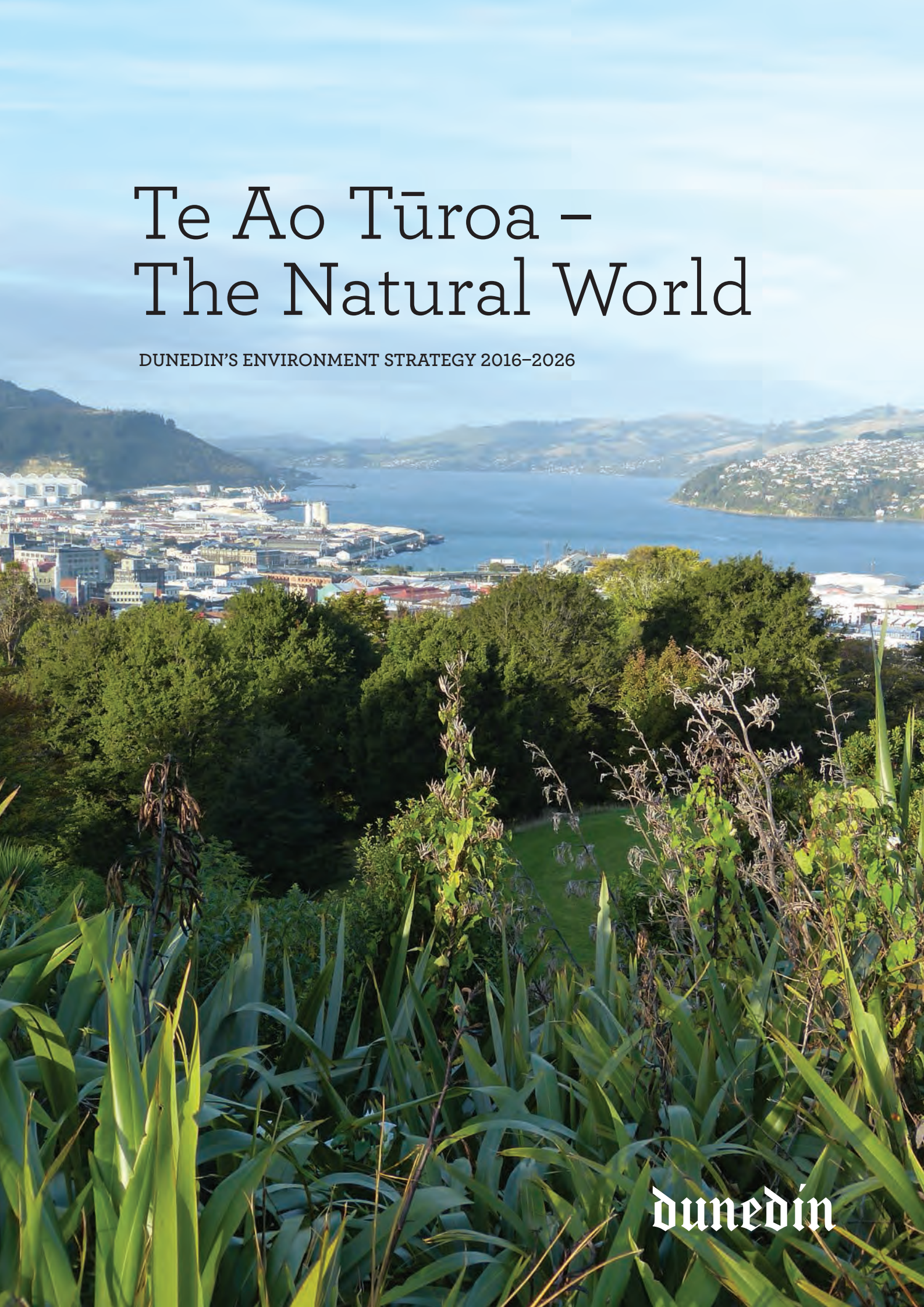
Te Ao Tūroa – The Natural World

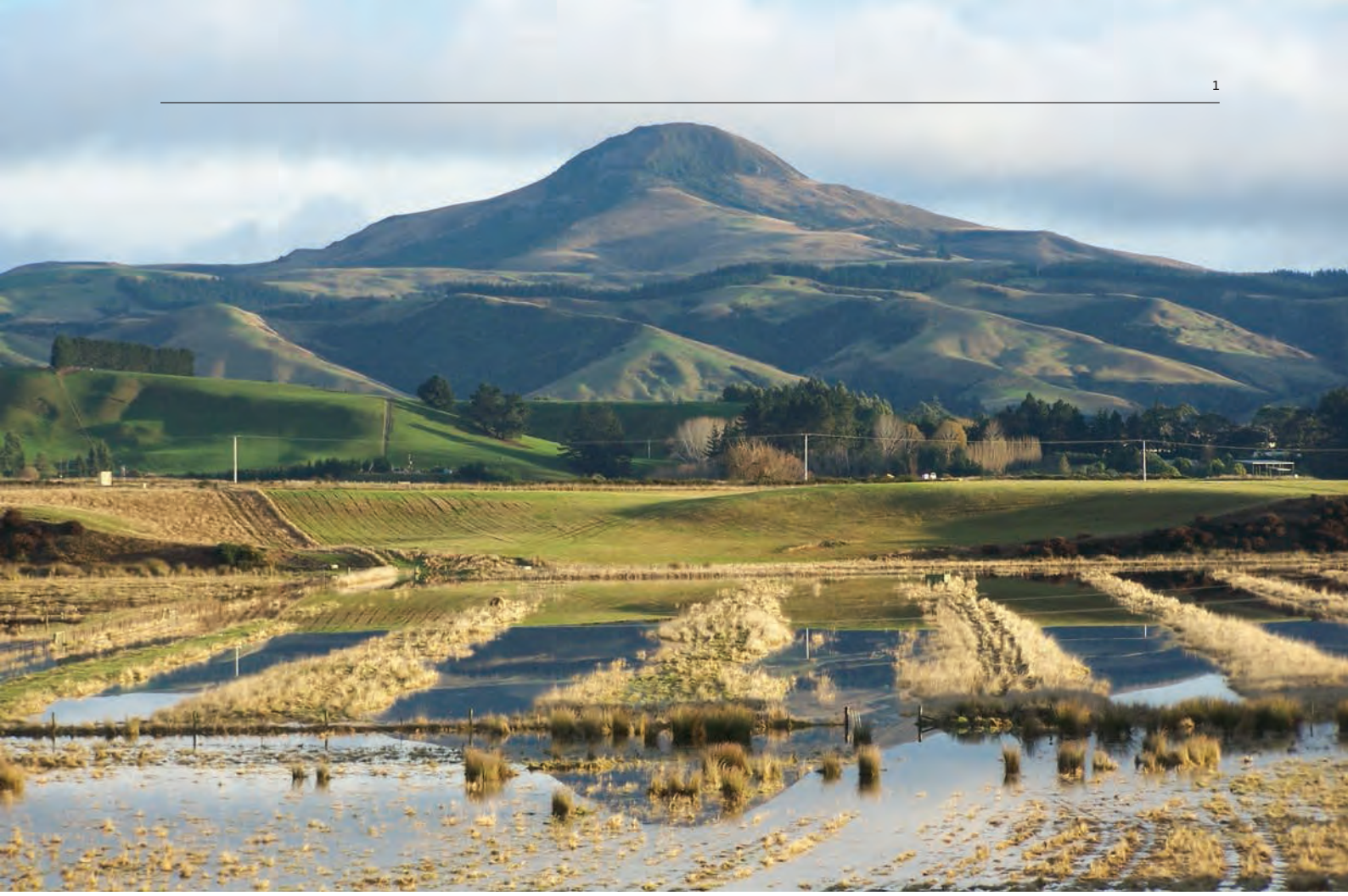
DUNEDIN'S ENVIRONMENT STRATEGY 2016–2026



dunedin

Kia ora koutou

It is with great pleasure that Manawhenua stand as a Treaty partner to support Te Ao Tūroa, Dunedin's Environment Strategy. Dunedin's natural environment and resources – our landscapes, wildlife, mahika kai and coastline – are a source of pride and prestige for Kāi Tahu, as they are for all the city's residents, and are a statement of our identity.



Hikaroroa | Mount Watkin and Te Tauraka Poti | Merton Tidal Arm. Photographer: Chris Hull.

Kāi Tahu people see their existence as an integral part of Te Ao Tūroa (the natural world), and it is our inherited role as kaitiaki to ensure the life-supporting functions of our environment are maintained and protected. For Kāi Tahu, all natural resources – air, land, water and indigenous biodiversity – are taoka, or treasures, derived from the atua (gods) and left by the tipuna (ancestors) to provide and sustain life.

As kaitiaki of Dunedin's natural environment we have two responsibilities: protecting life-supporting capacity and passing the environment to future generations in a state which is as good as, or better than, the current state.

The relationship Kāi Tahu has with the Dunedin City Council is in good heart, reflected by the robust consultation and input of Manawhenua within the development of this strategy.

A relationship that reflects genuine partnership is emerging. This strategy sets out how together we will leave Te Ao Tūroa healthy for those who come after us.

Mō tātou, ā, mō kā uri, ā muri ake nei – for us and our children after us.

Ka tū mātou hei hoa Tiriti, hei tuarā i tēnei Rautaki Taiao o Ōtepōti, arā ko Te Ao Tūroa. Mōkori anō e whakahīhī ana mātou o Kāi Tahu, mātou kā kirirarau o te taone nei i ō mātou taiwhenua, i tō mātou taimoana, i ngā toiora, i kā mahika kai hoki. He taoka tuku iho hai tuakiri mō mātou.

Ko tā Kāi Tahu, ko te ao tūroa ko au, ko au ko te ao tūroa. E kore e wetekina atu mātou i tō mātou haepapa hei kaitiaki kia ora tou ai te tauoraka, a, te taiao tonu rā. Ki a mātou o Kāi Tahu ko ngā wao katoa, ko te hau, ko te whenua, a, ko te wai, he taoka, he waihotaka nā kā atua, nō rātou mā tou kia ora ai te ao mō tātou.

E rua kē kā kaweka ā mātou i tō mātou tūka hei tūtei taiao; kia noho hei tāwharau mō te oraka toutaka o kā kararehe kahere, kātahi. Ka rua, ka tukuna ihotia te whenua kia haumako ake nei tōna āhua i tōna āhua ināianei.

He aukaha kua kaha kia hono ai kā waka e rua, a, Kāi Tahu, a Te Kaunihera o Ōtepōti. Ko tohua tērā tūhono i kā matapakika pakari, i te whāika mana o tō mātou reo i te whanaketaka o te rautaki nei. He honoka whai mana e pihi mai ana. Mā te rautaki nei e tohua me pēhea mātou ko te kaunihera e mahikātahi kia tuku atu he whenua haumako ki ā mātou waihotaka.

Mō tātou, ā, mō kā uri a muri ake nei

Donna Matahaere-Atariki
Chairperson
Te Rūnanga o Ōtākou

Matapura Ellison
Chairperson
Kāti Huirapa Rūnaka ki Puketeraki

Dunedin is one of the world's great small cities and our natural environment is one of our greatest strengths. We all engage with nature at some point in our daily lives. We are all part of the Dunedin ecosystem, and we all need a healthy natural environment to provide us with food, shelter, water and clean air.

Our natural spaces and unique wildlife are a large part of Dunedin's appeal to residents, visitors and migrants and the city's economic wellbeing. We need to safeguard what we have, and strive to improve the health of our environment where it has become degraded. Our wellbeing depends on this, and as guardians of the environment, we have a responsibility to leave it in a better condition for future generations.

Dave Cull
Mayor of Dunedin

Our climate is changing; for example, extreme weather events are happening more frequently. Although climate change poses risks and uncertainties for Dunedin, such as the impact of sea level rise, it also offers opportunities. As part of the international Compact of Mayors, Dunedin has committed to reducing our greenhouse gas emissions. This is our city's contribution to mitigating the global impacts of climate change while we focus on solutions to local challenges.

Te Ao Tūroa is not a starting point. It continues the stewardship and guardianship of the environment by many people and organisations over many generations. This strategy builds on that work, and will help guide our efforts to look after, respect and enjoy the natural environment now and into the future.

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Green space in South Dunedin

Dunedin people are proud of our city's natural beauty. We treasure its uniqueness and value the easy access to clean beaches, natural spaces and wildlife. These things are a big part of our city's identity and sense of place in the world. We cannot take them for granted, and one of the aims of this strategy is to set the direction for protecting, restoring and enhancing Dunedin's natural environment now and into the future.

"Let's lead the world as a small city with a small environmental footprint and a big big beating heart when it comes to looking after our natural environment."

Tanya Lyders, Dunedin citizen

We are experiencing and will continue to experience the impacts of climate change. As part of its commitment to the Compact of Mayors, Dunedin will measure its greenhouse gas emissions, set targets to reduce emissions, report on progress and deliver a climate action and adaptation plan. As a city we want to understand our impacts on the environment and do what we can to mitigate them.

Te Ao Tūroa is a city-wide strategy. We will work together to achieve the strategy's vision through integrated planning and action, and strong and effective partnerships with everyone who has a role to play in protecting the environment. This includes Kāi Tahu, central government agencies, non-profit organisations, community groups, businesses and citizens. We will work smartly and efficiently by sharing our information and resources. Working together, we can make Dunedin one of the world's great small cities with a thriving environment we look after, respect and enjoy.

To significantly reduce the risks and impacts of climate change, governments at the United Nations Convention in Paris 2015 agreed an aim to limit increasing the global average temperature to 1.5°C above pre-industrial levels. They also called for zero net anthropogenic (human-caused or influenced) greenhouse gas emissions to be reached during the second half of the 21st century.

In 2015 Dunedin joined the Compact of Mayors. Launched at the 2014 United Nations Climate Summit, the Compact of Mayors is the world's largest coalition (currently 459 cities globally) of city leaders addressing climate change by pledging to reduce their greenhouse gas emissions, tracking their progress and preparing for the impacts of climate change.

Photographer: Shaun Templeton.

Purpose

The purpose of Te Ao Tūroa is to:

- set the direction for a future safe from climate change impacts
- improve and maintain the health of Dunedin's natural environment
- give Dunedin people every opportunity to feel connected to and look after the environment.

What is the natural world?

Te Ao Tūroa takes a broad view of what constitutes the natural world including, but not restricted to, indigenous flora and fauna; areas of special conservation value, the conservation estate and covenants; the sea, coastline and waterways; farms; forests (native and exotic); botanic, domestic and market gardens; parks, reserves and sports-grounds; street frontages, road reserves, vacant lots and open spaces at or near workplaces – in other words, anywhere there is plant and animal life. While many of these areas have been modified by human activity, they are places where people connect with nature. The health of these places is essential for the health of our city and our people.

The Council acknowledges Manawhenua and their knowledge and understanding of the natural world and the importance of its life-supporting capacity (mauri). We ensure our survival and the survival of future generations when we look after the natural world.

The strategy's definition of 'environment' is based generally on the Resource Management Act definition, which includes ecosystems and their constituent parts, including people and communities; all natural and physical resources and amenity values; and the social, economic, aesthetic and cultural conditions of ecosystems, communities and resources.[1]

[1] Resource Management Act 1991

The Dunedin context

Dunedin's ecosystems

Dunedin's natural environment is unique, from the Rock and Pillar Range to the Aramoana Saltmarsh. The harbour, hinterland, coast, islands, rivers, wetlands and streams provide a magnificent setting for the region's distinctive flora and fauna.

The natural environment has ancestral, spiritual and cultural value to Kāi Tahu, and provides the places and resources that sustain cultural traditions and practices. The Council recognises and supports the importance of mahika kai to Manawhenua and its place at the heart of Kāi Tahu values.

Within our city's boundary there are natural habitats that are home to numerous native plant and animal species, 30 of which are found only in Dunedin. These habitats provide a wide range of important ecosystem services that sustain us and our health and wellbeing by providing food, clean air and water, and healthy soil. Some of Dunedin's ecosystems provide other services such as stormwater cleaning swales, regenerating woody vegetation that absorbs carbon dioxide and water-producing tussock grasslands. We will continue to work with landowners to help sustain the ecosystem services that benefit the whole community.

Research shows that being exposed to the natural environment has direct positive effects on physical and mental wellbeing.[2] The sense of identity we experience when we connect to local natural places has positive effects. It is part of what is called the 'biophilia hypothesis' – the instinctive bond between human beings and other living things.

Dunedin's communities

Many landholders, organisations, community groups and individuals are doing great work for Dunedin's natural environment. Local environmental champions include schoolchildren, teachers, farmers, gardeners, conservationists, scientists, volunteers and iwi. The Council has a strong relationship with the two Kāi Tahu rūnaka in Dunedin and works with them to protect places of particular importance. We value the people who work hard to protect, restore and enhance Dunedin's natural environment. Their work benefits everyone and as a city we want to recognise and celebrate their achievements.

Dunedin has more than 11,300ha of public and private land protected by the District Plan or a Queen Elizabeth II covenant. In addition, the Department of Conservation protects 24,700ha of conservation reserves, and the DCC protects a further 1500ha of reserve land with biodiversity value. Collectively, more than 36,000ha of land with conservation value are protected, or 11% of Dunedin's land area, representing 0.3ha of protected land for every Dunedin resident.

Special places

Dunedin has an abundance of special natural places. The Otago Peninsula's wildlife has led to Dunedin being dubbed the wildlife capital of New Zealand. It is home to world-famous species, including hoiho (yellow-eyed penguins), little blue penguins, sea lions and the only royal albatross colony located on a mainland. In 2010, Lonely Planet named Otago Peninsula one of the top ten destinations in the world for 'twitchers' (birdwatchers). The Orokonui Ecosanctuary, between Port Chalmers and Waitati, is a predator-fenced forested valley where threatened species are being re-introduced, including kiwi, robin, tuatara and the Otago skink.

The entire Dunedin city area is a wāhi tūpuna (ancestral landscape) as it was used and valued by Manawhenua. Wāhi tūpuna sites include, but are not limited to, settlements, battle sites, burial places, wāhi tapu and wāhi taoka sites, mahika kai areas and resources, trails and significant landscape features such as peaks, ridgelines and views.

An Open Space covenant is a legal agreement between a private landowner and the Queen Elizabeth II National Trust and is registered on the title to the land. The agreement is voluntary and binds current and subsequent landowners in perpetuity. There are 66 registered QEII covenants in the Dunedin area (with more in the pipeline) protecting a total of 672ha of land with special conservation value.

[2] Blaschke, P (2013) *Health and Wellbeing Benefits of Conservation in New Zealand.*
[3] New Zealand Tourism Strategy 2015.
[4] Tisdell, C (2007) *The Economic Importance of Wildlife Conservation on the Otago Peninsula – 20 Years On.*

"There is no dispute that healthy stands of upland snow tussocklands maximise water production compared with any alternative types of land cover, even including bare soil."

Sir Alan Mark,
Emeritus Professor, Department of Botany, University of Otago

Image: Snow tussock grassland on the Lammermoor Range. Photographer: Sir Alan Mark.

Tourism

The New Zealand Tourism Strategy recognises a sustainable tourism sector cannot be achieved in isolation, and we need to develop a whole of New Zealand environmental management plan that demonstrates our commitment as a nation to a clear, co-ordinated response to environmental issues.[3] We want our special places and natural resources to be accessible to locals and visitors, but we also want to protect these places from damage and unsustainable use. Careful management is needed to protect Dunedin's natural environment for future generations to use and enjoy. As we continue to protect, restore and enhance Dunedin's ecosystems, we will build on the city's nature and wildlife reputation and help strengthen the local economy.

Dunedin attracts about two million visitors annually with an average of 5500 visitors daily. Enterprises directly involved in viewing wildlife on the Otago Peninsula have a gross annual turnover of around $6.5 million and employ the equivalent of 70 full-time staff.[4]

"An environmentally sensitive and sustainable wildlife and tourism industry is a key component for the active guardianship of health of natural environments and unique ecosystems for current and future generations."

Steve Broni, Chairman,
New Zealand Sea Lion Trust

Challenges and solutions

A changing climate

The Council is working to understand the effects of climate change and to plan for climate change adaptation. Responding to these challenges is one of the main objectives of Te Ao Tūroa. As the responsibility of planning for sea level rise rests primarily with local government, the Council is developing options for areas at risk and will engage with communities as this work progresses.

Climate change impacts in Dunedin mean more extreme rainfall events, storms, floods, droughts, fires and extreme winds. Rising sea levels and groundwater in low-lying areas are seen as the biggest risks.[5] In parts of Dunedin, the water table is very close to the surface and is connected to the sea, increasing the risks of inundation and salination. The Parliamentary Commissioner for the Environment found that the St Kilda and South Dunedin floods in 2015 were made worse by a high water table, which prevented water from prolonged heavy rainfall and high tides from draining away.[6]

Indigenous animal and plant species are most at risk from climate change. Major changes are expected in all groups of vegetation. Rising sea levels increase salt water intrusion in river flows, and warmer temperatures alter the species composition of fresh water habitats.

Sea level rise is a result of sea water warming and expanding, mountain glaciers retreating and polar ice sheets shrinking.

People and the environment

Human activity changes the natural environment. People's daily decisions and actions have impacts – both positive and negative – on vegetation, animals, soil, water, landform and climate. We recognise that it takes a lot of work just to maintain the status quo of the environment's health. Unless we take collective responsibility and action, environmental degradation is the likely result. However, people can also have a positive effect when we learn what to do to minimise or eliminate the negative impacts our decisions and actions have on the environment.

Biodiversity

For several hundred years, Dunedin's natural resources have been used for the survival of the people who have travelled and settled here. While there were some human-induced losses, the region before European arrival was still covered in diverse vegetation types, from coastal scrub and wet forest to inland dry forest and tussockland, and alpine and sub-alpine vegetation at higher altitudes. Following European settlement, these areas were converted for large-scale agriculture and urban development. Most natural habitats were lost and many indigenous species disappeared. The loss has been compounded by introduced plant and animal pests. Today, around three-quarters of the Dunedin region is covered in exotic vegetation and artificial or impervious surfaces.[7]

Dunedin's biodiversity continues to face risk from land clearance and modification, pest animals and plants, and fragmented vegetation and animal populations. There are many organisations and individuals working hard to help reverse biodiversity loss.

[5] Fitzharris, B (2010) *Climate Change Impacts for Dunedin.*
[6] Parliamentary Commissioner for the Environment (2015) *Preparing New Zealand for Rising Seas: Certainty and uncertainty.*
[7] A Biodiversity Strategy for Dunedin City 2007.

"We not only treasure our environment but depend on it. Similarly the ecosystems that sustain us also need our guardianship in order to flourish."

Sustainable Dunedin City

Image: Northern royal albatross at Pukekura | Taiaroa Head. Photographer: Junichi Sugishita.

In 2007 the Council set up the Biodiversity Fund to support landowners wanting to protect, restore and enhance indigenous biodiversity on their land. From September 2013 to September 2015, the Council approved more than $153,000 to support biodiversity projects on private land.

Resource use

The natural environment supports and sustains us and is essential to our wellbeing. However, the natural resources our environment provides are limited and must be managed sustainably to ensure our future survival. Across the Dunedin region, the effects of climate change will increase the seasonality of rainfall, with longer dry periods, and water supply will need to be managed accordingly. Local food production is already adapting to a changing environment, and to the demand for more sustainable farming methods.

In Dunedin 716kg of waste per person/per year is being sent to landfill – based on the 2010/11 total waste to landfill divided by Dunedin's population. Just over one quarter of the waste collected was organic.[8]

One of the aims of Te Ao Tūroa is to minimise waste to help reduce greenhouse gas emissions and to use resources sustainably. Te Ao Tūroa reinforces our aspiration of a zero waste city, which is being taken forward through Dunedin's Waste Management and Minimisation Plan.

New Zealand enjoys a large amount of electricity generated from renewable sources, but we also import a significant amount of non-renewable energy, with oil making up over half of total consumer energy. Dunedin's high rate of car ownership and dependence correlates with increasing vehicle travel, oil usage and carbon emissions.[9]

Being forward-looking when it comes to energy is essential if we are to meet the city's aims to have healthy people in warm homes, reduce our reliance on non-renewable energy sources and explore how to make more use of our own renewable energy sources. The Energy Plan, which is about the city taking action to address these and other energy issues, reinforces the goals and objectives of Te Ao Tūroa.[10]

At 58% of total energy inputs, Dunedin's use of transport fuels sits above the national average. In Dunedin other energy inputs are electricity (31%), LPG (3%), coal (5%) and wood fuels (3%).[11] *The biggest consumers of energy in Dunedin are the transport and industrial sectors, which in 2011 consumed 70% of all energy.*[12]

[8] Waste Management and Minimisation Plan 2013
[9] Dunedin City Integrated Transport Strategy 2013.
[10] The Energy Plan 1.0.
[11] *The Dunedin Energy Baseline Study* (2015).
[12] *An Energy Plan for Dunedin: Discussion document (2015).*

The DCC's role

The DCC promotes positive environmental outcomes in its roles as provider, funder, facilitator and advocate through activities such as:

- spatial and land use planning to protect the natural environment and manage resources sustainably
- working with others to protect and enhance native plants, wildlife and coastal environments
- managing parks, gardens and reserves, including the Town Belt, and maintaining walking and cycling tracks
- disposing of solid waste and water discharges in an environmentally responsible manner
- facilitating and encouraging activities that lessen environmental impacts, such as cycling, walking and minimising waste
- reducing greenhouse gas emissions from its operations to help reduce costs and achieve sustainability goals
- divesting equity investments in fossil fuels
- working in partnership with Kāi Tahu to enhance Dunedin's natural resources.

Some of the things the DCC is doing now

- The Emissions Management and Reduction Plan has targets to reduce emissions, including non-landfill emissions, by 20% from 2013/14 levels within five years.
- Most of the DCC's emissions come from the Green Island landfill. To help reduce these, the DCC is focused on a number of initiatives such as minimising household waste and extending recycling collections.
- Projects such as replacing lighting in the City Library with a more energy efficient system are expected to reduce annual carbon emissions by 54 tonnes. Another example is the plan to replace streetlights with more energy efficient and longer lasting LEDs.
- The Council's commitment to the Compact of Mayors is about the city joining global efforts to reduce greenhouse gas emissions to mitigate the effects of climate change. An action plan will be developed to deliver on this commitment.
- The Energy Plan outlines the ways different sectors can collaborate to reduce Dunedin's climate change and environmental effects. The Plan's BioMassive Project is exploring the city's biomass resources for viable energy alternatives.
- The Strategic Cycle Network is designed to provide cyclists with greater connectivity and safety. It caters to both recreational and commuting cyclists, contributes to fewer cars on the road and provides opportunities for residents and visitors to enjoy the harbour and the city's green spaces.
- The DCC manages a number of reserves for their landscape, biodiversity, archaeological, recreation and production values, including the 328ha Hereweka/ Harbour Cone working farm, which is managed by the Harbour Cone Trust on the DCC's behalf.[13]

[13] http://hereweka.org.nz/

Image opposite page: Ross Creek path. Photographer: Mary McLaughlin.

Strategic fit

National context

A range of national legislation, strategies and policy documents sets the broader strategic context for protecting and enhancing Dunedin's natural environment, including the New Zealand Biodiversity Strategy, the New Zealand Coastal Policy Statement, the New Zealand Emissions Trading Scheme and the Resource Management Act 1991.

Regional context

The Kāi Tahu ki Otago Natural Resources Management Plan 2005 outlines the natural resource values, concerns and issues of Kāi Tahu in Otago. The Otago Regional Council's Regional Policy Statement provides a high level policy framework for sustainably managing Otago's resources and identifies regionally significant issues.

Local context

With the community and stakeholders, the Council has developed a strategic framework to deliver on Dunedin's vision to be one of the world's great small cities. The Council identifies the city's strategic priorities and agrees on resourcing to deliver on these priorities through the three-yearly Long Term Plan process, and within the parameters of the Financial Strategy.

The principles that underpin the strategic framework are a commitment to sustainability and Te Tiriti o Waitangi.

Sustainability – the Council takes a sustainable development approach that takes into account the social, economic and cultural interests of Dunedin's people and communities, maintaining and enhancing the quality of the natural environment and the needs of future generations.

Te Tiriti o Waitangi – the Council values its relationship with the two local rūnaka, Te Rūnanga o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki, and operates in accordance with the Treaty of Waitangi principle of partnership with regard to Kāi Tahu's environmental aspirations. The Council acknowledges that this partnership is essential to achieving the goals and objectives of Te Ao Tūroa.

[13] http://hereweka.org.nz/

Strategy development

Image: Broad Bay School pupils at Smiths Creek. Photographer: Paul Le Comte.

Te Ao Tūroa was initially developed from assessing the community's existing environmental priorities. The DCC reviewed feedback from consultation processes that took place from 2009 to 2015. More than 11,000 individual submissions were reviewed and analysed. The key themes identified were:

- people appreciate the intrinsic and aesthetic values of the flora and fauna around them
- protecting, restoring and enhancing native bush and indigenous ecosystems, including the control of invasive weeds and predators, are high priorities
- the city's beaches should be clean and erosion should be managed
- significant cultural and visual landscapes should be protected from inappropriate development
- the city's dependence on fossil fuels should be reduced by improving energy efficiency, increasing the use of public transport and providing for active modes of travel
- people are concerned about pollution and rubbish being dumped within the natural environment and want ecologically responsible management and treatment of water discharges into the natural environment.

The Council then worked closely with Kāi Tahu to develop a draft Environment Strategy and asked for community feedback during July and August 2015. This feedback identified greenhouse gas emissions, climate change and biodiversity loss as the community's three biggest concerns. The Council also worked closely with Kāi Tahu to develop the final strategy. Key stakeholders who have contributed to and endorse the strategy in principle are the Otago Regional Council, Forest and Bird, the Otago Chamber of Commerce, Sustainable Dunedin City, Federated Farmers and the Department of Conservation.

"The wellbeing of Dunedin as a city will rely on attracting and keeping motivated young people who are committed to a Dunedin that is ecologically, socially and environmentally sustainable."

Mary-Ann McKibben, Manager, BASE (South Dunedin Social Sector Trial)

Te Ao Tūroa – The Natural World: Strategy at a Glance

STRATEGIC DIRECTION	What we want to achieve	**Vision**	**Dunedin is one of the world's great small cities with a thriving environment**
		Goals	**Dunedin is resilient and carbon zero | *Mō tātou, ā, mō kā uri, ā muri ake nei***
		Objectives	**Impact positively on the global environment** · **Plan for and adapt to climate change** · **Manage natural resources sustainably**
	How we'll do this		We'll: • reduce greenhouse gas emissions • be energy efficient • investigate innovative renewable energy solutions • minimise waste • deliver a low carbon transport system • make sure our infrastructure supports positive environmental outcomes • develop resilient and sustainable supply chains • use natural resources with future generations in mind • implement appropriate climate change mitigation and adaptation responses.
DELIVERY FRAMEWORK	How we'll deliver on the goals	**Te Ao Tūroa governance**	**Governance group to drive the strategy's delivery**
		Delivery partners	**DCC | Kāi Tahu | Community | Key stakeholders | Businesses | Places of learning**
		Approach to delivery	**We'll work in partnership to achieve great environmental outcomes | We'll adjust**
		Initial actions	**Compact of Mayors** | Progress work as part of the Compact of Mayors commitment to measure city greenhouse gas emissions, set emission reduction targets and develop and deliver an action plan to reduce emissions. **Climate Change Adaptation** | Develop and implement a climate change adaptation plan and investigate options for areas affected or threatened by sea level rise. **Delivering on Existing Commitments** | Deliver key city commitments and continue work already underway that contributes to this goal (notably the Energy Plan 1.0, the Integrated Transport Strategy, the 3 Waters Strategic Direction Statement and the Waste Management and Minimisation Plan).
			Flagship projects | Town Belt Boost, Backyard Biodiversity, P&P Environment (Promote
			BAU review | Business-as-usual reviews by the DCC, Kāi Tahu and key city stakeholders
			Target set | Baseline data established relating to the new measures (see below) and initial
	How we'll measure success	**Annual State of the Environment report**	Annual check-in with Kāi Tahu, key stakeholders, community and business to provide
			Track progress on key indicators
			• City greenhouse gas emissions[14] (new measure) • Non-landfill city greenhouse gas emissions[15] • Percentage of Dunedin census respondents who cycle, walk or take public transport to work[16] • Number of Dunedin people vulnerable to climate change impacts (new measure)
		Annual State of the Environment report	DCC staff to support Te Ao Tūroa Partnership to update the Council through a report on
	How we'll keep up to date	**Triennial community hui**	Progress on the strategy will be discussed and the strategy direction and delivery adapted
		Strategic review	The strategy will go through a full review at least every 10 years.

[14] Note: The DCC is committed to reducing its overall greenhouse emissions by 5% (including landfill) by 2018/19 (CEMARS Certification Scheme) and the city is now committed to setting a city-wide emissions reduction target through the Compact of Mayors.

[15] Note: The DCC is committed to reducing its non-landfill greenhouse gas emissions by 20% by 2018/19 (CEMARS Certification Scheme).

[16] The DCC is committed to increasing this to 40% by 2024 (Integrated Transport Strategy).

Te Ao Tūroa is structured around three high level goals: Dunedin is resilient and carbon zero, Dunedin has a healthy environment and Dunedin people care for the natural world. This framework outlines the strategy's goals and objectives and how the DCC – in close collaboration with partners and stakeholders city-wide – will deliver on the strategy's intent.

we look after, respect and enjoy

Dunedin has a healthy environment | *He ao tūroa, he ao hauora*

Sustain ecosystem services	Increase indigenous biodiversity	Restore areas of ecological value

We'll:

- safeguard the life-supporting capacity (mauri) of indigenous and taoka species' habitats
- protect important ecological areas
- protect areas of importance to Kāi Tahu
- take a landscape-scale approach to protecting ecosystems and increasing biodiversity
- reduce wastewater overflows
- reduce polluting discharges to the land, air and water
- draw on science, Mātauraka Māori and good environmental practice
- use the best technology available for managing pests.

Dunedin people care for the natural world | *Tiakitaka*

Enjoy, connect to and celebrate the natural world	Increase understanding of the natural world	Champion the natural world

We'll:

- honour and support the kaitiaki role of Kāi Tahu
- improve access to our special places and spaces
- promote active learning about Dunedin's natural environments
- advocate and collaborate for better environmental outcomes
- monitor environmental changes and environmental wellbeing
- support conservation volunteering efforts and initiatives
- support a diverse range of opportunities for volunteers to engage with the environment.

the way we do business as usual to deliver on the strategy's goals | We'll undertake flagship projects to enhance Dunedin's natural environment

Managing Pests | Develop and implement an integrated landscape-scale pest management plan.

Ecosystem Health Boost | Identify and protect areas of ecological significance, establish biodiversity and ecosystem health measures and establish integrated planning for key environmental areas including air, water and soil standards.

Productive Landscapes | Work with landowners to integrate biodiversity into productive environments and to help sustain ecosystem services.

Wildlife Best Practice | Develop and use best practice guidelines for managing wildlife sites and nearby adjacent areas in a consistent way to get better outcomes when protecting wildlife.

City Know-how | Take a city approach to public education and awareness-raising initiatives for topics like protecting penguins on beaches, making use of existing education initiatives.

Volunteer Conservation | Increase volunteer opportunities by communicating and prioritising conservation projects and supporting communities to deliver projects; develop a way to track the volunteer conservation contribution and outcomes.

Visitor Management | Develop and implement a visitors' management plan to protect Dunedin's special places.

and Profile), Environment Envoy (an Urban Dream Brokerage for the environment)

using Te Ao Tūroa lens to kick-start alignment of city work with the strategy's goals by end of 2017

actions, and milestone targets set from this information (e.g. for 2020, 2035 and 2050) by end of 2017

qualitative data on how we're tracking towards achieving the goals of Te Ao Tūroa, and to ensure the strategic direction is still right

- Air quality, with performance benchmarked against National Environmental Standards air standard of PM10
- Soil contamination assessments, with performance benchmarked against the National Environmental Standards
- The water quality of Dunedin's lakes and rivers, including coastal and recreational risk, using Land Air Water Aotearoa measures
- Dunedin's natural ecosystems benefiting from pest management (Department of Conservation measure)
- Biodiversity and ecosystem health (new measure)
- Percentage of Dunedin people surveyed through the Residents' Opinion Survey and/or Quality of Life Survey who feel connected to the natural world
- Percentage of Dunedin people surveyed through the Residents' Opinion Survey and/or Quality of Life Survey who have the opportunity to engage with the natural world
- Volunteer conservation contribution (new measure)

city progress in delivering on the strategy's goals, including updates on initial actions, business-as-usual reviews by the DCC, Kāi Tahu and key city stakeholders.

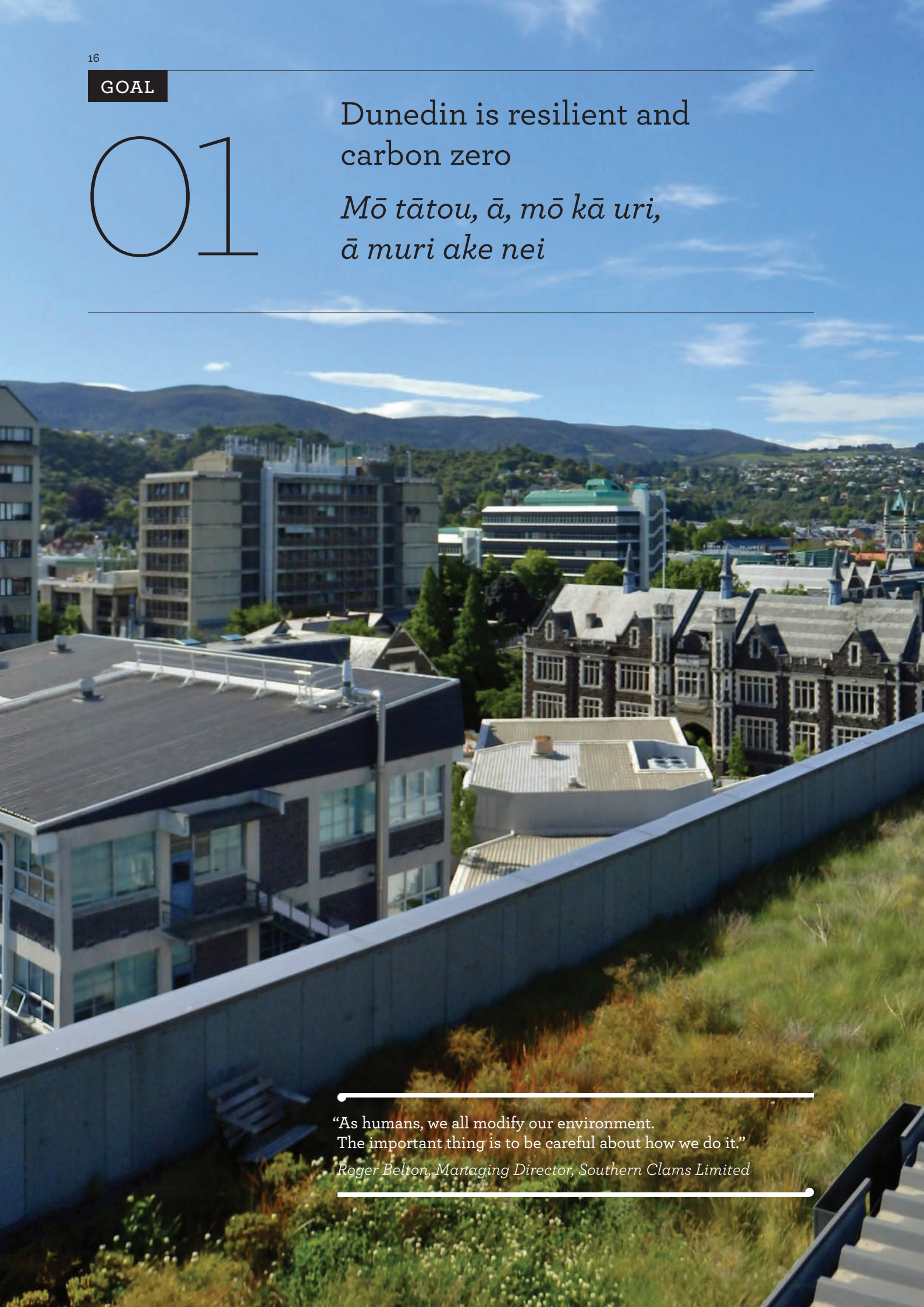
to reflect changing needs and priorities.

GOAL

01

Dunedin is resilient and carbon zero

Mō tātou, ā, mō kā uri, ā muri ake nei



"As humans, we all modify our environment. The important thing is to be careful about how we do it."

Roger Belton, Managing Director, Southern Clams Limited

Dunedin people have always faced environmental changes and extreme weather events. We will do our part as members of the global community to reduce the causes and severity of climate change by reducing our local emissions (mitigation). We will also develop ways to increase our resilience to withstand and recover from the adverse effects of a changing climate and environment (adaptation). We will take an intergenerational approach to looking after the environment by considering future generations in everything we do, and we will manage our natural resources sustainably for Dunedin's long-term health, wellbeing and prosperity.

Objectives

- Impact positively on the global environment
- Plan for and adapt to climate change
- Manage natural resources sustainably

How we'll achieve this

We'll:

- reduce greenhouse gas emissions
- be energy efficient
- investigate innovative renewable energy solutions
- minimise waste
- deliver a low carbon transport system
- make sure our infrastructure supports positive environmental outcomes
- develop resilient and sustainable supply chains
- use natural resources with future generations in mind
- implement appropriate climate change mitigation and adaptation responses.

Initial actions

Compact of Mayors

- Progress work as part of the Compact of Mayors commitment to measure city greenhouse gas emissions, set emission reduction targets and develop and deliver an action plan to reduce emissions.

Climate Change Adaptation

- Develop and implement a climate change adaptation plan and investigate options for areas affected or threatened by sea level rise.

Delivering on Existing Commitments

- Deliver key city commitments and continue work already underway that contributes to this goal (notably the Energy Plan 1.0, the Integrated Transport Strategy, the 3 Waters Strategic Direction Statement and the Waste Management and Minimisation Plan).

Indicators of change

- City greenhouse gas emissions (new measure)
- Non-landfill greenhouse gas emissions
- Percentage of Dunedin census respondents who cycle, walk or take public transport to work
- Number of Dunedin people vulnerable to climate change impacts (new measure)

Image opposite page: A green roof on top of the William James Psychology Building at the University of Otago Photographer: Mark Mason

GOAL

02 Dunedin has a healthy environment

He ao tūroa, he ao hauora

"Dunedin's natural environment is integral to our identity and has a clear role in the health and wellbeing of out people."

Jo Kingi, Public Health South, Southern Health Board

Dunedin has a diverse range of flora and fauna on public and private land, and in urban, rural, freshwater and coastal areas. We will take collective action in a holistic way that draws on science, mātauraka Māori and good environmental practice to maintain, improve and measure biodiversity values, ecosystem services and the overall health of our environment.

Objectives

- Sustain ecosystem services
- Increase indigenous biodiversity
- Restore areas of ecological value

How we'll achieve this

We'll:

- safeguard the life-supporting capacity (mauri) of indigenous and taoka species' habitats
- protect important ecological areas
- protect areas of importance to Kāi Tahu
- take a landscape-scale approach to protecting ecosystems and increasing biodiversity
- reduce wastewater overflows
- reduce polluting discharges to the land, air and water
- draw on science, mātauraka Māori and good environmental practice
- use the best technology available for managing pests.

Initial actions

Managing Pests

- Develop and implement an integrated landscape-scale pest management plan.

Ecosystem Health Boost

- Identify and protect areas of ecological significance, establish biodiversity and ecosystem health measures and establish integrated planning for key environmental areas including air, water and soil standards.

Productive Landscapes

- Work with landowners to integrate biodiversity into productive environments and to help sustain ecosystem services.

Indicators of change

- Air quality, with performance benchmarked against National Environmental Standards air standard of PM10
- Soil contamination assessments, with performance benchmarked against the National Environmental Standards
- The water quality of Dunedin's lakes and rivers, including coastal and recreational risk, using Land Air Water Aotearoa measures
- Dunedin's natural ecosystems benefiting from pest management (Department of Conservation measure)
- Biodiversity and ecosystem health (new measure)

Image opposite page: Caversham peripatus (Peripatoides 'Dunedin') close-up inside rotten log.
Photographer: Rod Morris. ©Rod Morris / www.rodmorris.co.nz

GOAL

03 Dunedin people care for the natural world

Tiakitaka

"The Strategy calls on us, as Dunedinites, to do something we've done really well on all sorts of other projects: to own the vision as a community, and collectively innovate our way to making it a reality."

Jinty Mactavish, Chair, Landscape Connections Trust

We are the guardians of the environment and we are responsible for looking after it, for our generation and generations after us. We will foster understanding and connections between people and nature. Dunedin is a place where people join together to look after, respect and enjoy the natural environment.

Objectives

- Enjoy, connect to and celebrate the natural world
- Increase understanding of the natural world
- Champion the natural world

How we'll achieve this

We'll:

- honour and support the kaitiaki role of Kāi Tahu
- improve access to our special places and spaces
- promote active learning about Dunedin's natural environments
- advocate and collaborate for better environmental outcomes
- monitor environmental changes and environmental wellbeing
- support conservation volunteering efforts and initiatives
- support a diverse range of opportunities for volunteers to engage with the environment.

Initial actions

Wildlife Best Practice

- Develop and use best practice guidelines for managing wildlife sites and nearby adjacent areas in a consistent way to get better outcomes when protecting wildlife.

City Know-how

- Take a city approach to public education and awareness-raising initiatives for topics such as protecting penguins on beaches, making use of existing education initiatives.

Volunteer Conservation

- ncrease volunteer opportunities by communicating and prioritising conservation projects and supporting communities to deliver projects; develop a way to track the volunteer conservation contribution and outcomes.

Visitor Management

- Develop and implement a visitors' management plan to protect Dunedin's special places.

Indicators of change

- Percentage of Dunedin people surveyed through the Residents' Opinion Survey and/or Quality of Life Survey who feel connected to the natural world
- Percentage of Dunedin people surveyed through the Residents' Opinion Survey and/or Quality of Life Survey who have opportunities to engage with the natural world
- Volunteer conservation contribution (new measure)

Delivering on the strategy's objectives

Te Ao Tūroa sets the strategic direction for improving Dunedin's environmental wellbeing. Delivering on the strategy's objectives requires a long-term, collaborative and concerted effort from us all. Some work is already underway in existing projects and plans. New ideas will come forward as work progresses and our thinking develops. Flagship projects, involving organisations and individuals dedicated to protecting, restoring and enhancing Dunedin's natural environment, will be planned and implemented as part of that process.

Monitoring and review

This strategy identifies three strategic goals against which successful delivery will be monitored. Governance arrangements will be established to review and monitor the strategy's implementation. The Council will receive an annual progress report on the strategy's delivery. The wider community will be involved in tracking progress on Te Ao Tūroa through:

- a community event each year where an annual State of the Environment report is presented, celebrated and discussed
- a triennial hui to examine progress and review the strategy's direction.

The triennial hui will be an opportunity to evaluate the strategy's progress and highlight any areas where the objectives are no longer fit for purpose. This process will feed into a formal evaluation of the strategy and any revisions needed to keep it fresh and relevant. A full review of the strategy will take place every 10 years.

Glossary

Advocate: when the DCC appeals to other agencies such as central government and the Otago Regional Council to promote and achieve environmental wellbeing outcomes.

Anthropogenic: caused or influenced by humans.

Areas of special conservation value: recognised areas of indigenous vegetation and fauna on public or private land protected by the District Plan.

Biodiversity: the variety of plant and animal life in a particular habitat.

Biomass: biological material derived from living or recently living organisms. In the context of biomass for energy it is often used to mean plant-based material (such as woodchip), but biomass can equally apply to both animal- and vegetable-derived material.

Biophilia hypothesis: the theory of the instinctive bond between human beings and other living systems.

Carbon emissions: carbon dioxide and carbon monoxide in the atmosphere, produced by vehicles and industrial processes.

Ecosystem: a biological community of interacting organisms and their physical environment.

Ecosystem services: the benefits provided by ecosystems that make human life possible (e.g. clean air, soil and water).

Environment: ecosystems and their constituent parts, including people and communities; all natural and physical resources; amenity values; and the social, economic, aesthetic and cultural conditions which affect or are affected by the factors listed (this definition is based on the Resource Management Act 1991).

Funder: when the Council provides funding to another organisation or community group towards providing a service or facility (e.g. Biodiversity Fund).

Greenhouse gas: any gas that absorbs infrared radiation in the atmosphere, including carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride (www3.epa.gov).

He ao tūroa, he ao hauora: a natural world, a healthy world.

Kaitiaki: guardian.

Kaitiakitaka: the exercise of customary custodianship in a manner that incorporates spiritual matters by takata whenua who hold manawhenua status for a particular area or resource. The concept of kaitiakitaka evolved as Manawhenua responded to their impact on the natural environment.

Photographer: Taichi Nakamura

Landscape-scale conservation: a holistic approach to conservation that, in addition to biodiversity, considers local economies and agriculture, eco-tourism, geodiversity and the health and social benefits of the environment.

Mahika kai: the customary gathering of food or natural materials, and the places where those resources are gathered.

Mātauraka Māori: Māori knowledge or wisdom.

Manawhenua: those who exercise customary authority or rakatirataka (chieftainship or decision-making rights).

Mō tātou, ā, mō kā uri, ā muri ake nei: for us and for our children after us.

Promoter/Facilitator: when the DCC undertakes promotional activity and educational programmes, or brings together other organisations or community groups to work towards positive environmental outcomes (e.g. Enviroschools and Keep Dunedin Beautiful).

Provider: when the DCC provides a service, facility or infrastructure (e.g. Green Island landfill).

Queen Elizabeth II (QEII) covenant: a legally binding and permanent protection agreement which is registered on the title of land to protect its special natural and cultural features.

Regulator/Planner: when the DCC enforces government legislation and develops its own bylaws and plans (e.g. District Plan).

Resilient: able to withstand or recover quickly from unexpected or difficult conditions.

Supply chain: a system of organisations, people, activities, information and resources involved in moving goods or services from suppliers to consumers.

Takata whenua: the iwi (tribe) or hapū (sub-tribe) that holds manawhenua in a particular area.

Taoka: a treasure, a thing of great value.

Te Tiriti o Waitangi: the Treaty of Waitangi.

Tiakitaka: the act of guarding or keeping.

Tikaka: customary values and practices.

Wāhi taoka: resources, places and sites treasured by Manawhenua.

Wāhi tapu: places sacred to takata whenua.

Wāhi tūpuna: the landscapes that embody the ancestral, spiritual and religious traditions of all the generations before European settlement.

Photographer: Paul Le Comte.