2025 - 2035

Upper Lakes Catchment Action Plan

Comprehensive document

Workshopped by:
Upper Lakes Integrated Catchment Group

upper-lakes-orcnz.hub.arcgis.com

Facilitated by:
ORC Integrated Catchment Management Team

icm@orc.govt.nz

CONTENTS

Executive Summary 6

Project Purpose 9

- Rationale 9
- Catchment action plan Development 9
  - Upper Lakes Integrated Catchment Group (ICG 9
  - Workshops and planning process 10
- Scope 11
- The Upper Lakes ICG Mission Statement 14
- Vision of the Upper Lakes CAP area in 2075 14
- Mana Whenua Partnership 15
- Connection to existing plans 15

The Upper Lakes Catchments 16

- Catchment Profile 16
- Cultural significance to mana whenua 17

Our Values 18

Cultural and Community Values 18

- Environmental values 20

Environmental Value Profiles 22

- Alpine Environment 22
  - Aspirational Profile: Alpine and subalpine 22
- Terrestrial Environments 23
  - Aspirational Profile: Beech Forest 23
  - Aspirational Profile: Tussock Grassland 23
  - Aspirational Profile: Shrubland and woodland 24
  - Aspirational Profile: Naturally uncommon ecosystems (NUEs) 24
- River Environments 24
  - Aspirational Profile: Braided Rivers and Braidplains 25
  - Aspirational Profile: Rivers and Riparian zones 25
- Lake Environments 25
  - Aspirational Profile: Deepwater Lakes (Whakatipu Waimāori / Wakatipu, Wānaka and Hāwea) 26
  - Aspirational Profile: Lakes (Including Waiwhakaata / Lake Hayes) 26
- Wetland Environments 27
  - Aspirational Profile: Wetlands 27
- Groundwater Environment 27
  - Aspirational Profile: Aquifers and groundwater 28

Modified Environments 28
Aspirational Profile: Productive Land 29
Aspirational Profile: Urban Spaces 29
Drivers and pressures 29
Driver and pressure profiles 30
Driver profile: Historic Introduction of Species and Insufficient Control 30
Driver profile: Increasing Population and Rapid Development 30
Driver profile: Recreational and Tourism Activities 31
Driver profile: Intensification of Agriculture 31
Driver profile: Changing Climate 31
Driver profile: Knowledge Gaps 31
Pressure Profile: Introduced Predator Mammals 32
Pressure Profile: Freshwater Invasive Organisms 32
Pressure Profile: Wilding Conifers (Pines and firs) 32
Pressure Profile: Terrestrial Weeds (other than wilding conifers) 33
Pressure Profile: environmental conditions that are not suitable for mahika kai 33
Pressure Profile: Clearing and Changing Native Vegetation and Wetlands 33
Pressure Profile: Introduced Herbivore Mammals 34
Pressure Profile: STORMWATER AND WASTEWATER DISCHARGES 34
Pressure Profile 9: CONTAMINANT LOSSES FROM LAND USE 34
Pressure Profile: Microplastics 35
Pressure Profile: Introduced Fish 35
Pressure Profile: Hydroelectric Dam Network 36
Pressure Rating 36
Our Goals 39
Goal: Increase the abundance of native wildlife 39
Goal: Maintain or improve water quality 39
Goal: Improve freshwater ecosystem function 39
Goal: Improve environmental conditions for mahika kai and enable safe use 40
Goal: Increase overall native vegetation coverage and improve condition 40
GoaL: Improve overall wetland coverage and function 40
Goal: Maintain or improve naturally uncommon ecosystems 41
Goal: Strengthen ki uta ki tai (interconnectedness) 41
Action Plan 43
Effectiveness Rating 43
Programme 1: Foundational Programme 46

Strategy 1: Develop a long-term and diverse framework that sustains funding that will support actions 46
Strategy 2: Increase science, research and knowledge sharing for the community 47
Strategy 3: Strengthen our mana whenua partnership 48
Strategy 4: Improve environmental conditions for mahika kai and enable safe use 49
Programme 2: Native wildlife 50
Strategy 5: Control introduced predator mammals 50
Strategy 6: Assist tuna kuwharuwharu (longfin eel) and kanakana (lamprey) migration, in partnership with Mana Whenua 52
Strategy 7: Protect and enhance galaxiid habitats 54
Programme 3: Native vegetation 55
Strategy 8: Control wilding conifers (pines ANd FIRS) and terrestrial weeds 55
Strategy 9: Protect, restore and enhance native vegetation 57
Programme 4: Freshwater 59
Strategy 10: Protect, restore and enhance wetlands 59
Strategy 11: Reduce contaminants from stormwater and wastewater 61
Strategy 12: Reduce contaminant losses from land use 63
Strategy 13: Reinforce freshwater biosecurity in deepwater lakes 64
Monitoring CAP progress 66
The future of our Upper Lakes ICG 66
On-the-ground Delivery 67
Kicking things off – initial projects and actions 67
Communicating the plan 68
Adaptive management and review 69
References 71
Appendices 74

Acknowledgement

We warmly thank all members of the Upper Lakes Integrated Catchment Group (ICG). This plan reflects your dedication and willingness to work together for the benefit of the Upper Lakes CAP area and its communities. Across our hui (in person and online), six workshops, and a sunny site visit, you shared time, knowledge, and experience - from local insights and cultural perspectives to industry expertise and practical know-how.

Your mahi highlights the value of collaboration, bringing together mana whenua, community groups, landholders, agencies, and industry partners with a shared vision for te taiao. This collective impact approach gives the CAP both its grounding and its strength.

We sincerely appreciate your contributions, your commitment through some bumps in the road, and your patience throughout this process. The CAP has been shaped by your effort and will rely on your ongoing leadership and energy into the future. We look forward to continuing our work together as we bring the plan to life.

Kā mihi maioha,
ORC's Integrated Catchment Management Team (past and present)

EXECUTIVE SUMMARY

Catchment Action Plan (CAP) Rationale

Otago Regional Council's (ORC) Integrated Catchment Management (ICM) programme was established in 2021 to lead the development of Catchment Action Plans with iwi and the community. A CAP is a long-term, non-regulatory plan for protecting biodiversity and freshwater. It builds on the work of mana whenua, communities, and local government, providing a coordinated focus for new actions and projects.

The Upper Lakes Integrated Catchment Group (ICG) and Workshops

The Upper Lakes Integrated Catchment Group (ICG) was established in 2024 to co-develop this CAP. Membership was approved by ORC councillors and includes mana whenua representation, community representatives, staff from agencies such as Queenstown Lakes District Council (QLDC), the Department of Conservation (DOC), and Toitū te Whenua Land Information New Zealand (LINZ), and an ORC councillor. Over 12 months, members contributed more than 880 hours through 2 hui, 6 workshops, and a site visit, guided by the Open Standards for the Practice of Conservation.

Purpose

The Upper Lakes CAP is a long-term, non-regulatory plan to protect, enhance, and restore native biodiversity and freshwater quality. It builds on the work of mana whenua, communities, and local government, aiming for collective impact by aligning efforts around shared goals for environmental health and community wellbeing.

Scope

The plan spans a 10-year timeframe (2025–2035) with initial actions prioritised for the first 3–5 years. Spatially, the Upper Lakes CAP area aligns with QLDC boundaries. The area includes Whakatipu Waimāori (Wakatipu), Wānaka, Hāwea, Waiwhakaata (Lake Hayes), the upper Kawarau River, Ōrau (Cardrona River), the Upper Mata Au (Clutha River) and Hāwea Flat.

Mana Whenua

The hapū who hold mana whenua status in the Upper Lakes CAP area are affiliated with seven papatipu rūnaka across Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku. As Te Tiriti (treaty) o Waitangi partners, they exercise rakatirataka (authority) in relation to the management of te taiao (the natural environment). Otago Regional Council and the Upper Lakes ICG acknowledge that building trusted, enduring relationships requires consistent engagement and support for mana whenua participation.

Mission

The mission affirms a shared commitment:
"The Upper Lakes, with its soaring mountains and deep glacial lakes, is where manaaki whenua and manaaki takata is inherent in all we do. We are committed to protecting and improving the unique native biodiversity in our place, while aiming to inspire and empower future generations to further protect and enhance the area's special values."

Cultural and Community Values

The cultural and community values identified for the Upper Lakes CAP are: waimāori (fresh water), health and wellbeing of people, rest, replenishment and learning, local economy, sustainable agriculture,

visitors and tourism, recreation, taoka species, scenic landscapes, and ki uta ki tai (interconnectedness). These values depend on the health of the environment - “Ka ora te whenua, ka ora te takata” – when the land and waters are well, the people are well.

Goals and objectives

Environmental health goals: “what we need to achieve”

Increase the abundance of native wildlife
Maintain or improve water quality
Improve freshwater ecosystem function
Improve environmental conditions for mahika kai (cultural resources and practices) and enable safe use
Increase overall native vegetation coverage and improve condition
Improve overall wetland coverage and function
Maintain or improve naturally uncommon ecosystems
Strengthen ki uta ki tai (interconnectedness)

Pressure reduction objectives: “What we need to get on top of”

Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, possums, mice, hedgehogs, and feral cats)
Reduce the risk of new freshwater invasive organisms establishing
Contain and remove lagarosiphon
Reduce wilding conifer seed sources, infestations, and re-infestations
Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)
Improve environmental conditions for mahika kai and enable safe use
Avoid clearing and change to native vegetation
Avoid clearing, draining, or filling of wetlands
Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois, and tahr)
Reduce contaminants — sediments, nutrients, pathogens, microplastics — in stormwater
Avoid wastewater discharge to freshwater
Reduce contaminants — sediments, nutrients, pathogens, agrichemicals — from land use entering freshwater
Reduce introduced fish interactions with non-migratory galaxiids
〰 Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration
Reduce knowledge gaps

Summary Action Plan

Development the action plan must be grounded in meaningful partnership with mana whenua. A dedicated partnership plan (strategy 3) will be prepared to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish to within the Upper Lakes Governance Group. The action plan is an initial framework only and will be adapted as required, with a clear commitment to respond to mana whenua direction and guidance in action design and implementation.

The action plan is organised into four programmes with twelve strategies:

- **Foundational Programme:** Develop a long-term funding framework, increase science, research and knowledge sharing, strengthen mana whenua partnerships, and improve environmental conditions for mahika kai and enable safe use.
- **Native Wildlife Programme:** Control introduced predator mammals, assist tuna kuwharuwharu (longfin eel) and kanakana (lamprey) migration, and protect and enhance galaxiid habitats.
- **Native Vegetation Programme:** Control wilding conifers and terrestrial weeds, and protect, restore, and enhance native vegetation.
- **Freshwater Programme:** Protect, restore, and enhance wetlands; reduce contaminants from stormwater, wastewater, and land use; and reinforce freshwater biosecurity in deepwater lakes.

Monitoring Plan

Monitoring will track delivery of actions, measure progress towards objectives, and test assumptions to ensure the CAP remains effective and adaptive. A framework of indicators will guide assessment of pressures, environmental health, and cultural values. Progress will be tracked using existing monitoring programmes and community science.

Communicating the Plan

The CAP will be shared widely to maintain transparency and collective ownership. Communication will use tools such as an interactive ArcGIS Hub, printed and digital summaries, community events, and local displays, supported by ongoing engagement with mana whenua, landholders, groups, and the wider community.

Delivery and Governance

An Upper Lakes CAP Governance Group will be established, made up of core members (including mana whenua) with decision-making power. A wider circle of collaborators will be invited to participate as the work progresses. Clear terms of reference will guide the governance group, and participation is expected to evolve over time.

Delivery of actions will not rest with governance alone but with conservation and catchment groups, agencies (including ORC), landholders, and industry partners who will lead projects on the ground. Practical support will come from ORC work programmes and CAP delivery coordination, while the governance group will also seek contestable funds and other funding sources and types.

Adaptive Management and Review

The CAP will be managed adaptively, with an 18-month health check and a five-year evaluation to assess progress, address pressures, and adjust actions. While the vision remains constant, strategies and priorities will evolve as new knowledge, collaborators, and resources emerge.

PROJECT PURPOSE

RATIONALE

Otago Regional Council's (ORC) Integrated Catchment Management (ICM) programme was established following the adoption of the Long-term Plan 2021–31 in June 2021. This plan tasked ORC with leading the development, implementation, and review of "Integrated Catchment Plans" (now called Catchment Action Plans) in collaboration with iwi and the community.

A Catchment Action Plan (CAP) is a long-term, non-regulatory plan for managing the native biodiversity and freshwater quality of an entire catchment or multiple catchments. It builds on the existing efforts of mana whenua, communities, and local government to protect and enhance their environment and provides a coordinated focus for new actions and projects.

CATCHMENT ACTION PLAN DEVELOPMENT

UPPER LAKES INTEGRATED CATCHMENT GROUP (ICG

The Upper Lakes CAP area of Otago was selected as the second location, following the Catlins pilot. ORC staff held an online webinar to tell the community about the CAP process in June 2024 and invited people to express their interest in being part of the group via and online form. The members of the ICG were approved by ORC councillors at a meeting in July 2024. In August 2024, the Upper Lakes ICG was established to co-develop this CAP.

The ICG includes:

- Mana whenua representation, including Kaumatua Darren Rewi (Ngāti Mamoe and Waitaha, Ngāti Kahungunu ki Te Wairoa, Rongowhakaata, Ngāti Porou), and supporting representation from Aukaha and Te Ao Marama (iwi regional environmental entities).
- 16 community members from conservation and catchment groups, including people who are involved with the following:

- Aspiring Biodiversity Trust
- Central Otago–Lakes Forest & Bird
- Destination Queenstown
- Glenorchy Catchment Group
- Glenorchy Community Association
- Glenorchy Community Nursery
- Glenorchy Rural Women
- Guardians of Lake Hawea
- Guardians of Lake Wānaka
- Friends of Lake Hayes
- Hawea Community Association Inc
- LINZ Lake Wānaka Lagarosiphon Management Committee
- Makarora Community Committee
- Mana Tāhuna Charitable Trust
- Matukituki Charitable Trust
- Otago Deep Lakes Technical Advisory Group
- Otago Fish & Game
- Routeburn-Dart Wildlife Trust
- Shaping our Future
- Southern Lakes Sanctuary
- Upper Clutha Wilding Tree Group
- WAI Wānaka
- Whakaata Strategy Group
- Predator Free Wānaka
- Wānaka Catchment Group
- Wānaka Wilding Pine Group
- Whakatipu Conservation Alliance
- Whakatipu Conservation Collective
- Whakatipu Wilding Conifer Control Group
- Whakatipu Wildlife Trust

- Staff members from:
    - Queenstown Lakes District Council (QLDC)
    - Department of Conservation (DOC)
    - Toitū Te Whenua/Land Information New Zealand (LINZ)
- An ORC Councillor
- ORC staff do not sit within the ICG and play a supporting role.

It is important to note that each of the community members in the Upper Lakes ICG wear "many hats" in their community, providing a wide representation with a combined total of over 70 community groups represented – from catchment and conservation groups to community committees and interest groups - bringing a good variety of knowledge and connections to the CAP. We also had more people join us along our workshop journey, drawing on industry and community connections.

WORKSHOPS AND PLANNING PROCESS

Over the 12 months from August 2024 to August 2025, the Upper Lakes ICG met for two introductory hui (meetings), six collaborative workshops and one site visit (figure 1) facilitated by ORC staff. We deeply appreciate the willingness of all members to participate in this process. Their openness in sharing knowledge, insights, and perspectives greatly enriched the development of this CAP. In total, the group contributed over 880 hours of their time, including workshops and travel - a significant commitment that reflects their passion and dedication to the wellbeing of the Upper Lakes environment and communities.

The CAP planning process follows the Open Standards for the Practice of Conservation and has made use of Miradi planning software. This globally recognised, adaptable framework has been built for designing, managing, and monitoring conservation projects, and supports long-term, focused and effective conservation outcomes. The CAP takes a collective impact approach - bringing multiple interested parties together to work toward developing shared goals tracked by shared measurement systems. It plans for mutually reinforcing actions, where different groups take on complementary roles and activities, each contributing in their own way toward the shared goals and long-term vision. It relies on collaboration and trust, with ORC acting as the dedicated backbone structure to facilitate planning and coordinate delivery.

Figure 1: Upper Lakes ICG workshops (Wānaka and Arrowtown) and site visit (Waiwhakaata / Lake Hayes wetland)

SCOPE

Table 1: The scope of this CAP

Temporal scope	The CAP sets out strategies for a 10-year delivery from 2025 to 2035. This first iteration identifies initial actions for delivery within the initial 3–5 years. Scheduled reviews will be undertaken every 18 months and a more comprehensive review every 5 years.
Spatial scope	The Upper Lakes CAP area lies entirely within the Otago region and is centered around the headwaters of major lake and river systems, including lakes Whakatipu Waimāori, Wānaka and Hāwea. The area includes Waiwhakaata / Lake Hayes, the upper Kawarau River, Ōrau (Cardrona River), the Upper Mata Au / Clutha and Hāwea Flat. The towns of Wānaka, Hāwea, Makarora, Tāhuna / Glenorchy, Tāhuna / Queenstown, Kā-muriwai / Arrowtown, and Takerehaka / Kingston are within the area (figure 2). It is important to note the Upper Lakes CAP area includes all of the Upper Lakes Rohe as defined in ORC draft land and water regional plan (LWRP), and the Upper Clutha portion of the Dunstan Rohe – both rohe are part of the Mata-au / Clutha freshwater management unit (FMU).

	While the CAP area broadly aligns with major catchments, it does not strictly follow rohe boundaries defined in the LWRP. Instead, the Queenstown Lakes District Council (QLDC) boundary is reflected (figure 3). This boundary has been used for the CAP process because: 1. The major urban towns that our volunteer Integrated Catchment Group members call home are included, and how they think about their area is acknowledged. 2. Existing plans can more easily be incorporated – such as the QLDC Climate and Biodiversity Plan, and Wai Wānaka's Community Catchment Plan. 3. It is a more efficient use of volunteer and district council staff time – avoiding the need for some people/organisations to participate in two CAPs (including the Dunstan Rohe) to have input about their whole area. 4. Pressures from outside the Upper Lakes Rohe boundary (ie. in major urban towns within the QLDC boundary) have a big impact on environmental values of the lakes and their catchments. 5. The results of a community online survey showed public preference for the QLDC boundary (87%) over the Upper Lakes Rohe boundary (13%). In-person conversations also indicated a preference for the QLDC boundary. 6. The QLDC boundary was approved as the spatial scope for this plan by ORC councillors at a meeting in July 2024.
Thematic scope	The core purpose of the CAP is the protection, enhancement, and restoration of native biodiversity and freshwater. An ecosystem services approach is taken to link how environmental health provides for people - such as clean water, cultural values, recreation, and climate resilience. The CAP is a non-regulatory plan, which means it focuses on guiding, coordinating, and supporting community actions rather than creating or enforcing rules. Because of this, the CAP does not deal with issues that are already managed through ORC's regulatory functions - such as compliance, consents, or enforcement. While the ICG may raise and discuss regulatory themes, these are outside the scope of the CAP and are instead handled through ORC's normal statutory and regulatory processes.

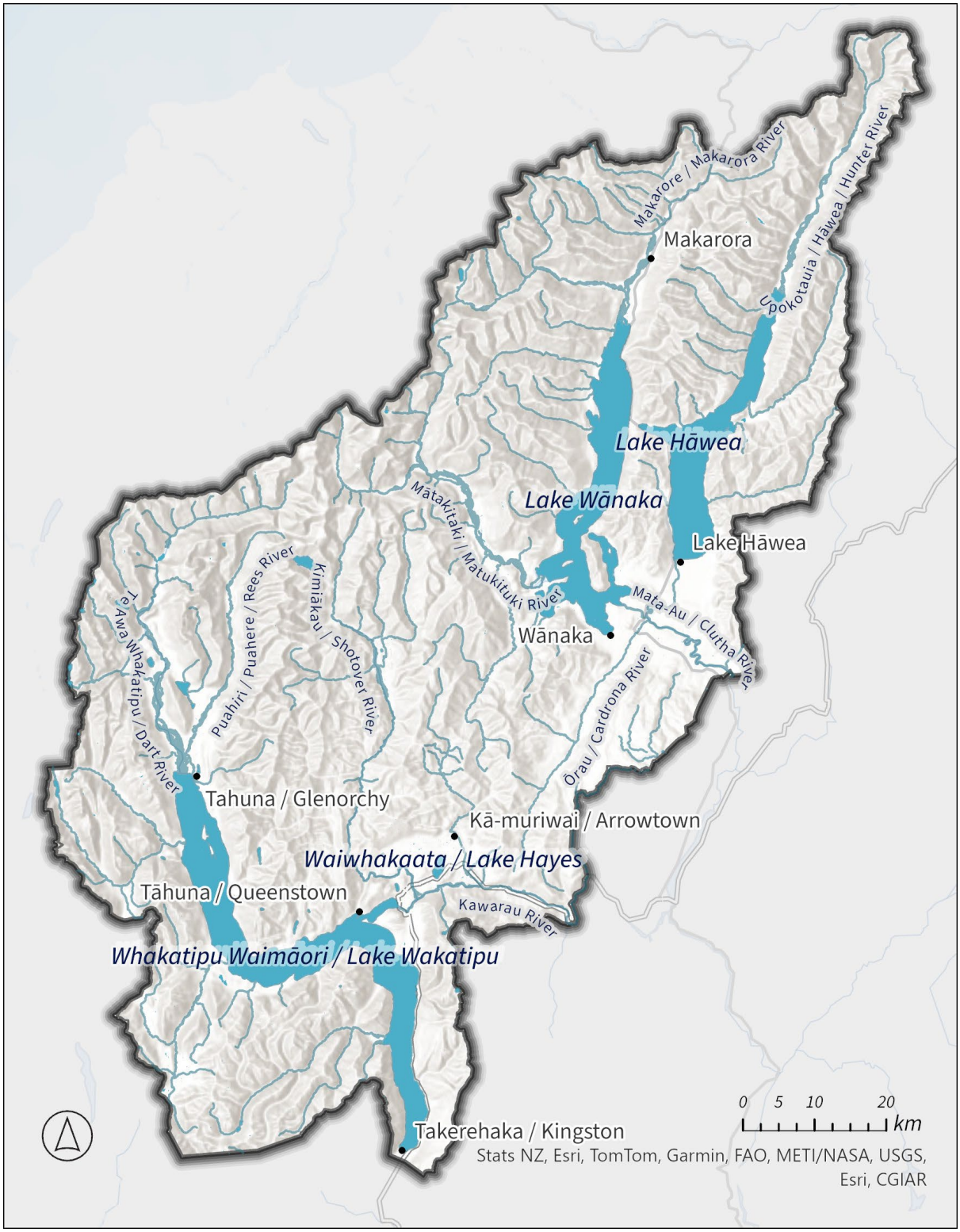


Figure 2: The spatial scope of Upper Lakes CAP area

THE UPPER LAKES ICG MISSION STATEMENT

This mission was collaboratively developed at Upper Lakes ICG workshops, incorporating suggestions and edits from multiple members working together.

"The Upper Lakes, with its soaring mountains and deep glacial lakes, is where manaaki whenua (caring for the land and waters) and manaaki takata (caring for the people) is inherent in all we do. We are committed to protecting and improving the unique native biodiversity in our place, while aiming to inspire and empower future generations to further protect and enhance the area's special values"

VISION OF THE UPPER LAKES CAP AREA IN 2075

This vision was developed from ideas generated during our Upper Lakes ICG's initial workshop on catchment environmental values and values. It was later refined through collaborative editing by three group members. Its purpose is to articulate our shared 'why' and a guiding vision to inform future decision-making.

"It's 2075 in the Upper Lakes. Together, mana whenua and the community have carried out decades of mahi for our catchments, adapting along the way.

In the valleys, takahē cross paths with trampers, emerging from thick golden tussock, bird colonies can be watched as they nest undisturbed on braided river gravels, and as dusk falls pekapeka tou-roa (long-tailed bats) glide overhead, through ancient beech canopies chasing moths. Pīwauwau (rock wrens) jump from boulder to boulder within alpine basins and along ridges. Tuna kuwharuwharu (longfin eel) can be seen feeding amongst native submerged plant beds and gliding out into the crystal-clear depths of our lakes.

The waterways, lined with native riparian plants, offer abundant mahika kai (food and resources) for Kāi Tahu whānaui, and the environment offers wild foraging for the wider community. Tamariki (children) splash and swim at the lake shorelines in the clean water, then rest under the shade of native trees to tuck into a freshly cooked trout for lunch. Behind them, wetlands and bush weave through sustainable, thriving farms renowned for their food and fibre produce – a mosaic of native biodiversity and productive land.

In our towns, a connected network of streams, wetlands, and green space cools the landscape brings nature to the heart of daily life. Nature-based solutions form part of the infrastructure that is necessary to ensure the health of the water as it heads downstream.

Mana whenua connection to place and taoka is flourishing, mātauraka (knowledge) is strong and rakatirataka (authority) evident. Locals value the thriving native biodiversity around them, happily sharing fruit harvests with kākā and kākāriki. The community

welcomes visitors who come to connect and contribute, helping to ensure the catchment remains vibrant for generations to come."

MANA WHENUA PARTNERSHIP

The hapū who hold mana whenua status in the Upper Lakes CAP area are affiliated to the following papatipu rūnaka:

- Te Rūnanga o Moeraki
- Kāti Huirapa Rūnaka ki Puketeraki
- Te Rūnanga o Ōtākou
- Hokonui Rūnaka
- Te Rūnanga o Oraka-Aparima
- Te Rūnanga o Awarua
- Waihopai Rūnaka.

As Te Tiriti (treaty) o Waitangi partners, they exercise rakatirataka (authority) in relation to the management of te taiao (the natural environment). This includes involvement in decision making and a central role relating to the care and management of the whenua (land), the wai (water) and the taoka (treasured resources) they support.

ORC and the Upper Lakes ICG are committed to partnering with mana whenua on CAP work. We acknowledge the context of the Ngāi Tahu Claims Settlement Act as a foundation for a forward-focused relationship, grounded in mutual respect, recognition, and responsibility. It reflects our intention to honor Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku as kaitiaki (guardians) and Te Tiriti (treaty) partners, recognising their authority, mātauraka (indigenous knowledge), and enduring connection to place. We understand that building trusted and enduring relationships requires consistent engagement, a willingness to learn, and support for mana whenua participation in ways that are meaningful and empowering for all parties. This includes ensuring Kāi Tahu aspirations are reflected throughout planning and delivery.

The Upper Lakes ICG includes a mana whenua representative from Ngāi Tahu ki Murihiku, and input from Aukaha and Te Ao Mārama (iwi regional environmental entities). We are actively pursuing further opportunities for engagement with mana whenua, noting that the CAP is a living process, and we continue to value and hold space for mana whenua input as the plan evolves. This is essential in the face of environmental pressures and increasing community-driven action that is already moving ahead on the ground.

CONNECTION TO EXISTING PLANS

Numerous non-regulatory plans and strategies have been developed in recent years for the Upper Lakes CAP area, by both the community and various organisations. These plans cover topics closely aligned with this CAP - including native biodiversity, freshwater quality, productive land, and urban spaces.

Rather than superseding any existing plans, we aim to consolidate and strengthen efforts heading in the same direction together. A stock take of these plans was undertaken to inform the CAP in the pre-planning phase and the existing plans were incorporated by:

1. Forming a list of cultural and community values.
2. Forming a list of environmental values, and why they are valued.

3. Pre-filling situation analyses of drivers, pressures and their impact on values.
4. Learning from what actions have and have not been successful.
5. Looking for gaps and places where ORC can fill a gap.
6. Aligning our goals and objectives with those in existing plans – for collective impact.
7. Directly copying actions that are underway into the CAP – to ensure we are supporting current work.

Plans that have had the greatest influence on our CAP are:

- QLDC Draft Climate and Biodiversity Plan 2025-2028
- Wānaka Water Project / Wai Wānaka Community Catchment Plan
- Wai Wānaka Upper Clutha Biodiversity Strategy
- Shaping Our Future community visioning (various QLDC locations)
- Lake Hāwea Stakeholders Group Catchment Action Plan (facilitated by ORC)
- Lake Wānaka Lagarosiphon Management Plan 2025-2035
- Waiwhakaata (Lake Hayes) Strategy (to be published)
- Kāi Tahu Ki Otago Natural Resource Management Plan 2005
- The Cry of the People - Te Tangi a Tauira
- QLDC Blue Green Network planning (to be published)
- Head of Lake Whakatipu Natural Hazards Adaptation Strategy (ORC, QLDC, EM Otago)
- ORC draft land and water regional plan – drawing on background information for the Upper Lakes Rohe and Dunstan Rohe.

THE UPPER LAKES CATCHMENTS

CATCHMENT PROFILE

AREA

The Upper Lakes CAP area follows the boundaries of the Queenstown Lakes District Council and is just over 8,700 km2 (or roughly 27% of the Otago region) (Stats NZ 2023).

CLIMATE

The Upper Lakes CAP area experiences a semicontinental climate. Summers are warm with daily highs often reaching the mid 20 °C range and can exceed 30 °C. Winters are cold, with frosty nights and frequent snowfalls. The area receives relatively modest precipitation, often under 400 mm annually (NIWA 2021).

SOILS

The New Zealand Soil Classification orders present in the CAP area are Brown, Podzol, Raw, Pallic, Recent, and Gley (Hewitt et al 2021). Brown soils, the most extensive nationally, form in wetter hill and mountain environments. They are generally well-drained and support sheep and beef farming, plantation forestry, and conservation land. Podzol soils develop under high rainfall and native beech or podocarp forests, where leaching creates acidic profiles. Raw soils occur in alpine rock, screes, and braided rivers, with little soil development. Pallic soils, common in the Wānaka and Tāhuna/Queenstown basins, are loess-derived, dense, and often constrained by winter wetness and summer drought. Recent soils, formed from eroded or deposited material on floodplains, are nutrient-rich, deep-rooting, and highly

productive. Gley soils are poorly drained and oxygen-deficient, occurring mainly on floodplains, but can be productive if managed carefully.

WATER QUANTITY

High rainfall in the Mountains West and North of the deepwater lakes, feeds water to these important waterbodies. The lakes receive high amounts of water during snow melt in spring. While a precise annual snowfall total for the Upper Lakes CAP area, The Remarkables ski field receives about 3.7 m of snow each year (NZ Ski 2023), and resorts closer to Wānaka like Cardrona and Treble Cone average 2.7 m (NZ Ski 2025). The Upper Lakes CAP area provides most of the flow to the downstream Mata-au (Clutha) catchment (ORC 2025). Tāhuna (Queenstown) receives around 750 mm rainfall per annum while Wānaka receives around 600 mm rainfall per annum. On average, Tāhuna (Queenstown) has one dry spell every six months (ORC 2025). Irrigation increases pressure on water quantity, as abstraction demand is highest during dry periods when natural flows are lowest.

LAND AND PEOPLE

Conservation estate and dry-stock farming dominate the land uses in the Upper Lakes CAP area. The rest is made up of various land uses including significant lakes and rivers. Towns include Tāhuna/Queenstown, Wānaka, Kā-muriwai/ Arrowtown, Lake Hawea, Makarora, Takerehaka /Kingston, and Tāhuna/Glenorchy. The population of the district has increased 22.1% between 2018 and 2023. Current projections show that the district has one of the highest growth rates in Aotearoa/New Zealand (QLDC 2025).

CULTURAL SIGNIFICANCE TO MANA WHENUA

The Upper Lakes takiwā (area) is of strong significance to mana whenua, whose traditions are grounded in whakapapa (genealogy) and ahikāroa (long-burning fires of occupation). Associations for Kāi Tahu extend from the traditional narratives relating to the formation of the landscape and continue through centuries of exploration, occupation and use.

The takiwā (area) is woven into the pūrakau (stories) and ikoa wāhi (place names) of Kāi Tahu, including the creation traditions. One of these tells of Rākaihautū, who arrived in Te Wai Pounamu (South Island) on the waka (canoe) Uruao and used his kō (digging stick) to form major roto (lakes), including Whakatipu Waimāori (Whakatipu), Wānaka and Hāwea.

Kāi Tahu tīpuna (ancestors) knew and interacted with the whole of this landscape from the ancestral mauka (mountains) to the tūpuna roto (great inland lakes/deepwater lakes) and large flowing awa (rivers). Ara tawhito (traditional travel routes/trails) followed the awa and roto and traversed the mauka, connecting kāika and nohoaka (permanent and seasonal settlements) and providing access to pounamu (greenstone) and to the plentiful mahika kai (food and other natural resources) supported by the water bodies, wetlands, forests, tussock lands and alpine grasslands. The area was also traditionally important for whakatā (rest), whakakaha (replenishment) and ako (learning). These aspects make the area immensely significant to mana whenua.

OUR VALUES

Figure 3: Display of natural and modified environmental values that are the focus of this plan, along with the cultural and community values that are supported by the environment.

CULTURAL AND COMMUNITY VALUES

Our cultural and community values (figure 3) are deeply connected to both the natural and built environments of the Upper Lakes region. Through the lens of "ecosystem services", we recognize the essential functions and processes provided by nature that sustain human life, shape our cultures, and strengthen our communities. The environment is not separate from us - it is interwoven with our wellbeing. When we care for and invest in it, the environment, in turn, supports and sustains us. This perspective highlights that environmental health is not only an ecological priority but also a social, cultural, and economic priority.

"Ka ora te whenua, ka ora te takata" – when the is well land, the people are well.

The following section outlines the cultural and community value themes identified by the ICG. A proposed monitoring framework is provided in appendix 3.

WAIMĀORI (FRESH WATER)

The purity of water in the tūpuna roto (deepwater lakes) is highly valued by mana whenua because of its source as hikuwai (meltwaters) in the ancestral mountains, and it is also highly valued by the wider community. Waimāori plays a central part in the Kāi Tahu creation narrative and supports the health of ecosystems and the provision of safe drinking water.

MAHIKA KAI (CULTURAL RESOURCES AND PRACTICES)

The mahika kai values associated with waterbodies, wetlands, forests, tussock lands and alpine grasslands - and the vital connections between them - are highly significant to mana whenua. Culturally important food sources and resources from healthy ecosystems sustain traditional practices and maintain enduring connections to the land.

HEALTH AND WELLBEING OF PEOPLE

Clean water, green spaces, birdsong, and accessible natural landscapes support our physical, mental, and spiritual wellbeing. These places provide opportunities to reflect, restore, and connect with nature and each other. Ka ora te whenua, ka ora te takata (when the land and waters are well, the people are well).

REST, REPLENISHMENT AND LEARNING

The landscape around the deepwater lakes is valued by mana whenua as a place traditionally used for rest, replenishment, and learning. These values remain strong today and are shared by the wider community, as people from around the world are drawn to the scenic beauty of the lakes for recreation, reflection, dwelling and holidaying.

LOCAL ECONOMY

Healthy ecosystems support diverse industries like tourism, fishing, and local businesses that rely on natural resources, clean waterbodies and scenic landscapes.

SUSTAINABLE AGRICULTURE

Healthy soils, clean water, and pockets of native vegetation underpin sustainable agricultural systems that support native biodiversity while producing food and fibre.

VISITORS AND TOURISM

Pristine lakes, forests, and scenic landscapes attract visitors who contribute to the local economy and, increasingly, support conservation efforts.

RECREATION

Diverse and resilient natural ecosystems offer opportunities for fishing, hiking, swimming, skiing, bird watching, rest and reflection that enhance quality of life.

TAOKA SPECIES

To Kāi Tahu, all native species are taoka (treasures). The relationship with native species is also highly valued by the wider community. Caring for and protecting these treasured species is essential to maintaining cultural identity, biodiversity, and the health of the natural environment.

Kāi Tahu taoka (treasures) cover the landscape from the ancestral mauka (mountains), large flowing awa (rivers), tūpuna roto (deepwater lakes), pounamu (greenstone) and ara tawhito (traditional travel routes). The relationship with native species is highly valued by mana whenua. Native species are also highly valued by the wider community. Caring for and protecting these treasured species is essential to maintaining cultural identity, biodiversity, and the health of the natural environment.

SCENIC LANDSCAPES

The landscape holds deep cultural, spiritual, historical, and whakapapa connections for mana whenua. Our mountains, lakes, braided rivers, and native vegetation also create iconic scenic beauty valued by communities and visitors alike. The landscape holds deep cultural, spiritual, historical, and whakapapa connections.

KI UTA KI TAI (INTERCONNECTEDNESS)

There is a strong interconnection between what happens across the Upper Lakes CAP area and the wider values of the Mata-au / Clutha River, from the mountains to the sea. This holistic view recognises that land, water, and people are all connected, and that the health of one part of the system affects the whole.

ENVIRONMENTAL VALUES

As part of our application of the Open Standards for Conservation framework, we have identified the key environmental values within the Upper Lakes CAP area that are critical to achieving long-term environmental outcomes, and that support community and cultural values. These environmental values are a core focus of our action plan. By concentrating our actions on environmental values, we aim to maintain or improve their health and resilience, while supporting the interconnectedness of the broader landscape.

KEY ATTRIBUTES

Key attributes were identified to help us assess the 'health' of both natural and modified environmental values throughout the Upper Lakes CAP area. The key attributes serve two purposes:

1. They form the basis of an environmental value health monitoring framework to track CAP impact (appendix 4).
2. They are used to assess an 'environmental health score' (table 2) that guides goal setting.

Our key attributes are:

- Native wildlife
- Water quality
- Freshwater ecosystem function
- Mahika kai (food and cultural resources)
- Native vegetation
- Wetlands
- Naturally uncommon ecosystem functions
- Additional attributes as relevant per environmental value

It is important to note that the full list of key attributes does not apply to every environmental value, rather the attributes are customised for each environmental value. Attributes may also overlap and take different forms in different environments – which reflects the complex and interconnected nature of natural systems.

ENVIRONMENTAL HEALTH SCORE

The Upper Lakes ICG made assessments of the health of key attributes for each environmental value (table 2) based on local environmental knowledge, and the ICG members' interpretation of science reports (such as ORC state of the environment reports) and data (such as species distribution and threat status). The ICG also gave their assessment of the best possible future environmental health score after 10 years of successful action (table 1). The gap between current and future health scores was used to direct goal setting, from the perspective of "where are we at now" and "where could we get to in 10 years".

The Open Standards for Conservation 'health score' method recognises that while formal monitoring has its place in providing consistent data and benchmarks, and driving evidence-based management, it also has gaps in coverage and can lack inclusion of lived experience. Local people, are constantly observing, thinking about and experiencing their environment. The model used here – whilst based on the available information, but not strictly scientific, and often trust-based – shows that much can be learned from local environmental knowledge, reminding us of the need to listen closely to our community.

Table 2: Environmental value health score card results

← Environment	Key attribute →	Native wildlife		Water quality and freshwater ecosystem function		Mahika kai health & accessibility		Native vegetation		Wetland size and hydrology		NUE functions		Ice and snow		Soil health	
		Current: 2025	Future: 2035	Current: 2025	Future: 2035	Current: 2025	Future: 2035	Current: 2025	Future: 2035	Current: 2025	Future: 2035	Current: 2025	Future: 2035	Current: 2025	Future: 2035	Current: 2025	Future: 2035
Terrestrial	Alpine and subalpine	Poor	Fair	Fair	Fair	Fair	Fair	Poor to fair	Fair	Fair	Fair	Fair	Fair	Poor to fair	Poor	N/A	
Terrestrial	Beech forest, tussock grassland, shrubland and woodland, NUEs	Poor	Poor to fair	N/A		Poor to fair	Fair	Poor to fair	Fair	N/A		Poor	Poor to fair	N/A		Good	Good
River	Rivers in modified landscapes	Fair	Fair to good	Fair	Good	Poor	Fair	Poor to fair	Fair to good	N/A		N/A		N/A		N/A	
River	Rivers in less modified landscapes	Fair	Fair to good	Good to very good	Good to very good	Poor	Fair	Good to very good	Good to very good	N/A		Fair	Fair	N/A		N/A	
Lake	Deep, medium, shallow	Poor to fair	Fair	Fair	Fair	Poor	Fair	Poor to fair	Good	N/A		N/A		N/A		N/A	
Wetlands		Fair	Good	Fair	Fair	Fair	Good	Poor to fair	Fair to good	Poor to fair	Fair	N/A		N/A		N/A	
Aquifers and groundwater		N/A		Good	Good	N/A		N/A		N/A		N/A		N/A		N/A	
Modified	Productive land and urban spaces	Poor	Fair	Fair	Good	Poor	Fair	Poor	Fair	Poor	Fair	Poor	Poor to fair	N/A		Good	Good

Table 3: Environmental health score key showing the viability-based scoring system used by the Upper Lakes ICG to determine a rapid assessment of environmental value health across key attributes.

Poor	Fair	Good	Very good
If it remains in this condition for an extended period, restoration will be practically impossible.	It is below our acceptable variation and requires human intervention. If left unchecked, it will be vulnerable to degradation.	It is functioning within the range of our acceptable variation. It may require some human intervention	It is functioning at an ecologically desirable status within our acceptable variation and requires little human intervention

ENVIRONMENTAL VALUE PROFILES

The following environmental value "aspirational profiles" were collaboratively developed with individual members of the Upper Lakes ICG. They are first and foremost a description of how the environment could be - aspirational visions shaped by hopes and priorities. At the same time, they highlight the cultural and community connections. In developing these profiles, ICG members shared their own descriptions and reflections, with parts recorded in their own words. As these profiles are not strictly scientific, they have been framed as aspirational - they have both a practical grounding and a strong community voice.

ALPINE ENVIRONMENT

Figure 4: Alpine and subalpine average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG noted that climate change is a major factor affecting the future health of alpine and subalpine environments (figure 4). They acknowledged that some attributes - such as snow and ice mass - are already declining and may continue to do so, falling outside our ability to directly influence. See table 2 for a key to the score values.

ASPIRATIONAL PROFILE: ALPINE AND SUBALPINE

With Otago's highest altitudes, icy temperatures and rocky terrain, the alpine and subalpine zone (appendix 1, map 1) is a tough environment. For Kāi Tahu, the mauka (mountain peaks) are tapu, sacred places with spiritual and ancestral importance. This zone is home to specialised native plants and wildlife. Where introduced predator control is in place, birds like kea and pīwauwau (rock wren) live here year-round, alpine lizards can be found clinging to rock crevices, and mountain stone wētā come out at night. Down the slope, snow tussocks, tikumu (mountain daisies), taramea (wild Spaniard) and alpine shrubs grow low to the ground. The mountains are a vital part of the catchment's water cycle. Snow and

ice that builds up in the winter melts slowly through spring and summer - this waiora (fresh water) sustains the health and mauri (life force, health) of the rivers and lakes in the catchments, supplying water to ecosystems, farms and people downstream.

TERRESTRIAL ENVIRONMENTS

Figure 5: Terrestrial environments (beech forest, tussock grassland, shrubland and woodland, naturally uncommon ecosystems) average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG noted that some areas of native terrestrial environments are “good” - like core stands of ancient beech - but that some environments such as inland outwash plains, are almost completely lost and that many species are threatened and at risk (figure 5). They also pointed out the importance of the 'small stuff' - like specialised moth and beetle species, mosses, lichen, and fungi - which all play important roles in the health and balance of ecosystems and are often overlooked.

ASPIRATIONAL PROFILE: BEECH FOREST

Ancient beech forests (appendix 1, map 2) cloak mountain valleys and lower slopes along the headwaters of Whakatipu Waimāori (Lake Wakatipu) right through to the headwaters of lakes Wānaka and Hāwea, along with remnant pockets throughout the area. Tall mountain beech, silver beech and red beech trees are layered with an understory of native tree ferns, mosses, liverworts and shrubs. The rich soils, with layers of fungi, decaying leaves and twigs, retain moisture and are resilient through seasonal changes, providing water regulation to the catchments. Forests play a vital role in nutrient cycling, water retention, and carbon storage - essential for the health and resilience of the entire catchment. Where predator control is in place, mohua (yellowhead) forage for insects in the canopy, while tītitipounamu (rifleman) can be seen moving through the lower branches. Pekapeka-tou-roa (long-tailed bats) roost in tree cavities and emerge at dusk to feed, while kākā and kea (native parrots) visit the treetops. On the forest floor, geckos and wētā shelter under logs or within dense ground cover. Every species in this interconnected system helps uphold the mauri (life force, health) that sustains the forest.

ASPIRATIONAL PROFILE: TUSSOCK GRASSLAND

Windswept tussock grasslands stretch across more than half the Upper Lakes CAP area (appendix 1, map 2), covering wide valleys, hilltops and slopes. Layered amongst the tufts of tussock are hardy native herbs, cushion plants, and small flowering plants. These are mostly secondary grasslands, shaped by early forest clearance and grazing, combined with the area’s harsh winters and dry summers. Tussock grasslands play an essential role in the catchment’s water system - their long leaves capture moisture from mist and low clouds, and their roots slowly release water into the soil, providing a steady water supply to downstream systems, an example of ki uta ki tai (interconnectedness) (Mark et al., 2013). These places are full of movement – skinks scurry between rocks, tussock moths fly between plants, pīhoihoi

(pipit) weave through the grass in search of insects, while kārearea (New Zealand falcon) scan the open spaces from above.

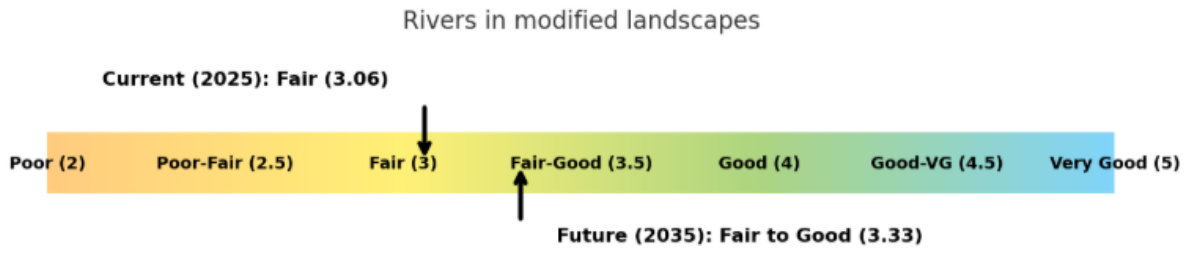
ASPIRATIONAL PROFILE: SHRUBLAND AND WOODLAND

A variety of shrubland and woodland types are scattered across the catchment's slopes (appendix 1, map 2), with hardy native species such as mānuka, kānuka, matagouri, and coprosmas, alongside trees such as kāramū and pittosporum. These types of vegetation are typically found on dry slopes, river terraces, old moraines, and areas regenerating from past burning or grazing. These plants are adapted to sun-exposed, nutrient-poor soils and they help stabilise erosion-prone ground and improve soil structure. They play a key, transitional role in restoring native vegetation cover across dry parts of the catchments, growing into denser woodland and forest with time. Shrublands and woodlands support mahika kai (food and cultural resources), with plants like kāramū and mānuka valued for nectar, wood and rokoā (plant medicine). They are important habitat for native wildlife - pīwakawaka (fantail birds) chase insects through the undergrowth, korimako (bellbirds) call from the canopy, and native butterflies, beetles, and skinks thrive in the warmth and shelter of the shrubs.

ASPIRATIONAL PROFILE: NATURALLY UNCOMMON ECOSYSTEMS (NUES)

Naturally uncommon ecosystems (NUEs) are scattered across the Upper Lakes CAP area, often occurring within and alongside more common ecosystems, and interacting closely with them. They are 'naturally rare' - meaning that they are rare in the natural environment - forming only where unique combinations of geology, soil, and climate align. Naturally uncommon ecosystems are very diverse, in the Upper Lakes CAP area they include inland outwash gravels, braided riverbeds, tarns, string mires, cushion bogs, ephemeral wetlands, seepages, screes, and tors. Although NUEs can be small in area, they contribute in a disproportionately large way to national biodiversity and often support rare native species found nowhere else.

RIVER ENVIRONMENTS



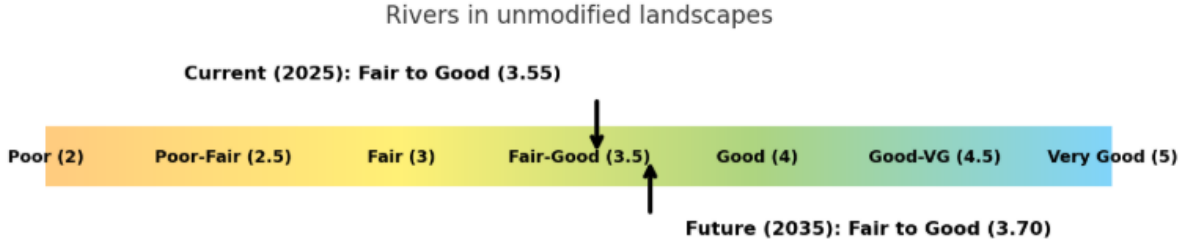


Figure 6: River environments average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG noted that the biggest improvements could be made in rivers that run through modified environments (figure 6), particularly urban rivers such as Bullock Creek (Wānaka) and Horn Creek (Tāhuna Queenstown), which have poorer health than rivers less-modified landscapes such as the upper catchment's mountain streams and large braided rivers. However, braided rivers and upland streams also require protection in different ways, such as introduced predator mammal control where whio (blue duck) live and braided river birds nest.

ASPIRATIONAL PROFILE: BRAIDED RIVERS AND BRAIDPLAINS

Braided rivers are a defining feature of the Upper Lakes CAP area (appendix 1, map 3). The Puahere (Rees), Te Awa Whakatipu (Dart), lower Kimiākau (Shotover), Mātakitaki (Matukituki), Makarore (Makarora) and Upokotauia (Hunter) rivers shape the upper valleys above the lakes, through their wide braidplains (the large gravel riverbed) and shifting channels. For mana whenua, these awa (rivers) are significant ara tawhito (travel routes), sources of mahika kai (food and cultural resources), and habitat for taoka (treasured) species. Braided rivers support flood-adapted native grasses, sedges, and herbs amongst the gravel. The braidplains provide critical breeding grounds for threatened native taoka birds such as pohowera (banded dotterel), tarapirohe (black-fronted tern), and ngutu pare (wrybill). The rivers also support native fish and freshwater plants and invertebrates, and are popular recreational fishing spots for trout and chinook salmon.

ASPIRATIONAL PROFILE: RIVERS AND RIPARIAN ZONES

The rivers and streams of the catchments carve through glaciated mountain valleys, into lakes and across outwash plains to eventually connect with the mighty Mata-Au (Clutha River) (appendix 1, map 3). The network of rivers and streams provided Kāi Tahu tīpuna (ancestors) convenient travel routes as well as sustaining mahika kai (food and cultural resources). Their mauri (lifeforce, health) is closely tied to the wellbeing of the surrounding landscape and the communities who connect with them. Riparian zones are plant corridors that line the banks of rivers and streams. Where intact or restored along lowland rivers, they can have thick vegetation such as harakeke (flax), toetoe, tī kōuka (cabbage tree), ribbonwood, sedges and grasses. Thriving riparian zones stabilise riverbanks, provide shade, filter runoff, and support nutrient cycling through diverse microbial communities. Rivers and riparian zones are hotspots for native wildlife - whio (blue duck) are at home in the rocky headwater streams, rich in aquatic insects and rare non-migratory galaxiids shelter in upper tributaries of the Ōrau (Cardrona River) Valley, while freshwater invertebrates like mayflies, caddisflies, and stoneflies thrive in clean, clear and well-shaded streams.

LAKE ENVIRONMENTS

Figure 7: Lake environments (deep, medium and shallow) average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG noted that the health of lakes surrounded by more intensive land use was poorer than those surrounded by unmodified land (figure 7). Issues that were discussed included: very low tuna kuwharuwharu (longfin eel) populations relative to historic levels, small but significant declines in deepwater lake water quality that can signal big changes. The presence of invasive freshwater plant species is also a serious concern. The group understands that some attributes, such as water quality trends in deepwater lakes cannot be turned around in just 10 years and that the results of restoration actions will be generational in nature.

ASPIRATIONAL PROFILE: DEEPWATER LAKES (WHAKATIPU WAIMĀORI / WAKATIPU, WĀNAKA AND HĀWEA)

Our deep, iconic lakes (appendix 1, map 4) have exceptionally clear water fed by alpine rivers and glaciers framed by steep, scenic mountains. Dug by the ancestor Rākaihautū with his kō and fed from the ancestral mauka (mountains), these lakes hold deep cultural importance for mana whenua and play a key role in the interconnected freshwater system (ki uta ki tai). They provide freshwater storage (including for hydroelectric power generation), excellent but declining water quality, climate regulation, and habitat for threatened biodiversity. They provide stronghold habitats for native taoka water birds like pūteketeke (Australasian crested grebe) and pāpango (New Zealand scaup). These lakes are a vital source of water for community use – drinking water supply, urban community use, rural irrigation and in the case of Lake Hāwea, hydro-electric generation storage. As headwaters of the Mata-Au (Clutha River), the deepwater lakes are important to the mauri (lifeforce, health) of all freshwater ecosystems right through to the coast.

Historically renowned for mahika kai, these lakes were formerly thriving with tuna kuwharuwharu (longfin eel), large kākahi (freshwater mussel beds), and bird life - people travelled from the coast to harvest kai (food and resources). These lakes now support popular recreational fishing stocks of trout and chinook salmon, drawing anglers from around the motu (country) and overseas. Serious data gaps minimise our ability to understand deep lakes and therefore our ability to ensure their evidence-based management.

ASPIRATIONAL PROFILE: LAKES (INCLUDING WAIWHAKAATA / LAKE HAYES)

Valley floor lakes - such as Waiwhakaata (Lake Hayes), Waikāmāhaka (Moke Lake), Lake Dispute, Waipuna (Lake Johnson), and Ōturu (Diamond Lake, Paradise) (appendix 1, map 4) play a key role in catchment hydrology, water quality, and biodiversity. When healthy, these lakes support clear water and a balanced freshwater ecosystem with diverse invertebrates, submerged plants, and native fish such as tuna kuwharuwharu (longfin eel), kōaro (climbing whitebait), and upland bullies. They are important places for mahika kai and provide habitat for native taoka water birds such as tētē-moroiti (grey teal), kuruwhengi (Australasian shoveler) and pūkeko, which nest and feed along the lake margins.

Valley floor lakes tend to respond quickly to change, and their mauri (lifeforce, heath) is closely linked to the mauri and land use of the surrounding catchment. Waiwhakaata and Te Whaka-ata a Haki-te-kura, the two known Kāi Tahu names for Lake Hayes, referring to its mirror-like waters reflecting the surrounding mauka (mountains) and to personify of tīpuna (ancestors) in the landscape (Arnold 2023). It is a source of mamae (hurt) for mana whenua to think that tīpuna (ancestors) would not recognise the roto (lake) today due to its degraded state (Timms-Dean et al. 2023).

There are numerous remote high-altitude lakes, nestled throughout the mountain landscapes. They range from small, isolated tarns to larger alpine lakes including examples such as Ōtaka (Lochnagar), Te Hokaputu (Lake Harris), Lucidus Lake, Lake Alta and Lake Mystery. Most of these lakes lie within national

parks in largely unmodified sub-catchments, making them some of the most pristine freshwater environments in Otago.

WETLAND ENVIRONMENTS

Figure 8: Wetland environments (swamps, peat bogs, marshes, and ephemeral seeps) average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG noted that healthy wetlands help keep freshwater healthy too, and that wetlands are closely linked with river valleys, lake margins, and tussock grasslands. They also pointed out the importance of the 'small stuff' in wetlands – like protozoa, fungi, insects, mosses, small dips and bumps in the land, and temporary pools - because these all play a key role in how wetlands work and support native biodiversity (figure 8).

ASPIRATIONAL PROFILE: WETLANDS

In the Upper Lakes, wetlands include swamps, peat bogs, marshes, seepages and ephemeral wetlands (which are not wet all year round) (appendix 1, map 6). These are among the most diminished (Stats NZ 2022) yet vital environmental values in the region. Despite widespread drainage and degradation, remaining wetlands perform essential ecological roles such as regulating water flows by buffering floods and sustaining baseflows during dry periods, along with the cycling of nutrients through microbial communities that break down organic matter and reduce contaminants.

Native vegetation such as raupō (bulrush), harakeke (flax), sedges, and mānuka thrive in waterlogged, low-oxygen soils that are rich in carbon. Some wetland types can provide habitat for native taoka fish like tuna kuwharuwharu (longfin eel) and kōaro (climbing whitebait), and many wetlands are home to a diverse range of native birds such as pūkeko, putakitaki (paradise duck), kotoreke (marsh crake) and kōtare (kingfisher). Diverse invertebrates, skinks, and bats also rely on these habitats. For mana whenua and the wider community, repo (wetlands) are important places for mahika kai (food and cultural resources) that continue to connect people with wai (water) and whenua (land).

GROUNDWATER ENVIRONMENT

Figure 9: Groundwater average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG did not assess the health of aquifers (figure 9) and groundwater in a workshop, however ORC's 2023 report on the State and Trends of Rivers, Lakes, and Groundwater in Otago 2017 – 2022, states:

- For the Upper Lakes Rohe (which covers the upland parts of the Upper Lakes CAP area): "groundwater quality in the Upper Lakes Rohe is good with low E. coli exceedances and nitrate-N concentrations" and notes that elevated arsenic is from the rocks that surround the groundwater.
- For the Dunstan Rohe (of which the Upper Clutha part is within the Upper Lakes CAP): "Groundwater quality state results also generally show good compliance with the DWSNZ (drinking water standards for New Zealand) across the Dunstan Rohe, with most bores having no or low exceedances of the E. coli MAV (maximum acceptable value)."
- There is some groundwater quality issues in areas like Tāhuna Glenorchy, Takerehaka (Kingston) and Hāwea Flat.
- Geogenic arsenic is naturally elevated in much of the Upper Lakes CAP area at levels that can exceed human health protection guidelines (NES CS 2012).

The group notes that expanding demand for water from aquifers and increasing land use means that monitoring of aquifer quality and quantity will be very important going forward.

ASPIRATIONAL PROFILE: AQUIFERS AND GROUNDWATER

Beneath the Upper Clutha and Whakatipu basins is a network of aquifers (appendix 1, map 5), filled by rain and surface flow that seeps through layers of gravel and rock. In areas like Wānaka, Hāwea, and the Ōrau (Cardrona River) and Luggate valleys, gravel outwash in the basins allows for steady recharge of aquifers. Some aquifers are connected to the lakes, rivers and wetlands below the surface and feed into surface flows. For mana whenua, wainuku (groundwater) is linked to the wider whakapapa of water and the health of wainuku reflects the health of the landscape. Aquifers are essential for providing drinking water, sustaining local agriculture, supporting biodiversity, and maintaining river levels that are vital for both environmental and human wellbeing.

MODIFIED ENVIRONMENTS

Figure10: Modified environments (productive land, urban spaces and other modified land) average environmental health score - across a holistic view of the key attributes - for current (2025) and the future (2035).

The Upper Lakes ICG did not assess the health of modified environments (figure 10) in a structured workshop, as these environments became more of a focus as the Open Standards for Conservation progressed and the ICG highlighted the need for these environments to be included. The environmental health score in table 2 has been based on discussions held with the Upper Lakes ICG during later workshops.

Current community, conservation and catchment group mahi (work) is already on a pathway to improve the key attributes for modified environmental values, if this continues to grow even more could be achieved. Feedback from the ICG pointed out that a big improvement in environmental health can be achieved in concentrated hotspots of action within modified environments – such as urban plantings and wetland restoration in rural places.

ASPIRATIONAL PROFILE: PRODUCTIVE LAND

The Upper Lakes CAP area has a long history of mahika kai, which includes growing and harvesting resources to sustain the people. The landscape is renowned for its scenic qualities, with productive land now an integral part of its visual and cultural character. High country pastoral farms, dairying, vineyards, orchards, and arable fields (appendix 1, map 8) have shaped the valleys for over a century, with productive land being central to the area's community, identity and way of life. Soils, essential for production, range from stony outwash terraces to rich alluvial flats, and are fertile however weakly developed and can be vulnerable to erosion.

Productive land intersects and is intertwined with surrounding native ecosystems. Remnants of wetlands, native tussock grassland, grey shrubland, and forest can be found in pockets across productive land, whilst streams and rivers cross through productive areas. Suitable habitat can be found on productive land for native wildlife, which moves through and uses these landscapes - pīhoihoi (pipit), kāhu (harriers), pīwakawaka (fantail), and skinks can be found in paddocks, rocky outcrops and pockets of native vegetation.

ASPIRATIONAL PROFILE: URBAN SPACES

Urban spaces occupy a small but rapidly expanding (QLDC.govt.nz 2025) footprint in the Upper Lakes CAP area (appendix 1, map 7), and have significant influence on freshwater health, biodiversity, and cultural values. Streets, parks, stormwater systems and built infrastructure are in constant interaction with natural environmental values. Urbanisation brings substantial environmental pressures placing stress on environmental values and cultural and community values alike.

For local communities, urban spaces are not separate from nature, they are part of a living network of relationships between people and place. These places are also the home of the local environmental stewards – the people putting in the mahi (work) to live in a more reciprocal way with native ecosystems. Green urban areas support mental and physical well-being, strengthen social connection, and enable daily encounters with nature. Together these reinforce care, belonging, and responsibility. When thoughtfully designed, urban spaces are key sites for the regeneration of ecosystems and the human relationships with them.

DRIVERS AND PRESSURES

Understanding the root causes, or "drivers" of pressures is essential for effective catchment action planning. These drivers are broader forces or trends, operating at regional scales, that create or intensify "direct pressures" (detailed in the next section). Many drivers reflect deeply embedded social, economic, and institutional systems, and while these drivers can lead to environmental degradation, they also present opportunities to shift behaviors, systems, and policies in a more sustainable direction.

A "pressure" refers to a human activity that directly affects the environmental values. Each pressure has been rated as having a low, medium, high, or very high impact on environmental values (table 9), and a pressure reduction objective has been created to frame "What we need to get on top of".

In the Open Standards for Conservation, linking of drivers, pressures, and environmental values forms the core of a "situation analysis". By tracing how drivers (broader forces and trends) give rise to pressures (direct human activities), and how these pressures in turn affect the health of environmental values, we can build a picture of the cause-and-effect relationships (figure 11) in the CAP area.

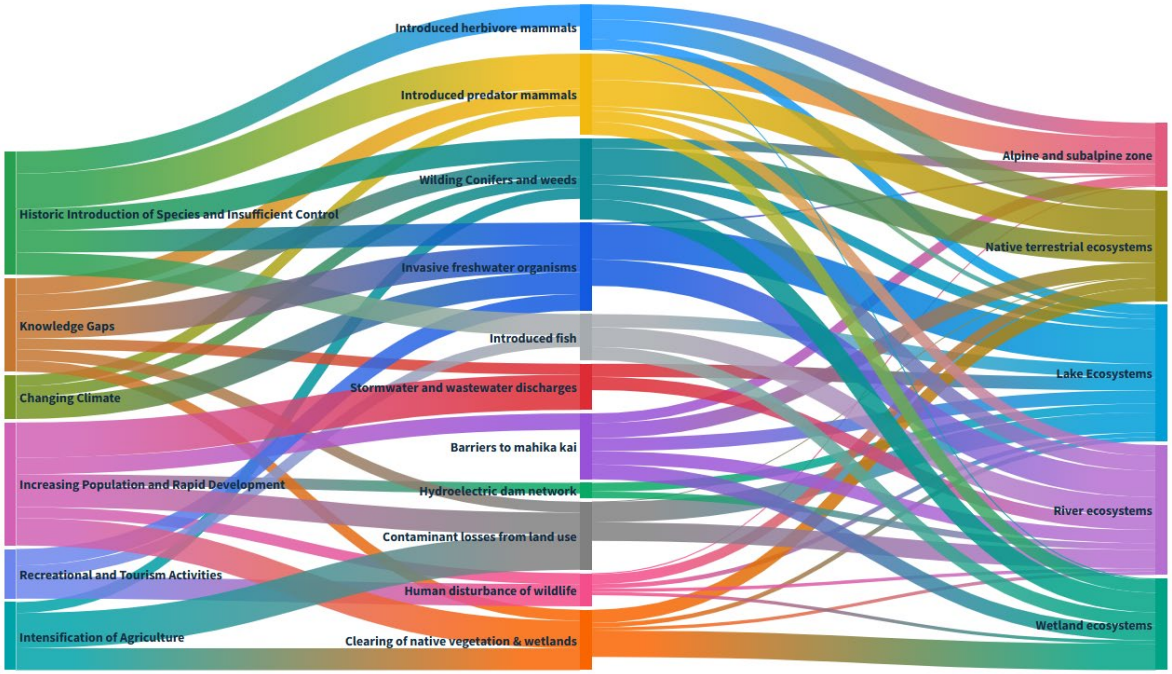


Figure 11: "Sankey diagram" showing the complex and overlapping cause-and-effect relationships between drivers, pressures and environmental values. The diagram was created using flourish.com software. An interactive version can be found on our Upper Lakes GIS hub at upper-lakes-orcnz.hub.arcgis.com

DRIVER AND PRESSURE PROFILES

The following driver and pressure profiles were co-developed with Upper Lakes ICG members. They frame up both the group's shared understanding of the underlying causes of environmental pressures and the direct impacts these create, while also reflecting the perspectives of individual members. In many cases, members contributed their own words and reflections, ensuring the profiles are not just technical summaries but carry the depth and grounding of local knowledge and lived experience.

DRIVER PROFILE: HISTORIC INTRODUCTION OF SPECIES AND INSUFFICIENT CONTROL

The spread of invasive species - like wilding conifers, weeds, introduced predator mammals, introduced herbivores, introduced fish, and invasive freshwater organisms - has been shaped by both intentional introductions and accidental arrivals. The ongoing spread of these organisms is often enabled by gaps in control efforts and a reactive approach, particularly when agency coordination is lacking and/or funding is inconsistent.

DRIVER PROFILE: INCREASING POPULATION AND RAPID DEVELOPMENT

The Upper Lakes attracts people to live in and visit the area - with its scenery, lifestyle, and economic opportunities. QLDC projects the average daily population will grow from 81,600 in 2025 to 104,000 by 2035 (QLDC.govt.nz 2025). More people, and more development to support people, drives pressures such as native vegetation clearance, stormwater and wastewater. Rapid land use development in the

catchments of our deepwater lakes appears to be accelerating the decline of lake water quality and ecosystem functioning. More people also gives opportunities to drive positive change – a larger pool of volunteers, emerging local champions and talent, and opportunities to build larger regenerative enterprises.

DRIVER PROFILE: RECREATIONAL AND TOURISM ACTIVITIES

The Upper Lakes CAP area is a key destination for tourism and recreation. Peak-season daily visitors are projected to rise from 68,000 in 2025 to 86,500 by 2035 (QLDC.govt.nz 2025). This growth brings pressures like irresponsible freedom camping, loss of alpine habitat through ski field expansion, invasive species spread, disturbance of native wildlife, and increased stormwater and wastewater impacts from supporting infrastructure. Growth of recreational infrastructure relating not only to tourism but also the growing resident population include new golf courses, tourist accommodation, motor camps, ski fields – each with associated pressures. High visitor numbers can present a platform for communicating catchment actions, attracting funding and growing strong conservation-focused tourism ventures.

DRIVER PROFILE: INTENSIFICATION OF AGRICULTURE

Productive land in the Upper Lakes catchments has long been used for extensive dryland sheep, beef, deer, and arable farming - once the dominant land use, and still a key part of the farming landscape today. With the introduction of reliable spray irrigation, the potential for pastoral production has significantly increased, resulting in an intensification of land use in some areas. Irrigation can produce environmental benefits such as reducing the risk of erosion, and the development of productive topsoil. It is also directly linked to intensification of land use, increases the abstraction of water, the modification of native vegetation and associated habitats, and can result in an increased contaminant losses to waterbodies, including aquifers. There is a strong farming community in the Upper Lakes, with a long history connected to the area. Within the farming community there are well-established catchment groups, working together to understand and address the challenges their land use has on the landscape.

DRIVER PROFILE: CHANGING CLIMATE

Climate change is intensifying existing pressures and creating new ones in the Upper Lakes CAP area. By 2100, there could be up to 60 more days over 25°C each year, and winter highs may rise by 5–7°C. More intense rainfall is expected, along with earlier snowmelt, less snowfall, diminished or shrinking glaciers, and increased risks of drought, heatwaves, and wildfires. These changes will affect species distribution, strain water resources, and stress ecosystems, favoring invasive species and reducing native habitats. The urgency of climate impacts is driving collaborative thinking about adaptation, choices about low-impact ways of living, and interest in blue-green infrastructure.

DRIVER PROFILE: KNOWLEDGE GAPS

Gaps in data and understanding limit our ability for effective evidence-based management and strategic responses. Uncertainties include whether deepwater lakes have a trophic tipping point, how climate change will affect lake mixing, and how invasive species interact with these systems - we need an expanded understanding of what is entering our deep lakes and their catchments. Serious data gaps minimise our ability to understand deep lakes and therefore our ability to ensure their evidence-based management.

The risk of introduced predator mammals spreading further into alpine zones under warming conditions is also unclear. Current monitoring may be too limited to detect key changes in time to take action. These knowledge gaps present a chance to engage universities and researchers, to utilise mātauraka Kāi Tahu to inform and compliment science, and to build local capacity through community science, to enable

evidence-based management decisions. Meeting the information needs to support ongoing environmental management decisions will require long-term investment.

PRESSURE PROFILE: INTRODUCED PREDATOR MAMMALS

Pressure rating: Very High

Pressure reduction objective: Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, hedgehogs, possums, mice and feral cats)

Introduced predator mammals such as stoats, ferrets, weasels, rats, hedgehogs, possums, mice and feral cats have wreaked havoc on native birds, lizards, and invertebrates across the Upper Lakes CAP area (Innes et al., 2010) - they are one of Aotearoa / New Zealand's greatest environmental pressures. While community-led trapping and baiting efforts (appendix 1, map 10) have made progress, the scale of the issue remains significant. Predator surges - particularly stoats and rats - are triggered by beech mast events, whist urban areas continue to be a source of stray cats that can become feral - which have become a significant issue in our national parks. The pressure is even bigger for ground nesting and cavity nesting birds like whio, takahē and mohua, along with lizards and invertebrates like wētā (O'Donnell et al., 2017). Cats, stoats, ferrets and weasels are relentless hunters, and rats not only eat eggs, chicks and insects - they also disrupt forest regeneration by eating seeds (McAulay 2020). Native birds are deeply woven into the community's identity, and recent species reintroductions have highlighted the impact of predators, helping to build momentum and collaboration toward predator free goals.

PRESSURE PROFILE: FRESHWATER INVASIVE ORGANISMS

Pressure rating: Very high

Pressure reduction objective: Reduce the risk of new freshwater invasive organisms establishing

Pressure reduction objective: Contain and remove lagarosiphon

Lakes and rivers in the Upper Lakes CAP area are affected by freshwater invasive organisms such as lagarosiphon (appendix 1, map 14), elodea, didymo, lindavia, and daphnia, with new invasions being a constant threat (for example Schallenberg et al., 2022). These organisms are often spread through boating, fishing, and bird movement. Once established - often unnoticed at first - they are costly to control and usually cannot be eradicated. Warmer water and longer summers from climate change may accelerate their spread. The noticeable impacts of freshwater invasive organisms on recreational activities have increased public awareness about the sensitivity of lake and river ecosystems and have been a catalyst for community-based action. Our lakes are highly vulnerable to incursions by new pest species. Constant vigilance is required to avoid and/or manage new arrivals.

PRESSURE PROFILE: WILDING CONIFERS (PINES AND FIRS)

Pressure rating: Very high

Pressure reduction objective: Reduce wilding conifer seed sources, infestations and re-infestations

Wilding conifers have spread alarmingly in parts of the Upper Lakes CAP area, displacing native tussock, shrubland and beech forest (Peltzer 2018). Originally planted as shelterbelts, woodlots and screening, some of these exotic conifer species have been fast-spreading wilding seed sources creating further infestations which threaten to permanently alter the Upper Lakes CAP area's special values; degrading our outstanding natural landscapes, decreasing biodiversity, increasing wildfire risks, reducing water

yield - affecting creeks, wetlands and rivers and in turn aquatic biodiversity, outdoor recreation, irrigation and hydroelectric power generation and limiting productive land use.

Wilding conifers spread as a monoculture and grow well above our natural high elevation tree line, also destroying this delicate native alpine vegetation. Although wilding spread will be an intergenerational problem, large landscape-scale projects have already proven successful (appendix 1, map 12). Unlike many biosecurity pressures, wilding conifers can be effectively controlled by sufficient funding of community-led action, strategies based on scientific research, collaboration from all relevant agencies and support from the Biosecurity NZ National Programme.

PRESSURE PROFILE: TERRESTRIAL WEEDS (OTHER THAN WILDING CONIFERS)

Pressure rating: High

Pressure reduction objective: 🌾 Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)

Weeds like gorse, introduced broom, cotoneaster, buddleia, and lupin thrive on disturbed ground, roadsides, and gaps in native shrubland, producing large amounts of seed and forming dense stands. Trees such as willow, poplar, and sycamore can help with erosion control but often spread into riparian zones, wetlands, and hillsides, changing vegetation and soil. Many wetlands are impacted by grasses, herbaceous weeds, and recent invaders like yellow flag iris, which alter hydrology and reduce habitat (Houlahan et al., 2006). In braided rivers, weeds change the way the braidplains move seasonally, impacting threatened native bird feeding and nesting behavior, and changing flood dynamics (O'Donnell et al. 2016). The challenge of persistent and widespread weed infestations provides a strong case for uptake of innovations and technology like the use of drones, AI-assisted mapping, and precision spraying technologies. These tools improve efficiency, reduce environmental impact, and enable smarter, large-scale weed management.

PRESSURE PROFILE: ENVIRONMENTAL CONDITIONS THAT ARE NOT SUITABLE FOR MAHIKA KAI

Pressure rating: High

Pressure reduction objective: ⚒️ Improve environmental conditions for mahika kai and enable safe use

Mahika kai practices (appendix 1, map 9) in the Upper Lakes CAP area face multiple challenges. River access issues include barriers such as dams and willows, whilst water contamination poses both cultural and safety issues. Widespread land conversion, and the decline of key species - like tuna kuwharuwharu (longfin eel) and weka – mean mahika kai is significantly less abundant. A limited understanding of mahika kai practice constrains support from the wider community. These environmental and societal pressures reduce opportunities for mātauraka Māori (indigenous knowledge and intergenerational sharing of the knowledge), food and resource gathering, and connection to place for mana whenua. Some of these issues (such as water contamination) also impact wild harvesting opportunities for the wider community.

PRESSURE PROFILE: CLEARING AND CHANGING NATIVE VEGETATION AND WETLANDS

Pressure rating: High

Pressure reduction objective: ⛏️ Avoid clearing and change to native vegetation

Pressure reduction objective: Avoid clearing, draining or filling of wetlands

Historic clearing of native vegetation, especially shrubland and wetlands, created space for the valued productive land and urban areas where communities live, work and play - with scattered fragments remaining within these places. Ongoing development and intensification continue to shrink native vegetation remnants through earthworks and irrigation, particularly affecting less obvious vegetation types like dryland outwash plain assemblages that offer unique and rare habitats. Less recognised types of wetlands are at risk of clearing, draining and filling – such as seepages and ephemeral wetlands. Often, the small but cumulative impacts of this clearance and change are poorly documented and not well accounted for, but it hasn't gone unnoticed by the community - prompting stronger demand for urban and semi-rural planting and restoration projects, which if done in a connected and coordinate way can have significant biodiversity gains.

PRESSURE PROFILE: INTRODUCED HERBIVORE MAMMALS

Pressure rating: High

Pressure reduction objective: Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois and tahr)

Herbivores such as goats, pigs, deer, chamois, and tahr are valued hunting stock, but when populations grow too large or expand out from accessible hunting areas, they over-browse and trample native vegetation, and uproot soils in forests, shrublands, and subalpine zones (Gormley et al., 2012). In rabbit-prone areas, rabbits and hares dig into soils and heavily browse native plants, including new community plantings, while also impacting productive land. Possums feed heavily on the leaves, buds, flowers, and fruit of many native trees and shrubs. Controlling these species can be challenging, especially in remote and rugged terrain, but opportunities to partner with the hunting community and the farming community - whose local knowledge and access can support targeted control – could strengthen community-led management and landscape-scale management.

PRESSURE PROFILE: STORMWATER AND WASTEWATER DISCHARGES

Pressure rating: High

Pressure reduction objective: Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater

Pressure reduction objective: Avoid wastewater discharge to freshwater

Population growth and urban development drive stormwater and wastewater loads. Stormwater carries sediment, nutrients, pathogens, heavy metals, microplastics, and emerging contaminants into waterbodies, including the deepwater lakes. Treated wastewater is discharged to land or rivers and contains varying levels of nutrients, pathogens, and other contaminants depending on the treatment process. Infrastructure (appendix 1, map 13) upgrades in the Upper Lakes CAP area have struggled to keep up with rapid growth, leading to overflows and increased discharges into waterways. Stormwater and wastewater impacts are highly visible near urban areas and often spark community concern, creating a platform to build support for futureproofing infrastructure and investing in nature-based solutions with multiple co-benefits.

PRESSURE PROFILE 9: CONTAMINANT LOSSES FROM LAND USE

Pressure rating: Medium

Pressure reduction objective: Reduce contaminants - sediments, nutrients, pathogens, agrichemicals – from land use entering freshwater

Surface runoff (overland flow) from agricultural and rural development areas can carry potentially high loads of sediment, nutrients, pathogens such as E. coli and other contaminants such as agrichemicals. Diffuse losses of contaminants can also occur through leaching to groundwater, and via groundwater flow to connected surface water bodies. The Upper Lakes catchments host a variety of different land uses - from extensive High-Country sheep, beef and deer farming to intensively run dairy farms, winter grazing blocks, specialist cropping, golf courses, camping grounds, ski fields, and lifestyle blocks, through to urban areas.

These land uses, without appropriate mitigations put in place, can increase potential losses of contaminants where soils are left bare (exposed), stream beds and banks are not protected from heavy animals (stock), fertilisers are used in-efficiently or applied inaccurately and high levels of agrichemicals are used. Climate change is expected to increase the severity of this pressure through more extreme weather and adverse events, such as drought, fires and floods. The diversity of land uses contributing to surface runoff creates an opportunity for cross-sector collaboration and innovation.

PRESSURE PROFILE: MICROPLASTICS

Pressure rating: Medium

Pressure reduction objective: Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater. Additional pressure reductions may be developed in the adaptive management of this plan.

Microplastics are an emerging concern in lakes, rivers, wetlands, and terrestrial environmental values. They enter the environment through stormwater, wastewater and urban and agricultural runoff. Microplastics can form as larger plastic parts - often left behind after recreational activities - which break down. Microplastics can also be found associated with dust particles, often linked to population growth and urban development (Li et al 2018). While data on their distribution and impacts is limited, the main worries focus on microplastics entering freshwater food webs (Mora-Teddy & Matthai 2019), accumulating in soils on productive land (Yang et al., 2021), and becoming a human health risk (Hale et al., 2020). As an emerging issue, microplastics offer a focus for mobilising action on plastic waste reduction and highlighting ecosystem sensitivity.

PRESSURE PROFILE: INTRODUCED FISH

Pressure rating: Medium

Pressure reduction objective: Reduce introduced fish interactions with non-migratory galaxiids

Anglers from across Aotearoa (New Zealand) and the world come to fish for trout and salmon in the deepwater lakes, rivers and streams, with both visitors and locals enjoying them as a recreation and food source. Since their introduction, trout, salmon and perch have greatly impacted smaller native fish (McIntosh et al., 2010). In the lakes and headwaters koaro and bullies can be preyed on, below the lakes non-migratory galaxiids are mostly limited to refuges in headwater streams (appendix 1, map 11) due to predation and competition. Fishing remains an important part of local recreation, food gathering, tourism and culture. Recreational anglers' strong appreciation for freshwater health is an opportunity to build awareness and harness more support for freshwater protection and restoration and native freshwater fish species protection.

PRESSURE PROFILE: HYDROELECTRIC DAM NETWORK

Pressure rating: Medium

Pressure reduction objective: Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration

Pressure reduction objective: Improve environmental conditions for mahika kai and enable safe use

The deepwater lakes connected to the Mata Au / Clutha River are part of the hydroelectric system, with Hāwea serving as a storage reservoir. The Roxborough and Clyde dams block tuna kuwharuwharu (longfin eel) migration, preventing elvers from reaching the lakes and adults from leaving without help. These barriers to eel migrations, along with an unmanaged historic eel fishery, have substantially reduced eel populations in the lakes and rivers. Recent small-scale success in manually transporting elvers upstream presents an opportunity to expand collaborative restoration of tuna populations.

PRESSURE RATING

As part of the Open Standards for Conservation, the Upper Lakes ICG identified and assessed each pressure in terms of its scope, severity, and irreversibility, thinking about what is happening now and over the next 10 years.

- **Scope** refers to the spatial proportion of environmental values expected to be affected within the next 10 years under current conditions.
- **Severity** represents the extent of damage to the value within the next 10 years
- **Irreversibility** indicates how permanent the impact may be, or how difficult it would be to reverse.

Each pressure has been rated as having a low, medium, high, or very high impact on environmental values (table 4). Pressure reduction objectives have been developed, which guide us on the work that needs to be done. Pressures rated as low impact (figure 11) have not been included in table 4.

Table 4: Pressure ratings and pressure reduction objectives.

Pressure	Pressure rating	Environmental values worst affected	**Pressure reduction objectives** What we need to do about the pressure
Knowledge gaps	**Very high**	Alpine and subalpine zone, deepwater lakes	Reduce knowledge gaps
Introduced Predator Mammals	**Very high**	Alpine and subalpine zone, native terrestrial environmental values, braidplains and riparian zones, productive land and urban spaces	Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, possums, mice hedgehogs and feral cats)
Freshwater Invasive Organisms	**Very high**	Deepwater lakes, lakes, rivers	Reduce the risk of new freshwater invasive organisms establishing Contain and remove lagarosiphon
Wilding Conifers (Pines & Firs)	**Very high**	Tussock grasslands, shrubland, alpine and subalpine zone, wetlands, riparian zones, braided rivers	Reduce wilding conifer seed sources, infestations and re-infestations
Terrestrial Weeds (other than wilding conifers)	**High**	Wetlands, riparian zones, braided rivers, native terrestrial environmental values, productive land	Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)
Environmental conditions that are not suitable for mahika kai	**High**	Wetlands, native terrestrial environmental values, rivers and lakes, urban spaces	Improve environmental conditions for mahika kai and enable safe use
Clearing and Changing Native Vegetation and Wetlands	**High**	Wetlands, shrubland NUEs: (inland outwash plains), urban spaces	Avoid clearing and change to native vegetation Avoid clearing, draining or filling of wetlands
Introduced Herbivore Mammals	**High**	Shrubland, beech forest, alpine and subalpine zone, productive land	Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois and tahr)
Stormwater and Wastewater Discharges	**High**	Deepwater lakes, lakes, urban spaces (urban streams)	Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater Avoid wastewater discharge to freshwater
Contaminant Losses from Land Use	**Medium**	Deepwater lakes, lakes, rivers, productive land (streams running through productive land)	Reduce contaminants - sediments, nutrients, pathogens, agrichemicals – from land use entering freshwater
Microplastics	**Medium**	Deepwater lakes, urban spaces (urban streams)	Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater
Introduced Fish	**Medium**	Rivers (upland tributary streams)	Reduce introduced fish interactions with non-migratory galaxiids
Hydroelectric Dam Network	**Medium**	Deepwater lakes, rivers	Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration

Figure 11: "Bubble diagram" showing the relative "size" of pressures according to the pressure rating of table 9. The diagram was created using flourish.com software. An interactive version can be found on our Upper Lakes GIS hub at upper-lakes-orcnz.hub.arcgis.com

OUR GOALS

The following goals were developed with the Upper Lakes ICG as part of the Open Standards for Conservation planning process. They describe the broad outcomes we are working towards over the next 10 years, reflecting both the aspirations of the community and the needs of the environment. Each goal is linked to the environmental values it most strongly relates to. A brief monitoring framework is provided in appendix 5, wich will be developed in more detail during the CAP delivery.

GOAL: INCREASE THE ABUNDANCE OF NATIVE WILDLIFE

By 2035, native wildlife (birds, bats, lizards, fish and invertebrates) populations are increasing from the 2025 baseline throughout the Upper Lakes CAP, and in focus areas they are thriving and connected. Low-predator spaces support the persistence and recovery of taoka wildlife over time, with more populations on track to be self-sustaining in the future.

Key attribute: Native taoka wildlife

Indicator(s): Species threat status, population statistics, observations, birdsong level, 5-minute bird count

Environmental values this goal applies to: Alpine and subalpine, beech forest, tussock grassland, shrubland and woodland, naturally uncommon ecosystems (NUEs), braided rivers and braidplains, rivers and riparian zones, deepwater lakes, other lakes, wetlands, productive land, urban spaces.

GOAL: MAINTAIN OR IMPROVE WATER QUALITY

By 2035, river and lake water quality across the length, breadth and depth of water bodies in the Upper Lakes is maintained or improved compared to the 2025 baseline. Water quality parameters showing a degrading trend in 2025 are demonstrating improvement by 2035, or in waterbodies where natural recovery takes longer (such as deepwater lakes) are clearly on track to improve. Water throughout the Upper Lakes CAP area supports healthy freshwater ecosystems with thriving habitats for native taoka freshwater life.

Key attribute: Water quality

Indicator(s): Lake trophic level index, national objective framework band, water quality parameter trends

Environmental values this goal applies to: braided rivers and braidplains, rivers and riparian zones, deepwater lakes, other lakes, aquifers and groundwater, productive land, urban spaces.

GOAL: IMPROVE FRESHWATER ECOSYSTEM FUNCTION

By 2035, the impact of aquatic weeds (invasive submerged macrophytes) in our lakes is reduced, or eliminated where possible.

From 2025 to 2035 and beyond, lakes throughout the Upper Lakes CAP area are protected from new incursions of invasive aquatic organisms as far as practicable, and any new invasive aquatic organisms are promptly managed so they do not establish. Biosecurity actions are taken that will help to reduce impacts from existing invasive aquatic organisms and eliminate them where possible.

Before 2035, actions are taken towards understanding, then maintaining or improving the functional biodiversity (primary production and food webs) in deepwater lakes.

Key attribute: Freshwater ecosystem function

Indicator(s): Aquatic life and ecosystem processes

Environmental values this goal applies to: braided rivers and braidplains, rivers and riparian zones, deepwater lakes, other lakes, wetlands, aquifers and groundwater, productive land, urban spaces.

GOAL: IMPROVE ENVIRONMENTAL CONDITIONS FOR MAHIKA KAI AND ENABLE SAFE USE

By 2035, mahika kai plants and wildlife are increasing in abundance compared to 2025, with more species on track to being plentiful enough for cultural take by mana whenua. Kāi Tahu whānui have safe contact and connection with a greater number of wāhi mahika kai (cultural food and resource gathering sites) throughout the Upper Lakes and conditions are suitable for use. Mana whenua are able to exercise kaitiakitaka (guardianship) and to practice mahika kai. The wider community are engaged in stewardship and conditions are suitable for fishing and wild food harvest.

Key attribute: Mahika kai health and accessibility

Indicator(s): Mahika kai species presence, abundance, diversity, and safety

Environmental values this goal applies to: Alpine and subalpine, beech forest, tussock grassland, shrubland and woodland, braided rivers and braidplains, rivers and riparian zones, deepwater lakes, other lakes, wetlands, urban spaces

---

GOAL: INCREASE OVERALL NATIVE VEGETATION COVERAGE AND IMPROVE CONDITION

By 2035, ecologically appropriate native vegetation cover across the Upper Lakes CAP area has increased, and the overall condition of native vegetation is improving form the 2025 baseline. Vegetation reflects the natural diversity and composition of the area, with native taoka plants becoming more prevalent. Ongoing recruitment of new growth sustains these ecosystems, and regenerating areas show visible ecological succession - from pioneer species to more mature native plant assemblages.

Key attribute: Native vegetation (alpine, beech, shrub, tussock, riparian, submerged, wetland)

Indicator(s): Coverage (ha) per type, vegetation type succession observations, threatened plant presence, canopy cover, biomass, submerged plant index

Environmental values this goal applies to: Alpine and subalpine, beech forest, tussock grassland, shrubland and woodland, naturally uncommon ecosystems (NUEs), rivers and riparian zones, productive land, urban spaces

---

GOAL: IMPROVE OVERALL WETLAND COVERAGE AND FUNCTION

By 2035, the overall number, size and coverage of wetlands in the Upper Lakes CAP area has increased from the 2025 baseline. No further wetlands have been lost and there are improvements in native wetland vegetation condition and native wildlife presence at wetlands,. Improvements of wetland ecological functioning, hydrological functioning and resilience are apparent as part of the whole-catchment system.

Key attribute: Wetland size and hydrology

Indicator(s): Wetland coverage (ha), wetland hydrology measures

Environmental values this goal applies to: Alpine and subalpine, wetlands, productive land, urban spaces

---

GOAL: MAINTAIN OR IMPROVE NATURALLY UNCOMMON ECOSYSTEMS

By 2035, the extent and function of naturally uncommon ecosystems (NUEs) in the Upper Lakes is maintained (where possible with climate changes) at least at the 2025 baseline, with these ecosystems being recognized and cherished. NUEs in priority sites are actively managed to protect and support the persistence and recovery of rare and threatened plants and wildlife. NUEs in the alpine and sub-alpine zone are resilient to increasing temperatures, to the greatest extent practicable.

Key attribute: Naturally uncommon ecosystem functions

Indicator(s): NUE number, NUE coverage (ha), threatened species presence

Environmental values this goal applies to: Alpine and subalpine, naturally uncommon ecosystems (NUEs), braided rivers and braidplains, productive land

---

GOAL: STRENGTHEN KI UTA KI TAI (INTERCONNECTEDNESS)

By 2035, the interconnections between whenua (land) and wai (water) are stronger compared to 2025 – providing resilience and expressing the 'natural state' of water in its journey through the water cycle. The natural network of forest, tussock, shrubland, wetlands, rivers, braidplains, lakes and groundwater are connected and have a positive impact through to the lower Mata-au (Clutha River) and out to the coast.

Key attribute: Ki uta ki tai (interconnectedness)

Indicator(s): Nutrient fluxes, riparian and wetland continuity, habitat connectivity, fish passage, water quality and ecosystem integrity downstream.

Environmental values this goal applies to: Alpine and subalpine, beech forest, tussock grassland, shrubland and woodland, naturally uncommon ecosystems (NUEs), braided rivers and braidplains, rivers and riparian zones, deepwater lakes, other lakes, wetlands, aquifers and groundwater, productive land, urban spaces (all environmental values)

Table 5: Relationship between environmental health goals ("what we need to achieve") and pressure reduction objectives ("What we need to get on top of")

Environmental health goal: what we need to achieve	Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, possums, mice hedgehogs and feral cats)	Reduce the risk of new freshwater invasive organisms establishing	Contain and remove lagarosiphon	Reduce wilding conifer seed sources, infestations and re-infestations	Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris,	Improve environmental conditions for mahika kai and enable safe use	Avoid clearing and change to native vegetation	Avoid clearing, draining or filling of wetlands	Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois and tahr)	Reduce contaminants - sediments, nutrients, pathogens, microplastics - in	Avoid wastewater discharge to freshwater	Reduce contaminants - sediments, nutrients, pathogens, agrichemicals – from land use entering freshwater	Reduce introduced fish interactions with non-migratory galaxiids	Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration	Reduce knowledge gaps
Increase the abundance of native wildlife	✓					✓	✓	✓					✓	✓	
Maintain or improve water quality				✓		✓				✓	✓	✓			✓
Improve freshwater ecosystem function		✓	✓			✓		✓		✓	✓	✓		✓	✓
Improve environmental conditions for mahika kai and enable safe use	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	
Increase overall native vegetation coverage and improve condition.				✓	✓	✓	✓	✓	✓						
Improve overall wetland coverage and function	✓			✓	✓	✓	✓	✓	✓						
Maintain or improve naturally uncommon ecosystem functions	✓			✓	✓		✓	✓	✓						✓
Strengthen ki uta ki tai (interconnectedness)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

ACTION PLAN

The strategies in this action plan are defined as "a set of one or more actions with a common focus, designed to either reduce pressures, improve environmental health, or both." These strategies are grouped into four programmes based on shared themes and impacts. The initial action plan outlined within each strategy serves as a "menu" of recommendations and preferred directions from our Upper Lakes ICG. Detailed prioritisation will follow during the Governance phase of this CAP.

The four programmes are:

1. Foundational programme
2. Native wildlife programme
3. Native vegetation programme
4. Freshwater programme

Local conservation and catchment groups have already seen positive results from the great mahi they have carried out to date. The strategies in this CAP align with much of their work and build on that success. Examples of current projects are provided in Appendix 8.

The 13 outputs and outcomes strategies of this CAP are directly linked to the pressure reduction objectives and environmental health goals (see Tables 6–18 for details by strategy). This strong alignment ensures that the collective impact of on-the-ground work contributes to the community's values and vision, as established by the ICG. This integration is a valuable contribution of the CAP, as it provides coherence and purpose while avoiding "random acts of conservation."

We are committed to upholding this partnership, creating space for mana whenua input, and ensuring their perspectives shape decision-making. The strategies presented here represent an initial framework only. They will be adapted as required, with a clear commitment to respond to mana whenua direction and guidance in their design and implementation.

Monitoring to track the progress of each strategy is provided in appendix 2.

EFFECTIVENESS RATING

The Upper Lakes ICG and ORC staff analysed the "effectiveness rating" of each strategy (table 10), rating the potential impact, feasibility and affordability of carrying out the work. The ICG also looked at each strategy through the "strategic lenses" of urgency, easy wins, building blocks and advocacy (table 6). The effectiveness rating, together with the pressure rating help guide decision making. Note that strategies with a low impact and low feasibility and affordability have already been excluded.

Table 6: Effectiveness rating of the 13 strategies

Programme	Strategy	Related pressure and catchments-wide rating	Impact	Feasibility & affordability	Strategic lens
1. Foundational programme (supports all other actions)	1: Develop a long-term and diverse framework that sustains funding that will support actions	**Supports other pressure reductions**	**Supporting impact**	**Medium feasibility**	**Building block**
	2: Increase science, research and knowledge sharing for the community	**Supports other pressure reductions**	**Supporting impact**	**High feasibility**	**Building block**, **easy win**
	3: Strengthen our mana whenua partnership	**Supports other pressure reductions**	**Supporting impact**	**Very high feasibility**	**Advocacy, building block**
	4: Improve environmental conditions for mahika kai and enable safe use	Conditions not suitable for Mahika kai: **High**	**High impact**	**Medium feasibility**	**Advocacy**
2.Native wildlife programme	5: Control introduced predator mammals	Introduced predator mammals: **Very High**	**High impact**	**Medium feasibility**	**Urgent**
	6: Assist tuna kuwharuwharu (longfin eel) and kanakana (lamprey) migration	Hydroelectric Dam Network: **Medium**	**High impact**	**Medium feasibility**	**Advocacy**
	7: Protect and enhance galaxiid habitats	Introduced Fish: **Medium**	**Very high impact**	**Very high feasibility**	**Urgent**, **easy win**
3.Native vegetation programme	8: Control wilding conifers (pines and firs) and terrestrial weeds	Wilding Conifers (Pines): **Very high** Terrestrial Weeds: **High**	**Very high impact**	**Medium feasibility**	**Urgent**, **building block**
	9: Protect, restore and enhance native vegetation	Clearing and Changing Native Vegetation: **High**	**Medium impact**	**Medium feasibility**	**Easy win**, **building block**
4.Freshwater programme	10: Protect, restore and enhance wetlands	Clearing Wetlands: **High**	**Very high impact**	**Medium feasibility**	**Building block**
	11: Reduce contaminants from stormwater and wastewater	Stormwater & Wastewater Discharges: **High** Microplastics: **Medium**	**Medium impact**	**Medium Feasibility**	**Urgent,** **advocacy**
	12: Reduce contaminant losses from land use	Contaminant Losses from Land Use: **Medium**	**High impact**	**Medium feasibility**	**Building block**
	13: Reinforce freshwater biosecurity in deepwater lakes	Freshwater Invasive Organisms: **Very High**	**High impact**	**Very high feasibility**	**Urgent**

Impact Key:

Very high impact	Very likely to meaningfully contribute to goals and objectives
High impact	Likely to meaningfully contribute to goals and objectives
Medium or supporting impact	Likely to enable/amplify the impact of other strategies, or could meaningfully contribute to goals and objectives
Low impact	Unlikely to meaningfully contribute to goals and objectives

Feasibility and affordability key:

Very high feasibility	Very likely technically feasible and we have most of the resources
High feasibility	Likely technically feasible and requires some additional resources
Medium feasibility	Could be technically feasible with substantial additional resources
Low feasibility	Not technically feasible and/or required resources beyond our reach

Strategic lens key:

Urgent	Needs to happen or values will be lost forever
Easy win	We can achieve (at least some of) this with what and who we have
Building block	Needs to be done to support other/more action
Advocacy	We need to do this to bring people along on our catchment action journey

PROGRAMME 1: FOUNDATIONAL PROGRAMME

STRATEGY 1: DEVELOP A LONG-TERM AND DIVERSE FRAMEWORK THAT SUSTAINS FUNDING THAT WILL SUPPORT ACTIONS

Objective: Develop a long-term, sustainable, and diverse funding framework to deliver CAP strategies and support proactive, community-led restoration.

Key people to drive this strategy: Upper Lakes Integrated Governance Group (to be formed), Mana Whenua, catchment and conservation groups supported by agencies.

Initial action plan for first 3 to 5 years:

- **a. Funding that recognises landscape-scale action is a long game**
  Collectively advocate to for funding options that recognise landscape-scale actions - such as wilding conifer control, predator control and maintenance of plantings - are a long game that requires stable, long-term funding.
- **b. Investable restoration actions**
  Measure the economic value of externalities from restoration and conservation - like carbon storage, climate regulation, erosion control, and water supply - and show the benefits of restoration and conservation to community and industry – such as avoided costs, revenue generation, and broader social benefits. Create investable projects based on this concept, to make our actions more self-sustaining.
- **c. Cost-benefit-based early intervention**
  Funding needs to prioritise early intervention to manage pressures - such as infestations of wilding conifers, invasive freshwater organisms and declining water quality - where cost-benefit analysis shows that acting early intervention is significantly more effective and less expensive than dealing with long-term impacts.
- **d. Help land holders fund action**
  Develop funding mechanisms to help land holders take action on private property - such as wetland restoration, replacing conifers with natives, critical source area management, or installing property-level stormwater solutions - across a diverse range of land uses. Explore options like co-funding, rates relief, green loans, subsidies, visitor levies, stewardship payments, eco-certifications and carbon and certified biodiversity credit systems.

Table 6: Strategy 1 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Long-term funding options	Continuous progress of actions – we don't lose the gains because funding stops	Enabling role for all pressure reduction objectives	Supporting roles for all environmental health goals
Data on the economic value of externalities from restoration and conservation	Link between restoration/conservation spend and community benefits/industry profits		
Pro-active interventions	Better cost-benefits		
A range of incentives, co-funding etc	Easier for landholders to take action		

STRATEGY 2: INCREASE SCIENCE, RESEARCH AND KNOWLEDGE SHARING FOR THE COMMUNITY

Objective: Identify and bridge knowledge gaps, and provide accessible, up-to-date scientific information to improve understanding, enable evidence-based management, and support the implementation of all other strategies.

Key people to drive this strategy: Deep Lakes Technical Advisory Group, mana whenua, Upper Lakes CAP Governance Group, Enviroschools, catchment and conservation groups, ORC, University of Otago, WAI Wānaka.

Initial action plan for first 3 to 5 years:

- **a. Deep Lakes Research Programme**
  Carry out scientific research on deepwater lakes, as proposed by Deep Lakes Technical Advisory Group in partnership with mana whenua. Research may include historic and future trajectories, nutrient budgets, mixing processes, food webs and invasive species impacts. Apply any findings to make management recommendations for on-the-ground actions.
- **b. Build on current community science opportunities**
  Build on current opportunities for community science and monitoring – such as water clarity, macroinvertebrate counts, photo points, bird and bat counts, moth surveys, and braided river walkover surveys – and support community science with coordination, robust methods, technical advice, access to technology, and data storage.
- **c. Develop an interactive CAP data system**
  Implement an interactive, digital mapping platform to collate real-time spatial data from decentralised sources – this could involve using existing platforms after a thorough assessment. Encourage the community to contribute observations and stories – utilising accessible platforms like iNaturalist and eBird, or by providing a place to upload photos and sharing local stories. Support catchment groups to use the information to inform actions.
- **d. Establish a knowledge sharing network**
  Establish a collaborative network, supported by a digital platform - that brings together predator control, planting, conservation and catchment groups, with mana whenua, researchers, scientists and technical or industry experts – to facilitate knowledge exchange, support the adoption of innovative technologies, and draw on mātauraka to guide actions.

Table 7: Strategy 2 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Research outcomes	Land and water management recommendations	Reduce knowledge gaps Enabling role for all pressure reduction objectives	Supporting roles for all environmental health goals
Community science engagements	Increased information coverage and flow		
Interactive digital mapping platform			
Knowledge sharing network	Increased information sharing and learning		

STRATEGY 3: STRENGTHEN OUR MANA WHENUA PARTNERSHIP

We are committed to upholding this partnership, creating space for mana whenua input, and ensuring their perspectives shape decision-making. The strategies presented here represent an initial framework only. They will be adapted as required, with a clear commitment to respond to mana whenua direction and guidance in their design and implementation.

Objective: Continue to build and enhance meaningful partnerships between mana whenua, local government, and local conservation and catchment groups to uphold Kāi Tahu values, reflect shared aspirations, and provide a strong foundation to support all other CAP strategies.

Key people to drive this strategy: Mana whenua, Upper Lakes Integrated Governance Group (to be formed), Waiwhakaata Strategy Group, catchment groups, QLDC, ORC

Initial action plan for first 3 to 5 years:

- **a. Support development of meaningful mana whenua partnership engagements**
  Develop an Upper Lakes CAP partnership enhancement plan to ensure genuine and meaningful korero (discussions) and mahi (work) that reflects partnership commitments between mana whenua, local government and the local conservation and catchment groups, and delivers on Kāi Tahu and community aspirations. This may include networking hui and practical workshops to enhance effective and efficient outcomes. to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish to within the Upper Lakes Governance Group.
- **b. Reflect the Waiwhakaata Rautaki (strategy) in our work together**
  Look to the Waiwhakaata Rautaki (Arnold, 2025) as a pathway to position the mauri (life force) and mana (prestige) of te taiao (the environment) and the catchments as the central priority for what we do in partnership. Set expectations for aligning restoration activities with sustainable economic opportunities and actively engage the community to take ownership of ecosystem restoration, expressing kotahitaka (unity).

Table 8: Strategy 3 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Meaningful partnership engagements	Actions aligned with Kāi Tahu and community aspirations and undertaken in partnership	Supporting role for all pressure reduction objectives	Supporting roles for all environmental health goals
Waiwhakaata Rautaki (Lake Hayes strategy)	A pathway to work together in partnership and te taiao at the centre		

STRATEGY 4: IMPROVE ENVIRONMENTAL CONDITIONS FOR MAHIKA KAI AND ENABLE SAFE USE

We acknowledge that the development of these strategies must be grounded in meaningful partnership with mana whenua. A dedicated partnership plan (strategy 3) will be prepared to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish to within the Upper Lakes Governance Group. We are committed to upholding this partnership, creating space for mana whenua input, and ensuring their perspectives shape decision-making. The strategies presented here represent an initial framework only. They will be adapted as required, with a clear commitment to respond to mana whenua direction and guidance in their design and implementation.

Objective: Strengthen community understanding of mahika kai practices; improve conditions at wāhi mahika kai (food and resource gathering sites) to enable safe use by mana whenua; and increase the abundance of mahika kai species.

Key people to drive this strategy: Mana whenua, Upper Lakes Integrated Governance Group, Waiwhakaata Strategy Group, catchment groups, QLDC, ORC

Initial action plan for first 3 to 5 years:

- **a. Strengthen community knowledge on mahika kai**
  Strengthen community knowledge and awareness of mahika kai practices, along with increasing the broader understanding of what mahika kai is, and its importance in Kāi Tahu life and identity. This could include opportunities to support mana whenua-led community education events and engagements, or other forms of delivery as determined by mana whenua.
  b. Integrate mahika kai across actions
  Invest in mana whenua-led plans, designs and/or guidelines, to ensure mahika kai resources, habitats, and practices are appropriately built into large-scale restoration and enhancement projects - to increase the abundance of mahika kai. Prioritise wāhi mahika kai for relevant actions to improve safe contact – such as willow control and actions relating to discharges to water – with direction from mana whenua.

Table 9: Strategy 4 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Educational engagement	Increased community knowledge and involvement	Reduce knowledge gaps	Improve the abundance and accessibility of mahika kai
Plans, designs and guidelines	Planting projects with high mahika kai value	Improve environmental conditions for mahika kai and enable safe use	

PROGRAMME 2: NATIVE WILDLIFE

STRATEGY 5: CONTROL INTRODUCED PREDATOR MAMMALS

Objective: Reduce populations of introduced predator mammals (stoats, ferrets, weasels, rats, hedgehogs, possums, mice, and feral cats) to increase native wildlife abundance, enhance mahika kai, and maintain or improve the function of naturally uncommon ecosystems.

Key people to drive this strategy: Predator control-focused conservation groups, community trapping groups, catchment groups, Department of Conservation

Initial action plan for first 3 to 5 years:

- **a. Use advanced and innovative trapping and monitoring tools**
  Support current community predator control groups to expand the use of advanced trapping and monitoring technologies - to further improve predator detection and control efficiency including remote sensors, smart traps, and real-time data tracking. Conduct long-term predator and biodiversity monitoring to build vital baseline data
- **b. Enhance current core-buffer-corridor control operations**
  Continue to intensify predator control in established core hubs: Mākarore (Makarora) catchment, Mātakitaki (Matukituki) catchment, Te Awa Whakatipu-Puahere (Dart-Rees) catchment) through higher-density trapping and baiting. Enhance the buffer zones surrounding core areas to reduce predator reinvasion risk. Improve ecological connectivity between predator control zones by intensifying control along wildlife corridors (Wildlands 2020).
- **c. Establish a predator elimination zone in 5-10 years**
  Within 5-10 years, establish a predator elimination zone in a topographically confined area using aerial baiting, perimeter trapping, and ongoing incursion response (Wildlands 2023). The minimum viable size is 10,000 ha.
- **d. Expand community engagement and trapping in urban/semi-rural areas**
  Support the growth of existing and new community backyard-style trapping groups and trap libraries in urban and semi-rural areas through strategic planning, monitoring frameworks, equipment supply, and volunteer training.
- **e. Support responsible companion cat ownership and policy interventions**
  Deliver education campaigns on responsible ownership and build public understanding of the impacts of cats on native biodiversity – upskilling and connecting with cat welfare groups. Urgently advocate for policy interventions that promote responsible cat ownership and prevent domestic cats from contributing to the stray and feral cat population.
- **f. Strengthen feral cat control**
  Strengthen feral cat control capability within existing predator management projects by creating targeted, cat-specific plans for identified hotspots, guided by on-going monitoring data.

Table 10: Strategy 5 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
High-tech trapping and monitoring technology installed	More efficient trapping work	Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, hedgehogs, possums, mice and feral cats)	Increase the abundance of native wildlife Improve the abundance and accessibility of mahika kai
Intensified predator control	Low predator density core areas and corridors		
Predator elimination zone	A predator-free area		
Growth of community trapping	Reduced predators in the urban and semi-rural areas		
Growth of trap libraries			
Feral cat control plans for hot spots	Reduced populations of feral cats		
Responsible cat ownership education	Companion cat wellbeing, and reduced roaming cats		
Cat ownership policy intervention			

STRATEGY 6: ASSIST TUNA KUWHARUWHARU (LONGFIN EEL) AND KANAKANA (LAMPREY) MIGRATION, IN PARTNERSHIP WITH MANA WHENUA

We acknowledge that the development of these strategies must be grounded in meaningful partnership with mana whenua. A dedicated partnership plan (strategy 3) will be prepared to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish to within the Upper Lakes Governance Group. We are committed to upholding this partnership, creating space for mana whenua input, and ensuring their perspectives shape decision-making. The strategies presented here represent an initial framework only. They will be adapted as required, with a clear commitment to respond to mana whenua direction and guidance in their design and implementation.

Objective: Support tuna kuwharuwharu (longfin eel) and kanakana (lamprey) migration into and out of the catchments to increase native wildlife abundance, enhance mahika kai, strengthen freshwater ecosystem function, and uphold ki uta ki tai (interconnectedness).

Key people to drive this strategy: Mana whenua, Contact Energy, WAI Wānaka , catchment groups

Initial action plan for first 3 to 5 years:

- **a. Mana whenua-led collaboration with key partners to increase tuna trap and transfer**
  Support collaboration and communication among key partners (mana whenua and Contact Energy) on tuna kuwharuwharu (longfin eel) trap and transfer efforts, with the aim of increasing elver transfer into deepwater lakes and adult tuna transfer to below the dam network.
- **b. Support mana whenua-led tuna (eel) research**
  Connect with and support mana whenua-led tuna research, including factors affecting elver arrival and capture, elver growth and survival, and the health of transferred tuna kuwharuwharu (longfin eel)
- **c. Monitor tuna (eel) health in the deepwater lakes**
  Develop a mana whenua-led monitoring plan for tuna kuwharuwharu (longfin eel) – involving the community for collaborative data collection. Support this with digital tools and data validation, to grow shared knowledge about tuna health in deepwater lakes and inform the trap and transfer programme.
- **d. Support a kanaknaka assisted passage programme**
  Understand mātauraka of kanakana / lamprey in the Upper Lakes CAP area and support mana whenua-led research that can lead to a trial of assisted passage over the Mata-au (the Clutha) dam network – both up and downstream. Assess the potential for future mana whenua-led trap and transfer to appropriate kanakana breeding areas in the Upper Lakes CAP area.

Table 11: Strategy 6 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Increase elver trap and transfer	Increase tuna / eel population	Improve environmental conditions for mahika kai and enable safe use	Increase the abundance of native wildlife
Tuna / eel research	More effective trap and transfer	Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration	Improve freshwater ecosystem function
Tuna / eel health monitoring data		Reduce knowledge gaps	Improve the abundance and accessibility of mahika kai
Future kanakana programme	A trial of assisted kanakana migration		Strengthen ki uta ki tai (interconnectedness)

STRATEGY 7: PROTECT AND ENHANCE GALAXIID HABITATS

Objective: Reduce interactions between introduced fish and non-migratory galaxiids to increase the abundance of native wildlife and enhance freshwater ecosystem function.

Key people to drive this strategy: Otago Fish and Game, catchment groups, mana whenua, DOC, ORC

Initial action plan for first 3 to 5 years:

- **a. Determine galaxiid distribution with mātauraka and eDNA**
  Form a clearer picture of non-migratory galaxiid distribution in the upper Ōrau (Cardrona River) catchment, building on recent work using eDNA analysis, along with mātauraka (indigenous knowledge) about the extent of suitable habitats. Apply the findings to inform habitat restoration.
- **b. Provide on-site community and visitor education on galaxiids**
  Build community and visitor knowledge and awareness of galaxiid habitats by installing storyboard signs - including mātauraka and science information - at walking track entry points or rest stops, in the vicinity of galaxiid sites in the upper Ōrau (Cardrona River) catchment.
- **c. Undertake galaxiid habitat restoration**
  At identified priority sites (from current knowledge, mātaurataka and eDNA), undertake salmoniid barrier installation, culvert modifications or shoring-up of natural barriers, removal of trout and riparian planting, to improve or restore non-migratory galaxiid habitats – in collaboration with catchment groups. Community nurseries and Otago Fish and Game.

Table 12: Strategy 7 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Non-migratory galaxiid distribution map	Targeted habitat restoration	 Reduce introduced fish interactions with galaxiids  Reduce knowledge gaps	 Increase the abundance of native wildlife  Improve freshwater ecosystem function  Increase overall native vegetation coverage and improve condition
Storyboard signs	Increased community awareness and involvement		
Barrier installations or culvert modifications	Salmoniid-free habitats		
Riparian planting	Better galaxiid habitats		

PROGRAMME 3: NATIVE VEGETATION

STRATEGY 8: CONTROL WILDING CONIFERS (PINES AND FIRS) AND TERRESTRIAL WEEDS

Objective: Reduce wilding conifer seed sources, infestations, and re-infestations, and control other terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster) to improve the condition of native vegetation, expand overall native coverage, and maintain or enhance the function of naturally uncommon ecosystems.

Key people to drive this strategy: Wilding conifer groups, catchment groups. wilding conifer national programmes and organisations - such as Wildling Pine Network, QLDC, DOC, MPI, LINZ, ORC.

Initial action plan for first 3 to 5 years:

- **a. Build community weeds knowledge**
  Build community knowledge and awareness around invasive weeds by expanding the reach of current resources and education - about weed identification and effective control methods, along with the compounding impacts fast-spreading weeds – to landholders and the public. Foster community engagement to grow a motivated volunteer workforce willing to take on coordinated wilding conifer work and bring our community along with us.
- **b. Maintain a wilding conifer spread map**
  Update and maintain data on the spread of wilding conifers and develop a dynamic digital heatmap identifying previous and current seed sources of wilding species, along with projected dispersal hotspots. Use modelling for 3-year and 10-year control plans, to support current wilding conifer groups and catchment groups.
- **c. Replace conifer seed sources with native plants or non-spreading exotics**
  Promote the phased removal of conifer shelterbelts, woodlots, and visual screening plantings that pose a risk of wilding spread. Provide funding and practical support to replace them with functional native trees (or non-spreading introduced trees as a second choice).
- **d. Support and enable collaborative weed control**
  Establish mechanisms to share resources - such as helicopter spraying runs, ground crews and drone technology – and coordinate weed control work between public landholders, private landholders, contractors and catchment groups. Connect catchment groups with expert advice on the most effective methods and design of weed control work, collaborating with relevant national programmes and agencies.
- **e. Address emerging weed pressures**
  Strengthen efforts to monitor and manage fast-spreading weeds – such as yellow flag iris, lupins, sycamores and willows. Support proactive community-led efforts with funding, strategic support, based on recognising the cost-benefit of early intervention to stop spread.
- **f. Control weeds in braided rivers**
  Tackle weed issues in braided rivers and braidplains – such as Te Awa Whakatipu-Puahere (Dart–Rees) which has an existing weed control plan - where weeds impact the natural dynamics and shifting of gravel birds, which changes flood patterns, alter sediment movement, and impacts bird nesting habitats.
- **g. "Right plant, right place" and targeted control approach**
  Apply the "right tree/plant, right place" approach to exotic vegetation in locations where it provides ecological, social, or engineering benefits without causing unintended harm

(ie. non-spreading species). Focus weed control efforts based on risk to native ecosystems, functioning of waterways, mahika kai and catchment landscapes. Apply control methods carefully using precision techniques to maximise effectiveness while minimising unintended ecological harm.

Table 13: Strategy 8 outputs, outcomes and impacts

<table>
<tr><th>Outputs</th><th>Outcomes</th><th>Pressure reductions</th><th>Environmental health goals</th></tr>
<tr><td>Educational engagements</td><td>Increased community, landowner and visitor knowledge and involvement</td><td rowspan="8">🌲 Reduce wilding conifer seed sources, infestations and re-infestations

🌾 Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)

🔬 Reduce knowledge gaps</td><td rowspan="8">🌱 Increase overall native vegetation coverage and improve condition

🦎 Maintain or improve naturally uncommon ecosystem functions

🐟 Improve freshwater ecosystem function (riparian)

⛰️ Strengthen ki uta ki tai (interconnectedness)</td></tr>
<tr><td>Conifer spread map</td><td>Targeted conifer seed source control.
Ability to show historic wins as part of the story and show the investments in control work.</td></tr>
<tr><td>Native trees planted</td><td>More native plants</td></tr>
<tr><td>Shared weed control spray runs</td><td rowspan="2">Increased control and reduced weeds</td></tr>
<tr><td>Control work on yellow flag iris, lupins, sycamores and willows</td></tr>
<tr><td>Weed control work in braided rivers</td><td>More natural river function</td></tr>
<tr><td>Risk-based prioritisation</td><td>Targeted control</td></tr>
</table>

STRATEGY 9: PROTECT, RESTORE AND ENHANCE NATIVE VEGETATION

Objective: Protect native vegetation by avoiding clearance and land use change; expand native vegetation through large-scale planting; and reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois, and tahr) to improve vegetation condition, increase overall native coverage, enhance the abundance of mahika kai, and maintain or improve the function of naturally uncommon ecosystems.

Key people to drive this strategy: Planting-focused conservation groups, native plant nurseries, catchment groups, community groups involved in planting, mana whenua, DOC, QLDC, ORC

Initial action plan for first 3 to 5 years:

- **a. Ensure our native plantings are adequately maintained**
  Fund and support community and catchment groups to carry out full and adequate maintenance operations (3 years minimum) on current and future plantings, to give the best chance for plants to thrive. Ensure projects are not "plant and walk away".
- **b. Support community nurseries**
  Support community nurseries with further development of propagation, climate resilient plant species selection and diverse, non-restrictive eco-sourcing (Heenan et al 2023).
- **c. Improve public access to eco-sourced native plants**
  Promote and improve public access to diverse, non-restrictive eco-sourced (Heenan et al 2023) native plant seedlings for residential use, along with information on plant species selection, appropriate assemblages of plants and climate-resilience considerations.
- **d. Develop a spatial native vegetation restoration plan**
  Develop a spatial model to guide where active planting is a priority, where natural regeneration should be encouraged, and which areas should be protected to achieve long-term ecological connectivity, climate resilience. Include a mana-whenua-led plan for mātauraka-informed vegetation enhancement of wāhi tupuna (mana whenua ancestral sites) and wāhi mahika kai (food and cultural resource gathering sites). Build on the planting work achieved so far, with gap-filling, buffers and corridors.
- **e. Incentivise retirement of marginal land and protection of habitats**
  Provide incentives to landowners to retire marginal land for natural regeneration of native vegetation and to legally protect sensitive or rare habitats through covenanting or other mechanisms. Support these efforts with stewardship agreements and ongoing assistance for maintenance.
- **f. Coordinate goat and pig control**
  Facilitate coordination of goat and pig control between public and private landholders. Utilise the local knowledge, skills, and networks of hunting and catchment groups, and focus on reducing reinvasion from unmanaged land (please note that deer, chamois and tahr management will be assessed, but this expertise were not available to the ICG at this time)
- **g. Increase rabbit and hare control**
  Provide funding and technical support for increased rabbit control and rabbit-proof fencing and guards to safeguard native plantings. Support neighbouring landholders to band together for coordinated rabbit and hare control. Address the spread of hares into sensitive alpine habitat through collective, landscape-scale control.

Table 14: Strategy 9 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Plantings are maintained	Planting has long term positive impact and good growth	Avoid clearing and change to native vegetation Avoid clearing, draining or filling of wetlands Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois and tahr)	Increase overall native vegetation coverage and improve condition Maintain or improve overall wetland coverage and function (planting) Increase the abundance of native wildlife Maintain or improve naturally uncommon ecosystem functions Improve freshwater ecosystem function (riparian) Improve the abundance and accessibility of mahika kai Strengthen ki uta ki tai (interconnectedness)
Diverse, non-restrictive eco-sourced seedlings	Plantings appropriate to place and climate resilient		
Retired and protected land	Natural regeneration of vegetation		
Goat and pig control	Less browsing on shrubland, soils not rooted		
Rabbit and hare control	Less browsing on native plantings		

PROGRAMME 4: FRESHWATER

STRATEGY 10: PROTECT, RESTORE AND ENHANCE WETLANDS

Objective: Protect wetlands by avoiding clearing, draining, or filling; restore and enhance wetlands to increase their extent and function; expand native wetland vegetation; improve mahika kai and native wildlife abundance; strengthen *ki uta ki tai* (interconnectedness); and use wetlands to improve downstream water quality.

Key people to drive this strategy: Catchment groups, native plant nurseries and community groups involved in planting, mana whenua, QLDC, ORC

Initial action plan for first 3 to 5 years:

- **a. Build community wetland knowledge**
  Build community knowledge and awareness of wetlands by supporting the delivery of community science and education focusing on wetland mapping, wetland nutrient cycling, flow regulation, native wetland biodiversity, and a mana whenua-led component on mahika kai.
- **Share wetland restoration guidance**
  Share and promote best practice guidance on wetland protection, restoration and mahika kai enhancement.
- **Provide a start-to-finish support package for wetland restoration**
  Identify priority and feasible wetlands for restoration - including mana whenua-led assessment within wāhi tupuna (ancestral sites) and a mātauraka-informed prioritisation component. Then, make the restoration process easy for willing landholders with a package of start-to-finish support including access to experts, planting design, coordination of on-the-groundwork and on-going maintenance support.
- **Control Willows in Wetlands**
  Enable the phased control, removal, and ongoing maintenance of willows where they compromise wetland function, mahika kai values, and native biodiversity. Streamline consenting processes, promote the use of approved methods, and ensure work is carried out by experienced operators.

Table 15: Strategy 10 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Educational engagements	Communities value wetlands for their functions	Avoid clearing, draining or filling of wetlands Reduce terrestrial weeds (willows) Reduce knowledge gaps	Maintain or improve overall wetland coverage and function Increase overall native vegetation coverage and improve condition (wetland plants) Increase the abundance of native wildlife Improve the abundance and accessibility of mahika kai Improve freshwater ecosystem function Maintain or improve water quality Strengthen ki uta ki tai (interconnectedness)
Package of landholder support	Restored wetlands		
Control/removal of willows	Better functioning wetlands		

STRATEGY 11: REDUCE CONTAMINANTS FROM STORMWATER AND WASTEWATER

Objective: Avoid wastewater discharges to freshwater and reduce contaminants — including sediments, nutrients, pathogens, and microplastics — from stormwater and wastewater, in order to maintain or improve water quality, enhance freshwater ecosystem function, and improve conditions for mahika kai.

Key people to drive this strategy: QLDC, Wai Wānaka, Enviroschools, ORC, Guardians of Lake Wānaka, Guardians of Lake Hāwea, urban developers

Initial action plan for first 3 to 5 years:

- **a. Build community stormwater awareness**
  Build community knowledge and awareness of stormwater pressures and property-level solutions through increased delivery of community education programmes such as "our drains are streams", "adopt a drain", and rain garden workshops.
- **b. Enable property level water-sensitive solutions**
  Enable residential/commercial property-level water sensitive solutions - such as greywater recycling systems, rain tanks, rain gardens, litter traps, permeable concrete, green rooves, urban riparian planting, or wetland networks - through subsidies and support packages in semi-rural and urban areas, collaborating with urban catchment groups and QLDC.
- **c. Encourage best practice stormwater design**
  Partner with residential and commercial developers to celebrate best practice stormwater design, and examples of water sensitive urban design. Collaborate on a pilot project demonstrating how nature-based solutions can effectively mitigate stormwater impacts.
- **d. Investigate stormwater contamination sources**
  Understand sources of stormwater contamination to deepwater lakes though a scientific study - such as trace metal isotopic analysis. Apply the results to determine action towards contamination sources.
- **e. Advocate for wastewater discharge to land**
  Advocate for the use of best practice land-based disposal systems for discharge of wastewater, and advocate against the discharge of wastewater to waterbodies. Advocate for good management of discharges to land including better planning, especially for new developments and rapidly growing areas

Table 16: Strategy 11 outputs, outcomes and impacts

<table>
<tr><th>Outputs</th><th>Outcomes</th><th>Pressure reductions</th><th>Environmental health goals</th></tr>
<tr><td>Educational engagements</td><td>Community behaviour change, reduced stormwater pollution</td><td rowspan="8">Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater

Avoid wastewater discharge to freshwater

Reduce knowledge gaps</td><td rowspan="8">Maintain or improve water quality

Improve freshwater ecosystem function

Improve the abundance and accessibility of mahika kai

Strengthen ki uta ki tai (interconnectedness)</td></tr>
<tr><td>Greywater recycling system installs</td><td>Reduced wastewater volume</td></tr>
<tr><td>Rain tank and rain garden installs</td><td rowspan="4">Reduced stormwater volume, slower flow and reduced contaminants in stormwater discharge</td></tr>
<tr><td>Litter trap installs</td></tr>
<tr><td>Permeable concrete, green rooves</td></tr>
<tr><td>Water sensitive urban design</td></tr>
<tr><td>Understanding of contamination sources</td><td>Stormwater contaminants controlled at source</td></tr>
<tr><td>Wastewater discharge to land</td><td>No discharge to freshwater</td></tr>
</table>

STRATEGY 12: REDUCE CONTAMINANT LOSSES FROM LAND USE

Objective: Reduce contaminants — including sediments, nutrients, pathogens, microplastics, and agrichemicals — from land use entering freshwater, in order to maintain or improve water quality, enhance freshwater ecosystem function, and improve conditions for mahika kai.

Key people to drive this strategy: Catchment groups, ORC catchments team

Initial action plan for first 3 to 5 years:

- **a. Provide a start-to-finish support package for contaminant management**
  Enable critical source area, runoff and sediment management measures – such as fencing, planting out gullies, buffer strips, sediment traps, wetlands and riparian planting- to reduce sediment, nutrients, pathogens, and other contaminants entering water bodies. Make the process easy for landholders and contractors with a package of start-to-finish support including access to experts, design, easy consenting, and coordination delivery.
- **b. Develop a co-funding programme for contaminant management**
  Develop a co-funding programme to help landholders undertake critical source area, runoff and sediment management measures across a diverse range of land uses and property sizes – from agricultural land to lifestyle blocks, from golf courses to ski fields.
- **c. Support contaminant management with advice, data and modelling tools**
  Support land holders to self-identify their own high impact runoff locations using data and modelling of sub-catchment conditions (eg. slope, soil, rainfall, stock density, nutrient application, ground cover, proximity to waterways). Encourage on-the-ground observations during heavy rain events and provide follow-up advice for mitigation, with an "education over regulation" approach.

Table 17: Strategy 12 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Fencing	Reduced contaminants from stock entering water	Reduce contaminants - sediments, nutrients, pathogens – from land use entering freshwater	Maintain or improve water quality Improve freshwater ecosystem function Improve the abundance and accessibility of mahika kai Strengthen ki uta ki tai (interconnectedness)
Planted gullies	Reduced erosion and sediment		
Buffer strips	Contaminants intercepted		
Sediment traps	Sediment intercepted and removed		
Wetland and riparian planting	Increased nutrient cycling, contaminants intercepted		
Data and modelling	Targeted runoff management		

STRATEGY 13: REINFORCE FRESHWATER BIOSECURITY IN DEEPWATER LAKES

Objective: Reduce the risk of new freshwater invasive organisms establishing in deepwater lakes, and contain and remove lagarosiphon, in order to improve freshwater ecosystem function and increase the abundance of mahika kai.

Key people to drive this strategy: LINZ, MPI, Fish and Game, ORC

Initial action plan for first 3 to 5 years:

- **a. Build community awareness of invasive freshwater organisms**
  Build community and visitor knowledge and awareness of invasive freshwater organisms – such as lindavia (lake snow), didymo (rock snot), Daphnia pulex (water flea), lagarosiphon and egeria (lake weeds) and freshwater gold clam - through increased signage, leaflets and community events focusing on best practice check, clean and dry practices.
- **b. Build check, clean, dry capacity with the tourism and visitor industry**
  Work with tourism operators and visitor-based businesses to provide manuhiri (visitors) with access to cleaning equipment, and train key tourism staff to share 'Check, Clean, Dry' knowledge and techniques with customers who may come into contact with freshwater ecosystems, as part of their care for guests.
- **c. Continue work to contain and remove lagarosiphon**
  Contain and remove lagarosiphon from Whakatipu Waimāori and northern Lake Wānaka. Continue progressive containment and sustained control action in southern Lake Wanaka and upper Kawarau River (NIWA, 2025). Support the use of hessian matting, with the aim of establishing native submerged freshwater vegetation.
- **d. Increase lagarosiphon surveillance and infestation prevention**
  Ensure detection and delimitation of lagarosiphon infestation with divers and cameras, as a key management step. Provide cleaning facilities for vessels entering deepwater lakes – such as portable wash-down units and treatments for contaminated boats – and install weed cordons/netted containment areas at boat ramps, to capture weed fragments (NIWA, 2025).

Table 18: Strategy 13 outputs, outcomes and impacts

Outputs	Outcomes	Pressure reductions	Environmental health goals
Educational engagements	Increased community awareness and following of check, clean, dry procedure	Reduce the risk of new freshwater invasive organisms establishing Contain and remove lagarosiphon Reduce knowledge gaps	Maintain or improve water quality Improve freshwater ecosystem function Improve the abundance and accessibility of mahika kai Strengthen ki uta ki tai (interconnectedness)
Trained check, clean, dry people	Increased following of check, clean, dry procedure		
Lagarosiphon eradication progress	Weed-free lake		
Lagarosiphon surveillance			

MONITORING CAP PROGRESS

Monitoring will be essential to help the Upper Lakes CAP Governance Group track the implementation of actions and achievement towards pressure reduction objectives and environmental health goals. Monitoring tests assumptions in our outputs and outcomes, reduces uncertainties. We will learn from information collected and improve through adaptive management.

The overall aim of CAP monitoring to answer the following questions:

- Are the CAP's activities being implemented as expected?
  - Are we efficient and effective?
  - Do we need to adjust our projects?
- Are the CAP's objectives being achieved in the expected time frames?
  - Are our pressures reducing?
  - Are our values improving?
- Are the CAP's assumptions valid?
  - Are the changes due to our work?
- What is working, what is not, and why?
- How can the Upper Lakes CAP Governance Group improve the CAP's strategies?

Monitoring framework and data sources

- Tracking progress of scheduled activities (appendix 2) will be part of project delivery and will be recorded in Miradi software.
- Monitoring of pressures (appendix 3), environmental values (appendix 4) and cultural and community values (appendix 5) is specifically designed to utilise the best available data, or closest fit from existing local, regional and national monitoring programmes.
- Monitoring will be supplemented with community science (citizen science) data and public open-source platforms – with a "best available data" approach.
- Any new monitoring sources, datasets or scientific findings will be incorporated as they become available over the CAP timeframe.

Monitoring schedule

- Bi-monthly task updates track progress of scheduled activities
- Annual progress reviews provide a comprehensive assessment of yearly achievements
- Annual outcomes reviews evaluate the medium-term project impacts
- Annual checks and 5-yearly comprehensive reporting on pressure reduction (appendix 3), environmental value health (appendix 4) and cultural and community values (appendix 5) assesses the overall impact of the CAP.

THE FUTURE OF OUR UPPER LAKES ICG

Our Upper Lakes Integrated Catchment Group is presenting the Catchment Action Plan to the Otago Regional Council (ORC) for endorsement in September 2025. Following this, we will move into the Governance phase with support from ORC's Environmental Implementation Team.

An Upper Lakes CAP Governance Group will be set up. This will be made up of core members (some from our Upper Lakes ICG) with decision-making power, including mana whenua representation. A wider circle of collaborators, including more rūnaka involvement, conservation, catchment, industry and community groups, will be invited to engage with us as the work progresses. Participation may shift over time, and

there will be a clear term of reference to guide the group. As the governance group moves forward, the CAP will remain a living document, adapting and evolving with input from all involved.

ON-THE-GROUND DELIVERY

Delivery of actions will not rest with governance alone but with conservation and catchment groups, mana whenua, agencies (including ORC), landholders, and industry partners who will lead projects on the ground. These partners bring the local knowledge, capacity, and commitment needed to turn strategies into real outcomes for the Upper Lakes. Practical support will come from ORC work programmes and CAP delivery coordination, ensuring alignment with regional priorities and technical expertise. To resource delivery, the governance group will actively seek contestable funds, partner agency budgets, philanthropic contributions, and other funding sources, while also recognising the significant value of volunteer time, community effort, and in-kind contributions. This shared responsibility and resourcing model reflects the collective impact approach at the heart of the CAP, where success depends on many hands working together.

KICKING THINGS OFF – INITIAL PROJECTS AND ACTIONS

Grounding our strategies and actions in tangible, on-the-ground projects during the first few years of Governance will be critical for turning vision into momentum. Early, visible implementation not only delivers immediate environmental benefits, but also builds trust, confidence, and shared understanding, ensuring that the plan remains a living action plan rather than an abstract document. By translating the 13 strategies into a small list of projects and practical "first steps," we create a common reference point for collaboration and decision-making.

POTENTIAL LARGE-SCALE MULTI-FACETED PROJECTS

The Upper Lakes ICG have 13 strategies that can deliver actions independently, but they are far more effective when combined and applied to focus areas as a multi-faceted project. Several community-led projects, either planned or already underway, have the potential to bring together multiple strategies (or elements of them) into a multifaceted project approach. The Upper Lakes CAP Governance Group may choose to aim to identify three or four projects to put forward for contestable funding.

The ideas outlined below can be considered potential projects and examples only.

- The Upper Lakes ICG has suggested Te Tapunui Queenstown Hill (wilding Douglas fir removal, native tree and grassland planting, goat control, stream restoration, feral cat and other predator control) as a project that already has a plan but is not yet fully funded and aligns with several strategies.
- Other potential projects that build on existing community actions and bring together several streams of work are:
    - **Bullock Creek in Wānaka**: native riparian planting, wetland protection and restoration, stormwater improvement. This could also apply to Horne Creek in Tāhuna Queenstown.
    - **Hāwea Foreshore**: native planting, stormwater wetland, introduced predator mammal control, in alignment with the Lake Hāwea Stakeholder's Group CAP.
    - **The Puahere (Rees), Te Awa Whakatipu (Dart) area**: weed control in braidplain which has a detailed plan, willow control in wetland, feral cat and other predator control, and linking-in with natural hazards work.

- **The Makarore (Makarora) area:** weed control in braidplain, feral cat and other predator control in forest to alpine.

POTENTIAL FIRST STEP ACTIONS

Many of the actions within the 13 strategies may be considered by the Upper Lakes Governance Group as either good “first steps” or long-term actions that require some development to begin right away. The Governance Group will work in partnership with mana whenua and in collaboration with local conservation and catchment groups, supported by ORC’s Environmental Implementation Team – and could choose to "kick off” some actions that will support further work.

The selected actions below can be considered potential "first steps” examples:

- Developing an Upper Lakes CAP partnership plan.
- Update data on the spread of wilding conifers and identification of seed sources.
- Undertake a pilot project to showcase property level water-sensitive solutions (eg rain gardens) and collaborate with developers to celebrate at least one example of best practice stormwater design.
- Improve public access to eco-sourced plants and increase capability for planting maintenance.
- Develop a spatial native vegetation restoration plan, in collaboration with community planting groups.
- Build check, clean, dry capacity with the tourism and visitor industry.
- Advocate for policy interventions that promote responsible cat ownership.
- Connect with mana whenua-led tuna kuwharuwharu (longfin eel) and kanakana (lamprey) research.
- Support catchment groups with facilitation of collaborative weed control and mechanisms to share resources.
- Facilitate coordination of goat control between public and private landholders, in focus areas, working with catchment groups.

COMMUNICATING THE PLAN

KEY AUDIENCES

The wider Upper Lakes community and interested parties - including mana whenua, agencies, residents, landholders, businesses, the conservation, community and catchment groups are key audiences that need be able to access and follow the plan's progress.

COMMUNICATION FRAMEWORK

This document is the first formal output of the Upper Lakes planning process. It will be proactively shared across relevant networks. It captures a snapshot in time, at the end of our workshop process. It should be seen as the foundation of an ongoing and evolving conversation.

- An ArcGIS Hub will serve as the primary communication channel - an online, interactive platform that allows us to track and celebrate the plan’s Governance through maps, dashboards, and

stories. The Hub will be maintained by the ORC ICM Team, and the community will be able to contribute information through online interaction.
- A printed and digital brochure will summarise the key goals and actions in a clear, accessible format for quick reading and wide distribution - including at community events, through local community centers, and via the networks of the Upper Lakes ICG.
- Community events, held in collaboration with local conservation and catchment groups, will create opportunities for people to learn about the plan, contribute to action, get involved in community science, and connect with others working towards shared goals.
- Displays in Queenstown Lakes District libraries could provide an ongoing physical presence for the plan, making it visible and accessible to the public. We intend to collaborate further with the QLDC library team on this idea.

ADAPTIVE MANAGEMENT AND REVIEW

Adaptive management is a structured, iterative approach to decision-making, particularly in complex or uncertain environments, that emphasizes learning from experience and adjusting management strategies accordingly. This requires that plans are monitored and reviewed regularly, so that new information and lessons learned can be incorporated. This ensures the plan remains responsive, relevant, and effective over time.

The temporal scope of this plan is 10 years, with review points to check progress and adapt as needed:

- **18-month health check:** The initial phase of Governance often includes establishing new workstreams and teams. This early review will assess which strategies are underway, which have yet to start, and where minor adjustments or additional support are needed to stay on track.

- **5-year evaluation review:** At the halfway point, a more in-depth review will take place. This will assess progress of the CAP, defined by:

    - Actions initiated.
    - Actions completed.
    - Measurable reductions in pressures.
    - Positive shifts in environmental value health.
    - Positive changes in key attributes.
    - Measurement of progress is supported by the proposed monitoring framework, which will be developed in more detail in the beginning phase of CAP delivery.

Parts of the CAP we anticipate being adapted are:

- Additional cultural and community values, particularly as partnerships between mana whenua and catchment and conservation groups are strengthened.
- Environmental value health assessments – as new evidence becomes available.
- Drivers, pressures and pressure ratings – as some pressures become more prominent.
- Potential increased focus on climate change as new evidence and better understanding is established.
- Changes to strategies to reflect any changes to pressures.

- Updating the initial action plan as work is completed, flagged as unable to be progressed, or new groups with new resources, skills or interests become involved with the governance group.
- Changes in terminology and approaches – such as “ecosystem services” to a wider “nature’s contribution to people” or “environmental value health” to “environmental value integrity”.

It is anticipated that the vision of the CAP would not be adapted.

A non-exhaustive list of themes that we note should be included in the first 18-month review are:

- Incorporate recreational fishing values in a more explicit way, as raised by members of the public via an online survey and by Otago Fish and Game.
- Re-visit pressures from deer, chamois and tahr with further information from DOC and with input from the hunting community, as raised by members of the public via an online survey.
- Further evaluation suitable of nature-based solutions, as raised by members of the public via an online survey.
- Refresh the CAP to reflect further conversations with mana whenua.
- Review of the CAP relating to any relevant (keeping in mind the CAP is non-regulatory) impacts of Resource Management Act (RMA) reform.

REFERENCES

Arnold, J. (2025). *Waiwhakaata Rautaki. Lake Hayes Strategy*. Kauati.

Gormley, A. M., Holland, E. P., Pech, R. P., Thomson, C., & Reddiex, B. (2012). Impacts of an invasive herbivore on indigenous forests. *Journal of Applied Ecology, 49*(6), 1296–1305. https://doi.org/10.1111/j.1365-2664.2012.02219.x

Hale, R. C., Seeley, M. E., La Guardia, M. J., Mai, L., & Zeng, E. Y. (2020). A global perspective on microplastics. *Journal of Geophysical Research: Oceans, 125*, e2018JC014719. https://doi.org/10.1029/2018JC014719

Heenan, P. B., Smissen, R. D., & Dawson, M. I. (2023). [Article]. *New Zealand Journal of Botany*. https://doi.org/10.1080/0028825X.2023.2210289

Hewitt, A. E. (2010). *New Zealand soil classification* (3rd ed.). Manaaki Whenua – Landcare Research. https://digitallibrary.landcareresearch.co.nz/digital/api/collection/p20022coll1/id/268/download

Houlahan, J. E., Keddy, P. A., Makkay, K., & Findlay, C. S. (2006). The effects of adjacent land use on wetland species richness and community composition. *Wetlands, 26*(1), 79–96. https://doi.org/10.1672/0277-5212(2006)26[79:TEOALU]2.0.CO;2

Hufton, L., & Robertson, H. (2023). A significant remnant population of whio (blue duck, *Hymenolaimus malacorhynchos*) bridging the gap between Fiordland and West Coast recovery sites, South Island, New Zealand. *Notornis, 70*, 190–195.

Innes, J., Kelly, D., Overton, J. M., & Gillies, C. (2010). Predation and other factors currently limiting New Zealand forest birds. *New Zealand Journal of Ecology, 34*(1), 29–48.

Kāi Tahu ki Otago. (2005). *Natural resource management plan, 2005*. Kāi Tahu ki Otago. Retrieved from https://natlib.govt.nz/records/22191735

Kāi Tahu ki Otago. (2005). *Natural resource management plan* (includes *Te Tangi a Tauira, The Cry of the People*). Kāi Tahu ki Otago. Retrieved from https://www.orc.govt.nz/media/13286/kai-tahu-ki-otago-sandra-mcintyre.pdf

Land Information New Zealand (LINZ) et al. (2016–2025). *Ten-year management plan for Lagarosiphon in Lake Dunstan (Lake Wānaka as reference)*. LINZ. Retrieved from https://www.orc.govt.nz/media/2265/ten-year-management-plans-for-lagarosiphon-at-lakes-dunstan-and-wanaka-2016-2015-and-lagarosiphon-incursion-in-kawarau-river-2016-2019.pdf

Li, J., Liu, H., & Chen, P. J. (2018). Microplastics in freshwater systems: A review on occurrence, environmental effects, and methods for microplastics detection. *Water Research, 137*, 362–374. https://doi.org/10.1016/j.watres.2017.12.056

Mark, A. F., Barratt, B. I. P., & Weeks, E. (2013). Ecosystem services in New Zealand's indigenous tussock grasslands: Conditions and trends. In J. R. Dymond (Ed.), *Ecosystem services in New Zealand – conditions and trends* (pp. 1–33). Lincoln, New Zealand: Manaaki Whenua Press.

McAulay, J., Seddon, P. J., Wilson, D. J., & Monks, J. (2020). Stable isotope analysis reveals variable diets of stoats (*Mustela erminea*) in the alpine zone of New Zealand. *New Zealand Journal of Ecology, 44*(2). https://doi.org/10.20417/nzjecol.44.16

McIntosh, A. R., McHugh, P. A., Dunn, N. R., Goodman, J. M., Howard, S. W., Jellyman, P. G., O'Brien, L. K., Nyström, P., & Woodford, D. J. (2010). The impact of trout on galaxiid fishes in New Zealand. *New Zealand Journal of Ecology, 34*(1), 195–206.

Mora-Teddy, A. K., & Matthaei, C. D. (2020). Microplastic pollution in urban streams across New Zealand: Concentrations, composition and implications. *New Zealand Journal of Marine and Freshwater Research, 54*(2), 233–250. https://doi.org/10.1080/00288330.2019.1703015

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011. (2012). In *New Zealand Legislation*. https://www.legislation.govt.nz/regulation/public/2011/0361/latest/whole.html

NIWA. (2021). *The climate and weather of Otago* (NIWA Science and Technology Series No. 67). National Institute of Water and Atmospheric Research. https://webstatic.niwa.co.nz/library/NIWAsts67.pdf

NZ Ski Limited. (2023). *The Remarkables Ski Area – Annual snowfall* [Media kit]. https://www.mthutt.co.nz/media/5553/002042-nzski-2023-winter-media-kit-the-remarkables.pdf

NZ Ski Limited. (2025). *Coronet Peak – Average snowfall* [Media kit]. https://www.nzski.com/media/6220/002271-nzski-2025-winter-media-kit-refresh-coronet-peak.pdf

O'Donnell, C. F., Sanders, M. D., Woolmore, C. B., & Maloney, R. (2016). Management and research priorities for conserving biodiversity on New Zealand's braided rivers. Wellington: Department of Conservation.

O'Donnell, C. F., Weston, K. A., & Monks, J. M. (2017). Impacts of introduced mammalian predators on New Zealand's alpine fauna. *New Zealand Journal of Ecology, 41*, 1–22.

Otago Regional Council. (n.d.). *Land and Water Regional Plan* [Webpage]. https://www.orc.govt.nz/your-council/plans-and-strategies/land-and-water-regional-plan/

Otago Regional Council. (2024, July 24). *Council agenda – 24 July 2024*. Cromwell: Author. https://www.orc.govt.nz/media/g5flic3p/20240724-council-agenda.pdf

Otago Regional Council. (2024, July 24). *Council minutes – 24 July 2024* [PDF]. Cromwell: Otago Regional Council. https://www.orc.govt.nz/media/brtp43bu/20240724-council-minutes.pdf

Otago Regional Council. (2025, May 21). *Head of Lake Whakatipu Natural Hazards Adaptation Strategy* [PDF]. https://www.orc.govt.nz/media/vqrbms05/adaptation-strategy-for-head-of-lake-whakatipu-communities-21-may-2025-official.pdf

Otago Regional Council. (2025, June 5). *Agenda and supporting documents including Waiwhakaata (Lake Hayes) Strategy* [PDF]. https://www.orc.govt.nz/media/l20ghtuu/20250605-ed-agenda.pdf

Ozanne, R., Levy, A., & Borges, H. (2023). *State and trends of rivers, lakes, and groundwater in Otago 2017–2022*. Otago Regional Council. https://www.orc.govt.nz/media/14523/orc-river-lake-groundwater-state-and-trends-2017-2022.pdf

Peltzer, D. A. (2018). Ecology and consequences of invasion by non-native (wilding) conifers in New Zealand. *Journal of New Zealand Grasslands, 80*, 39–46.

Queenstown Lakes District Council. (2025, June 30). *Draft Climate & Biodiversity Plan 2025–2028*. Queenstown Lakes District Council.

Queenstown Lakes District Council. (2025). *Population and demand projections*. https://www.qldc.govt.nz/community/population-and-demand/

Schallenberg, M., Borges, H., Bell, T. J., Hinkley, S. F. R., & Novis, P. M. (2022). Dynamics of pelagic mucilage produced by the invasive, cyclotelloid diatom, *Lindavia intermedia*, in oligotrophic lakes of New Zealand. *PLOS Water, 1*(9), e0000028. https://doi.org/10.1371/journal.pwat.0000028

Stats NZ. (2022). *Wetland area*. https://www.stats.govt.nz/indicators/wetland-area/

Stats NZ. (2023). Queenstown-Lakes District. In *Census 2023 – Geographic boundaries*. Wellington: Statistics New Zealand.

Takau, Y. (2021). *Cultural values statement: Dart–Rees area*. Aukaha. https://www.orc.govt.nz/media/10110/cultural-values-statement-for-dart-rees-area-january-2021.pdf

Timms-Dean, K., Wesley-Evans, M., & Golding, G. (2023). *Cultural values statement: Waiwhakaata*. Aukaha.

WAI Wānaka. (2020, June 10). *Community catchment plan for the Upper Clutha catchment*. Wānaka Water Project.

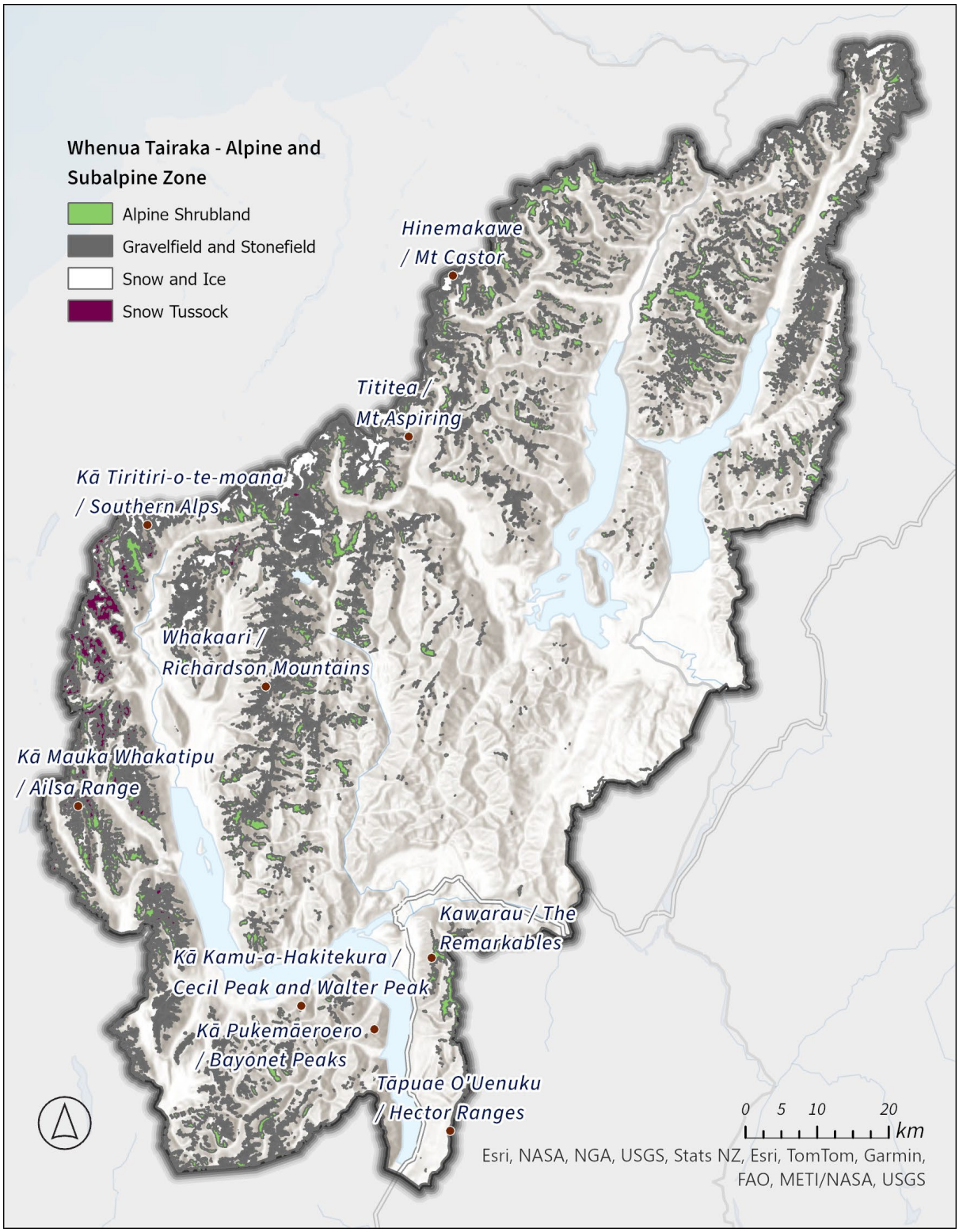
WAI Wānaka. (2023, October). *Upper Clutha Biodiversity Strategy* [PDF]. https://waiwanaka.nz/wp-content/uploads/2023/10/Upper-Clutha-Biodiversity-Strategy.pdf

WAI Wānaka. (n.d.). *Wānaka Water Project*. Retrieved August 2025, from https://waiwanaka.nz/projects/wanaka-water-project/

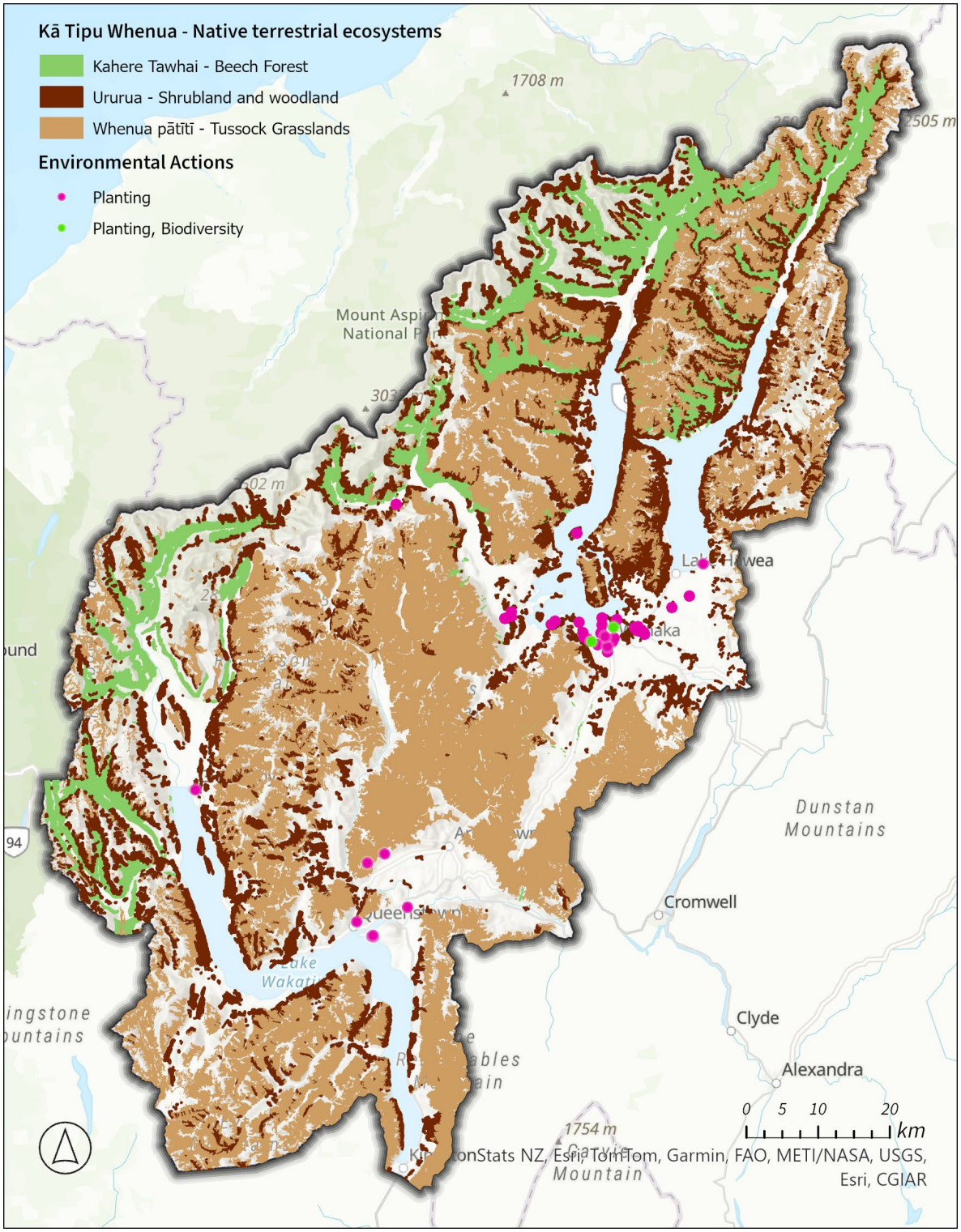
Williamson, M., & Rohani, M. (2023). *Benefits and cost of additional investment in wilding conifer control in the Otago Region*. Boffa Miskell for Otago Regional Council. https://whakatipuwilding.co.nz/wp-content/uploads/2024/09/Benefits-and-Costs-of-Additional-Investment-in-Wilding-Conifer-Control-Otago.pdf

Yang, L., Zhang, Y., Kang, S., Wang, Z., & Wu, C. (2021). Microplastics in soil: A review on methods, occurrence, sources, and potential risk. *Science of the Total Environment, 780*, 146546. https://doi.org/10.1016/j.scitotenv.2021.146546

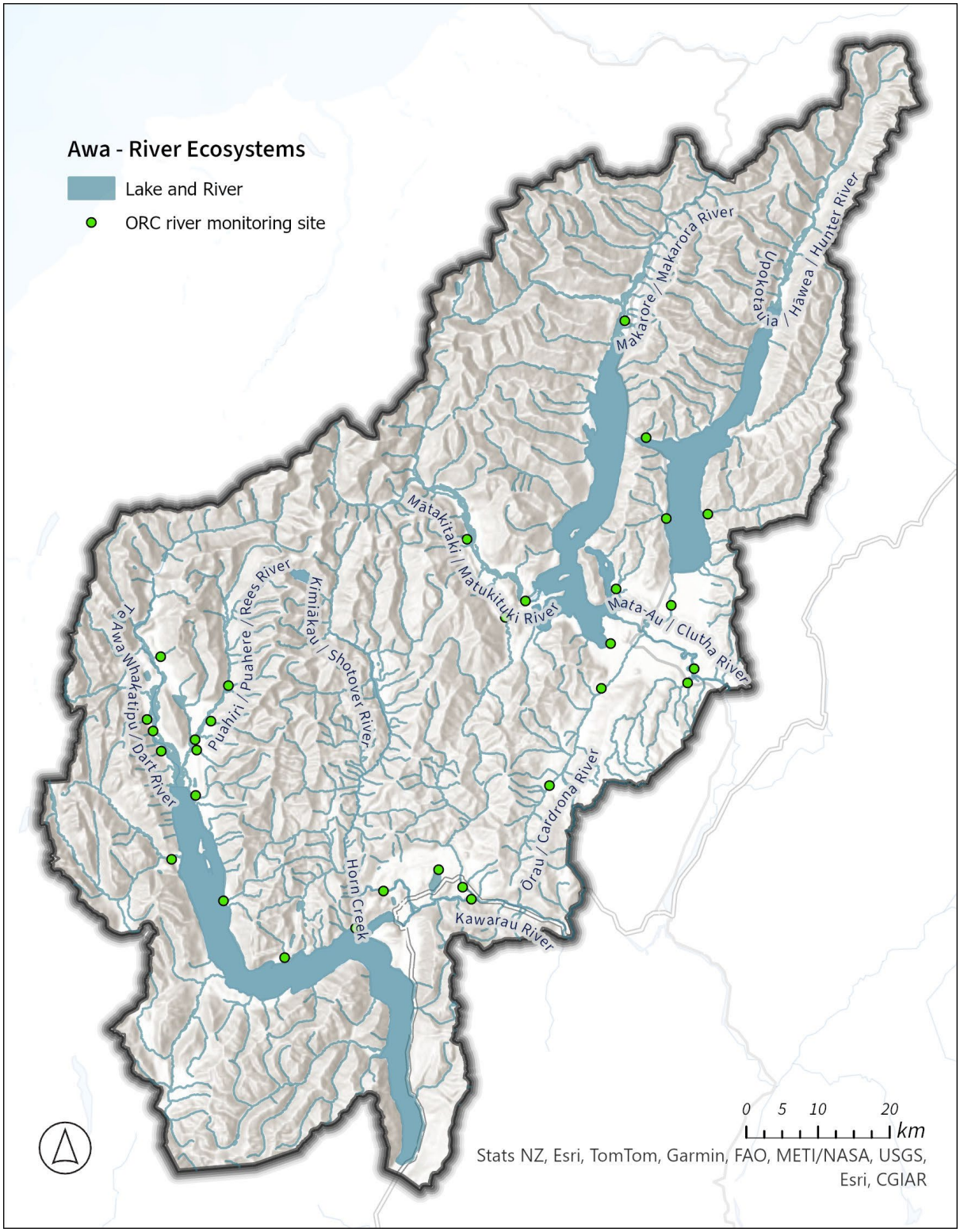
APPENDIX 1 ENVIRONMENTAL VALUE MAPS



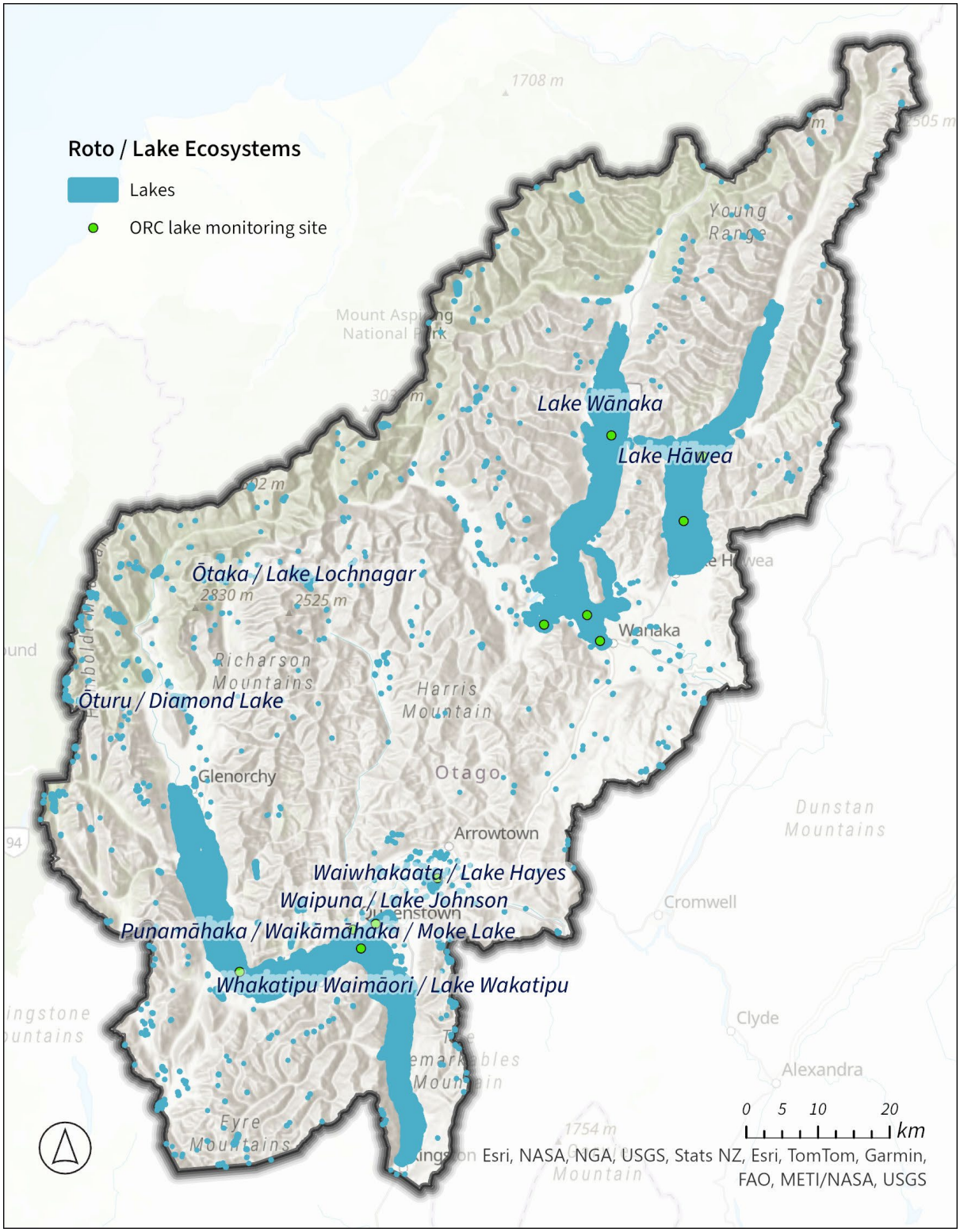
Map 1. Environmental value: Alpine and Subalpine zone of the Upper Lakes CAP area



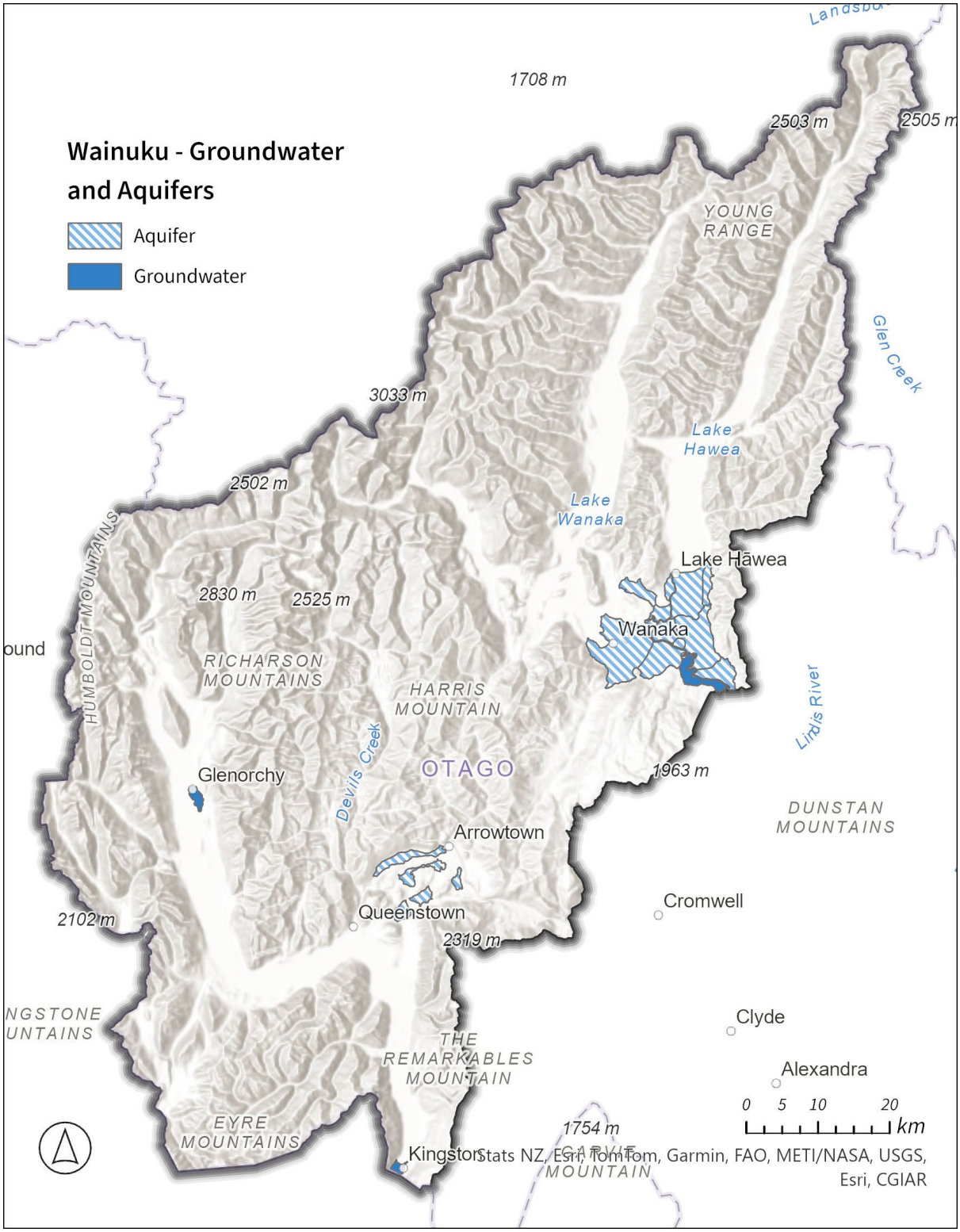
Map 2. Environmental value: Native vegetation types in the Upper Lakes CAP area



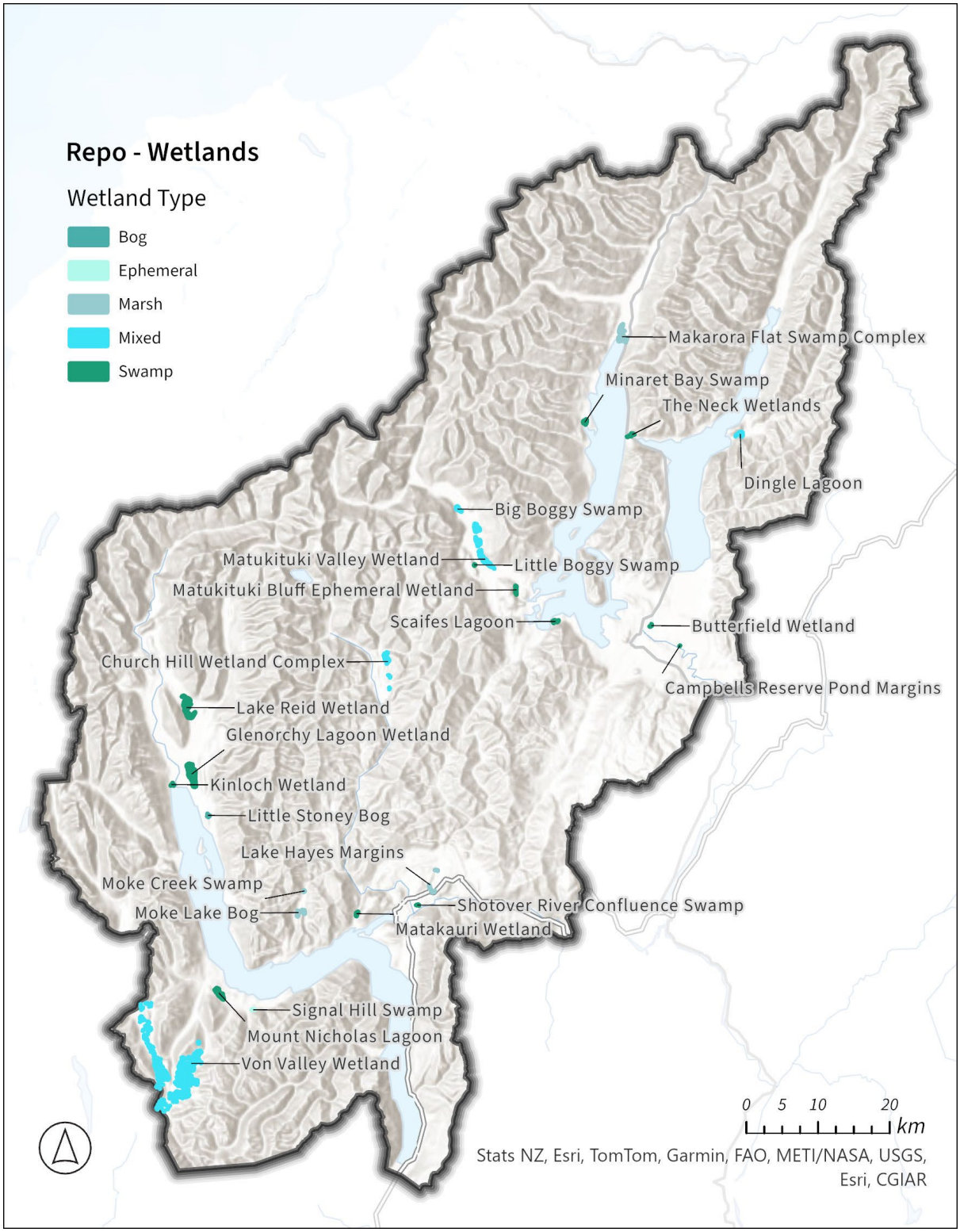
Map 3. Environmental value: Rivers in the Upper Lakes CAP area



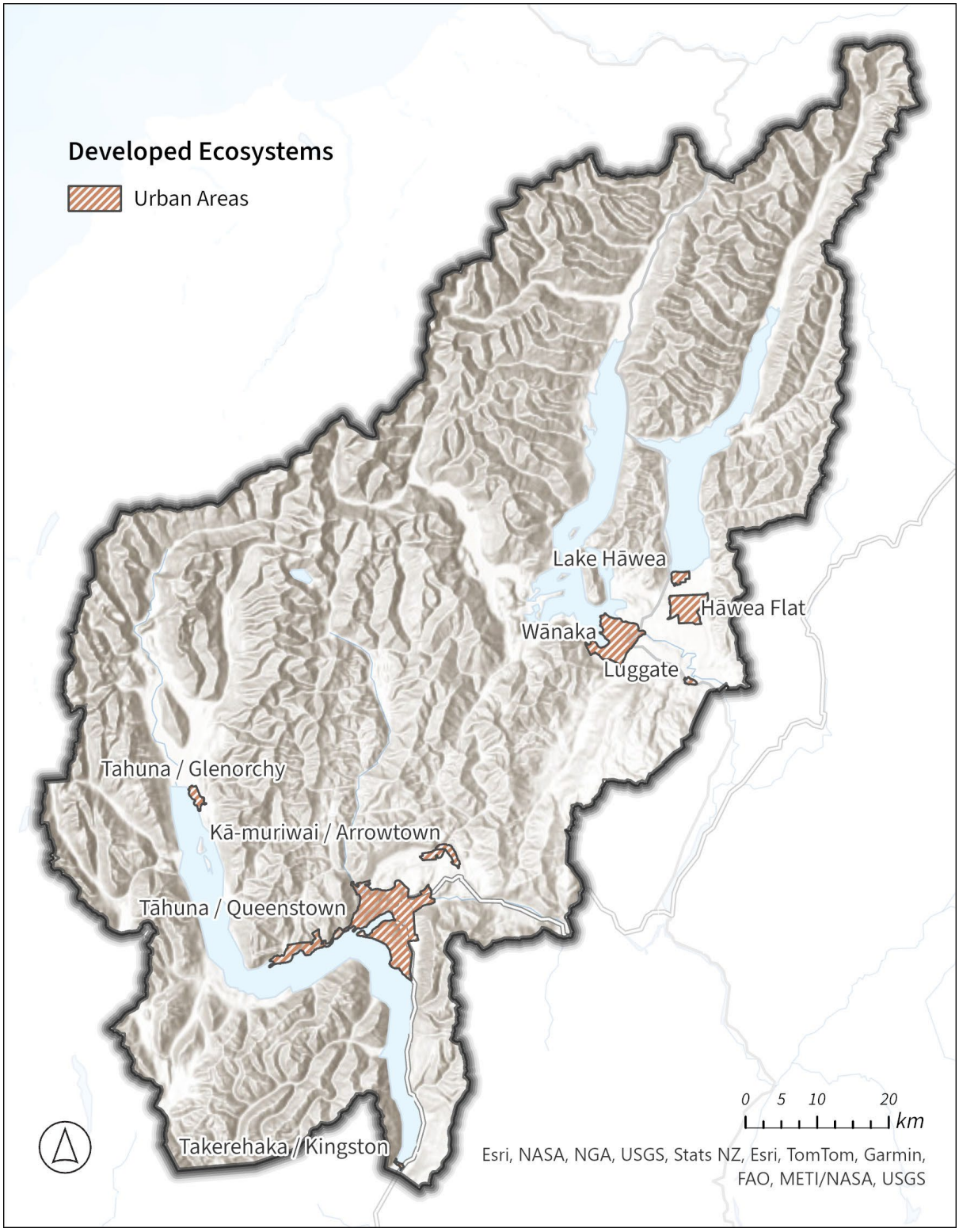
Map 4. Environmental value: Lakes in the Upper Lakes CAP area



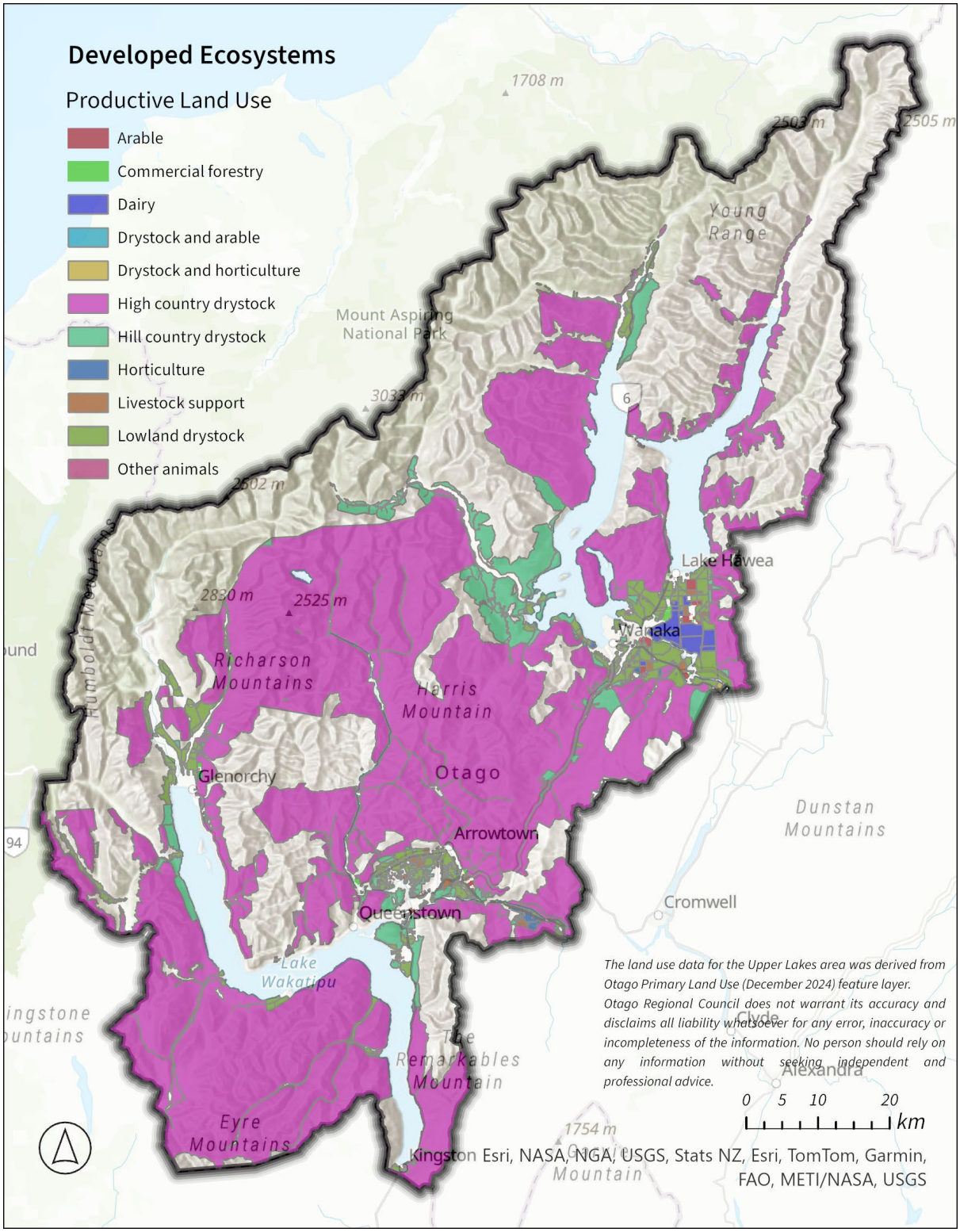
Map 5. Environmental value: Groundwater and Aquifers in the Upper Lakes CAP area



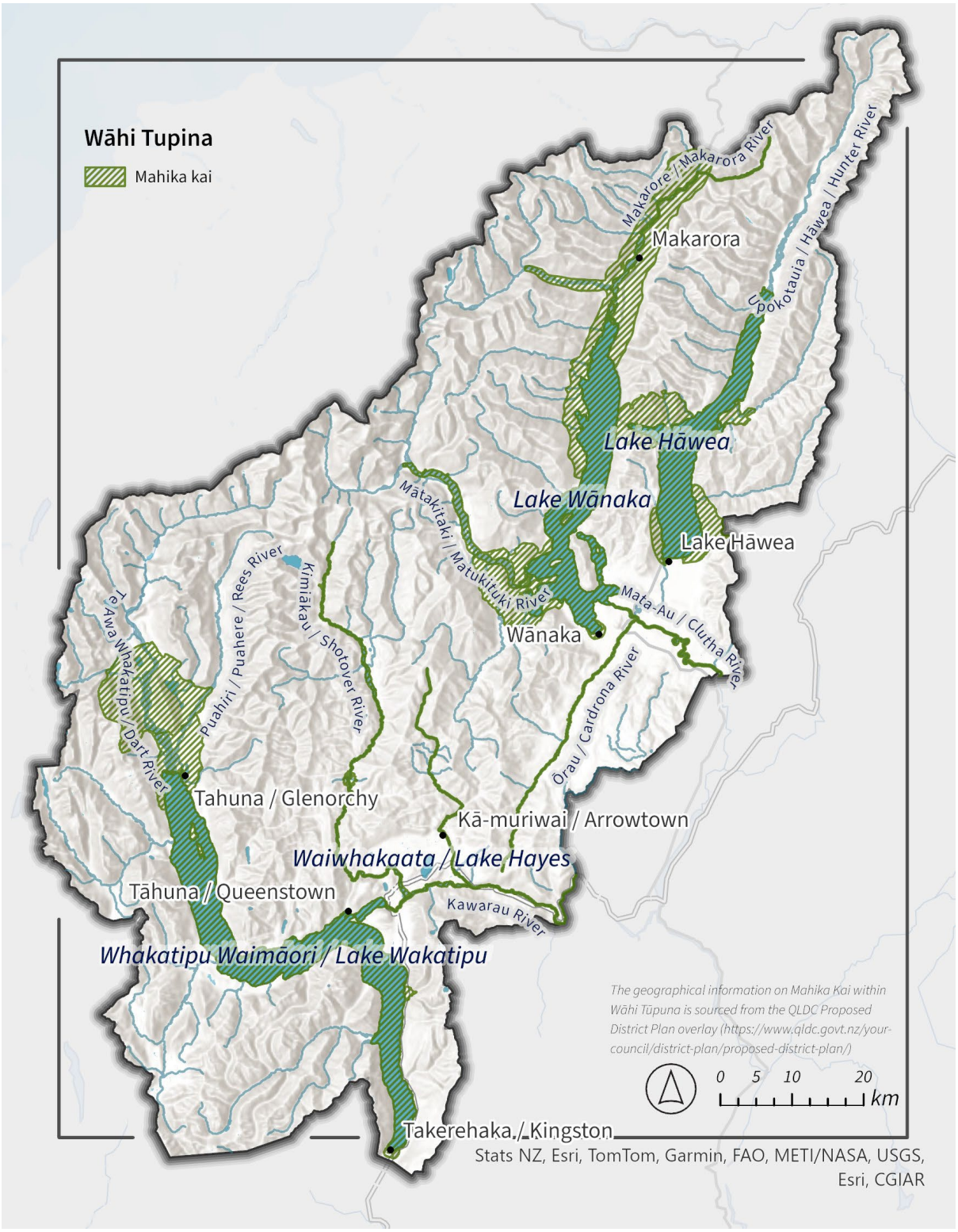
Map 6. Environmental value: Regionally significant wetlands across the Upper Lakes CAP area – note this map will be updated with all mapped wetlands (completed by ORC) as soon as data is available to the public.



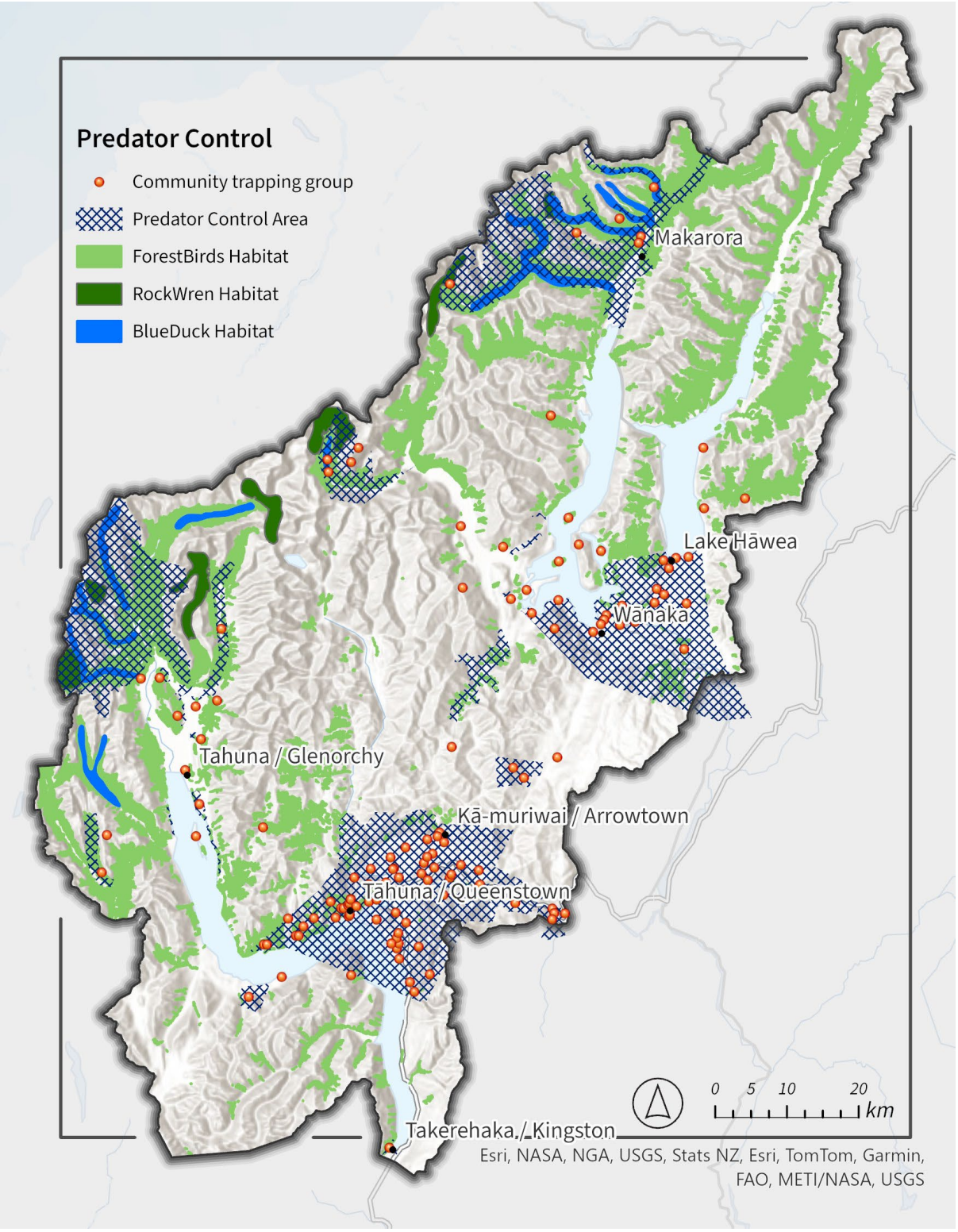
Map 7. Environmental value: Urban spaces in the Upper Lakes CAP area



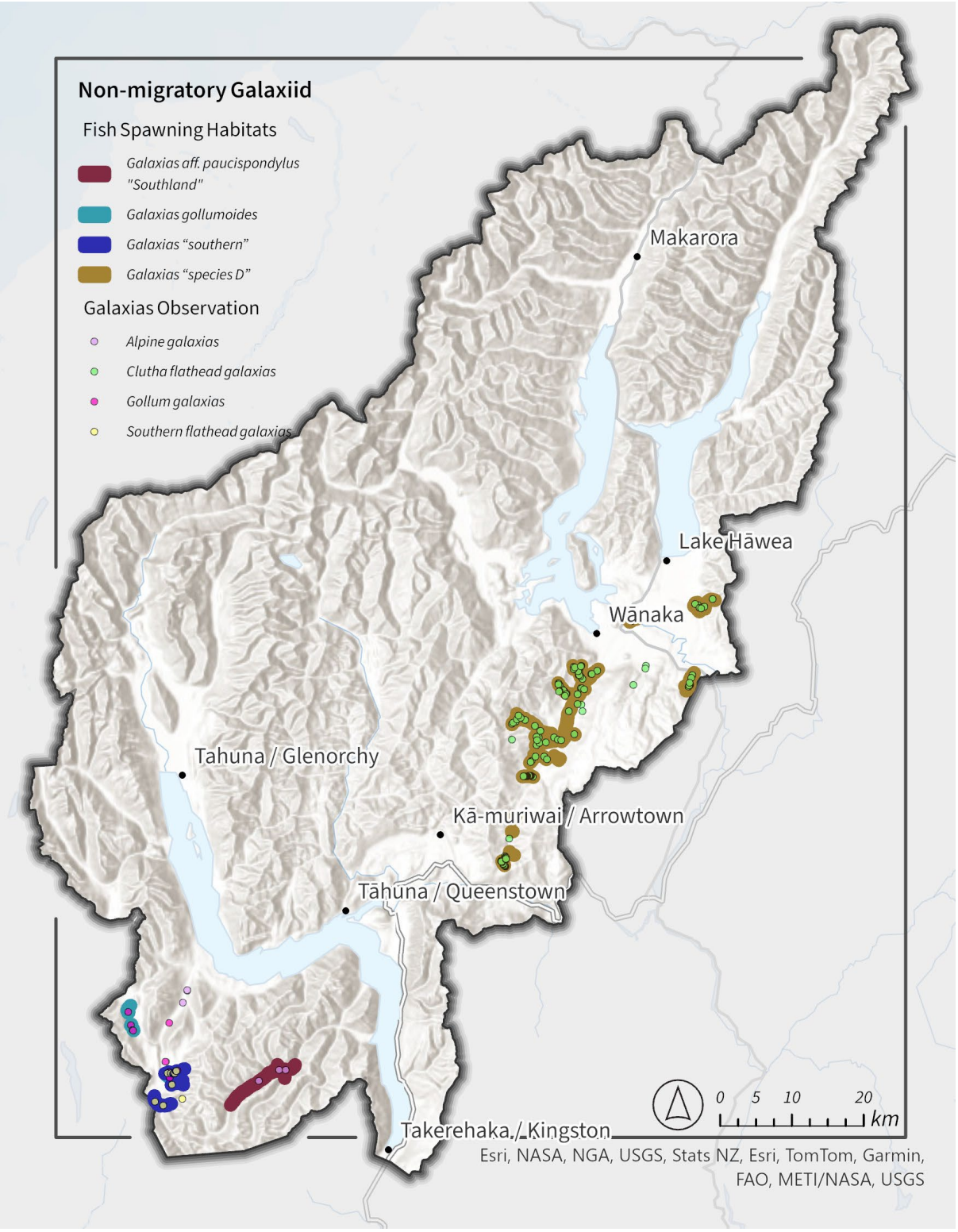
Map 8. Environmental value: Productive Land in the Upper Lakes CAP area



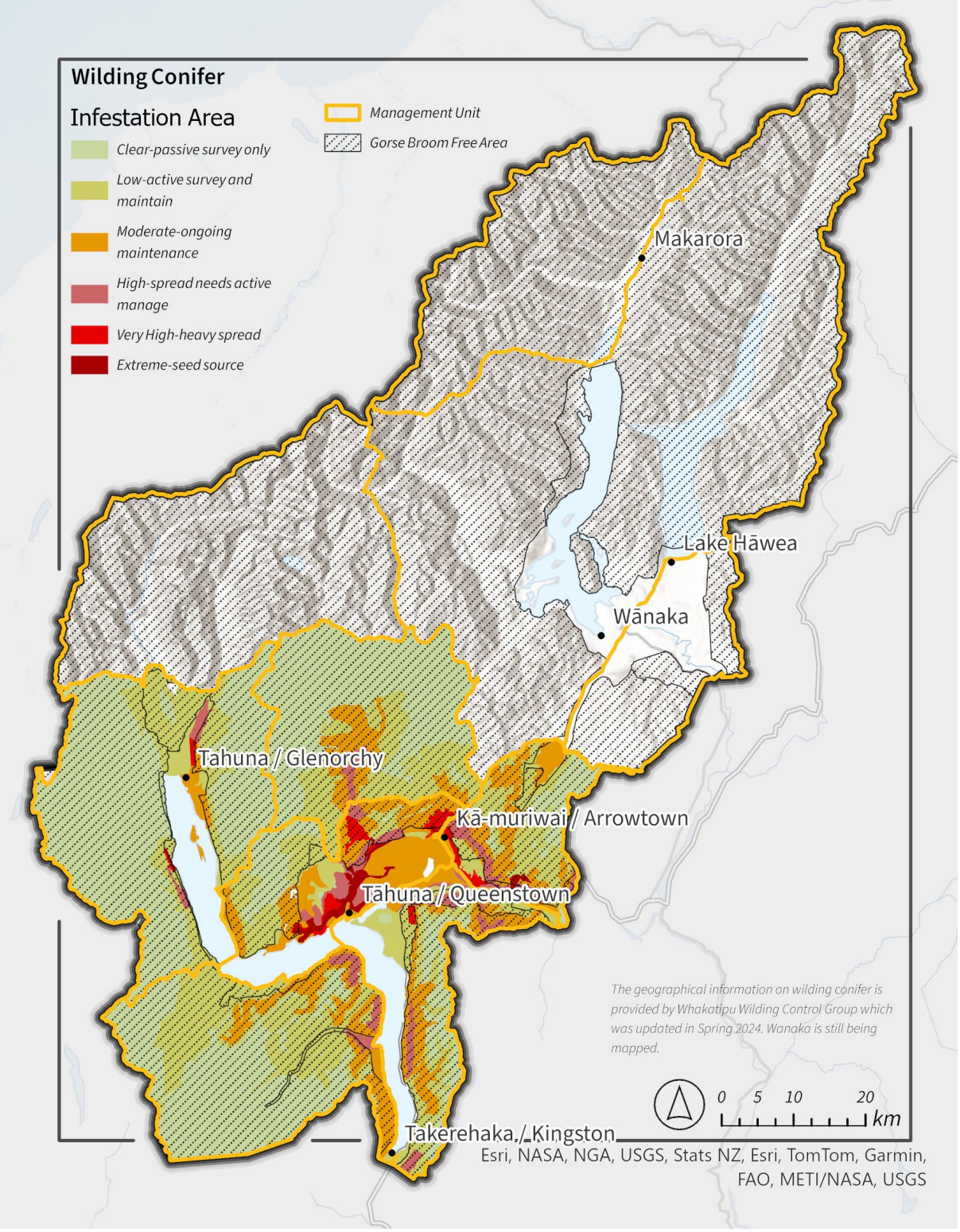
Map 9. Wāhi Tupuna (ancestral locations) of and wāhi mahika kai (food and resources sites)



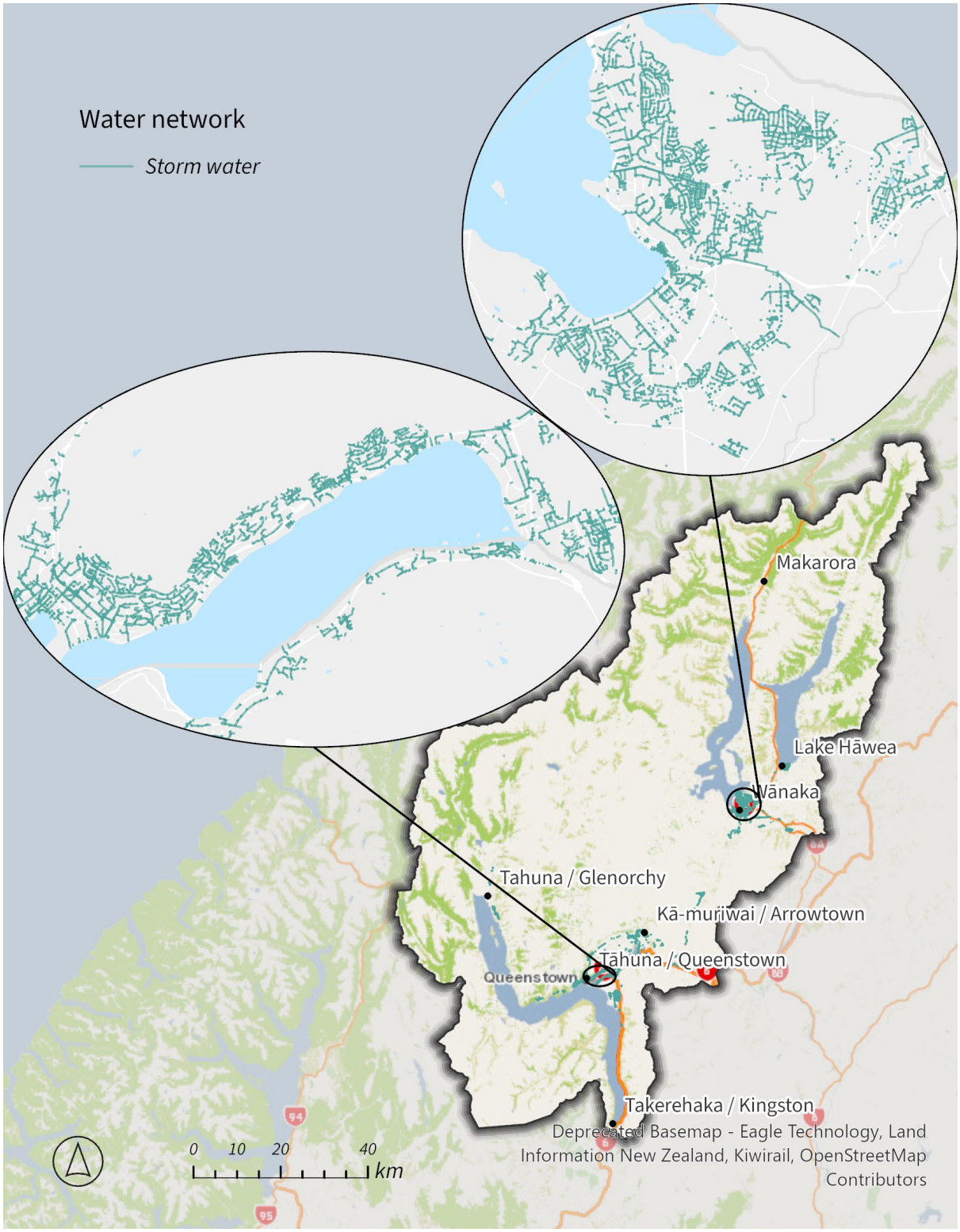
Map 10. Predator control current action and approximate habitats of native species targeted for protection in the Upper Lakes CAP area



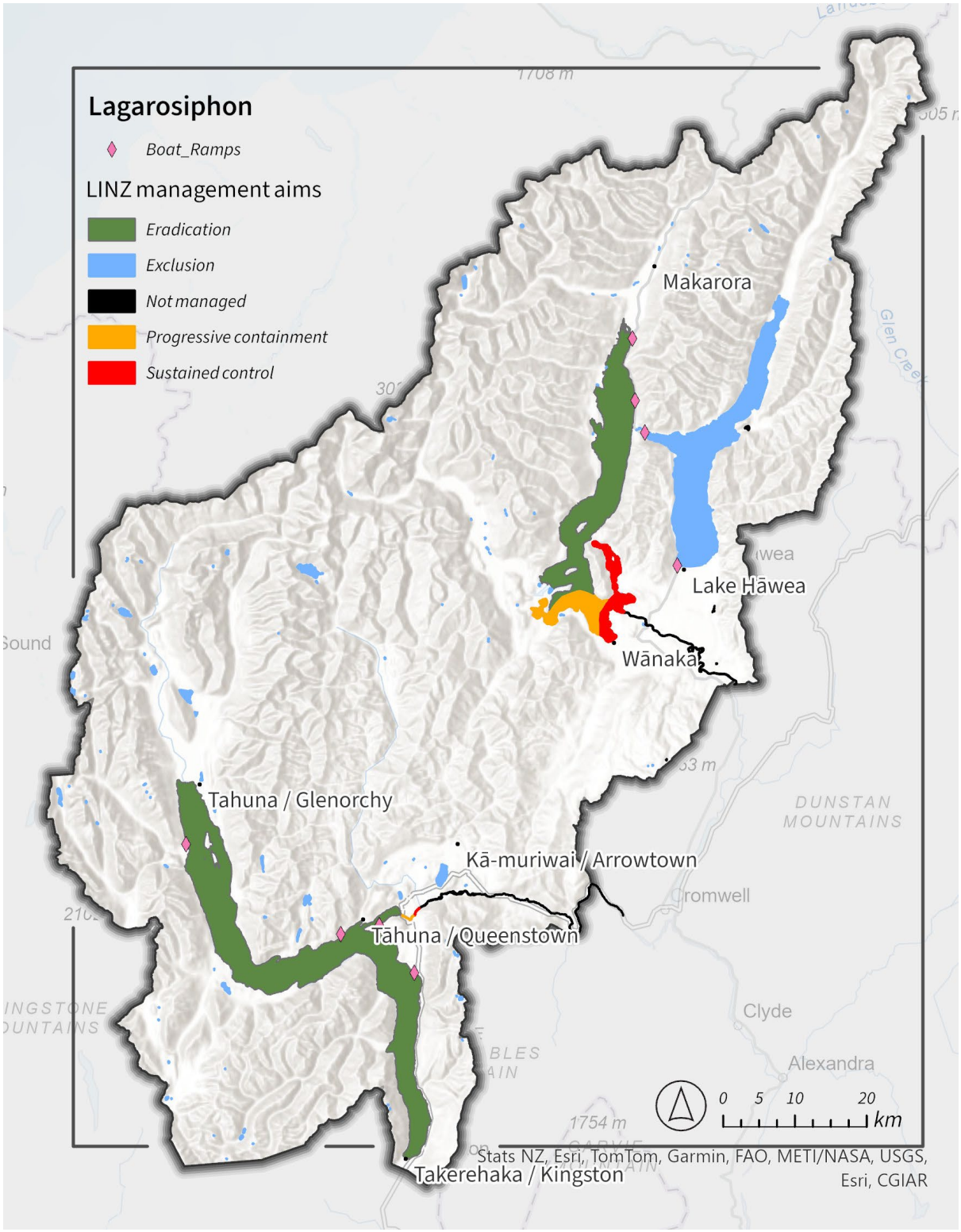
Map 11. Non-migratory galaxiid records in the Upper Lakes CAP area



Map 12. Wilding conifer spread situation in the Upper Lakes CAP area



Map 13. QLDC stormwater network (pipes) within urban areas of the Upper Lakes CAP area



Map 14. Lagarosiphon management aims in the Upper Lakes CAP area

APPENDIX 2: DRAFT ACTION MONITORING FRAMEWORK

Strategy	Monitoring Indicators
1. Long-term funding framework	Amount of secured funding ($), number of funding sources, proportion of projects co-funded
2. Science, research, knowledge sharing	Number of research projects completed, number of community science participants, data platform use (uploads/visits)
3. Mana whenua partnership	Number of hui/workshops held, number of projects with mana whenua leadership, integration of Waiwhakaata Rautaki (strategy)
4. Mahika kai conditions & safe use	Number of mahika kai sites restored, species abundance (e.g. tuna), number of community education events
5. Predator control	Remaining population of predator mammals (trapping indices, camera counts), area under active predator control (ha)
6. Tuna migration & research outcomes	Number of tuna transferred, elver transfer success rate, research outcomes on elver growth, survival, and health
7. Galaxiid habitats	Number of habitats restored (km/ha), galaxiid abundance (eDNA, monitoring counts), number of barriers installed/modified
8. Wilding conifers & terrestrial weeds	Area of conifers/weed controlled (ha), area replanted (ha), conifer seed source removal (shelterbelts replaced), ratio of native to invasive plants
9. Native vegetation	Number of plants planted, survival rate (%), area of protected native vegetation (ha), area retired from land use/to low impact use
10. Wetlands	Area of wetlands restored or created (ha), number of wetland sites under protection, willow control area (ha)
11. Stormwater & wastewater	Number of stormwater treatment devices installed, number of properties with water-sensitive solutions, stormwater water and wastewater discharge and receiving water quality (nutrients, pathogens, sediment, contaminants, microplastics)
12. Land use contaminants	Area of land under contaminant management (ha), number of landholders supported, sediment/nutrient reductions (kg/yr), receiving water quality (nutrients, pathogens, sediment, contaminants)
13. Freshwater biosecurity	Number of Check, Clean, Dry stations, number of visitors reached through awareness, area of lagarosiphon controlled (ha), detections of invasive freshwater species

APPENDIX 3: DRAFT PRESSURE REDUCTION MONITORING FRAMEWORK

Pressure reduction objectives	Attribute	Indicator(s)
Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, hedgehogs, possums, mice and feral cats)	Remaining predator abundance	Catch per unit effort, tracking (camera traps, tracking tunnels, scat surveys)
Reduce the risk of new freshwater invasive organisms establishing	Organism detection	eDNA, biosecurity inspections
Contain and remove lagarosiphon	Infestation coverage	Size of eradication zone, containment zone and control zone, detections of lagarosiphon
Reduce wilding conifer seed sources, infestations and re-infestations	Extent and density of infestation	Infestation coverage and density mapping, remote sensing, time until follow-up control effort required
Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)	Extent and density of infestation	Mapped area infested, weed density score, time until follow-up control effort required
Improve environmental conditions for mahika kai and enable safe use	Mahika kai health & accessibility	Presence, abundance, diversity, and safety
Avoid clearing and change to native vegetation	Covenants and protection	Area covenanted (ha)
Avoid clearing, draining or filling of wetlands	Size of wetlands	Wetland coverage (ha)
Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois and tahr)	Remaining herbivore population size	Fecal pallet counts, night spotlight counts, camera traps, rebound rate, aerial surveys
Reduce introduced fish interactions with non-migratory galaxiids	Number of trout in stream, abundance of galaxiids	Fish surveys
Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater	Stormwater quality	Discharge and receiving water sample analysis
Avoid wastewater discharge to freshwater	Number of discharges and quality	Discharge and receiving water sample analysis
Reduce contaminants - sediments, nutrients, pathogens, agrichemicals – from land use entering freshwater	Number of landholder actions	Count and size (fencing, planting out gullies, buffer strips, sediment traps, wetlands and riparian planting)
Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration	Elver transfer volume, adult tuna transfer count, kanakana detections	Kg of elvers per year, number adults transferred, eDNA

APPENDIX 5: DRAFT KEY ATTRIBUTE-BASED ENVIRONMENTAL HEALTH MONITORING FRAMEWORK

Environmental health goal	Key Attribute	Indicator
Increase the abundance of native wildlife	Native wildlife	Species threat status, population statistics, observations, birdsong level, 5-minute bird count
Maintain or improve water quality	Water quality (lakes, rivers, groundwater)	Lake trophic level index, national objective framework band, water quality parameter trends
Improve freshwater ecosystem function	Freshwater ecosystem function	Aquatic life and ecosystem processes
Improve the abundance and accessibility of mahika kai	Mahika kai health & accessibility	Presence, abundance, diversity, and safety
Increase overall native vegetation coverage and improve condition	Native vegetation coverage and condition (beech, shrub, tussock, riparian, submerged, wetland)	Coverage (ha) per type, vegetation type succession observations, threatened plant presence, canopy cover, biomass, submerged plant index
Maintain or improve overall wetland coverage and function	Wetland coverage and function	Wetland coverage (ha), wetland hydrology
Maintain or improve naturally uncommon ecosystem functions	Naturally uncommon ecosystem functions	Naturally uncommon ecosystem number and coverage (ha), threatened species presence, ecological integrity
Strengthen ki uta ki tai (interconnectedness)	Interconnectedness	Nutrient fluxes, riparian and wetland continuity, habitat connectivity, fish passage. Water quality and ecosystem integrity connecting to other CAPs downstream
	Water quantity	River flow, lake level, depth to groundwater
	Soil health	Structure, nutrients and soil life

APPENDIX 5: DRAFT COMMUNITY AND CULTURAL VALUE MONITORING FRAMEWORK

Community and cultural value	**Attribute**	**Indicator**
Waimāori (fresh water)	Drinking water	Boil water notices
	Recreational swimming water	E. coli long term grade
Mahika kai	Mahika kai health & accessibility	Presence, abundance, diversity, and safety
Health and wellbeing	Overall quality of life	Percent rate their quality of life as good or extremely good (QLDC)
	Physical and mental health	Percent rate their physical health as excellent or mostly good
		Percent rate their mental health as excellent or mostly good (QLDC)
Rest, replenishment and learning	Mental health	Percent rate their mental health as excellent or mostly good (QLDC)
Local economy	Jobs and income	Percent have some or a sufficient level of disposable income (QLDC)
Sustainable agriculture	Environmental certifications	Number of farms with environmental certifications
Visitors and tourism	Sustainable tourism experiences	Number of available sustainable tourism experiences in region Tourism approval rating (community sentiment out of 100)
Recreation	Neighborhood participation	Percent participate in activities in neighborhood (QLDC)
	Sustainable tourism experiences	Number of available sustainable tourism experiences in region
	Recreational swimming water	E. coli long term grade
Taoka species	Ecosystem integrity	Indigenous biodiversity and habitat extent
Outstanding landscapes	Outstanding natural landscapes and features	Data being sought (QLDC)
Ki uta ki tai (interconnectedness)	Health of Mata Au / Clutha River	Water quality and ecosystem integrity connecting to other CAPs downstream

APPENDIX 6: FOCUS LISTS FOR GOALS AND INDICATORS

The following focus lists help narrow down the work within our goals and action plan to assist with delivery. These are initial examples based on current community action and are not exhaustive. Specific details will be developed during delivery of the CAP.

Initial focus taoka wildlife that connect with current community action are:
Taoka birds and bat:

- **Alpine zone:** pīwauwau / rock wren, kea
- **Forest and shrubland:** mohua / yellowhead, pekapeka-tou-roa / long tailed bat, kākā, tītitipounamu / rifelman, miromiro / tomtit, pipipi / brown creeper, toutouwai / New Zealand robin, riroriro/ grey warbler, kakaruai / South Island robin
- **Tussock and shrubland:** takahē, kārearea / New Zealand falcon
- **Freshwater**: whio / blue duck, matuku-hūrepo / bittern, pūteketeke / grebe
- **Braided rivers:** pohowera / banded dotterel, tarapirohe / black fronted tern, ngutu pare / wrybill, kakī / black stilt, tōrea / South Island pied oystercatcher, tarāpuka / black-billed gull

Taoka lizards: mokopirirakau / jeweled gecko and other geckos, grand skink and other skinks
Taoka fish: tuna kuwharuwharu (longfin eel), kōaro, Gollum galaxias, alpine galaxias (Southland), southern flathead galaxias, upland bully, common bully and kākahi / freshwater mussel

Taoka invertebrates: giant wētā, mountain stone wētā, olearia moths, other terrestrial insects, and aquatic macroinvertebrates

Non-exhaustive sample of focus mahika kai species (when and where population abundance allows for cultural take are:

- Tuna kuwharuwharu (longfin eel) and other native fish species
- Weka and native game bird species
- Mikimiki (bracken), kānuka, taramea (wild Spaniard, for fragrant oil), tikumu (mountain daisy) for kākahu (cloaks), plants for mōkihi (rafts), harakeke, rāupo and other plants for raranga (weaving).

Focus vegetation types include:

- Beech and podocarp forest
- Native shrubland and woodland (grey shrub, kānuka-kōwhai-olearia woodland, mikimiki (bracken)-kānuka shrub)
- Native tussock grasslands (tall and short tussocks, snow tussock)
- Native wetland vegetation (such as purei / sedges, raupō / rushes, harakeke / flax, karamu / coprosmas and other native wetland shrubs)
- Native riparian vegetation (such as harakeke / flax, tī kōuka / cabbage tree, karamu / coprosmas, kānuka and mānuka, purei / sedges, raupō / rushes, toetoe, and other native shrubs)
- Native alpine vegetation (alpine shrublands, snow tussock, alpine herb fields)

Non-exhaustive sample of potential initial focus wetland locations that connect with current community action are:

- Butterfield wetland

- Bullock Creek Hatchery Springs wetland
- Scarfies Lagoon / Glendhu Wetland
- Waiwhakaata / Lake Hayes Margins
- Mātakitaki / Matukituki Wetland Management Areas and Big Boggy Swamp
- Makarore / Makarora Flat Swamp Complex
- Kimiākau / Shotover River Confluence Swamp
- Matakauri Wetland
- Glenorchy Lagoon Wetland
- Manuhaea / The Neck lower and upper wetlands
- Von Valley Wetland Management Area

Focus types of naturally uncommon ecosystems are:

- Inland outwash gravel plains (Upper Clutha flats area)
- Braided riverbeds
- Alpine tarns (small lakes)
- Alpine snowbanks and cushion bogs
- Seepages, flushes, ephemeral wetlands
- Cliffs, scarps, tors, boulder fields and screes (where known threatened species occur)

IMPACT KEY:

Very high impact	Very likely to meaningfully contribute to goals and objectives
High impact	Likely to meaningfully contribute to goals and objectives
Medium or supporting impact	Likely to enable/amplify the impact of other strategies, or could meaningfully contribute to goals and objectives
Low impact	Unlikely to meaningfully contribute to goals and objectives

Feasibility and affordability key:

Very high feasibility	Very likely technically feasible and we have most of the resources
High feasibility	Likely technically feasible and requires some additional resources
Medium feasibility	Could be technically feasible with substantial additional resources
Low feasibility	Not technically feasible and/or required resources beyond our reach

Strategic lens key:

Urgent	Needs to happen or values will be lost forever
Easy win	We can achieve (at least some of) this with what and who we have
Building block	Needs to be done to support other/more action
Advocacy	We need to do this to bring people along on our catchment action journey

Strategy 1: Develop a long-term, sustainable funding framework

Potential impact	Feasibility and affordability
Supporting	**Medium**
The actions are likely to enable other strategies to get underway, be implemented at scale, and support long-term progress. However, the direct impact depends on the success of on-the-ground action.	The actions could be technically feasible over the long-term but making them work will mean rethinking how funding is prioritised, who contributes, and how we value nature's contribution to people. That shift in mindset will take time and broad support, even if the tools and approaches already exist.
The Upper Lakes ICG did not formally analyse the effectiveness of this strategy in a workshop, as it was developed later through a group discussion; however, the discussion focused primarily on the **building block** elements and **advocacy** aspects of the strategy.	

Strategy 2: Increase community science, research and knowledge sharing

Potential impact	Feasibility and affordability

Supporting	High
The actions are likely to enable evidence-based management for other strategies. However, the direct impact depends on the success of on-the-ground action.	The actions are technically feasible because ORC has the necessary digital tools and technical expertise. There are existing community science projects to collaborate with and build upon. A high level of funding ($20M) is required for deep lakes research, and a low level of funding required to execute the rest of the actions.
The Upper Lakes ICG determined that this strategy is a **building block** because it enables evidence-based management and emphasises **advocacy** because community science will help bring people along our journey.	

Strategy 3: Strengthen partnerships and restore access to mahika kai

Potential impact	Feasibility and affordability
Supporting	**Very high**
The actions are likely to strengthen many other strategies. However, the direct impact depends on the success of on-the-ground action.	The actions are technically very feasible and moderate funding is required to support the work. There is potential to scale the actions to reflect the scale of on-the-ground action. The activities rely heavily on strong partnership relationships and on-going, long-term coordination.
The Upper Lakes ICG determined that this strategy is centred on **advocacy** because it supports mana whenua and community partnerships along with cultural connection. It is also a **building block** because it enables and strengthens other actions.	

Strategy 4: Control introduced predator mammals

Potential impact	Feasibility and affordability
High	**Medium**
The actions are likely to meaningfully contribute to reducing the pressure from introduced predator mammals, and therefore increasing populations of native wildlife. However, the actions need to be carried out in conjunction with habitat protections and enhancements (see Native Vegetation Programme)	The actions are technically feasible and there are good examples of successful predator control in the catchments However, substantial long-term funding is required to undertake intensification of predator control at the required scale and maintain the progress.
The Upper Lakes ICG determined that this strategy is **urgent** because without successful predator control, threatened species may fall below critical population levels.	

Strategy 5: Increase tuna kuwharuwharu (longfin eel) trap and transfer

Potential impact	Feasibility and affordability
High	**Medium**

The actions are likely to meaningfully contribute to increasing populations of native wildlife and increasing mahika kai (tuna kuwharuwharu (longfin eel)) if undertaken at scale. The actions don't directly reduce the pressure of hydroelectric dams but does reduce the stress on tuna / eel migration. Tuna / eels play a vital role in structuring the biological and ecological communities within freshwater.	The actions would require a moderate investment to up-scale the current operations, and the technical feasibility is limited by the number of elvers that arrive at Roxburgh dam and logistical constraints of transporting the elvers without distressing them.
The Upper Lakes ICG determined that this strategy emphasizes **advocacy** because tuna kuwharuwharu are taoka and an important mahika kai for Kāi Tahu and the wider community.	

Strategy 6: Protect and enhance galaxiid habitats

Impact	Feasibility and affordability
Very high	**Very high**
The actions are very likely to meaningfully contribute to reducing the pressure from introduced fish in priority sites (headwater sections of upland streams), and therefore increasing populations of native wildlife (galaxiids). The actions include habitat enhancements that contribute to improving wider freshwater ecosystem function.	The actions are technically feasible, there are examples of this being successful in the Upper Lakes and elsewhere in Otago. The activity is low cost and scalable (the number of streams can be increased or decreased) whilst remaining effective in place.
The Upper Lakes ICG determined that this strategy is **urgent** due to the potential loss of threatened non-migratory galaxiids, and that it represents an **easy win** because the strategy can be successfully carried out in a single starting location.	

Strategy 7: Control wilding conifers (pines) and other terrestrial weeds

Impact	Feasibility and affordability
Very high	**Medium**
The actions are very likely to meaningfully contribute to reducing the pressures of wilding conifers and other terrestrial weeds, and therefore improving native vegetation and NUEs, and - in braidplains riparian zones, and wetland - improve freshwater ecosystem function. It is essential that accurate record keeping is maintained for the intergenerational nature of controlling wilding conifers.	The actions are technically feasible, we have people who can do this work, and they have proven that wilding conifers could be managed at a large scale. Significant funding is required to undertake control and maintenance at the required scale and speed, however getting on top of the pressure will be more cost effective in the long term. The 2023 ORC Otago Benefit : Cost Analysis Report for Wilding Conifers shows an extremely high ratio of 96:1 showing the seriousness of Wilding Conifers and escalating costs if nothing is done.
The Upper Lakes ICG determined that this strategy is **urgent** due to the fast-spreading nature of wilding conifers and other weeds, and that it serves as a **building block** because 'we need to first sort the wildings and the weeds out' to achieve broader gains in native habitat restoration.	

Strategy 8: Restore, protect and enhance native vegetation

Impact	Feasibility and affordability
Medium	**Medium**
The actions are could meaningfully contribute to reducing the pressures from clearing of native vegetation and introduced herbivores and could directly contribute to increasing the overall native vegetation coverage and improving the condition of native vegetation.	The actions are technically feasible, we have examples of where large-scale planting has been successful in the Upper Lakes, and there is potential to build on existing plantings. However, moderate to significant on-going funding and/or incentives are required.
"The Upper Lakes ICG determined that this strategy is an **easy win** because of the significant community planting efforts already underway, and that it serves as a **building block** because legally protecting areas can help secure the investments made through other actions.	

Strategy 9: Restore and enhance wetlands

Impact	Feasibility and affordability
Very high	**Medium**
The actions are very likely to meaningfully contribute to reducing the pressure of willows, and directly improving overall wetland coverage and wetland functioning, and therefore improving freshwater ecosystem function, improving water quality and increasing the abundance of mahika kai – though interconnectedness and ki uta ki tai.	The activities are technically feasible at individual sites, however the scale at which it can be achieved (number of wetlands) and the level of landholder willingness is unknown. Significant funding will be required to undertake this throughout the catchments in order to have an impact on water quality, but the number of sites could be scaled up or down, while remaining successful in place for biodiversity gains.
The Upper Lakes ICG determined that this strategy is a **building block** because enhancing wetlands supports the health of downstream freshwater ecosystems, and because action within wetlands can integrate multiple strategies - such as introduced predator control and planting.	

Strategy 10: Reduce contaminants from stormwater and wastewater

Impact	Feasibility and affordability
High	**Medium**
The actions could meaningfully contribute to reducing pressure from stormwater and wastewater on freshwater ecosystems and therefore improving water quality. However, there is an uncertainty around achieving the necessary adoption of changes at the scale required to impact water quality.	The actions are technically feasible but would require significant funding in the form of subsidies and/or incentives to gain uptake at the required scale.
The Upper Lakes ICG determined that this strategy is **urgent** due to increasing stormwater and wastewater pressure driven by population growth and rapid development, and that it also emphasises **advocacy** because community awareness and support are critical to addressing these challenges.	

Strategy 11: Reduce contaminant losses from land use

Impact	Feasibility and affordability
High	**Medium**
The actions are likely to meaningfully contribute to reducing contaminant loss from land use and therefore improving water quality – but only if the actions are undertaken at a large scale.	The activities are technically feasible at individual locations, but require significant landholder buy-in to reach the required scale to have a measurable impact on water quality. Significant funding and/or incentives will be required to gain uptake by landholders.
The Upper Lakes ICG determined that this strategy is a **building block** because addressing contaminant inputs is essential for the success of other freshwater interventions.	

Strategy 12: Reinforce freshwater biosecurity in deepwater lakes

Impact	Feasibility and affordability
High	**Very high**
The actions are likely to contribute to reducing pressure from invasive freshwater organisms and therefore improving freshwater ecosystem function, increasing submerged native vegetation and freshwater native species, along with increasing mahika kai. However, remaining accidental human spread of freshwater pests and spread by birds cannot be controlled.	The activities are technically feasible with lagarosiphon control work planned by LINZ, and an established check, clean, dry programme to build upon.
The Upper Lakes ICG determined that this strategy is **urgent** because once freshwater pests enter our lakes and rivers, they can spread rapidly and are extremely difficult to eradicate.	

APPENDIX 8: COMMUNITY AND CONSERVATION GROUP MAHI (WORK) ALREADY UNDERWAY, ALIGNING TO EACH STRATEGY

Strategy 2: Increase community science, research and knowledge sharing

- ORC's Deepwater Lakes Technical Advisory Group research programme
- Conservation Alliance quarterly meetings bringing together people working in conservation in the Whakatipu area
- Stream health monitoring supported by ORC with Precipice Creek Group and Arrowtown Village Association
- Enviroschool programme: 15 schools and 3 early childhood education centres
- 'Get Your Feet Wet' community stream health monitoring collaboration between WAI, ORC, and Otago Fish and Game
- Monitoring at Shotover and Matakauri wetlands collaboration between Whakatipu Restoration Trust, QLDC and Shotover Primary school
- Wai Wānaka physiographic mapping
- 'Fluker Post' photo monitoring point installation - Wānaka lakefront by WAI Wānaka
- Kārearea monitoring project by Cardrona Foundation and RealNZ
- Annual braided river bird monitoring in Makarora by the Aspiring Biodiversity Trust
- Pīwauwau/ rock wren, whio, and pekapeka tou-roa/ long-tailed bat monitoring in Makarora by the Aspiring Biodiversity Trust
- Educational programmes put on by the Aspiring Biodiversity Trust
- Braided River Aid – an organisation supporting braided river conservation

Strategy 3 & 4: Strengthen partnerships and conditions for mahika kai

- Waiwhakaata Rautaki document and the relationships and alliances formed from the Waiwhakaata Strategy Group
- Mahi by Mana Tāhuna and by Te Tapu O Tane in the Waiwhakaata catchment that includes mahika kai outcomes
- Short film, Mahika Kai, set in Wānaka, directed by Kieran Mpetyane Satour and starring the Cassidy whanau (Kāi Tahu)
- Te Tapu O Tāne and Te Rūnanga o Ngāi Tahu restoration work at Tuckers Beach Nohoaka, Treespace Mt Dewar project, and Waiwhakaata wetlands

Strategy 5: Control introduced predator mammals

- Southern Lakes Sanctuary projects
    - Bob's cove sanctuary – 62 AT220/AT520 traps (in partnership with Whakatipu Wildlife Trust)
    - Bush Creek - over 200 traps (in partnership with Whakatipu Wildlife Trust)
    - Coronet Face – 112 traps (in partnership with Whakatipu Wildlife Trust)
    - Makarora Mohua and Makarora Whio – 1500 traps (in partnership with Central Otago Lakes Branch of Forest and Bird)
    - Takahē return to the Rees – 600 traps (in partnership with Routeburn Dart Wildlife Trust)

    - Wye Creek – 300 traps (in partnership with Whakatipu Wildlife Trust and Queenstown Climbing Club)
- Forest & Bird, Central Otago Lakes Branch – Makarora: 1358 traps
- Mātakitaki Conservation Group: 2424 traps
- Routeburn Dart Wildlife Trust: 1399 traps
- SOHO Properties Ltd: 661 traps
- Predator Free Wānaka: 860 traps
- Whakatipu Wildlife Trust: 3114 traps
- Mana Tāhuna – Waiwhakaata: 263 traps
- Aspiring Biodiversity Trust Ridge to River: 850 traps
- Real NZ and Mt Cardona Station: 98 traps
- 12 "backyard style" community trapping groups with over 100 traps each, and additional smaller groups
- Queenstown Trap Library and Wānaka Community Workshop (trap library)
- QLDC Draft Climate and Biodiversity Plan – Proposed cat management actions
- Cat welfare and cat rescue groups
- Aspiring Biodiversity Trust is leading Makarora whoio distribution, abundance, and genetic research to guide targeted invasive predator control and effective conservation management.
- Identified Pīwauwau/ rock wren populations in the Servern alpine basin through monitoring supported by an alpine monitoring system.
- Invasive mamma and avian predator control and awareness through education programmes to protect and restore braided river bird populations by Aspiring Biodiversity Trust.

Strategy 6: Increase tuna kuwharuwharu (longfin eel) trap and transfer

- Contact Energy trap and transfer programme - transfer of tuna / eels from below Roxbrough to Wānaka and Hāwea: approximately 5 to 20 kg of elvers being released into Wānaka and Hāwea per year.
- 2024 and on-going partnership building between mana whenua and Contact Energy.
- ORC Science Team fish passage and barrier mapping
- Hokonui Taiao Wai-Māori team's tuna migration research (outside of the Upper Lakes but findings could be applied)
- NIWA-led Lakes380 development of new eDNA-based detection tool for assessing spatial distributions (outside of the Upper Lakes but findings could be applied)

Strategy 7: Protect and enhance galaxiid habitats

- Taking Care of Tyre Gully project: A population of Clutha flathead galaxias were discovered using eDNA, a fish barrier was installed and electric fishing undertaken to remove trout, with riparian planting to follow. There has been involvement from many parties working together: WWF-NZ, the Tindall Foundation, Wai Wānaka, ORC, DOC, Fish and Game Otago, Te Kākano Aotearoa Trust, and the Cardrona Catchment Group, Otago Polytechnic engineering students, University of Canterbury.
- Recent (2025) new populations of Clutha flathead galaxias discovered in the Ōrau (Cardrona River) Valley, through research funded by the Donald Scott Memorial Scholarship in Freshwater Ecology, with support from Otago Fish & Game Council and Clutha Fisheries Trust.

Strategy 8: Control wilding conifers (pines) and other terrestrial weeds

- National Wilding Conifer Control Programme: 6 Whakatipu management units
- Whakatipu Wilding Control Group 10 year Strategy & operational work: helicopter boom spraying, Aerial Basal Bark Application (lancing), logging where feasible, arborists and chainsaw ground crews.
- Whakatipu Wilding Control Group regular vvolunteer conservation events and 40 x Ben Lomond volunteer plots at 1 ha each.
- Upper Clutha Wilding Tree Group 10 year Strategy & operational control plan for the Wānaka and Hāwea area: aerial boom spraying in dense areas, aerial basal bark application (lancing), logging where feasible and removal using arborists and chainsaw crews.
- QLDC Parks tree succession plans for conifer removals and replacements, such as, Queenstown Hill, Te Kararo Queenstown Gardens and Eely Point.
- QLDC District Plan Chapter 34 – Since 2006 Wilding tree species have not been permitted to be planted (unless the NES-CF prevails)
- LINZ biosecurity management delivered by Boffa Miskell, including weed removal on the Lake Hāwea shore and in braided rivers, in compliance with the Regional Pest Management Plan (RPMP)
- Remarkables Station National Trust Ltd, (RSNTL)- QEII and Queenstown Airport sycamore removal project along the base of Kawarau/Remarkables mountain range
- Significant and numerous efforts from individual land holders and catchment groups to remove weeds such as gorse, broom, wilding conifers, yellow flag iris, buddleia, cotoneaster, lupins, sycamores and willows.

Strategy 9: Restore, protect and enhance native vegetation

- Project Tohu, a QLDC initiative to recloak the shoulders of Coronet Peak, collaborating with Te Tapu O Tāne, Citycare and E3 Scientific. 80,000 plants are in the ground so far.
- Te Kākano Trust native plant nursery, with tens of thousands of eco-sourced native plants in the ground around the Wānaka area within 30 sites.
- Whakatipu Reforestation Trust native plant nursery and five large keystone planting sites: Bush Creek, Whitechapel Reserve, Waiwhakaata / Lake Hayes South, Slope Hill Road and Feehly Hill.
- Te Tapu O Tāne commercial native plant nursery and planting work at Tuckers Beach Nohoaka (Te Rūnanga o Ngāi Tahu), and planned work at Mt Dewar (Treespace)
- Thursday Group planting at the Lake Hāwea foreshore and Gladstone Gap to John Creek.
- Glenorchy Community Native Plant Nursery and community planting days
- Sustained rabbit management Eco Fund projects, including fencing and associated infrastructure for groups of 5+ adjoining properties (8 projects 2022-2025)
- Rabbit fencing around Waiwhakaata wetland restoration to prevent rabbit damage to the newly planted area.
- Rabbit fencing by local homeowners and installation of cattle stops by QLDC (or rabbit stops as they now are), along the lake-shore path at Bermner Bay, Wānaka – along with native planting at the wetland/seep.
- Goat control by DOC and QLDC aims to reduce browsing pressure of native plants by preventing the spread of feral goats, keeping their numbers to manageable levels, and to maintain goat free areas.

Strategy 10: Restore and enhance wetlands

- Waiwhakaata Wetlands project: 5 ha of willows removed and 30,000 wetland plants in the ground. Involving Mana Tāhuna, Friends of Lake Hayes, Te Tapu O Tāne and other partners.
- Butterfield wetland restoration project led by the Central Otago Lakes branch of Forest and Bird.
- Restoration at 2016 Bullock Creek Hatchery Springs wetland has been driven by Friends of Bullock Creek and Otago Fish & Game, with support from community groups such as Wai Wānaka and Te Kākano Aotearoa Trust. It includes a QEII covenant and on-going planting and habitat management.
- Restoration for the Matakauri Wetland is being led by QLDC.
- The Wakatipu Island Reforestation Trust and local volunteers carried out revegetation and predator control at the Glenorchy Lagoon Wetland.

Strategy 11: Reduce contaminants from stormwater and wastewater

- WAI Wanaka led 'Adopt a Drain' initiative encouraging community members to take responsibility for 'adopt' local drains and undertake regular clean ups to minimise waste entering the system. Along with their "our drains are stream" educational programme.
- 2025 updates to QLDC's Land Development and Subdivision Code of Practice

Strategy 12: Reduce contaminant losses from land use

- Installation of two sediment traps in collaboration with Mana Tāhuna, Friends of Lake Hayes, e3 Scientific, ORC, and private landowners to reduce the sediment load entering Waiwhakaata.
- Wetland restoration and riparian planting undertaken by Mana Tāhuna in the Waiwhakaata catchment.
- A huge effort from catchment groups and individual land holders to ensure best practice, and undertake measures such as fencing streams, riparian planting and wetland enhancements across their land.

Strategy 13: Reinforce freshwater biosecurity in deepwater lakes

- Lake Wānaka Lagarosiphon Management Plan 2025-2035 and Boffa Miskell operational activities towards lagarosiphon removal, along with the use of hessian matting.
- ORC Check, Clean, Dry summer ambassadors operating in the area for the past two summers.
- NIWA's development of AI camera detection of lake weeds and other pests for surveillance

APPENDIX 9: RESULTS OF PUBLIC SURVEYS

Survey Question Summary	**Percent that Agree or Strongly Agree**
Survey at 'half-way' point (61 responses)	
Mission	**86%**
Values	**77%**
Pressures	**80%**
Goals	**85%**
Survey on the 12 Strategies and Initial Actions (118 responses)	
Strategy 1 - Funding	**91%**
Strategy 2 - Science	**86%**
Strategy 3 & 4 – Partnership & Mahika kai	**67%**
Strategy 5 – Predator control	**96%**
Strategy 6 – Trap & transfer	**75%**
Strategy 7 - Galaxiids	**79%**
Strategy 8 – Wilding conifers & weeds	**93%**
Strategy 9 – Planting & protection	**90%**
Strategy 10 – Wetland enhancement	**95%**
Strategy 11 – Stormwater & wastewater	**96%**
Strategy 12 – Contaminants from land use	**93%**
Strategy 13 – Freshwater biosecurity	**92%**

Attachment B: Upper Lakes Catchment Action Plan Summary

2025 - 2035

Upper Lakes Catchment Action Plan

Summary document

Workshopped by:
Upper Lakes Integrated Catchment Group

upper-lakes-orcnz.hub.arcgis.com

Facilitated by:
ORC Integrated Catchment Management Team

icm@orc.govt.nz

CONTENTS

Context and Purpose 4

Rationale 4

Purpose 4

Scope 4

Mana Whenua 4

The Upper Lakes Integrated Catchment Group (ICG) and Workshops 5

Setting the path together 6

Mission 6

Vision story 6

Our Values 7

Cultural and Community Values 7

Environmental Values 9

Environmental Value Health Score 11

Environmental Health Goals 12

Drivers: Root causes of Environmental Pressures 13

Pressures on environmental values and objectives to reduce them 13

Action plan 16

Foundational programme 16

Strategy 1: Develop a long-term and diverse framework that sustains funding that will support actions 16

Strategy 2: Increase science, research and knowledge sharing for the community 17

Strategy 3: Strengthen our mana whenua partnership in the Upper Lakes area 17

Strategy 4: Improve environmental conditions for mahika kai and enable safe use 18

Native wildlife programme 18

Strategy 5: Control introduced predator mammals 18

Strategy 6: Assist tuna kuwharuwharu (longfin eel) and kanakana (lamprey) migration, in partnership with mana whenua 19

Strategy 7: Protect and enhance galaxiid habitats 19

Native vegetation programme 20

Strategy 8: Control wilding conifers (pines and firs) and terrestrial weeds 20

Strategy 9: Protect, restore and enhance native vegetation 21

Freshwater programme 22

Strategy 10: Protect, restore and enhance wetlands 22

Strategy 11: Reduce contaminants from stormwater and wastewater 23
Strategy 12: Reduce contaminant losses from land use.....24
Strategy 13: Reinforce freshwater biosecurity in deepwater lakes.....24
Carrying the Plan Forward 26
Delivery and Governance 26
Kicking things off.....26
Monitoring Plan 27
Communications.....27
Adaptive Management and Review.....27

Acknowledgement

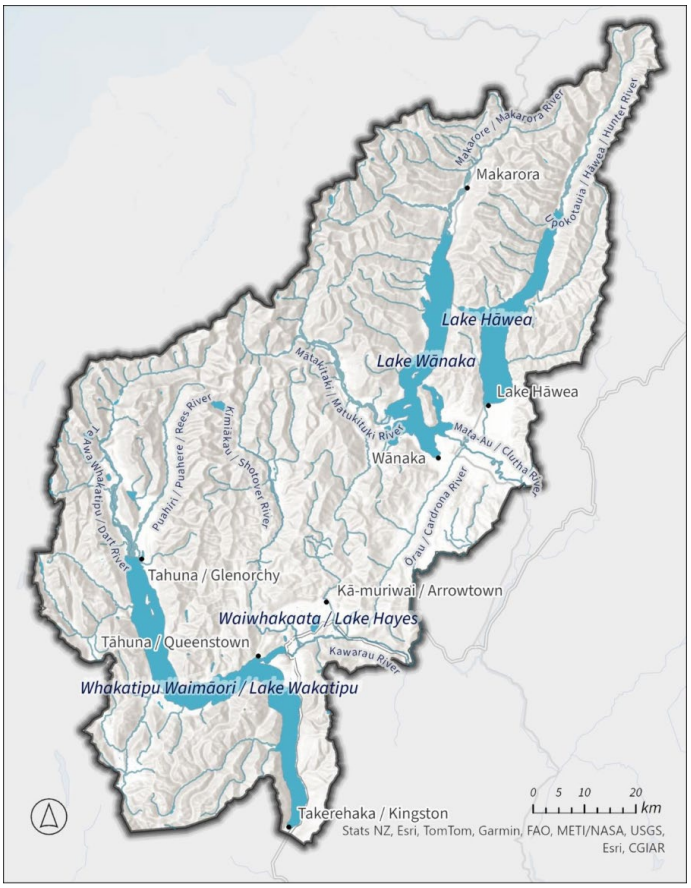
We warmly thank all members of the Upper Lakes Integrated Catchment Group (ICG). This plan reflects your dedication and willingness to work together for the benefit of the Upper Lakes CAP area and its communities. Across our hui (in person and online), six workshops, and a sunny site visit, you shared time, knowledge, and experience - from local insights and cultural perspectives to industry expertise and practical know-how.

Your mahi highlights the value of collaboration, bringing together mana whenua, community groups, landholders, agencies, and industry partners with a shared vision for te taiao. This collective impact approach gives the CAP both its grounding and its strength.

We sincerely appreciate your contributions, your commitment through some bumps in the road, and your patience throughout this process. The CAP has been shaped by your effort and will rely on your ongoing leadership and energy into the future. We look forward to continuing our work together as we bring the plan to life.

Kā mihi maioha,
ORC's Integrated Catchment Management Team (past and present)

CONTEXT AND PURPOSE



Above: Upper Lakes CAP area, the spatial scope for this plan, matching the QLDC boundary.

RATIONALE

Otago Regional Council's (ORC) Integrated Catchment Management (ICM) programme was established in 2021 to lead the development of Catchment Action Plans with iwi and the community.

PURPOSE

The Upper Lakes CAP is a long-term, non-regulatory plan to protect, enhance, and restore native biodiversity and freshwater quality. Non-regulatory means it focuses on guiding, coordinating, and supporting community actions rather than creating or enforcing rules. It builds on the work of mana whenua, communities, and local government, aiming for collective impact by aligning efforts around shared goals for environmental health and community wellbeing.

SCOPE

The plan spans a 10-year timeframe (2025–2035) with initial actions prioritised for the first 3–5 years. Spatially, the Upper Lakes CAP area aligns with QLDC boundaries. The area includes Whakatipu Waimāori (Wakatipu), Wānaka, Hāwea, Waiwhakaata (Lake Hayes), the upper Kawarau River, Ōrau (Cardrona River), the Upper Mata Au (Clutha River) and Hāwea Flat.

MANA WHENUA

The hapū who hold mana whenua status in the Upper Lakes CAP area are affiliated with seven papatipu rūnaka across Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku. As Te Tiriti (treaty) o Waitangi partners, they exercise rakatirataka (authority) in relation to the management of te taiao (the natural environment). Otago Regional Council and the Upper Lakes ICG acknowledge that building trusted, enduring relationships requires consistent engagement and support for mana whenua participation.

THE UPPER LAKES INTEGRATED CATCHMENT GROUP (ICG) AND WORKSHOPS

The Upper Lakes Integrated Catchment Group (ICG) was established in 2024 to co-develop this CAP. Membership was approved by ORC councillors and includes mana whenua representation, community representatives, staff from agencies such as Queenstown Lakes District Council (QLDC), the Department of Conservation (DOC), and Toitū te Whenua Land Information New Zealand (LINZ), and an ORC councillor.

Above: ICG members at a workshop in Arrowtown, completing Open Standards for Conservation tasks to capture local environmental knowledge for the CAP.

Over the 12 months from August 2024 to August 2025, the Upper Lakes ICG met for two introductory hui (meetings), six collaborative workshops and one site visit, facilitated by ORC staff. We deeply appreciate the willingness of all members to participate in this process. Their openness in sharing knowledge, insights, and perspectives greatly enriched the development of this CAP. In total, the group contributed over 880 hours of their time, including workshops and travel - a significant commitment that reflects their passion and dedication to the wellbeing of the Upper Lakes environment and communities.

Above: Word cloud of the many community groups Upper Lakes ICG members are involved in. Their ability to "wear many hats" reflects a deep commitment and passion for their community, bringing together a truly wide and vibrant representation.

SETTING THE PATH TOGETHER

Above: Upper Lakes ICG members touring wetland plantings at Waiwhakaata (Lake Hayes). Site visits like these are vital for grounding discussions in lived experience, fostering connection, and deepening understanding of on-the-ground restoration efforts.

MISSION

The Upper Lakes ICG mission affirms a shared commitment:
"The Upper Lakes, with its soaring mountains and deep glacial lakes, is where manaaki whenua and manaaki takata is inherent in all we do. We are committed to protecting and improving the unique native biodiversity in our place, while aiming to inspire and empower future generations to further protect and enhance the area's special values."

VISION STORY

The vision story provides a shared picture of what we are working toward - not about returning to the past, but about imagining a thriving future where people and nature flourish together. It sets direction, inspires action, and helps guide decisions.

"It's 2075 in the Upper Lakes. Together, mana whenua and the community have carried out decades of mahi for our catchments, adapting along the way.

In the valleys, takahē cross paths with trampers, emerging from thick golden tussock, bird colonies can be watched as they nest undisturbed on braided river gravels, and as dusk falls pekapeka tou-roa (long-tailed bats) glide overhead, through ancient beech canopies chasing moths. Pīwauwau (rock wrens) jump from boulder to boulder within alpine basins and along ridges. Tuna kuwharuwharu (longfin eel) can be seen feeding amongst native submerged plant beds and gliding out into the crystal-clear depths of our lakes.

The waterways, lined with native riparian plants, offer abundant mahika kai (food and resources) for Kāi Tahu whānaui, and the environment offers wild foraging for the wider community. Tamariki (children) splash and swim at the lake shorelines in the clean water, then rest under the shade of native trees to tuck into a freshly cooked trout for lunch. Behind them, wetlands and bush weave through sustainable, thriving farms renowned for their food and fiber produce – a mosaic of native biodiversity and productive land.

In our towns, a connected network of streams, wetlands, and green space cools the landscape brings nature to the heart of daily life. Nature-based solutions form part of the infrastructure that is necessary to ensure the health of the water as it heads downstream.

Mana whenua connection to place and taoka is flourishing, mātauraka (knowledge) is strong and rakatirataka (authority) evident. Locals value the thriving native biodiversity around them, happily sharing fruit harvests with kākā and kākāriki. The community welcomes visitors who come to connect and contribute, helping to ensure the catchment remains vibrant for generations to come."

OUR VALUES

Environmental values provide ecosystem services - such as regulating water, supporting biodiversity, supplying food and resources, and offering recreation and inspiration - that sustain cultural and community values, reflecting the principle “Ka ora te whenua, ka ora te takata” - when the land is well, the people are well. Modified environments, including productive land and urban spaces, show how natural and altered systems interact and can be managed together to contribute to both environmental, and cultural and community values.

Above: Display of the environmental, cultural, and community values identified by the Upper Lakes ICG alongside pre-existing community plans. These shared values form the foundation of the CAP goals and actions, ensuring they are grounded in what matters most to the community represented by the ICG.

CULTURAL AND COMMUNITY VALUES

Waimāori (fresh water)
The purity of deepwater lakes, sourced from Kāi Tahu ancestral mountains, is treasured by mana whenua and the wider community for its cultural, ecological, and drinking water values.

Mahika kai (cultural resources and practices)
Waterbodies, wetlands, and forests sustain traditional food gathering and the cultural practices of mana whenua, maintaining strong connections between people and land.

Health and wellbeing of people
Clean water, green spaces, and natural landscapes support physical, mental, and spiritual wellbeing. “Ka ora te whenua, ka ora te takata” – when the land is well land, the people are well.

Rest, replenishment and learning
Deepwater lakes and surrounding landscapes are places of rest, renewal, and learning, valued both traditionally and today for recreation and reflection.

Local economy
Healthy ecosystems support tourism, fishing, farming and businesses that rely on natural resources and scenic landscapes.

Sustainable agriculture
Clean water, healthy soils, and native vegetation underpin farming systems that can balance food production whilst supporting biodiversity.

Visitors and tourism
Pristine lakes, forests, and scenery attract visitors who boost the economy and can participate in conservation.

Recreation
Diverse ecosystems provide opportunities for fishing, hunting, hiking, swimming, skiing, and relaxation - enhancing quality of life.

Taoka species
All native species are taoka (treasures) for Kāi Tahu. Protecting them maintains cultural identity, biodiversity, and environmental health.

Scenic landscapes
Mountains, lakes, rivers, and native vegetation hold deep cultural and spiritual meaning while offering iconic beauty.

Ki uta ki tai (interconnectedness)
From mountains to sea, land, water, and people are connected - what affects one part of the system affects all.

Above: A view over Lake Hāwea, where crystal-clear waters meet rugged slopes, showcasing the beauty and scenic value of the Upper Lakes landscape. This iconic scenery is central to tourism and also serves as a source of inspiration, learning, and renewal for both the community and visitors alike.

ENVIRONMENTAL VALUES

Alpine and Subalpine

Mauka (mountain peaks) with specialised plants and wildlife. Snow and ice feed rivers and lakes, sustaining ecosystems, farms, and people. These are ancestral mountains of Kāi Tahu.

Beech Forest

Ancient beech forests with layered understory, rich soils, and strong water and carbon roles. Predator control allows birds, bats, geckos, and wētā to thrive.

Tussock Grassland

Extensive tussock grasslands capture and slowly release water, supporting downstream systems and diverse wildlife like skinks, moths, pipit, and kārearea.

Shrubland and Woodland

Hardy native shrubs and trees stabilise slopes, restore vegetation, and provide mahika kai and habitat for birds, insects, and skinks.

Naturally Uncommon Ecosystems (NUEs)

Rare ecosystems like gravels, braided riverbeds, and bogs that support biodiversity and rare native species.

Braided Rivers and Braidplains

Defining rivers with shifting gravel beds, important for mahika kai and taoka birds like dotterels, terns, and wrybill, as well as native fish.

Rivers and Riparian Zones

Rivers and streams vital for travel, mahika kai, and mauri. Healthy riparian zones stabilise banks, filter runoff, and provide habitat for whio, galaxiids, and aquatic insects.

Deepwater Lakes

Iconic deep lakes with clear water, cultural importance, and habitats for native birds. Historically rich in mahika kai, now valued for recreation but facing water quality trend declines and knowledge gaps.

Above: View of the Rees River, beech-clad valley slopes, and mountain peaks, illustrating how interconnected environmental values of river, forest, and alpine landscapes shape the Upper Lakes.

Smaller Lakes, like Waiwhakaata (Lake Hayes) through to and alpine tarns support diverse ecosystems, mahika kai, and birdlife. Their health is closely tied to land use and catchment mauri.

Wetlands
Diminished but vital swamps, bogs, and marshes that regulate water, cycle nutrients, and support native vegetation, fish, birds, invertebrates, and cultural connections.

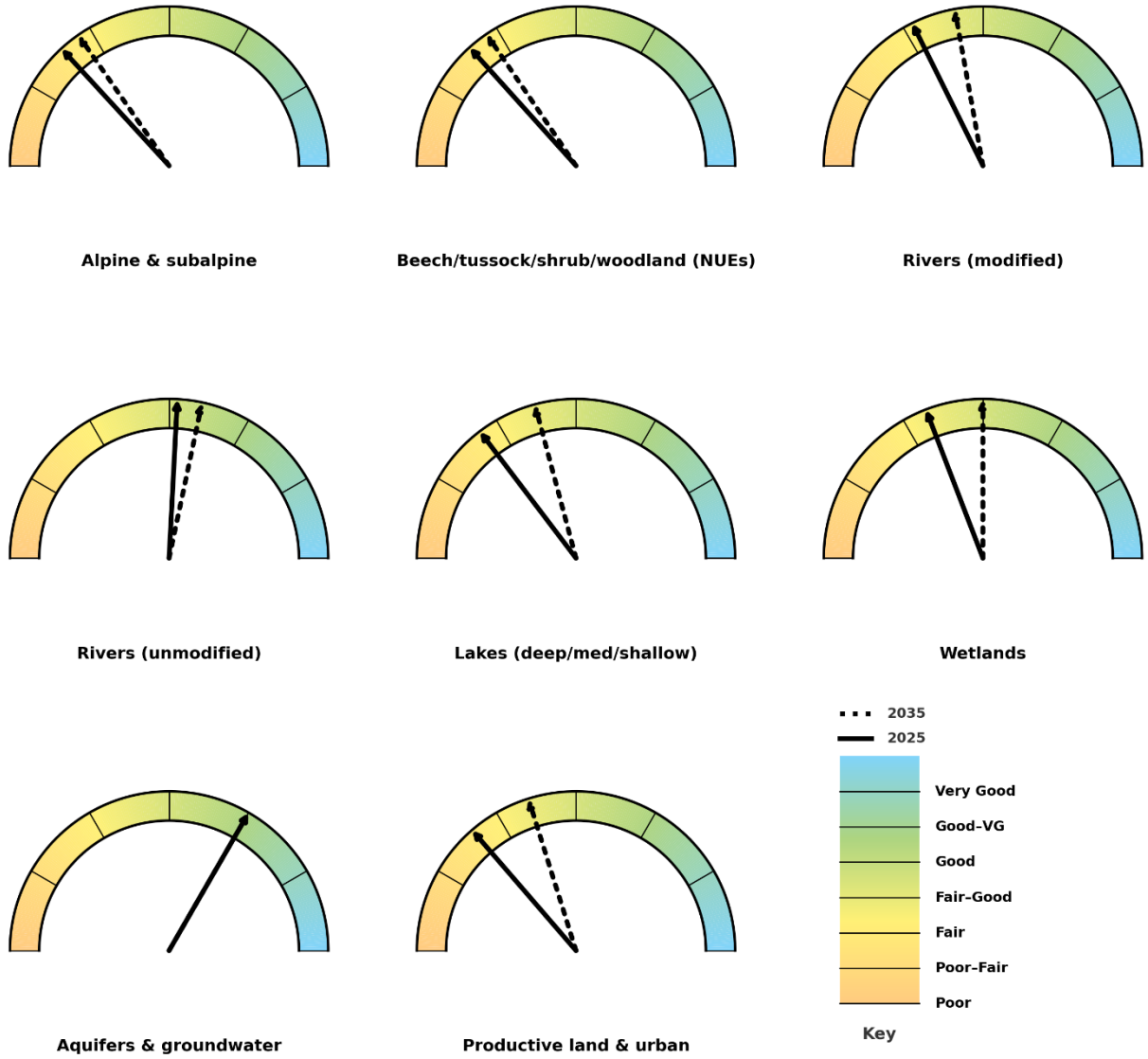
Aquifers and Groundwater
Underground water systems essential for drinking water, farming, biodiversity, and reflecting overall landscape health.

Productive Land
Farming, vineyards, and orchards central to community identity, intersecting with remnants of native ecosystems and novel habitats for birds and skinks.

Urban Spaces
Fast-growing towns that strongly influence freshwater quality and biodiversity. When well-designed, they connect people with nature and support regeneration.

Right: View across Lake Hāwea toward the small township on its edge, with blue skies and clear waters highlighting the lake's scenic setting.

ENVIRONMENTAL VALUE HEALTH SCORE



Above: Summary environmental health score card. The health of our environmental values were assessed by the Upper Lakes ICG, based on local environmental knowledge and supplied science reports. The scale from poor through to very good, is based on the viability of the environmental system. Some environmental values were grouped (such as beech/tussock/shrub/woodland and terrestrial NUEs) due to similarity, and others were split (rivers) due to significant health differences. The group assessed the current health in 2025 and where we could get to with 10 years of successful action, or, how much we could "shift the dial". The gap between current and future health helps guide realistic goal-setting.

ENVIRONMENTAL HEALTH GOALS

Environmental health goals set the direction for key attributes of our environmental values. They show the desired state we are working toward and guide the actions needed to get there.

Increase the abundance of native wildlife
By 2035, native wildlife is thriving and connected in low-predator spaces, with more populations self-sustaining compared to 2025.
Indicators: Species threat status, population stats, observations, birdsong, 5-min bird count.

Maintain or improve water quality
By 2035, river and lake water quality is maintained or improving from the 2025 baseline, supporting healthy freshwater ecosystems.
Indicators: Trophic level index, NOF band, water quality parameter trends

Improve freshwater ecosystem function
By 2035, aquatic weed impacts are reduced and in places are eliminated. Incursions are promptly delt with, and deepwater lake functional biodiversity is maintained or improved from the 2025 baseline.
Indicators: Aquatic life, ecosystem processes

Improve environmental conditions for mahika kai and enable safe use
By 2035, mahika kai species are increasing from the 2025 baseline, wāhi mahika kai (cultural food and resource gathering sites) are safe for use by mana whenua, and kaitiakitaka by mana whenua is supported.
Indicators: Species presence, abundance, diversity, safety

Increase overall native vegetation coverage and improve condition
By 2035, native vegetation cover and condition is improved compared to 2025, showing growth and succession with more taoka (treasured) plants present.
Indicators: Coverage, succession, threatened plants, canopy cover, biomass, submerged plant index

Improve overall wetland coverage and function
By 2035, wetland number, size, and function increase, with no further losses from the 2025 baseline. Wetland ecological and hydrological functioning, and resilience are apparent as part of the whole-catchment system.
Indicators: Coverage, hydrology measures

Maintain or improve naturally uncommon ecosystems (NUEs)
By 2035, the extent and function of NUEs is maintained to at least the 2025 level. NUEs are actively managed to protect and support the persistence and recovery of rare and threatened plants and wildlife.
Indicators: NUE number, coverage, threatened species presence

Strengthen ki uta ki tai (interconnectedness)
By 2035, land–water connections are stronger than in 2025, benefiting ecosystems from mountains to coast.
Indicators: Nutrient fluxes, riparian/wetland continuity, connectivity, fish passage, downstream integrity.

DRIVERS: ROOT CAUSES OF ENVIRONMENTAL PRESSURES

Historic introduction of species and insufficient control
Invasive species spread through intentional and accidental introductions, worsened by gaps in control, poor coordination, and inconsistent funding.

Increasing population and rapid development
Population is projected to grow sharply, driving vegetation clearance, stormwater, wastewater, and declining lake health – but also offering opportunities for volunteers, champions, and regenerative enterprises.

Recreational and tourism activities
Tourism and recreation growth increase habitat loss, invasive species spread, wildlife disturbance, and wastewater loads – but high visitor numbers also create platforms for awareness and conservation.

Intensification of agriculture
Irrigation has enabled more intensive farming, increasing water use, native vegetation loss, and runoff. Strong farming communities and catchment groups are working to address impacts.

Changing climate
Rising temperatures, rainfall extremes, snow and glacier loss, and more droughts and wildfires intensify pressures, favour some invasive species, and stress native ecosystems.

Knowledge gaps
Lack of knowledge on deeplake budgets, invasive interactions, and predator spread, limits evidence-based management; opportunities exist for science, mātauraka, and community monitoring.

PRESSURES ON ENVIRONMENTAL VALUES AND OBJECTIVES TO REDUCE THEM

Introduced Predator Mammals – ***Very High***
Introduced predator mammals such as stoats, ferrets, weasels, rats, hedgehogs, possums, mice and feral cats cause major impacts on native birds, lizards, and invertebrates. Surges are linked to beech masts. Stray cats remain a predator source.
Objective: Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, hedgehogs, possums, mice, feral cats)

Freshwater Invasive Organisms – ***Very High***
Lakes and rivers are affected by lagarosiphon, elodea, didymo, lindavia, and daphnia. They are costly to control, usually cannot be eradicated, and may spread faster with climate change.
Objective: Reduce the risk of new freshwater invasive organisms establishing
Objective: Contain and remove lagarosiphon

Wilding Conifers – ***Very High***
Wilding conifers spread rapidly, displacing native ecosystems, altering landscapes, reducing biodiversity and water yield, and raising wildfire risks. Large-scale coordinated community control has shown some success so far.
Objective: Reduce wilding conifer seed sources, infestations and re-infestations

Terrestrial Weeds – ***High***
Weeds like gorse, broom, lupin, willow, sycamore, and others alter terrestrial vegetation, wetlands and riparian zones. Dense infestations in braidplains change flood dynamics. New tools like drones and AI improve management.
Objective: Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)

Environmental Conditions Unsuitable for Mahika Kai – ***High***
Mahika kai faces unsuitable conditions like dams, contamination, land conversion, and species decline, reducing abundance, cultural practice, and connection to place.
Objective: Improve environmental conditions for mahika kai and enable safe use.

Figure 8: Wilding conifers are a very high pressure, and can quickly take over native tussock and shrubs.

Clearing and Changing Native Vegetation and Wetlands – ***High***
Historic and ongoing clearance and earthworks continue to affect native vegetation and wetlands, with cumulative impacts often poorly documented.
Objective: Avoid clearing and change to native vegetation
Objective: Avoid clearing, draining or filling of wetlands

Introduced Herbivore Mammals – ***High***
Goats, pigs, deer, rabbits, hares, possums, chamois, and tahr browse and trample vegetation, uproot soils, and impact native plantings and productive land.
Objective: Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois, tahr)

Stormwater and Wastewater Discharges – ***High***
Urban growth adds sediment, nutrients, pathogens, heavy metals, and plastics into waterways. Wastewater and stormwater infrastructure struggles to keep up.
Objective: Reduce contaminants – sediments, nutrients, pathogens, microplastics – in stormwater
Objective: Avoid wastewater discharge to freshwater

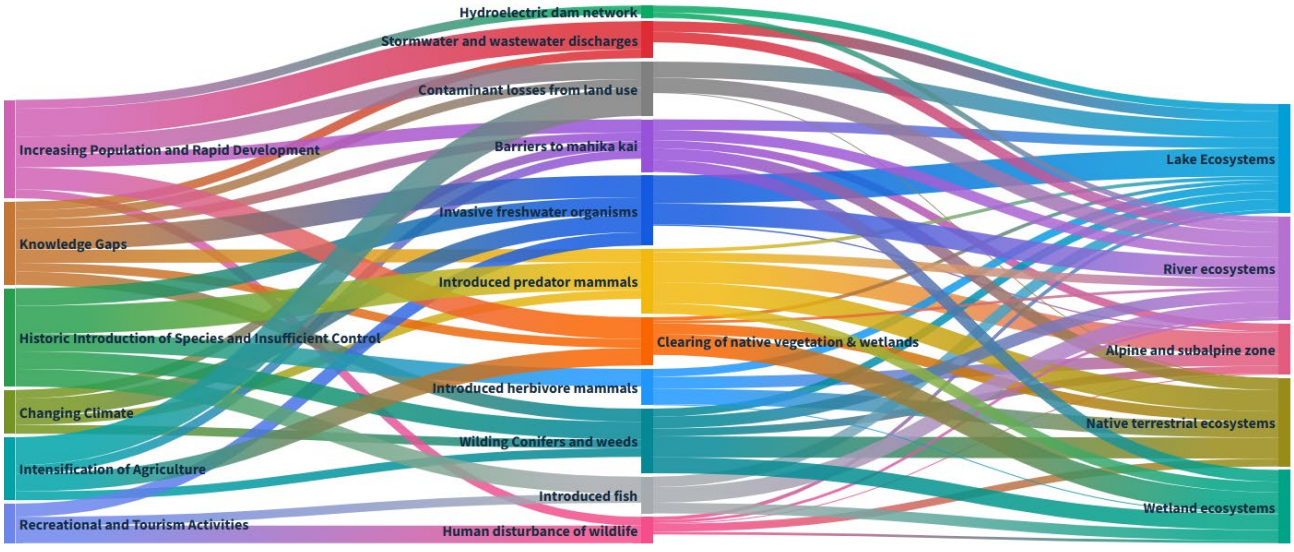
Contaminant Losses from Land Use – ***Medium***
Runoff and leaching from agriculture, rural land use and other diverse land uses, adds sediments, nutrients, pathogens, and agrichemicals to freshwater.
Objective: Reduce contaminants – sediments, nutrients, pathogens, agrichemicals – from land use entering freshwater

Microplastics – ***Medium***
Microplastics enter lakes, rivers, wetlands, soils, and food webs through stormwater, wastewater, and the breakdown of plastics.
Objective: Reduce contaminants – sediments, nutrients, pathogens, microplastics – in stormwater

Introduced Fish – ***Medium***
Trout, salmon, and perch impact smaller native fish such as galaxiids, koaro, and bullies, where they can interact. Fishing is culturally and recreationally important.
Objective: Reduce introduced fish interactions with non-migratory galaxiids

Hydroelectric Dam Network – ***Medium***
Dams on the Clutha system block tuna kuwharuwharu (longfin eel) and kanakana (lamprey) migrations, causing major declines. Small-scale manual tuna trap and transfers have shown promise.
Objective: Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration
Objective: Improve environmental conditions for mahika kai and enable safe use

Above: Block diagram of pressure analysis results. The Upper Lakes ICG assessed the impact of each pressure on environmental values in a matrix, rating them from low to very high. The analysis helps prioritise actions, but serves only as a guide - decisions also weigh what is feasible and what will deliver the greatest benefits across values.



Above: Sankey diagram showing the relationships between drivers, pressures, and environmental value categories. Mapping these linkages illustrates how a single driver can generate multiple pressures, and how each pressure can affect several values. An interactive version of this diagram is available on the Upper Lakes hub: upper-lakes-orcnz.hub.arcgis.com.

ACTION PLAN

We acknowledge that the development of these strategies must be grounded in meaningful partnership with mana whenua. A dedicated partnership plan (strategy 3) will be prepared to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish to.

Each strategy was assessed for impact on environmental values within the place the strategy would occur, and feasibility of the strategy including capability, affordability and alignment with current work by the community and agencies.

The actions presented here represent an initial plan only. They will be adapted as required, with a clear commitment to respond to changes in pressures, and with further mana whenua direction and guidance.

FOUNDATIONAL PROGRAMME

Strategies in the foundational programme support all other actions in the plan. They are long-term and ongoing approaches that should be initiated early in CAP delivery to ensure the sustained success of on-the-ground actions.

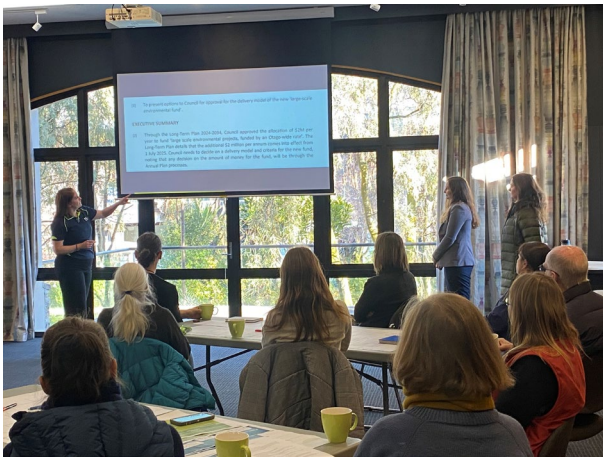
STRATEGY 1: DEVELOP A LONG-TERM AND DIVERSE FRAMEWORK THAT SUSTAINS FUNDING THAT WILL SUPPORT ACTIONS

Objective: Develop a long-term, sustainable, and diverse funding framework to deliver CAP strategies and support proactive, community-led restoration.
Key people: Upper Lakes Integrated Governance Group (to be formed), mana whenua, catchment and conservation groups supported by agencies.

Pressure(s) addressed: ★★☆☆ **Impact:** ★★☆☆ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Funding that recognises landscape-scale action is a long game:** Advocate for long-term funding that supports landscape-scale actions such as predator control and plantings.
b) **Investable restoration actions:** Measure economic value of restoration benefits and create investable projects for self-sustaining action.
c) **Cost-benefit-based early intervention:** Prioritise early interventions where cost-benefit shows effectiveness and reduced long-term costs.
d) **Help land holders fund action:** Provide funding tools like co-funding, loans, levies, and credit systems for landholder restoration.



Above: The Upper Lakes ICG held a group discussion in Wānka, that highlighted the need to work though sustainable funding options.

STRATEGY 2: INCREASE SCIENCE, RESEARCH AND KNOWLEDGE SHARING FOR THE COMMUNITY

Objective: Identify and bridge knowledge gaps, and provide accessible science to enable evidence-based management and support CAP strategies.
Key people: Deep Lakes Technical Advisory Group, mana whenua, Upper Lakes CAP Governance Group, Enviroschools, catchment and conservation groups, ORC, University of Otago, WAI Wānaka.

Pressure(s) addressed: ★★☆☆ **Impact:** ★★☆☆ **Feasibility:** ★★★☆

Initial action plan 3-5 years:

a) **Deep Lakes research programme:** Research deepwater lake trajectories, nutrient budgets, food webs and invasive species; apply the results to management of land use.
b) **Build on current community science opportunities:** Support community monitoring with coordination, robust methods, advice, and data storage.
c) **Develop an interactive CAP data system:** Create a digital mapping platform for real-time data and community observations.
d) **Establish a knowledge sharing network:** Build a collaborative network linking groups, mana whenua, scientists, and experts.

Above: ORC scientist sampling deepwater lakes for trace metals analysis.

STRATEGY 3: STRENGTHEN OUR MANA WHENUA PARTNERSHIP IN THE UPPER LAKES AREA

Objective: Continue to build partnerships between mana whenua, government, and conservation groups to uphold Kāi Tahu values and shared aspirations.
Key people: Mana whenua, Upper Lakes Integrated Governance Group (to be formed), Waiwhakaata Strategy Group, catchment groups, QLDC, ORC.

Pressure(s) addressed: ★★★☆ **Impact:** ★★☆☆ **Feasibility:** ★★★★

Initial action plan 3-5 years:

a) **Support development of meaningful mana whenua partnership engagements:** Develop a partnership plan that ensures genuine and meaningful korero (discussions) and mahi (work) that reflects partnership commitments and to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish.
b) **Reflect the Waiwhakaata Rautaki (strategy) in our work together:** Use the rautaki as a pathway to position the mauri (life force) and mana (prestige) of te taiao (the environment) and the catchments as the central priority for what we do in partnership.

STRATEGY 4: IMPROVE ENVIRONMENTAL CONDITIONS FOR MAHIKA KAI AND ENABLE SAFE USE

Objective: Strengthen understanding of mahika kai, improve conditions at sites, and increase species abundance.
Key people: Mana whenua, Upper Lakes Integrated Governance Group, Waiwhakaata Strategy Group, catchment groups, QLDC, ORC.

Pressure(s) addressed: ★★★☆ **Impact:** ★★☆☆ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Strengthen community education on mahika kai:** Strengthen community knowledge and awareness of mahika kai practices, along with increasing the broader understanding of what mahika kai is, and its importance in Kāi Tahu life and identity, as determined by mana whenua.
b) **Integrate mahika kai across actions:** Invest in mana whenua-led plans, designs and/or guidelines, to ensure mahika kai resources, habitats, and practices are appropriately built into large-scale restoration and enhancement projects

NATIVE WILDLIFE PROGRAMME

STRATEGY 5: CONTROL INTRODUCED PREDATOR MAMMALS

Objective: Reduce predator mammal populations to increase native wildlife, enhance mahika kai, and protect uncommon ecosystems.
Key people: Predator control groups, community trapping groups, catchment groups, Department of Conservation.

Pressure(s) addressed: ★★★★ **Impact:** ★★★☆ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Use advanced and innovative trapping and monitoring tools:** Expand use of smart traps, sensors, and real-time monitoring.
b) **Enhance current core-buffer-corridor control operations:** Intensify predator control in core areas, buffer zones, and wildlife corridors.
c) **Establish a predator elimination zone in 5–10 years:** Create a 10,000 ha predator elimination zone with aerial baiting and perimeter trapping.
d) **Expand community engagement and trapping in urban/semi-rural areas:** Grow backyard trapping groups and trap libraries with training and support.
e) **Support responsible companion cat ownership and policy interventions:** Promote responsible cat ownership through education and policy advocacy.
f) **Strengthen feral cat control:** Develop targeted feral cat control plans guided by monitoring data.

Above: Community trapping plays a vital role in building community engagement, and contributing to the wider operations.

STRATEGY 6: ASSIST TUNA KUWHARUWHARU (LONGFIN EEL) AND KANAKANA (LAMPREY) MIGRATION, IN PARTNERSHIP WITH MANA WHENUA

Objective: Support tuna (eel) and kanakana (lamprey) migration to enhance wildlife, mahika kai, freshwater ecosystems, and ki uta ki tai.
Key people: Mana whenua, Contact Energy, WAI Wānaka, catchment groups.

Pressure(s) addressed: ★★☆☆ **Impact:** ★★★☆ **Feasibility:** ★★★☆

Above: Tuna (longfin eel), a taoka species important for ecosystem health. They help maintain balance in freshwater systems and reflect the

Initial action plan 3-5 years:

a) **Mana whenua-led collaboration with key partners to increase tuna (eel) trap and transfer:** Strengthen partnerships to expand elver and adult tuna trap and transfer up and downstream of dams.
b) **Support mana whenua-led tuna research:** connect with and support mana whenua-led research on elver arrival, survival, and health of transferred tuna.
c) **Monitor tuna (eel) health in the deepwater lakes:** Develop a mana whenua-led monitoring plan with community involvement.
d) **Support a kanakana assisted passage programme:** Understand mātauraka of kanakana in the Upper Lakes CAP area and support mana whenua-led research that can lead to a trial of assisted passage.

STRATEGY 7: PROTECT AND ENHANCE GALAXIID HABITATS

Objective: Reduce interactions between introduced fish and galaxiids to boost native wildlife and freshwater ecosystem health.
Key people: Otago Fish and Game, catchment groups, mana whenua, DOC, ORC.

Pressure(s) addressed: ★★☆☆ **Impact:** ★★★★ **Feasibility:** ★★★★

Initial action plan 3-5 years:

a) **Determine galaxiid distribution with mātauraka (Kai Tahu knowledge) and eDNA:** Form a clearer picture of non-migratory galaxiid distribution, building on recent work using eDNA analysis, along with mātauraka.
b) **Provide on-site community and visitor education on galaxiids:** Install educational storyboard signage on galaxiids at tracks and rest stops.
c) **Undertake galaxiid habitat restoration:** Improve habitats with barriers, trout removal, culvert fixes, and planting.

Above: many of the non-migratory galaxiids are endemics found only in particular regions, including Otago.

STRATEGY 8: CONTROL WILDING CONIFERS (PINES AND FIRS) AND TERRESTRIAL WEEDS

Objective: Reduce wilding conifers and terrestrial weeds to improve vegetation, expand natives, and protect ecosystems.
Key people: Wilding conifer groups, catchment groups, national programmes, QLDC, DOC, MPI, LINZ, ORC.

Pressure(s) addressed: ★★★★ **Impact:** ★★★★ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Build community weeds knowledge:** Expand education on pest plant identification, impacts of weeds, and effective control methods. Bring our community along with us, for coordinated control work.
b) **Maintain a wilding conifer spread map:** Update and maintain data on the spread of wilding conifers and develop a dynamic digital heatmap identifying seed sources and dispersal hotspots.
c) **Replace conifer seed sources with native plants or non-spreading exotics:** Promote the phased removal of conifer shelterbelts, woodlots, and visual screening plantings that pose a risk of wilding spread. Replace with natives or non-spreading exotics.
d) **Support and enable collaborative weed control:** Share crews, resources, and expertise across groups for effective control. Coordinate control work across landholders for collective impact.

Above: Wilding conifers on slopes around Whakatipu Waimāori (Lake Wakatipu). These invasive trees spread rapidly, threatening native ecosystems and altering the iconic landscape.
Photo credit: Whakatipu Wilding Conifer Control Group.

e) **Address emerging weed pressures:** Proactively manage fast-spreading weeds recognising the cost-benefit of early intervention to stop spread.
f) **Control weeds in braided rivers:** Manage weeds that alter river dynamics and nesting habitats.
g) **"Right plant, right place" and targeted control approach:** Focus weed control efforts based on risk to native ecosystems, functioning of waterways, mahika kai and catchment landscapes. Apply control methods carefully using precision techniques.

STRATEGY 9: PROTECT, RESTORE AND ENHANCE NATIVE VEGETATION

Objective: Protect existing native vegetation, expand planting, and reduce browsing by introduced herbivores.
Key people: Planting groups, nurseries, catchment groups, mana whenua, DOC, QLDC, ORC.

Pressure(s) addressed: ★★★☆ **Impact:** ★★☆☆ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Ensure our native plantings are adequately maintained:** Fund maintenance for at least 3 years to ensure survival and growth. Ensure projects are not "plant and walk away".
b) **Support community nurseries:** Strengthen native seedling nurseries for propagation, non-restrictive eco-sourcing, and climate resilience.
c) **Improve public access to eco-sourced native plants:** Promote and improve public access to diverse, non-restrictive eco-sourced native plant seedlings for residential use
d) **Develop a spatial native vegetation restoration plan:** Model where planting, regeneration, and protection should occur for long-term ecological connectivity, climate resilience.
e) **Incentivise retirement of marginal land and protection of habitats:** Provide incentives to retire land and covenant sensitive habitats.

Above: Native planting by Lake Wānaka, where community members can support restoration by watering plants with equipment provided on site.

f) **Coordinate goat and pig control:** Facilitate coordinated control between landholders and across boundaries to reduce browsing.
g) **Increase rabbit and hare control:** Fund rabbit-proof fencing, rabbit guards for seedlings, and coordinated control efforts.

Above: Community planting on the shore of Lake Hāwea, showcasing the great work volunteers are doing to restore and care for the lakeshore environment.

STRATEGY 10: PROTECT, RESTORE AND ENHANCE WETLANDS

Objective: Protect and restore wetlands to increase extent, function, biodiversity, and downstream water quality.
Key people: Catchment groups, nurseries, planting groups, mana whenua, QLDC, ORC.

Pressure(s) addressed: ★★★☆ **Impact:** ★★★★ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Build community wetland knowledge:** Build community knowledge and awareness of wetland values - nutrient cycling, flow regulation, native biodiversity, and mahika kai.
b) **Share wetland restoration guidance:** Provide best practice guidance on wetland restoration and mana whenua-led guidance on wetland mahika kai enhancement.
c) **Provide a start-to-finish support package for wetland restoration:** Provide a package of start-to-finish support including access to experts, planting design, coordination of on-the-groundwork and on-going maintenance support.
d) **Control willows in wetlands:** Enable phased willow removal with streamlined consents and experienced operators.

Above: Butterfield Wetland. Wetlands are biodiversity hotspots, important for mahika kai, and play a vital role in filtering water and cycling nutrients.

STRATEGY 11: REDUCE CONTAMINANTS FROM STORMWATER AND WASTEWATER

Objective: Reduce stormwater and wastewater contaminants to improve water quality, freshwater ecosystems, and mahika kai.
Key people: QLDC, WAI Wānaka, Enviroschools, ORC, Guardians of Lake Wānaka, Guardians of Lake Hāwea, developers.

Pressure(s) addressed: ★★★☆ **Impact:** ★★☆☆ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Build community stormwater awareness:** increase delivery of community education programmes such as "our drains are streams", "adopt a drain", and rain garden workshops.
b) **Enable property level water-sensitive solutions:** Enable residential/commercial property-level water sensitive solutions - rain tanks, greywater systems, rain gardens, and permeable surfaces.
c) **Encourage best practice stormwater design:** Partner with residential and commercial developers to celebrate best practice stormwater design, and examples of water sensitive urban design
d) **Investigate stormwater contamination sources:** Understand sources of stormwater contamination to deepwater lakes though a scientific study
e) **Advocate for wastewater discharge to land:** Promote best practice land disposal and oppose wastewater discharges to water.

Above: Stormwater drain in Wānaka. Local community members have been "adopting drains," helping to keep them free of litter and pollutants to protect the waterbodies that stormwater is discharged to, such as Lake Wānaka.

STRATEGY 12: REDUCE CONTAMINANT LOSSES FROM LAND USE

Objective: Reduce sediments, nutrients, pathogens, and agrichemicals from land use entering freshwater.
Key people: Catchment groups, ORC catchments team.

Pressure(s) addressed: ★★☆☆ **Impact:** ★★★☆ **Feasibility:** ★★☆☆

Initial action plan 3-5 years:

a) **Provide a start-to-finish support package for contaminant management:** Enable fencing, planting out gullies, buffer strips, sediment traps, wetlands and riparian planting – Provide start-to-finish support including access to experts, design, easy consenting.
b) **Develop a co-funding programme for contaminant management:** Help landholders co-fund runoff and sediment measures across diverse land uses.
c) **Support contaminant management with advice, data and modelling tools:** Encourage on-the-ground observations during heavy rain events and provide follow-up advice for mitigation, with an "education over regulation" approach.

STRATEGY 13: REINFORCE FRESHWATER BIOSECURITY IN DEEPWATER LAKES

Objective: Reduce risk of new invasives and contain/remove lagarosiphon to protect ecosystems and mahika kai.
Key people: LINZ, MPI, Fish and Game, ORC.

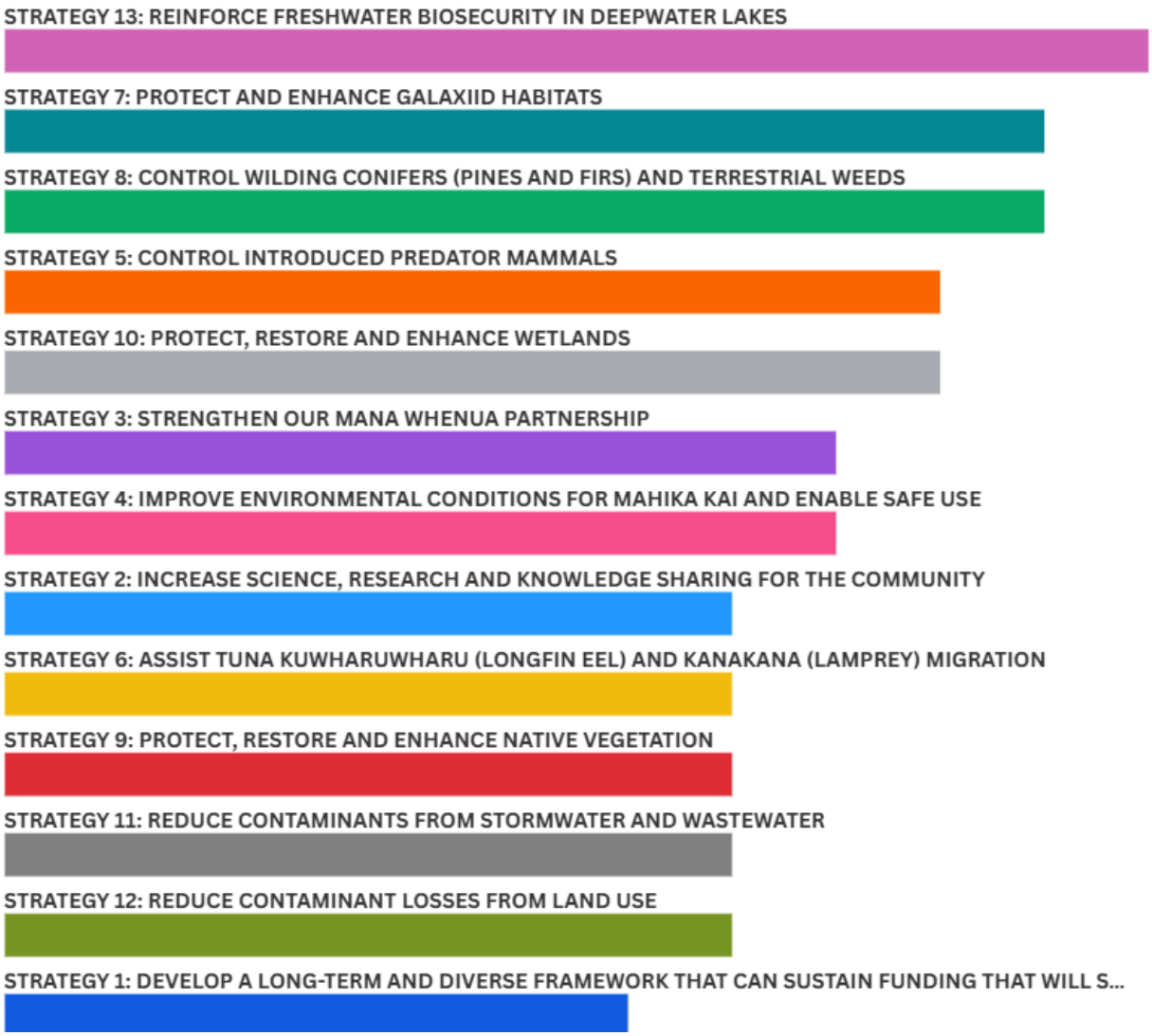
Pressure(s) addressed: ★★★★ **Impact:** ★★★☆ **Feasibility:** ★★★★

Initial action plan 3-5 years:

a) **Build community awareness of invasive freshwater organisms:** Increase signage, leaflets and community events focusing on best practice check, clean and dry practices.
b) **Build check, clean, dry capacity with the tourism and visitor industry:** Work with tourism operators and visitor-based businesses to provide visitors with access to cleaning equipment, and train key tourism staff to share 'Check, Clean, Dry' knowledge.
c) **Continue work to contain and remove lagarosiphon:** Contain and remove lagarosiphon from Whakatipu Waimāori and northern Lake Wānaka. Continue progressive containment and sustained control action in southern Lake Wanaka and upper Kawarau River
d) **Increase lagarosiphon surveillance and infestation prevention**: Ensure detection and delimitation of lagarosiphon infestation with divers and cameras, as a key management step. Provide cleaning facilities for vessels entering deepwater lakes

Above: ORC Environmental Monitoring Technician showing lagarosiphon, an invasive lake weed that forms dense growths, displacing native plants and impacting

Below: Chart showing strategy ratings, calculated from the size of the pressure reduced, the impact of the actions, and their feasibility (including affordability, capability, and whether community or agency work is already underway in the CAP area). The ratings provide guidance for prioritisation but do not determine decisions, as all strategies must work together in an integrated way.



CARRYING THE PLAN FORWARD

DELIVERY AND GOVERNANCE

An Upper Lakes CAP Governance Group will be established, made up of core members (including mana whenua) with decision-making power. A wider circle of collaborators will be invited to participate as the work progresses. Clear terms of reference will guide the governance group, and participation is expected to evolve over time.

Delivery of actions will not rest with governance alone but with conservation and catchment groups, mana whenua, agencies (including ORC), landholders, and industry partners who will lead projects on the ground. These partners bring the local knowledge, capacity, and commitment needed to turn strategies into real outcomes for the Upper Lakes.

Practical support will come from ORC work programmes and CAP delivery coordination, ensuring alignment with regional priorities and technical expertise. To resource delivery, the governance group will actively seek contestable funds, agency budgets and other funding sources, while also recognising the significant value of volunteer time, community effort, and in-kind contributions. This shared responsibility and resourcing model reflects the collective impact approach at the heart of the CAP, where success depends on many hands working together.

KICKING THINGS OFF

Grounding strategies in early, tangible projects is critical for turning vision into momentum. Visible implementation delivers environmental benefits, builds trust and confidence, and ensures the plan stays a living action plan by translating 13 strategies into practical first steps for collaboration.

CAP strategies are most effective when combined into multi-faceted projects. Community-led initiatives already underway could integrate several strategies, and the CAP Governance Group may identify three or four projects to put forward for contestable funding in 2026.

The Upper Lakes ICG has suggested Te Tapunui Queenstown Hill (wilding fir removal, native planting, goat control, stream restoration, predator control) as a project that already has a plan in place but still requires funding, and it aligns with several strategies. Other options that could build on community action include Bullock Creek and Horne Creek (riparian planting, wetland and stormwater improvements), Hāwea Foreshore (planting, wetland, predator control), the Puahere/Rees and Te Awa Whakatipu/Dart braided rivers (weed and predator control, and links to natural hazards), and Makarore/Makarora (weed and predator control from forest to alpine).

Many actions within the 13 strategies can serve as early “first steps” or long-term priorities. The Governance Group, working with mana whenua, local groups, and ORC support, may choose to kick-start actions that enable further progress. Some examples include:

- Developing an Upper Lakes CAP partnership plan.
- Update data on the spread of wilding conifers and identification of seed sources.
- Undertake a pilot project to showcase property level water-sensitive solutions (e.g. rain gardens) and collaborate with developers to celebrate at least one example of best practice stormwater design.
- Improve public access to eco-sourced plants and increase capability for planting maintenance.

- Develop a spatial native vegetation restoration plan, in collaboration with community planting groups.
- Build check, clean, dry capacity with the tourism and visitor industry.
- Advocate for policy interventions that promote responsible cat ownership.
- Connect with mana whenua-led tuna kuwharuwharu (longfin eel) and kanakana (lamprey) research.
- Support catchment groups with facilitation of collaborative weed control and mechanisms to share resources.

MONITORING PLAN

Monitoring will track delivery of actions, measure progress towards objectives, and test assumptions to ensure the CAP remains effective and adaptive. A framework of indicators will guide assessment of pressures, environmental health, and cultural values (appendix 1-4). Progress will be tracked using existing monitoring programmes (ORC monitoring, local and national agency monitoring and open sources data) and community science.

COMMUNICATIONS

The CAP will be shared widely to maintain transparency and collective ownership. Communication will use tools such as an interactive ArcGIS Hub, printed and digital summaries, community events, and local displays, supported by ongoing engagement with mana whenua, landholders, groups, and the wider community.

ADAPTIVE MANAGEMENT AND REVIEW

The CAP will be managed adaptively, with an 18-month health check and a five-year evaluation to assess progress, address pressures, and adjust actions. While the vision remains constant, strategies and priorities will evolve as new knowledge, collaborators, and resources emerge.

APPENDIX 1: DRAFT ACTION MONITORING FRAMEWORK

Strategy	Monitoring Indicators
1. Long-term funding framework	Amount of secured funding ($), number of funding sources, proportion of projects co-funded
2. Science, research, knowledge sharing	Number of research projects completed, number of community science participants, data platform use (uploads/visits)
3. Mana whenua partnership	Number of hui/workshops held, number of projects with mana whenua leadership, integration of Waiwhakaata Rautaki
4. Mahika kai conditions & safe use	Number of mahika kai sites restored, species abundance (e.g. tuna), number of community education events
5. Predator control	Remaining population of predator mammals (trapping indices, camera counts), area under active predator control (ha)
6. Tuna migration & research outcomes	Number of tuna transferred, elver transfer success rate, research outcomes on elver growth, survival, and health
7. Galaxiid habitats	Number of habitats restored (km/ha), galaxiid abundance (eDNA, monitoring counts), number of barriers installed/modified
8. Wilding conifers & terrestrial weeds	Area of conifers/weed controlled (ha), area replanted (ha), conifer seed source removal (shelterbelts replaced)
9. Native vegetation	Number of plants planted, survival rate (%), area of protected native vegetation (ha), area retired from grazing
10. Wetlands	Area of wetlands restored or created (ha), number of wetland sites under protection, willow control area (ha)
11. Stormwater & wastewater	Number of stormwater treatment devices installed, number of properties with water-sensitive solutions, water quality indicators (nutrients, pathogens, microplastics)
12. Land use contaminants	Area of land under contaminant management (ha), number of landholders supported, sediment/nutrient reductions (kg/yr)
13. Freshwater biosecurity	Number of Check, Clean, Dry stations, number of visitors reached through awareness, area of lagarosiphon controlled (ha), detections of invasive species

APPENDIX 2: DRAFT PRESSURE REDUCTION MONITORING FRAMEWORK

Pressure reduction objectives	Attribute	Indicator(s)
Reduce introduced predator mammal populations (stoats, ferrets, weasels, rats, hedgehogs, possums, mice and feral cats)	Remaining predator abundance	Catch per unit effort, tracking (camera traps, tracking tunnels, scat surveys)
Reduce the risk of new freshwater invasive organisms establishing	Organism detection	eDNA, biosecurity inspections
Contain and remove lagarosiphon	Infestation coverage	Size of eradication zone, containment zone and control zone, detections of lagarosiphon
Reduce wilding conifer seed sources, infestations and re-infestations	Extent and density of infestation	Infestation coverage and density mapping, remote sensing, time until follow-up control effort required
Reduce terrestrial weeds (gorse, broom, willows, sycamores, lupins, yellow flag iris, buddleia, cotoneaster)	Extent and density of infestation	Mapped area infested, weed density score, time until follow-up control effort required
Improve environmental conditions for mahika kai and enable safe use	Mahika kai health & accessibility	Presence, abundance, diversity, and safety
Avoid clearing and change to native vegetation	Covenants and protection	Area covenanted (ha)
Avoid clearing, draining or filling of wetlands	Size of wetlands	Wetland coverage (ha)
Reduce introduced herbivore populations (goats, pigs, rabbits, hares, possums, deer, chamois and tahr)	Remaining herbivore population size	Fecal pallet counts, night spotlight counts, camera traps, rebound rate, aerial surveys
Reduce introduced fish interactions with non-migratory galaxiids	Number of trout in stream, abundance of galaxiids	Fish surveys
Reduce contaminants - sediments, nutrients, pathogens, microplastics - in stormwater	Stormwater quality	Discharge and receiving water sample analysis
Avoid wastewater discharge to freshwater	Number of discharges and quality	Discharge and receiving water sample analysis
Reduce contaminants - sediments, nutrients, pathogens, agrichemicals – from land use entering freshwater	Number of landholder actions	Count and size (fencing, planting out gullies, buffer strips, sediment traps, wetlands and riparian planting)
Assist tuna kuwharuwharu (longfin eel) migration and kanakana (lamprey) migration	Elver transfer volume, adult tuna transfer count, kanakana detections	Kg of elvers per year, number adults transferred, eDNA

APPENDIX 3: DRAFT KEY ATTRIBUTE-BASED ENVIRONMENTAL HEALTH MONITORING FRAMEWORK

Environmental health goal	Key Attribute	Indicator
Increase the abundance of native wildlife	Native wildlife	Species threat status, population statistics, observations, birdsong level, 5-minute bird count
Maintain or improve water quality	Water quality (lakes, rivers, groundwater)	Lake trophic level index, national objective framework band, water quality parameter trends
Improve freshwater ecosystem function	Freshwater ecosystem function	Aquatic life and ecosystem processes
Improve the abundance and accessibility of mahika kai	Mahika kai health & accessibility	Presence, abundance, diversity, and safety
Increase overall native vegetation coverage and improve condition	Native vegetation coverage and condition (beech, shrub, tussock, riparian, submerged, wetland)	Coverage (ha) per type, vegetation type succession observations, threatened plant presence, canopy cover, biomass, submerged plant index
Maintain or improve overall wetland coverage and function	Wetland coverage and function	Wetland coverage (ha), wetland hydrology
Maintain or improve naturally uncommon ecosystem functions	Naturally uncommon ecosystem functions	Naturally uncommon ecosystem number and coverage (ha), threatened species presence, ecological integrity
Strengthen ki uta ki tai (interconnectedness)	Interconnectedness	Nutrient fluxes, riparian and wetland continuity, habitat connectivity, fish passage. Water quality and ecosystem integrity connecting to other CAPs downstream
	Water quantity	River flow, lake level, depth to groundwater
	Soil health	Structure, nutrients and soil life

APPENDIX 4: DRAFT COMMUNITY AND CULTURAL VALUE MONITORING FRAMEWORK

Community and cultural value	**Attribute**	**Indicator**
Waimāori (fresh water)	Drinking water	Boil water notices
	Recreational swimming water	E. coli long term grade
Mahika kai	Mahika kai health & accessibility	Presence, abundance, diversity, and safety
Health and wellbeing	Overall quality of life	Percent rate their quality of life as good or extremely good (QLDC)
	Physical and mental health	Percent rate their physical health as excellent or mostly good
		Percent rate their mental health as excellent or mostly good (QLDC)
Rest, replenishment and learning	Mental health	Percent rate their mental health as excellent or mostly good (QLDC)
Local economy	Jobs and income	Percent have some or a sufficient level of disposable income (QLDC)
Sustainable agriculture	Environmental certifications	Number of farms with environmental certifications
Visitors and tourism	Sustainable tourism experiences	Number of available sustainable tourism experiences in region
Recreation	Neighborhood participation	Percent participate in activities in neighborhood (QLDC)
	Sustainable tourism experiences	Number of available sustainable tourism experiences in region
	Recreational swimming water	E. coli long term grade
Taoka species	Ecosystem integrity	Indigenous biodiversity and habitat extent
Outstanding landscapes	Outstanding natural landscapes and features	Data being sought (QLDC)
Ki uta ki tai (interconnectedness)	Health of Mata Au / Clutha River	Water quality and ecosystem integrity connecting to other CAPs downstream

Above: View across the Cardrona Valley.

Upper Lakes 2025-2035 Catchment Action Plan

The Upper Lakes Catchment Action Plan (CAP) serves as a focus for environmental and natural resource management in the Queenstown Lakes district — including the catchments of lakes Whakatipu Waimāori, Wānaka, Hāwea and Waiwhakaata.

It is a long-term plan that builds on the work that mana whenua, communities and local government are already doing to protect and manage their place and serves as a focus for new actions and projects.

The hapū who hold mana whenua status in the Upper Lakes CAP area are affiliated with seven papatipu rūnaka across Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku. As te Tiriti o Waitangi (treaty) partners, they exercise rakatirataka (authority) in relation to the management of te taiao (the natural environment).

Cultural and community values

- Wai māori (fresh water)
- Mahika kai (traditional food resources)
- Health and wellbeing
- Rest, replenishment and learning
- Local economy
- Sustainable agriculture
- Visitors and tourism
- Recreation
- Taoka (treasured, native) species
- Outstanding landscapes
- Ki uta ki tai (interconnectedness)

Natural and managed environmental values

- Alpine
- Native forest, shrub and tussock
- Lakes
- Rivers
- Wetlands
- Productive land
- Urban spaces

Our mission affirms a shared commitment

"The Upper Lakes, with its soaring mountains and deep glacial lakes, is where manaaki whenua (caring for the land and waters) and manaaki takata (caring for the people) are inherent in all we do.

We are committed to protecting and improving the unique native biodiversity in our place, while aiming to inspire and empower future generations to further protect and enhance the area's special values."

Our vision sets a path for the future

"It's 2075 in the Upper Lakes. Takahē cross paths with hikers, bird colonies nest undisturbed on braided river gravels, and pekapeka tou-roa / long-tailed bat glide through ancient beech canopies.

Behind them, wetlands and bush weave through sustainable, thriving farms renowned for their food and fibre, while towns are cooled and connected by streams, wetlands, and green space.

Mana whenua connection to place and taoka (cultural treasures) is flourishing, mātauraka (knowledge) is strong and rakatirataka (authority) evident."

See our full vision story at **orc.govt.nz/upper-lakes**

Our story

The Upper Lakes Integrated Catchment Group (ICG) was established in 2024 to co-develop this CAP.

The ICG brings together mana whenua, community representatives from catchment and conservation groups, and staff from agencies including Queenstown-Lakes District Council, Department of Conservation, Land Information New Zealand, and Otago Regional Council — each offering knowledge, passion, and perspective.

Over 12 months, we held two hui, six workshops, and a site visit — more than 880 hours of shared commitment. Alternating hui between Wānaka and Tāhuna / Queenstown, we bridged rural and urban communities and built connections across the region.

Through listening and collaboration, we found common purpose. What began as separate contributions has become a collective plan to protect and enhance fresh water and biodiversity.

Today, many of us proudly mention our Upper Lakes ICG membership when we introduce ourselves — a testament to the strength of working together for the health of our place and people.

Our group and ORC team members gather in May 2025

Environmental health goals for 2035 relative to 2025 baseline –

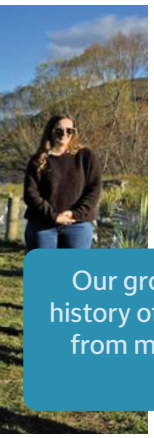
what we need to achieve

- Increase the abundance of native wildlife
- Maintain or improve water quality
- Improve freshwater ecosystem function
- Improve environmental conditions for mahika kai and enable safe use
- Increase overall native vegetation coverage and improve condition
- Improve overall wetland coverage and function
- Maintain or improve naturally uncommon ecosystem (NUE) functions
- Strengthen ki uta ki tai (interconnectedness)

Pressure reduction objectives –

what we need to get on top of

- Reduce introduced predator mammal populations
- Reduce the risk of new freshwater invasive organisms establishing
- Contain and remove lagarosiphon
- Reduce wilding conifer seed sources, infestations, and reinfestations
- Reduce terrestrial weeds
- Improve environmental conditions for mahika kai and enable safe use
- Avoid clearing and changing native vegetation
- Avoid clearing, draining, or filling of wetlands
- Reduce introduced herbivore populations
- Reduce contaminants in stormwater
- Avoid wastewater discharge to fresh water
- Reduce contaminants from land use entering fresh water
- Reduce introduced fish interactions with non-migratory galaxiids
- Assist tuna kūwharuwharu (longfin eel) migration and kanakana (lamprey) migration
- Reduce knowledge gaps



Our group hears about the cultural history of Wai-whakaata-o-Hākitekura from mana whenua representative Darren Rewi.

Our group brainstorms actions towards the goals

Our group takes in one of our workshop tasks in Wānaka

We will focus work to enhance the Upper Lakes area through **13 strategies**

Foundational Action Programme

Strategy one

Develop a long-term and diverse framework that sustains funding that will support actions

Objective: Develop a long-term, sustainable, and diverse funding framework to deliver CAP strategies and support proactive, community-led restoration.

Initial action plan, 3–5 years:

- Advocate for funding that recognises landscape-scale action is a long game
- Create investable projects for self-sustaining action
- Cost–benefit-based early intervention to reduce long-term costs
- Provide funding tools such as co-funding and credit systems for landholder restoration
- Create incentives and co-funding programmes to encourage landholder participation in restoration actions

Strategy two

Increase science, research and knowledge sharing for the community

Objective: Identify and bridge knowledge gaps, and provide accessible science to enable evidence-based management and support CAP strategies.

Initial action plan, 3–5 years:

- Undertake research on deep lakes and apply the results to management of land use
- Support community monitoring with coordination and robust methods
- Develop an interactive CAP data system
- Establish a knowledge-sharing network

Strategy three

Strengthen our mana whenua partnership in the Upper Lakes area

Objective: Continue to build partnerships between mana whenua, government, and conservation groups to uphold Kāi Tahu values and shared aspirations.

Initial action plan, 3–5 years:

- Develop a partnership plan that ensures genuine and meaningful kōrero (discussions) and mahi (work) that reflects partnership commitments and to ensure mana whenua are appropriately resourced and enabled to participate to the extent they wish
- Position the mauri (life force) and mana (prestige) of te taiao (the environment) and the catchments as the central priority for what we do in partnership

Strategy four

Improve environmental conditions for mahika kai and enable safe use

Objective: Strengthen understanding of mahika kai, improve conditions at sites, and increase species abundance.

Initial action plan, 3–5 years:

- Strengthen community knowledge and awareness of mahika kai practices and their importance in Kāi Tahu life and identity
- Ensure mahika kai resources, habitats, and practices are appropriately built into large-scale restoration projects

Native wildlife programme

Strategy five

Control introduced predator mammals

Objective: Reduce predator mammal populations to increase native wildlife, enhance mahika kai, and protect uncommon ecosystems.

Initial action plan, 3–5 years:

- Use advanced and innovative trapping and monitoring tools
- Intensify predator control in core areas, buffer zones, and wildlife corridors
- Establish a 10,000-ha predator elimination zone in 5–10 years
- Expand community engagement and trapping in urban/semi-rural areas
- Support responsible companion cat ownership and policy interventions
- Develop targeted feral cat control plans

Strategy six

Assist tuna kūwharuwharu (longfin eel) and kanakana (lamprey) migration, in partnership with mana whenua

Objective: Support tuna (eel) and kanakana (lamprey) migration to enhance wildlife, mahika kai, freshwater ecosystems, and ki uta ki tai.

Initial action plan, 3–5 years:

- Mana whenua-led collaboration with key partners to increase tuna trap and transfer.
- Support mana whenua-led tuna research
- Monitor tuna (eel) health in the deepwater lakes
- Support mana whenua-led research that can lead to a trial of assisted kanakana passage

Native vegetation programme

Strategy seven

Protect and enhance galaxiid habitats

Objective: Reduce interactions between introduced fish and galaxiids to boost native wildlife and freshwater ecosystem health.

Initial action plan, 3–5 years:

- Form a clearer picture of non-migratory galaxiid distribution using eDNA analysis and mātauraka (Kāi Tahu knowledge)
- Install educational storyboard signage about galaxiids
- Improve galaxiid habitats with barriers, trout removal, culvert fixes, and planting

Strategy eight

Control wilding conifers (pines and firs) and terrestrial weeds

Objective: Reduce wilding conifers and terrestrial weeds to improve vegetation, expand natives, and protect ecosystems.

Initial action plan, 3–5 years:

- Expand education on pest plant identification, impacts of weeds, and effective control methods
- Update and maintain data on the spread of wilding conifers
- Replace conifer seed sources with native plants or non-spreading exotics
- Support collaborative weed control — share crews, resources, and expertise across groups
- Proactively manage fast-spreading weeds
- Control weeds in braided rivers
- 'Right plant, right place' and targeted control approach

Strategy nine

Protect, restore and enhance native vegetation

Objective: Protect existing native vegetation, expand planting, and reduce browsing by introduced herbivores.

Initial action plan, 3–5 years:

- Fund planting maintenance to ensure survival and growth
- Support community nurseries
- Improve public access to eco-sourced native plants
- Develop a spatial native-vegetation restoration plan
- Provide incentives to retire land and covenant sensitive habitats
- Facilitate coordinated goat and pig control between landholders and across boundaries
- Fund rabbit-proof fencing, rabbit guards for seedlings, and coordinated control efforts

Freshwater programme

Strategy ten

Protect, restore and enhance wetlands

Objective: Protect and restore wetlands to increase extent, function, biodiversity, and downstream water quality.

Initial action plan, 3–5 years:

- Build community knowledge and awareness of wetland values
- Provide best practice guidance on wetland restoration and mana whenua-led guidance on wetland mahika kai enhancement
- Provide a start-to-finish support package for wetland restoration
- Enable phased willow removal with streamlined consents and experienced operators

Strategy twelve

Reduce contaminant losses from land use

Objective: Reduce sediments, nutrients, pathogens, and agrichemicals from land use entering fresh water.

Initial action plan, 3–5 years:

- Provide a start-to-finish support package for contaminant management — fencing, planting out gullies, buffer strips, sediment traps, wetlands and riparian planting
- Help landholders co-fund runoff and sediment measures across diverse land uses
- Encourage on-the-ground observations during heavy rain events and provide follow-up advice for mitigation, with an 'education over regulation' approach

Strategy thirteen

Reinforce freshwater biosecurity in deepwater lakes

Objective: Reduce risk of new invasives and contain/remove lagarosiphon to protect ecosystems and mahika kai.

Initial action plan, 3–5 years:

- Build community awareness of invasive freshwater organisms
- Work with tourism operators and visitor-based businesses to train key staff to share 'Check, Clean, Dry' knowledge
- Continue work to contain and remove lagarosiphon
- Detect and map lagarosiphon with divers and cameras and provide cleaning facilities for vessels entering deepwater lakes

Strategy eleven

Reduce contaminants from stormwater and wastewater

Objective: Reduce stormwater and wastewater contaminants to improve water quality, freshwater ecosystems, and mahika kai.

Initial action plan, 3–5 years:

- Increase delivery of community education programmes such as 'Our Drains are Streams', 'Adopt a Drain', and rain garden workshops
- Enable residential/commercial property-level water sensitive solutions — rain tanks, greywater systems, rain gardens, and permeable surfaces
- Encourage best practice stormwater design
- Understand sources of stormwater contamination to deepwater lakes through a scientific study
- Promote best practice land disposal and oppose wastewater discharges to water

Bringing the **plan to life**

This CAP is designed to be a living plan — one that moves from vision to action on the ground.

A new Upper Lakes CAP Governance Group, including mana whenua and key partners, will guide decisions, while a wider circle of collaborators ensures diverse voices stay involved.

Early projects will 'kick things off' and delivery rests with many hands. Conservation and catchment groups, mana whenua, agencies, landholders, and industry partners will lead projects, supported by ORC coordination, technical expertise, and shared resourcing.

Progress will be tracked through existing monitoring programmes, guided by science, mātauraka Māori (Māori knowledge), and community knowledge.

Transparent communication and regular reviews (18 months and five years) will keep the plan adaptive, ensuring it grows and evolves with new challenges and opportunities.

Want to get **involved?** Here's how!

- Visit our Upper Lakes CAP hub at **orc.govt.nz/upper-lakes** to stay up to date
- Use the iNaturalist app to snap photos and log locations of native species. We will synch the data to our maps to help guide our actions at **inaturalist.nz**
- Join your local trapping group and help trap predators to boost our native bird populations — find them on **trap.nz**
- See a pest? Report it online using our form at **orc.govt.nz/reportpests**
- Pollution in our waterways, air, or land? Call the ORC Pollution Hotline on **0800 800 033**
- Heading out on the lake or river? **Check, clean and dry** your gear to stop the spread of freshwater aquatic pests
- Adopt a drain and stop rubbish from reaching our lakes — find info at **waiwanaka.nz/adopt-a-drain**
- Pitch in a helping hand tackling wilding conifers — find volunteer events at **whakatipuwilding.co.nz** and **uppercluthawildingtreegroup.co.nz**
- Volunteer at a planting day or help a community nursery to restore our beautiful native vegetation — find events at **loveqt.co.nz** or **lovewanaka.co.nz**
- Learn about water quality and find the latest data at **lawa.org.nz**

For further **information**

Email our team with any questions: **icm@orc.govt.nz**

To download the summary or full plan, visit

orc.govt.nz/upper-lakes