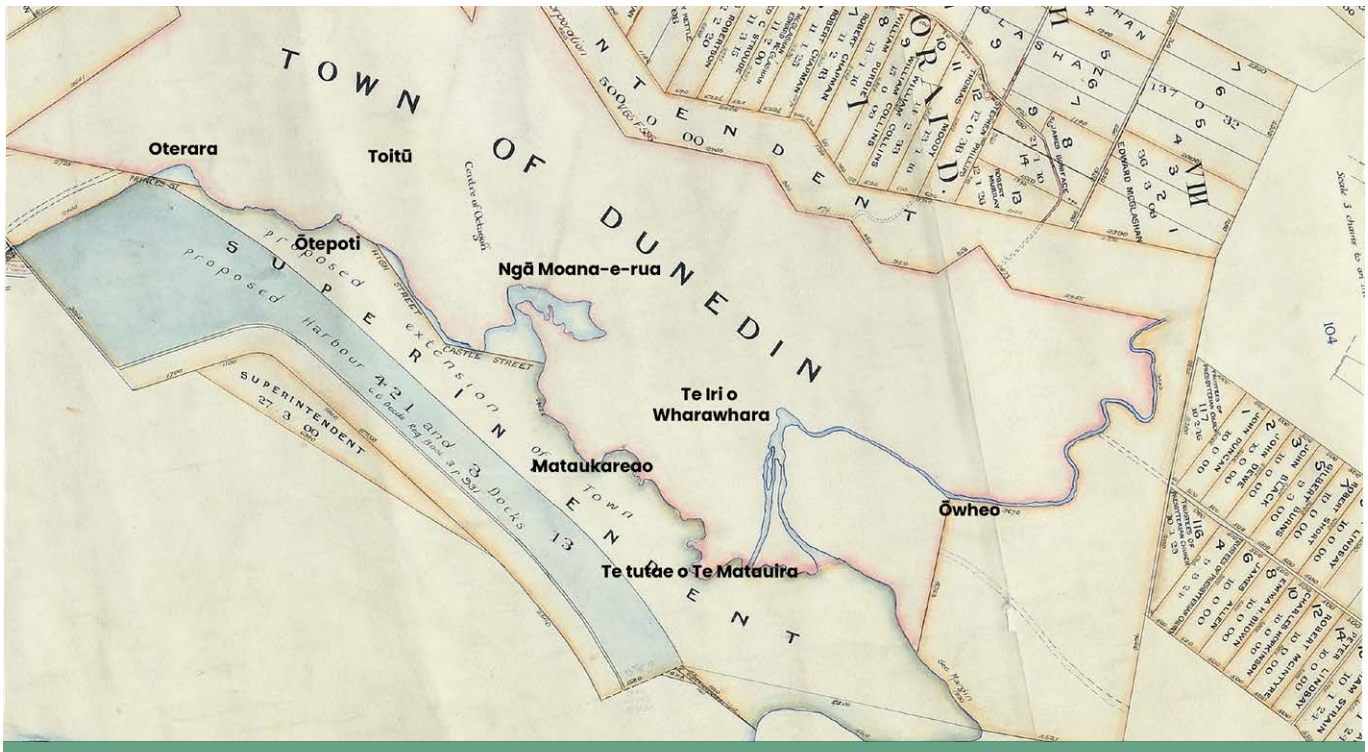


Figure 23 **Original placenames of areas at harbour front prior to reclamation. Credit: Aukaha**

2.5.2 Dredging of the harbour

A naturally shallow, sedimentary environment, yet also a naturally sheltered, bountiful harbour, Te awa Ōtākou was highly susceptible to the pressures of dredging, as interest in marine trade and transport grew. The harbour's shifting sand banks and channels posed a challenge to shipping navigation for the large European vessels arriving in increasing numbers.

A dredging program for the harbour was initiated in 1859 to enable and maintain safe navigation, with first dredger, the New Era, commissioned around 1868. The Victoria Channel was then dredged from 1881 to allow large ships access to the inner harbour basin, bolstering trade – prior to this, deep water access ran out at Port Chalmers. This dredging led to a significant change in the character of the harbour, with the Victoria Channel stabilised as a permanent passageway from Ōtepoti to the port; a rock wall was built lining the seaward edge of the channel to reduce sand intrusion.

Regular maintenance dredging has continued since, to maintain adequate depths in the channel for shipping access. In recent years, this has been undertaken by Port Otago, with a consent granted in 2017 for a further 25 years of maintenance dredging and offshore disposal off the coast of Aramoana, Shelley Beach and Heyward Point – up to 450,000 m3 of sediment can be uplifted from the harbour and disposed of as spoil per year[4]. As well as the ongoing maintenance, in 2015 Port Otago's Next Generation project begun with the intent to enable larger container ships to access the Port, requiring further deepening, widening and ongoing dredging works in the channel, with spoil disposed further offshore, off Pukekura / Taiaroa Head.

Figure 24 **Port Otago dredge 'New Era' works in Otago Harbour. Credit: Aukaha**

4 Next Generation: Port Otago Dredging Project Consent Application. Port Otago, 2016, https://www.portotago.co.nz/assets/Uploads/RM16.179.01.pdf.

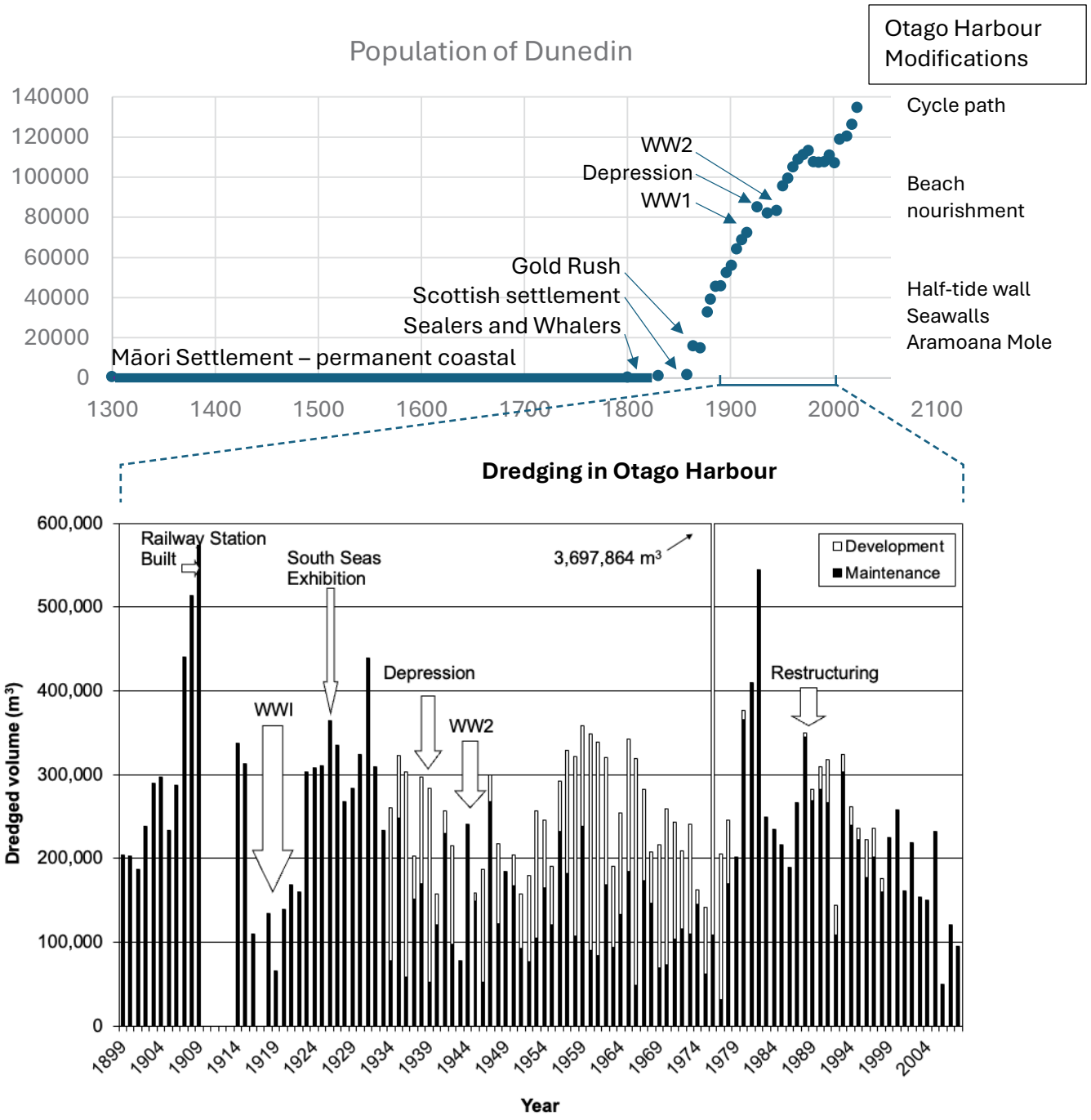


Figure 25 **Population of Dunedin from 1300 CE onward and the record of dredging in Otago Harbour 1899– 2009**

5 Image shared with author permissions, adapted from research article: Feary, T.M & Smith, A.M. (2024). Changing bryozoan fauna in Otago Harbour reflects growing urbanisation and globalisation. New Zealand Journal of Marine and Freshwater Research.

Figure 26 **Otago Peninsula and Te Awa Otakou. Credit: Aukaha**

2.5.3 Urban/commercial development

Urban and industrial development around the harbour has been largely shaped by it's strategic location. The first major European settlement in the mid-19th century was driven by the harbour's potential as a shipping and regional trade hub. Early development focused on establishing Dunedin and Port Chalmers as urban centres to support these activities. Before long, the harbour became a vital link for both domestic and international trade.

Ōtepoti (Dunedin) City

Ōtepoti (Dunedin) City was officially established in 1848 by Scottish settlers, with initial residential, religious and cultural development occurring close to the new shipping and industrial hubs. Following the discovery of gold in the 1860s the city quickly became an economic powerhouse, with rapid population growth and extensive infrastructure development including the Dunedin to Port Chalmers railway. The railway was crucial in facilitating the transport of goods arriving in the city from around the region for export. Land-use patterns and urban character of Dunedin varies on either side of the railway, from generally more industrial on the harbour side to more urban on the landward side, with its position causing a disconnect between the city and the water. The harbour side of the railway corridor has developed through time into a mixed-use area, largely dominated by industrial and light industrial activities.

In recent years, areas of the waterfront have developed further to accommodate residential and commercial areas, including retail dining and cultural destinations, albeit within a largely industrial or light industrial context. Much of the waterfront itself is occupied by industrial land uses, with their extent and positioning restricting access to the awa from the city. In the early 1920's, as a northward urban drift threatened the economic drive of Ōtepoti, the New Zealand and South Seas Exhibition was held on an area of large-scale reclamation on the former Lake Logan. The Exhibition in 1925/26 attracted over 3.2 million visitors (twice the total population of New Zealand at the time) and left the legacy of large flat land that now comprises Logan Park, a highly utilised sporting hub for the city.

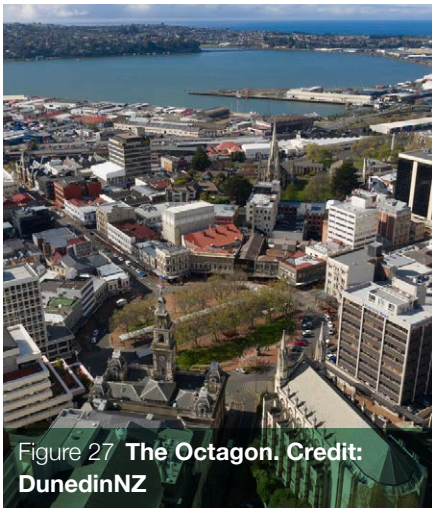


Figure 27 **The Octagon. Credit: DunedinNZ**

Figure 28 **View Over Dunedin towards Logan Park (1864-1865). The building of the 1865 New Zealand Exhibition is visible in the distance. Perry, Joseph. Credit: Hocken Digital Collections**

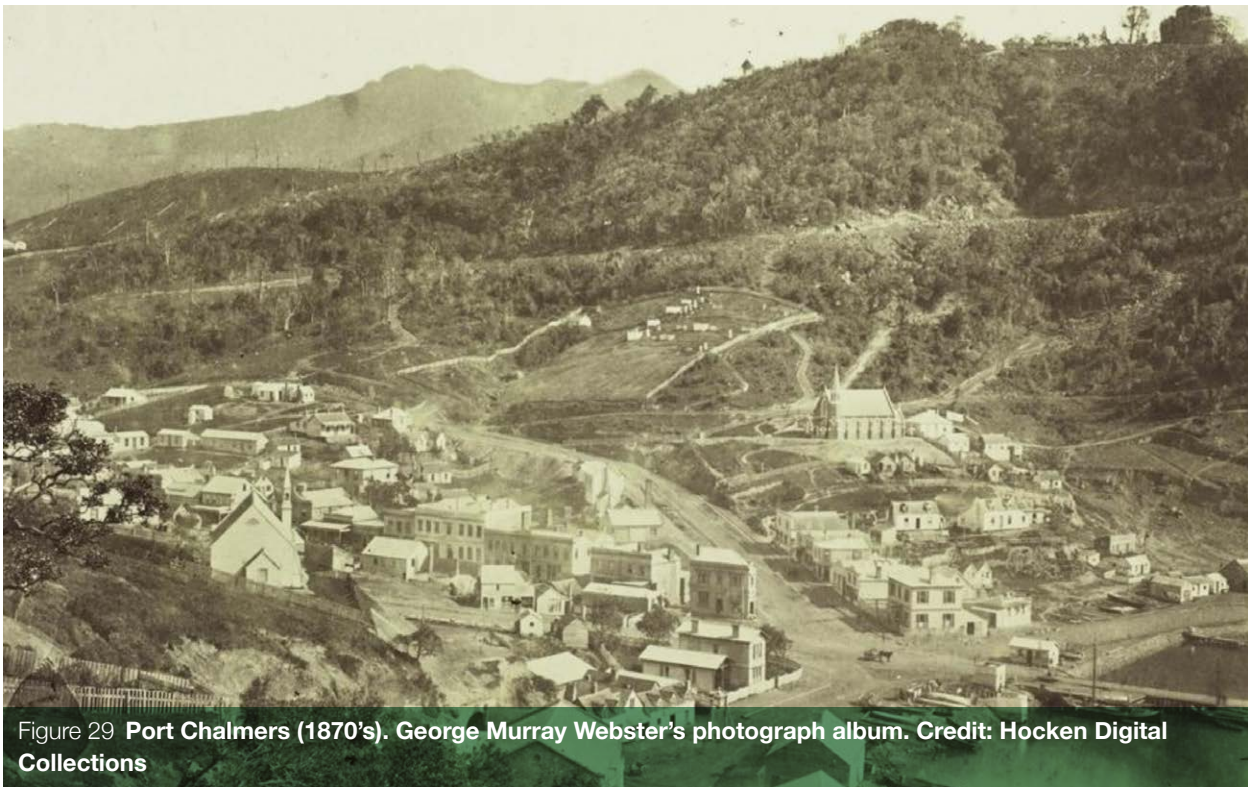


Figure 29 **Port Chalmers (1870's). George Murray Webster's photograph album. Credit: Hocken Digital Collections**

Port Chalmers

Port Chalmers' proximity to Dunedin and its deep-water harbour made it ideal for handling large shipping vessels, including those that were used for the export of the primary industry products that have been central to the national economy. The township flourished as a bustling centre around the port through the late 19th and into the early 20th century, with a thriving main street of shops hotels and businesses.

Port Chalmers remains a hub for industrial activities related to shipping and logistics, however throughout the 20th century several factors have contributed to the decline of the town as a commercial centre, including the centralisation and modernisation of port facilities meaning fewer people are needed to manage the port, leading to reduced foot traffic in the town, together with increased ease of access to and competition from larger retail centres in Dunedin. While cruise tourism has brought some economic activity back to the town, cruise passengers typically only spend a couple of hours in the town before moving on, and this has not been sufficient to revitalise the commercial sector fully, with many shops remaining closed or operating on a seasonal basis. Port Chalmers continues to explore ways to revitalise its commercial sector, with some efforts focused on promoting the town's rich heritage and attracting niche markets such as art galleries, cafes, and specialty shops.

Figure 30 **Port Chalmers. Credit: DunedinNZ**

Figure 31 **Port Chalmers. Credit: DunedinNZ**

Portobello

Portobello has a rich history as a popular holiday destination, attracting visitors from Dunedin and beyond, many of whom travelled by boat across the harbour to spend their summers in the area. Through the late 19th and early 20th century, the village was dotted with holiday cottages, or "cribs" who were drawn to the area for its sheltered position, northern aspect and calm waters ideal for swimming, boating, and fishing, as well as abundant green spaces in beaches. Many of the cribs were owned by Dunedin families who returned year after year. As vehicular access to the peninsula improved over the years, the reliance on harbour transport decreased, and the character of Portobello has evolved: slowly transitioning from a quaint and bustling holiday destination to a more permanent residential area. However, the legacy of the village as a holiday destination remains with many of the original cribs still standing.

At the same time, a scientific facility that was designed to raise European fish species for release into the Harbour (thankfully unsuccessful) came into use as a marine laboratory and centre for education. The Portobello Marine Laboratory, located at the tip of Portobello peninsula, and the New Zealand Marine Studies Centre now operate as local centres for marine research, public engagement, and education.

As the population grew, so did the small yet vibrant village centre, including a hotel, local shops, central services, cafes and restaurants catering to both residents and visitors. Portobello retains its charm and continues to attract visitors who are interested in its history and tranquil setting. While the recent closure of the aquarium may have led to a decline and visitors, the popularity of the new harbour loop cycleway has led to greater visitor numbers arriving via ferry or from the city on day cycling or walking trips.

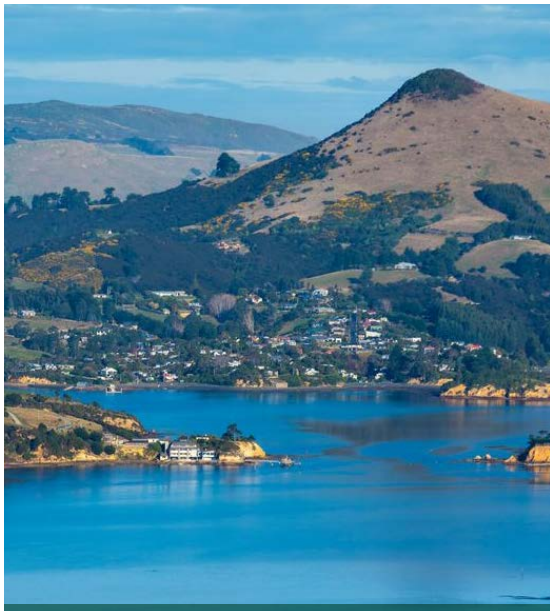


Figure 33 **Portobello. Credit: DunedinNZ**

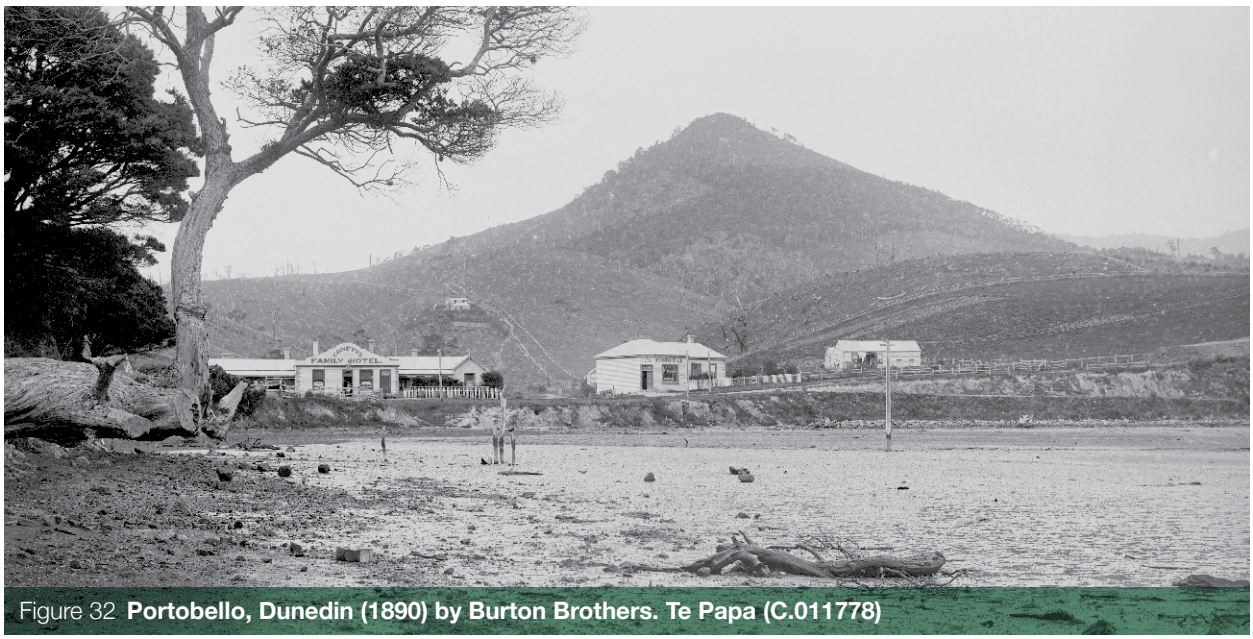


Figure 32 **Portobello, Dunedin (1890) by Burton Brothers. Te Papa (C.011778)**

Broad Bay

Similarly to Portobello, Broad Bay developed as a residential and holiday area, due to its scenic location and access to the harbour. The construction of holiday homes and cribs was common in the late 19th and early 20th centuries, with many families from Dunedin and beyond spending their summers in Broad Bay. The commercial sector in Broad Bay has always been limited, with only a few small businesses serving the close-knit local community, who Largely depend on nearby Portobello and Dunedin for essential services.

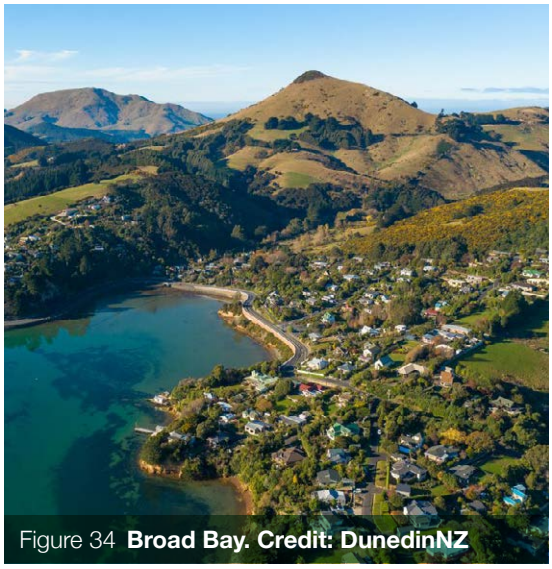


Figure 34 **Broad Bay. Credit: DunedinNZ**

Macandrew Bay & Company Bay

Closer to Dunedin, Macandrew Bay and Company Bay developed as residential suburbs, primarily serving as commuter areas for those working in the city. The area was valued for its picturesque location and sheltered position along the harbour edge. Both bays have small commercial centres, with a few shops and cafes, however, commercial development remains limited, with most residents travelling to the city centre for work and retail. Macandrew Bay and Company Bay are affluent areas and continue to grow as attractive locations for residential property development, largely due to their proximity to the city centre.

Figure 35 **Macandrew Bay. Credit: DunedinNZ**

Figure 36 **Portobello Road, Otago Peninsula (1910s). Credit: Hocken Digital Collections**

Ravensbourne

The development history of Ravensbourne is closely tied to the railway and shipping industries which contributed to its early growth. Commercial development in Ravensbourne has historically been limited, with only a handful of small businesses catering to the local residents. Over time the area has remained largely residential, with a mix of older homes and worker's cottages and some further modern housing. The decline of local industry further limited future commercial opportunities, with residents largely relying on nearby Dunedin for most services, however, the new cycleway infrastructure has significantly increased recreational activity in Ravensbourne, and the centre is optimally located part-way between the city and the ferry connection to the Peninsula.

Figure 37 **Roseneath. Credit: DunedinNZ**

Saint Leonards & Roseneath

St. Leonards and Roseneath developed as small residential areas closely linked to the nearby railway and harbour industries. Initially populated by port workers and their families, many residents now commute to the city for work. Commercial development has remained limited, with the areas attracting those looking for a quiet, scenic place to live, close to the city.

Aramoana

Aramoana is located at the entrance to the harbour and developed as a small, isolated community with a focus on fishing and recreation. The area is known for its natural beauty and peaceful, slow pace of life, with a small yet close-knit community. Residents rely on nearby Port Chalmers for essential services.

Figure 38 **Shelly Beach, Aramoana. Credit: DunedinNZ**

Figure 39 **Aramoana. Credit: DunedinNZ**

Ōtākou

Ōtākou is one of the oldest Māori settlements in the South Island, located within the Ōtākou Native Reserve. The area has an exceptionally rich cultural history, and a deep relationship to the harbour and the sea. Through time, Ōtākou has remained a small, residential area with small farms, and was home to Ōtākou Fisheries. Nearby tourism operations bring large numbers of visitors to the village over peak season. The marae remains a central point for the community. The village is also close to Te Rauone Beach and Weller's Rock, both of which are culturally significant landmarks.

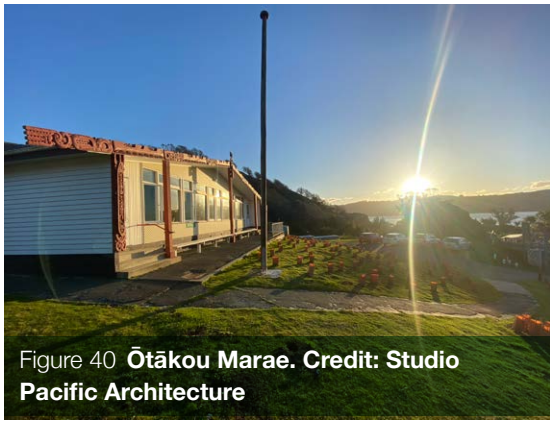


Figure 40 **Ōtākou Marae. Credit: Studio Pacific Architecture**

Harwood

Similarly to Ōtākou, Portobello and Broad Bay, Harwood developed as a small holiday destination, largely consisting of cribs providing a peaceful retreat for holidaymakers. The area remains primarily residential, with very limited commercial development and residents relying on Portobello and Dunedin for retail and services.

Figure 41 **Ōtākou. Credit: DunedinNZ**

Figure 42 **Ōtākou Kāika. Credit: Hocken Digital Collections**

2.5.4 **Land Use + Development History of Te Awa Ōtākou**

Tangata Whenua Settlement

1275 – 1300s
Waitaha Arrival

The Waitaha people, traditionally associated with the Uruao waka, arrive in the South Island and begin to establish settlements. The harbour was integral for resources and transport. The largest Waitaha settlement inside the harbour was at present-day Harwood.

~1500
Kāti Māmoe Settlement

The Kāti Māmoe tribe migrates southward and establishes themselves in the Otago region, intermarrying with the Waitaha and continuing to use the harbour for sustenance and trade

~1700 AD
Kāi Tahu Dominance

Kāi Tahu (Ngāi Tahu) becomes the dominant iwi (tribe) in the region. They use Otago Harbour extensively for food gathering, especially fishing and collecting kaimoana, and as an integral transport route.

Figure 43 **John Barnicoat Sketch 1844, Credit: Toitū Collection.**

Figure 44 **Otago Peninsula from Blueskin Road, 1872. O'Brien, George, 1821-1881. Credit: Aukaha.**

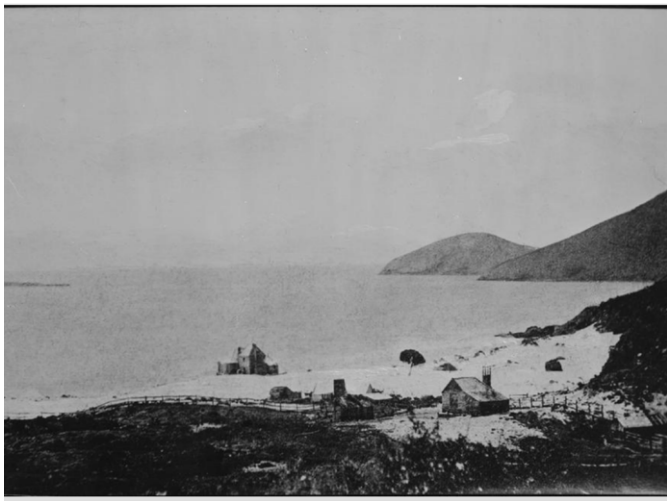


Figure 45 **Weller's whaling station (n.d.). Colville, A., Mrs. Credit: Hocken Digital Collections,**

Early European Exploration and Whaling Era

Early 1800s

Early 1800s: European sealers use the harbour but don't settle.

1800s - 1900s: Deforestation for Settlement and Farming
Large-scale clearance of native vegetation occurs to make way for European settlement, agriculture, and urban development. This significantly alters the natural landscape around the harbour

1800s: Trade and Relationships
Positive trade between mana whenua and European settlers develops.

1810s

1810: Captain Charles McLaren's Visit
Captain Charles McLaren anchors the Sydney Cove in Otago Harbour, making one of the first significant European visits.

1817: Incident at Whareakeake
Conflict between European sealers and Māori, resulting in the burning of the kāika at Te Rauone Beach and the loss of over 40 waka.

1820s - 1830s

1826: First chart of Otago Harbour by James Herd, naming it Port Oxley (a name that did not stick).

1830-1850: Epidemics
Serious epidemics of measles, tuberculosis and influenza for mana whenua decimate the population – estimated at only 200 in 1850.

1831: Weller Brothers' Whaling Station
Establishment of the whaling station at at Te Umu Kuri, Wellers Rock by the Weller Brothers, and the first European settlement in Otago. Brothers welcomed by and married into mana whenua.

1840s

1840: Signing of Te Tiriti O Waitangi
Following the signing by many iwi in the North Island, on the 13th June 1840 Kāi Tahu rakatira Korako and Karetai signed the Treaty at Pukekura Taiaroa Head. They were among the seven signatures for Kāi Tahu.

1844: New Zealand Company
New Zealand Company begins negotiations for land purchases with Kāi Tahu, leading to the purchase of the Otago Block. NZC partners with the Free Church of Scotland to attract Scottish emigrants.

1840s - 1850s: Fishing Industry
The fishing industry develops alongside whaling, with the harbour providing a rich resource base for both Māori and European settlers.

1844: First survey of Otago Harbour depths

1846: Arrival of Charles Kettle
Charles Kettle, surveyor, led the formation of the Town Belt and early city planning.

1848: Scottish Settlement
By March 1848 the first colonial settlers led by William Cargill and Reverend Burns arrived in Ōtepoti.

1850s

1850: Otago Harbour survey, charted by Stokes.
Otago Harbour surveyed in detail by Captain J L Stokes and his crew aboard the HMS Acheron.

1852: Māori Reserves
After petitions from Māori, land was set aside in Ōtepoti and Port Chalmers for visiting Māori. However, these reserves were contested by settler authorities and ultimately proved inadequate for use by mana whenua.

1853: Provincial Government
Creation of provincial government with Otago being one of six provinces in New Zealand

1859: First Dredging Programme
Provincial Council began dredging programme.

Industrial Development

Early 20th Century

1860s

1860: Seawall construction
Seawall building begun near Portobello Andersons Bay causeway.

1860s: Otago Gold Rush
Gold was discovered in Central Otago (gold rush 1861–1870), leading to rapid development of Dunedin and its harbour infrastructure.

1865: Lighthouse at Pukekura (Taiaroa Head) is first lit.

1867: Dunedin attains city status
Dunedin becomes New Zealand's first city, catalysing further growth and development around the harbour.

1865-1874: Ōtākou Marae established
The church is built in 1865, followed by a school in 1869, and finally the wharenui, Te Mahi Tamariki, in 1874.

1865 - 1875: Reclamation Projects
Extensive land reclamation projects are undertaken to create new land for industrial and port activities. This includes the reclamation of the foreshore near Dunedin, significantly altering the harbour's landscape.

1868: First Dredger
Commissioned to dredge harbour, the 'New Era'.

1869-71/74: Pakakohi men
Were transported to and held in Dunedin gaols for peacefully protesting their right to their lands. They are subject to dismal captive conditions and put to hard labour building the city.

1869-1885: Pukekura (Taiaroa Head)
Through various mechanisms the crown obtains full control of this wahi tapu historic pā from mana whenua. Land was taken for defence purposes against the 'Russian Threat' in 1885 and continued to be used for this purpose until the end of World War 2. In addition to the building and arming of fortifications on Pukekura, defence installations were also constructed along the coastal side of the Otago Peninsula, on Harington Point, and electronically controlled mines laid across the harbour from Harington Point to Aramoana. This taking of land remains under dispute to modern day.

1870s

1870-1872: North harbour seawall and embankment
Seawalls and embankment from Blanket Bay to Dunedin constructed to make way for trainline.

1873: Dunedin to Port Chalmers railway opened.
The first railway line constructed in Otago Province links Dunedin to Port Chalmers.

1873: Port Chalmers Rowing Club is established
One of the oldest rowing clubs in New Zealand.

1879-1881: Parihaka Men
Followers of the prophets Te Whiti o Rongomai and Tohu Kākahi from Parihaka, arrested for their peaceful resistance to land confiscations are detained in Dunedin. After initially forced to undertake hard labour, the Parihaka men subsequently refused to work. There are no existing records of where work they carried out was undertaken.

1880s

1881: Victoria Channel Dredged
The Victoria Channel is dredged to allow larger ships to reach Dunedin's wharves. This significant infrastructure project enhances trade and commerce by facilitating the movement of larger vessels.

Late 1800s: Wastewater reticulation
Wastewater and stormwater both drain into Otago Harbour.

1884 – 1888: Construction of Aramoana Mole
A long wall constructed in order to focus tidal currents on keeping the harbour entrance clear of sand and silt.

1900s - 1920s

1907: Increased port use due to improved infrastructure
Significant increase in the use of Dunedin's wharves due to improved harbour infrastructure. Port Chalmers continues to grow as a major port

1920s: Reclamation of Reclamation of Te Tutae o Te Matauira (Logan Park)
Infilling and considerable reclamation at Logan Park (formerly Lake Logan, and previously Pelichet Bay) .

1927 – 1935: Remedial work on Aramoana Mole
It has undergone significant maintenance, including using rock and tetrapods, ensuring safe passage for ships.

Figure 46 **Elevated view of men excavating seabed soil at Port Chalmers (1907). Credit: Hocken Digital Collections**

Figure 47 **Aramoana smelter sign at Deborah Bay, Michael Hitchings (November 1981). Credit: Hocken Digital Collections**

Modern Era

1930s - 1940s

1930s-1940s: Industrial reclamation continues, seawalls built.
Further reclamation occurs to support industrial growth, including areas for warehouses and shipping facilities. Further seawalls built along Otago Harbour edges

1940: Quarantine Island decommissioned
Quarantine Island is decommissioned as medical advances reduce the need for isolation facilities. The island should have been returned to mana whenua ownership at this point.

1948: Ōtākou Fisheries was formally incorporated.

1950s

1950-1964: Remedial work on Aramoana Mole

1951: Royal Albatross Colony
The Royal Albatross Colony is established at Pukekura Taiaroa Head, eventually becoming a major tourist attraction for wildlife enthusiasts interested in observing the breeding colony of Northern Royal Albatross.

1950s - 1960s: Expansion of Public Transport
Bus routes are expanded to improve connectivity between Dunedin, Port Chalmers, and the Otago Peninsula, facilitating easier access for residents and tourists

1960s

1961: The cruise liner *Seven Seas* is Dunedin's first cruise ship visit

1964: Construction of the Otago Harbour Bridge
The bridge connects Dunedin city with the Otago Peninsula, significantly improving transport links and accessibility.

1964: Otago Canoe and Kayak Club
Established to encourage canoeing and kayaking as recreational and competitive activities. The club regularly organizes paddling trips and training sessions.

1970s

1970s: Container Port Development
Development of Port Chalmers' container port, marking a shift in the harbour's industrial use and increasing its importance in international trade.

Mid-1970s: Aluminium Smelter
The proposed Aluminium smelter at Aramoana was abandoned after public protest, leading to the formation of the STOP (Save The Otago Peninsula) society. Vocal activism from mana whenua.

1980s

1986: Introduction of the Quota Management System (QMS).

1988: Port Companies Act.

1988 Port Companies Act, Harbour Board becomes Port Otago Limited.

Figure 48 **Port Chalmers view 4/9/1909 (1909). Rawson, Sidney Herbert, 1883-1951. Credit: Hocken Digital Collections.**

Figure 49 **Lake Logan (c.1910). Credit: Hocken Digital Collections.**

21st Century and Recent Developments

1990s

1990s: Otago Peninsula tracks
Several walking and biking tracks are opened on the Otago Peninsula, enhancing recreational opportunities and access to scenic coastal areas. Key tracks include the Harbour Cone Track and the Camp Road Track

1990: Otago Settlers Museum (Toitū)
The Otago Settlers Museum undergoes significant expansion and renovation, enhancing its role as a key historical and cultural attraction in Dunedin

1990's: Sewage no longer discharged into Otago Harbour.

1991-1992: Otago Harbour Planning Study Issues & Options Report.

1994: First Regional Coastal Plan for Otago.

1998: Ngai Tahu Claim Settlement Act.

1997: 1997: Establishment of Kai Tahu ki Otago (now known as Aukaha)
This represented a proactive step by mana whenua to ensure their voice was heard in resource management processes.

2000s

1990s-2000s: Designation of Protected Areas in and around Otago Harbour
Various parts of Otago Harbour and its surrounding environments receive protection status to preserve their ecological and historical significance. This includes the establishment of marine reserves and protected heritage sites.

2010s

2010-ongoing: Development of Cycle Paths
Cycle paths are developed around the harbour to promote sustainable transportation and recreational cycling. This includes the construction of the SH88 cycleway, connecting Dunedin to Port Chalmers.

2011: Next-Gen Project & continued dredging by Port Otago Ltd

Capital dredging for Next Generation Project approved. Regular maintenance dredging to keep the shipping channels clear and navigable.

2014: Ōtākou Mātaitai Reserve
Was established, enabling customary fisheries management processes over the upper harbour from Harwood to the mouth of the harbour.

2018: Passenger Ferry
Otago Harbour passenger ferry begins service.

2010s: Habitat Restoration and Cultural Preservation
Increased focus on habitat restoration, predator control, and cultural heritage preservation around the harbour, with active involvement from mana whenua and community groups.

2020s

2020 – 2023: Construction of Te Ara Moana and Te Aka Ōtākou Cycleways
Replacement of seawalls and development of harbour-side cycleways begins, opening in 2023.

Figure 50 **Te Aka Ōtākou Cycleway today. Credit: DunedinNZ**

2.6 Summary of impacts

Human settlement has profoundly altered Te awa Ōtākou's physical and cultural landscape. Land loss and restricted access disrupted traditional mahika kai practices. Sedimentation, reclamation, and overfishing depleted kaimoana resources, particularly affecting tuaki beds and the important intertidal and estuarine habitats that once flanked the harbour. These changes eroded mana whenua's spiritual and cultural connections to the harbour.

Quarrying destroyed wāhi tapu and urupā. Harbour modifications altered natural dynamics, while coastal erosion threatens land and wāhi tūpuna sites. Once-favourite gathering places like Te Umu Kurī have been transformed, with traditional practices, such as spearing flounder at night or gathering tuaki, becoming rare as species decline.

For mana whenua, the harbour remains a taoka. The challenge lies in balancing development with preservation, ensuring the harbour's special characteristics are retained and revitalized for future generations.

3 Understanding the Present

Te awa Ōtākou has been profoundly shaped by nearly a millennium of human occupation, with the last two centuries bringing particularly dramatic change, to the extent that the harbour would no longer be recognizable to our tūpuna. However, for mana whenua, the harbour remains the heart of cultural identity, an integral component of a cultural landscape etched with the footsteps and stories of our ancestors. It continues to be a treasured place in which to be ‘mana whenua’, albeit in a much-reduced manner compared to earlier times.

The health of Te awa Ōtākou today bears both the fruits and consequences of years past. While some positive changes have occurred, such as improved water quality in certain areas, the legacy of colonisation and intensive development has taken a heavy toll:

1. Habitat loss and degradation: extensive reclamation has led to fragmented and often degraded intertidal habitat in the inner harbour. The natural shoreline has been dramatically altered, making much of the harbour difficult and dangerous for wildlife to access. Te awa Ōtākou as a kōhaka is no longer the safe and welcoming place it once was for many species.
2. Reclamation of Toitu and Ōpoho awa and the modification of the Ōwheo has depleted the important freshwater interface and important spawning habitats for numerous freshwater fish species.
3. Declining biodiversity: Populations of culturally significant species such as tuaki are in serious decline. While some wildlife still draws visitors, the harbour's ecosystems are a shadow of their former glory.
4. Limited access and disconnection: Mana whenua face challenges in accessing traditional mahika kai areas and practicing kaitiakitaka due to private land ownership, infrastructure development, and environmental degradation. This has contributed to a sense of cultural and spiritual disconnection from parts of the awa.
5. Environmental pressures: Ongoing issues with sedimentation, stormwater runoff, and other pollutants continue to impact water quality and ecosystem health. Climate change poses additional threats to both the natural environment and low-lying communities, including the traditional kāika of Ōtākou.
6. Governance challenges: Despite some improvements, decision-making around the harbour often fails to align with mana whenua perspectives or adequately involve mana whenua as true Treaty partners. There is a lack of holistic integrated management that reflects a Kāi Tahu worldview.

Despite these challenges, there are signs of hope. The establishment of the Ōtākou Mātaitai has been a significant step in preserving customary fishing practices and enabling processes for sustainable management by mana whenua. Restoration efforts by community groups and growing awareness of the harbour's cultural and ecological significance offer potential for positive change.

Figure 51 **Deborah Bay. Credit: DunedinNZ**

3.1 The Harbour Today

Today, Te awa Ōtākou continues to weave its serpentine path from Pukekura to Ōtepoti as it has for many lifetimes: the glistening heart of the catchment etched with the footsteps and stories of our ancestors. The harbour is a treasured place to reflect and recreate, to witness wildlife and gather kaimoana. It forms a vital economic artery for the surrounding region, attracting tourists, and carrying shipping vessels through sheltered waters. Through biodiversity corridors, cycle and walking paths, marine navigation, urban linkages and freight routes, Te awa Ōtākou is intrinsically connected to the surrounding sea and landscapes. The harbour remains highly valued for its fishing resources by many due to its strong currents and extensive sand flats, with the outer harbour under protection from commercial fishing pressures through the Ōtākou Mātaitai, governed by Tākata Tiaki in accordance with tikaka Kāi Tahu. It is the tourism drawcard for Ōtepoti due to its wildlife, attracting local and international tourists, sustaining jobs for many of the community. Boating continues to be a central community connection to the awa – especially rowing, sailing, yachting and kayaking. Cycling and walking are booming in popularity since the construction of Te Aka Ōtākou, wrapping the harbour from Port Chalmers to Portobello. Swimming and free diving are popular pursuits in the summer months. Port Otago, nestled in Port Chalmers, has seen significant growth in shipping and cruise ship tourism over the years, currently employing 300 staff, and many of the harbour community commute between Ōtepōti and the outer suburbs for work.

Figure 52 **Otago Peninsula Scenic View. Credit: Aukaha**

Coastal wildlife is still prized as a key drawcard to the area for tourism, yet hoihō, the crowning yellow-eyed jewel, are nationally endangered – and the harbour fisheries remain a shadow of their former glory. Industrial development around the harbour edge effectively utliises the access and ease that environment provides for shipping; however, this has led to conflicts with other harbour uses, environmental values, cultural connections, land transportation, and access to the water.

The following sections provide an overview of the current health of Te awa Ōtākou, broadly addressing environmental, socio-cultural and economic elements with a focus on ecosystem health. The focus then shifts to the harbour community and their connection to the harbour, and explores existing initiatives being undertaken to enhance the harbour across the former elements. Finally, key issues currently faced across the harbour that emerged through this preliminary engagement and review process are summarised.

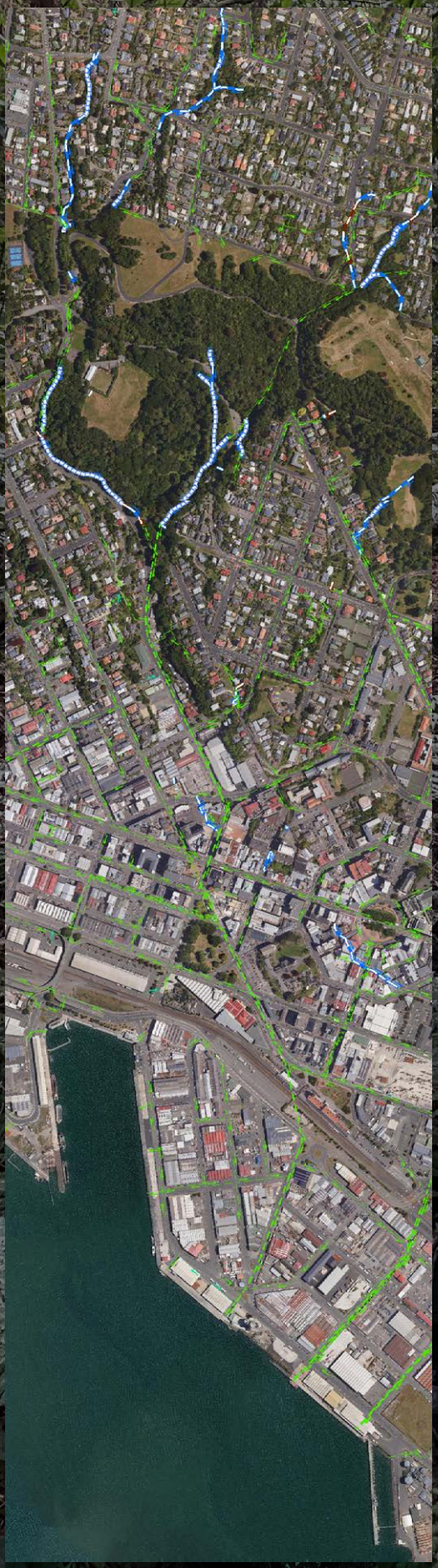


Figure 53 **Water Services Map. Credit: Dunedin City Council**

The beautiful Waimoī stream flows from its piped and open headwaters above Jubilee Park, through a stretch of abundant open habitat in the park. It then enters the piped stormwater network at Cannongate to join another tributary which has open headwater habitat, together forming Toitū stream. Toitū stream is piped until its outfall on Fryatt Street between the cement plant and cruise ship wharf. This presents a significant challenge for migratory indigenous freshwater fish to access thier habitat.

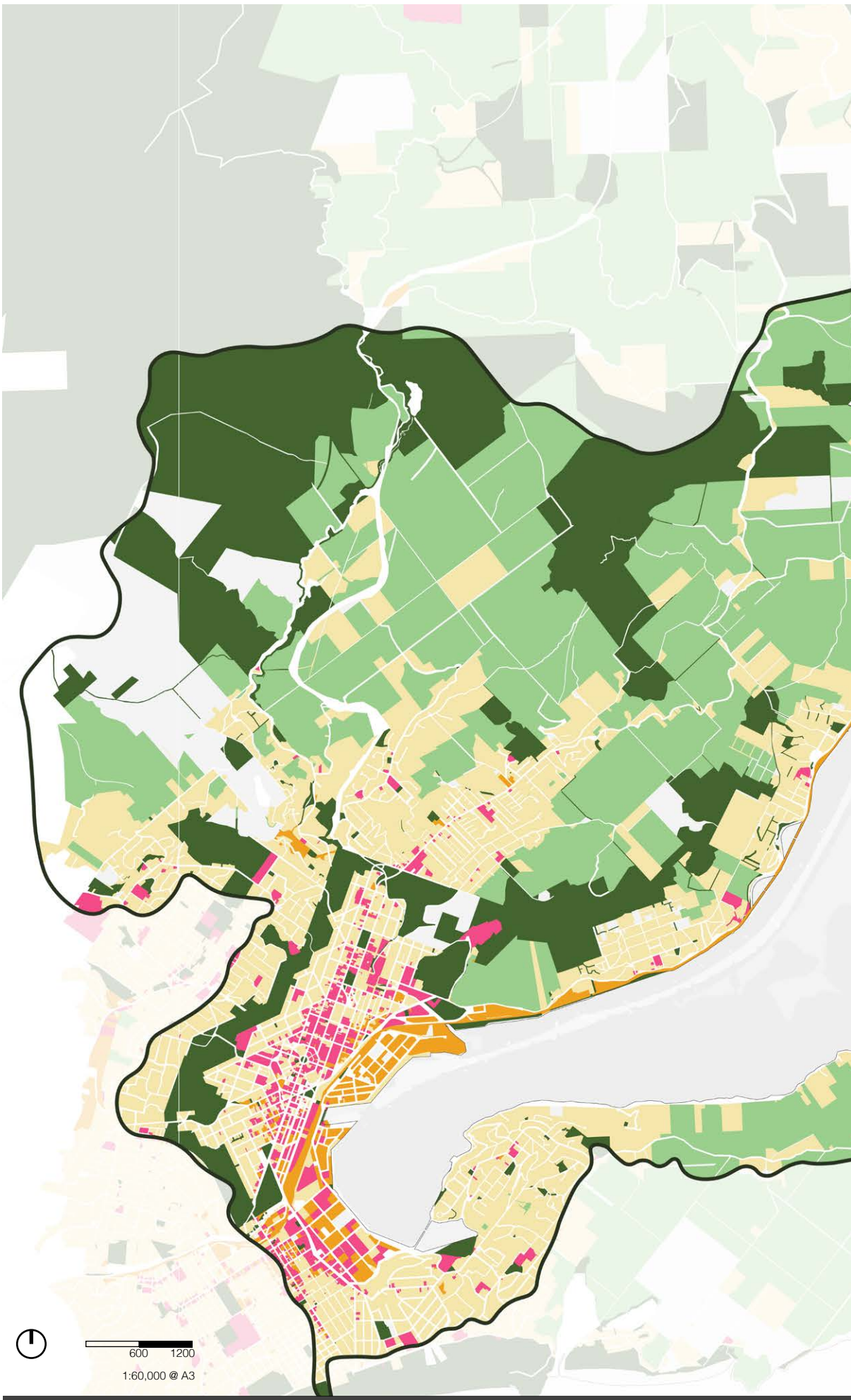
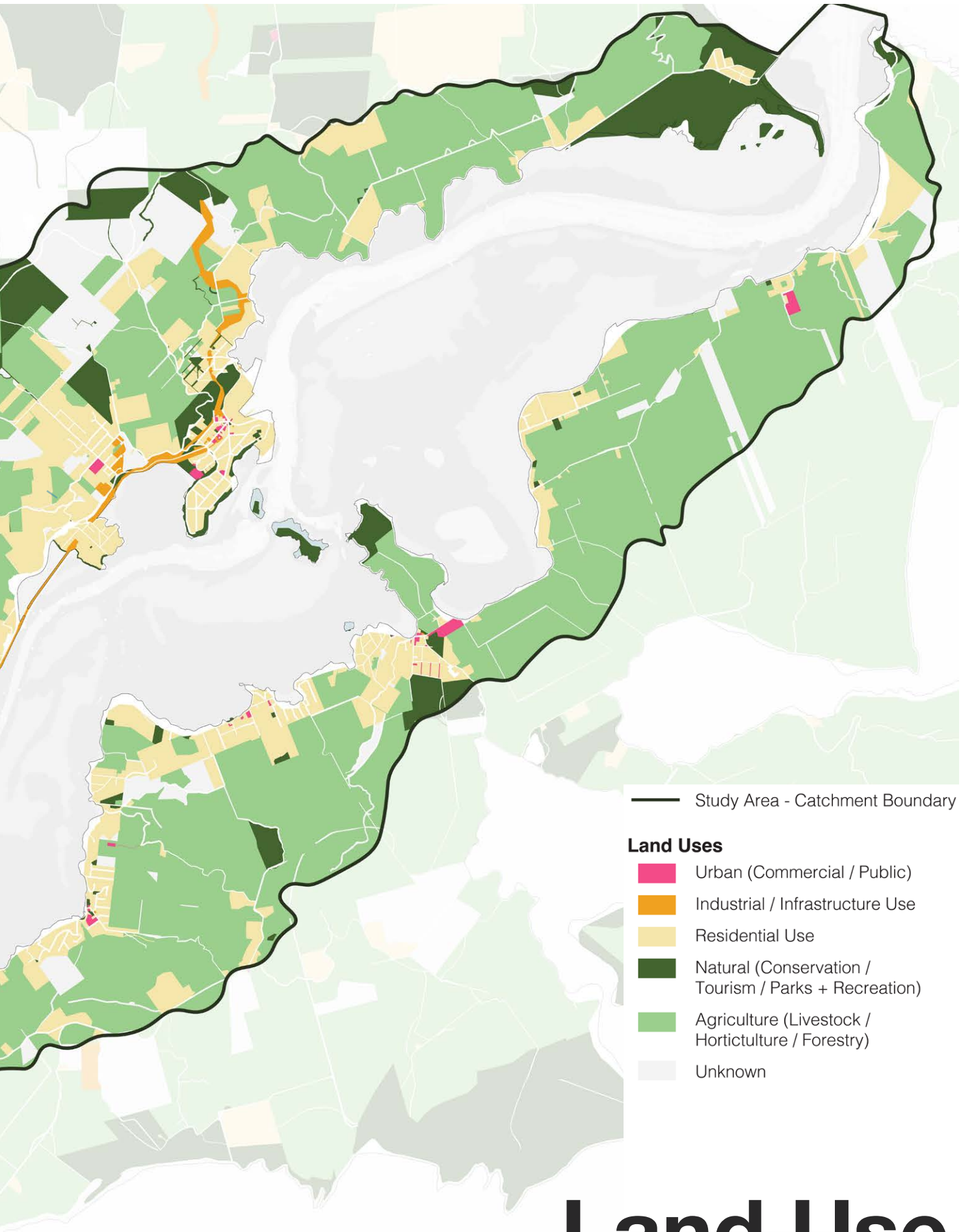


Figure 54 **Land Uses adjacent to Te Awa Ōtākou Map**


Study Area - Catchment Boundary
Land Uses
Urban (Commercial / Public)
Industrial / Infrastructure Use
Residential Use
Natural (Conservation / Tourism / Parks + Recreation)
Agriculture (Livestock / Horticulture / Forestry)
Unknown

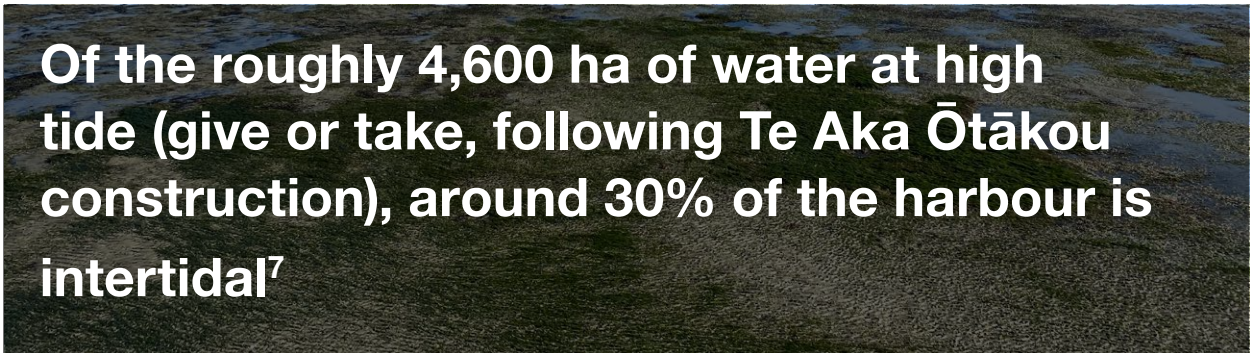
Land Use

3.2 Health of Te Awa Ōtākou

The landscape that envelops Te awa Ōtākou is in a state of slow regeneration, remaining dominated by pasture. Around the coast, pockets and fingers of bush on lifestyle blocks, in farms, within ecosanctuaries and in scenic reserves are being protected and enhanced. These patches and corridors form biodiversity stepping stones and corridors essential for indigenous biodiversity to thrive in the future. They connect by air, land and water from Orokonui Ecosanctuary in the North to Moore's Bush, across the water to Hereweka, out to OPERA and Pukekura. The bush is young, with regenerating kānuka scrub and mixed coastal broadleaf communities interspersed with stands of pine, eucalypt and other exotic trees. It is home to small populations of indigenous birds such as piwakawaka, korimako, tītipounamu and increasingly in protected areas, kererū, along with lizards such as korero geckos and the southern grass skink, and a unique range of endemic invertebrates[6]. Almost all natural connections between freshwater streams and the harbour are disrupted through culverts, reclamation and channelisation but still, streams on Otago Peninsula such as Smiths Creek host banded kōkopu, kōaro, kōura, īnaka, longfin and shortfin tuna. In the Ōwheo, you may find longfin and shortfin tuna, redfin bullys and kōura, as well as exotic trout and salmon.

> **Recently a hui of whānau could only gather a small feed of tuaki over 2 hours from the once plentiful Te Rauone beach**
>
> *- Julz Asher 08 Rūnaka Hui*

In and around the awa itself, lie precious tuaki beds, from the upper harbour out to Aramoana with its prized salt marshes. On a low tide, expansive glistening eel grass meadows can be seen spanning the once pristine sand flats along the Portobello-Ōtākou coast, now forming essential habitat for juvenile fish, seahorses and marine invertebrates, as well as a slowly recovering flounder population (anecdotal). Oyster catchers, royal spoonbills, the rare Otago shag, kōrora and stingrays can be found hunting for food on the coast, with toroa soaring high above at Pukekura amongst thousands of red billed gulls, at least five species of shags, and a diversity of coastal wildlife. Along rocky outcrops and cloaking the Mole are rimurimu (giant bladder kelp) forests, where kōura and octopus hide from fur seals and sea lions playing and hunting – increasingly renewing the harbour as home. Once frequent visitors, such as orca, dolphins, and southern right whales, still visit occasionally.



6 "Natural Features." Hereweka Harbour Cone Trust, https://hereweka.org.nz/natural-features/.

7 Planning Study 1991 Ecosystems & Physical Systems report

The ocean food chain in magnificent action

Sea lions on the hunt, with two of the harbour's star species unlucky captors – barracouta and octopus! Images captured by Oscar Thomas, author, wildlife photographer and MSc student at the University of Otago.

Figure 55 **Sea lions in action. Credit: Oscar Thomas**

Otago's biodiversity experiences pressures on the environment where they live, hunt, breed, and move. Dredging of the shipping channel remains controversial due to unconfirmed impacts on coastal ecosystems from spoil dumping off the coast. Tuaki are in significant decline within the harbour[8], with mass mortality events being witnessed. Stormwater inputs from urban and industrial areas contribute sediment, wastewater and contaminant loads during rainfall. Almost 100% of the harbour edge is modified, and the inner harbour basin lacks natural intertidal habitat due to progressive reclamation. Reclamation for roading and rail has created perched barriers to fish passage on all but high tides at many stream outlets, limiting migration of īnaka and estuarine species. Bio-security hazard pest species associated with the port are a constant risk. Almost all roosting habitat (both natural and artificial) for coastal birds has been removed, and pest plants are taking opportunities to spread across the sescape and landscape. Bird song remains a trace of the former raucous chorus, with the 'halo' effect from Orokonui to the harbour analogous to Zealandia in Wellington yet to be realised.

Since the 1991 Harbour Planning Study and related research, very little dedicated or published harbour scale monitoring and research has happened within the harbour, making it difficult to scientifically compare its health today against years past and future aspirations to inform management. Monitoring has been primarily driven by (minimal) resource-consenting requirements. Likewise, the initial flurry of academic research driven by the 1991 study through the University of Otago built a rich understanding of the geophysical and hydrological systems in the harbour in the 1990's – including that the main channel of the awa has a very good flushing regime. However, there has been little dedicated research within the harbour since. Research to build a holistic, catchment scale understanding of the state of the harbour's biodiversity, ecological functions, responses to human activities and resilience to climate change is particularly lacking.

This story of Te awa Ōtākou today would therefore be an impossible story to tell without the invaluable insights shared by the harbour community. These lived experiences, combined with the monitoring and research we can access, reveal that much work is still to be done to recover from the legacy of human impacts over the last two centuries – but we are heading in the right direction.

8 Williams, J. R., & Cranfield, H. J. Cockle Survey of Otago Harbour 2020. New Zealand Fisheries Assessment Report, no. 2021/02, Ministry for Primary Industries, 2021, https://fs.fish.govt.nz/Doc/24848/FAR-2021-02-Cockle-Survey-Otago-Harbour-2020-4081.pdf.ashx.

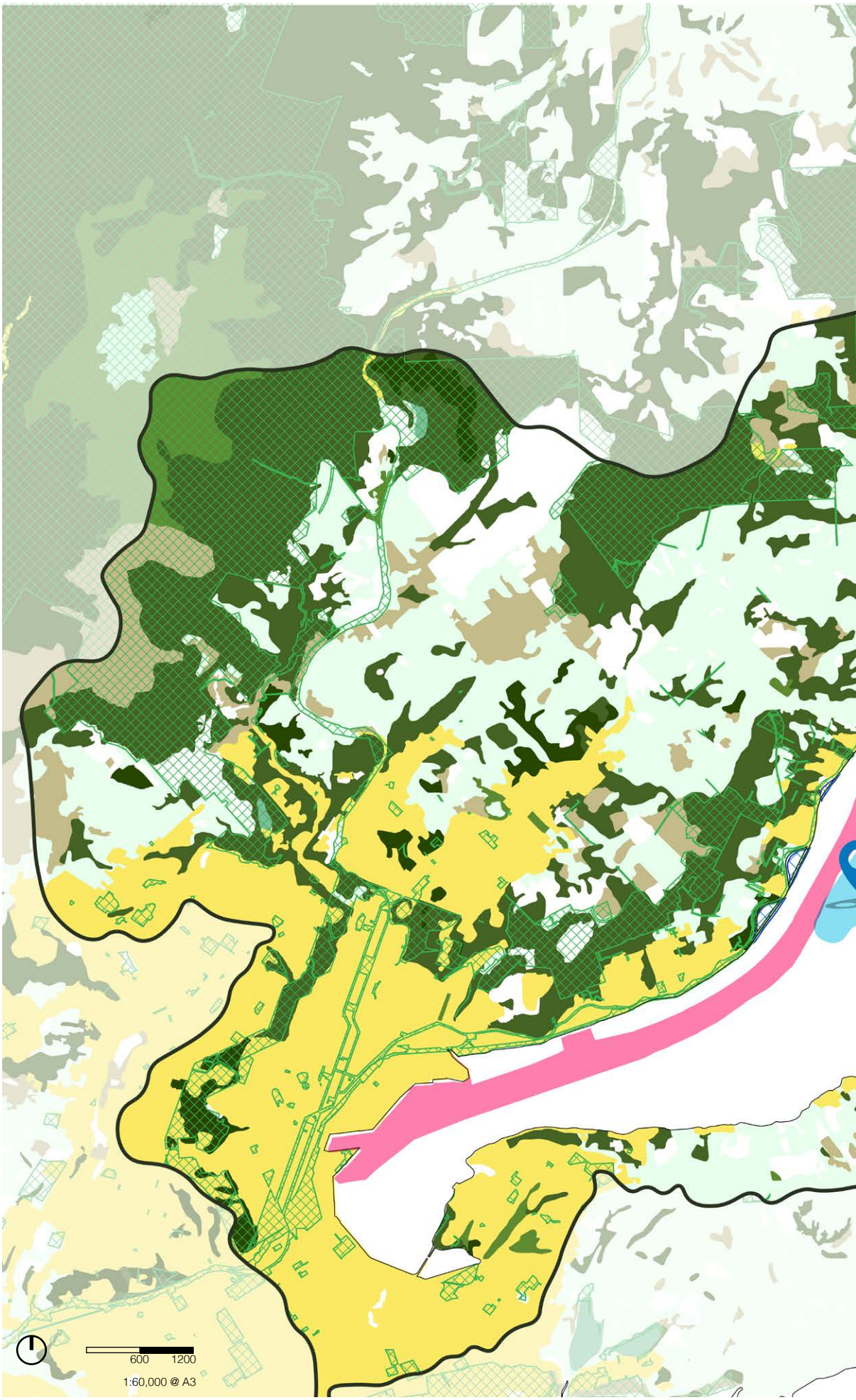
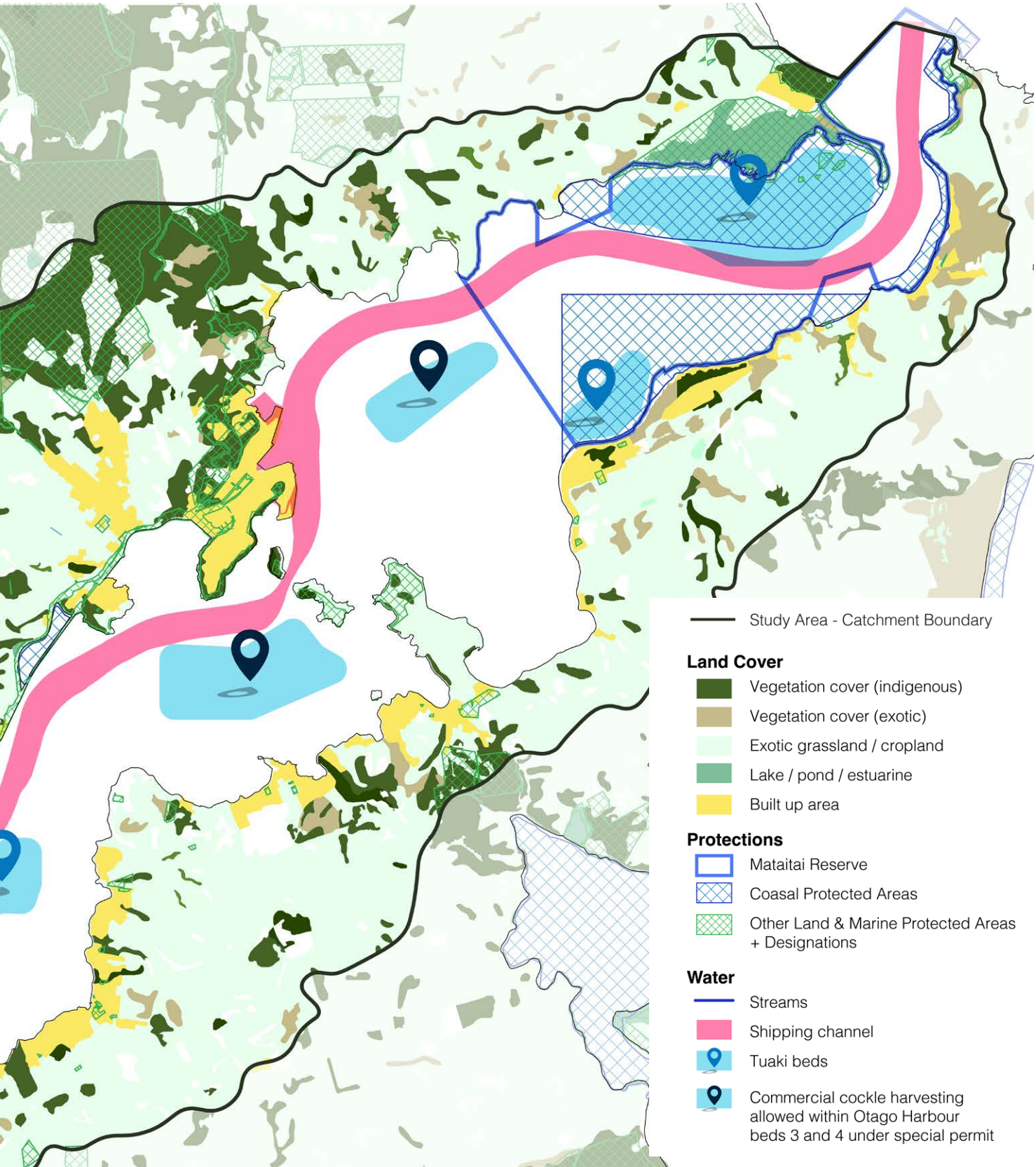
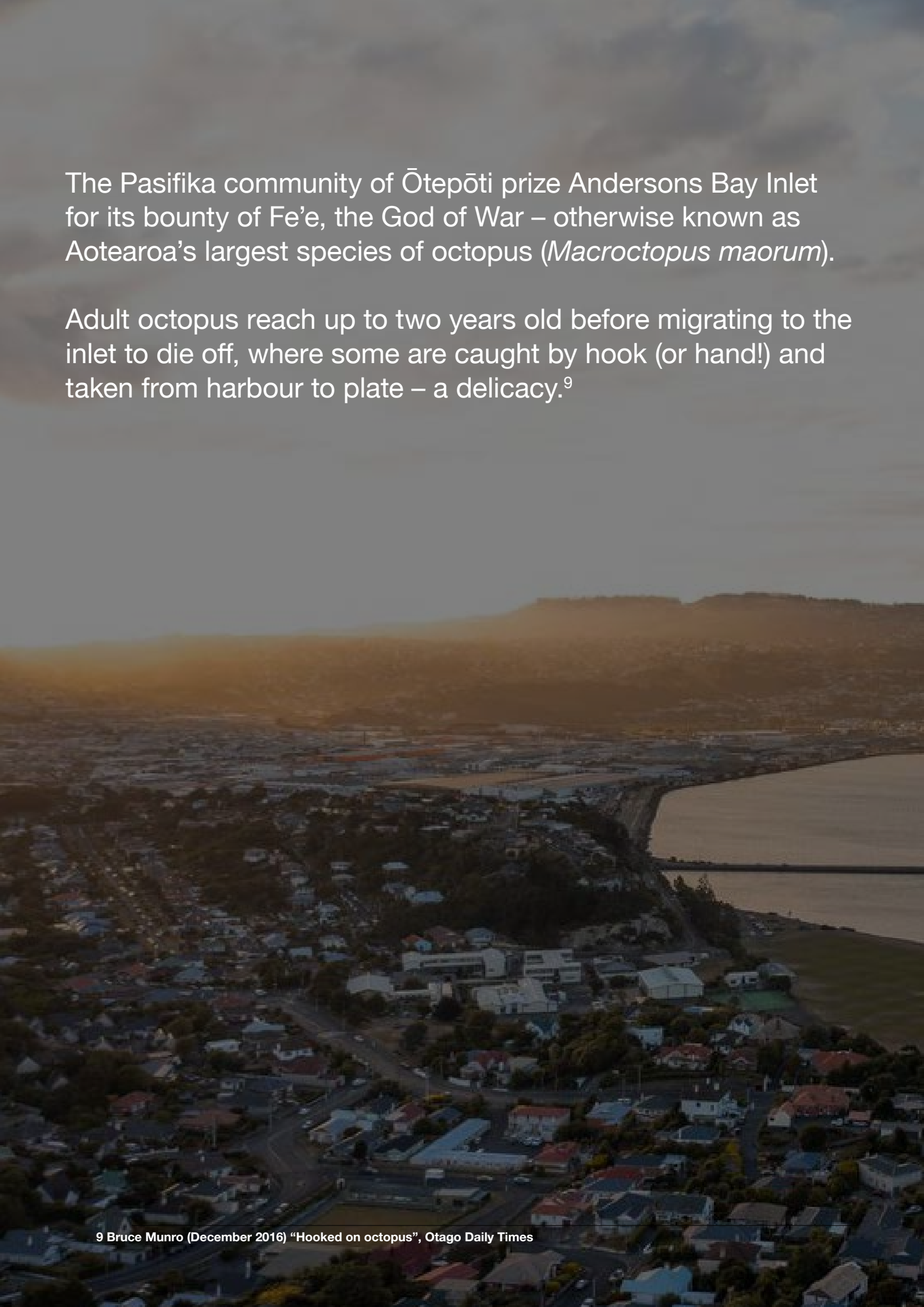


Figure 57 **Environments of Te Awa Ōtākou Map**



Environments of Te Awa Ōtākou



The Pasifika community of Ōtepōti prize Andersons Bay Inlet for its bounty of Fe'e, the God of War – otherwise known as Aotearoa's largest species of octopus (*Macroctopus maorum*).

Adult octopus reach up to two years old before migrating to the inlet to die off, where some are caught by hook (or hand!) and taken from harbour to plate – a delicacy.[9]

9 Bruce Munro (December 2016) "Hooked on octopus", Otago Daily Times

Figure 58 **City aerial from Andersons Bay. Credit: DunedinNZ**

3.3 The Harbour Community

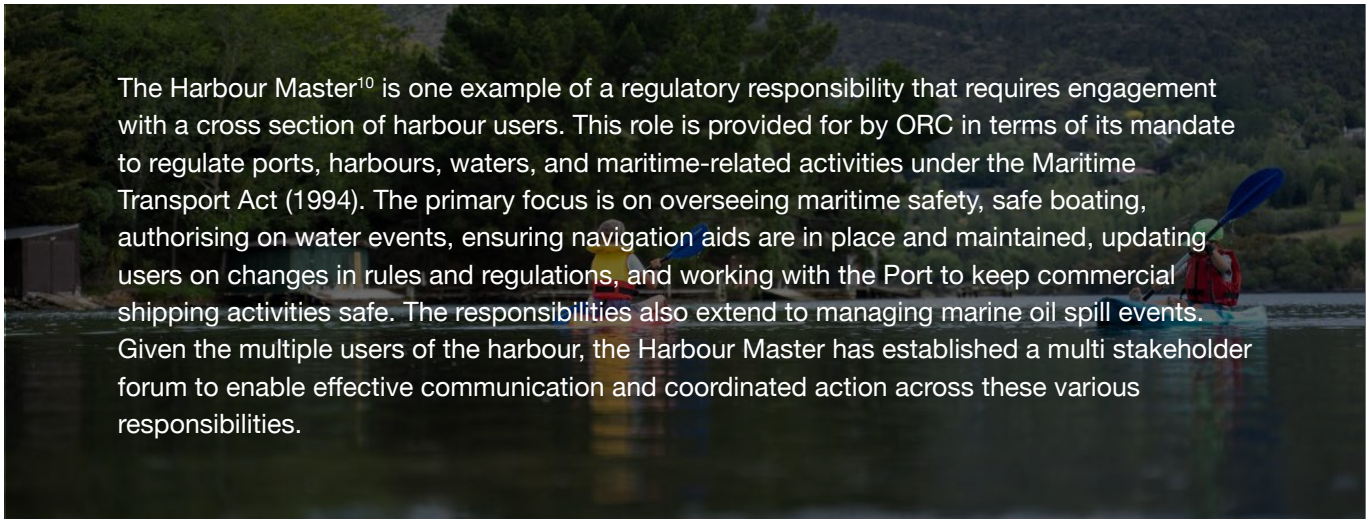
Te awa Ōtākou is a highly dynamic environment utilised by a range of communities, users and interest groups, that depend on, derive value from and, or influence the state of the harbour through mandated or other action and so have varying interests and investment in its preservation and future use. The result is a rich, if somewhat complex institutional context. An understanding of community, user, and interest group requirements and interrelationships is critical for establishing appropriate institutional structures and supporting systems to strengthen existing arrangements and take forward the opportunities in this report in a cohesive, efficient and collaborative manner. The stakeholder mapping and database developed as part of this process provides a foundational understanding to build on in achieving this in subsequent phase of this process.

"People choose to live out in the harbour to live in nature"

The nature and composition of these groupings is described below, with the following general observations. Many stakeholders sit clearly in one or two user/interest groups and are associated with a limited area or specific feature of the harbour, while others have multiple interests that span the entire system.

There is a web of connections, both formal and informal, between these various organisations, which are foundational to sustaining the social and cultural cohesion and co-operation that underpins many of the positive efforts and success stories embedded throughout the report. There are several organisations, which have influence and responsibility across the social, cultural, economic, and environmental aspects of the system, and spatially across the entire harbour catchment (and beyond) through mandate allocated via the regulatory framework, discussed in the following section.

It is the responsibility of the statutory organisations to account for the aspirations and needs of the broader community and provide for their equitable and effective involvement in decision making across planning and implementation of actions.



The Harbour Master[10] is one example of a regulatory responsibility that requires engagement with a cross section of harbour users. This role is provided for by ORC in terms of its mandate to regulate ports, harbours, waters, and maritime-related activities under the Maritime Transport Act (1994). The primary focus is on overseeing maritime safety, safe boating, authorising on water events, ensuring navigation aids are in place and maintained, updating users on changes in rules and regulations, and working with the Port to keep commercial shipping activities safe. The responsibilities also extend to managing marine oil spill events. Given the multiple users of the harbour, the Harbour Master has established a multi stakeholder forum to enable effective communication and coordinated action across these various responsibilities.

10 https://www.orc.govt.nz/environment/harbourmaster/

3.3.1 Harbour User + Interest Groups

Social and Cultural

Key Harbour values identified during stakeholder consultation:

Cultural Heritage Preservation | Environmental Stewardship | Public Access | Community Wellbeing and Future Prosperity | Art, Music and Creativity

Local community groups, cultural organisations, and the art and creative communities, including those representing mana whenua, have deep connections to the harbour. For many, the harbour is not just a resource but a place of historical, cultural, and artistic significance. The harbour has inspired generations of artists, with paintings, sculptures, and other creative works capturing its beauty and significance. Art galleries and local musicians frequently showcase the harbour in their work, contributing to its enduring presence in the creative fabric of Ōtepoti. These communities, alongside mana whenua, advocate for the protection of cultural sites, the continuation of traditional practices such as mahika kai, and the celebration of the harbour's artistic heritage. They are deeply invested in the harbour's well-being, actively engaging in discussions and initiatives that shape its management and future development, ensuring that the harbour's cultural and artistic heritage is respected and maintained.

Commerical

Key Harbour values identified during stakeholder consultation:

Economic Sustainability | Operational Efficiency | Shipping Access | Infrastructure Maintenance | Environmental Compliance

Port Otago has been a major role-player in the development of the local and regional economy. It is heralded as being the birthplace of New Zealand's modern export trade with New Zealand's first cargo of frozen meat leaving for London in February 1882. It has undergone various phases of expansion and modernisation but to this day Port Otago Limited and Port Chalmers remain at the forefront of New Zealand's export trade. Port Otago is responsible for much of the harbour's commercial activity, supporting shipping, logistics, and associated industries such as agriculture and forestry. Trade and commercial flows are enabled through the port's links to the broader region and South Island via road and rail. The company exists under the Port Companies Act 1988 and is 100% owned by the ORC, following the transition from the harbour board in the late 1980's, through which it is accountable to the Otago community.

The property group (Chalmers Property) comprises a significant property business, which includes developments in Auckland and Hamilton, as well as substantial land adjacent to the harbour in

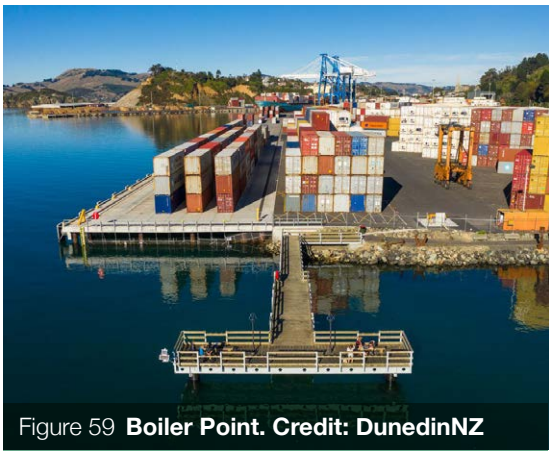


Figure 59 **Boiler Point. Credit: DunedinNZ**

Figure 60 **Ship at Port Otago. Credit: Aukaha**

Ōtepoti, which includes manufacturing and other commercial operations, many of which benefit from the proximity of this area in relation to the port and associated road and rail infrastructure.

Port Chalmers is also a key South Island port for cruise ships and the port of call immediately before or after visiting Fiordland.

Port Otago manages the ship access to the port via the ongoing dredging of the harbour channel, and infrastructure and significantly influences all vessel traffic within the harbour. The range, scale and nature of Port infrastructure development and operations means it has varying impacts on the receiving ecology, social and cultural systems and is subject to consent approval for many of these. . The Port is currently involved in ongoing adherence with approximately 100 consent conditions, and several of these, notably dredging, require ongoing monitoring. In addition to engagement required as part of the consenting processes, the Port acknowledges its responsibility to the environment and community and has various initiatives directed at dealing with ongoing issues management and supporting community needs. Examples include the Port Noise Liaison Committee, ongoing support for the Orokonui Ecosanctuary Valley live stream web-cam, and involvement in projects such as the Te Rauone Beach Renourishment. Another key initiative is the levy on cruise liner visitors, the proceeds of which are assigned to community projects.

Commercial fishing operators use the harbour to access open sea routes, often relying on the port's facilities and infrastructure for efficient and safe operations. Fishing charters and recreational boating also serve residents, researchers and tourists. There is also a commercial shellfish operation, Southern Clams, who have operated for over 35 years, but only recently in Otago Harbour. They harvest clams via a manual dredge system from two areas in the harbour, for the local and export market.

A number of further small businesses operate within the harbour catchment, including retail and commercial, manufacturing, art and creative enterprises, transport and hospitality. They serve the local residents, and visitors and often have influence beyond the catchment extent. All of these commercial users have a vested interest in the ongoing prosperity of the harbour.

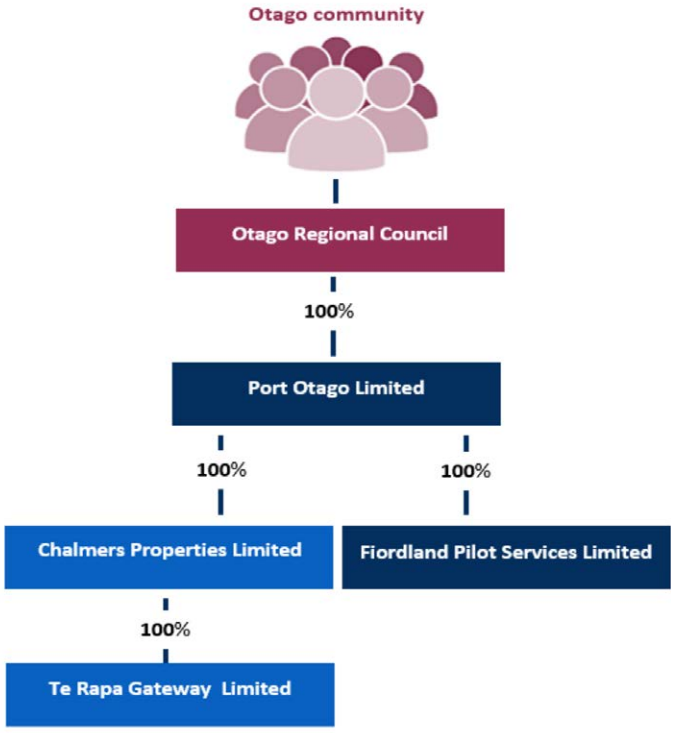


Figure 61 **Port Otago Company Structure Diagram.**
Credit: https://www.portotago.co.nz/assets/Uploads/SCI-Sept-23.pdf

Harbourside Vision Masterplan (2020)

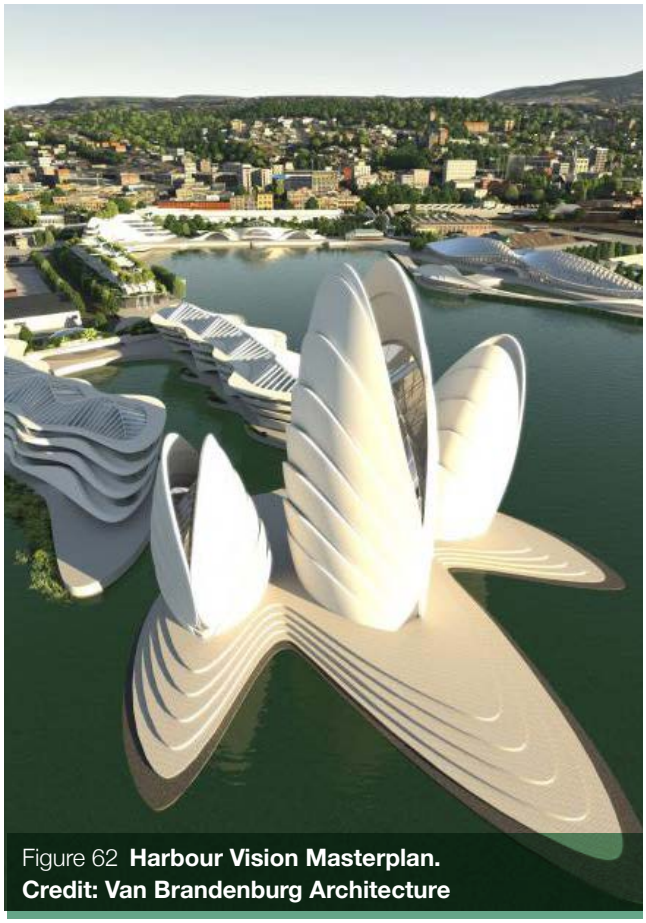


Figure 62 **Harbour Vision Masterplan. Credit: Van Brandenburg Architecture**

The Harbourside Vision Masterplan was an ambitious project aimed at transforming the city-end waterfront of Otago Harbour into a vibrant, multi-use space, featuring marinas, retail areas, tourism facilities, and residential developments. While the vision was bold and transformative, it faced limitations. Community consultation was lacking, resulting in a low degree of public ownership and a sense of disconnect between the project's goals and the community's needs. The project was further hindered by the COVID-19 pandemic and growing environmental concerns around some proposed developments. While the project sparked conversation around harbourfront potential, it highlighted the importance of inclusive, consultative processes for harbour projects. This approach, exemplified by the success of the cycleway project, provides a valuable model for fostering community ownership and ensuring that the harbour's future reflects the aspirations and needs of all Dunedin residents.

Tourism and Hospitality

Key Harbour values identified during stakeholder consultation:

Visitor Experience | Access and Connectivity | Environmental Preservation | Culture and Heritage | Economic Sustainability

The tourism and hospitality sector has an important and growing presence in the Te awa Ōtākou catchment, driven by the harbour's natural attractions, which draw visitors from both New Zealand and abroad. Dunedin has a longstanding history of eco-tourism, with early efforts to promote sustainable wildlife experiences, particularly through initiatives like the Royal Albatross Centre and the Ōrokonui Ecosanctuary. Key tourism operators offer harbour cruises, wildlife tours, and visits to historic sites, all of which depend on the harbour's accessibility and ecological health.

Tourists access the harbour through various services, including ferry operations, harbour tours, cycle rentals, and scenic boat trips, all of which rely on well-maintained infrastructure, jetties and ancillary facilities. Harbour tours are popular, with operators leveraging the harbour's scenic views, rich history and unique wildlife to create Otago-centric visitor experiences.

The summer season (mid-October to early-April) also sees the Harbour host international cruise liners, for which Port Otago have dedicated team and facilities at Port Chalmers and in the upper basin. This is a considerable use with several liners visiting a week and approximately 110 ships scheduled to visit in the 2024/25 summer. The ships are in the port for between one and two days and passengers utilise the various harbour cruises, cycling and wildlife tours, as well as visiting the city.

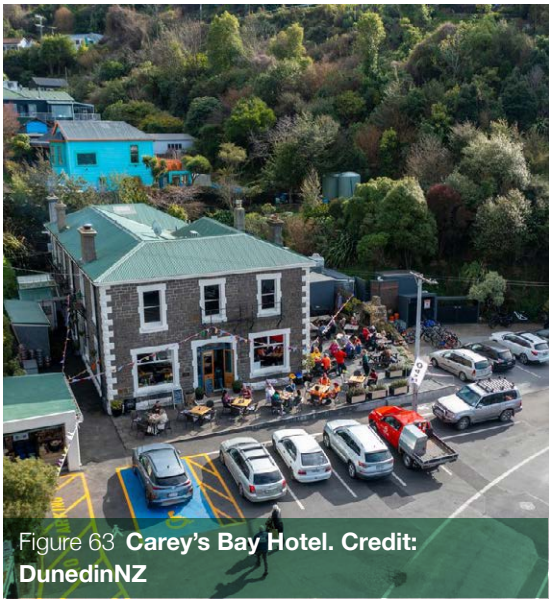


Figure 63 **Carey's Bay Hotel. Credit: DunedinNZ**

Figure 64 **Natures Wonders Tour. Credit: DunedinNZ**

Figure 65 **Penguin Place. Credit: DunedinNZ**

Figure 66 **Monarch Wildlife Cruises & Tours. Credit: DunedinNZ**

Recreational Users

Key Harbour values identified during stakeholder consultation:

Safety | Access to Water + Networks | Quality + Management of Facilities | Environmental Conservation | Community Engagement | Cultural Heritage

The harbour is a popular destination for a wide range of recreational activities, including cycling and walking, swimming and beach visits, recreational boating such as rowing, yachting, kayaking, and other water sports. Recreational boating is particularly prominent, with numerous yacht clubs and private and charter boat owners using the harbour regularly. These are some of the oldest yacht and rowing clubs in the country with many having celebrated 150 years of operation. The clubs have collaborated in running regattas, regional and national competitions and are important nursery for young sailors and rowers. There are also several schools, waka ama, and university clubs. The harbour also has various dive sites and companies running diving training courses and day trips.

The development of Te Ara Moana and Te awa Ōtākou cycleways has dramatically improved access and connectivity for recreational users around the harbour. These pathways, stretching from Dunedin to Portobello and Dunedin to Port Chalmers offer scenic and secure routes for cyclists, walkers, and outdoor enthusiasts. The potential for these cycleways to generate new local tourism, attracting

visitors to explore the harbour's natural beauty and cultural heritage was noted by many groups during consultation.

In recent years, the upper harbour has become a focal point for Matariki celebrations, revitalizing and emphasizing the connections mana whenua hold with the awa as a repository of knowledge. This creative inspiration has not only resonated for mana whenua, but also with Māori and Polynesian communities linked by Te Moana-nui-a-Kiwa. It has captured the imagination of the wider Dunedin community, forging a stronger link between the city and the waterfront.

Te Ara Moana & Te Awa Ōtākou Cycleway and Walkway

Te Ara Moana and Te Awa Ōtākou cycleways and walkways (collectively known as Te Aka Ōtākou) are key infrastructure projects designed to enhance connectivity around Otago Harbour. These pathways encourage recreational use and active travel, linking key sites and residential areas back to the city. Many have noted the tourism potential of this 'loop' experience, offering visitors a sustainable and intimate way to experience the harbour at a slower pace.

While some sections remain to be completed - specifically the Lower Portobello to Ōtākou section, along with necessary upgrades to carpark interfaces and narrow footpaths - these cycleways represent a positive addition to the harbour's future use. There is potential to expand this sustainable tourism network further by incorporating boat connections to transport cyclists to and from the harbour mouth and other destinations. These connections could integrate with walking tracks, mountain biking excursions, and overnight accommodation, creating a more immersive experience for visitors.

Figure 67 **Te Ara Moana & Te Awa Ōtākou Cycleway and Walkway. Credit: Dunedin NZ**

Environmental and Conservation Groups

Key Harbour values identified during stakeholder consultation:

Biodiversity Protection | Habitat Restoration | Water Quality | Climate Resilience | Sustainable Practices

Several environmental and conservation groups are active in the Te awa Ōtākou area, working to preserve its unique ecosystems and natural habitats. These organisations focus on the effects of human activity, such as dredging, pollution, and habitat loss, on the harbour's marine and coastal environments. Their efforts include water quality monitoring, advocating for sustainable practices, fundraising, pest eradication, and restoration projects. One significant initiative is the reforestation of the Otago Peninsula by the Save The Otago Peninsula (STOP) group, which helps reduce slips and sedimentation from reaching the harbour. These groups often use specific sites for habitat restoration and species monitoring, and their interests sometimes intersect with those of Te Rūnanga o Ōtākou, recreational users, and commercial operators, resulting in both collaboration and occasional tension.

Mataitai Reserve Establishment

The establishment of the Ōtākou Mataitai Reserve in 2014 was a significant step forward in preserving the harbour ecosystem for generations to come. The Mātaitai, managed by manawhenua, ensures fisheries management is sustainable, in accordance with tikaka and facilitative of cultural practices, contributing to the harbour's ecological balance and providing an ongoing connection between the community and the harbour.

Save The Otago Peninsula (STOP)

Save The Otago Peninsula (STOP) is a community group founded in 1981, dedicated to the conservation and restoration of native biodiversity on the Otago Peninsula. With a mission to preserve the peninsula's unique ecological and cultural landscapes, STOP focuses on pest and predator control, reforestation, and habitat restoration. The group collaborates closely with landowners and volunteers, embedding conservation efforts deeply within the community. Through targeted trapping, pest management, and native planting, STOP has significantly enhanced the ecological health of the peninsula.

Their accomplishments include increased native bird populations, improved forest health, and the preservation of critical habitats and ecological sites. Regular community events and workshops further foster a culture of conservation, educating residents on sustainable practices and strengthening long-term commitment.

STOP's origins are rooted in environmental activism, beginning with the successful protests against the aluminium smelter at Aramoana in the 1970s. This pivotal moment in Otago's history marked the emergence of a collective voice for protecting Te awa Ōtākou. Activists, including community heroine Lala Frazer, played a central role in safeguarding the peninsula from destructive activities, such as halting a proposed gold mining project at Hereweka. These efforts not only prevented ecological harm but also inspired a legacy of environmental stewardship.

Today, under the challenges of a changing political and environmental climate, the importance of community participation in conservation has never been greater. STOP exemplifies how collective effort and grassroots action can create meaningful change. It is now time for the next generation of kaitiaki to step forward, continuing the work of preserving and enhancing the vibrant tapestry of life around Te awa Ōtākou for future generations.

Predator Free Dunedin

Predator Free Dunedin

Predator Free Dunedin (PFD) collaborates with communities, local government, and conservation groups, and is currently leading and/or coordinating initiatives in several areas. These initiatives aim to restore native biodiversity by eradicating invasive predators, such as rats, stoats, and possums, which threaten local wildlife.

These initiatives aim to restore native biodiversity by eradicating invasive predators, such as rats, stoats, and possums, which threaten local wildlife.

City Sanctuary: Focused on urban Dunedin, City Sanctuary engages residents through education, provides trapping resources, and builds a network of backyard conservation efforts. It enables urban communities to contribute directly to the predator-free vision by supporting individuals and families in monitoring and managing traps in their own backyards. This involvement has created a collaborative urban sanctuary, reducing predator populations and increasing sightings of native birds in the city.

Halo Project: Targeting peri-urban and rural areas around the city, the Halo Project creates buffer zones that protect biodiversity within and beyond Dunedin's city boundaries. Working closely with landowners and local volunteers, the project uses a range of predator control methods across private and public lands. This initiative increases the habitat available to native species and strengthens the ecological resilience of the wider region, connecting urban and rural conservation areas.

Possum Free Peninsula: Originally the vision of the Otago Peninsula Biodiversity Group, this initiative has evolved into a large-scale, coordinated effort involving the entire community.

This group aims to restore biodiversity and protect sensitive ecological areas, reducing predation pressure on native flora and fauna, primarily targeting possums. The group works with local communities and landowners to set traps and maintain pest management systems.

Hereweka Harbour Cone Trust

Hereweka holds significant importance for Kāi Tahu and is a largely intact historical landscape typical of nineteenth and early twentieth-century settlement on the Otago Peninsula. The property's purchase by the Dunedin City Council (DCC) ensures its protection. The establishment of the Hereweka Harbour Cone Trust and the Memorandum of Understanding (MOU) between DCC and the Trust exemplify cooperative efforts by the Council to support local values and interests in restoring key habitats, biodiversity, and recreational spaces.

One key project has been the ongoing restorative work in the Smiths Creek catchment, which includes fencing, weed control, and replanting. These actions have positively impacted freshwater species on the property by enhancing spawning habitats and providing shade to lower water temperatures. These ecological benefits rely on appropriate connections to the harbour—a challenge in other streams with perched outfalls. Increased natural cover has also helped reduce sedimentation in the harbour during heavy rainfall, demonstrating how council-supported initiatives align with community aspirations to protect and restore land with high biodiversity, cultural, and social values.

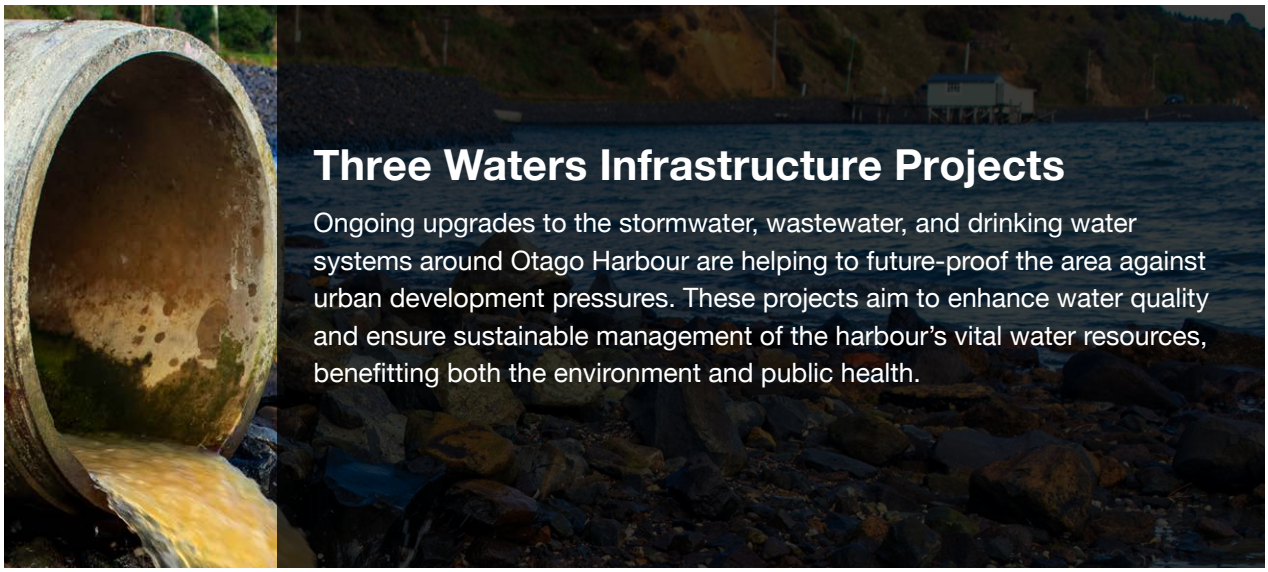
Figure 68 **Harbour Cone, Otago Harbour, N.Z. (c.1910). Credit: Hocken Digital Collections**

Infrastructure and Services Providers

Key Harbour values identified during stakeholder consultation:

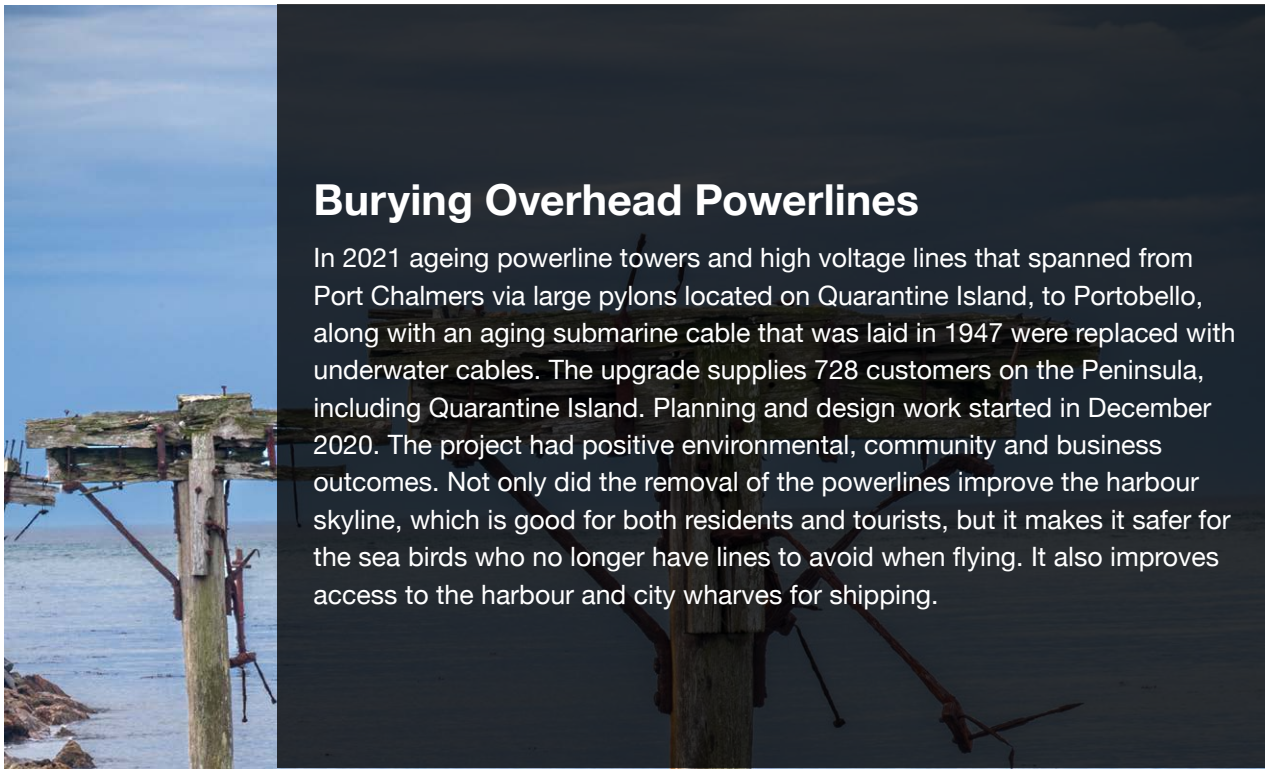
Operational Efficiency | Connectivity | Safety | Resilience | Public Health

The coordinated management of key transport and utility services is essential for Otago Harbour's smooth operation and delivered largely through DCC, waka Kotahi (NZTA) and KiwiRail assets. These services enable the movement of people and goods, support commercial, recreational, and tourism activities, and help protect the environment, property and people. Together, they maintain and improve the infrastructure that is vital to the harbour's success, ensuring it meets national standards, promotes sustainability, and benefits the community. A major focus is building infrastructure resilience, especially with the impacts of climate change. Waka Kotahi and DCC Roads prioritise the safety and connectivity of transport networks, while DCC's waste, sewerage, and stormwater systems help reduce pollution and protect water quality whilst also servicing often dispersed communities.



Three Waters Infrastructure Projects

Ongoing upgrades to the stormwater, wastewater, and drinking water systems around Otago Harbour are helping to future-proof the area against urban development pressures. These projects aim to enhance water quality and ensure sustainable management of the harbour's vital water resources, benefitting both the environment and public health.



Burying Overhead Powerlines

In 2021 ageing powerline towers and high voltage lines that spanned from Port Chalmers via large pylons located on Quarantine Island, to Portobello, along with an aging submarine cable that was laid in 1947 were replaced with underwater cables. The upgrade supplies 728 customers on the Peninsula, including Quarantine Island. Planning and design work started in December 2020. The project had positive environmental, community and business outcomes. Not only did the removal of the powerlines improve the harbour skyline, which is good for both residents and tourists, but it makes it safer for the sea birds who no longer have lines to avoid when flying. It also improves access to the harbour and city wharves for shipping.

Te Rauone Beach Coastal Erosion Project

Figure 70 **Te Rauone Beach. Credit: DunedinNZ**

Supported by Port Otago and the local community, the Te Rauone Beach Coastal Erosion Project stands as a strong example of collaborative efforts to protect natural assets. Despite the complexity of the engineering challenges and the ongoing threat of erosion, the project has made significant progress in mitigating erosion through the construction of groynes, revegetation, and sand replenishment. During consultations, the community's involvement was highlighted as exceptional, showcasing their passion and dedication to protecting the environment. These collective efforts have not only inspired many but also highlighted the power of community-driven conservation in relation to the harbour.

Educational and Research Institutions

Key Harbour values identified during stakeholder consultation:

Environmental Monitoring | Learning & Knowledge Sharing | Public Education | Research Opportunities | Sustainability

The University of Otago and other educational institutions use the harbour as a living laboratory for research in marine biology, ecology, and environmental science. These organisations provide valuable insights into the harbour's ecosystems, helping to inform conservation and management efforts. Research institutions access the harbour through designated sites and facilities, conducting field studies that are essential for understanding its natural processes and the effects of human activity. The University, in particular, has key infrastructure, including the Portobello Marine Laboratory on the Portobello Peninsula, several research vessels, and longstanding studies at various sites across the harbour.

The New Zealand Marine Studies Centre provides public education, support to schools, and programmes for youth and children focussed on the marine environment. Otago Harbour is their classroom, as indeed it is for the marine-facing parts of schools, polytechnic and university curricula.

Figure 69 **Department of Marine Science boat at Portobello (February 2010). Credit: Sharron Bennett via. Hocken Digital Collections.**

3.3.2 Mapping values and Relationships

The seven user groups - **Social and Cultural, Commercial, Tourism and Hospitality, Recreational Users, Environmental and Conservation Groups, Educational and Research Institutions,** and **Infrastructure Services** - all have a stake in the management and future of Te awa Ōtākou. Each group values the harbour for different reasons, yet there are significant overlaps in their interests, as well as key differences. Understanding these overlaps is crucial for planning the harbour's sustainable future.

Shared harbour values appear to sit within four overarching categories:

- **Environmental Stewardship** – clean, green, productive
- **Access and Connectivity** – can we get there?
- **Cultural and Environmental Preservation + Experiences** – keep it wonderful
- **Management, Safety and Operations** – the technical side

These overarching themes are set out in Table 1, which reveals commonly held interests across stakeholder groups.

Table 1: Comparing values / themes across user groups

Social + Cultural	Commercial Users	Tourism + Hospitality	Recreational Users	Environment + Conservation	Infrastructure and Services Providers	Education + Research
Environmental Stewardship	Environmental Compliance	Environmental Preservation	Environmental Conservation	Biodiversity Protection	Resilience	Environmental Sustainability
Community Wellbeing + Future Prosperity	Shipping Access	Access + Connectivity	Access to Water + Networks	Habitat Restoration	Public Health	Environmental Monitoring
Public Access	Economic Sustainability	Culture + Heritage Preservation + storytelling	Community Engagement	Water Quality	Connectivity	Learning & Knowledge Sharing
Cultural Heritage Preservation	Infrastructure Maintenance	Visitor Experience	Quality + Management of Facilities	Climate Resilience	Safety	Public Education
Art, Music and Creativity	Operational Efficiency	Economic Sustainability	Safety	Sustainable Management	Operational Efficiency	Research Opportunities

Environmental Stewardship

Access and Connectivity

Cultural and Environmental Preservation, Education + Experiences

Management, Safety and Operations

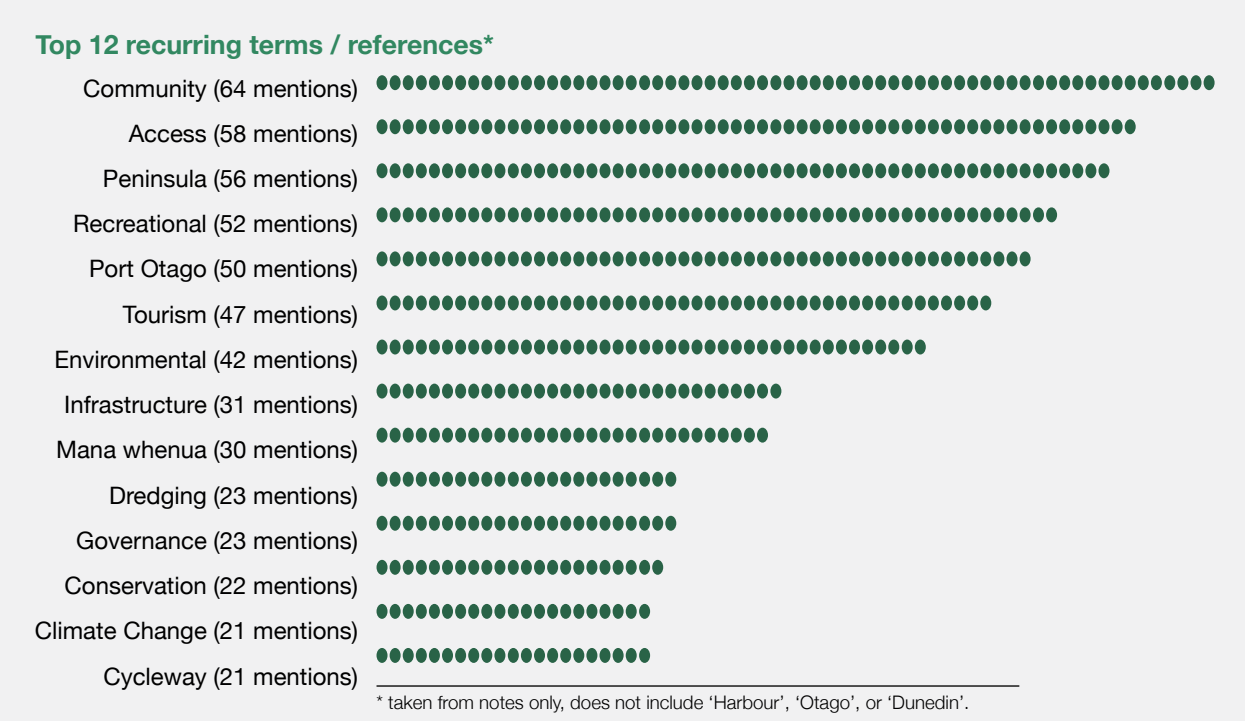


Figure 71 **Top 12 recurring terms / references from consultation interviews**

What This Means for the Future

Tensions and conflicts among user groups require several important philosophies to underpin future actions:

Collaboration and Integrated Planning

The future of Otago Harbour will depend on sustained collaboration among all user groups. With shared values such as environmental sustainability, public access, and safety, there is already a strong foundation for cooperation. Collaborative planning will allow diverse groups - economic, recreational, cultural, and environmental stakeholders - to work together in creating a harbour that reflects a shared vision and values.

Balancing Economic and Environmental Goals

Balancing economic benefits with environmental and cultural values is essential to Otago Harbour's long-term sustainability. Many economic users, such as those in tourism, shipping, and transport, already incorporate sustainability as a core principle, recognising that a healthy harbour is vital to their continued success. Integrating these economic activities with environmental stewardship and cultural respect will reinforce sustainable practices, helping to maintain the harbour as a thriving resource that supports multiple values.

Building on Existing Governance Frameworks

Strengthening governance frameworks with mana whenua, the Otago Regional Council (ORC), and Dunedin City Council (DCC) at the core will be essential for effective harbour management. This foundational governance group will guide decision-making and ensure that values central to the harbour's cultural, environmental, and social significance are upheld. Collaboration with other stakeholders, including commercial operators, environmental groups, and the community, can be integrated through consultative and advisory roles, enhancing transparency and alignment with the harbour's broader aspirations. Building on current governance efforts by ORC and DCC, this approach will help ensure Otago Harbour remains a thriving, multi-use resource that serves both present needs and long-term goals.

3.4 Regulatory Role-players and Responsibilities

There is a hierarchy of policy and legislation, summarised in **Table 2** below, that has bearing on the protection, management and use of the harbour and which requires the development of specific instruments in the form of plans, guidance and regulations to give effect to the intent of these overarching instruments.

These instruments also assign mandate and responsibility to the National and Regional organisations listed in **Table 2** below and **Figure 72 on page 83** below for the implementation and administration of these policies and acts.

Table 2. Reguatory Role Players and Responsibilities

Organisation	Responsibilities	Interrelationships
1. National Level		
Ministry for the Environment (MfE)	Oversees implementation of the Resource Management Act 1991 (RMA) and sets the national direction on environmental issues through National Policy Statements (NPS), National Environmental Standards (NES), and National Planning Standards.	Works with ORC and DCC to ensure compliance with national environmental policies and standards. Provides the framework within which regional and district plans are developed.
Department of Conservation (DOC)	Manages conservation estate, including protected areas, reserves, and marine environments. Has responsibilities under the Conservation Act 1987 and works to ensure that conservation values are maintained in development and use of natural resources, including coastal environments. Section 4 of the Act specifically addresses the relationships between conservation efforts and the principles of the Treaty of Waitangi.	Collaborates with ORC and DCC, particularly where protected areas or reserves intersect with urban and commercial development. Collaborates and consults with Te Rūnanga o Ōtākou particularly regarding conservation management and Section 4 of the Act.
Ministry of Business, Innovation and Employment (MBIE)	Provides policy advice and regulatory oversight for business, infrastructure, and innovation, including the tourism sector, which directly impacts coastal areas like Te awa Ōtākou. Also administers building regulations, which influence coastal development.	Interacts with ORC and DCC, influencing economic development strategies that consider environmental impacts.

Organisation	Responsibilities	Interrelationships
Ministry for Primary Industries (MPI)	The Biosecurity unit works to prevent harmful organisms entering New Zealand's. It manages border compliance activities as well as preparing for, and responding to, any biosecurity incursions. Fisheries New Zealand operates the country's fisheries management system and monitors the sustainability of fish stocks and sets limits on commercial catches. It enforces those limits and the rules associated with the system.	These units of MPI work with the Port and local councils, communities and harbour users, commercial and recreational fishers in managing risk of invasive species and monitoring fisheries.
2. Regional Level		
Rūnaka	Te Rūnaka o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki represent the interests of customary rights holders, of whose rights and responsibilities are derived through whakapapa. This ancestral lineage defines their connection to specific sites, places, and resources, as affirmed by the Treaty of Waitangi. Both rūnaka are statutorily recognised under the Te Rūnanga o Ngāi Tahu Act 1996, which ascribes them specific takiwā (customary areas). The harbour falls within Te Rūnanga o Ōtākou's takiwā, while Kāti Huirapa Rūnaka ki Puketeraki maintains an interest. The Ngāi Tahu Claims Settlement Act 1998 addressed historic grievances and established mechanisms recognizing Kāi Tahu rakatirataka and mahika kai interests. This legislation grants the rūnaka intrinsic and legally recognised rights and responsibilities in the governance and management of the harbour and its resources. Aukaha (1997) Ltd are mandated by rūnaka to work on their behalf in some environmental and cultural resource management areas.	Rūnaka exercise their Treaty-guaranteed and legislatively affirmed rights in their relationships with community and all levels of government, particularly ORC and DCC, in decision-making processes concerning land, water, and cultural heritage.

Organisation	Responsibilities	Interrelationships
Otago Regional Council (ORC)	ORC is responsible for preparing the Regional Policy Statement (RPS), which provides an overarching framework for resource management in the Otago region, including management of land, water, air, and coastal resources under the RMA. ORC also develops Regional Plans to regulate specific activities like water quality, land use, and coastal management, setting the regional policy context that DCC must adhere to in their District Plans. Additionally, ORC enforces the Local Government Act and holds responsibilities in environmental monitoring, compliance, hazard management, and river control. Other key responsibilities include: • Biosecurity which includes pest management: • Natural hazards – including mapping and understanding the range of hazards, providing information to improve understanding and ensuring appropriate response: • Harbour master function – responsible for navigational safety in the harbour.	ORC works closely with rūnaka, Aukaha, DOC, MfE, and other national bodies to implement national policies at a regional level. The relationship between ORC and rūnaka is formalised through the Mana-to-Mana Agreement, initially signed in 2003 and most recently renewed in 2022. These partnerships help ensure that regional policy decisions reflect a range of environmental, cultural, and community values.

Organisation	Responsibilities	Interrelationships
3. Local Level		
Dunedin City Council (DCC)	DCC is responsible for preparing and enforcing the District Plan under the RMA, which addresses zoning, land use, and development controls specific to the Dunedin area, including the Te awa Ōtākou catchment. The District Plan must align with ORC's Regional Policy Statement and national environmental standards. DCC also has extensive responsibilities under the Local Government Act, Reserves Act, and Local Government (Water Services) Act, covering infrastructure, water services, community facilities, and reserves management within the city.	DCC collaborates with ORC to implement regional policies locally and coordinates with DOC and MBIE when local development affects conservation areas or requires economic development support. Additionally, DCC works with rūnaka and Aukaha, particularly where cultural and environmental values intersect with local governance. The relationship between DCC and rūnaka is formalised in the Manatū Whakaaetaka, signed in 2022, fostering collaboration on culturally significant and conservation-focused projects. Dunedin City also has 6 community boards (2 within the Harbour catchment) that provide advice to Council on matters affecting their community. They also facilitate prioritisation and funding of community projects.

Given the overlap in focus and scale of these instruments and responsibilities effective governance requires that these organisations work closely together and involve community organisations to ensure alignment, and appropriate outcomes.

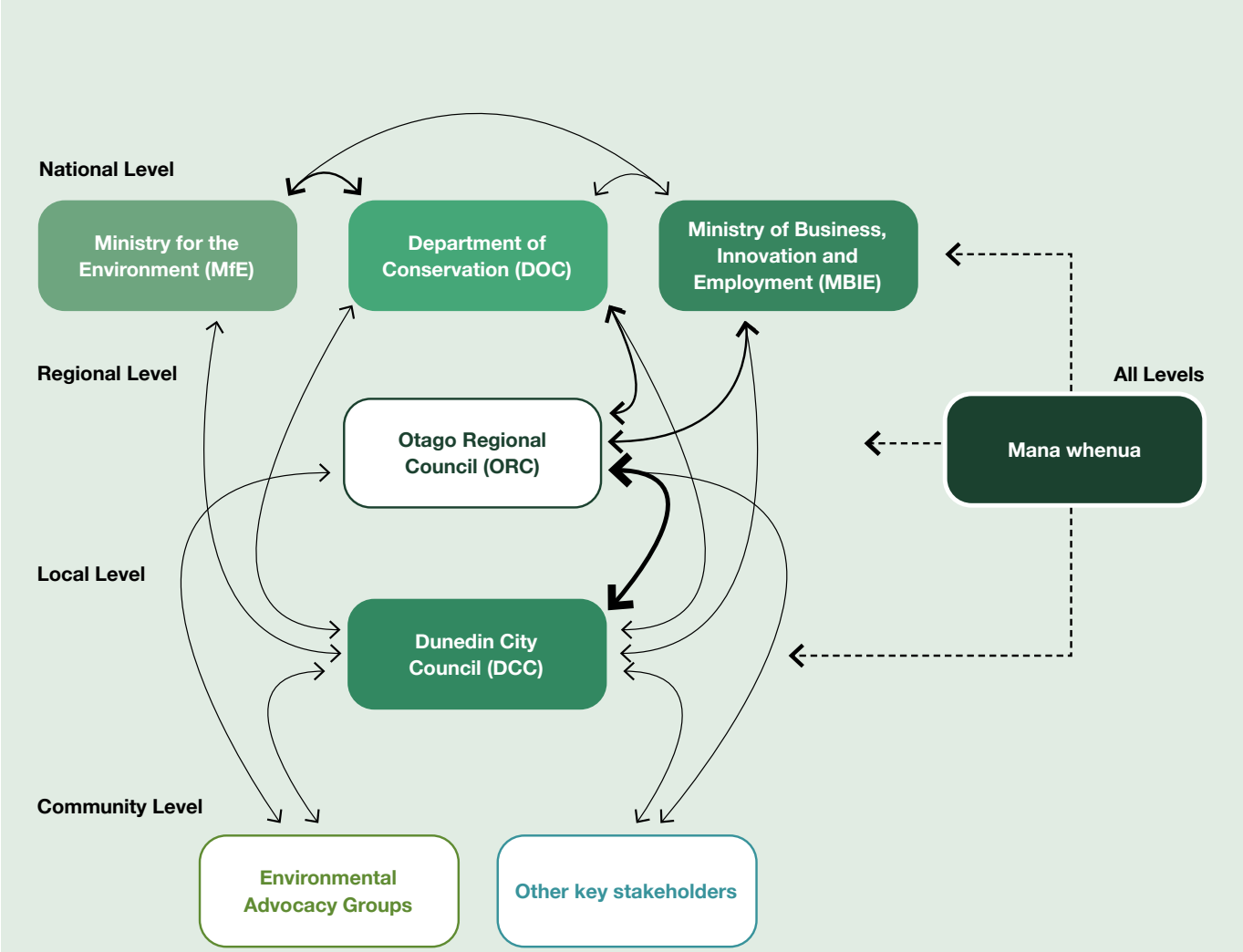


Figure 72 **Reguatory Role Players and Responsibilities Organogram**

These instruments vary in terms of their purpose (from guidance to policy to regulations), focus (biodiversity, harbour safety, stormwater, tourism), spatial scale, temporal relevance (short term or 50 year), and which statutory organisation is responsible. They are also at various points in terms of their lifespan (under development, in review). As some of the more action-orientated planning instruments have budgets attached to them, they are important in terms of enabling action at a local scale by complementing investment, often voluntary, of community organisations, NGOs and mana whenua. Some of the primary documents and processes are noted below.

The list in **Table 3** are just some of the key policy documents and legislation that have relevance. There are a multitude of further plans and instruments, mostly administered by ORC and DCC, that have been captured in a database linked to the database of opportunities. These databases serve as a tool to support further coordination and alignment of Council efforts with community initiatives in taking the opportunities forward.

Table 3: Policy & Regulations impacting Te Awa Ōtākou

Policy / Plan	Purpose and relationship to harbour
Dunedin City Council Otago Harbour Reserves Management Plan (2024)[11]	Focuses on enhancing recreational use and protecting natural and cultural landscapes of the harbour's reserves. Also sets guidelines for infrastructure upgrades, community engagement, and ecological sustainability.
Dunedin City Council District Plan (2GP) (2019)[12]	Includes zoning regulations to balance development with environmental protection, including around harbourfront areas.
Ōtākou Mātaitai Reserve - Under South Island Fishing Regulations (2016)[13]	Protects culturally significant fishing grounds and preserves customary fishing practices while ensuring the sustainable use of marine resources, with management by mana whenua. Prohibits commercial fishing.
Otago Regional Council Regional Plan: Coast for Otago (2001, amendments in 2009 and 2012)[14]	Governs the use and protection of the coastal marine area of Otago, addressing discharges, coastal space use, and erosion mitigation.
New Zealand Coastal Policy Statement (NZCPS) (2010)[15]	National policy framework guiding the sustainable management of coastal areas, including public access, biodiversity, and climate change mitigation.
Kai Tahu ki Otago Iwi Natural Resource Management Plan (2005)[16]	Guides the sustainable management of natural resources in Otago, reflecting the cultural and environmental priorities of Kai Tahu. Influences local government policies on land use, water quality, and conservation, ensuring resource management aligns with iwi values.
Te Rūnanga o Ngāi Tahu Freshwater Policy (1999)[17]	Addresses the cultural significance of freshwater to Ngāi Tahu and aims to protect and restore water quality in areas like Te awa Ōtākou.
Otago Regional Council Navigation Safety Bylaw (2020)[18]	Establishes rules to enhance maritime safety within Otago Harbour, including regulations for vessel speed limits, anchoring, mooring, and operational requirements around marine mammals and in designated areas. Aims to ensure the safety of all water users while supporting environmental protection and sustainable use of the harbour.

11 Otago Harbour Reserve Management Plan Review. Dunedin City Council, https://www.dunedin.govt.nz/community-facilities/parks-and-reserves/management-plan-reviews/otago-harbour-reserve-management-plan-review.
12 2nd Generation District Plan (2GP). Dunedin City Council, https://www.dunedin.govt.nz/council/district-plan/2nd-generation-district-plan.
13 Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017. New Zealand Legislation, 2017, https://www.legislation.govt.nz/regulation/public/2016/0206/latest/whole.html.
14 Regional Plan: Coast for Otago. Otago Regional Council, 2001, https://www.orc.govt.nz/media/1458/regional-plan-coast-for-otago.pdf.
15 New Zealand Coastal Policy Statement 2010. Department of Conservation, 2010, https://www.doc.govt.nz/Documents/conservation/marine-and-coastal/coastal-management/nz-coastal-policy-statement-2010.pdf.
16 Kāi Tahu ki Otago. Kāi Tahu ki Otago Natural Resource Management Plan 2005. Kāi Tahu ki Otago, 2005, Dunedin, NZ.
17 Te Rūnanga o Ngāi Tahu Freshwater Policy 1999. Otago Regional Council, 1999, https://www.orc.govt.nz/media/11527/te-runanga-o-ng%C4%81i-tahu-freshwater-policy-1999.pdf.
18 https://www.orc.govt.nz/media/9185/orc-navigation-safety-bylaw_forweb_2020-09-23.pdf

He pukenga wai he pukenga kōrero

A body of water is a body of knowledge

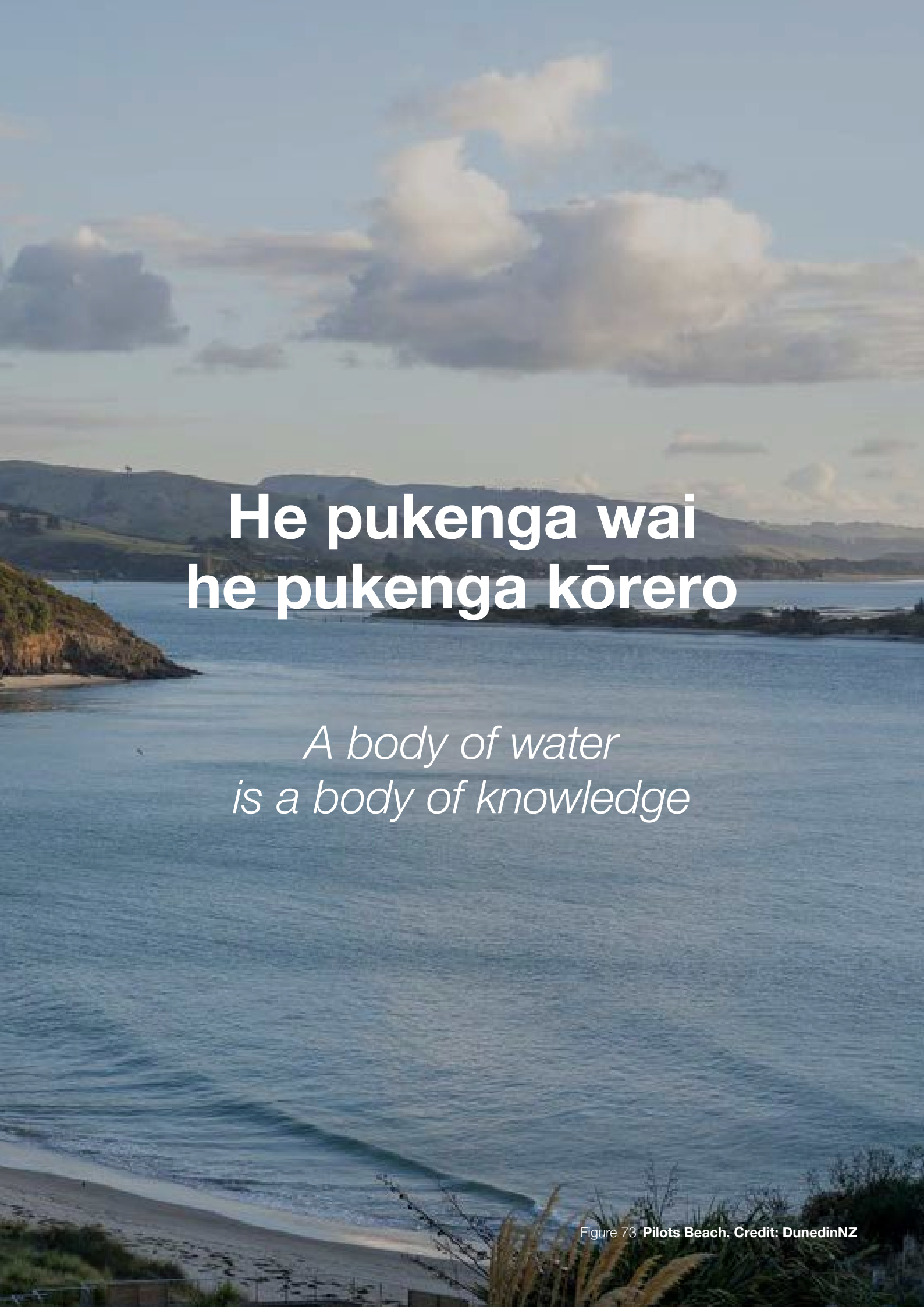


Figure 73 **Pilots Beach. Credit: DunedinNZ**

3.5 Current Issues

This image shows an array of colour gathered from the earth – whenua pigments. These colours were part of an exhibition by artist in residence Sarah Hudson, collected during her three-month artist resident project with the Caselburgh Trust on Yellow Head in Broad Bay in 2022. Yellow Head is one of few still exposed natural parts of the lining of Te awa Ōtākou. The rest of the harbour has been walled and reclaimed.

Figure 74 **Image of vials of colour via SH exhibition. Credit: Sarah Hudson**

Sarah's project points out the loss of access to whenua and with that a loss of access to matauraka held in the land. The effects of colonisation have caused a disconnect in cultural knowledge for mana whenua. As this knowledge is regained and surfaced it is important to remember, much of that knowledge is still held and stored in natural places.

As introduced in the prior sections, the health of Te awa Ōtākou today, as well as the wellbeing of its communities and strength of the local economy are influenced by many intersecting factors. The consultation with a cross-section of the harbour community, and supplementary literature review, generated a range of issues which are currently adversely impacting on environmental, socio-cultural and economic wellbeing. The extensive feedback was analysed in distilling and summarising the issues in terms of the following seven themes:

- **Accessibility**
- **Environmental Health**
- **Tourism**
- **Arts and Culture**
- **Infrastructure Resilience**
- **Climate Resilience**
- **Governance**

Whilst the array of issues explored here are extensive, it is essential to celebrate that the opportunities to restore the health of Te awa Ōtākou are abundant. Importantly, there are many hands-on deck already working to address them, from grass roots to local government, in many cases in collaboration. Existing initiatives are highlighted throughout the report, and associated opportunities are explored in the following chapter '**Looking to the Future**'.

3.5.1 Accessibility

Persistent loss of accessibility was one of the most common themes to emerge from consultation with the wider community. Access to and around the awa is an integral value held by all. Issues relating to access have persisted since railway construction in the 19th century. However, some success stories can be told, in particular, the construction of the 30 km long Te Aka Ōtākou from Portobello to Port Chalmers.

Accessibility

Issues

Limited accessibility to the awa

Accessibility issues are especially important to mana whenua. The imbalances and tensions in harbour access reflect fragmented decision-making that fails to align with a holistic management system in line with a Te Ao Kāi Tahu worldview. The lack of cultural representation, both in recreational spaces and culturally significant places, contributes to a sense of cultural and spiritual disconnection. This disconnect hinders mana whenua ability to practice kaitiakitaka and maintain traditional access to the awa.

Accessibility to the awa is a fundamental need for the wellbeing of the community. Mahika kai resources and practices can only sustain and be sustained by tākata whenua if those resources, such as tuaki beds and flat fish fisheries are accessible by foot and boat. Limited access to mahika kai impacts the ability of mana whenua to practice traditional food gathering and resource management. This contributes to a sense of disconnection to the awa, which in turn impacts both spiritual and mental wellbeing.

Boating, diving, swimming, kitesurfing and other water based recreational and tourism activities have been a part of the harbour way of life for generations, reliant on safe access and infrastructure for launching and navigation. At the same time, Port Otago and other commercial operators rely on the awa for shipping logistics. These operators connect with road and rail infrastructure along the coast to transport inland freight, and with the South Pacific Ocean to access international markets - Port Otago processes 8% of New Zealand's export trade.

The multiple uses of Te awa Ōtākou have led to a range of issues which were raised consistently across the engaged audience. It is acknowledged that DCC own, hold inventory of and manage many of the implicated wharf and jetty assets under their Otago Harbour Reserve Management Plan; the updated plan will speak to several of the issues raised. Substandard condition is often a reflection of inadequate capital funding to implement upgrades. Further, several access assets are owned and managed privately, subject to resource consent conditions. Many of the following issues reflect these systemic challenges.

- Recreational wharves at Careys Bay are considered unsuitable for current recreational uses. There is a clear need for a better recreation and tourism area separate from the port.
- The Aramoana wharf was removed several years ago due to being derelict and not replaced. This poses a risk to the community if there is a need to evacuate and the road is blocked.

Accessibility

Issues

- There was a perception that recreational wharves in general are in poor condition and that transparency in terms of responsibilities for harbour infrastructure is needed.
- Tourism operators feel that navigation within the shipping channel is dominated by large shipping vessels, with small vessels required to alter schedules or hold at sea to allow freighters to pass when travelling from the outer harbour islands to the basin.
- Sedimentation in key recreational access areas is reducing water depth, making it difficult for boats to navigate and access docks and piers. Ongoing dredging is not always feasible due to cost and environmental impact. North End wharf (used by the Otago Yacht Club) is a hot spot for this issue, due to silt from the Ōwheo, which has made access to the yacht basin and boating in this area dangerous especially as the area is utilised for teaching. While Port Otago have offered to assist in the near future, this will require ongoing attention.

Restricted accessibility around the awa

Open accessibility around the awa is essential for community connection, commuting, recreation, tourism, commercial activities and emergency response. Whilst accessibility has improved over time - particularly with the creation of Te Aka Ōtākou, some issues have persisted. Meanwhile, new infrastructure and demand has led to conflicts between existing and emerging uses – from the hills to the coast.

- The coastal pathway and road widening ends abruptly at Lower Portobello, leaving the Harwood, Ōtākou and Harrington Point communities without safe pedestrian, cycle and road access along the road.
- The coastal pathway also ends abruptly on the Port Chalmers side at an intersection of five roads, leaving cyclists and pedestrians at a busy and dangerous intersection of road and rail.
- The St Andrew Street level crossing in town also provides a key risk if an inland port is to progress, with more trains increasing traffic congestion. The Wickliffe Terrace level crossing is also a challenging legacy issue.
- There are areas of conflict on the new pathway where the route is not wide enough to safely support multiple accessibility modes, and where pathway users are forced to interact with vehicles. Hot spots for this issue are at cycleway intersections with reserves. Macandrew Bay beach is a key example, where the pathway is abruptly intersected by a carpark for the beach reserve, making navigation dangerous – particularly for children.
- There is a lack of connection between walking trails, public reserve areas and cycle networks, all of which lack a cohesive strategy for promotion, upkeep and management. Inland cycle / mountain biking network expansion is limited due to steep gradients, engineering limitations; as well as past conflicts with landowners limiting options for new routes.
- Private landowner conflicts have led to some challenges in creating new walking tracks around the Otago Peninsula.
- Signage and wayfinding relating specifically to tourism destinations or experiences is lacking.
- There are inadequate amenities, seating areas, shelters and rubbish bins around the harbour. Existing amenities, especially public bathrooms, are over capacity during cruise season.

Issues

Lack of connectivity to the harbour waterfront

Ōtepoti boasts an extensive harbour waterfront in close proximity to the CBD. Yet, the waterfront is almost entirely disconnected from the CBD and the public. From the intersection of Portsmouth and Portobello Roads to Ōwheo, aside from the Kitchener Street reserve and the inner Steamer Basin, there are virtually no areas for the public to recreate along with the waterfront. The wide band of industrial land use between the water, railway and state highway creates a physical and amenity barrier for the public. This disconnection impacts on the quality of life for everyone in the city, and on the quality of experience for visitors to the city.

> **For too long the city has turned its back on the tāoka that is our harbour.**

Edward Ellison, mana whenua.

- A “sensible”, safe pedestrian connection (and general corridor) between the Octagon and Steamer Basin is lacking.
- There are no green spaces or weather resilient facilities and activities along the upper harbour waterfront. The sparse public spaces that do exist are dominated by hard surfaces. Amenities, arts and culture in general are lacking.
- An interconnected route along the wider waterfront is lacking.
- There is poor access to and around the wharves on the waterfront.
- Buildings are occupied by industrial and commercial tenants; feedback suggested that lease costs are likely to deter other users.

Figure 75 **Railway Line separating City Centre from Harbourfront. Credit: DunedinNZ**

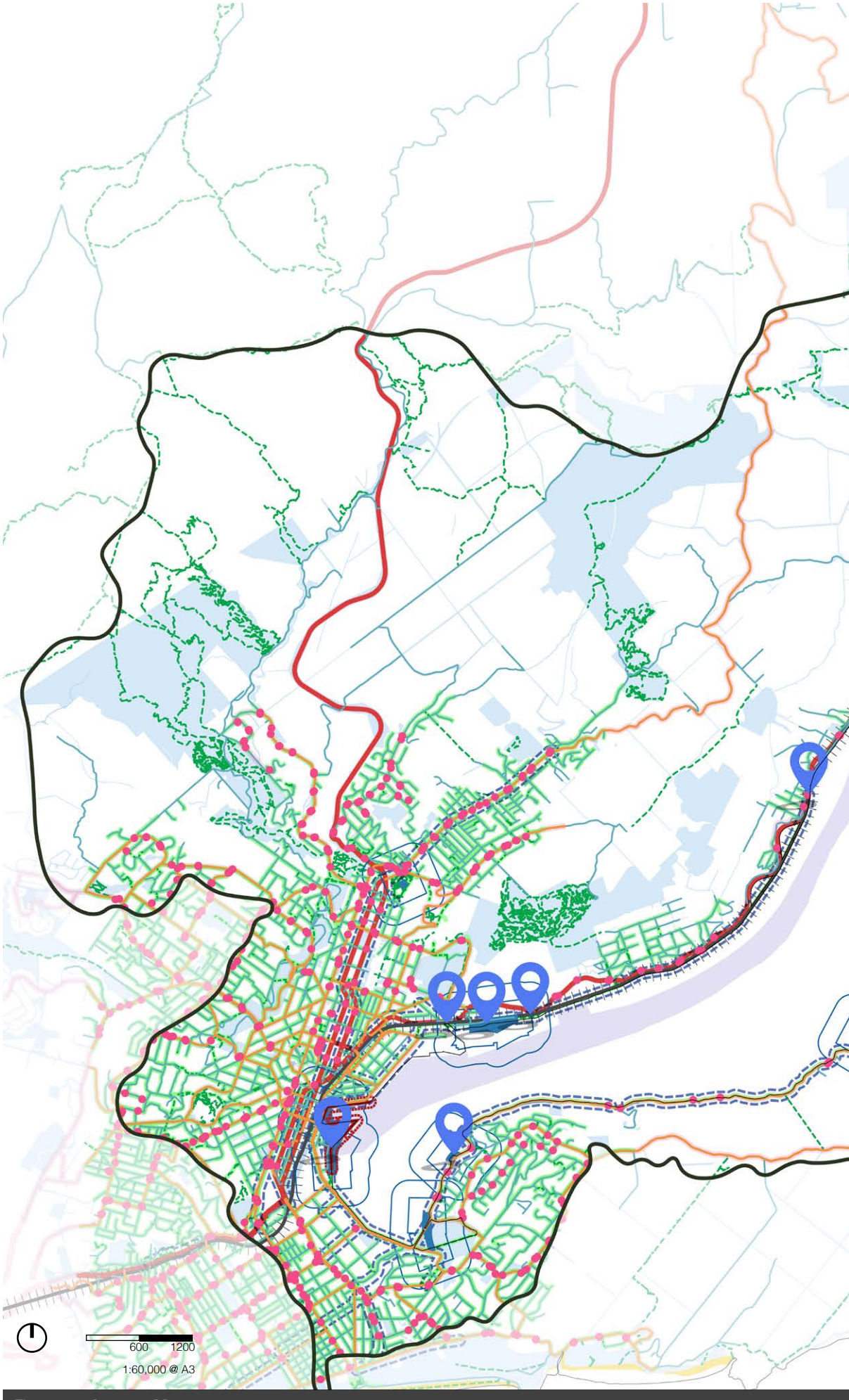
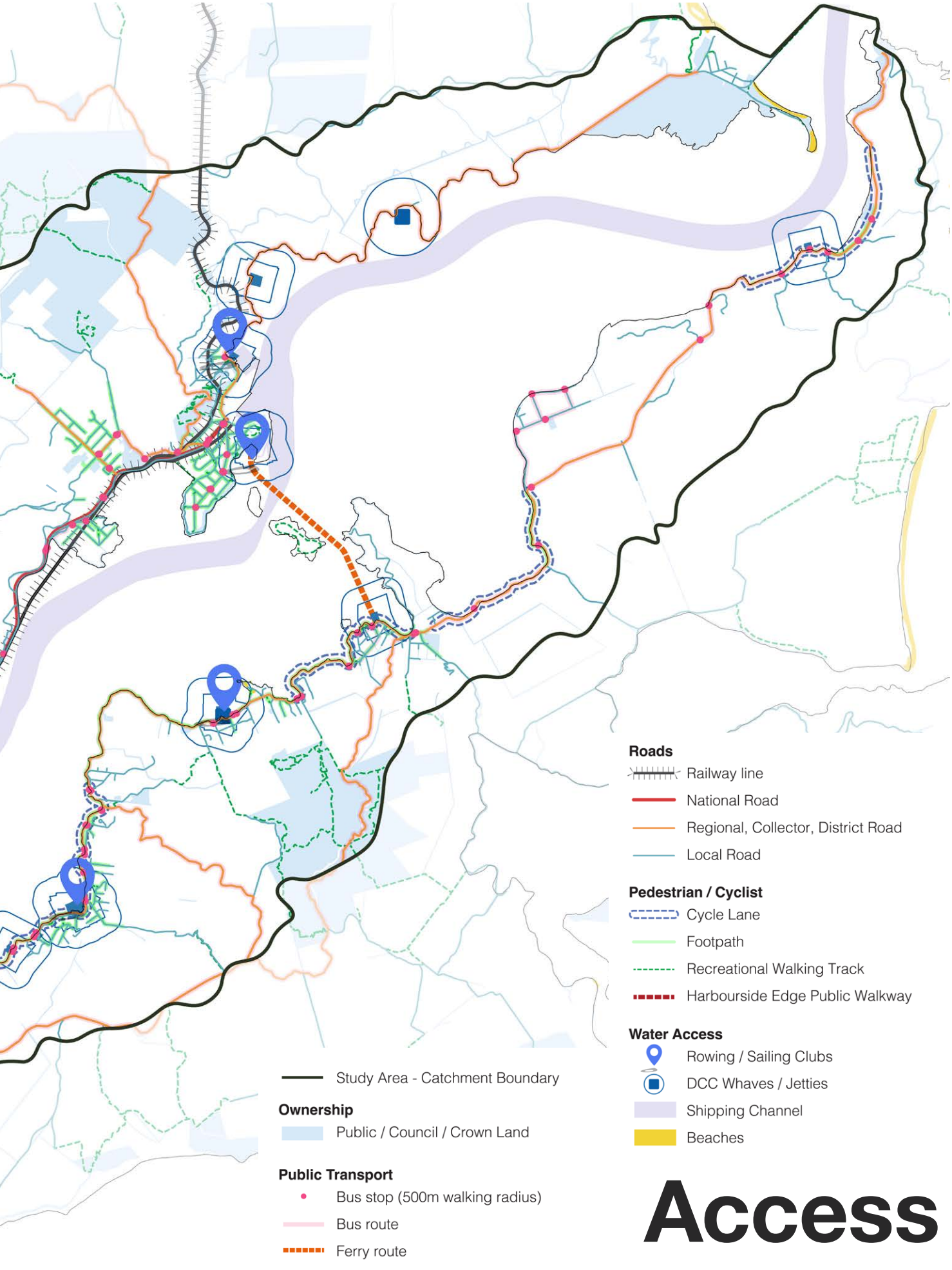


Figure 76 **Access Map**


Roads
Railway line
National Road
Regional, Collector, District Road
Local Road
Pedestrian / Cyclist
Cycle Lane
Footpath
Recreational Walking Track
Harbourside Edge Public Walkway
Water Access
Rowing / Sailing Clubs
DCC Whaves / Jetties
Shipping Channel
Beaches
Study Area - Catchment Boundary
Ownership
Public / Council / Crown Land
Public Transport
Bus stop (500m walking radius)
Bus route
Ferry route

Access

3.5.2 Environmental Health

"A significant improvement in water quality has been noticed over the years, particularly in the Port Chalmers area with the elimination of pollution sources... Nothing lived there back then – there were so many toxins".

The health of the marine, coastal, freshwater and terrestrial environments of the harbour catchment are a mirror of past and ongoing pressures and connection. Anecdotal evidence indicates the harbour health is slowly recovering, with many hands at work to drive this. Elimination of pollution sources including discharges of raw sewage, tannery waste from Sawyers Bay, wool processing plant effluent, and stormwater from gasworks plants have been key management successes. There are no commercial fin fishing operations in the harbour, bag limits are enforced for recreational fishing, and Tākata Tiaki manage and monitor customary takes.

Yet, structural modifications to habitat limit the ability for coastal and freshwater biodiversity to recover, and ongoing pollution issues, particularly untreated stormwater and sedimentation, continue to degrade the awa. A focus on knowledge-building and education to raise community awareness of the importance of indigenous biodiversity and encourage intergenerational participation in kaitiakitanga is now needed, along with targeted effort to address remaining pressures in a holistic manner.

Historically, screened sewage was discharged into the harbor from the city and at all communities around the coast, leading to tuaki collection being illegal until the late 1980's-90's. Now, following a significant investment by DCC to pipe effluent to the treatment plant and outfall the harbour sewage is mostly treated and pumped offshore at Lawyers Head[19]. Wastewater overflows, inflow and infiltration and septic systems are now the key challenges left, to remove the remaining sewage inputs into the harbour.

Figure 77 **Gathering tuaki. Credit: DunedinNZ**

19 Hepburn, C. D. "The Importance of What Lies Beneath." Otago Daily Times, 11 April 2016, https://www.odt.co.nz/lifestyle/magazine/importance-what-lies-beneath.

Issues

Permanent Loss and Degradation of Habitat

Te kōhaka o te awa Ōtākou

Ka kura te one, ka kura te wai ko kā Kōurariki i whakatau mai.

The sand is red, the sea is red, It is the masses of whale krill.

When the Weller Brothers arrived on Te Awa Ōtākou nearly 200 years ago, the harbour was a calving place for mother whales to birth their young.

With historical reclamation of the harbour foreshore including the recent Te Aka Ōtākou construction and road extension, most of the coastal edge of the inner harbour is now engineered including extensive areas of hand-built rock walls originally constructed by prison labour from Taranaki. In addition to the permanent loss and reduction in extent, this shoreline construction has significantly altered the natural wave dynamics, creating steeper patterns. The altered shoreline has resulted in much of the harbour being very difficult and dangerous for wildlife to access. The harbour as a kōhaka or nursery is no longer a safe and welcoming place.

This is a significant issue for the health of Te awa Ōtākou today, particularly within the inner harbour. The reduced extent, diversity and abundance of suitable habitat conditions means reduced diversity and abundance of indigenous plants and animals. Ultimately, biodiversity loss affects ecosystem health and resilience in the face of a changing climate, as well as our ability to sustain ourselves from the environment.

- Reclamation remains a key driver of loss of intertidal habitat. It was estimated that road widening, seawall and path creation for Te Aka Ōtākou has led to a further 10 hectares of rocky and shelly intertidal habitat lost – leaving the remaining intertidal zone along the pathway extent severely limited and fragmented in extent[20],[21] . The paucity of intertidal habitat within the inner harbour means the coastal food web is likely changing, with impacts on animals at the top of the web particularly visible due to reduced food supply, for example, coastal wading birds[22]. Intertidal habitat is particularly challenging to restore or recreate around the pathway, as it would require recreation of coastal habitat with a tidal gradient along the coast, which could lead to further reclamation.
- Perched fish passage barriers restrict access to freshwater habitat around the harbour roads for migratory indigenous fish such as banded kōkopu and īnaka. While new infrastructure is required to provide for fish passage, prior roading projects have resulted in the culverting of streams – and particularly stream mouths - around the harbour. There are many culvert outlets that at least pose a barrier for fish passage to upstream habitat during low tides, however it is considered likely that there are also barriers which pose a complete barrier to fish passage.

20 Intertidal Habitat Considered. Otago Daily Times, 14 September 2023, https://www.odt.co.nz/news/dunedin/intertidal-habitat-considered.
21 "Will Road Harm Harbour Life? Otago Daily Times, 1 August 2023, https://www.odt.co.nz/news/dunedin/will-road-harm-harbour-life.
22 Rullens, V., Mangan, S., Stephenson, F., Clark, D. E., Bulmer, R. H., Berthelsen, A., … Pilditch, C. A. (2022). Understanding the consequences of sea level rise: the ecological implications of losing intertidal habitat. New Zealand Journal of Marine and Freshwater

Environmental Health

Issues

- There is a lack of estuarine tidal habitat for fish spawning at stream mouths due to past reclamation of intertidal areas. Due to the steep nature of the harbour catchment, intertidal areas would have been historically limited in extent at the interface between the coast and hillsides, so this habitat was likely sparse in nature and highly vulnerable to reclamation. This means that fish such as īnaka which rely on a 'salt wedge' for spawning (area where freshwater and saltwater mix) have very limited spawning habitat within the harbour.
- Loss of bird roosting habitat was a common concern for the community. Most of the remaining shag roosting trees and structures were removed to make way for pathway infrastructure. The last roosting macrocarpa remains at Macandrew Bay. In efforts to recreate lost habitat, artificial roosting structures have been established at Andersons Bay.
- The Ōwheo has been extensively modified over an extended timeframe and is managed primarily for flood conveyance and mitigation. This has included the reclamation of the tidal estuary and removal of littoral and riparian habitat. As the largest freshwater connection into the harbour, the lower Ōwheo and estuary would have once provided important ecological functions for spawning of fresh and coastal species and a food source into the upper harbour. Development of the Forsyth Barr stadium has further constrained available space on the north side but undeveloped land on the south side remains.
- Sedimentation is an ongoing issue across the catchment. Sedimentation can be especially harmful to receiving environments during heavy or prolonged rainfall, causing large amounts of sediment to wash downstream. Sedimentation smothers habitat and causes turbid (cloudy) water which can affect sensitive plants and animals.
    - The upper harbour benthic environment (sea floor habitat, plants and animals) is being impacted by sediment sourced from Ōwheo catchment, particularly around the mouth of Ōwheo.
    - The wider harbour environment is also affected by sediment runoff from deforested, easily-eroded steep hill country during heavy rain.
    - Members of the community have reported poor erosion and sediment control practices through development and other earthworks activities. Sediment build-up in the Lindsay Creek sub-catchment has been highlighted.

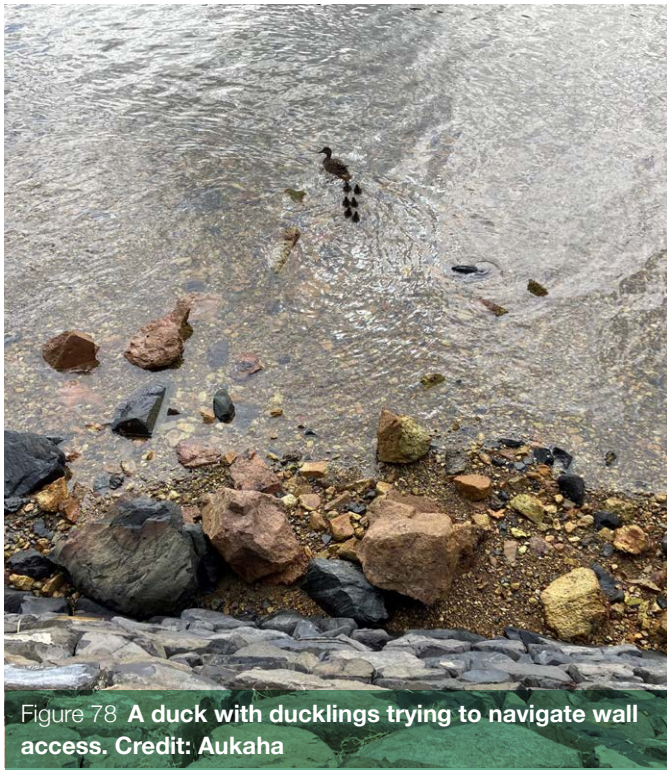


Figure 78 **A duck with ducklings trying to navigate wall access. Credit: Aukaha**

Issues

Biodiversity is far from 'thriving'

"The sky, a great part of the time, was without a cloud, and not a breeze ruffled the surface of the water, which reflected the surrounding wooded slopes, and every sea-bird that floated upon it, with mirror-like accuracy. For some hours after sunrise, the woods resounded with the rich and infinitely varied notes of thousands of tūīs and other songsters. I never heard anything like it before in any part of New Zealand" - **David Monro, 1844**

This quote from David Monro recorded in 1844 reminds us of the dynamic, wild and diverse environment of the harbour. This poetic observation is regarded as taonga by mana whenua and is often quoted when remembering the huge loss of wildlife and wild spaces as the harbour has been tamed and settled, developed and reshaped.

The establishment of the Ōtākou Mātaitai Reserve is a huge step in the right direction to protect and enhance marine biodiversity, as is the work of many in restoration planting and pest management around the harbour. The umbrella Predator Free Dunedin (PFD) initiative is achieving substantial improvements in pest control around the wider harbour, under the vision to "*get rid of possums, rats and stoats from Dunedin's urban and rural landscapes by 2050*" (PFD). Possum numbers have been significantly reduced on Otago Peninsula due to sustained control lead by the OPBG (under PFD), potentially reaching eradication in some areas, and STOP are reforesting the Hereweka catchment alongside the Hereweka / Harbour Cone Trust and Broad Bay School. At the Royal Albatross Centre, our magestic Royal Albatross along with over 20 native coastal wildlife species are thriving under the management of DOC and Te Poari a Pukekura. However, the harbour health is clearly a long way from the *"resource rich and thriving"*, *"loudest birdsong in the country", "whales galore"* state of years past.

- Tuaki populations are in decline, with significant declines in biomass recorded across four of the five main beds between 1999 and 2020 – the two years that the beds have been formally surveyed (noting no such trend was found at Sawyers Bay) . In areas where seagrass cover was higher, tuaki density was also higher (for four of the six beds), indicating that seagrass and tuaki health may be interconnected, although this is not conclusive. The drivers of this decline in tuaki are not clearly known, due to the limited monitoring that has happened – noting that the St Leonards bed is least accessible and least fished yet has undergone a 26% decline in biomass over 21 years[23].

  The two main commercial beds, Port Chalmers and Sawyers Bay, have had more frequent monitoring by Southern Clams Ltd, but display differing results - a clear trend of declining recruited biomass at the former, and no trend at the latter. As both prized mahika kai species and effective filter feeders, tuaki are an important feature of the harbour ecosystem, and further declines would impact on human health and wellbeing, as well as water quality and ecosystem health.

23 Williams, J. R., & Cranfield, H. J. "Cockle Survey of Otago Harbour 2020." New Zealand Fisheries Assessment Report, no. 2021/02, Ministry for Primary Industries, 2021, https://fs.fish.govt.nz/Doc/24848/FAR-2021-02-Cockle-Survey-Otago-Harbour-2020-4081.pdf.ashx.

Environmental Health

Issues

- Penguin populations are under threat.
  - Kororā, our precious little blue penguin (and the world's smallest!) are abundant around Pukekura. However, their populations are under threat both in and around the harbour, and across the country. A multitude of stressors including habitat destruction, dog attacks, pest predation, fishing net entanglement and overfishing are causing substantial pressure on kororā populations. Kororā are now classified as At Risk – Declining.
  - Whilst residing on the open coast of the Otago Peninsula, hoihō are a huge drawcard to the peninsula and harbour. Northern hoihō (those endemic to the south-east coast of Aotearoa) are in serious decline, with a 65% population decline over 20 years due to lack of food, disease, and predation[24]. The population was estimated at 163 breeding pairs in 2023. About half of these pairs come through the Otago Peninsula Eco Restoration Alliance (OPERA) every year, with six breeding pairs, and nearly 100 individual penguins living on the land at OPERA. It is considered likely Northern hoihō are now Critically Endangered and could be gone from mainland Aotearoa by the end of the decade if conservation strategies fail.
- Invasive exotic marine species pose a constant threat to the health of the harbour.
  - The invasive laminarian kelp species Undaria was introduced into Te awa Ōtākou in the 1980s via ballast water from cargo ships and is now one of the most prevalent species in the harbour. It is one of New Zealand's most invasive pest species - it is currently classified as an unwanted organism under the Biodiversity Act 1993. Undaria displaces native seaweed and kelps, restricts the lifecycle of shellfish and threatens aquaculture. Undaria is an increasing biosecurity and biodiversity risk, yet there is interest by some in utilising it for commercial purposes, indicating a need for improved engagement and education.
  - Mediterranean fanworms have recently been discovered (in September 2024) at Port Chalmers by NIWA undertaking routine biosecurity surveying for Port Otago. They were removed, but it is yet to be confirmed if they have since spread further. These highly invasive fanworms, similarly to Undaria, outcompete indigenous species for habitat resources and impact aquaculture and fisheries[25].
- There is concern regarding the impacts of dredge spoil dumping on rimurimu forests along the coast north of Te awa Ōtākou towards Karitane, particularly tied to the Port Otago Next Generation A0 dredging site, off the coast of Pukekura. The dredge ground was selected for hosting similar sediments to that being deposited, and low benthic biodiversity. However, mana whenua and wider communities up the coast are concerned that the spoil disposal may be leading to increased turbidity and reduced light availability in the surrounding coastal waters. Changes in light availability and increasing marine heat waves are considered the greatest threats to rimurimu populations.

24 "Yellow-Eyed Penguin/Hoiho." Department of Conservation, https://www.doc.govt.nz/nature/native-animals/birds/birds-a-z/penguins/yellow-eyed-penguin-hoiho/

25 "Invasive Marine Pest Found in Otago, Calls for Boaties to Remain Vigilant." RNZ, 5 October 2023, https://www.rnz.co.nz/news/national/527160/invasive-marine-pest-found-in-otago-calls-for-boaties-to-remain-vigilant.

Figure 79 **View from Highcliff Road out across the Hereweka / Smiths Creek catchment. Credit: Stu Farrant**

Environmental Health

Issues

> **Sediments and sand deposits are pushing our Pāua into places they previously wouldn't be in**
>
> *Brendan Flack, mana whenua*

- As well as noting potential impacts on rimurimu, mana whenua are observing pāua populations shifting – it is important that any connections to spoil dumping on this taonga species are understood.
- The Matapo / Otago shag was only identified as a unique species 10 years ago and is celebrated by the community, yet it has no conservation management strategy. It does not even appear on the official New Zealand bird list (e.bird). As noted, there has been loss of significant roosting trees through coastal construction. The shags are also threatened by set net entanglement, with set netting still permitted in most parts of the harbour.
- Whilst there are no commercial fishing operations in the harbour today, recreational fishing is still permitted throughout. Bag limits are enforced, but it is considered that they are still too high. There are also reported issues with excessive spearfishing pressure on dive sites.
- Exotic pest plants are prevalent around the harbour, with species such as banana passionfruit posing a substantial risk to forest recovery. Pest plants are particularly problematic along the coastal road where ownership boundaries and access make management challenging, creating a prime pathway for these invaders to spread. Pines on the peninsula also pose wilding risk to regenerating forest, but it has been reported that these are hard to remove due to designations given to some pine trees in plans, often requiring a consent process to remove.
- Climate change is already affecting native biodiversity within the catchment. The variety of fish in the harbour has anecdotally increased due to warming water temperatures - "*(We are) catching things that shouldn't be there*". The presence of kingfish in the harbour and snapper off the Otago Peninsula was noted by several community members, with snapper previously only seen as far south as Whakatū / Nelson. Due to a lack of targeted monitoring, it is not possible to conclude the degree to which these climate-related impacts have caused or contributed to changes in biodiversity, across ecosystems.
- The community have raised concern that operational noise and emissions may deter sea life from the harbour, particularly marine mammals.

> **"I would love for the harbour to be full of fish"**

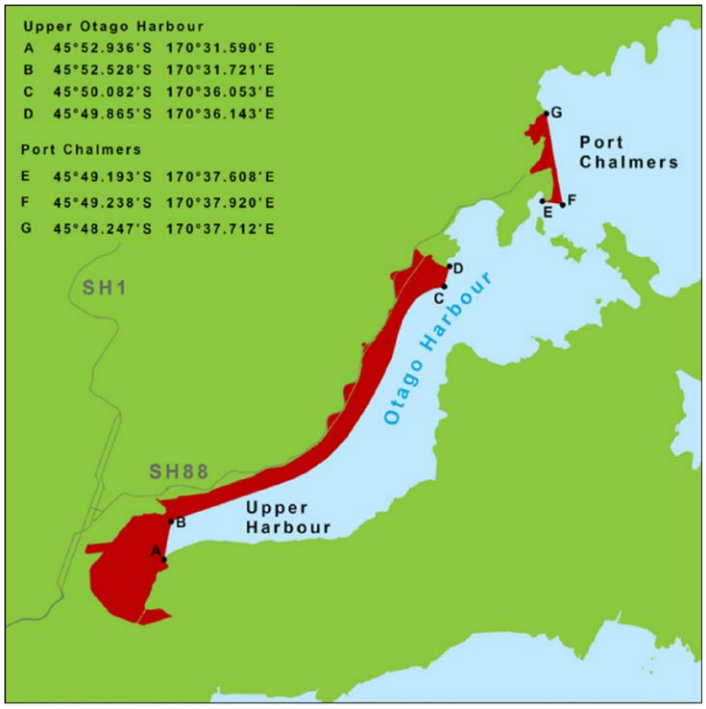


Figure 80 **Map 7: Upper Otago Harbour Set Net Ban. Source: https://www.mpi.govt.nz/dmsdocument/42237-Recreational-fishing-rules-South-East-South-Island**

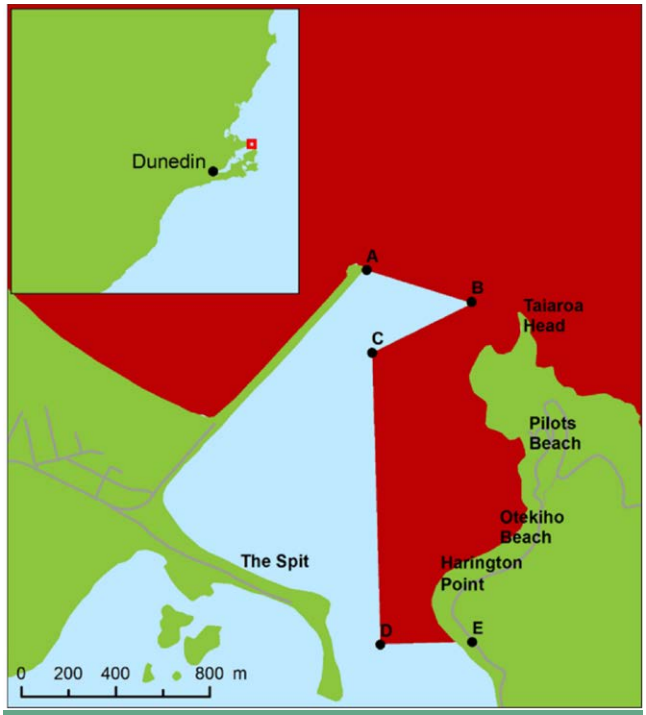


Figure 81 **Map 8: Otago Harbour Entrance Set Net Ban. Source: https://www.mpi.govt.nz/dmsdocument/42237-Recreational-fishing-rules-South-East-South-Island**

A selection of the diverse and significant wildlife that call Te Awa Ōtākou home

Figure 82 **NZ Fur Seal. Credit: DunedinNZ**

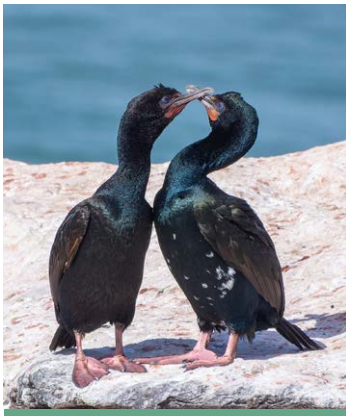


Figure 83 **Otago Shag at Shag Point. Credit: Oscar Thomas**

Figure 84 **Albatross. Credit: DunedinNZ**

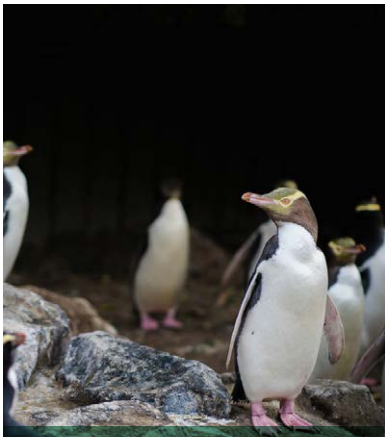


Figure 85 **Hoihō. Credit: DunedinNZ**

Figure 86 **Kororā. Credit: DunedinNZ**

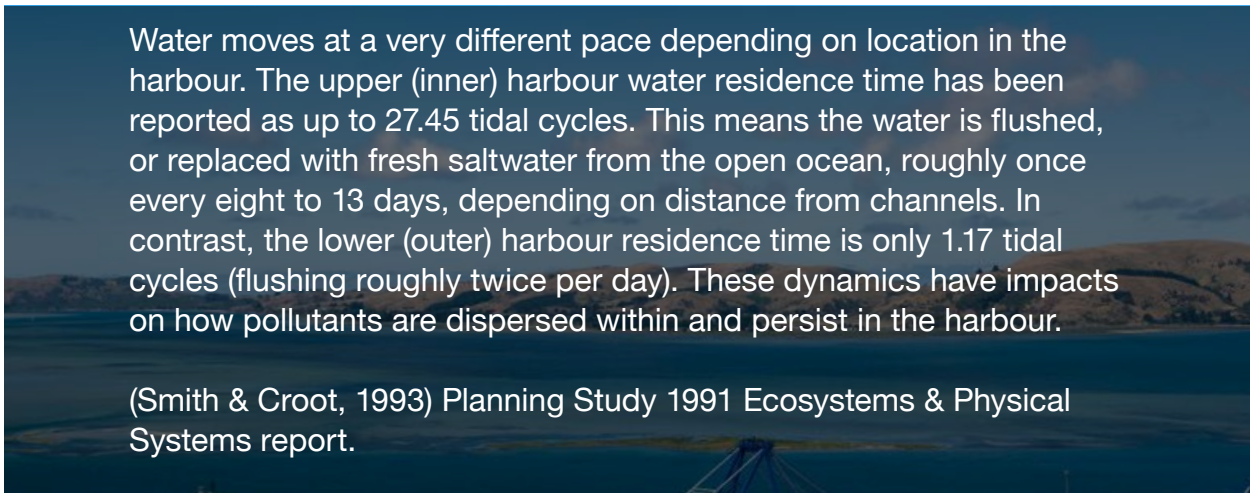
Figure 87 **Tuaki in Harbour. Credit: Aukaha**

Environmental Health

Issues

Pollution

Whilst some of the significant historical pollution issues have largely been addressed, ongoing contamination of the harbour from human activities persists from urban and rural land use practices. The effect of pollution on ecosystem health flows on to safety for people to harvest kai moana and swim or wade or dive. Historic pollution also remains an issue, with the legacy of contaminant build-up in harbour sediments posing a risk to water quality, ecology and potentially human health if the seabed is disturbed in some areas.



Water moves at a very different pace depending on location in the harbour. The upper (inner) harbour water residence time has been reported as up to 27.45 tidal cycles. This means the water is flushed, or replaced with fresh saltwater from the open ocean, roughly once every eight to 13 days, depending on distance from channels. In contrast, the lower (outer) harbour residence time is only 1.17 tidal cycles (flushing roughly twice per day). These dynamics have impacts on how pollutants are dispersed within and persist in the harbour.

(Smith & Croot, 1993) Planning Study 1991 Ecosystems & Physical Systems report.

- Wastewater contamination of the awa still persists. There are unreticulated septic systems along the harbour coast, with a high groundwater table meaning that groundwater flowing into and out of unlined septic tanks is leading to freshwater and coastal pollution. This issue has persisted for some time, and will worsen as the sea level rises. There are also understood to be numerous wastewater cross connections across the urban stormwater network between stormwater and wastewater systems due to illegal connections and the ageing, leaky 1880's pipe network. Wastewater thus continues to be present at some stormwater outfalls with increased discharge during rainfall. During large rain events, designed overflows from the wastewater networks into adjacent stormwater pipes or streams can result in large discharges. These wastewater issues are typically complex and challenging to fix and present an expensive, long-term challenge to resolve.
- As well as generally degrading the health of the awa, wastewater contamination poses risks to human health and the economy through shellfish harvest. Southern Clams shared that one full closure of the commercial tuaki fisheries across the harbour typically occurs per year, due to wastewater overflows breaching water quality limits defined to protect human health. These events trigger a 25-28 day stand down from harvesting due to fecal bacteria contamination risk, with testing recently also detecting norovirus for the first time. Flooding at Sawyers Bay was identified as being especially problematic for wastewater overflows for Southern Clams. However, recent interventions by Dunedin City Council have led to significant improvements in understanding and managing stormwater and wastewater overflows and overall water quality at the harvest sites, such as the addition of telemetered monitoring to the stormwater network.

Issues

- Extensive reticulated stormwater systems drain into the harbour, via numerous outfall structures and via Ōwheo. Further, untreated stormwater from South Dunedin is discharged to the harbour from the pumped outfall into Andersons Bay from the Portobello Road pump station. This stormwater is derived from a wide range of landcovers and land-use activities with a typical suite of urban contaminants including heavy metals (dissolved and particulate), hydrocarbons, nutrients, microplastics and sediments. Contaminants which are discharged into the inner harbour dissipate across shallow waters but tend to accumulate without effective flushing, whereas discharge into the deeper shipping channels tend to stay concentrated but are more effectively flushed towards the outer harbour. Both of these characteristics are likely to have implications for marine ecosystem health, but long-term data is lacking to paint this picture. The Portobello Road stormwater pump station is noted to discharge to the area of the harbour with the slowest flushing time. Point discharges and ships ballast discharge are also of concern.
- Many residents raised Litter pollution is a critical problem, with issue that there are inadequate and poorly designed rubbish disposal and recycling facilities along the coast of the awa. Rubbish is spread by the wind and birds, polluting the whenua and awa. Plastic rubbish frequently washes up on the coast (even onto the coastal pathway) in high swells. The Royal Albatross Centre runs cleanups at Takiharuru (Pilots Beach), and find that "*the next day it's all back*". In July 2024, a survey by the NZ Marine Studies Centre at Portobello found 481 litter items per 1,000 m^2 – mostly plastic[26]! It is likely that this issue is also tied to rubbish disposal practices within the Ōwheo catchment. Emerging international and local research highlights that estuaries, including shallow harbour environments such as Te awa Ōtākou, can act as 'plastic retention hotspots' . The wider urban catchment, and particularly the student area of North Dunedin, also contribute litter via the stormwater network and Ōwheo.

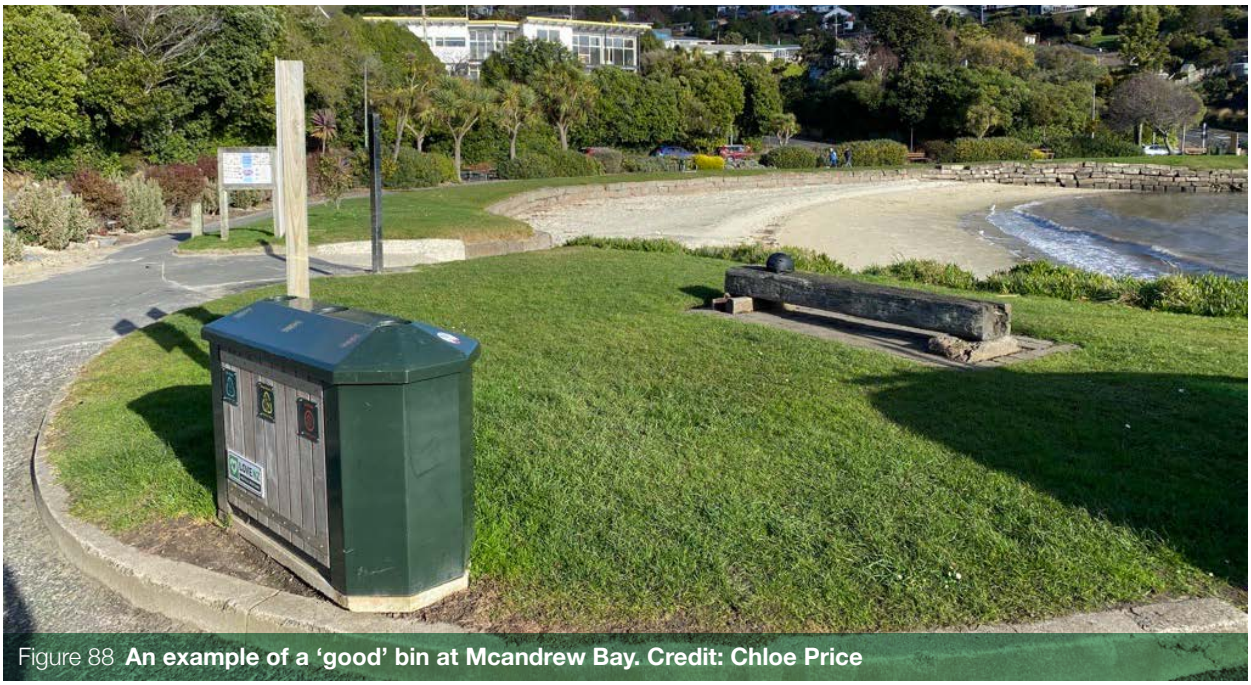


Figure 88 **An example of a 'good' bin at Mcandrew Bay. Credit: Chloe Price**

26 "Litter Survey: Otago Harbour - Harwood Site." Litter Intelligence, 2023, https://litterintelligence.org/data/survey?id=3151

Environmental Health

Issues

- Micro plastic pollution which is derived from the slow breakdown of plastic litter and other anthropogenic sources is also increasingly identified as a significant problem. Recent research by the University of Otago identified that fish collected from near urban areas within the Otago Harbour had up to 8.5x more microplastics in their gut content than those on the outer coast[27].
- Contaminated sediment built up in the inner harbour basin, at Sawyers Bay and in Andersons Bay risks marine and human health if resuspended. Historic contamination was from the tar well, gasworks, tannery and wool processing plants, added to by more recent contamination from heavy metal runoff and other contaminants found in urban stormwater runoff. There is also contaminated fill at Andersons Bay, which could affect groundwater quality and poses a long-term management challenge. The long residence times in upper harbour combined with contaminant transport from Ōwheo are likely causing the ongoing worsening of this issue, although long-term monitoring is needed to determine trends.
- Light pollution from the port and new boardwalk on the north side of the harbour has been raised as risk to wildlife. Light pollution causes impacts upon cultural values related to the night sky, as well as community enjoyment and amenity.
- Pesticide and herbicide runoff from agricultural landscapes surrounding the harbour, as well as emerging contaminants such as microplastics in stormwater are likely affecting water quality in the harbour. However, the scale and ecological effects of this issue in the local context are not well understood.
- There are many unfenced waterways, unprotected from livestock on the Portobello peninsula, which holds an Area of Cultural Significance character designation. This needs to be addressed to prevent both harm to freshwater ecosystems, and contamination of the water from stock effluent. Ongoing industrial discharge risks are considered a likely issue by the community and the long-term impacts on water quality and ecosystem health from such events are not well understood.
- Discharges to air from the Port were raised as a key concern for the Port Chalmers community, particularly with regards to cruise ship exhaust smoke whilst ships are docked in the Port. Addressing cruise ship emissions is currently challenging as use of scrubbers to remove pollutants can impact water quality, generators rely on fossil fuels, and providing mains grid electricity for docked ships is not yet feasible due to under capacity power infrastructure. However, Port Otago is investigating solutions to solve this electrification challenge.
- Noise pollution is an ongoing issue due to the close proximity of residential areas to port operations. A range of community members highlighted increasing levels of noise pollution over time related to cruise ships idling whilst docked at port, and other sources of noise (particularly relating to cargo ships) as significantly impacting their quality of life. This is acknowledged by the Port is working to address issues through various mechanisms[28] to manage and mitigate noise issues, based on engagement with community via a Port Noise Liaison Committee.

27 Munsterman, F., Allan, B. J. M., & Johnson, S. L. (2024). The availability and ingestion of microplastics by an intertidal fish is dependent on urban proximity. New Zealand Journal of Marine and Freshwater Research, 1–14. https://doi.org/10.1080/00288330.2024.2365272
28 https://www.portotago.co.nz/about/port-noise/

Issues

A recent study led by Fletcher Munsterman at the University of Otago has found that **fish collected closer to urban areas within Otago Harbour (Ōtepoti and Port Chalmers) consumed many more microplastics than those along the coast of a rural area outside the harbour (Pūrākanui)**. The fish from the upper harbour near Ōtepoti had **8.5x more microplastics** than outside the harbour! This can affect fish survival, as well as impacting the marine food chain. The authors quote "*the concentration of microplastics in sediments and ingested by the triplefins here in Otago are similar to the microplastic levels in the highly polluted Venetian Lagoon*"[29].

Another study led by Melissa Bowen at the University of Auckland found that **60-90% of floating material** released and tracked in the Waitematā estuary **stayed there**, and did not reach the open sea[30].

Fragmented Understanding and Response

Whilst monitoring is occurring in the harbour, it is currently ad hoc, disjointed, and spatially restricted. Results are not shared or saved in any kind of central repository, nor are they communicated in a readily accessible manner to the public. Existing data are inadequate and incomplete, so they are unable to provide evidence of state and trends in any metric, across ecosystems and inform management needs. There have been many discrete and unrelated studies but there is currently no holistic vision for knowledge building, recording, or dissemination (or for the harbour, in general).

- There is a lack of wider understanding by regulatory and research institutions of mana whenua cultural perspectives, values and knowledge, particularly regarding holistic management practices and cultural health of environments.
- The harbour lacks a coherent, holistic, and integrated monitoring program for ecosystem health. The only State of Environment monitoring sites are two freshwater sites in the Ōwheo catchment.
- Most existing monitoring is currently tied to resource consenting for DCC's stormwater discharges, Port Otago dredging and port operations, Ravensdown stormwater discharges, and Southern Clams harvest operations. Port Otago makes monitoring, and study results available on their website, which is highly commended, although it is unknown to what degree the public access and can interpret this technical information.
- Existing monitoring of stormwater discharges undertaken by DCC as part of their stormwater discharge consent are not considered to be suitable or practicable to provide accurate understanding of the issues due to the complexity with capturing the highly variable concentrations of contaminants, conflict between agreed monitoring points with tidal influences and ready access to monitoring sites.

29 Munsterman, F., Allan, B. J. M., & Johnson, S. L. (2024). The availability and ingestion of microplastics by an intertidal fish is dependent on urban proximity. New Zealand Journal of Marine and Freshwater Research, 1–14. https://doi.org/10.1080/00288330.2024.2365272

30 NZ Estuaries May Harbour More Plastic Than First Estimated. The Listener, New Zealand Herald, 9 Jul, 2024, https://www.nzherald.co.nz/the-listener/new-zealand/nz-estuaries-may-harbour-more-plastic-than-first-estimated/.

Environmental Health

Issues

It is noted that meaningful monitoring of stormwater outfalls is particularly challenging, with a better understanding typically derived through modelling of known land uses within catchments and a clear program of continuous improvement with stormwater management. Monitoring for illicit wastewater discharges in the stormwater network is however an effective tool in identifying where wastewater is discharging to the harbour due to cross connections.

- The University of Otago has studied the harbour for decades, including studies of hydrology, geophysics, biodiversity, and water quality. These studies have been generally single-focus and short-term, lacking comprehensive projects dedicated to holistic studies of harbour ecosystem health over the long term, a clear reflection of financial incentives. An exhaustive review of the university's literature and proposed research on the harbour has not been undertaken here (or anywhere).
- Mobilising community support and awareness in conservation and restoration efforts is challenging, with an ageing volunteer force posing a risk to sustaining the gains achieved through conservation and restoration work to date, as well as to the resourcing of ongoing work. There is a clear need to improve (and incentivise) rangatahi participation in this work.
- Whilst contestable funding is available from a range of sources including ORC and DCC as well as philanthropic and other community funding, barriers due to inadequate or inaccessible sources of funding persist. Securing operational funding to cover permanent staff to administer conservation and restoration projects is particularly challenging. This operational funding is desperately needed to improve resourcing and project management within and across projects.

A review of existing marine ecological data was undertaken by ORC in 2023, which found that 25 different ecosystem characteristics have been documented to date (post-1990) either in distinct studies or through monitoring initiatives[31]. This includes:

- Water quality monitoring for stormwater discharges
- General reporting on marine biology and ecology for the original 1991 Harbour Study
- Seabirds and marine mammal observations
- Studies of benthic communities and algal cover
- Marine fisheries (fish and shellfish) assessments
- State of Environment freshwater monitoring
- Seagrass and saltmarsh cover
- Tuaki surveys
- Red billed seagull monitoring
- Wading bird biannual counts
- Rocky shore community observations
- Turbidity studies relating to dredging activities

Figure 89 **University Marine Sciences Vessel Tūhura. Credit: Abby Smith, University of Otago.**

31 Johnston, O., Berthelsen, A., Crossett, D., & Newcombe, E. "Otago Harbour: Review of Existing Marine Ecological Data." Cawthron Institute, Envirolink Report 2239-ORC001, Contract CAWX2109, Prepared for Otago Regional Council, January 2023.

Freshwater Health Monitoring

Freshwater health is currently monitored by Otago Regional Council on the Leith at Dundas Street Bridge, and Lindsay's Creek at North Road Bridge. Both sites are currently in the worst 25% of all SOE sites monitored nationwide for *E.coli*, which is continuing to worsen.

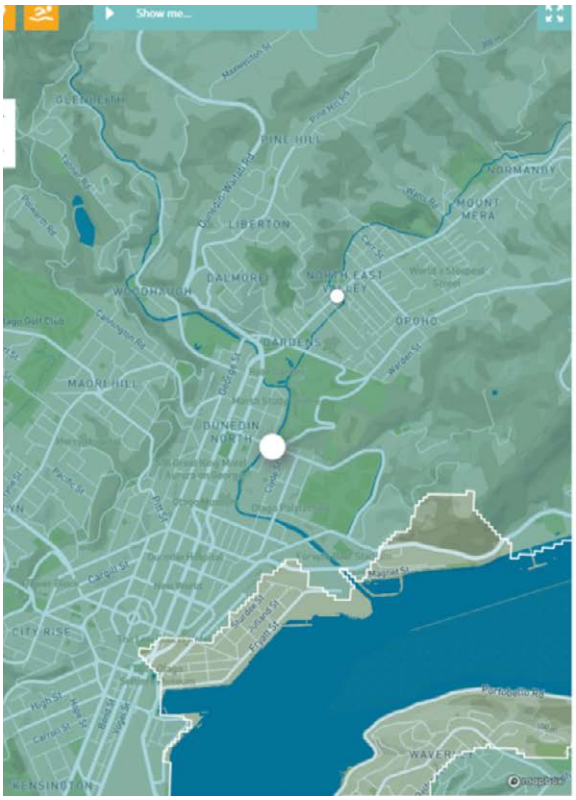
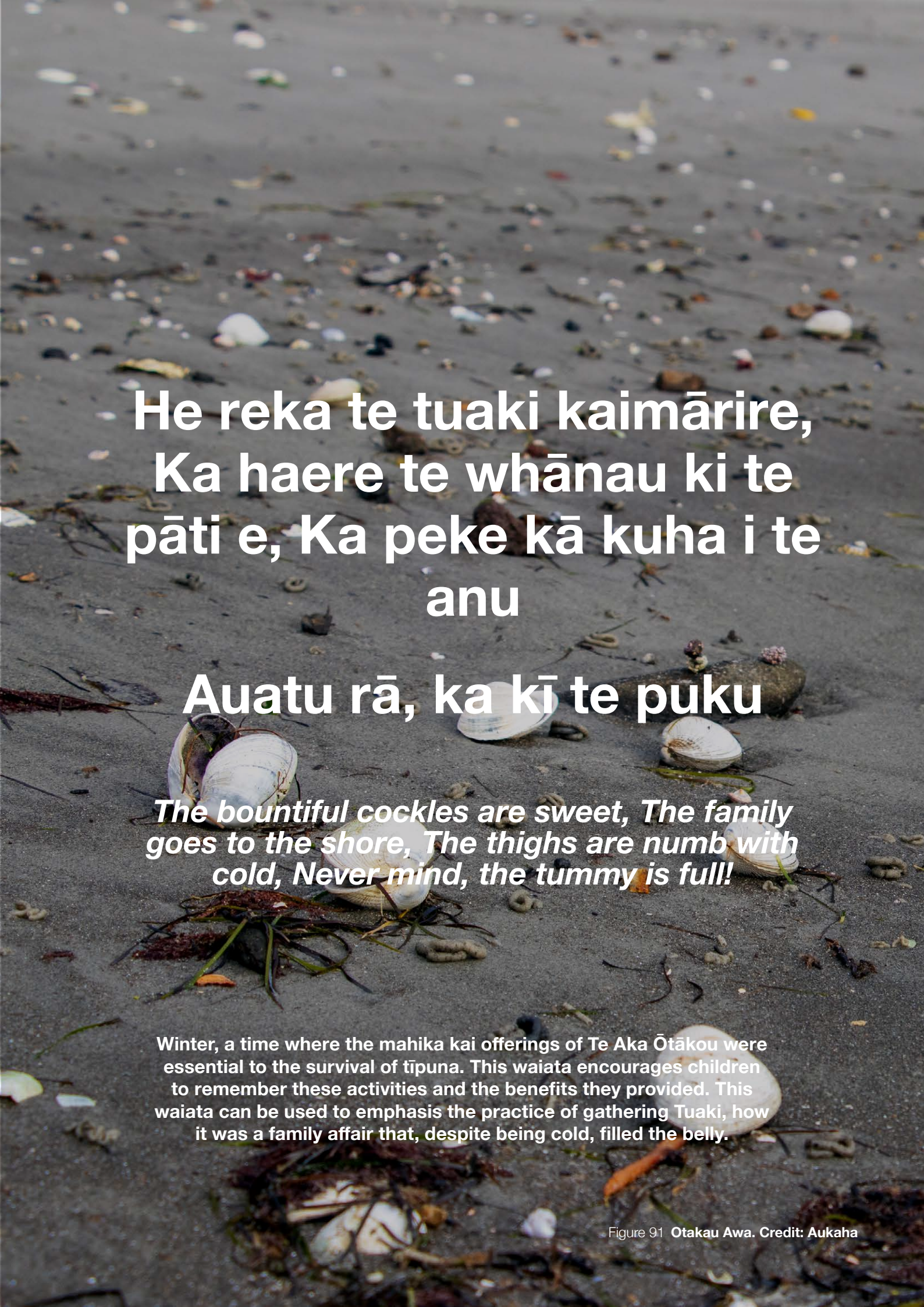


Figure 90 **Screenshot from LAWA Website. Credit: "Leith at Dundas Street Bridge – River Quality." LAWA - Land, Air, Water Aotearoa, https://www.lawa.org.nz/explore-data/otago-region/river-quality/dunedin-coast-fmu/leith-at-dundas-street-bridge.**



He reka te tuaki kaimārire, Ka haere te whānau ki te pāti e, Ka peke kā kuha i te anu

Auatu rā, ka kī te puku

The bountiful cockles are sweet, The family goes to the shore, The thighs are numb with cold, Never mind, the tummy is full!

Winter, a time where the mahika kai offerings of Te Aka Ōtākou were essential to the survival of tīpuna. This waiata encourages children to remember these activities and the benefits they provided. This waiata can be used to emphasis the practice of gathering Tuaki, how it was a family affair that, despite being cold, filled the belly.

Figure 91 **Otakau Awa. Credit: Aukaha**

3.5.4 **Tourism**

> **"Wildlife is what brings people"**
>
> *Otago Peninsula Community Board*

The harbour and its surrounding landscapes have a long history as a tourism destination, drawing upon its unique natural beauty, rare ecology, and deep historic and cultural significance. These values have attracted both domestic and international visitors for many years and provided hosts and tourism operators with globally unique narratives and experiences.

It is notable that the environment which supports tourism operators' activities is also impacted by those very activities. Many stakeholders highlighted the untapped potential for further tourism around the harbour. However, achieving this potential is complex and requires a coordinated, balanced approach.

Tourism development around Otago Harbour is supported by a range of existing projects, frameworks, and collaborative efforts championed by key stakeholders, including the Otago Regional Council (ORC), Dunedin City Council (DCC), DunedinHOST, and other community-driven organisations. The Destination Ōtepoti strategy[32], a Destination Management Plan for Dunedin released in 2023, provides a strong foundation for tourism. It aims to grow the value of the visitor economy while prioritising the protection of the environment, taoka, and communities. This strategy identifies pathways (Actions, Partners, Outcomes) across four priorities, with a detailed implementation plan for the next three years and beyond.

Additionally, the 2018 Tourism Growth Framework[33] developed by DunedinHOST provides a strategic vision for tourism in the region, and ORC actively supports cruise ship arrivals with additional public bus services, enhancing visitor connectivity. On-the-ground initiatives such as the Te Aka Ōtākou cycleway, ferry services, and community-driven conservation projects further integrate tourism opportunities with environmental sustainability and local values.

32 https://www.dunedinnz.com/__data/assets/pdf_file/0004/997825/destination-otepoti-october-2023.pdf
33 https://dunedinhost.co.nz/wp-content/uploads/2018/12/Tourism-Growth-Framework-Dunedin-Host.pdf

Issues

Implementation of the Tourism Strategy

The recently released Destination Ōtepoti strategy (2023) provides an overarching framework for tourism in Dunedin, outlining a clear vision, actions, and an implementation plan for the next three years and beyond. However, stakeholders, including DunedinHOST, have highlighted the need for a stronger implementation focus specific to Otago Harbour. Currently, tourism operators, businesses, and governing bodies often work independently, without a shared vision or coordinated approach. This lack of cohesion can lead to missed opportunities for tourism development, preventing the harbour from fully realising its potential as a top destination.

- While there have been efforts to establish a cohesive strategy in the past, these have encountered challenges, resulting in some fragmentation of marketing efforts and inconsistent visitor experiences.
- The lack of stronger connections among stakeholders has made it difficult to fully leverage Dunedin's unique natural and cultural assets, such as the harbour, in a way that enhances its overall appeal to visitors.
- Without a unified harbour focus developed in collaboration with mana whenua and including all stakeholders - from small operators to larger businesses and governing bodies - there is a risk of uncoordinated and inauthentic development of key attractions, infrastructure, and services. This can make the harbour less coherent and appealing as a tourist destination. A more collaborative approach could enhance the growth potential and create new opportunities for the region.

The **2018 Tourism Growth Framework**[34] developed by DunedinHOST offers a strategic vision for tourism in the region, setting out ambitious goals and identifying key opportunities. However, for this framework to be effectively realised, it requires a practical, detailed approach to implementation. Building upon the existing framework and the Destination Management Plan, it would be beneficial to identify clear actions, allocate responsibilities, and establish specific timeframes and funding sources. Designating champions or lead stakeholders to oversee various components would enhance coordination and accountability, ensuring that all involved parties work toward a shared, cohesive vision.

By strengthening the existing framework with actionable steps and resource allocations, Dunedin can better leverage the region's unique tourism potential, fostering sustainable growth that aligns with the area's environmental and cultural values. This approach will enhance the capacity of the framework to drive practical outcomes without the need for an entirely separate tourism strategy.

34 https://dunedinhost.co.nz/wp-content/uploads/2018/12/Tourism-Growth-Framework-Dunedin-Host.pdf

Issues

Seasonality and Climate

There is a notable disparity between peak and off-peak tourism offerings, with many businesses and attractions operating seasonally, limiting year-round tourism potential and creating economic instability for operators dependent on seasonal income.

- Dunedin's winter climate can be challenging, especially when compared to other national tourism destinations. However, this climate also plays a crucial role in shaping the unique habitats and attracting the marine species that make the area so special.
- During consultations, many highlighted the harbour's climate as a significant barrier to improving usability, public access, and developing destinations, particularly in the upper harbour near the city. The wind effects, intensified by the harbour's steep landforms, are specifically noted as a limiting factor.
- The seasonality of activities in Te awa Ōtākou creates significant challenges for tourism operators. During peak season, the area experiences a surge in visitor numbers, which supports local businesses and attractions. However, outside these peak periods, there is a sharp decline in visitors, leading to economic instability for operators who rely heavily on seasonal income. This disparity limits the harbour's potential to attract year-round tourism, as many businesses and attractions are unable to sustain operations during off-peak times.
- The arrival of cruise ship passengers presents both opportunities and challenges for Otago Harbour. While the potential for these visitors to significantly boost the local economy is substantial, the large influx of passengers, especially during peak seasons, can place strain on the existing infrastructure and pose significant environmental issues for the harbour eco system.
- From Port Chalmers, cruise ship passengers often find themselves somewhat disconnected from many of the harbour's key destinations. They largely depend on organised coach trips or excursions to visit local attractions, which can limit their experience and engagement with the area.
- The infrastructure around the harbour, including public facilities, charter boats, ferries, and transport systems, is not always equipped to handle the sudden increase in footfall that accompanies the arrival of a cruise ship. This can lead to overcrowding and pressure on local services, making it difficult to provide the high-quality experience that visitors expect. There are social, environmental, and cultural issues with large scale commercial activities of global conglomerate cruise ship companies operating in and polluting the harbour.

Issues

Market Challenges for Operators

Turbulent recent economic conditions and the global pandemic have all had their part to play, with small and start-up tourism operators face significant financial constraints, which limit their ability to expand or invest in improving their services.

- This may include limited access to the necessary capital to invest in their business, high operational costs, seasonal revenue fluctuations, and marketing and visibility challenges without the support of a wider strategic approach.
- The tourism sector is still recovering from the impacts of the COVID-19 pandemic. Visitor numbers remain below pre-pandemic levels, and the industry faces ongoing challenges in restoring its former vibrancy[35].

Access & Connectivity

Public transport options to and from key tourism sites are limited, reducing accessibility for visitors without private vehicles. This lack of connectivity hampers the overall visitor experience and limits the harbour's appeal as a tourist destination.

- Tourism destinations are somewhat dispersed, lacking integrated transport options, which can make it challenging for visitors to fully explore the harbour's offerings. ORC already support cruise ship arrivals by providing additional public bus services, offering visitors a valuable means of connecting to key sites, however expansion of such transport options could further enhance visitor access to the area's diverse attractions beyond organised coach tours or hosted trips.
- Many existing and potential tourism assets—such as natural landscapes, culturally significant sites, and heritage areas—are underutilised on both the mainland and peninsula sides of the harbour. The lack of accessible connections, such as walking, cycling, boat, or public transport links between these sites, limits the visitor experience and prevents the full potential of these assets from being realised.
- The tourism loop, heavily reliant on ferry services, is vulnerable due to the ferry being in private ownership. The lack of integration with the city's public transport system and the inability to use transport cards make this an unreliable option for tourists.
- Quarantine Island provides a rich experience for a wide range of visitors including school groups from both new Zealand abroad and a unique venue for weddings, yoga and art retreats amongst others. The Trust[36] keep the accommodation very reasonable but have no boat and the commercial ferry fee is equivalent to accommodation.

35 "Six of the Best Ways to Immerse Yourself in Nature Around Dunedin." BBC Travel, 30 July 2023, https://www.bbc.com/travel/article/20230730-six-of-the-best-ways-to-immerse-yourself-in-nature-around-dunedin.

Te awa Ōtākou - Te pito o te Ao

The harbour – It is the centre of the world

Figure 92 **Otago Peninsula and Te Awa Ōtākou. Credit: Aukaha**

Issues

Authenticity vs. Commercialisation

The Destination Ōtepoti strategy and community-led initiatives like the Predator Free Dunedin project contribute to preserving the harbour's ecological integrity, ensuring that tourism remains aligned with environmental sustainability. This will always be a delicate balance, and should remain a priority for any future projects and policy.

- Large influxes of visitors and increased freedom camping impact on smaller harbour communities with no or limited infrastructure, and create resentment at a sense of being 'invaded'. There can be very little economic benefit coming into those communities despite bearing the brunt of impacts. A prime example are the communities within the Ōtākou Native Reserve, which is also home to several significant wildlife tourism attractions.
- Tourism activities, particularly those involving visits to sensitive environments like sandspits, intertidal zones, and wāhi tūpuna, have the potential to cause environmental and cultural degradation.
- Increased foot traffic and recreational activities in these areas can disrupt habitats, threaten local biodiversity, and erode cultural connection.
- Many features are remote, which also lends to their high ecological value, such as beach areas, nature reserves, or historically significant sites, which may require either enhanced access by foot, boat, or public transport options to become more accessible to a larger range of visitors. The promotion of these assets is also often fragmented or at times non-existent, and as a result, many sites are not known to visitors.

Underutilisation of Tourism Assets

Despite the rich array of natural landscapes, culturally significant sites, and heritage areas around the harbour, many of these assets remain underdeveloped or poorly integrated into the broader tourism offering. This underutilisation limits the harbour's potential as a tourist destination and reduces the economic and cultural benefits that could be realised through more strategic development. The Tourism Growth Framework and ongoing discussions about infrastructure improvements are steps toward better utilising these assets.

- Many of the harbour's natural and cultural assets lack the necessary infrastructure to support a steady flow of visitors. Key sites may be missing basic amenities such as restrooms, seating, or signage and interpretation materials, which can discourage extended visits or leave visitors unaware of the historical or cultural significance of these sites.
- Some of the harbour and its surrounding landscapes have valuable and special assets that are difficult to access, either due to topography or insufficient transport connectivity. The Aramoana Mole, a popular tourist spot, lacks adequate facilities and signage, reducing the overall visitor experience. Its potential as a key attraction, particularly at sunrise is underutilised.
- The closure of the Portobello Aquarium has had a significant impact on local tourism. This loss has diminished Portobello's appeal as a key attraction on the harbour, affecting visitor numbers and local businesses that once thrived on aquarium-related traffic.

3.5.5 Arts and Culture

Te awa Ōtākou is a constant inspiration for creative hearts and minds in Ōtepoti - Dunedin. To mana whenua, the harbour is regarded as the centre of the world and is always at the heart of creative expression. Early written records contain the memories and hopes of Ōtākou tūpuna regarding their harbour home as a central focus. In the early 1960's renowned carvers Paratene Machitt and Cliff Whiting created new carvings for the Ōtākou School, which reflected relationships mana whenua held with the harbour, including depictions of tohorā, shipping, as well as historical events such as the marriages of Paparū and Nikuru to Edward Weller. In recent years layers of harbour history and connection have become embedded in the landscape through contemporary cultural design and architectural interventions.

Acclaimed artists Colin MaCahon, Ralph Hotere, Frances Hodgkins and Robin White and countless others have recreated the many faces of Te awa Ōtākou in their work. The harbour is the muse of poets, authors, artists and musicians and there is a fondness from audiences far and wide.

An upcoming Aukaha/DCC initiative to install a series of Tohu Whenua around the harbour which tell the stories of mana whenua will be a welcome addition and will be a positive visual and educational addition to the city's public art collection.

It is acknowledged that consultation with the creative community has not yet happened for this kaupapa, although this community is integral to the harbour and has in many ways been its voice through the years. More so, a thriving arts and culture scene is part of the fabric of a thriving city – none more than Ōtepoti. The identification of arts and culture issues is therefore considered a key knowledge gap to be addressed moving forward. However, several issues were raised through the initial limited consultation, which are shared below.

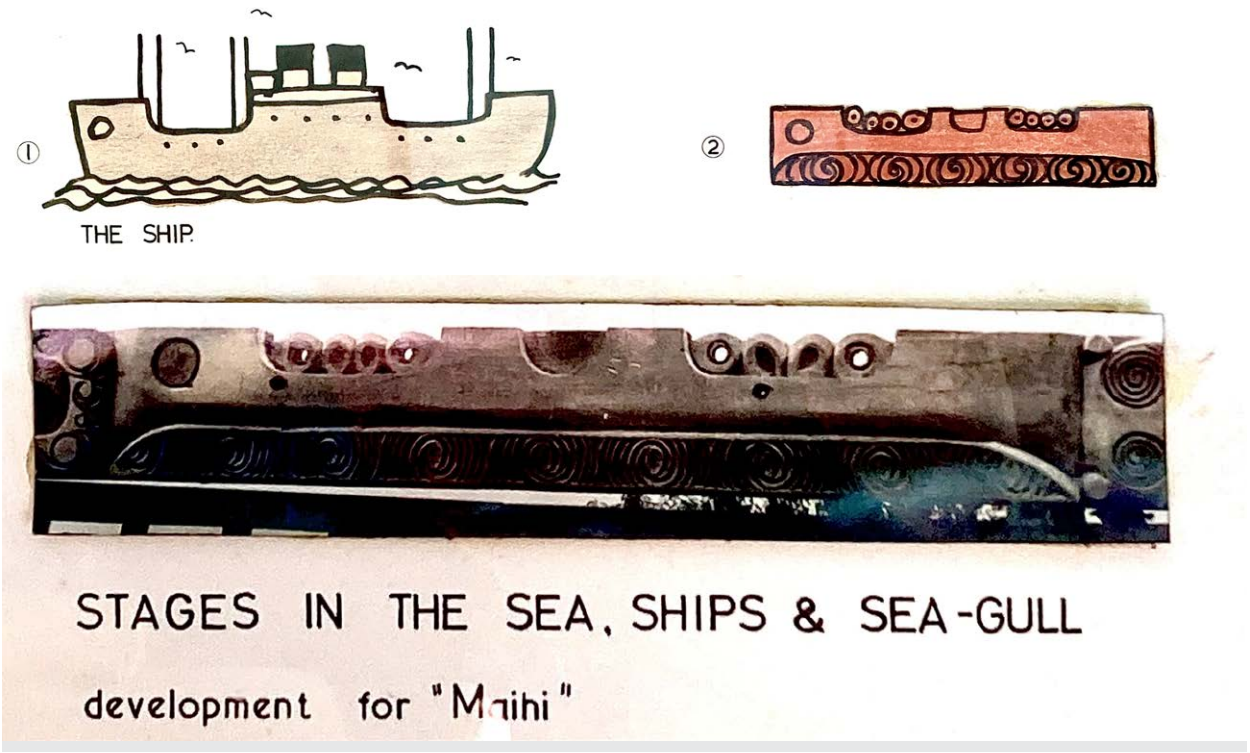


Figure 93 **Carving evolutions. Credit: Te Rūnaka o Ōtākou**

Arts and Culture

Issues

- Although the harbour is the subject and inspiration of much art and culture it is rarely the location. There is a need for more art, sculpture and cultural design to celebrate the harbour and to elevate the cultural value of the landscape to visitors and locals alike.
- There is a lack of mana whenua representation (including arts) around harbour, which has stemmed from a legacy of colonial practices that have marginalised mana whenua and privileged the 'Scottish' heritage of the city, resulting in a diminished visible cultural identity and connection to place for mana whenua.
- Limited public funding for arts and culture poses a barrier to improving the visibility of both around the harbour.

3.5.6 Infrastructure Resilience

Otago Harbour benefits from a range of strategies, policies, and projects designed to support its infrastructure, enhance its resilience, and protect its unique environmental and cultural values. Key players such as the ORC, DCC, and Port Otago have implemented numerous initiatives that collectively aim to manage and improve the harbour's infrastructure. The DCC 2021-2031 Long Term Plan Infrastructure Strategy outlines a long-term vision for managing critical assets such as drinking water, wastewater, stormwater, and transport infrastructure, with approximately $1 billion allocated for these systems over a ten-year period. The 2022 Flood Protection Management Bylaw safeguards critical flood protection and drainage infrastructure to minimise risks and ensure public safety. Additionally, the recently released DCC Otago Harbour Reserves Management Plan 2024 provides a framework for managing and enhancing council-owned reserves around the harbour, ensuring their sustainable use and enjoyment.

Despite these efforts, stakeholder feedback and community consultations have highlighted specific challenges in translating some aspects of the policies and strategies into practical outcomes. These include inconsistent maintenance of key infrastructure such as wharves and jetties, fragmented coordination between different governing bodies and private owners, and a lack of clarity around who is responsible for managing and upgrading certain assets. These issues can result in gaps in service delivery, uneven infrastructure standards, and missed opportunities for effective collaboration.

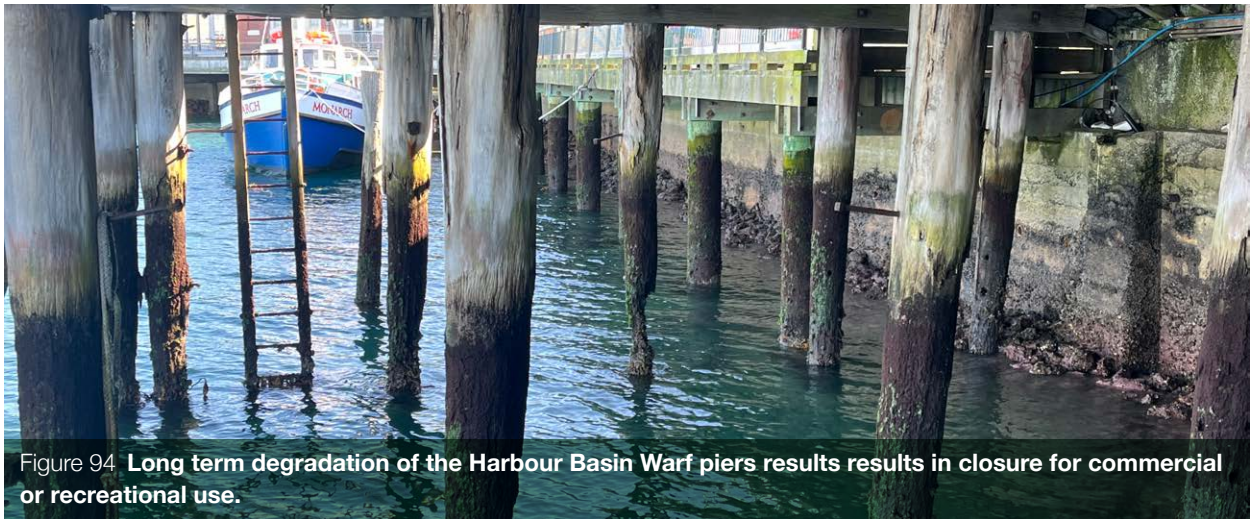


Figure 94 **Long term degradation of the Harbour Basin Warf piers results results in closure for commercial or recreational use.**

Issues

Access to and protection of infrastructure

Access to and protection of the harbour and its surroundings is supported by key infrastructure including:

- **Access** (Roading, Cycleways and Walkways, Jetties and Wharves, Moorings, Ferry Terminals, Boat Ramps, recreational areas, and Parking Areas)
- **Protection and Erosion Control** (Sea Walls, Groynes, Breakwaters, Aramoana Sandspit, natural landscape features)
- **Marine and Port Operations** (Dredging Equipment and Channels, Rail Infrastructure, Berth Facilities)
- **Water and Environmental Management** (Stormwater Systems, Wastewater Systems, ecosystem restoration)
- **Streamworks** (flood protection structures, retaining, weirs and culverts/bridges)

This infrastructure enables residents, visitors, and businesses to engage with the harbour. However, fragmented ownership and unclear allocation of responsibilities, coupled with the harsh coastal environment and changing climate, create challenges in ensuring consistent upkeep and functionality. While strategies such as the Otago Harbour Reserves Management Plan aim to guide infrastructure improvements, more robust implementation and coordination are needed to address these challenges effectively.

These systems are vital to the daily lives of residents, visitors, and the businesses that depend on them, as well as the services they provide. A key challenge lies in their management, as fragmented ownership and unclear allocation of responsibility can make coordination difficult. Many of the systems are also vulnerable to the harsh coastal environment, rising sea levels, changing climate and ongoing maintenance needs (including persistent historical under-investment). Inconsistent upkeep across different areas of the harbour can lead to operational challenges and affect both the visual appeal and the overall functionality of the space. A clear example of this is the highly degraded condition of large parts of the Harbour Basin wharf due to a lack of ongoing maintenance and renewal.

Dilapidated Wharves and Inadequate Maintenance

The deteriorating condition of many wharves around the harbour was highlighted as a major concern, affecting both commercial operations and recreational activities. Wharves around the harbour are critical for commercial and recreational use, yet many are in poor condition due to inconsistent and sometimes inadequate maintenance, impacting their usability and safety.

- The involvement of multiple owners and the need for compliance improvements provide opportunities to establish collaborative maintenance agreements and enhance infrastructure standards.
- Leveraging existing initiatives under the DCC Infrastructure Strategy could help address these gaps systematically.
- Health and safety concerns around some privately owned structures limit recreational and research access, further highlighting the need for collaborative solutions.

Infrastructure Resilience

Issues

Complexity of Infrastructure Management

Managing the harbour's infrastructure involves multiple entities, each with its own obligations and standards for maintenance. While coastal permits and resource consents clearly outline responsibilities, there is room to strengthen compliance and ensure safety standards are consistently met across all assets.

- While permits and resource consents provide a regulatory framework, stakeholders have highlighted opportunities to improve compliance and coordination.
- Strengthening governance mechanisms and fostering collaboration between ORC, DCC, Port Otago, and private owners could ensure a more unified and efficient approach to infrastructure management.

Lack of Moorings and Supporting Facilities

A lack of moorings and supporting facilities was frequently mentioned by stakeholders as an issue.

- Managing the harbour's infrastructure involves various entities, each with different obligations and standards.
- While permits and resource consents provide a regulatory framework, stakeholders have highlighted opportunities to improve compliance and coordination.
- Strengthening governance mechanisms and fostering collaboration between ORC, DCC, Port Otago, and private owners could ensure a more unified and efficient approach to infrastructure management.

Vulnerability to Sea-Level Rise and Storm Surges

Concern was raised for the harbour infrastructure vulnerability to risks from climate change, particularly rising sea levels and more frequent storm surges.

- Many structures in the harbour, including wharves and seawalls, were not designed to handle the effects of rising sea levels, and their aging state exacerbates their vulnerability.
- Even newer infrastructure, such as Te Aka Ōtākou, is showing signs of vulnerability to tidal erosion in areas exposed to wind and storm surges.
- As sea levels continue to rise and storm surges become more frequent, the risk of flooding, erosion, and damage to both public and private assets will increase, threatening long-term viability.

Aging Rail and Road Infrastructure

The aging and vulnerable rail infrastructure that services the port is another area of concern for the Port and its dependants. While the railway serves as a vital link for transporting goods to and from the port, it may struggle to meet future demands, potentially increasing reliance on lorries - a method already heavily used for a portion of current freight movements.

Issues

Beyond the local challenge, this railway is also the main south line connecting Dunedin to the broader region and Christchurch and so has major economic implications. This concern relates to State highway 88 as it is the only large vehicle route and so there is no resilience in the network to deal with failure of these systems linking the Port and Dunedin to the broader South Island.

- This increased demand would place additional pressure on the narrow and winding roads through West Harbour communities, which are already prone to landslides.
- Existing roads will require ongoing maintenance and reinforcement to prevent closures, highlighting the need for long-term planning and investment in key infrastructure upgrades to support reliable and safe transport routes.

Aging Stormwater/Wastewater Systems and Unreticulated Septic Systems

The following issues were raised by many, highlighting the need for comprehensive upgrades to ensure the harbour's infrastructure is resilient and environmentally sound.

- Stormwater and wastewater systems servicing the harbour are aging, and some areas still rely on unreticulated septic systems, posing risks to water quality. The discharge of untreated stormwater, particularly from South Dunedin, has been identified as a long-term environmental concern.
- Initiatives under the DCC Infrastructure Strategy already address the need for upgrades to these systems, but greater focus on implementation and funding is required to mitigate environmental impacts effectively.
- The historical reclamation of streams such as Toitu and modification of Ōwheo through engineered banks have significantly reduced the ecological and cultural value of these waterways.

Balancing Competing Interests

The harbour's infrastructure serves a diverse range of users, including commercial operators, recreational boaters, tourists, and residents.

- Conflicting priorities among these groups can create challenges, particularly around mooring sites and shared facilities.
- The development of the Harbour Arterial Project exemplifies a proactive approach to balancing these interests by improving connectivity and reducing traffic congestion.
- Further stakeholder engagement and careful planning are necessary to navigate competing demands effectively.

Balancing the competing interests in the use of the harbour's infrastructure remains a challenge. The harbour serves a diverse range of users, from commercial operators and recreational boaters to tourists and local residents. Each group has different priorities, which often converge on key locations and mooring sites. Navigating these competing interests requires careful planning and consultation across stakeholders.

3.5.7 Climate Resilience

With a rapidly changing global climate, Te awa Ōtākou is very likely to see changes over the coming years across its seasons and ecosystems. The Otago climate is predicted to become warmer, with fewer frost days, and wetter in winter and spring[37]. As is the case for much of Aotearoa, extreme weather events are going to become more frequent and impactful, and sea levels are going to rise. These changes will bring with them a range of impacts on people, ecosystems, and place – impacts which are deeply interconnected and intersectional. Key issues relating to climate change impacts, including those specific to coastal resilience are explored below. It is emphasised that all these issues are already impacting livelihoods and environmental health – they are not merely a matter for 'future generations', although future generations will certainly be affected if action is not taken to address them.

Climate Resilience

Issues

- The low-lying communities of Harwood, Ōtākou and Aramoana are highly vulnerable to the impacts of climate change through submersion of low-lying areas. There are no alternative road links, and reinstatement of roads impacted by sea level rise/storm surges could be challenging.
- Climate change assessments to date have applied an empirical science lens in isolation from mātauraka Māori, as raised in the 2021 Otago Climate Change Risk Assessment report by Tonkin & Taylor for ORC. They have also occurred at a regional, rather than local scale. Collectively, the assessments thus miss essential local knowledge and lived experience and may not be relevant to the harbour scale.
- Rising marine temperatures are affecting mahika kai species, with shifts in the diversity of fish entering Te awa Ōtākou and surrounding coastal areas already being observed by recreational fishers. Particularly vulnerable are the kelp beds, which provide shelter and food for so many fish and invertebrates. This could have implications for the ability to harvest mahika kai in the future.
- As well as being vulnerable to sedimentation effects, rimurimu (kelp) beds are particularly vulnerable to increasing sea temperatures. The rimurimu beds in the harbour and around the coast provide essential habitat and food for fish and invertebrates – so further reduction in extent would have significant impacts on marine ecosystem health.
- Changing temperatures may result in the worsening of threats from invasive pest plant species as pest plants adapted to warmer climates are able to establish further south, affecting restoration efforts.
- The Harwood and Te Rauone Reserve erosion and retaining structures are points of contention and ongoing risk for different reasons, due to similar drivers. Along Harwood, community-installed retaining structures such as tyre walls pose pollution risk to the environment as they degrade. At Te Rauone reserve, the major ongoing replenishment project has faced ongoing erosion issues, leading to multiple replanting efforts. There is concern that resource demands for such projects can detract from other initiatives needing attention.
- The resilience of the Aramoana sandspit is an ongoing point of contention, with Port Otago replenishing the sandspit with clean sand from dredging as needed when the sandspit has been eroded by climatic conditions.
- Changing rainfall patterns and intensities will likely amplify existing wastewater and stormwater issues in terms of increased wastewater overflows and more concentrated discharge of urban contaminants in more frequent high intensity rainfall events.

37 Otago Climate Change Risk Assessment 2021. Otago Regional Council, 2021, https://www.orc.govt.nz/media/9653/tt-otago-climate-change-risk-assessment-2021.pdf.

Whakaro ki te taki o te rakatahi

Listen to the beat/speech of the youth

Figure 95 **Careys Bay. Credit: DunedinNZ**

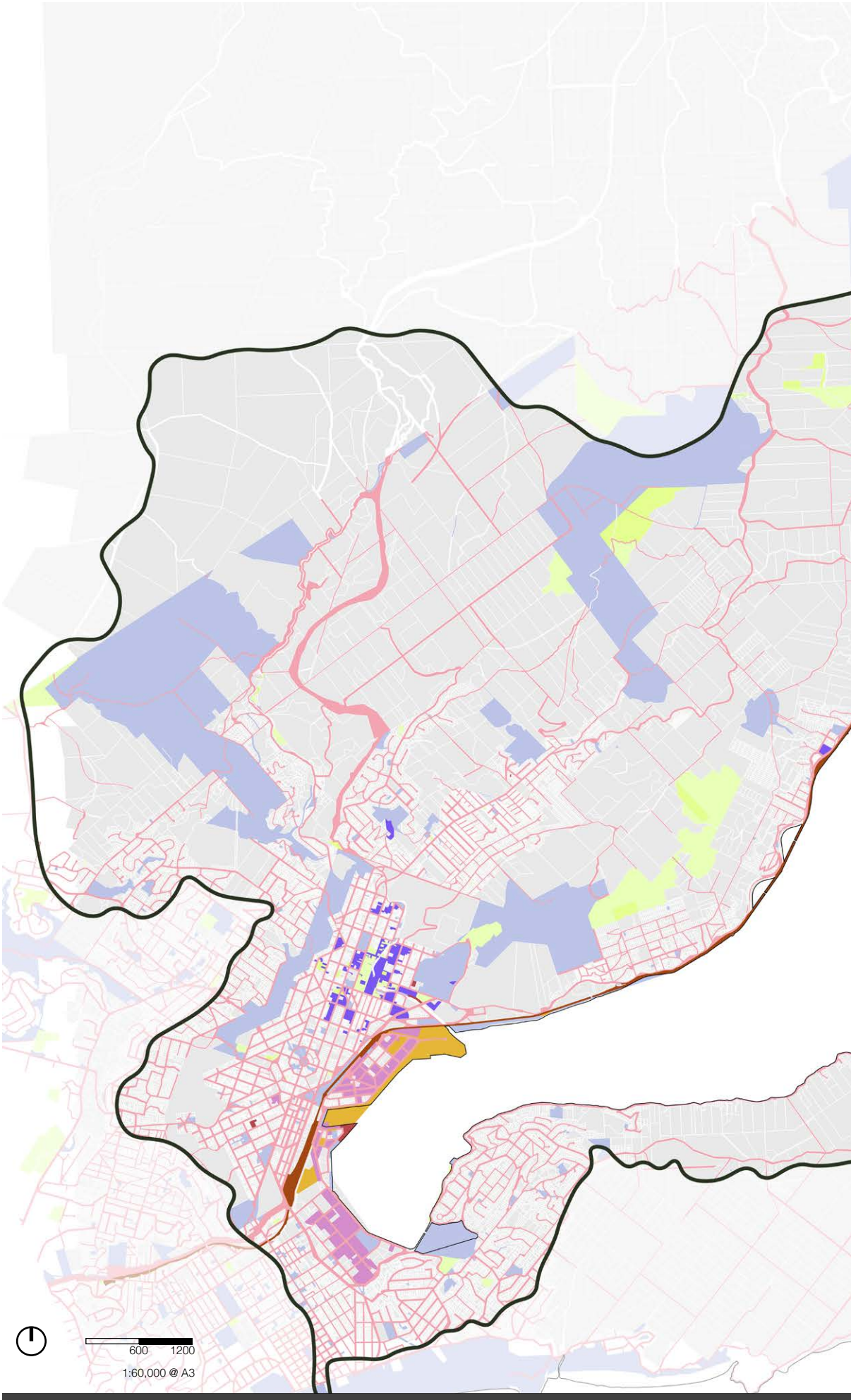
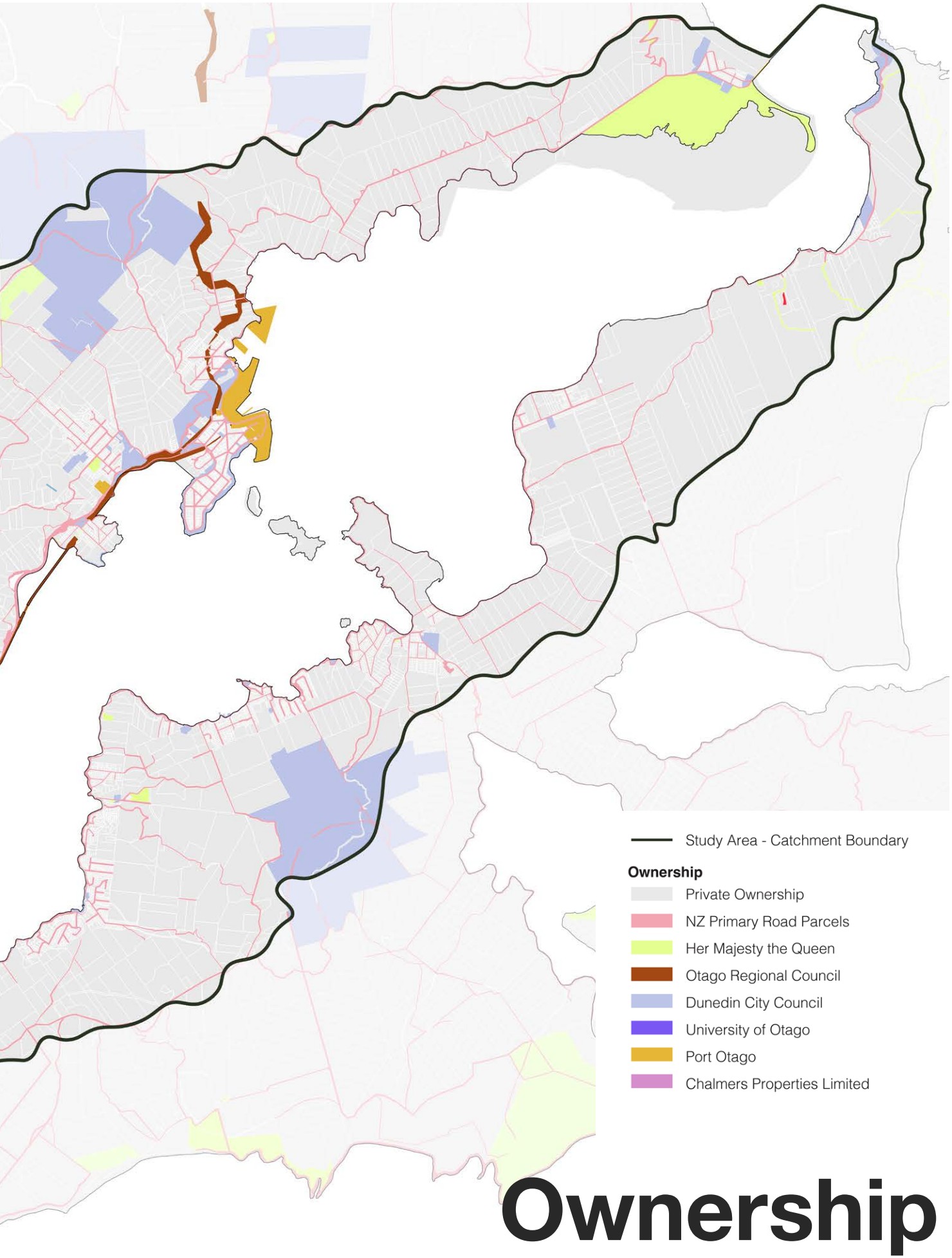


Figure 96 **Ownership Map**


Study Area - Catchment Boundary
Ownership
Private Ownership
NZ Primary Road Parcels
Her Majesty the Queen
Otago Regional Council
Dunedin City Council
University of Otago
Port Otago
Chalmers Properties Limited

Ownership

3.5.8 Governance

Governance is a broad concept. It covers the institutional structures, and associated processes, rules, norms, and power dynamics that determine who makes decisions, how and for whom decisions are made, whether, and how resources are allocated and managed, and what actions are taken, by whom and to what effect. Communication and access to information and understanding are also key requirements for empowering people in decision-making processes and underpin good governance. Resources in the governance context include finance but also human capital, information, knowledge and infrastructure.

Governance arrangements, notably institutional structures and relationships can be both formal as required by regulatory frameworks, and informal in nature. In many instances, the informal relationships and networks that exist within communities have been developed over decades and are critical for social cohesion and resilience.

The following issues were noted with regard to the governance system within which decision making regarding the harbour's development, management and use takes place.

Governance

Issues

Lack of a Coordinating Harbour Vision, Objectives and Plans

Many of the individual business conservation, recreational, and tourism organisations described in section 3.3 have each developed some form of guiding document, whether it be a strategy policy or plan to guide action that gives effect to their specific organisational purpose. The organisations mandated in terms of policy have likewise established strategies and workplans to give effect to their responsibilities. These have been generated through consultation processes aimed at integrating the vision and intent of individual interest groups and organisations. A database of the relevant ORC and DCC strategies, and plans has been developed during this process, and is extensive. Many of the strategies reflect a similar intent, but, there is no collective strategy to serve as a framework for aligning efforts and resources and measuring progress. This is compounded by some of the following underlying challenges.

While there is a general shared intent, there are specific aspects where this differs and creates cause for tension.

- There are a lot of strategies and supporting elements. In the case of regulatory instruments, there is often overlap between agencies in terms of the content and or scale at which they have been developed or apply.
- The timing and spatial focus vary across existing strategies and plans.
- Certain strategies are outdated and their relevance/currency is limited.
- Where plans lack a monitoring component or regular reflection, it is difficult to adapt responses which is essential in a dynamic context like the harbour.
- Lack of reflection and reporting progress against outcomes undermines accountability.
- Multiple agencies carrying out similar activities is a waste of resources in an under-funded area.

Issues

Lack of a Coordinated and Structured Approach

Organisations across the harbour collaborate through both formal and informal structures and systems. These have emerged organically in response to specific needs such as the Otago Peninsula Biodiversity Group and its mission to eradicate possums from the Otago Peninsula. Other engagement structures are borne out of regulatory processes. Ravensdown has a long running (15 years) forum for engaging with the community and other interested and affected parties around implementation of consent conditions but also enables consideration of other opportunities for improving the environment around the plant. Similarly Port Otago has a community noise liaison committee and ORC have developed various structures to support co-ordinated action. This includes the Harbour Master's forum, established to get input to and share actions for improved communication around harbour maritime safety. It includes a comprehensive suite of role players from recreational users to the Port and Maritime authority. The ORC's Catchment Advisor is a further active role focussed in coordinating support between ORC and harbour role players.

There is however no coordinated and structured approach to management and enhancement of the harbour which has the following associated challenges.

- Not all voices across the community are heard and members are, or have the perception of being unable to influence decision making or secure the required support from the Councils and other agencies.
- Existing systems and actors are specific to certain features, areas or developments across the harbour. Critically, isolated, inequitable or fragmented decision making does not always ensure interventions consider unintended consequences for other aspects or users.
- Multiple actors are involved in multiple forums are often requested to engage on various matters in relation to each. This is inefficient, and places significant burden on organisations to be involved in multiple engagement processes, which is compounded by the issue below - no-one more so than mana whenua (see issue below).
- Given the extensive resources (people, data, funding international linkages) and major gaps in understanding regarding Te awa Ōtakou and its catchment, the University has an important role to play. It is also one of the largest employers in the city, responsible for a large proportion of the population, archive of a significant research, information and history, and has been undertaking research within the harbour and marine environment for many decades. It also has infrastructure (Portobello Marine Lab and New Zealand Marine Studies Centre) and vessels, through which the University has contributed to the understanding of the harbour. Its location makes it the University best able to explore and research the Southern Ocean Most stakeholders reported some level of interaction of relationship with the university, but the nature, strength and efficacy and these relationships were reported to vary considerably. Some of the specific challenges noted in achieving coordinated and effective relationships with the University were noted to be:
    - It is inadequately funded to carry out the kind of research and monitoring that it could so usefully do.

Governance

Issues

— Many other organisations have a relationship with one or more individuals or units within the University. While some of these relationships are strong, stakeholders reported that they could be better structured and more effective. Many of these connections were reported to have developed organically, which is not a bad thing, but a more coordinated approach to involving the University, notably in terms of research was considered a gap.

— There is no obvious role, person or office at the wider University where an organisation that wanted particular information about the marine environment could go. The Department of Marine Science is small and not resourced to help in this way, though it does what it can.

Regulatory Driven Decision Making

Extensive effort and energy are required from stakeholders to engage in regulatory processes related to activities requiring consent such as dredging operations.

- While necessary, regulatory processes are by nature 'negative spaces' in which to engage because the focus on assessing and managing impacts, rather than on optimising opportunities.
- Despite the intent, it is often challenging in the Assessment of Environmental effects for a specific activity or site to adequately identify and assess cumulative, downstream and longer-term impacts because there is not always the long term or system wide understanding to enable high levels of confidence in the assessment outcomes. There is often reliance on modelling to address these limitations and it is far from an exact science. This is particularly relevant in an estuarine environment where there are so many dynamic processes at play.
- Regulatory processes under the RMA are time restricted and pressurized, which means consenting processes can be confrontational and break down, rather than build trust and relationships.
- These processes are costly in terms of financial and human resources (resulting in stakeholder fatigue), which could be more proactively spent in more constructive processes.

Tension between Societal Landscape Outcomes and Personal Property Rights

As illustrated in Figure 96 on page 121, the vast majority of the land across the Harbour catchment is under private ownership. This presents a challenge to achieving outcomes that require linking properties in a network such as a bike trail or biodiversity corridor, where its use or efficacy is reliant on an uninterrupted continuum across many properties to support the desired use or purpose and results in a loss of, or limitation to the owners' use - effectively representing an opportunity cost. In short there is a tension between community and societal objectives and personal property rights.

- Any change in land-use or altered management that impact on existing use rights afforded by the land-use zoning and the purpose for which an individual purchased the property would be time-consuming, expensive, and complex.

Issues

- Where personal rights are impacted there is an opportunity cost to the landowners for altering use and or access to something that supports a communal aspiration and use. There are limited financial and other mechanism to create a single or basket of incentives to offset the opportunity cost and facilitate access.
- Outright purchase of properties by government (DOC, ORC, or DCC - as in the case of Harbour Cone) is an option. However, it has a high cost, and places added management burden on often limited government agency budgets. An appropriate mandate to purchase a property may also not exist.

Access to Finance and Resources

There are numerous environmental and community organisations operating within the harbour catchment, for the good of the environment, residents and visitors. These are some of the oldest such organisations in New Zealand, with the Otago Peninsula Trust notably being New Zealand's first charitable conservation trust, established in 1967 for the purpose of protecting and enhancing peninsula flora and fauna. While some receive tourism revenue, many rely on volunteers and grant funding to continue their good work. Both ORC[38] and DCC[39] have biodiversity funds to support the protection and enhancement of local biodiversity, and ORC provides links to other funding sources including national programmes. While the ORC fund has increased in recent times there is currently a general decline in funding for catchment restoration and conservation work as several national programmes such as the Jobs for Nature, administered by MfE are concluding and the Department of Conservation faces major funding shortfalls[40].

Conservation organisations engaged all expressed the following concerns:

- The range and value of grant funding sources is limited and declining in the current economic and political climate.
- In many instances organisations are competing for the same funding for work with similar objectives in the same areas.
- Many of the organisations rely on often ageing and limited membership on a voluntary basis for what is often physical restoration and other activities. Better coordination through appropriate institutional structures and communication platforms will assist. However upscaling efforts to realise landscape change will require a larger effort and more hands that would be enabled through more funding.
- Historical inequities in access to finance and resourcing for mana whenua remain a challenge.

38 https://www.orc.govt.nz/environment/enhancing-and-protecting/grants-and-funding/eco-fund/
39 https://www.dunedin.govt.nz/services/funding-and-grants/biodiversity-funding
40 https://www.rnz.co.nz/news/ldr/535121/future-of-marlborough-environment-projects-in-question; https://www.rnz.co.nz/news/political/533105/doc-asking-for-donations-to-fund-work

Governance

Issues

Fragmented Policy Framework Diminishes mana whenua Capacity to Engage Meaningfully and lead Decision Making

As documented in the introductory sections, mana whenua have deep connection with the entire system, and as kaitiaki they play a significant role in the management and governance of natural resources under the principles of Te Tiriti o Waitangi and the Ngāi Tahu Claims Settlement Act 1998. The rūnaka are consequently and rightly requested to engage and comment on almost all policies, plans, and consenting processes for specific projects. They make a concerted effort to collaborate with the ORC and DCC on the management of land and water resources across the catchment of Te awa Ōtākou. They also work with government agencies, local councils, and the community to promote sustainable land use and marine protection around the harbour. The nature of the policy framework however represents a systematic barrier to mana whenua being able to bring their holistic understanding in providing the leadership in decision making - as is appropriate to their role and stated as a requirement of much of the policy and strategy. The challenges faced include:

- As described in Section 3, the policy framework is complex and dynamic. The sheer number of processes requiring consultation coupled with the technical nature of certain projects and rule-driven time constraints all translate into a significant burden on mana whenua and community organisations. This diminishes their capacity to engage meaningfully in all processes.
- Mana whenua are frequently asked for similar information in a different context. This places an additional burden on their limited resources.
- A further reality is that these processes often prioritise external agendas, limiting mana whenua ability to shape engagement timelines and outcomes despite their status as essential partners.
- Inequitable manawhenua representation on decision-making bodies due to systemic barriers and lack of culturally appropriate processes.
- The above constraints hinder mana whenua from proactively furthering their own initiatives and visions.

Challenges of a Fragmented Policy Landscape

In his recent publication (Going with the grain) the Parliamentary Commissioner for the Environment (PCE) concluded that:

"We currently have a fragmented environmental policy landscape with multiple policies that impact on land and water use. The environmental impacts of land use have been seen as a series of technical problems (climate mitigation, climate adaptation, freshwater quality and biodiversity) with discrete solutions. This fragmented approach is particularly at odds with the holistic approach that tangata whenua have towards land, and the responsibility they take on as kaitiaki, mana whenua and landowners."

The fragmented nature of the policy landscape places excessive demands on mana whenua and other role-players to engage with multiple processes required to develop the strategies and plans under each policy. A consequence of this is stakeholder fatigue, particularly in the case of mana whenua.

Issues

Lack of Transparency and Accountability in Harbour Decision Making

There are key organisations that, have considerable influence across all aspects of the harbour: the ORC, DCC and Port Otago. DOC as a major landholder responsible for relevant policy and legislation is also an important role-player. Several issues were raised regarding the transparency and accountability in decision making by these organisations, compounded in certain instances by poor co-ordination underpinned by inadequate communication.

- Community businesses and other users find it difficult to unravel responsibility for dealing with various issues and administration of the multitude of regulatory requirements. This is reflected in a comment by a recreational harbour user in a comment related to the consenting process for infrastructure upgrades - "*If I just knew who to speak to at council*"
- There is also a level of frustration regarding accountability for inactivity – the failure to follow through in the commitment to develop a harbour forum by ORC[41] (one of the answers to this issue) is an example of this.
- Community feeling is that there are not effective working relationships between the key agencies (ORC, DCC and DOC) responsible for administering the majority of the relevant policy and regulatory instruments. Lack of coordination exacerbates the issue of the somewhat fragmented policy landscape. Several DCC and ORC staff echoed this sentiment, noting that working relationships could be more effective and recognise the importance of improving the situation, to the point that the improvement of working relationships with partner agencies has been identified as a strategic priority in several of these organisations workplans.
- While acknowledging the efforts of the Port to limit and mitigate its environmental footprint and support community needs, and despite certain success stories in relation to both, there was a strong and consistent feeling across all role-players engaged that there is a need for improved performance by the Port in terms of the following issues.
    - The community feels excluded from decision making regarding planning and projects – the back beach and dog park proposals were raised on several occasions by different stakeholders as examples of where this could have been done better in terms of eliciting community and mana whenua input sooner in the process.
    - Lack of transparency regarding value and use of funding from tour the cruise ship levyboat operators – in a poor economic climate this is a consistent and relatively large funding stream for community projects. There were several requests for more transparency regarding the value of the funds generated by the levy and clarity regarding the criteria and process through which projects are prioritised for funding.

41 https://www.odt.co.nz/news/dunedin/boaties-call-harbour-forum; https://www.odt.co.nz/news/dunedin/orc-commits-itself-otago-harbour-forum

Governance

Issues

Access to Information

Access to appropriate understanding and information is essential for informed decision making. There is a wealth of different data and information types available about the history, ecology, culture and uses of the harbour. As reported in various sections, these data are held and administered by a range of organisations, including Museums, the University, Agencies (DOC, ORC, DCC), and mana whenua.

- Information and understanding is housed and accessed via various platforms and some data, related to consenting or commercial operations, are not synthesized and made available to show change in the state of the harbour over time.
- In addition to written and scientific data, much of the understanding about the harbour is intergenerational, and held by mana whenua and residents who have lived in and interacted with the landscape over generations. They understand how the system was, has changed and some of the causes. This understanding is often not documented or brought to bear in decision-making processes, primarily because the institutional structures and engagement process are not designed to enable this.
- There is significant amount of information and data housed by the Councils, other state organisations like DOC, research organisations and libraries, but the community is often not aware of where it is housed or how to access it. The lack of a coordinating harbour forum or structure with a communication platform such as a website and associated social media and other tools like newsletters, and importantly inks to Council, research and library resources where the wealth of existing information and knowledge can be accessed. These tools also create awareness of events and opportunities across the harbour, the lack of a coordinating central communication system and tool under a coordinating institution was noted as a gap noted by various stakeholders.

Figure 97 **Biking and Boatsheds along Te Aka Ōtākou. Credit: DunedinNZ**

Te awa Ōtākou is at a critical juncture– its future hinges on our collective ability to blend diverse perspectives into a cohesive vision of restoration and sustainable management. Central to this vision is mana whenua's aspiration to see Te awa Ōtākou restored to a thriving ecosystem that supports abundant mahika kai, fostering wellbeing for all and enabling the full expression of kaitiakitaka and cultural identity. To achieve this ambition, we must acknowledge and understand the past and the present, addressing historical legacies while navigating current complexities at the intersection of cultural, economic, environmental and social values.

Establishing a genuine Treaty partnership framework for harbour management is essential, recognizing mana whenua not as mere stakeholders, but as equal partners with protected and enabled rakatirataka. This involves implementing a co-governance and co-design model throughout the entire process, ensuring mana whenua decision-making authority is clearly defined and upheld. Any management strategy should explicitly incorporate tikaka, mātauraka, and kaitiakitaka, reflecting the deep intergenerational connections between mana whenua and Te awa Ōtākou.

It is crucial to address historical injustices related to the harbour and resource management, and through this, to develop specific initiatives for building Māori capacity in leadership roles. It is also important to integrate Te Reo Māori terms and concepts throughout the framework to authentically reflect mana whenua worldviews. Protection and enhancement of customary rights, such as mahika kai, should be prioritized. It is also recommended that cultural impact assessments be conducted as a standard part of planning and implementation processes. By co-creating this approach with mana whenua, a harbour management framework can be developed that truly ensures the intergenerational well-being of both Te awa Ōtākou and its people, transitioning authentic partnerships and mana whenua-led initiatives from concept to practice.

Figure 98 **Otago Shag. Credit: Oscar Thomas**

4.1 Opportunities

With a focus on being forward-looking and action orientated, an abundance of opportunities have been identified to restore and enhance the wellbeing of Te awa Ōtākou and all living within, into the future. These are structured under the same themes which have emerged through this kaupapa. Some opportunities directly address issues raised, whilst others stand on their own. Some can be done in a heartbeat, others will take generations to come to pass. Their embodiment in this report is intended to enable collective ownership and action moving forward.

In taking these opportunities forward it is worth reflecting on Dunedin's reality, that it has one of the largest land areas of any City Council with a relatively small population limiting its capital funding source compared with larger port cities like Auckland and Wellington. It also has its own unique identity. The nature and pace of change needs to be in keeping with this context.

It is important to consider the following in reflecting on the opportunities presented below:

- The opportunities have been generated through the engagement process that has involved mana whenua, community, business and both councils. This is in line with the ORC ICM approach which is facilitated by ORC in partnership with mana whenua and involves co-design of catchment action plans with community and thereby co-ownership and collective action.
- The nature of the opportunities varies significantly in the level of definition between broad ideas and specific acations. They all however represent opportunities to be refined/added to and prioritised with community via the opportunities for generating a Catchment Action Plan summarised under the governance theme.
- In describing the opportunities, reference is made to relevant existing strategy, programmes and projects being undertaken by the Councils, in many cases with, or in support of, community and other stakeholder efforts.
- In line with the action-oriented focus of this work, potential 'quick win actions' that will demonstrate success and build social cohesion and partnerships between council, iwi and community interest groups, have been noted. Some broad criteria for defining a quick win (to be refined as part of further engagement) include:
    - An action which is supported by all stakeholders.
    - Can happen immediately/very short term.
    - There are no major barriers (consent requirements, finance, and so on) to making it happen.
    - It may be visible and thereby show success.
    - Involve several roleplayers and thereby builds relationships.
    - Supports a range of objectives – environmental, social, cultural and economic.

This journey needs to be intergenerational, holding a long-term view but acting now to start enacting change together. These immediate actions will help to galvanise collaborative action.

4.1.1 Accessibility

It is clear that accessibility is a persisting and key issue for the community of Te awa Ōtākou. The focus now needs to be on enhancing what we already have and enabling multiple users of the harbour to enjoy harmonious co-existence.

Accessibility

Opportunities

Enhancing existing access

With the aim to avoid further adverse effects on the harbour – particularly through reclamation and dredging, providing improved access to and across the awa should focus on enhancing existing access where it is already provided.

Continued consultation with residents on access enhancement will ensure that solutions are tailored to local needs (including meeting demands) while advancing environmental and resilience goals.

Further, alignment and collaboration between infrastructure owners and managers is key to improve access outcomes, particularly DCC, ORC, Port Otago, Waka Kotahi and Kiwirail. This includes continued collaboration in the development and/or implementation of relevant plans and strategies, including the *DCC Otago Harbour Reserve Management Plan* (revised plan under review) and the *DCC Future Development Strategy and Spatial Plan* (particularly regarding chapter 6.3.2 - Transport).

- Historic inequities should be addressed, particularly in communities such as Harwood and Ōtākou, where infrastructure improvements have been neglected. Peninsula Connection roading improvements bypassed these areas, leaving roads in poor condition. Additionally, the Te Aka Ōtākou cycleway ceases at Portobello, excluding the kāik community that contributed to the cycle network's name. Options to extend Te Aka Ōtākou out to Harrington Point should be investigated and actioned.
- Whilst it is acknowledged that the Otago Harbour Reserve Management Plan implementation will serve to address issues raised by the community regarding coastal public infrastructure condition, not all publicly used assets around the harbour are owned and managed by DCC. Collaboration between Council and other asset owners to create an expanded asset register (DCC already holds one for all Council owned wharves and jetties) which incorporates both public and private asset maintenance needs and regimes could provide beneficial to achieving a consistent standard of asset condition around the harbour. This should include input by ORC's Compliance Team, as maintenance of private assets often falls under resource consent conditions.
- Solutions should be investigated to address the siltation at North End Wharf to restore its functionality for recreational and visiting boats.
- A bike hub could be established on Portobello Road, well connected to the ferry terminal; linking the upper harbour to Portobello.
- Existing walking tracks around the awa should be maintained, enhanced and promoted with signage, and public maps provided / updated. If linkages between tracks could be formalised and communicated, usage would be better in quality and quantity.

Accessibility

Opportunities

- A unified body for access and recreation across the harbour, led by mana whenua, ORC, DCC, and DOC; in collaboration with relevant transport entities, local boards and tourism operators, would provide obvious benefits in terms of reducing duplication of effort and unnecessary conflict and ensuring aligned planning.

Harbour waterfront regeneration

The opportunity to regenerate the harbour basin waterfront is no new topic. In 2020, in the midst of COVID-19 lockdowns, $19.9 million from the Provincial Growth Fund to begin waterfront regeneration through redeveloping the Steamer Basin was pulled as the project was deemed "*too much money in the too-hard basket*" (Mayor Jules Radich, Otago Daily Times)[42]. However, in the words of ex-mayor Aaron Hawkins, "*this (was) a delay, not a death knell*"[43]. Waterfront redevelopment is a highly complex, long-term process; for Ōtepoti, it is likely a matter of when, not if – the Steamer Basin and surrounds are a fantastic asset with potential yet to be realised. This potential should look to the question "*What do the best harbours in the world look like?*", with a focus on enhancing local community well-being and visitor experiences.

- Ōtepoti is celebrated for its arts and culture - heritage buildings, street art, cafes and creatives; Te awa Ōtākou is celebrated for its wildlife and wild, windswept elements. Regeneration of the waterfront provides opportunity to lean on the best of both environments where they meet – celebrating city and harbour, paying respect to the past whilst looking forward.
- To be effective regeneration should address the Octagon-Harbour connection, providing safe pedestrian access across or over the state highway and rail lines. This should focus on providing connection through Queens Garden. Opportunities to enhance safe connections outwards towards Forsyth Barr Stadium and Kitchener Street Reserve should be explored.
- The transformation of Te Whanganui-a-Tara / Wellington's central waterfront from working port to the bustling crown jewel of 'Welly on a good day' provides a hugely successful model from a similar setting to reflect on. Similarly to the Ōtepoti waterfront, Wellingtons waterfront operated as a working port under control of the harbour board until change in legislation in the late 1980's. This transferred ownership to Wellington City Council who subsequently recognized its value as a community owned asset and instigated the development of the waterfront masterplan and the significant projects which stemmed from it.

42 Steamer Basin Redevelopment in 'Too-Hard Basket'. Otago Daily Times, 1 October 2023, https://www.odt.co.nz/news/dunedin/steamer-basin-redevelopment-too-hard-basket.

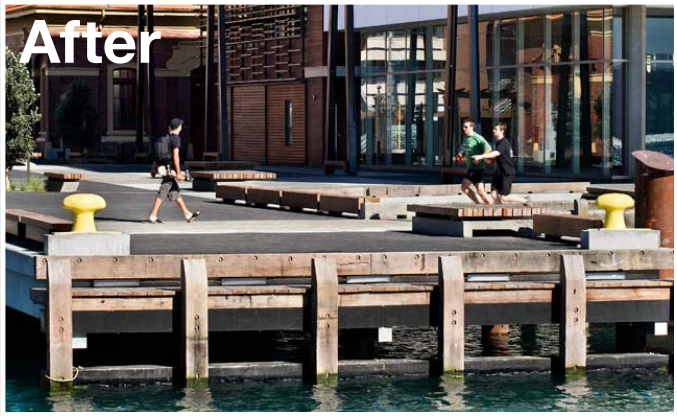
43 Harbour Projects 'Delayed'. Otago Daily Times, 27 May 2020, https://www.odt.co.nz/news/dunedin/harbour-projects-%E2%80%98delayed%E2%80%99. strong interest in this issue

Case Study

Wellington Waterfront Regeneration (2006-2008)

Wellington Harbour's Kumutoto precinct regeneration provides a compelling example of how waterfront redevelopment can reconnect a city with its awa while transforming underused areas into vibrant public spaces. Once dominated by car parking, the area has been revitalised through thoughtful design, creating a thriving hub for locals and visitors.

The project celebrated the natural and historical features of the Kumutoto Stream by pulling the water's edge back into the city, turning a former carpark into a pedestrian-friendly space. The expansion of Wharf Plaza, with a new fixed wharf and floating pontoon, enhanced the city-to-harbour connection, while the addition of ramps, pedestrian crossings, and a sculptural bridge improved access and visual appeal.



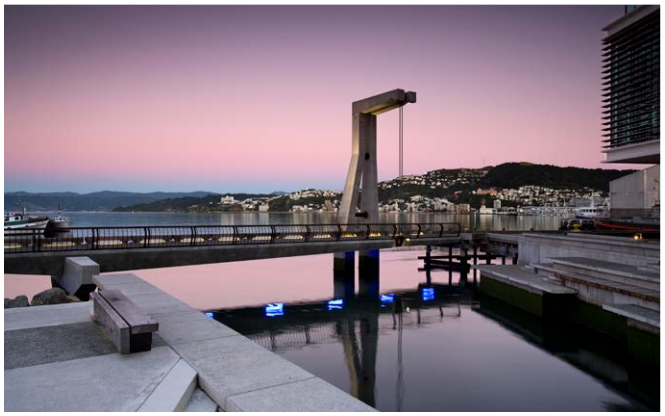


Figure 99 **Kumutoto Waterfront. Credit: Studio Pacific Architecture**

Wellington's waterfront now stimulates economic activity, attracting businesses, tourism, and events while redefining the city's identity. The success of this regeneration demonstrates how Dunedin could similarly reclaim underutilised spaces, focusing on placemaking and environmental restoration to transform its harbourfront into a vibrant community asset.

Opportunities

- Through consultation, there were many references to Te Whanganui-a-Tara as an aspiration for the Ōtepoti waterfront, especially given both are afflicted by exposure to high winds. In particular, the way the northern example speaks to its industrial past – retaining, repurposing and enhancing existing buildings and structures, whilst celebrating the natural elements and Te Ao Māori - should be reflected on.
- Port Otago and Chalmers Property holds the majority of land ownership along the waterfront industrial area. This should make it easier to plan and develop than if the land was owned by a complex mosaic of land owners.
- There remains opportunity (as explored through the prior regeneration project) to establish a dedicated marine education and science centre in partnership with the University of Otago on the waterfront which could include a mix of research and visitor experiences and facilities to showcase the role of the city as a gateway to the Southern Ocean. It has been proposed for this to be located along the Wharf Reserve / Fryatt Street wharf. This would provide a place for 'marine science in action'.

4.1.2 Environmental Health

The opportunities to enhance the health of Te awa Ōtākou are plentiful, and many are already at play across the catchment. Whilst some will be 'quick wins' to implement, including enabling ongoing restoration and conservation work to continue, the realisation of many of these opportunities will be dependent on a collective effort and committed direction moving forward.

This direction needs to be shaped by a unified biodiversity vision and plan for Te awa Ōtākou catchment, which forms the overarching opportunity for environmental health identified through this kaupapa. It is recommended that the biodiversity vision and plan is developed under the leadership of mana whenua in partnership with ORC and DCC, in collaboration with the harbour community boards and conservation groups and other community players such as DOC, Port Otago, and the University. Commercial operators who rely on the harbour such as the Monarch and Southern Clams should also be consulted with.

The plan should seek to align with the revised Our Living Treasure | Tō tātou Koiora Taoka Our Otago Regional Council Biodiversity Strategy (2018)[44], currently under development) and associated Action Plan, and also consider the Dunedin City Biodiversity Strategy, which while out of date has relevant thinking and involvement by many of the role-players.

44 https://www.orc.govt.nz/media/5798/orc_biodiversitystrategy_document-final-web.pdf

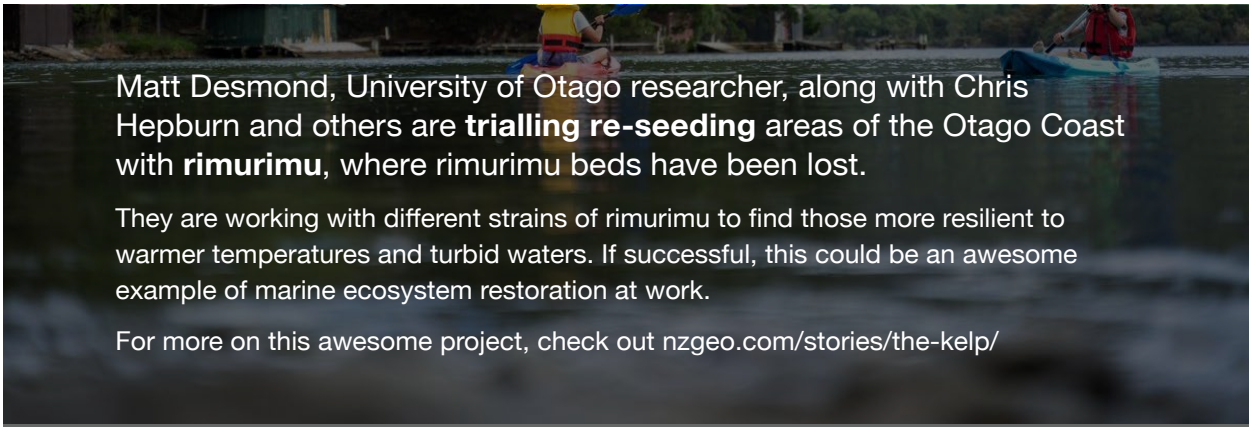
Opportunities

Monitoring and Research

There is a clear need for a holistic, whole-of-harbour environmental monitoring strategy to be created and implemented. This should sit under an overarching biodiversity strategy. The aim of this opportunity is to improve understanding of the state and trends in environmental health, to inform education and management. This knowledge building is essential to enhance the health of the harbour for future generations.

The monitoring strategy should broadly address marine, freshwater and terrestrial ecosystem health. Dedicated monitoring programs will need to be expanded or established across these domains.

This strategy should be co-designed by Te Rūnanga o Ōtākou, in partnership with ORC, the University of Otago, and DCC. It is essential that other knowledge generators and end users participate in this process, including representation for Ōtepoti area schools, relevant community environmental groups, Port Otago and Southern Clams.



The following opportunities should tie to this strategy:

- A dedicated harbour marine health monitoring program should be established as a priority. This program could include (but is not limited to) marine fisheries, marine benthic health, coastal ecology, cultural health, biophysical habitat condition monitoring, and marine water quality. This opportunity could include establishment of long-term coastal State of Environment monitoring sites in partnership with ORC and Rūnaka.
  - Learnings from establishing this first program should be applied to streamline development of freshwater and terrestrial monitoring programs for the harbour catchment.
  - The monitoring program should connect to environmental health outcomes so that it is not 'monitoring decline'. Rather, monitoring should contribute to identifying needs to undertake or expand restoration, conservation, and other environmental management actions (including regulatory and non-regulatory initiatives); and to communication and education outreach.

Environmental Health

Opportunities

- Existing initiatives including cultural, citizen science, statutory and consenting-driven monitoring should be assessed to identify opportunities for integration within or alignment with the strategy, before new programs are developed – to avoid 'recreating the wheel'.
- With regard to marine citizen science initiatives, the University of Otago New Zealand Marine Science Centre should be engaged with, to leverage their expertise in this space.

"Can the harbour sustain it?"

" Why are the tuaki in decline...? "

- Development by mana whenua of a Cultural Health Index for monitoring the health of ecosystems from a mātauraka lens. This can form part of dedicated harbour marine and terrestrial ecosystem health monitoring programmes and led by mana whenua. For example, a University of Otago student is undertaking an isotope study on redbill foraging to serve as an indicator for changes in food sources in the harbour, which would indicate changes in fisheries health. There is an opportunity to weave mātauraka Māori indicators such as guano condition with this approach and use these combined indicators to monitor ecosystem health.
- The establishment of avenues for mana-whenua-directed research would be beneficial for improving communication, knowledge, and resource sharing among Te Rūnaka o Ōtākou, the University, Port Otago and other knowledge providers.

"There is life if you are prepared to look"

- A review of the DCC stormwater discharge consent requirements would ensure that monitoring is implementable and driving continuous improvement. This review should include consideration of monitoring actions and outcomes, tied to catchment planning which is holistic and focused on harbour health outcomes.
- Accessibility to Ravensdown's marine compliance monitoring results could be improved similarly to Port Otago's practices.
- There is potential for increased engagement by citizen science initiatives with differing fisheries takes (e.g., floundering, spearfishing, line fishing). This could also provide invaluable information about the community's perspectives on the health of the fisheries and shifting baselines - "*did you catch what you expected?*". This would add understanding to monitoring undertaken by MPI and inform the ongoing review of limits and support recovery of fisheries from severe overfishing in the past and continued pressure. This deserves dedicated attention in partnership with mana whenua, and the wider fishing community – acknowledging that recreational fishing is a key pathway through which the community connect with the harbour.

Opportunities

- Research needs to be progressed to understand whether dredge spoil dumping off the coast is adversely impacting the Karitane kelp forests north of the harbour mouth, as the community have indicated a strong interest in this issue[45].
  - It is understood that Port Otago are undertaking ongoing monitoring along the coast in association with their resource consent; open communication of ongoing results to the harbour community will be of benefit.
  - In-situ assessment of deep water rimurimu populations along the stretch of coast between the Otago and Moeraki Peninsulas has been proposed[46]. This would improve understanding of their responses to changes in light availability and heat wave frequencies, as well as improving remote sensing of ecosystem health capabilities for ongoing monitoring. These rimurimu populations may be most responsive to potential turbidity impacts due to lower light infiltration at depth. Progression of this research is encouraged, with provision for research design and collaboration with Rūnaka, and ongoing, accessible communication of research findings to the harbour community.

45 Caldwell, P. C., Harcourt, R., Kelaher, B. P., & Steven, A. D. L. "Automating Marine Wildlife Detection: A Review of Machine Learning Approaches and Applications." Frontiers in Marine Science, vol. 8, 2021, https://www.frontiersin.org/articles/10.3389/fmars.2021.721087/full.

46 Schwarz, A.-M., & Robinson, K. "Macrocystis Forests: Distribution and Trends for the Otago Region." Otago Regional Council, 2022, https://www.orc.govt.nz/media/15546/macrocystis-forests_distribution-and-trends-for-the-otago-region.pdf.

Opportunities

Education

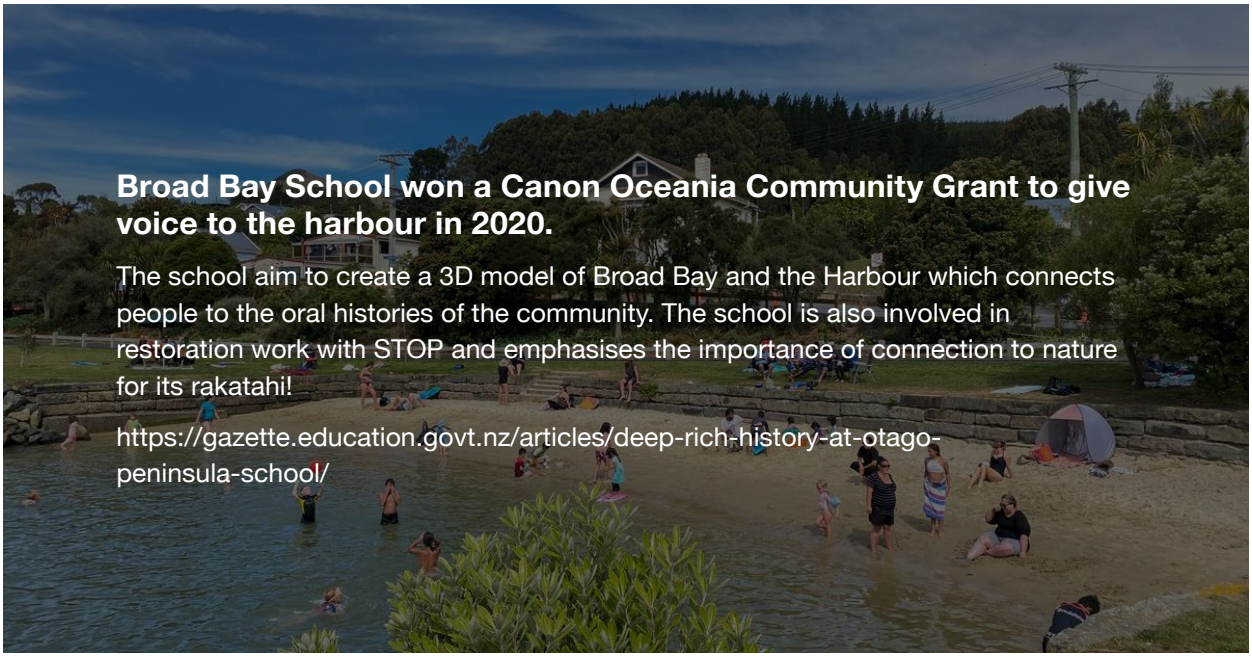
Education is crucial for improving understanding of the harbour's health as well as social and cultural wellbeing, and it is essential that knowledge generated through monitoring and research is shared with the community. The harbour holds profound significance for all who interact with it, embodying diverse cultural heritage, connection to place, and kaitiaki responsibilities.

"I'd like to see lots more kids doing all that!"

The community are well aware of and prizes the life within Te awa Ōtākou. However, understanding of the causes, scale, and impacts of existing threats to the harbour's biodiversity limits consistent community participation in stewardship roles and actions, such as sustainable recreational fishing practices, and prevention of littering, which impacts not just the environment, but also cultural practices and connection to place.

As a result, there are clear but contrasting perspectives on the state of the harbour within its community. These perspectives are influenced by factors such as generational knowledge, cultural background, and access to scientific information. By improving education and communication in coordination with monitoring and research, the community can engage more meaningfully in efforts to enhance and sustain the health of the harbour.

It is noted that the education community were not engaged directly in the limited consultation for this report, and it is strongly recommended that this happens in refining issues and opportunities centred around education. Many schools around Ōtepoti have long-running connections to Te awa Ōtākou, in particular those around the harbour - and these connections needs to be celebrated and supported thorough this ongoing kaupapa. The University of Otago New Zealand Marine Studies Centre also plays a role in nurturing these connections, which should be recognised.



Broad Bay School won a Canon Oceania Community Grant to give voice to the harbour in 2020.

The school aim to create a 3D model of Broad Bay and the Harbour which connects people to the oral histories of the community. The school is also involved in restoration work with STOP and emphasises the importance of connection to nature for its rakatahi!

https://gazette.education.govt.nz/articles/deep-rich-history-at-otago-peninsula-school/

Opportunities

Opportunities specific to education include:

- There is a need to develop avenues for more accessible communication of research and information about the harbour ecosystems to the harbour and wider Ōtepoti community, including visitors. This should include improved use of social media tools to engage younger audiences.
- There is opportunity to create a book or leaflet about Te awa Ōtākou – what's special about it. Enabling access to this through online platforms is strongly recommended, which could be linked via QR codes on signage around the harbour.
    - There could be an opportunity to partner with Port Otago to develop this initiative, which should include avenues for cruise ship visitors to have access to the resource before entering Te awa Ōtākou. This could include a spoken or film presentation on 'what's special about the harbour' to ensure that visitors are appreciate its environmental and cultural sensitivities before disembarking.
- The Yellowfish campaign for avoiding littering and polluting around stormwater drains could be revitalised with an accompanying digital element (e.g., gamification) in partnership with Keep Ōtepoti Dunedin Beautiful.
- Better education is needed on domestic stormwater – whatever goes onto the ground will go into the sea. This education could be tied to the Yellowfish (or similar) campaign.
- Improved education on the fate of piped urban awa including Toitu and Ōpoho through visual arts, story telling and renaming of piped streams on DCC asset plans and consenting documents. Ensure developers understand the continued importance of these piped streams to connecting the harbour with the headwaters.
- There is a clear need to centre and improve visibility of cultural perspectives in existing educational programs and initiatives.
- The visibility and celebration of unique species could be enhanced, for example an underwater camera could be installed at Anderson's Bay to capture the octopus migration; and engaging signage could be installed celebrating the Otago Shag. A campaign to DOC and ebird to acknowledge the Otago shag's existence would be a good start.
- Education opportunities to provide for youth and enable continued connection to the harbour throughout the education pathway (primary – tertiary), are fundamental to the wellbeing of the harbour and community. Opportunities to utilise a variety of educational styles that speak to different ways of knowing and learning will be key to raising rakatahi to be future kaitiaki.
    - There is a need to provide equitable access to the harbour (e.g., Monarch shuttle to bring students from town; Council/community board funding support as an act of manaakitanga). A review should be undertaken to better understand what's already happening, what has & hasn't worked, and to work with schools to ID opportunities to weave the harbour into curriculum.
    - There is a major opportunity to better utilise Kamautaurua (Quarantine Island) for this purpose. It is currently sporadically used by schools from across Aotearoa, but access is limited as there is no dedicated water taxi to the island and the wharf needs upgrading. The Kaumautaurua community currently provide affordable accommodation to school students to access the island, however this does not provide enough funds to ensure facilities meet the required standards whilst also covering restoration work.

Environmental Health

Opportunities

— The history of Kamautaurua holds significant mamae (hurt) for mana whenua, because of the use of the culturally significant island as a quarantine by the settler community between 1863-1942, and subsequent alienation from the whenua. Opportunities for mana whenua to lead and partner in ongoing regeneration and revitalisation work on the island should be prioritised, particularly where these relate to rakatahi access to educational opportunities there. This partnership should also seek collaboration with local schools to find opportunities to embed Kaumautaurua in environmental education programs, including avenues for funding to be shared.

Kaitiakitanga in action

As highlighted throughout this report, there are already many hands-on deck to restore habitat for indigenous biodiversity across Te awa Ōtākou catchment. Some pest animals are being brought under control on the Otago Peninsula and throughout West Harbour and the city under the Predator Free Dunedin campaign, and restoration of the Hereweka catchment is actively progressing under STOP's custodianship. Meanwhile, tributaries in private ownership are being fenced and planted, and the kōrora colony at Takiharuru (Pilots Beach) has grown into the largest colony on the Otago Peninsula under many caring hands, funded by the Blue Penguins Pukekura tours. This collective work is greatly encouraged and celebrated.

> **Would love to see pāua in the rock pools!**
>
> *Forest & Bird*

However, there is much to do in a landscape still very much dominated by pasture grasses, lacking healthy, connected, resilient habitat for indigenous flora and fauna, and vulnerable to a changing climate. Broadly, the recovery is still 'young', with Moore's bush an example of more advanced regeneration as podocarps such as tōtara, kahikatea and matai form the canopy of the established forest.

- The creation of a Biodiversity Hub for the harbour would greatly benefit community groups who are heavily time and funding constrained. There are existing organisations and programmes whose coordinate restoration and conservation efforts in the Harbour. Examples include the Halo Project whose role is to "support the planning, administration, fundraising, development and implementation of a variety of environmental projects", primarily in the western portion of the harbour, and the Otago Peninsular Biodiversity Group has coordinated work across the Peninsular with a focus on pest eradication. The opportunity is to provide additional resource to provide support to areas and aspects of restoration efforts not covered by these organisations and coordinate efforts across them in supporting administrative work across non-profit community organisations, including funding applications and grant reporting, supplier management, community outreach, management and growth of volunteer workforce.

Opportunities

  - The latter point could be especially beneficial to enable the sharing of human resources across the many restoration and conservation initiatives working in the harbour and yet to come. This support would be instrumental in enabling groups to keep doing the important restoration mahi on the ground, rather than spending increasing proportions of their voluntary time on administration. Weavetogether[47] already provides this type of support and would need to be consulted in understanding how such a hub could support and build on what they provide.
  - If established or formalised as a physical hub, this could also serve as a 'toolshed' location for the sharing of tools and resources across groups (e.g., it could include a 'trap library), as well as a space for workshops.
  - Creation of the Biodiversity Hub needs to be led by the community, with resourcing needs and responsibilities clearly identified (including the number of FTE and other roles required). This leadership should include mana whenua, STOP, the Otago Peninsula Biodiversity Group, OPERA, Pukekura Trust and the Otago Peninsula Trust, the Halo project, Predator Free Dunedin and others.

  - The Sustainable Peninsula concept has raised the opportunity to expand introduce a voluntary levies on visitors was proposed, especially beyond the levy Port Otago applies to cruise ship visitors, to other accommodation and tourism operations. This could be ringfenced for which support directly funds of restoration and conservation activities around the harbour. For example, a levy on companies who benefit from tourism activities on the Otago Peninsula, such as AirBnB and cruise companies. This initiative is strongly encouraged. Funds could then be managed and allocated through the Biodiverity Hub.

- Public reserves, marginal, and unused land are places which are ready to restore (and in some cases have restoration under way); and should be prioritised for restoration planning and funding due to fewer barriers to implementation.
- For marginal and unused land on private property, existing funding and support pathways need to be identified and communicated to landowners. Landowners who are already actively working to restore their back yard should be encouraged and supported to continue; and incentives developed for indigenous reforestation where these are currently lacking.
- Green and 'avian' corridors linking areas of regenerating native cover can be pathways for taoka species. The feasibility of formally developing, restoring and protecting a continuous biodiversity corridor connecting Orokonui Sanctuary through the inner islands and across to Hereweka should be investigated as a priority, to enhance this regeneration. The expansion of the formalised corridor to connect to Moore's Bush, OPERA and Pukekura should follow. This should include the mapping of existing and potential biodiversity stepping stone habitat, and of areas where contiguous habitat could be restored. The outcomes of this investigation should drive physical restoration prioritisation and planning; with consideration of the prior two opportunities.

47 weavetogether.org.nz

Environmental Health

Opportunities

- A conservation management plan could be developed for mahika kai (species harvested for food sources), keystone (essential to healthy ecosystem structure and function), and flagship (conservation 'icons' for community engagement) species of Te awa Ōtākou catchment. This could sit within the broader biodiversity strategy
- Creation of a Regional Park within Te awa Ōtākou catchment should be investigated. There are locations within the area for which existing and enhanced long-term management, landowner, Council and community group collaboration could serve well to shape this opportunity. The Auckland Council Regional Parks system and approach is a hugely successful model for environmental restoration and conservation alongside ongoing pastoral grazing, providing more readily accessible recreation and conservation experiences for the local community than typically harder to access DOC land.
- Riparian native plantings protect waterways flowing into the catchment of Te awa Ōtākou and help filter the waterways entering into the harbour. Planting of riparian zones can be encouraged and prioritised by ORC management.
- Mātauraka should be integrated into planting and pest management plans to ensure appropriate habitat and food for manu (native bird) species, is restored across the catchment. This could then enable the reintroduction of taoka species such as wēkā over time.
- Assessment of man-made fish passage barriers around the harbour needs to be undertaken, and a remediation program developed, with prioritisation for coastal outfalls on those sub-catchments with high quality and/or abundant upstream habitat. This would be an easy 'low hanging fruit' well suited to community participation, which could include fish monitoring upstream before and after remediation.
    - It is understood that ORC is undertaking fish passage barrier validation against those modelled in NIWA's Fish Passage Assessment Tool, however this process does not include the harbour sub-catchments – this should be revised for inclusion.
- Creation of more coastal bird roosting habitat should be investigated – this could include outreach to harbour schools by Council ecologists to teach pupils about seabird ecology, as well as running a model roost building challenge, which could enable rakatahi to contribute to conservation action for the harbour.
- Culturally and environmentally sensitive options could be investigated to restore intertidal zone habitat within the inner harbour. This could aid in mitigation of further losses of remnant habitat in the inner harbour due to ongoing sea level rise.
- Mana whenua should lead the progression of a Fisheries Management Plan for the harbour, including but not exclusive to tuaki, scallops, fin fish and kōura.
    - There is a need to enable and support mana whenua to rejuvenate and lead the sustainable management of tuaki populations.
    - This could include the extension of the Mātaitai across the whole harbour.

Portobello Peninsula

> **Right in the centre of the creation story, the heart of the harbour, a crowning jewel.**

Lala Frazer on Portobello Peninsula.

Portobello Peninsula is highly significant to mana whenua and the wider Ōtepoti community; an iconic part of the landscape. Wrapping the southern and northern coast of the Peninsula is coastal fringe vegetation which is well suited habitat for native geckos and seabirds. Along the rocky seashore, precious intertidal habitat persists, where elsewhere on the inner harbour mainland this habitat has been lost to reclamation. The Peninsula's small freshwater catchments host wetland habitat, flowing down to several bays.

The northern end of the Peninsula is home to approximately 19 hectares of public land, endowed as Local Purpose Reserve under the Portobello Libraries Trust stewardship. The University of Otago Marine Studies Centre Portobello Marine Laboratory is nestled on this coast, and leases land from the Libraries Trust, which in turn provides essential funding for three suburban libraries. The Laboratory is Aotearoa's oldest marine research facility!

The Laboratory oversees the management of the public land, in collaboration with the Otago Peninsula Biodiversity Group and STOP. Together, these groups (including many students) are working to study and restore the habitat corridor wrapping the Peninsula coast and beginning to recloak the upper Peninsula, with the financial support of the University, the Yellow-Eyed Penguin Trust, Town Belt Kaitiaki, DCC Biodiversity Fund and Aurora Energy ltd (https://www.otago.ac.nz/news/newsroom/portobello-peninsula-to-be-hub-of-science-and-sustainability). Currently, public overland access to the Peninsula reserve and coast is restricted.

Environmental Health

Opportunities

- Previous conceptual plans for the naturalisation of the Ōwheo should be revisited. A comprehensive restoration plan should be developed in collaboration with adjacent land and infrastructure owners to reintroduce ecological functions to the area of tidal influence (including allowance for sea level rise) whilst ensuring that flood conveyance is improved as part of the wider Ōwheo catchment. Restoration should provide for community access and amenity to connect with estuarine habitat and support a greater awareness around indigenous flora and fauna at interface between harbour and catchments that was previously lost through development.
- The University of Otago marine laboratory is undertaking a coastal restoration and recovery study that will inform restoration efforts in the coastal environment – open sharing of knowledge between the University, mana whenua, and community groups on these findings should be enabled.
- In partnership with mana whenua and the University of Otago, the preservation of Titeremoana (Pudding Island) as a form of marine protected area should be investigated, to provide an example of 'untouched' intertidal ecology within the inner harbour. This could have co-benefits for environmental education and tourism.
- Mana whenua and the University of Otago could investigate the possibilities for regenerative ocean farming, to create commercial opportunities balanced with methods of farming that regenerate fishing grounds, filter water and store carbon. This could include partnership with Greenwave Aotearoa to leverage the existing expertise, funding models, and progress being made in regenerative seaweed farming further north.

Regional Parks

Regional Parks are protected areas which are administered by Local Councils, rather than the Department of Conservation (DOC). They are generally more accessible than DOC estate, and can host a range of activities including camping, barbecues, day walks, swimming, snorkelling, and participation in restoration and conservation actions. Regional Parks are a great way for the community to connect to nature.

The Auckland Council Regional Parks system is a shining example of how existing farmland can be intertwined with recreational spaces, ecosystem restoration, and celebration of culture. There are now 28 Regional Parks in Auckland, including the beautiful Tāwharanui. Tāwharanui Regional Park is a working sheep and cattle farm which is also being actively restored through planting and conservation management lead by Tāwharanui Open Sanctuary Society Inc (TOSSI), in partnership with Auckland Council. The vision of TOSSI is:

"To create an open sanctuary where visitors can freely experience a representative range of natural communities that would have originally been present on the Tawharanui peninsula"

Tāwharanui is protected from mammalian predators by a 2.5 km predator proof fence running across the peninsula. Since its construction in 2004, over 16 indigenous species have returned, or been re-introduced to the sanctuary – including takahē, korimako, kākā, tīeke and geckos. It is frequented by school and university groups on field trips and attracts thousands of volunteers including overseas visitor groups for plantings every year. The sanctuary is also a hostspot for surfing and diving and has one of Auckland's largest and most scenic campgrounds which brings in much needed funding for the sanctuary through the year.

Find out more at Tāwharanui Open Sanctuary Society Inc. (TOSSI), https://www.tossi.org.nz/, https://www.aucklandcouncil.govt.nz/parks-recreation/Pages/park-details.aspx?Location=228

Tāwharanui Regional Park in Tāmaki Mākaurau is model for a farmland peninsula turned Council reserve and conservation success story.

Figure 100 **A kererū perched in the lush regenerating broadleaf forest in Tāwharanui. Credit: Ellis Nimick**

Figure 101 **View over the peninsula from the rocky coast. Credit: Ellis Nimick**

Environmental Health

Opportunities

Pollution reduction

Land use and other activities across the entire Te awa Ōtākou catchment contribute directly to the health of the harbour through the generation and discharge of a range of pollutants. Often transported via the stormwater network, they include contaminants such as heavy metals, hydrocarbons, sediments, litter and wastewater. Historical design of infrastructure has in many instances prioritised the conveyance of these contaminants to the environment which it is now understood is contributing to ongoing degradation.

Change in practice and education is needed to enable future developments to better manage pollutants, as well as to support the wider community in avoiding polluting activities. This will be achieved through empowering organisations and households make better decisions through an improved understanding of the impacts of actions on the health of Te awa Ōtākou. Guidance, legislation and strategies such as the recent *Residential Earthworks in Otago v 1.0 guidance* released by ORC (March 2023), the *DCC Stormwater Quality Bylaw 2020* (effective February 2021), and the *ORC Urban Water Quality Strategy (2017)* are contributing to this progress.

Aging stormwater and wastewater systems require upgrades, especially as urban development around the harbour continues. These upgrades, and the subsequent operational maintenance regimes, will form a key final piece in the puzzle in the intergenerational mission to prevent and minimise wastewater and heavy metal contamination sourced from urban areas from reaching Te Awa Ōtākou.

Opportunities to reduce pollution pressures on Te awa Ōtākou include:

- Work with Keep Ōtepoti Beautiful, University of Otago Student association and other interest groups to target litter issues around the inner harbour, in particular around the north Dunedin student precinct.
- Work with DCC to investigate solutions to wind-blown litter pollution around the Te aka Ōtākou, including improvement of disposal facilities and provision for recycling.
- Ensure that the District Plan, Regional Plan: Coast, Regional Plan: Water, and proposed Land and Water Regional Plan directly address stormwater quality and volume in Te awa Ōtākou catchment with specific policy and rules to cover residential intensification/infill and non-residential developments. All future development within Te awa Ōtākou catchment shall contribute to ongoing improvements in avoiding and reducing contaminant discharge.
    - Current rules in the District Plan could focus more on areas outside the ‘new development mapped areas’ (which are almost all outside of the harbour catchment) such as intensified redevelopment of existing residential and commercial areas where much of the future development is anticipated to occur. Redevelopment should be supported by clear and unambiguous rules which ensure that development can drive continuous improvement in water quality outcomes regardless of scale.

Opportunities

- Ongoing works to resolve the challenges in South Dunedin through the South Dunedin Future program should investigate viable ways to provide robust treatment for the existing pumped stormwater discharge from Portobello Road. It appears feasible to integrate this process with other resilience focussed outcomes such as redesign of the coastal edge which could include an area of constructed wetland or similar.
- Ensure all Council and Waka Kotahi roading and transport projects integrate best practice stormwater measures including water sensitive design.
- Upgrading the existing stormwater and wastewater systems to better cope with heavy rain events, rising sea and groundwater levels is essential to prevent pollution and safeguard water quality.
- Wastewater reticulation is still absent beyond Portobello with a reliance on domestic septic tanks. A resolution to improve the long-term resilience of these systems needs to be developed, in particular to prevent the ongoing contamination of culturally and recreationally valued receiving waters by septic system sourced wastewater. This could, for example, include improved treatment and pumping to land-based disposal at higher elevations.
- Investigate mechanisms (such as imperviousness rates) to fund ongoing retrofit of stormwater management and water sensitive design interventions across existing urban areas.
- Continue ongoing investigations and targeted improvements to reduce the frequency and severity of wastewater discharges to the stormwater network.

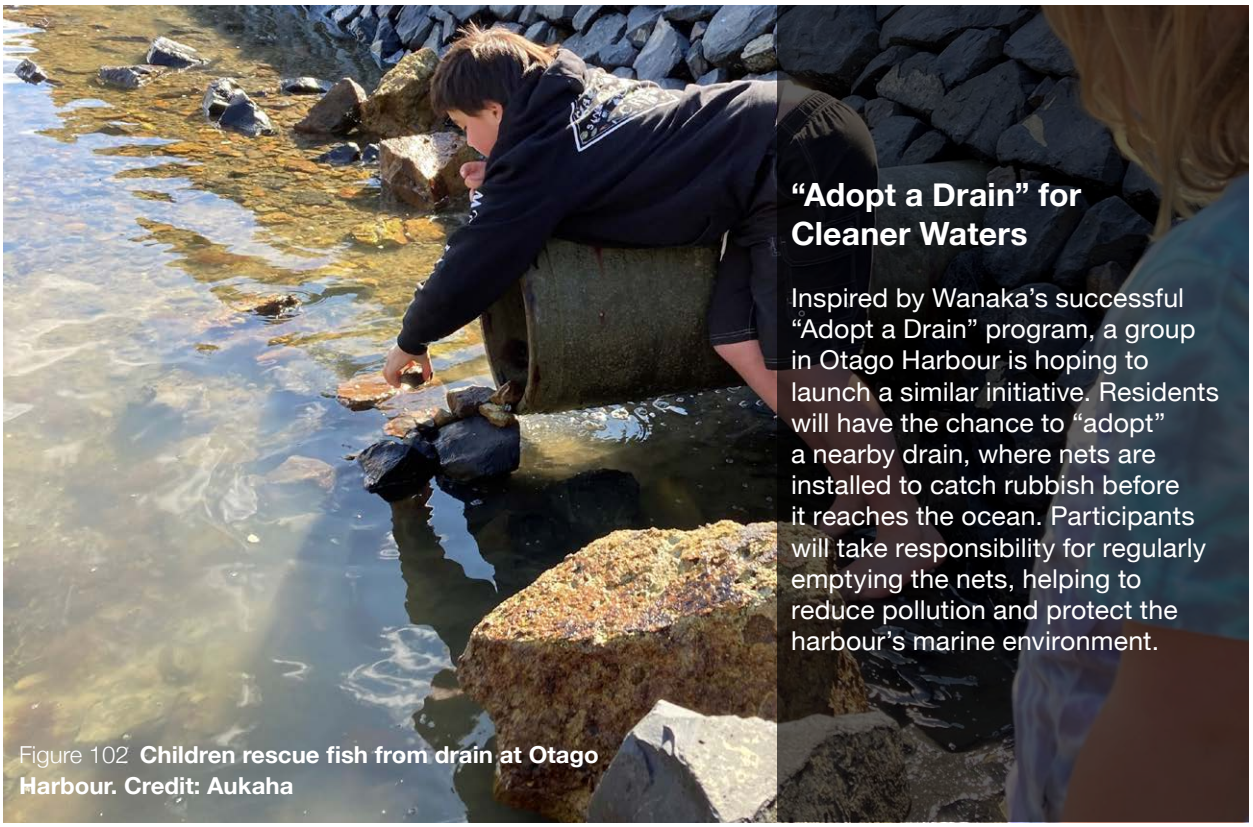
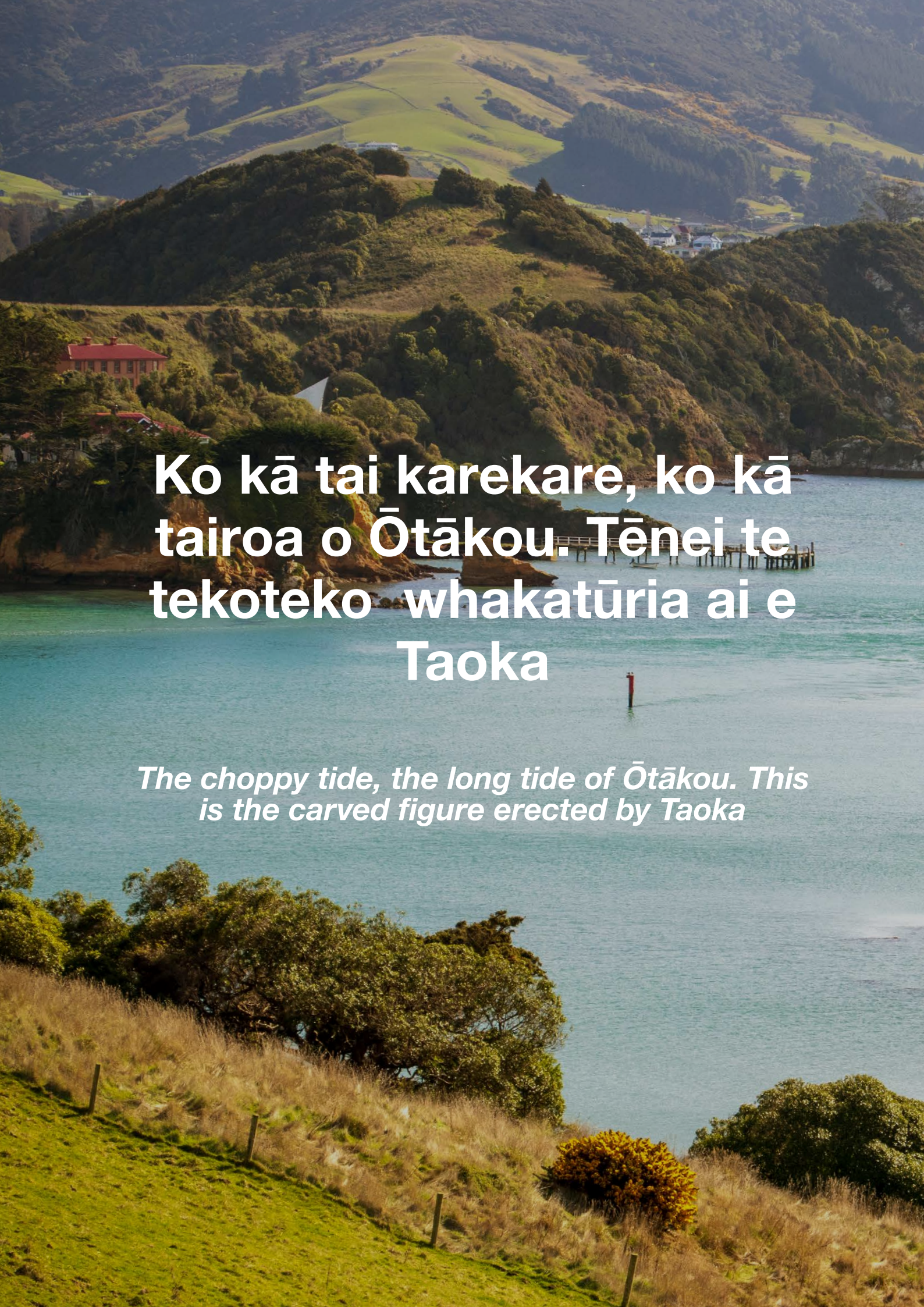


Figure 102 **Children rescue fish from drain at Otago Harbour. Credit: Aukaha**

"Adopt a Drain" for Cleaner Waters

Inspired by Wanaka's successful "Adopt a Drain" program, a group in Otago Harbour is hoping to launch a similar initiative. Residents will have the chance to "adopt" a nearby drain, where nets are installed to catch rubbish before it reaches the ocean. Participants will take responsibility for regularly emptying the nets, helping to reduce pollution and protect the harbour's marine environment.



Ko kā tai karekare, ko kā tairoa o Ōtākou. Tēnei te tekoteko whakatūria ai e Taoka

The choppy tide, the long tide of Ōtākou. This is the carved figure erected by Taoka

4.1.3 Tourism

The recently released Destination Ōtepoti Strategy (2023) provides a clear vision and implementation framework to grow the visitor economy while enhancing the region's environments, cultural taoka, and communities. Efforts such as the Tourism Growth Framework (2018) and projects like the improvement of recreational boating infrastructure improvements reflect a commitment to elevating Dunedin's profile as a sustainable tourism destination. However, the next critical step lies in the implementation of these strategies, including the clear allocation of responsibilities, adequate resourcing, and the establishment of timelines to ensure these plans translate into coordinated and actionable outcomes.

Tourism

Opportunities

Building on the Destination Ōtepoti Strategy

A successful strategy would build upon the already established eco-tourism offerings[48], integrating conservation with visitor experiences. Stakeholders emphasised that the successful implementation of the Destination Ōtepoti Strategy must extend to Te awa Ōtākou and ensure that actions and responsibilities are clearly allocated and adequately resourced. This includes:

- Embracing the existing Tourism Growth Framework by DunedinHOST to ensure that key ambitions are translated into specific, actionable steps, aligning efforts across the region to fully realise the harbour's tourism potential.
- Embodiment of mana whenua values and practices and ensure that they are integral to this effort.
- Being phased with clearly defined ownership and allocation of responsibilities. A phased approach also provides flexibility, enabling the strategy to adapt to changing conditions and emerging opportunities.
- Balancing tourism growth with environmental conservation efforts, key to maintaining the harbour's natural beauty and ecological health, ensuring its long-term appeal as a destination. Balancing tourism growth with community wellbeing and identity is also vital to ensure sustainability.
- Focus development on the enhancement of attractions and services that operate year-round, embracing and celebrating the Otago climate, thus helping to mitigate the impacts of seasonality and provide more stable economic opportunities for local businesses.
- Ensure that mana whenua lead the curation and development of experiences that promote the rich Māori heritage of the harbour in an authentic manner, which centres mana whenua ownership and agency. Mana whenua could develop these as purchasable standalone resources for self-guided tours, for use by operators under license, or developed as tourism destinations.
- Regular monitoring and updates to the implementation plan to ensure it remains relevant and adaptive to emerging opportunities and challenges.

48 "Six of the Best Ways to Immerse Yourself in Nature Around Dunedin." BBC Travel, 30 July 2023, https://www.bbc.com/travel/article/20230730-six-of-the-best-ways-to-immerse-yourself-in-nature-around-dunedin.

Opportunities

Support for Small Operators

Consultation highlighted the need for targeted support for small operators to thrive within a collaborative tourism framework. Opportunities include:

- Promoting Visibility: Building on DunedinHOST's marketing platforms to ensure small businesses are integrated into the region's wider tourism narrative.
- Collaborative Resources: Facilitating cooperative ventures such as shared marketing, transport, or booking systems to reduce operational overheads.
- Encouraging Innovation: Developing incentives to support new offerings aligned with the harbour's unique natural and cultural context, including eco-tourism and low-season activities.

Figure 103 **NaturesWonder Ecotour. Credit: DunedinNZ**

Enhancing Infrastructure and Connectivity

Stakeholders have noted that while infrastructure improvements are underway, such as public bus services for cruise passengers provided by ORC, further investment is needed to enhance connectivity across the harbour. Suggestions include:

- Upgrading amenities and signage at key attractions, such as The Mole, Aramoana, and other underutilised sites, to enhance visitor experiences.
- Continuing to work with private operators, such as ferry services, to improve reliability and accessibility.

Opportunities

Diversifying Tourism Offerings

The Destination Ōtepoti strategy identifies opportunities for creating year-round attractions. Existing initiatives have already begun leveraging the harbour's unique attributes, such as dark sky tourism and wildlife tours. Building on these, stakeholders suggested: Adventure Tourism: Expanding water-based activities like kayaking and sailing, as well as land-based options such as hiking and mountain biking.

- Marine Science Tourism: Strengthening partnerships with the University of Otago to develop educational tourism, potentially reintroducing a public-facing marine science centre or aquarium.
- Volunteer Tourism: Developing programs that invite visitors to engage in conservation efforts, such as wildlife monitoring and habitat restoration, to foster meaningful connections with the harbour.
- Food and Creative Markets: Expanding successful events like the Port Chalmers Seafood Festival into a broader initiative celebrating local cuisine, art, and cultural experiences
- Dark Sky Tourism: Promotion of dark sky tourism around the Southern Lights (Aurora Australis) is already underway in Dunedin, attracting visitors interested in unique astronomical experiences. The harbour's low light pollution offers an ideal setting for stargazing, night tours, and aurora viewings, positioning it as a potential hub for further dark sky tourism initiatives.
- Environmental and Cultural Stewardship: To maintain the harbour's natural beauty and cultural significance, stakeholders recommended ensuring that mana whenua values and practices are embedded in tourism initiatives, allowing them to lead the curation of Māori heritage experiences, and promoting education on sustainable tourism practices for visitors and operators to minimise the environmental footprint of tourism activities.

4.1.4 Arts and Culture

As acknowledged earlier, consultation with the creative community is yet to unfold, and must happen for this kaupapa, given how integral this community is to the harbour and vice versa. The identification of arts and culture opportunities is considered a key knowledge gap to be addressed. However, several opportunities were identified through preliminary consultation.

Arts and Culture

Opportunities

Funding and Support

- Collaboration between DCC Creative Partnerships and mana whenua could identify further key areas for creative representation.
- Avenues to improve the availability and sustainability of arts and cultural funding should be sought, in recognition of the benefits returned to the harbour and its communities.
- The structure and promotion of community grants and funding should be enhanced, and barriers to applying for and securing funding identified and mitigated through consultation with the community.
- Ara Toi Ōtepoti (DCC's city-wide arts and culture strategy) is 10 years old in 2025. When the strategy is refreshed, this process should seek to interface with the kaupapa of this report and its recommendations – seeking opportunities for the arts and culture to thrive in a way that celebrates and benefits Te aAwa Ōtakou.

Public Arts

- The waterfront regeneration project would shine a spotlight on the Ōtepoti arts community, providing opportunities for the creative sector to contribute both in conceptualising what regeneration will look like, and in bringing that vision to life. They would be instrumental in identifying how space can be created for the arts to thrive in the revitalised precinct.
- The feasibility of a sculpture trail to connect the city to the coast along Portobello Road – Harrington Point Road and SH88 - Aramoana Road should be explored, enhancing cultural and recreational offerings. This should include elements to engage rakatahi such as interactive installations.

Figure 104 **Harbour Mouth Molars. Credit: DunedinNZ**

Iwi action on climate resilience

Te Tahū o te Whāriki - Ngāi Tahu Climate Change Strategy

Te Tahū o te Whāriki, the 2018 Te Rūnanga o Ngāi Tahu Climate Change Strategy, outlines a comprehensive approach to addressing climate change impacts on the iwi's interests, assets, and activities. This forward-thinking strategy emphasizes the critical balance between maintaining cultural identity, managing resources wisely, and building resilience among whānau and papatipu rūnanga.

Structured around nine key areas, including governance, cultural identity, kaitiakitaka, economic sustainability, education and whānau well-being, the strategy sets out both short-term goals and long-term priorities for action. It places a strong emphasis on adaptation, mitigation, and seizing opportunities arising from climate change.

Te Tahū o Whāriki demonstrates a proactive, holistic approach that balances cultural values with economic and environmental considerations. It highlights the importance of intergenerational thinking, innovation, and collaboration with various stakeholders, including local and central government.

The strategy provides an overarching framework for incorporating cultural perspectives and values into climate change planning. It focuses on local-level action, emphasizing the protection and adaptation of traditional practices such as mahika kai, while advocating for education to build resilience amongst whānau and communities. The strategy offers a model on how to incorporate cultural values into climate change planning and emphasizes the importance of local, community-driven solutions.

By offering a model for integrating cultural values into climate change planning, Te Tahū o te Whāriki underscores the importance of local, community-driven solutions. It challenges us to think beyond short-term fixes and consider the well-being of future generations, serving as a powerful reminder that effective climate action must be rooted in culture, community, and a deep connection to the land.

Figure 105 **Ōtākou_Awa. Credit: DunedinNZ**

4.1.5 Infrastructure Resilience

The catchment of Te awa Ōtākou would benefit from a clear, user-focused access network that identifies infrastructure priority areas that offer the most public benefit or address historic inequities – prioritising improvements and management with access and use.

Infrastructure Resilience

Opportunities

Integrated Infrastructure and Access Strategy

Building on ongoing initiatives by DCC, ORC, and Port Otago, an integrated approach to infrastructure and access will ensure cohesion for harbour infrastructure. This should involve Woka Kotahi and Kiwi Rail. Existing efforts such as the DCC Infrastructure Strategy, Otago Harbour Reserves Management Plan, and Harbour Arterial Project have laid valuable groundwork. Stakeholder suggestions are to expand and coordinating efforts responding to patterns of use / demand, to address gaps and ensure equitable outcomes.

- Leverage existing plans: Build on the DCC Infrastructure Strategy and the Otago Harbour Reserves Management Plan to shape a unified approach to wharves, moorings, parking, and public facilities. This will ensure alignment with broader citywide goals and facilitates cohesive development.
- Hierarchy of Use: Prioritise high-use areas where improved access will benefit the greatest number of users, guiding targeted investment and ensuring immediate improvements in critical areas.
- Expansion to Secondary Locations: Expand the network to secondary locations in future phases, maintaining integrated management that balances the needs of both commercial and recreational users while maximising the benefits of infrastructure investment.
- Phased Development: Focus initially on key locations such as Dunedin City, Port Chalmers, and Portobello, with future expansion to Pukekura. This phased approach allows decision-makers to target infrastructure that maximises socio-economic benefits and system resilience.
- Unified Planning: Develop a unified plan for the expansion and management of wharves, moorings, parking, and public facilities at these key nodes to ensure cohesive and efficient development.
- Address Historic Inequities: Focus on communities such as Harwood and Ōtākou, where infrastructure improvements have been historically neglected. For example, Peninsula Connection roading improvements bypassed these areas, leaving roads in poor condition. Additionally, the Te Aka Ōtākou cycleway ceases at Portobello, excluding the kāik community that contributed to the cycle network's name.

Opportunities

Stormwater and Wastewater System Upgrades

The aging stormwater and wastewater systems require significant upgrades to meet the demands of urban development around the harbour. These upgrades align with ongoing efforts under the DCC Infrastructure Strategy and ORC's Three Waters initiatives, which focus on addressing critical infrastructure challenges across Dunedin. These upgrades will form a critical component of the intergenerational mission to eliminate wastewater and heavy metal contamination in Te Awa Ōtākou.

- System Upgrades: The aging stormwater and wastewater systems require significant upgrades to meet the demands of urban development around the harbour. These upgrades, along with operational maintenance regimes, are critical to eliminating wastewater and heavy metal contamination from urban areas in Te Awa Ōtākou. Ensure all upgrades on existing piped streams (Toitu and Ōpoho) recognise the cultural and ecological value of these systems as connectors to remnant headwater ecosystems. Consideration of long-term strategies to daylight reaches (as part of waterfront redevelopment) and improve ecological connectivity should be integrated into asset plans.
- Address unreticulated systems: Beyond Portobello, wastewater reticulation remains absent, with reliance on domestic septic tanks. Developing resilient long-term solutions for these systems is essential.
- Focus on Redevelopment: Current rules in the District Plan emphasise 'new development mapped areas,' which are largely outside the harbour catchment. There is a need for clear and unambiguous rules to support intensified redevelopment of existing residential and commercial areas, ensuring continuous improvement in water quality outcomes at all scales.
- Incorporate innovative practices: Build on efforts under the DCC Infrastructure Strategy to prioritise water-sensitive design principles, such as raingardens, constructed wetlands, and incentivised water-sensitive practices.
- Stormwater and Wastewater Capacity: Upgrading existing stormwater and wastewater systems to handle heavy rain events and rising groundwater levels is essential to safeguard water quality and prevent pollution.
- Leverage the South Dunedin Future program: Acknowledge the progress under this program and explore ways to integrate stormwater management improvements with coastal resilience projects, such as constructing wetlands.
- Incorporating water sensitive design principles, water quality treatment devices (such as raingardens and constructed wetlands), hydrological controls and incentivised water sensitive practices should be prioritised in all new developments.
- Ongoing works to resolve the challenges in South Dunedin through the South Dunedin Future program should investigate viable ways to provide robust treatment for the existing pumped stormwater discharge from Portobello Road. It appears feasible to integrate this process with other resilience focussed outcomes such as redesign of the coastal edge which could include an area of constructed wetland.
- Wastewater reticulation is still absent beyond Portobello with a reliance on domestic septic tanks. Resolution to the long-term resilience of these systems needs to be developed.

Figure 107 **Flooding along Portobello road during the October 2024 rain event. Credit: Paul LeComte**

Infrastructure Resilience

Opportunities

Diversifying Public Transport Offer

Following the success of Te Aka Ōtākou cycleways, there is an opportunity to explore additional transport options, enhancing connectivity and sustainability.

- Build on existing initiatives: Reference the success of the cycleways and ORC's additional bus services for cruise ship arrivals as a foundation for expanding electric commuter ferries, tourism ferries, and public transport routes.
- Enhance coordination: Collaborate with ORC, DCC, and Port Otago to create an integrated public transport network that complements existing cycleways and roadways, reducing congestion and enhancing accessibility.

Figure 108 **Otago Peninsula and Te Awa Ōtākou. Credit: Aukaha**

4.1.6 Climate Resilience

The recent 2024 storm events of the third and fourth of October are a timely reminder that community education and action are urgently needed to address both the current poor state of the health of the harbour, and resilience of the harbour landscape and infrastructure in the face of imminent challenges due to climate change.

The opportunity here is to gather around this issue and respond with some solid steps towards improving the situation. Collaboration, partnerships, working groups, community initiatives, governance solutions, legislative ideas - macro and micro solutions are all required.

There is the knowledge and ability to find solutions – scientists have the language to articulate what it means to 'restore an ecosystem', indigenous knowledge is being surfaced and accepted and, crucially, it's not too late.

Climate Resilience

Opportunities

Ecological Solutions for Resilience

Mātauraka Māori is a rich kete holding experiential, ecological and climatic indicators gathered over generations and bound to place, which has much to teach us in our preparation for the changes to come. It is fundamental that mana whenua participate in climate change risk assessment and mitigation planning initiatives, including technical modelling, looking through the lenses of matāuraka Māori and empirical science as they complement one another. Te Tahū o te Whāriki, the Ngāi Tahu Climate Change strategy sets the framework to achieve this.

- The drivers and long-term need for erosion mitigation along Harwood and at Te Rauone Reserve need to be clarified. Any ongoing mitigation measures must be ecologically sensitive, long-term solutions which bolster resilience.
- Continued mapping and monitoring of invasive pest plant species will be essential to inform adaptive management and protect the gains achieved through restoration efforts. This includes early identification of emerging invasive species which may be driven by changing climatic conditions, with such species addressed via revision of the Otago Pest Management Plan and Biosecurity Strategy to ensure they are captured in management programs.

4.1.7 Governance

This work has provided insight into and examples of the extensive ongoing effort by mana whenua, councils and national government agencies, community, business and conservation interest groups and organisations towards the common purpose of healthy harbour. There is also evidence of multiple relationships and collaboration through existing forums and institutional structures around some of the issues and opportunities. The main issue raised is that much of the collaboration is focussed on specific aspects habitat, feature, species, use, area. There is not the level of collective understanding, vision and objectives for the harbour or a mechanism for coordinating planning, effort, funding, resources towards optimising the effort nor assessing potential negative consequences of certain interventions on the system or other users.

Given the dynamic nature of the harbour at the interface of the land, ocean, and freshwater, and its complex web of users and multiple values, the need for coordination was expressed a primary

overarching need. The focus and nature of the ORC's Integrated Catchment Management (ICM) Programme (overview in the text box below) has major relevance in support of effective governance that gives effect to collective community aspirations, effort and involvement in decision making with support from mandated agencies.

ORC Integrated Catchment Management

The focus of the Integrated Catchment Management (ICM) approach is summarised as follows:

Active management, with the objective of catalysing community, iwi and stakeholder action on projects that have a positive impact on the environment. ORC's role is to partner with mana whenua, tangata whenua and collaborate with community and stakeholders to identify the things they value in their place and then to identify what puts pressure on these values. The ICM team then help to plan, implement and monitor actions that manage these pressures or restore the value most effectively. In short, this is a focussed and coordinated approach with the output being Catchment Action Plans (CAPs).

Key aspects of the approach are:

- Non regulatory – the integrated catchment management programme and CAPs are not prescribed legislation, nor are they concerned with making rules. They are however consistent with and seek to support the intention of regulatory planning instruments.
- Collaborative approach based on partnership to support co-ownership of the CAPs.
- Long-term view - recognising that restoration of landscapes will take time and needs to account for climate change and other drivers of change.
- Actions orientated - building on existing efforts and quick win projects that demonstrate progress, success and build partnership between the council, community, iwi, hapū and other role-players.
- Accessible – CAPs will be available online and will be 'live' showing progress and tracking progress towards shared objectives.

The ICM programme initiated from ORC's Long Term Plan (2021-2031) and has kicked off in the Catlins where the CAP has been finalised as well as in the Upper Lakes, where an integrated catchment group has been established, a stocktake of existing community efforts has been compiled, and the group have ben through a series of workshops towards the development of their CAP.

ORC is providing on the ground support in the form of a catchment advisor for each Fresh Water Management Unit in the region[49]. The role of the advisors is to provide the following support:

- Demonstrate stream health assessment methods so people/ community groups can undertake future stream health assessments independently.
- Provide advice on good management practices that can protect waterways, local biodiversity and water use efficiency
- Connect communities with the science about local waterways, as well as other resources and expertise within ORC
- Engage with and assist integrated catchment groups, community groups, primary sector groups and individual landowners
- Give advice on applications for ORC's ECO Fund

49 https://www.orc.govt.nz/environment/water-care/integrated-catchment-management/

- Connect with Otago Catchment Community, who provide organisational support, collaboration and facilitation for integrated catchment groups.

This approach echoes a second major finding and recommendations of the PCE regarding community scale structures - "*Catchment groups provide a way for willing land users to learn from each other and develop a shared understanding of the catchment context. If empowered with high quality information, these groups can be a place where mana whenua, landowners, communities and other local stakeholders can confront, face to face, the trade-offs between social, environmental and economic issues resulting from land use change. Catchment groups should be incentivised to play a larger and more proactive role in environmental management. Incentivisation could happen through increased resourcing or devolution of greater power to these groups*."

The ICM approach also gives effect to the strategic direction expressed by the ORC [50] which aims to focus on community led community initiatives.

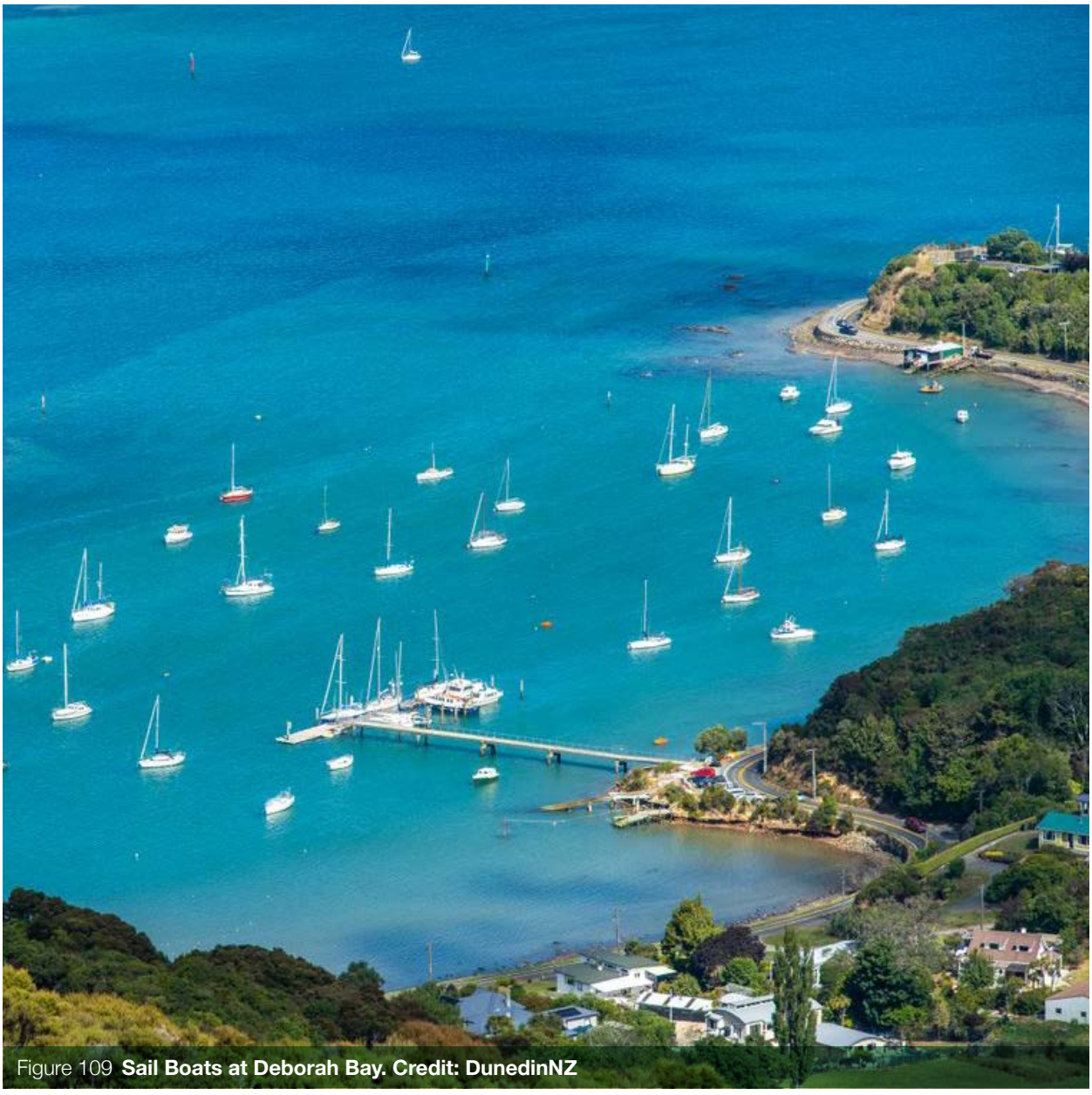


Figure 109 **Sail Boats at Deborah Bay. Credit: DunedinNZ**

50 https://centralapp.nz/NewsStory/orc-to-focus-on-community-led-environmental-initiatives/

Opportunities

Development of an Integrated Harbour Catchment Group

As per the ICM process, development of an integrated catchment group is a key first step in understanding who the community is and ensuring effective representation in the development of a Catchment Action Plan (CAP) for the harbour.

This structure should serve to facilitate coordinated decision making in giving effect to the overarching vision and objectives. The development of a harbour forum was a strong recommendation in the 1990s report. As reflected in the Otago Times[51] failure by ORC to act on subsequent commitments to follow through are a source of major frustration across harbour role-players. It is a critical and primary need underpinning the success of any next steps, and a 'quick win' that should be progressed as a priority. The development an integrated Catchment Group will go a long way to confirming the council's commitment to the system and community, shown by this foundational work. The arrangements should:

- Recognise mana whenua not as mere stakeholders, but as equal partners with protected and enabled rakatirataka. The commissioning of this work by ORC and the authentic partnership with DCC and mana whenua leading the narrative voice in this first phase, demonstrates intent and serves as a solid foundation for achieving this. The establishment of a Governance structure that provides strategic oversight, guidance and regular review of progress against objectives is an option for strengthening this partnership. The Te-Hoiere Project has established a Trust with Trustees from local Iwi, Community, Council and special advisors from partner organisations such as DOC and MBIE.

- Improve the involvement of the Port and University of Otago. These two organisations are notable for their long history with and important role they play in the local economy, society and contribution to the harbour.
  - Given the strategic role of the Port in the economy and many areas and of the port, landholdings and influence in most aspects of the harbour, it is a potential and significant enabler of positive change. A clear sentiment across almost every stakeholder engaged, was that there is a need for improved relationships with the Port underpinned by improved sharing of information and more equitable structures and processes that enhance equitable decision making in terms of mana whenua and community leadership in working with the Port.
  - The University has and continues to play an important role in all aspects of Dunedin life. It is one of the largest employers in the city, responsible for a large proportion of the population, archive of significant research, information and history, and has been undertaking research within the harbour and marine environment for many decades. It also has infrastructure (Portobello Marine Lab and New Zealand Marine Studies Centre) and vessels, through which the University has contributed to the understanding of the harbour. Its location makes it the University best able to explore and research the Southern Ocean. Almost all role-players noted having a relationship with the University, but these varied considerably in terms of the focus, nature and effectiveness and that there is an opportunity to enhance all the University has to offer.

51 "Boaties Call for Harbour Forum." Otago Daily Times, 3 October 2023, https://www.odt.co.nz/news/dunedin/boaties-call-harbour-forum.

Governance

Opportunities

- Identify, and look to optimise/build on any existing relationships and institutional structures, both formal and informal, several of which were noted across the report.
- Consider establishing an appropriate legal entity that serves as the co-ordinating organisation, or capacitating an appropriate existing organisation. It is preferable that the institution be of a type and nature that is able to receive and administer funding. It is similarly beneficial if the entity is not a government organisation, primarily to align with the community ownership, but also to avoids bureaucracy and provide resilience against changes associated with political change and short-term cycles. There are various options. In the case of the Te-Hoiere Catchment the project has funded staff who are located within the council. WAI Wanaka is a non-profit community organisation with funded staff, and Thriving Southland is similar. In the Catlins, the ORC ICM programme has supported the community in establishing an Integrated Catchment Management Group and development of a CAP, but in Catchments where there are existing groups, such as the Manuherekia, where an existing organisation (Manuherekia Catchment Group[52]) has been allocated responsibility for implementing the CAP, ORC will support these organisations.
- Include sub structures or working groups potentially. These could be arranged as sub catchment groups or under the themes of action. The latter option may prove more suitable in view of the interconnected nature of the Harbour. Substructures and work themes could serve as the basis for collaboration and efficiency in drafting funding proposals and sharing resources equitably.
- It is essential that the selected institutional structure is appropriately resourced to provide for efficient and sustained coordination in developing and Implementing the CAP. The resources (people, skills, technology and infrastructure) required to operationalise this structure should be identified. ORC have a catchment advisor for the larger Coast and Dunedin FMU. However additional resources may be required for developing and implementing a CAP at the scale and complexity of the Harbour.

Development of a Harbour Catchment Action Plan

Approximately 100 opportunities were identified across the 7 themes and have been summarised in a database. This tool can be used to add, refine and prioritise actions – assigning responsibility, spatial and temporal focus, link council workplans and community initiatives, and identify funding needs and opportunities. Importantly, nothing demonstrates intent and generates support and interest like immediate action. The table has an initial set of existing and new quick win initiatives – actions that are proven successes, desired by the majority of stakeholders, and have limited barriers (consent/funding) to progressing them in the immediate /short term. Along with the broader list of options, the initial list of quick wins should be refined with a view to actioning them in the immediate term.

52 An Integrated Catchment Planning process was initiated by the Ministry for the Environment and developed in partnership with ORC, Central Otago District Council, mana whenua, DOC and several other partner organisations https://www.mcg.org.nz/.

Governance

Opportunities

The specific actions should give effect to the complimentary elements of the CAP which should comprise of the various elements found in the CAPs developed for existing CAPs such as the Catlins[53], including a Vision, Strategic Objectives, Values (human and environmental), Actions and the supporting mechanisms that ensure the plans effective operation and functionality i.e. governance arrangements and systems.

The process of collaboratively developing a harbour vision is important for establishing and building the social cohesion and organisational partnerships that are fundamental to shared, collective action, acknowledging and harnessing the strengths of all interest groups and role players.

Through the required communication role-players develop an understanding about each other's values and points for connection and cooperation. Working through inevitable differences is important in building strong connections. It is in these strong connections that give the foundation for meaningful action. This process:

- Should be co-developed with mana whenua at the forefront.
- Requires appropriate time space, organisation and is best designed and run by an expert facilitator.
- The stakeholder database should serve as a starting point for identifying role-players and structuring the engagement.
- This process could inform the appropriate institutional structures required to ensure appropriate involvement of role-players in refining an action plan for the harbour, and which cements their role in the implementation thereof.
- The vision should be supported with objectives and outcomes against which success can be measured. These high-level objectives also serve as a basis against which to prioritise actions.
- The vision framework should be supported by principles that guide the way role-players work together in subsequent action planning and implementation. These principles should be imbedded in the institutional mechanism and arrangements developed to enable and sustain collaborative and inclusive relationships across the user and interest groups.
- The CAP needs to be intergenerational in view and action to redress the preceding generations of harm and realise system level change. The strategy is required to account for a complex and dynamic system where changes in drivers beyond the boundaries and control of the harbour and council – policy, economic and environmental – will require an adaptive management and changes in the responses. Responses may also need to be updated as better understanding emerges from system level monitoring and research. The strategy therefore requires a reflective component that accounts for this dynamic context and ensures the responses remain relevant and effective. This regular reflection needs to be built into the project action plan via a monitoring and evaluation framework. Importantly it should include space for reflection on the strength, effectiveness and health of the governance arrangements and relationships they support. The strategy also needs to be resilient to the political winds of change.

53 https://storymaps.arcgis.com/stories/374e8fb65f0b4ee58b32ba68b8b887cc

Opportunities

The Dunedin City Council Future Development Strategy[54] while focused on a city-wide scale, serves as a blueprint with an overarching vision that emphasises the natural environment, cultural connections, and sustainability. It provides spatial guidance, grounded in community outcomes and supported by key principles, including upholding the Treaty of Waitangi and enhancing residents' social, economic, and cultural wellbeing.

Develop a Communication Strategy and Platform

Along with the importance of information, are the systems to share information in an accessible and timely manner so that stakeholders are able to know about events, have the information to inform input to planning processes share information and learning and connect with other people and organisations.

- The development of a communication strategy and supporting tools (websites, social media) and processes (meeting structures and communication protocols) is an important requirement to support the effective coordination and collaboration of role-players across the harbour.
- It is acknowledged that many community-led platforms already exist, including Facebook groups and networks connected to schools and boating clubs; an overarching strategy needs to lean on and integrate these existing platforms.
- Share success and learning broadly across role-players to maintain energy, interest and momentum and motivation for attracting additional funding (a successful track record is an important criterion for funders)
- Other integrated catchment groups have developed websites, newsletters and social media tools to achieve this[55], with the ORC ICM programme supporting the Catlins Catchment Group in hosting a coordinating site for the group.[56]

54 "Future Development Strategy 2024-2054." Otago Regional Council, 2024, https://www.orc.govt.nz/media/l0lfybwk/1091-future-development-strategy-2024-2054.pdf.
55 https://waiwanaka.nz/; https://www.tehoiere.org.nz/; https://www.thrivingsouthland.co.nz/catchment-groups/;
56 https://the-catlins-cap-orcnz.hub.arcgis.com/

Opportunities

Develop Financial Instruments to incentivise Conservation and Land-use Management

As documented by the PCE, catchment scale outcomes are hampered by the fact that the cost rests with private landowners, and are risky and often too high to bear. The PCE suggest we need to explore alternative financial tools to mobilise resources to enable land-use change and improved management at a catchment scale. There is significant body of work internationally around the development of market-based and other financial instruments to incentivise biodiversity restoration and conservation on private land. The need to start adopting and adapting these to the New Zealand context has been recognised. The appropriateness of the instruments varies depending on the social, economic, political and cultural context and the nature of the tenure rights and required change in use and or management. The process should involve:

- Prioritisation, testing and piloting of these instruments[57] to support unlocking of access to private land to achieve landscape level objectives, through appropriate compensation for the associated opportunity cost.
- These instruments will need to ensure the effective inclusion of mana whenua realities, such as collectively owned land and intergenerational equity.

Develop Sustainable Funding Mechanisms

Both ORC and DCC provide funding for community projects and a range of supporting resources. ORC list many of the available funding sources but unlikely all which include National and Local Government, but also corporate responsibility funding, research and philanthropic grant funding among others. Catchment restoration is intergenerational and requires sustained funding in the long term at sufficient values to enable landscape level intervention. Government funding, such as Jobs for Nature (JfN) is often short-to medium term. This poses a risk to the sustained implementation of the CAP. With several national funding programmes for conservation like Jobs for Nature coming to conclusion in the near future many integrated catchment groups are struggling to maintain the effort they built up on the back of this fund. Opportunities to address this challenge include:

- Develop a database of all funding opportunities.
- Provide guidance and support where possible for coordinating funding applications and aligning with existing funding to optimise the investment.
- Investigate, test and implement innovate sustainable funding solutions, like biodiversity credits and payment for ecosystem services, and levy's on visitors such as for cruise liners.

57 Novel financing solutions for land use change, Prepared for Our Land and Water National Science Challenge. Report prepared by Perrin Ag Consultants Ltd and GHA 20 March 2020, June 2023

4.2 Conclusions and Recommendations

This work has painted a rich picture of the history of Te Awa Ōtākou and documented the drivers of change in its health over time, including present issues and how climate change is amplifying these. Importantly the report is peppered with examples of the significant effort toward the common vision of a healthy and thriving harbour. It concludes with a positive lens, documenting a multitude of opportunities to take forward. Importantly the ORC ICM approach provides the blueprint for doing this.

The ICM programme is being rolled out at an FMU scale with the harbour falling within the Dunedin and Coast FMU. However, given the highly developed nature of the catchment and the multiple uses/users and strategic importance of the harbour, for the approach to be successful, it is recommended that it is applied at the scale of the Harbour catchment.

This work has laid a solid platform for following ORC applying the ICM approach in developing a Harbour Catchment scale CAP. The stakeholder database and engagement minutes, draft action plan structure and associated list council strategies, and work-programmes provide useful tools to support this process.

The most obvious quick win would be the setting up of the integrated catchment group, and is the first step in the ICM process. There are also no obvious barriers to this action, and it underpins the success of any next steps.

A highlight of this process has been the effective partnership between mana whenua, the ORC and DCC, and involvement of staff from relevant units and councillors. The following steps are proposed with the aim of consolidating the partnership, institutionalising and building on the outcomes within councils, and building collective ownership for planning and moving into the next phases.

- Meeting between ORC, DCC and mana whenua to reflect on the first phase and establish the nature, approach to and structure of their partnership in taking this mahi forward.
- Review within councils by relevant departments for consideration in terms of relevance to their work-programmes. The outcome would be a more comprehensive list of relevant strategies and workplans in relation to the opportunities database.
- Review of the stakeholder database and mapping by council staff to expand this.
- The involvement of councillors has also been a strength in this process to date and would be useful to cement the process and confirm councillor support and options for further involvement, potentially through a joint session with Councillors from both ORC and DCC. They would likely also contribute to ideas on stakeholders to involve and the process.
- Develop a joint ORC/DCC working group informed by the preceding steps that is responsible for working with mana whenua in facilitating collaboration within and across the councils and stakeholders in taking the process forward.

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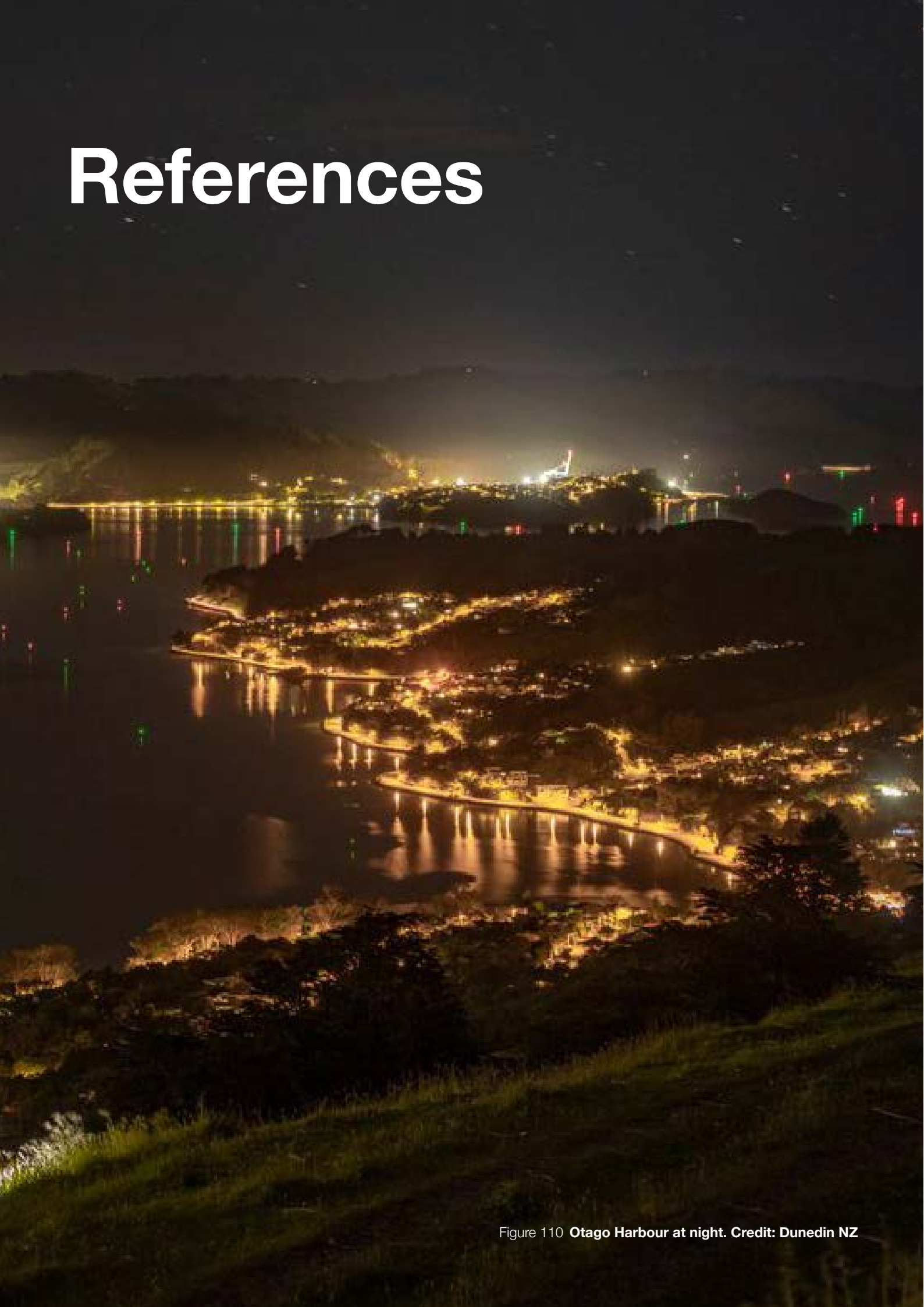

Figure 110 **Otago Harbour at night. Credit: Dunedin NZ**

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