THE CATLINS CATCHMENT ACTION PLAN

“Deeply connected and involved local communities thrive alongside sustainable resource use within the enhanced natural ecosystems that set the Catlins apart.”

Catlins Integrated Catchment Group

November 2024

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PROJECT PURPOSE

RATIONALE

Otago Regional Council's (ORC) Integrated Catchment Management (ICM) programme arose from the adoption of the Long-term Plan 2021-31 in June 2021 which tasked the ORC to "*Lead the development, implementation, and review of integrated Catchment Plans (ICP) in collaboration with iwi and community*." A Catchment Action Plan (CAP) is a plan for the management and conservation of an entire catchment or catchments. It is a long-term plan that builds on the work that iwi, communities and local government are already doing to protect and manage their place and serves as a focus for new actions and projects. The CAPs are not prescribed by regulation, nor are they making any rules.

The Catlins area of Otago was chosen as the first pilot area for the region, and the Catlins Integrated Catchment Group (CICG) was established in October 2023 to co-develop a CAP for the area. The planning process is based on the Open Standards for the Practice of Conservation (Open Standards) and guided by the corresponding planning software, Miradi. The Open Standards process provides an evidence-based planning framework that helps achieve lasting impacts. The aim of the CAP is to collaboratively produce a plan that can serve as a focus for environmental and natural resource management in the Catlins.

SCOPE

The Catlins area for the CAP[1] comprises an area in the south-eastern corner of the South Island of New Zealand. The area lies between Balclutha and Invercargill, straddling the boundary between the Otago and Southland regions. The Catlins CAP area is bounded to the north by the Koau Branch of the Clutha/Mata-au River and to the south by Waiparu head (on the Otago Southland boundary at Wallace beach). Inland the northern boundary extends to the source reaches of the Puerua, Ōwaka, Catlins and Tahakopa rivers, the marine boundary extends to the twelve nautical mile territorial sea limit (Figure 1).

The temporal scope of the CAP is from 2024 - 2034.

VISION

The CICG's long-term vision for the Catlins is:

"Deeply connected and involved local communities thrive alongside sustainable resource use within the enhanced natural ecosystems that set the Catlins apart."

[1] Where this Plan refers to "the Catlins" it refers to the Catlins area of Otago as shown in Figure 1.

Figure 1. The spatial boundary of The Catlins Catchment Action Plan

MANA WHENUA

Mana whenua are the tāngata whenua who hold traditional customary authority and maintain contemporary relationships within an area determined by whakapapa, resource use and ahīkāroa (the long burning fires of occupation). Kai Tahu hold mana whenua status in the Otago region. The two rūnaka invited to have representation on the CICG to ensure mana whenua values are recognised and upheld in this plan are Te Rūnaka o Awarua and Hokonui Rūnaka.

STAKEHOLDERS AND COMMUNITY

The government agencies involved in creating this CAP are:

- Clutha District Council (the territorial authority that includes the Catlins)
- Department of Conservation
- Otago Regional Council

Community members involved in the group that has co-designed this CAP come from, or represent interests from across the Catlins region and have expertise in agriculture, forestry, conservation, tourism and recreation.

PROFILE OF THE CATLINS CAP AREA

CAP AREA PHYSICAL PROFILE

CAP area size: The Catlins land area is around 130,000 hectares (or roughly 5% of the Otago region) and the marine area around 160,000 hectares.

Climate: The Catlins generally has temperate climate compared to inland Otago. In summer, the temperatures generally range around 16-24 degrees Celsius while winter temperatures are in the 8-13 degree range. There are occasional hot days in summer with temperatures exceeding 30 degrees and in winter temperatures can dip to -5 degrees.

Significant waterbodies: The area contains four major freshwater rivers: the Puerua, Owaka, Catlins and Tahakopa and four estuaries: Waipati/Chaslands estuary, Tautuku River estuary, Tahakopa estuary, and the Catlins River estuary. The Tautuku and Waipati/Chaslands estuaries are relatively unmodified, and are predominantly fringed by native forest, showing a natural transition between the estuary to dunes/salt marsh/wetland into native forest and have low mud content.

Soils: The dominant soil orders in the Catlins are brown soils and podzols. The structure and drainage of brown soils make them suitable for cultivation. Podzols occur where there is a combination of acid leaf litter and high rainfall, so mainly in areas of indigenous forest. They have low natural fertility and root growth is limited, and as such they require fertiliser if used for grassland farming.

Water quantity: The Catlins is wetter than most parts of Otago and has an average annual rainfall of about 1300 mm (compared to 400 mm in Central Otago). Rainfall is fairly consistent throughout the year, which. is beneficial to the local agricultural industry and allowed for the formation and preservation of the Catlins rainforests. The Catlins usually has more water than is used for agriculture and industry, as rainfall is high, and evapotranspiration is low.

Major land uses: Land use in the Catlins is dominated by sheep and beef dry-stock farming (38%) and conservation estate (29%). The notable trends in land use change over the past three decades have been an increase in the extent of dairying and forestry, although these remain a relatively modest amount of the total Catlins area. Dairying increased by 36% from 1990 to 2018 and currently comprises 7% of the Catlins area. Similarly, the extent of plantation forestry has increased by 48% over the 1990-2018 period, to cover 7% of the Catlins area.

CAP AREA BIODIVERSITY PROFILE

Nearly a third of the Catlins is in conservation estate. The Catlins contains many unmodified river, coastal and estuarine ecosystems, including an extensive spread of indigenous land cover. The landscape is made up of low ridges running in a north-west/southeast direction which supports the native forest and high-producing grasslands.

Taoka species: Taoka species are culturally significant species that shape Mātauranga Māori (Māori knowledge) and whakapapa (genealogy). Ngai Tahu, as the iwi (tribe) that has authority over this area, also have the authority to define their own taoka species. These are detailed in the *Ngai Tahu Claims Settlement Act 1998* , which gives a **non-exclusive** list of birds, plants and marine mammals that are taoka to the iwi.

Valued introduced species: There are also introduced species in the Catlins that are important for sport hunting and as a source of wild food. These include trout and perch, game birds and waterfowl, and

mammals such as deer and pigs. Some of these species also threaten indigenous species and ecosystems through predation, browsing, disease, competition and habitat degradation

CAP AREA COMMUNITY PROFILE

The Catlins is a special place for the whole of Otago, but especially for mana whenua and the local community, and the many visitors who are welcomed into the area every year. In 2018, the Catlins was home to around 1,600 residents. Most Catlins residents live rurally, and nearly 40% of the population live in the Ōwaka, Kākā Point, or Pounawea townships.

While this CAP is focussed on protecting and enhancing environmental values. The CICG also identified human wellbeing values (Figure 2) that are important to them and their lives in the area. This Plan acknowledges that protecting and enhancing environmental values can also benefit the social, economic and cultural well-being of Catlins people and visitors – Ka ora te whenua, ka ora te tangata; When the land is well, we are well.

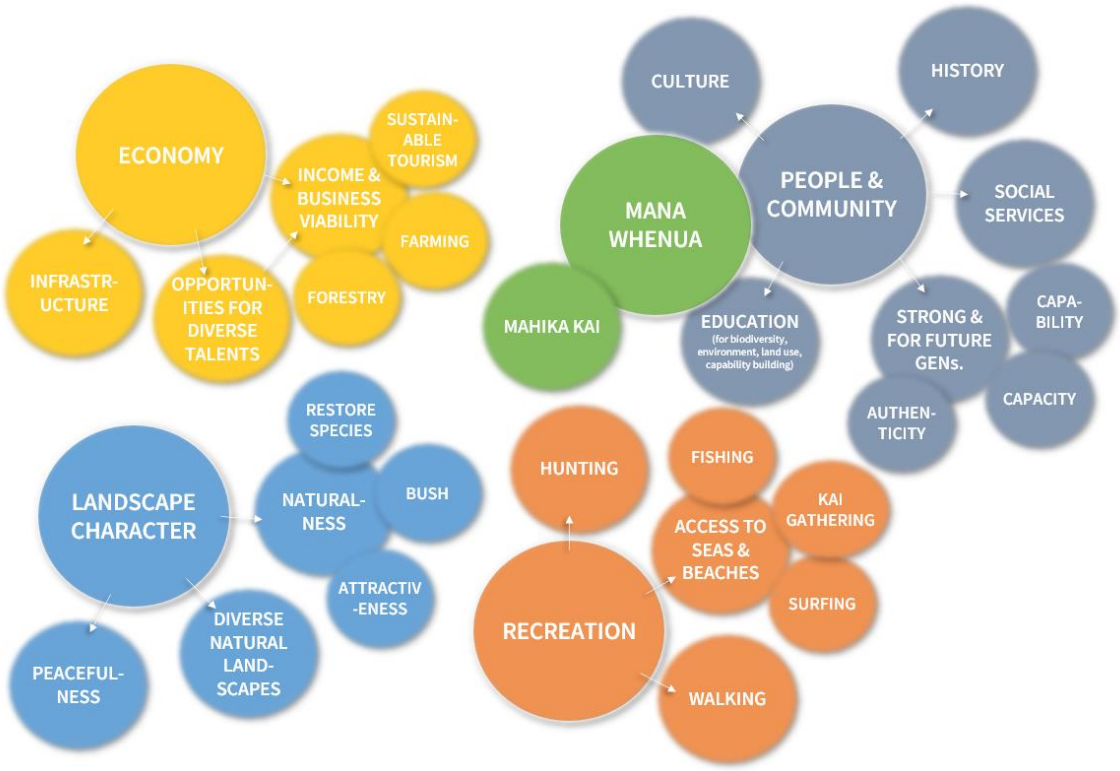

Figure 2. A diagram that summarises the human values identified by the CICG as important to The Catlins CAP are

CAP OVERVIEW

Figure 3 below gives an overview of this CAP, showing how its elements fit together. This diagram illustrates that the CAP is underpinned by policies, regulations and industry standards that make up the current operating environment and considers the environmental work that Catlins residents are already undertaking. Above this foundation are the strategies described in the CAP, the foundational actions of these strategies, the environmental values the CICG has identified as important and the human values which are supported when these environmental values are enhanced. The vision sits above the plan to guide the direction of travel.

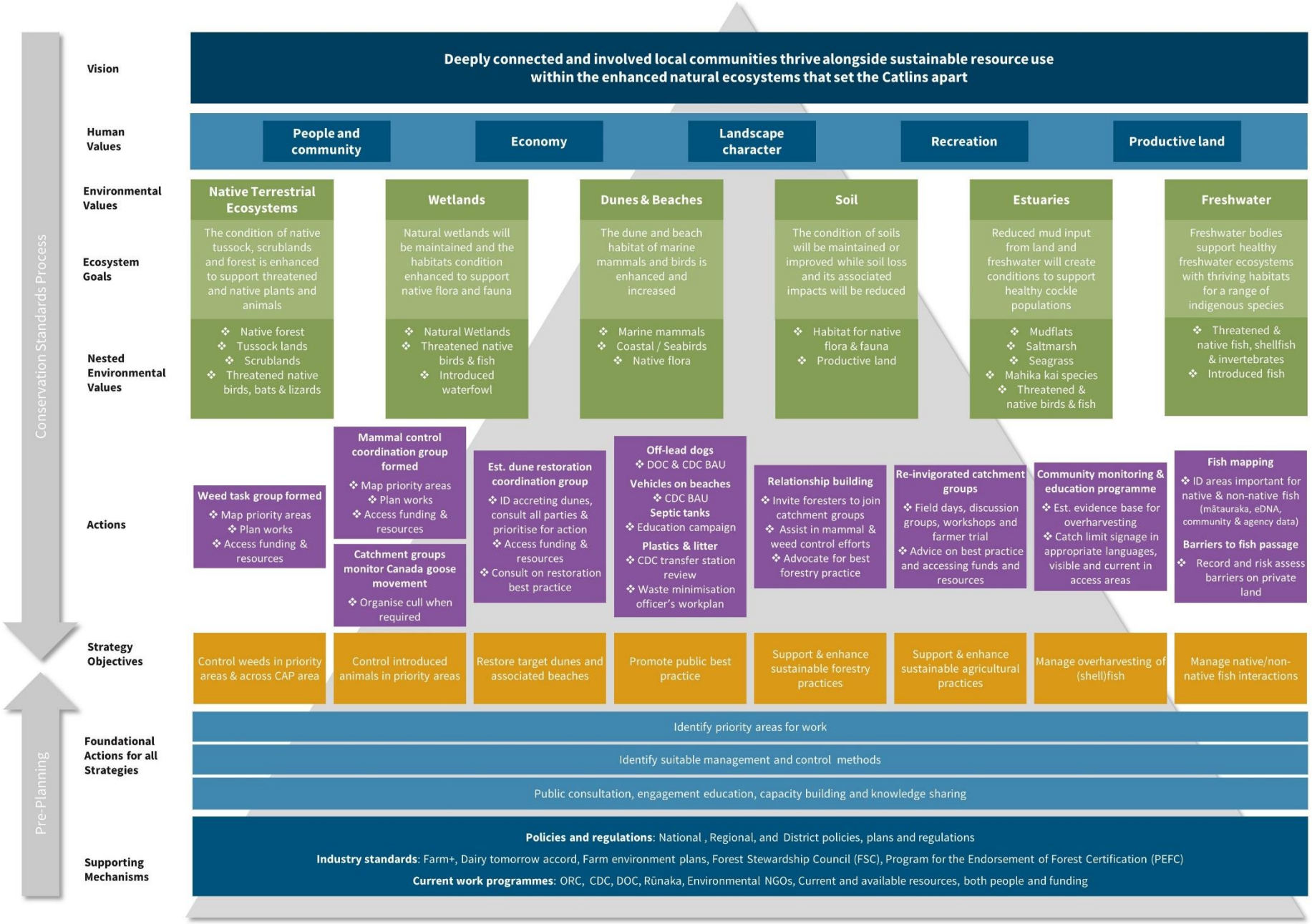

Figure 3. The "plan on a page" diagram that summarises this plan.

ENVIRONMENTAL VALUES

INTRODUCTION

This CAP defines a "value" as:

The features and assets that we care most about improving, protecting, restoring, and keeping healthy.

The values presented in this plan were developed with the CICG and are based on the knowledge of community and mana whenua. Similar values were grouped together into broad categories based on the ecosystem that they belong to. Grouping values assumes that by protecting the ecosystem, the values that are grouped within that ecosystem will also be protected.

The CICG also collaboratively developed goals for each value which detail the desired future state of the value and rated the current state of health of the value. The strategies in the plan are designed to move the health of each value closer to the goals.

SUMMARY OF VALUES AND GOALS

Native Terrestrial Ecosystems: By 2034 the condition of native tussock, scrubland and forest is enhanced to support native plant and animal species.

- **Indicators:** seedling / sapling ratio; biological integrity (condition of flora and fauna)
- **Current health**: Poor to fair

Wetlands: By 2034, the natural wetlands in The Catlins will be maintained and the habitat condition of native wetland flora is enhanced to support native species of fauna.

- **Indicators:** wetland extent; hydrological integrity; biological integrity (condition of flora and fauna)
- **Current health**: Good

Estuaries: By 2034, reduced mud input from terrestrial and freshwater sources will allow the estuaries to be potentially good cockle habitat.

- **Indicators:** mud content %; macrofauna score
- **Current health**: Good

Dunes & Beaches: By 2034, the dune and beach habitat of marine mammals and marine and coastal birds is enhanced and increased

- **Indicators:** % cover of target weeds; % cover native dune plants
- **Current health**: Fair

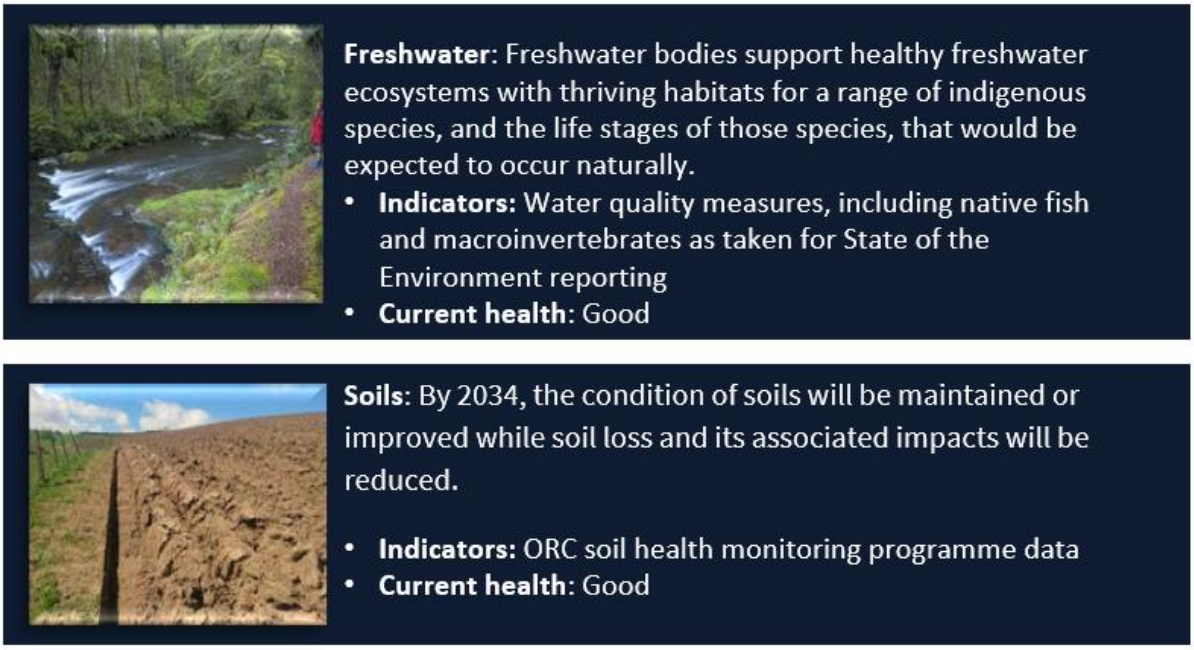

Figure 4. A summary of the values in this plan, the goal for each value, the indicators of value health and their current health status

VALUE 1. NATIVE TERRESTRIAL ECOSYSTEMS

THE GOAL FOR THE FUTURE HEALTH OF NATIVE TERRESTRIAL ECOSYSTEMS

By 2034 the condition of native tussock, scrubland and forest is enhanced to support native plant and animal species.

CURRENT STATUS AND HEALTH

The area has three major types of native terrestrial ecosystems:

- Native forest
- Shrublands
- Tussock

The native terrestrial ecosystems of the Catlins are diverse and retain many species of native fauna, flora, and fungi, many of which are threatened. These ecosystems have been affected by introduced browsers, predators and weeds and are in a fragile state and in need of conservation management. Some of the precious fauna species found within the Catlins terrestrial ecosystems include: pekapeka-tou-roa/ long-tailed bats (Nationally Critical); geckos (eg. Tautuku gecko Mokopiriakau "southern forest" At Risk, Declining) and skinks. The Beresford Ranges in the Catlins are home to approximately a quarter of the remaining mohua/yellowhead (At Risk, Declining) and the Catlins are also home to one of only two mainland populations of red-crowned kākāriki (At Risk, Relict). The Catlins also has a small population of the Nationally Critical hoiho/yellow eyed-penguins.

The native terrestrial ecosystems are part of the patchwork that give the Catlins landscape its distinctive character. The landscape's diversity, naturalness and peacefulness are all important to Catlins people, and

the terrestrial ecosystems are used for recreation, food and mahika kai gathering and draw tourists to the area.

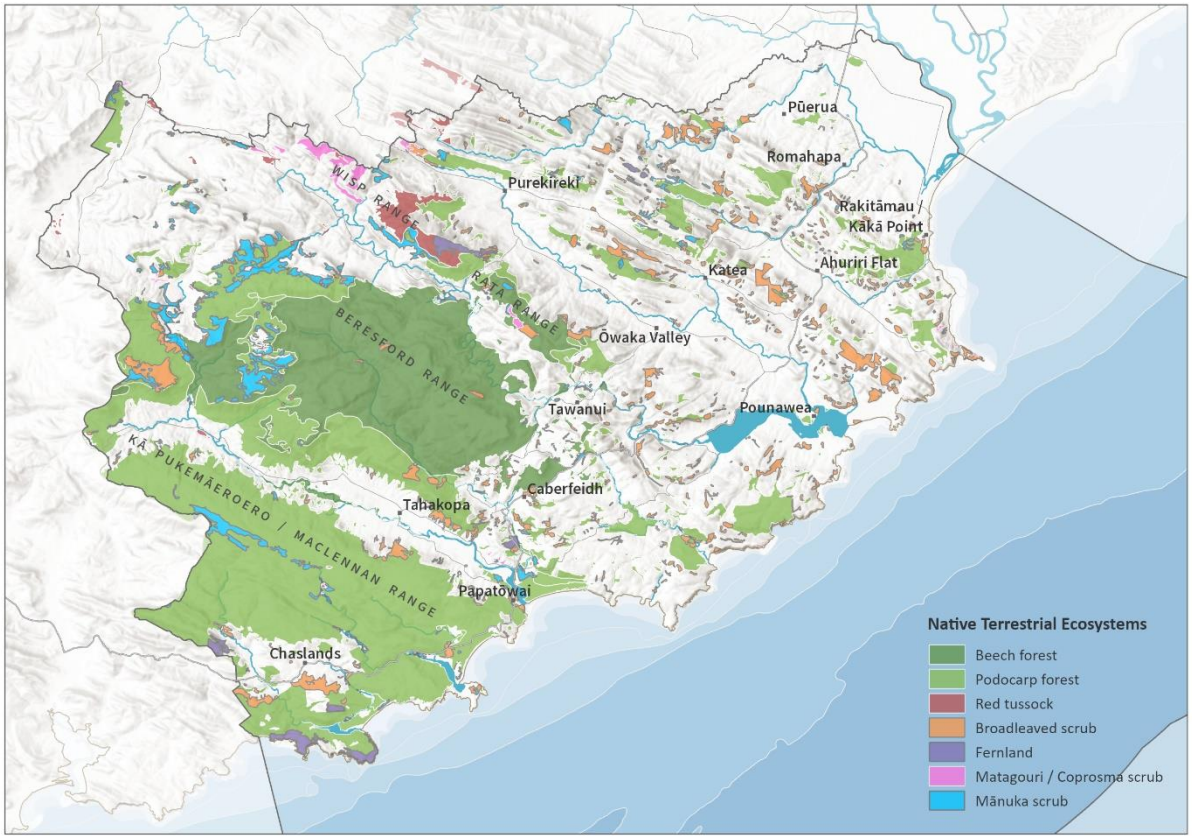

Figure 5. The distribution of the native terrestrial ecosystems across the area

The **current health** of the Catlins native terrestrial ecosystems is poor to fair. This rating is based on the CICG's evaluation of the condition of these ecosystems and includes the concern that the increasing numbers of introduced browsing mammals has resulted in few plant seedlings and saplings that should replace the mature plants when they die. Equally, introduced predators have a negative effect on all the Catlins' wildlife.

NESTED VALUES

A nested value is part of an ecosystem such a species, place or place-based practice that is protected or enhanced when the wider ecosystem is protected or enhanced.

When we protect the Catlins native terrestrial ecosystems, we also protect:

- Species that live within this ecosystem such as:
    - Mammals: for example, pekapeka-tou-roa/ long-tailed bats which are classified as threatened/nationally critical
    - Birds: for example, mohua/yellowhead which are at risk, declining, hoiho/yellow eyed penguins which are nationally critical
    - Reptiles: for example, the Tautuku gecko which is at risk/declining
- The landscape's diversity, naturalness and peacefulness
- Cultural values

There are other species of fauna, flora and fungi within this ecosystem, which will also be protected when the ecosystem is protected.

STRESSORS AND PRESSURES

For each of the values, the CICG identified the stressors and pressures that act on the health of that value. In this CAP, a "pressure" is usually a human activity that directly affects one or more of the values. These pressures will cause a "stress" on a value. For example, introduced browsers, shown in pink boxes in Figure 6 (below) are a **pressure** on native terrestrial ecosystems and are shown in pink boxes. The causes of the pressures are shown in yellow boxes. The **stressors** that these animals cause includes a reduced or absent forest understory, and stresses are shown in green boxes.

STRATEGIES

Strategies that will help us achieve this goal for native terrestrial ecosystems are listed below. For further detail on each strategy, refer to the "Strategies" section of the Plan.

- Introduced mammal and bird control strategy
- Weed control strategy
- Plastics and litter strand of the Human Behaviours strategy

MONITORING

The indicators we will use to measure the health of native terrestrial ecosystems:

- Seedling/sapling ratio: DOC has number of sites in the Catlins where it monitors the regeneration of the bush. Data for this indicator will be sourced from DOC.
- Other measures such as:
    - Abundance of deer palatable plants at browse level
    - Saplings without antler rub
    - Area of forest floor not disturbed by pigs
    - Evidence of possum browse
- The health of the populations of precious native species, for example mohua/yellowhead and pekapeka-tou-roa/ long-tailed bats should continue to be monitored in the area to provide data both for this plan and for wider species conservation.
- As appropriate, cultural monitoring will be developed with mana whenua

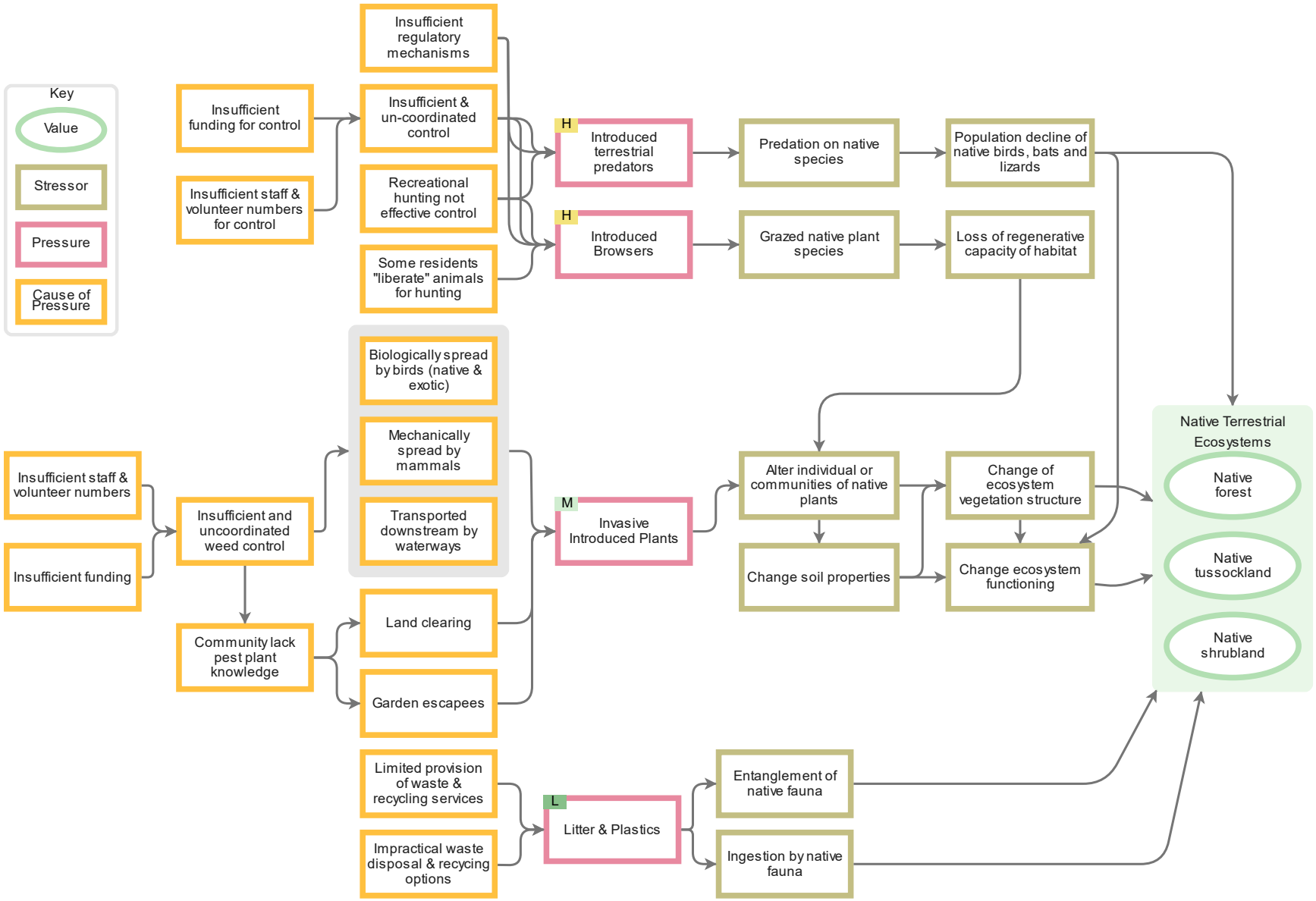

Figure 6. A diagrammatic representation of the current situation of The Catlins Native Terrestrial Ecosystems. Pressures are shown in pink rectangles. These pressures will cause a "stress" on a value, and the stressors are shown in green. The yellow rectangles show the factors that contribute to the pressures. The symbols in top left corner of pink rectangles rate the impact of the pressure across The Catlins plan area. L = low impact; M = medium impact; H = high impact; VH = very high impact.

VALUE 2. SOILS

THE GOAL FOR THE FUTURE HEALTH OF SOILS

By 2034, the condition of soils will be maintained or improved while soil loss and its associated impacts will be reduced.

CURRENT STATUS AND HEALTH

The areas dominant soil is brown soils and podzols. Brown soils occur with moderate structure and drainage making these soils suitable for cultivation. Podzols occur where acid leaf litter and high rainfall combine, mainly in indigenous forest. They have low natural fertility and root growth and require fertiliser for grassland farming.

Human activities such as unsustainable forestry and farming in the area affect the soils, and introduced mammals that strip the undergrowth can cause soils to be washed into the waterways and eventually into wetlands and estuaries and out to sea. Careful land-use management practices and effective introduced mammal control, however, will ensure that the soils are kept on the land and out of the waterways.

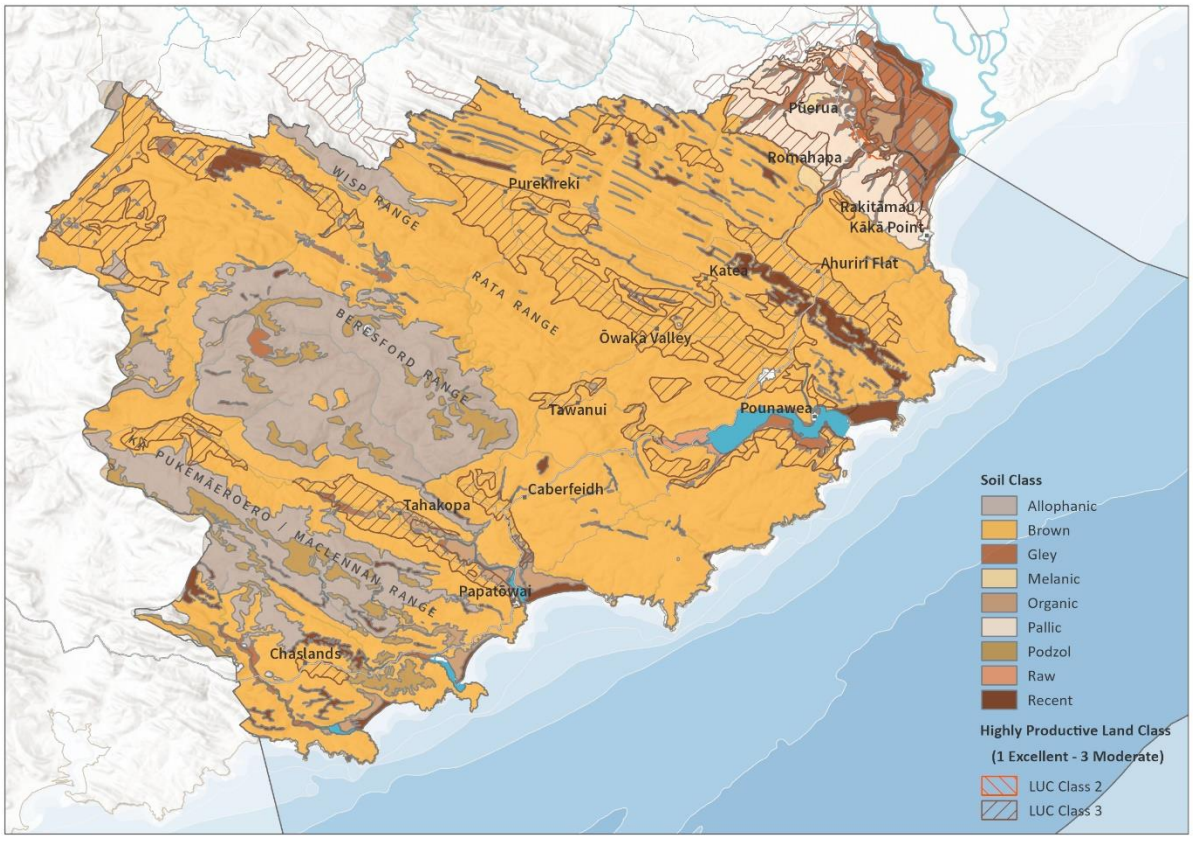

Figure 7. A map of the Catlins CAP area showing the distribution of the soils (shown by different colours) and areas of highly productive land (shown by the cross-hatching).

The **current health** of the soil on The Catlins' productive land is good, based on the farmers evaluation of the land that they work. There has yet to be work that determines the health of the soils under indigenous vegetation, but the ORC is about to establish soil test sites in indigenous forests.

NESTED VALUES

There are no nested values within the soil value, although by protecting soil, the fauna and microbes within the soil are also protected. Additionally, protecting the soil enhances the economic potential of the Catlins as a good place for farming and forestry, thereby protecting resident's livelihoods.

STRESSORS AND PRESSURES

See Figure 7 below.

STRATEGIES

Strategies that will help us achieve the goal are listed below. For further detail on each strategy, refer to the "Strategies" section of the Plan.

- Sustainable forestry strategy
- Sustainable farming strategy
- Introduced mammal and bird control strategy
- Weed control strategy

MONITORING

The indicators we will use to measure the health of the soils are:

- ORCs soil health monitoring programme has sites in the Catlins that are sampled once every 5-10 years. Data for this indicator will be sourced from the ORC. It is important to note due to the time that it takes for environmental change to occur, it is unlikely that there will be significant changes in the state of the soil over the timescale of this plan.
- As appropriate, cultural monitoring will be developed with mana whenua

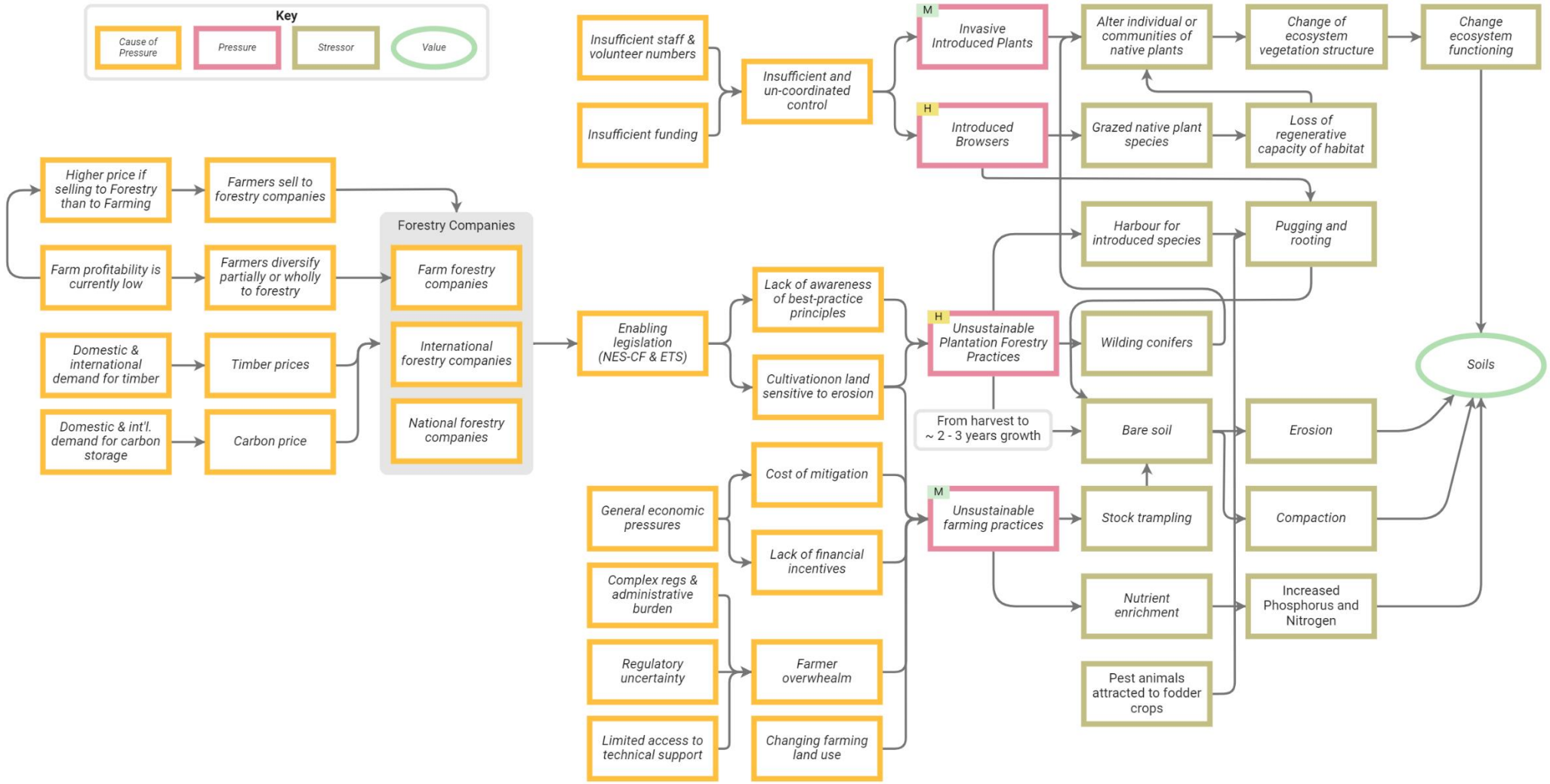

Figure 8. A diagrammatic representation of the current situation of The Catlins soils. Pressures are shown in pink rectangles. These pressures will cause a "stress" on a value, and the stressors are shown in green. The yellow rectangles show the factors that contribute to the pressures. The symbols in top left corner of pink rectangles rate the impact of the pressure across The Catlins plan area. L = low impact; M = medium impact; H = high impact; VH = very high impact.

VALUE 3. FRESHWATER

THE GOAL FOR THE FUTURE HEALTH OF FRESHWATER

Freshwater bodies support healthy freshwater ecosystems with thriving habitats for a range of indigenous species, and all life stages of those species, that would be expected to occur naturally.

CURRENT STATUS AND HEALTH

The Catlins area has four major freshwater rivers: the Puerua, Owaka, Catlins and Tahakopa.

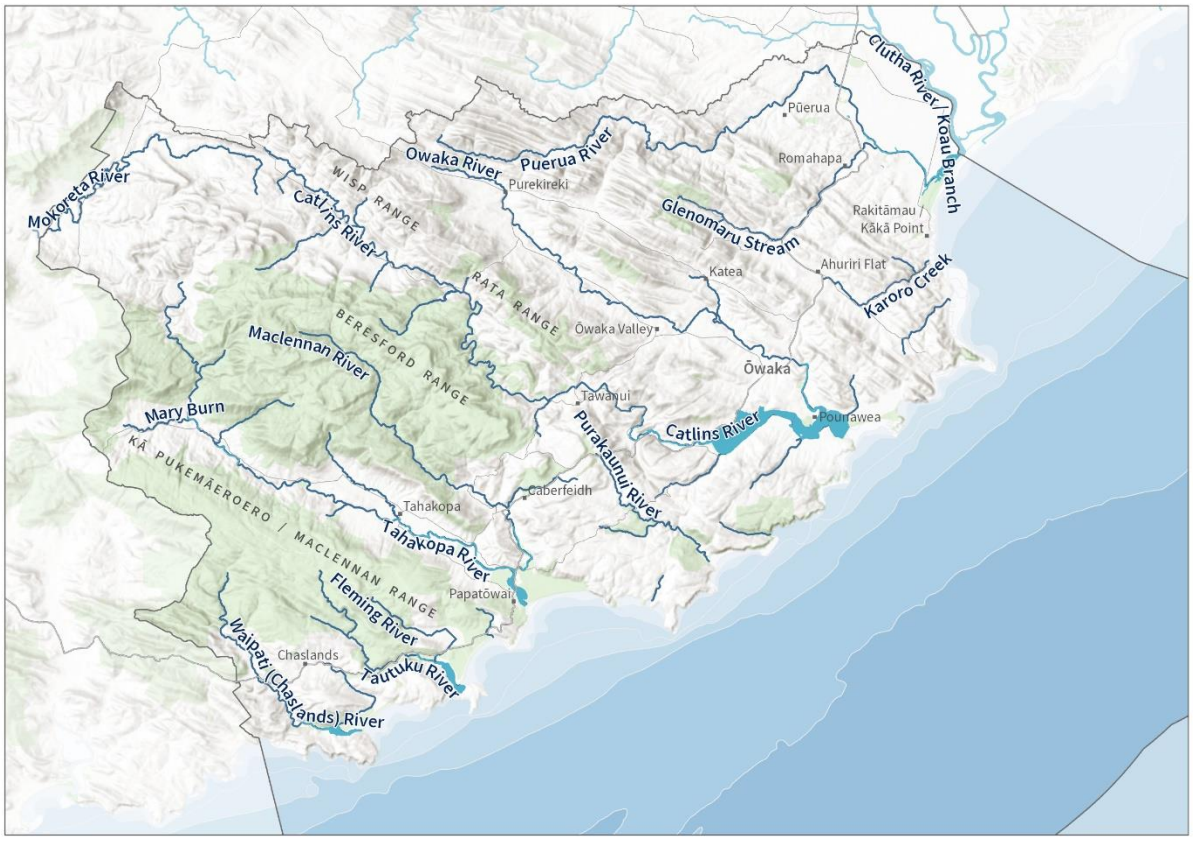

Figure 9. The main rivers and streams in The Catlins

The Catlins freshwater ecosystem is extensively monitored by the ORC and reported as part of the Ministry for the Environment's "State of the Environment" reporting. This sustained monitoring effort results in multiple health measures for the Catlins freshwater, as shown in the data below, from the "Catlins at Houipapa" testing site on the Owaka river. These data were taken from taken from LAWA on 8/9/2024.

Indicator	5-year median	Attribute band	Indicator trend
E. coli	145n/100ml	D	Indeterminate
Suspended fine sediment, clarity	1.15 metres	C	Indeterminate
Suspended fine sediment, turbidity	3.25 NTU		Indeterminate

Indicator	5-year median	Attribute band	Indicator trend
Total nitrogen	0.635 mg/L		Indeterminate
Total oxidised nitrogen	0.4 mg/L		Likely improving
Dissolved Inorganic Nitrogen	0.4375 mg/L		Likely improving
Ammoniacal Nitrogen	0.0055mg/L	A	Likely improving
Nitrate Nitrogen	0.4 mg/l	A	Likely improving
Dissolved reactive Phosphorus	0.01005mg/L	B	Very likely improving
Total Phosphorus	0.0245 mg/L		Likely improving

NESTED VALUES

When we protect the freshwater ecosystems in the area, we also protect:

- Streams
- Rivers
- Lakes
- Native freshwater wildlife
- Valued introduced freshwater species
- Cultural values such as mahika kai

Freshwater features in each of the human values mentioned for the Catlins. For example, river walks and spectacular waterfalls are an essential part of the Catlins' landscape character and serve to draw visitors to the area. Access to freshwater is important for successful farming operations, and clean freshwater is vital to human health.

STRESSORS AND PRESSURES

See Figure 8 below.

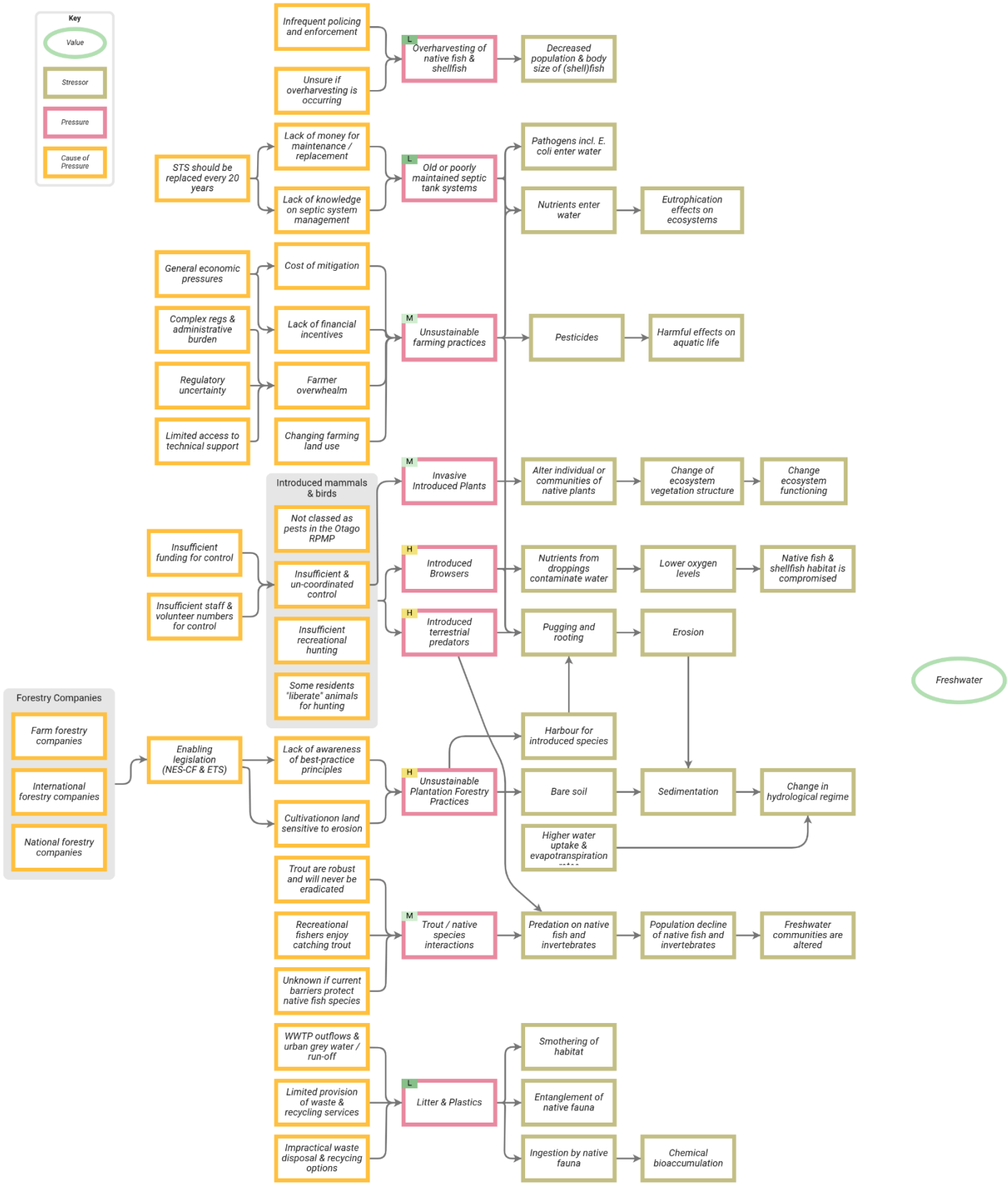

Figure 10. A diagrammatic representation of the current situation of The Catlins freshwater ecosystem. Pressures are shown in pink rectangles. These pressures will cause a "stress" on a value, and the stressors are shown in green. The yellow rectangles show the factors that contribute to the pressures. The symbols in top left corner of pink rectangles rate the impact of the pressure across The Catlins plan area. L = low impact; M = medium impact; H = high impact; VH = very high impact.

STRATEGIES

Strategies that will help us achieve the goal are listed below. For further detail on each strategy, refer to the "Strategies" section of the Plan.

- Sustainable farming strategy
- Sustainable forestry strategy
- Fish species interaction strategy
- Over-harvesting strategy
- Human behaviour strategy, especially the septic tank and plastic and litter strands
- Weeds control strategy
- Introduced mammal and bird control strategy

MONITORING

We will use the same indicators used to measure the health of the freshwater ecosystems as outlined above. These data will be sourced from the State of the Environment reporting done by the ORC. It is important to note due to the time that it takes for environmental change to occur, it is unlikely that there will be significant changes in the state of the freshwater over the timescale of this plan. As appropriate, cultural monitoring will be developed with mana whenua.

VALUE 4. WETLANDS

THE GOAL FOR THE FUTURE HEALTH OF WETLANDS

By 2034, the natural wetlands in the Catlins will be maintained and the habitat condition of native wetland flora is enhanced to support native species of fauna.

CURRENT STATUS AND HEALTH

The Catlins has many types of natural wetlands that are home to native and endangered plant and animal species. “Wetlands” include peatlands and bogs and are also home to introduced birds that are valued for hunting and food.

Wetlands are areas where the water table is high, and water stays in the area for long enough to influence the soil, plants and animals that can live in a place. Wetlands can be dominated by freshwater, have brackish or salty water or a mixture of both. Just over 10% of New Zealand’s historical extent of wetlands remains. Although wetlands have not always been valued, they are now recognised as having important function in trapping sediment, filtering water and can serve as flood protection to surrounding lands. Wetlands also contain characteristic fauna and flora that can live in this waterlogged environment.

The **current health** of the Catlins wetlands is “good” based on the community’s assessment of the wetlands extent and condition. This rating includes the concerns of the spread of introduced weeds, but does not consider that, nationally, the current extent of wetlands is just 10% of its historical extent (Dymond et al, 2021)

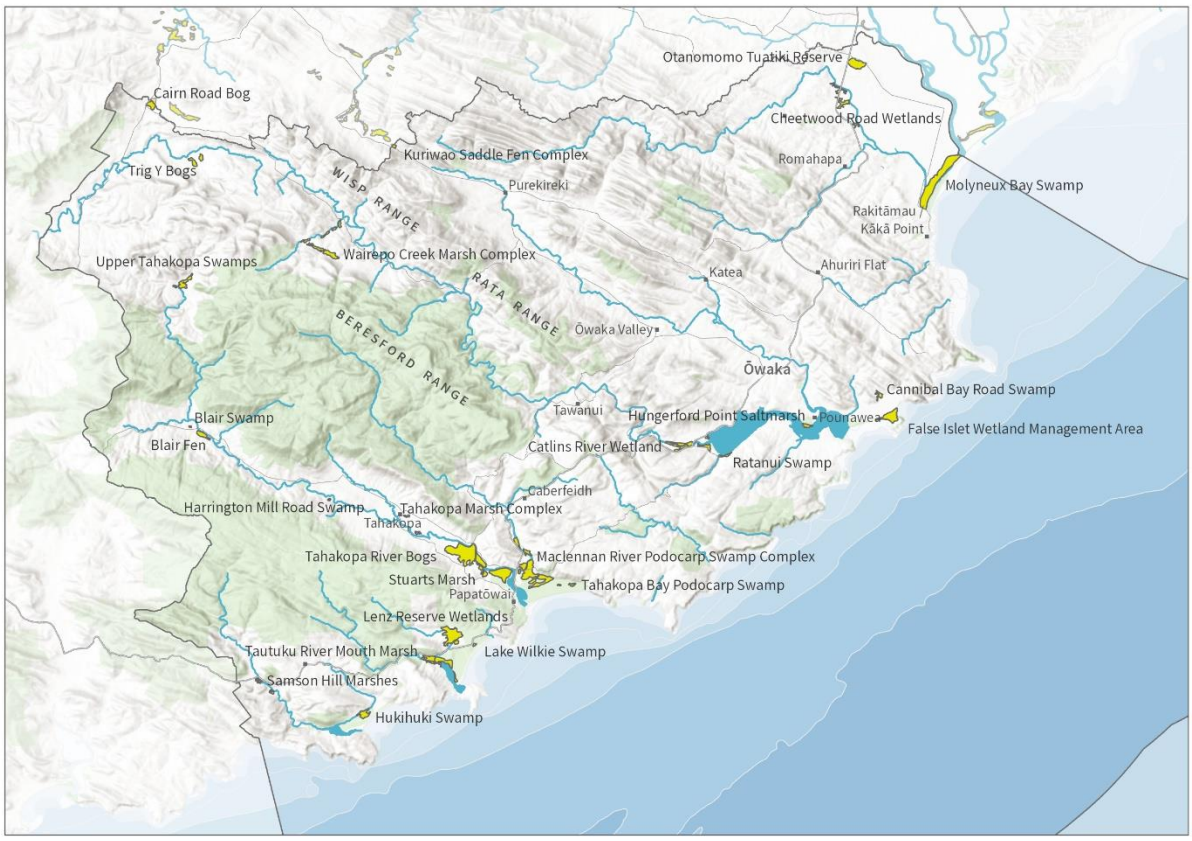

Figure 11. A map of The Catlins area showing the location of the natural wetlands, previously classified as Regionally Significant Wetlands.

NESTED VALUES

When we protect the wetland ecosystems in the area, we also protect:

- Bogs
- Swamps
- Marshes
- Native wetland flora and fauna
- Cultural values such as mahika kai
- Valued introduced wetland species (such as game birds)

Wetlands also offer great flood mitigation and can retain water. This means that they can act as a natural sponge and temper both high and low water flows for the whole ecosystem.

Catlins wetlands are an important part of the area's natural character, which is valued by those who live here and that attracts tourist to the area, thereby supporting tourism livelihoods.

STRESSORS AND PRESSURES

See Figure 12 below.

STRATEGIES

Strategies that will help us achieve the goal are listed below. For further detail on each strategy, refer to the "Strategies" section of the Plan.

- Sustainable farming strategy
- Sustainable forestry strategy
- Fish species interaction strategy
- Overharvesting strategy
- Human behaviour strategy, particularly the plastic and litter and septic tank strands
- Weed control strategy
- Introduced mammal and bird control strategy

These are the same strategies as for the freshwater value as outlined in the previous section and are also the same as those that will serve to protect estuaries in the next section.

MONITORING

Photo points are fixed locations from which you take regular photographs and compare against previous images taken from the same spot and from the same direction. These are the simplest and cheapest ways to monitor change in a plant populations.

Formal community wetland monitoring, such as the WETmak resource developed by the NZ Landcare Trust/Ngā Matapopore Whenua, could be also established.

As appropriate, cultural monitoring will be developed with mana whenua.

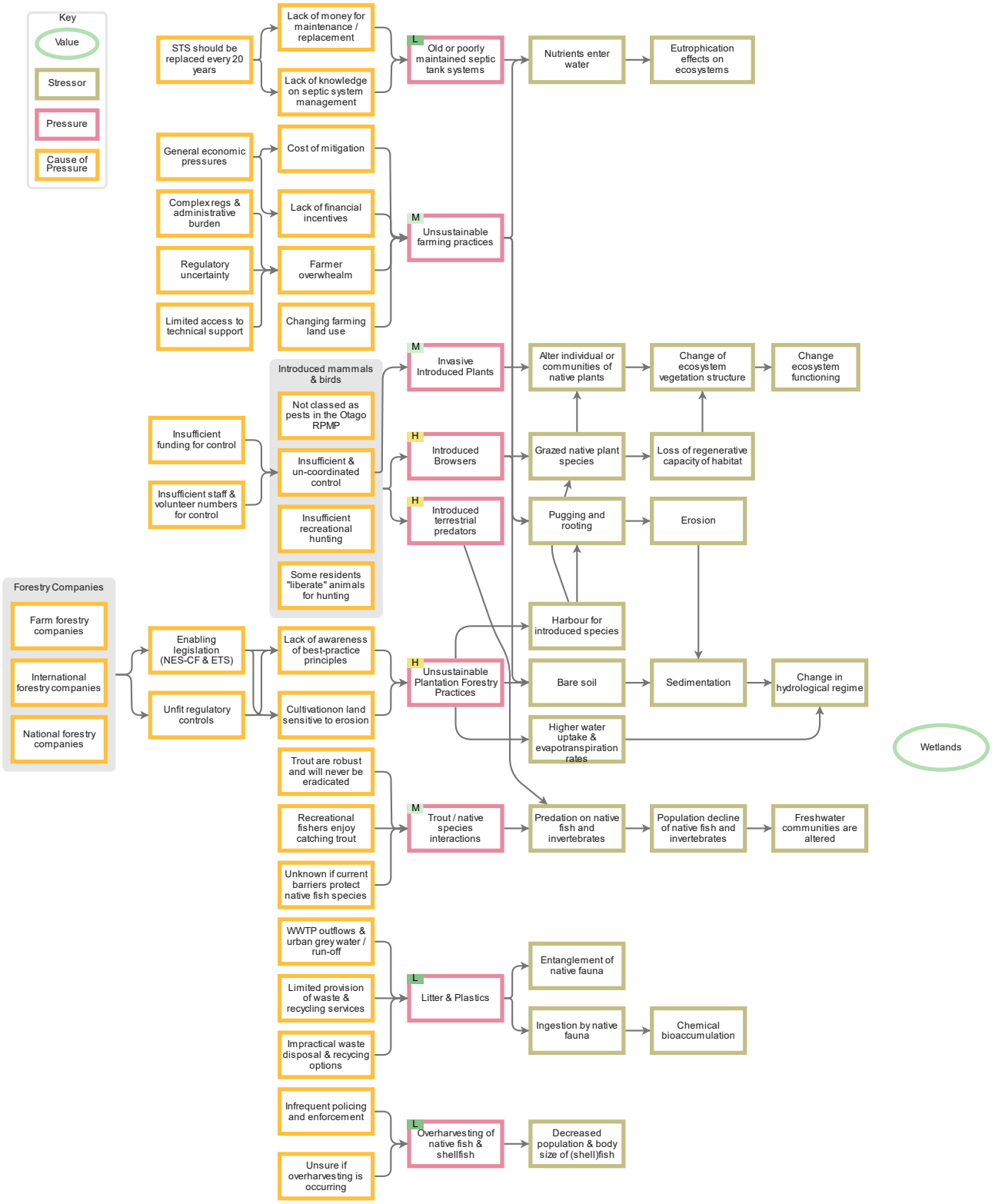

Figure 12. A diagrammatic representation of the current situation of The Catlins wetland ecosystems. Pressures are shown in pink rectangles. These pressures will cause a "stress" on a value, and the stressors are shown in green. The yellow rectangles show the factors that contribute to the pressures. The symbols in top left corner of pink rectangles rate the impact of the pressure across The Catlins plan area. L = low impact; M = medium impact; H = high impact; VH = very high impact.

VALUE 5. ESTUARIES

THE GOAL FOR THE FUTURE HEALTH OF ESTUARIES

By 2034, reduced mud input from terrestrial and freshwater sources will allow the estuaries to be potentially good cockle habitat.

CURRENT STATUS AND HEALTH

The Catlins contains four estuaries: the Waipati/Chaslands Estuary, the Tautuku River Estuary, the Tahakopa Estuary, and the Catlins Estuary.

The Tautuku and Waipati/Chaslands estuaries are almost un-modified, which is unusual in Southern New Zealand. Both estuaries are fringed by native forest and contain a natural transition between estuary and dunes/salt marsh/wetland into native forest. pakeke/ NZ sealion use the Catlins river estuary to feed and estuaries are home to creatures such as kanae (mullet), tuangi (cockles) and pātiki (flounder) are mahika kai and food species for many local people.

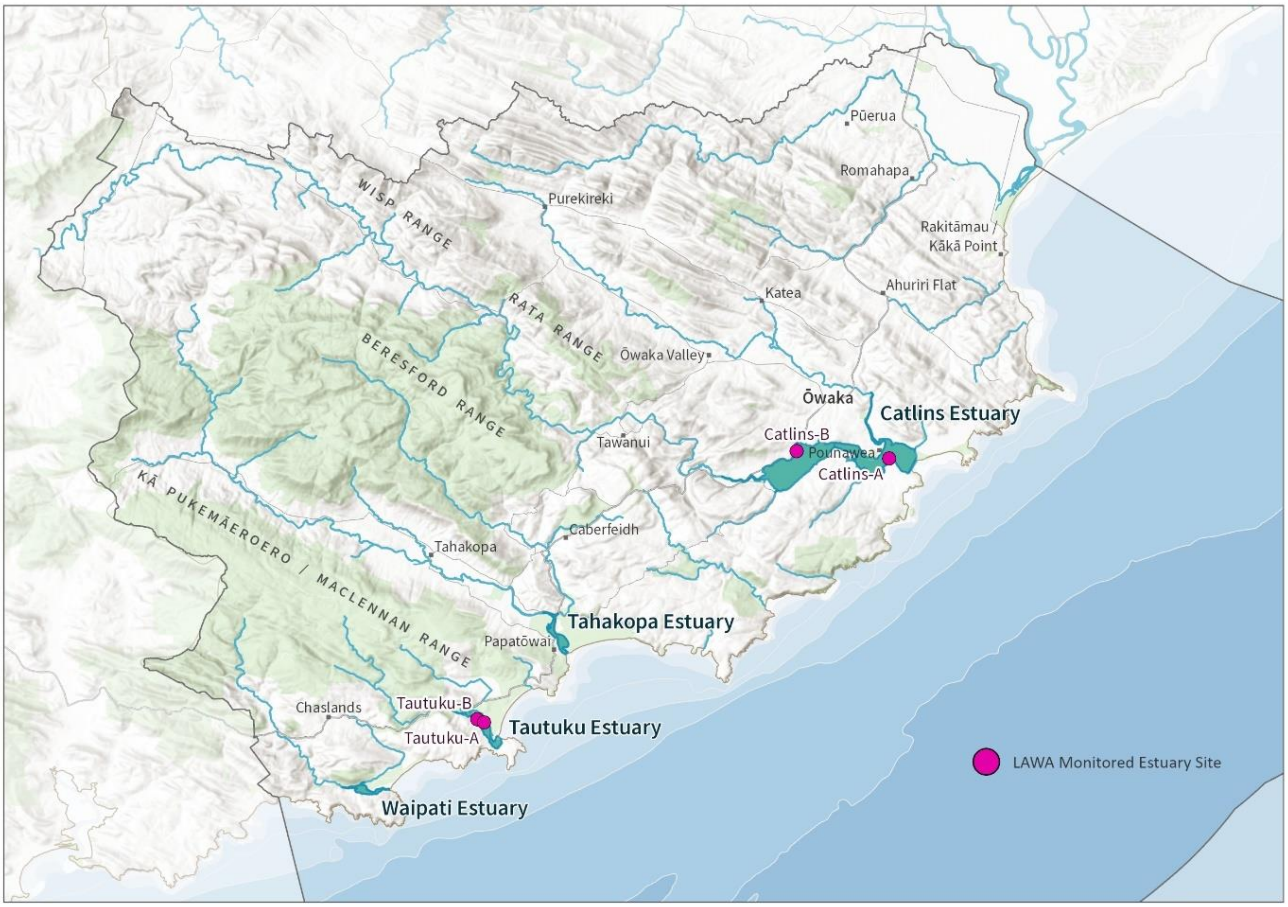

Figure 13. The location of the four open estuaries, and the monitoring points in these estuaries.

The **current health** of the estuaries in the Catlins is shown below, as illustrated by monitoring data from the Catlins and Tautuku Estuaries. The locations of the Catlins A and B, and Tautuku A and B monitoring sites are marked on the map in Figure 13. The data were taken from taken from LAWA on 8/9/2024.

Indicator	Catlins A (2019)	Catlins B (2019)	Tautuku A (2022)	Tautuku B (2022)
Estuary macrofauna score*	3.09	4.48		
Mud content	1.3%	42.9%	16.8%	49%

* a measure that illustrates the impact of mud on the creatures that live in the estuary mud. Low scores show a low effect.

NESTED VALUES

When we protect the estuary ecosystems in the area, we also protect:

- Saltmarshes
- Seagrass meadows
- Native estuarine wildlife
- Cultural values such as mahika kai

STRESSORS AND PRESSURES

See Figure 14 below.

STRATEGIES

Strategies that will help us achieve the goal are listed below. For further detail on each strategy, refer to the "Strategies" section of the Plan.

- Sustainable farming strategy
- Sustainable forestry strategy
- Fish species interaction strategy
- Overharvesting strategy
- Human behaviours strategy, particularly the plastic and litter and septic tank strands
- Weed control strategy
- Introduced mammal and bird control strategy

These are the same strategies as for the freshwater and wetlands values as outlined previously. As these ecosystems are connected by water, all actions that improve the freshwater health will improve the health of the estuaries.

MONITORING

The indicators we will use to measure the health of estuaries are the two shown in the table of freshwater indicators, above. These will be collected by ORC in their regular "State of the Environment" monitoring and reporting. As in previous sections, it is important to note due to the time that it takes for environmental change to occur, it is unlikely that there will be significant changes in the state of the estuaries over the timescale of this plan. As appropriate, cultural monitoring will be developed with mana whenua.

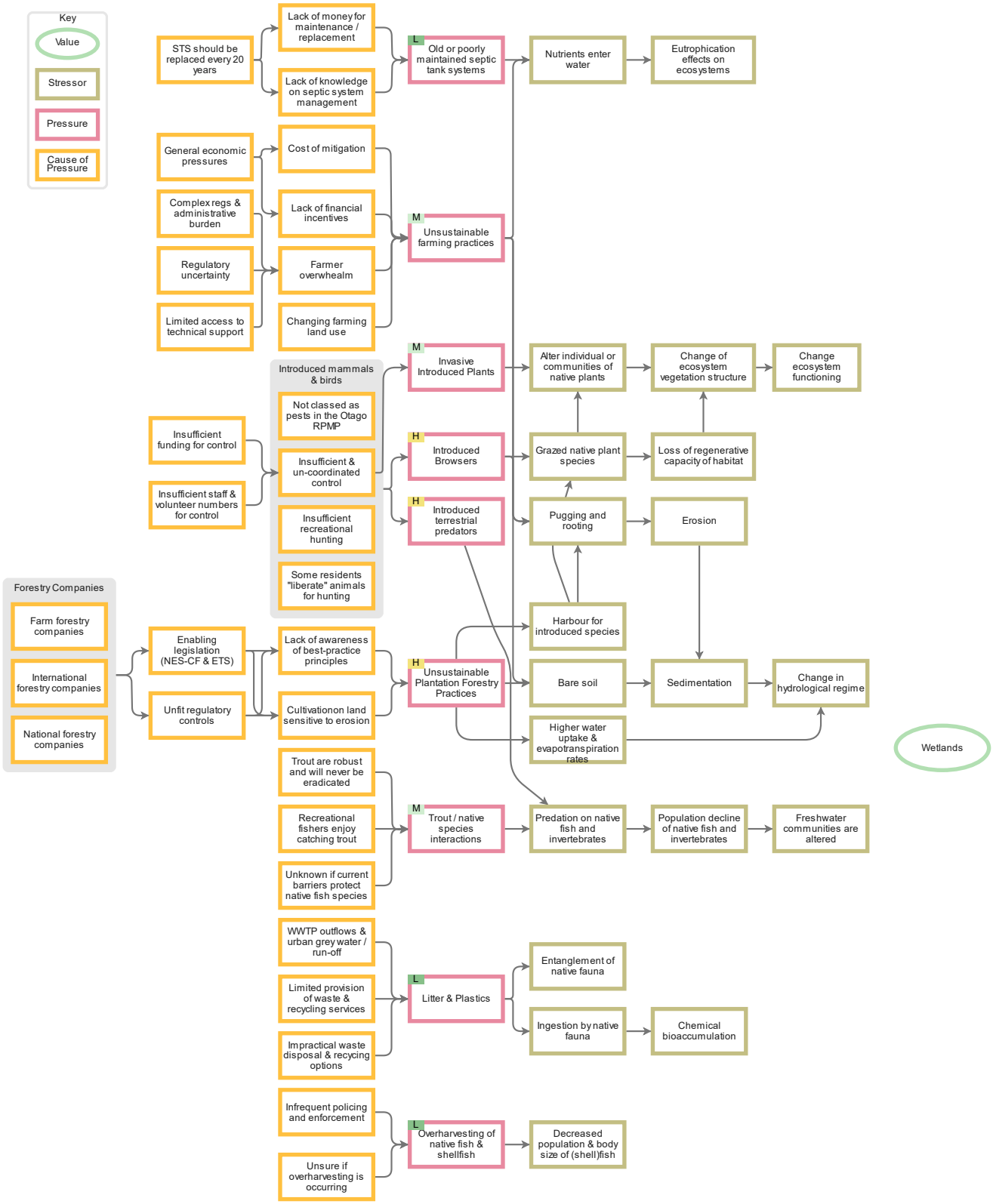

Figure 14. A diagrammatic representation of the current situation of The Catlins estuary ecosystems. Pressures are shown in pink rectangles. These pressures will cause a "stress" on a value, and the stressors are shown in green. The yellow rectangles show the factors that contribute to the pressures. The symbols in top left corner of pink rectangles rate the impact of the pressure across The Catlins plan area. L = low impact; M = medium impact; H = high impact; VH = very high impact.

VALUE 6. DUNES AND BEACHES

THE GOAL FOR THE FUTURE HEALTH OF DUNES AND BEACHES

By 2034, the dune and beach habitat of marine mammals and birds is enhanced and increased.

CURRENT STATUS AND HEALTH

Although the scope of the CAP goes out to the twelve nautical mile limit off the coast (see Figure 1), the dunes and beaches are the most accessible part of the coastal marine area for community management. This means that this value concentrates on the dunes and beaches of The Catlins.

Sand dunes are classed as "endangered" ecosystems and, in conjunction with the sand beaches to the waterline, are important habitats for pakeke/NZ sea lion, hoiho/yellow eyed penguins, kororā/ little blue penguins and tōrea pango/variable oystercatchers. Many of the Catlins dunes were originally active dunes. The area of active dunes has declined by 70% between the early 1900s and 2000s primarily due to the introduction of marram grass (*Ammophila arenaria*) which stabilises the dunes and to tree lupin (*Lupinus arboreus*). Marram grass has also replaced the native pīkao (*Ficinia spiralis*) a grass species that has both cultural importance to Māori and is part of an important ecosystem for native birds and invertebrates.

The **current health** of the Catlins dune and beach ecosystems is designated as “fair” based on the community’s assessment of the dune ecosystems. However, the threat level of species that use these ecosystems differs; Hoiho/yellow-eyed penguins have declined by 78% in 15 years, and are classed as “Nationally Critical”, and the New Zealand sealion are classed “Nationally Vulnerable.”

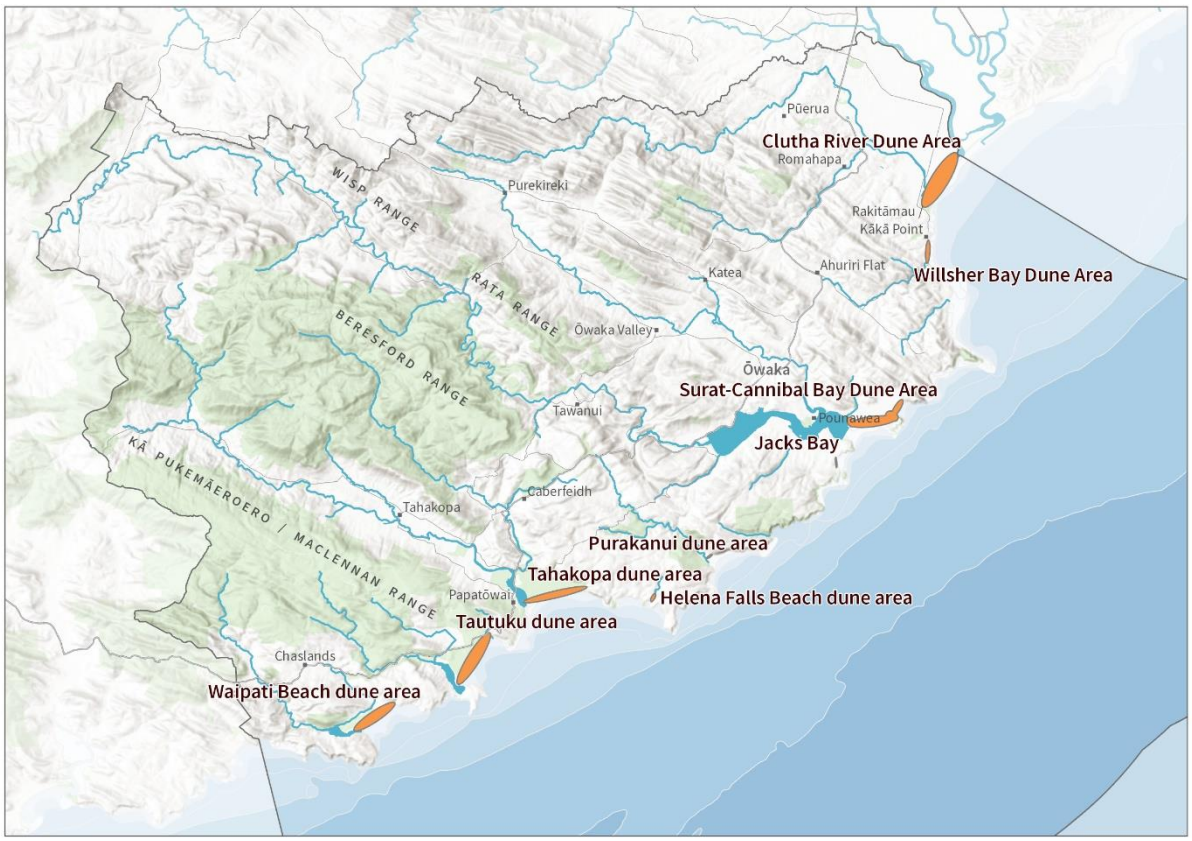

Figure 15. A map of The Catlins showing the location of the main dune areas and their associated beaches

NESTED VALUES

When we protect the dune ecosystems in the area, we also protect:

- Beach systems
- Dune systems
- Marine mammal habitats
- Seabird habitats

STRESSORS AND PRESSURES

See Figure 16 below.

STRATEGIES

Strategies that will help us achieve the goal are listed below. For further detail on each strategy, refer to the "Strategies" section of the Plan.

- Weed control strategy
- Introduced mammal and bird control strategy
- Human behaviours strategy, particularly the off-lead dog and vehicles on beaches strand

Together these three strategies combine for form the dune restoration programme which will be discussed further following the strategy section.

MONITORING

The health of the dunes and beaches will be monitored by:

- The percentage cover of target weeds (which this plan seeks to reduce)
- The percentage cover of native dune plants (which this plan seeks to increase)
- As appropriate, cultural monitoring will be developed with mana whenua

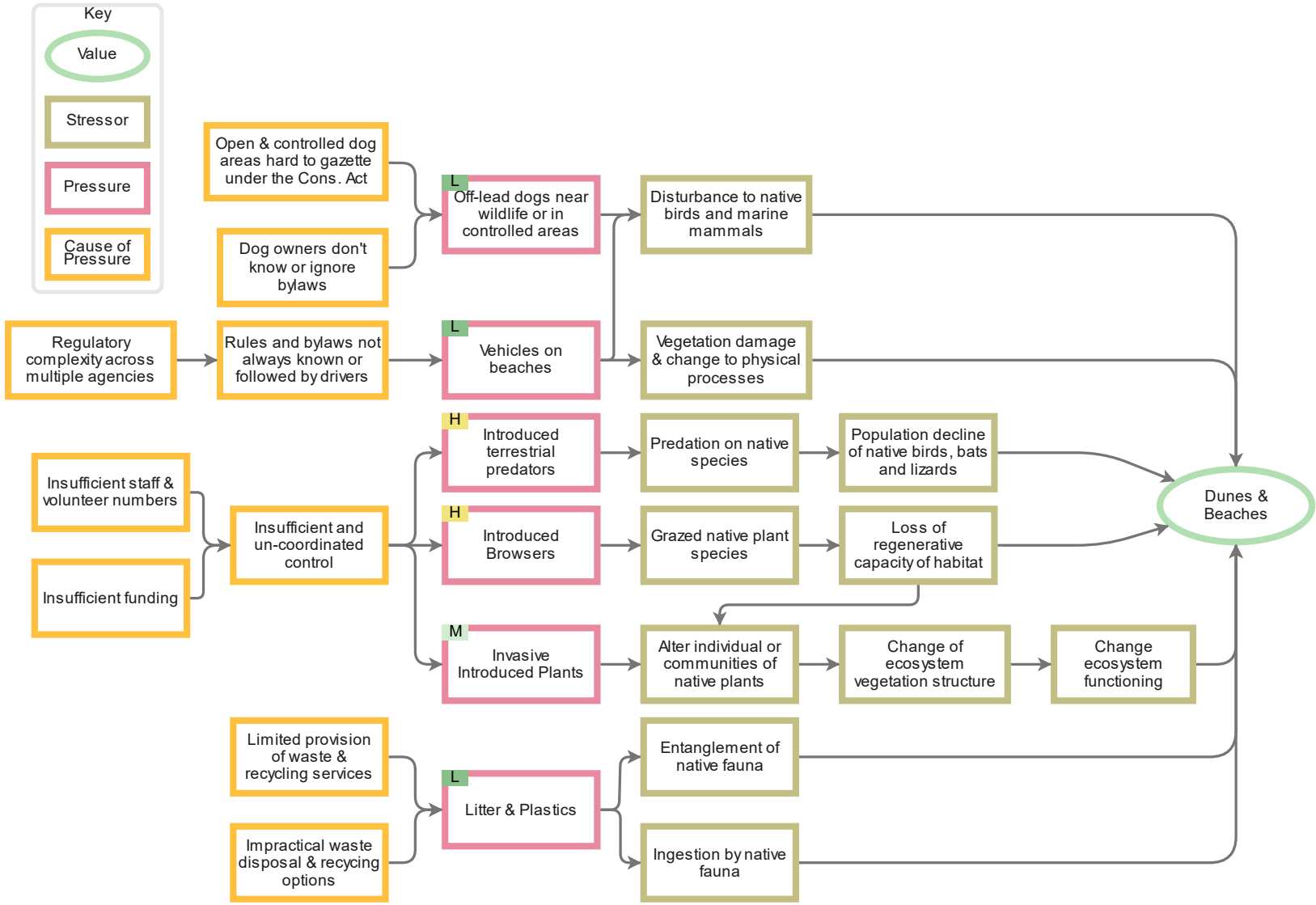

Figure 16. This diagram shows the current state of The Catlins dune and beaches. Pressures are shown in pink rectangles. Pressures are shown in pink rectangles. These pressures will cause a "stress" on a value, and the stressors are shown in green. The yellow rectangles show the factors that contribute to the pressures. The symbols in top left corner of pink rectangles rate the impact of the pressure across The Catlins plan area. L = low impact; M = medium impact; H = high impact; VH = very high impact.

PRESSURES ON ENVIRONMENTAL VALUES

In this plan, a "pressure" is usually a human activity that directly affects the values. Below is a summary table showing the values and pressures in the Catlins. The CICG considered the **scope**, **severity**, and **irreversibility** of each pressure. **Scope** refers to the proportion of the value (area for ecosystems, population for species) that is likely to be affected within 10 years under current circumstances. **Severity** attempts to categorize the level of damage to the value. Irreversibility is the degree to which the effects of a given pressure can be undone. The blanks show that a particular pressure does not act on a value. Each pressure is rated by the CICG as having a Low, Medium, High or Very High effect on the values. The summary pressure rating provides a guide to the cumulative effect of the pressures across multiple values, and the summary value rating indicates how affected the values are by the pressures in the area.

Value / Pressure	Dunes & Beaches	Estuaries	Freshwater	Soils	Wetlands	Native Terrestrial Ecosystems	Summary Pressure Rating
Dairy & sheep farm effluent		Medium	Medium	Medium			**Medium**
Invasive Introduced Plants	High	Medium	Low	Low	Medium	Medium	**Medium**
Land clearing		Medium	Medium	Low	Medium	Low	**Medium**
Overharvesting of native fish & shellfish		Low	Low				**Low**
Poor agricultural wintering practice		Medium	Medium	Medium	Low		**Medium**
Vehicles on beaches	Low						**Low**
Introduced Browsers	Medium	Medium	Low	Medium	Medium	High	**High**
Introduced predators	Medium				Medium	High	**High**
Litter & Plastics	Low	Low	Low	Low	Low	Low	**Low**
Off-lead dogs near wildlife or in controlled areas	Medium					Low	**Low**
Old or poorly maintained septic tanks		Low	Low		Low		**Low**
Fish species interactions		Medium	High		Low		**Medium**
Unsealed roads		Low	Low	Low			**Low**
Summary Value Ratings	**Medium**	**High**	**High**	**Medium**	**Medium**	**High**	

STRATEGIES

The strategies in this plan are defined as "A set of one or more activities or actions with a common focus created to either restore values or reduce pressures. A strategy outlines a specific set of activities."

This plan has seven strategies and one programme (which is a collection of strategies) which cover many aspects of the environment and natural resources in The Catlins. The strategies, and the strategy effectiveness, are summarise below. The "strategy effectiveness" is calculated by rating the potential impact of the strategy, its feasibility, and its estimated cost. The strategy effectiveness is calculated to help prioritise the work outlines in the plan but does not determine what work is done. Detailed actions required to implement the strategy will be developed for implementing the CAP. These will be captured in the 'living' plan hosted online in the CAP Hub.

Strategy	Strands	Strategy effectiveness
Introduced mammal and bird control strategy	Mammal control at focus sites	Low
	Canada goose monitoring and control	Medium
Weed control strategy	Control weeds in priority areas	Low
	Suppress weed growth and spread across the region	Low
Sustainable farming strategy		Medium
Sustainable forestry strategy		High
Overharvesting		Medium
Fish species interaction strategy	Mapping	High
	Barriers	Medium
Human behaviour strategy	Plastic and Litter	High
	Septic tanks	Low
	Vehicles on beaches	Low
	Off-lead dogs	Low

The weed control, introduced mammal and bird, vehicles on beaches and off-lead dog strategies combine to become a **Dune Restoration programme** which is outlined fully at the end of this section.

STRATEGY 1. INTRODUCED MAMMAL AND BIRD CONTROL STRATEGY

This is a **pressure reduction** strategy that aims to decrease the negative impacts that invasive introduced mammals and birds have on The Catlins ecosystems and endangered species through coordinated control of their numbers in focus areas.

New Zealand has over 90 introduced vertebrate species (Clout 2002) and introduced mammals have become major predators of New Zealand's birds, invertebrates, plants, reptiles, and even freshwater fish. The Catlins not only has relatively intact forests, it is also home to mōhua/yellowhead, native bats, geckos and countless other organisms that are affected by introduced mammals. Additionally, crops and newly planted forestry trees can be destroyed by introduced mammals.

Although Canada geese are not present across the whole Catlins, without monitoring and control, the geese could become more widespread. As Canada geese flock on pastures and lake edges, their faeces may contribute to the microbial and nutrient load in freshwater ecosystems and therefore be a risk to human health and native species. The geese feed on pasture and other natural grasses, degrading habitat when the flock in large numbers.

RELATED VALUES

This strategy will contribute to the enhancement of the following values:

- Wetlands
- Freshwater
- Terrestrial native ecosystems
- Dunes and beaches
- Estuaries
- Soils

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are:

- Increase effectiveness of control work through collaboration

The outputs of this strategy will be:

- Formation of an introduced mammal and bird control group
- Coordinated control activities
- Fewer Canada geese

FOCUS AREAS FOR ACTIVITIES

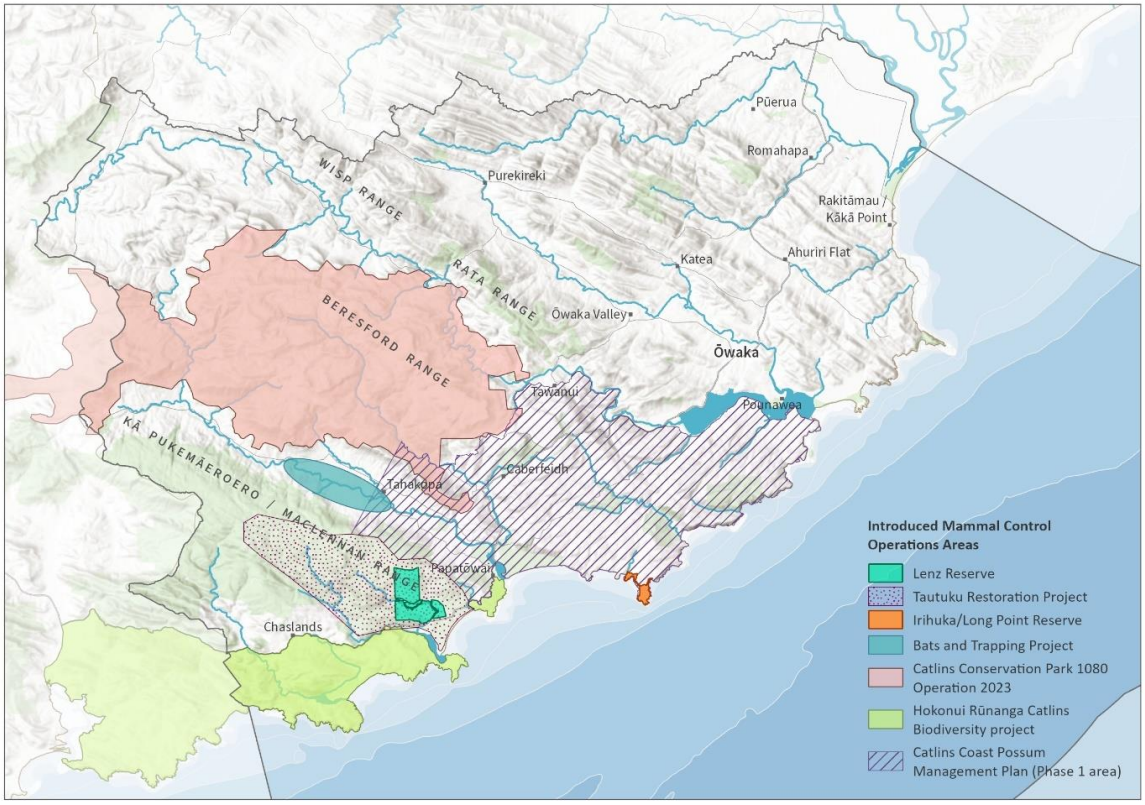

Figure 17. A map of The Catlins showing the location of current introduced mammal control and suggested areas where this work could continue to be supported.

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are shown in Figure 18 below.

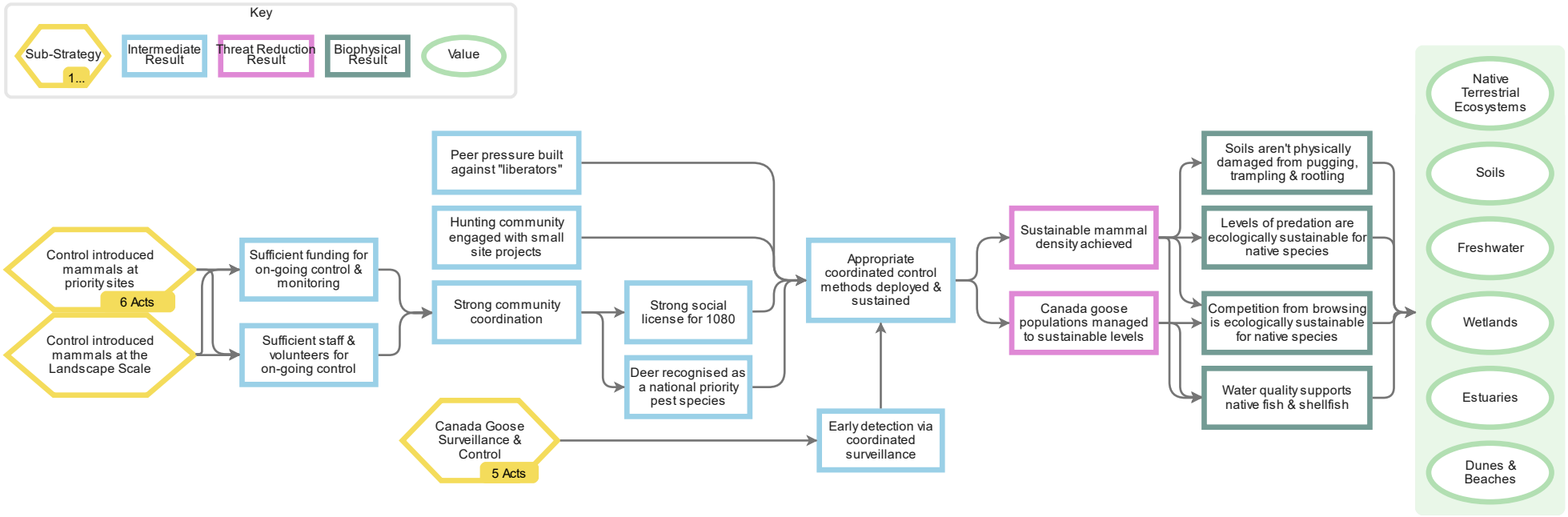

Figure 18. This diagram shows the results we expect to achieve by implementing the strategies of the introduced mammal and bird control programme. A key is provided in the diagram.

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Affordability	Strategy effectiveness
Mammal control at focus sites	High	Low	Very expensive	Low
Canada goose monitoring and control	High	Medium to high	Expensive	Medium

STRATEGY EVIDENCE

Across the country there are many examples that show that coordinated and targeted introduced animal control can be achieved at a landscape scale. Many of these efforts receive money and support from Predator Free 2050 and are focused on different introduced species.

ASSUMPTIONS MADE

- Control of browsing mammals will support the regeneration of native vegetation in the focus areas
- Control of predatory mammals will protect populations of threatened native species

STRATEGY MEASURES

The progress of this strategy will be monitored by the following measurements:

- In situ ecological outcomes such as:
    - Abundance of deer palatable plants at browse level
    - Seedling to sapling ratio indicative of a self-sustaining forest
    - Saplings without antler rub
    - Area of forest floor not disturbed by pigs
    - Absence of possum browse
- Appropriate monitoring of threatened native species

STRATEGY TIMEFRAME

- Immediately – there are foundational activities that will take time to establish

PEOPLE INVOLVED

This strategy could be lead by:

- Mana whenua/ Rūnaka
- Landowners
- Community

The strategy could be supported by:

- DOC
- ORC
- Forest & Bird
- Catlins Biodiversity Group
- Hunting groups could help with Canada Goose control
- Catchment Groups

- Experienced contractors and operators

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Foundational Action	Description	Who
Mammal Control Coordination Group	Form a group to lead, coordinate and focus invasive mammal control work, including: • Mapping priority areas • Planning on-ground works • Accessing funds and resources	Mana whenua, community, DOC, environmental NGOs and ORC Biosecurity Team form a group. ORC can support mapping and data analysis.
Canada Geese Monitoring	Investigate Canada geese issue using: • eBird to seek data on numbers • a community monitoring project could also be established and, if necessary, organise a control strategy	Catchment Group / farmer organisations to be involved in evidence gathering. ORC can provide annual data updates.

STRATEGY 2. WEED CONTROL STRATEGY

Of the 25,000 exotic plants that humans have introduced to New Zealand, 3,000 have been found growing wild and 1,800 have become environmental weeds (Parliamentary Commissioner for the Environment 2021). Some weeds are site specific, some are ecosystem specific (for example freshwater Lagarosiphon in the Puerua river) and some live on the boundaries between ecosystems.

There are two strands to the weed control strategy: (i) control weeds in targeted areas and (ii) suppress growth and spread of weeds across the region. The first strand is a pressure reduction strategy that aims to decrease the negative impacts that invasive exotic plants have on ecosystems through coordinated removal of weeds in targeted areas. Strand 2 is a pressure reduction strategy across the whole Catlins.

RELATED VALUES

This strategy will contribute to the health of the following values:

- Wetlands
- Terrestrial native ecosystems
- Dunes and beaches
- Estuaries
- Freshwater

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are to:

- Increase effectiveness of weed control work in target areas through collaboration
- Increase public knowledge of key weeds
- Permanently reduce the area-wide coverage of invasive plant species
- Increase native plant coverage in focus sites once the weeds have been removed

The outputs of this strategy will be:

- The formation of a weed task group
- Public education materials

FOCUS AREAS FOR ACTIVITIES

As invasive weeds are so widespread, mapping helps prioritise where the work could begin (Figure 19 below).

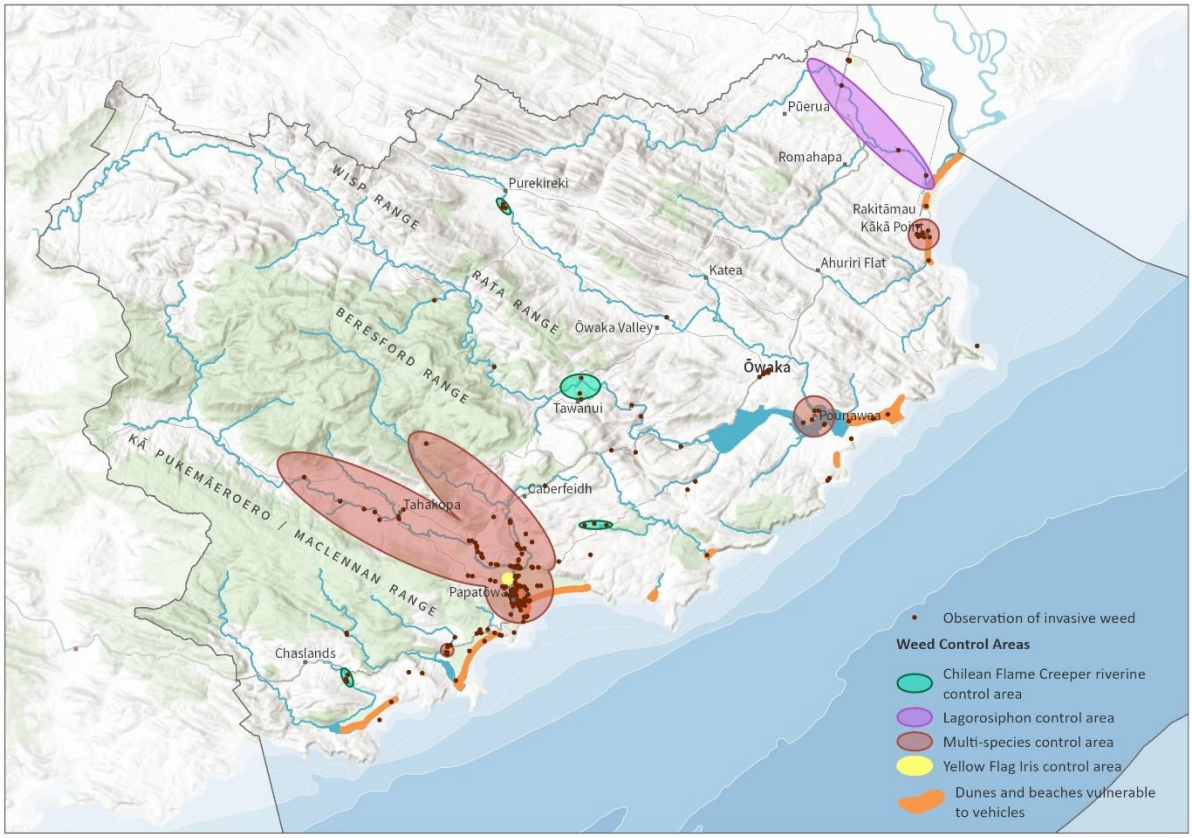

Figure 19. A map of The Catlins showing the suggested locations of priority areas for weed control.

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are shown in Figure 20 below.

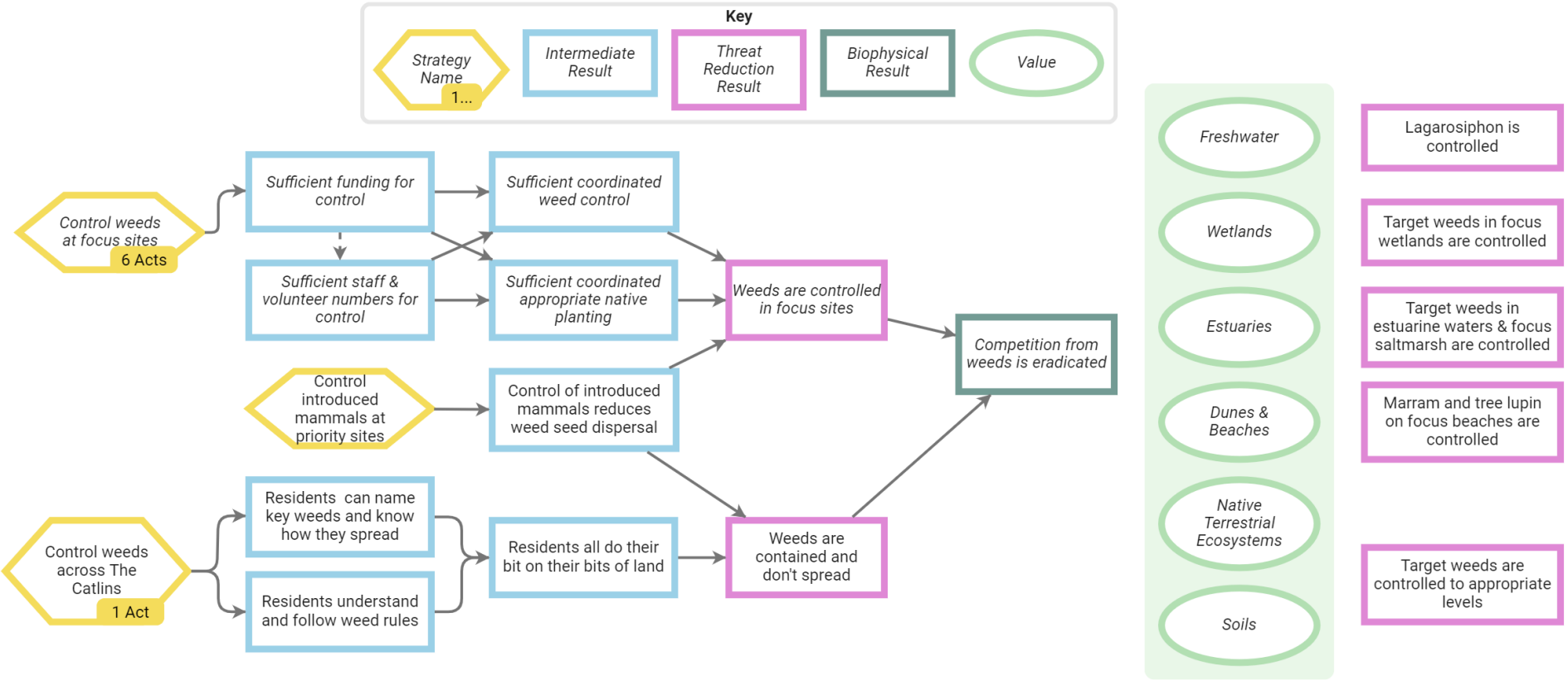

Figure 20. This diagram shows the results we expect to achieve by implementing the strategies of the weed control programme. A key is provided in the diagram.

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Cost	Strategy effectiveness
Control weeds in priority areas and suppress weed growth and spread across the region	High	Medium	Expensive	Low

STRATEGY EVIDENCE

There are many excellent examples of successful community weed control initiatives/projects in the Parliamentary Commissioner for the Environment's 2021 report: Space Invaders: A review of how New Zealand manages weeds that threaten native ecosystems.

- Stewart Island / Rakiura Community & Environment Trust (Aim to enhance the environment around settled parts of the island. Weed control, particularly of Darwin's Barberry)
- Project De-Vine Environmental Trust in Golden Bay (Control of passionfruit, old man's beard, and other weeds to form a weed-free buffer zone around their national parks)
- Weed Action Native Habitat Restoration Trust at Whangārei Heads (Restore native habitat through site specific control, community awareness and landscape scale management)
- Te Roroa: Te Toa Whenua (weed control after plantation forest harvesting to ultimately regenerate native forest)

ASSUMPTION MADE

- Long term resourcing will be secured for continued weed control and that the community and contractors have the time and will to do the work.

STRATEGY MEASURES

The progress of this strategy will be monitored by the following measurements:

- Area of weed control work carried out per year
- Area of land planted with natives per year
- Number of engagements with public per year

STRATEGY TIMEFRAME

This strategy was rated as beginning in the short term.

PEOPLE INVOLVED

List the people/groups/agencies who will do the work and who will monitor the work

- Landholders (undertake invasive pest plant control work)
- Catchment Groups (planting)
- ORC (advice and monitoring)
- Other groups working on introduced species control and/or habitat restoration such as South Otago Forest and Bird, Papatōwai Barberry Busters

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Initial actions which will enable us to progress this strategy are outlined below:

Foundational Action	Description	Who
Weed task group	Form a group to lead, coordinate and focus weed control work, including: • Mapping priority areas • Planning on-ground works and monitoring • Accessing fund and resources including suitable plants to fill gaps following weed removal	Mana whenua, community, DOC, Papatōwai Barberry Busters, South Otago Forest and Bird. ORC Biosecurity Team can provide advice, ORC can help with mapping and prioritisation.

STRATEGY 3. SUSTAINABLE FARMING STRATEGY

DESCRIPTION

Farming is the largest industry in The Catlins, making up 41% of total employment in the area (using data from ANZSIC 200612). Farmers work within many rules and regulations and follow industry standards all of which regulate the effects that farms can have on the environment. Some of these rules are currently in flux as the Government has signalled that it will overhaul the rules around freshwater management when it reforms the Resource Management Act. This uncertainty around the rules puts pressure on farmers, including those who go over and above the regulations and standards.

Across the country, catchment groups have successfully worked to support farmers to collectively make a positive difference in their area. Otago South River Care is currently the only catchment group active in The Catlins, although others have operated until recently. This strategy is to enable these catchment groups to support their members to effect positive change.

This is a pressure reduction strategy.

RELATED VALUES

This strategy will improve the health of the following values:

- Terrestrial Ecosystems
- Freshwater Ecosystems
- Wetlands
- Estuaries
- Soils

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are:

- Farmers are supported in the work that they do to enhance the environment on their farms
- Productive soils are kept on the land and out of the waterways
- Improved water quality across the area

The outputs of this strategy will be:

- Reinvigorated catchment groups who meet regularly and promote “on-farm” change
- A farming community that feels connected to each other and supported in their work
- An increase in land management actions that improve water quality

FOCUS AREAS FOR ACTIVITIES

This is an “across area” strategy covering the whole of the Otago part of the Catlins

- Encourage and support farms with fewer land management actions to improve their work
- Focus on low cost – high return initiatives first and seek support to determine these

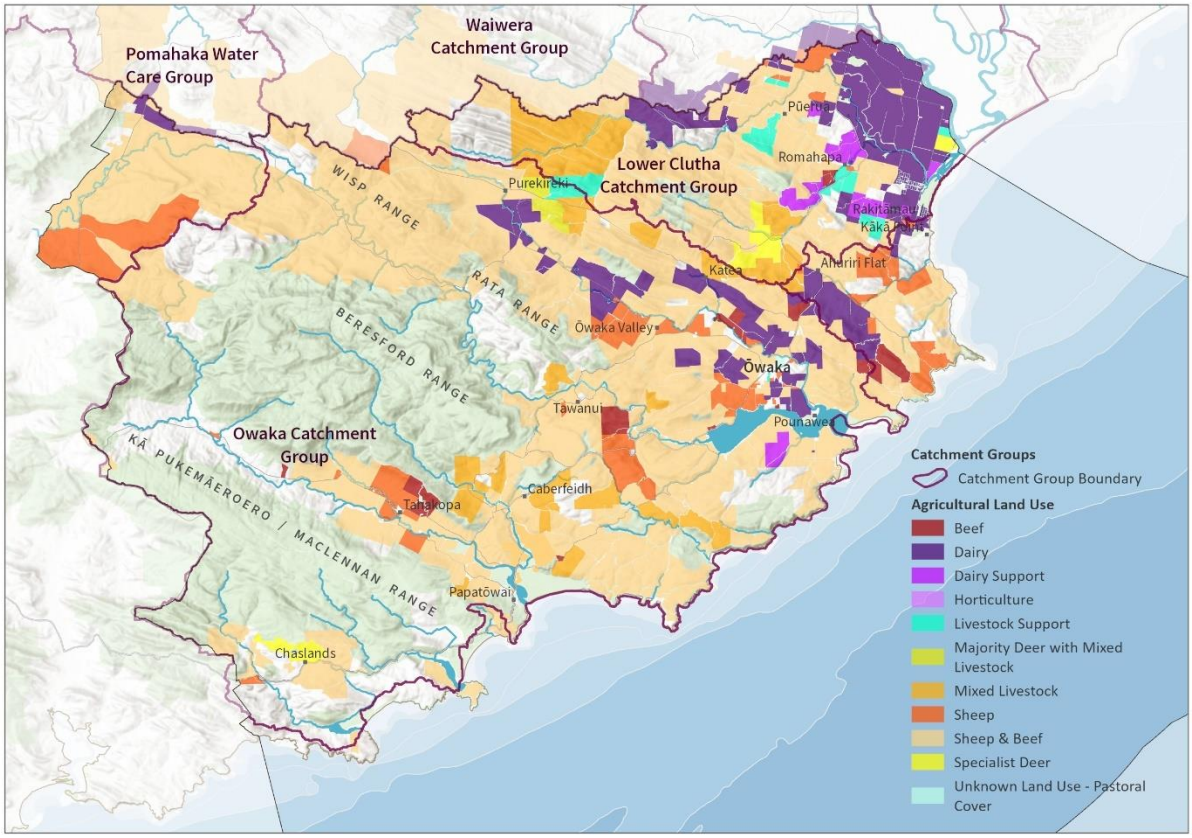

Figure 21. A map of The Catlins showing the primary farming practice on agricultural properties and the boundaries of the current catchment groups

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are show in Figure 22 below.

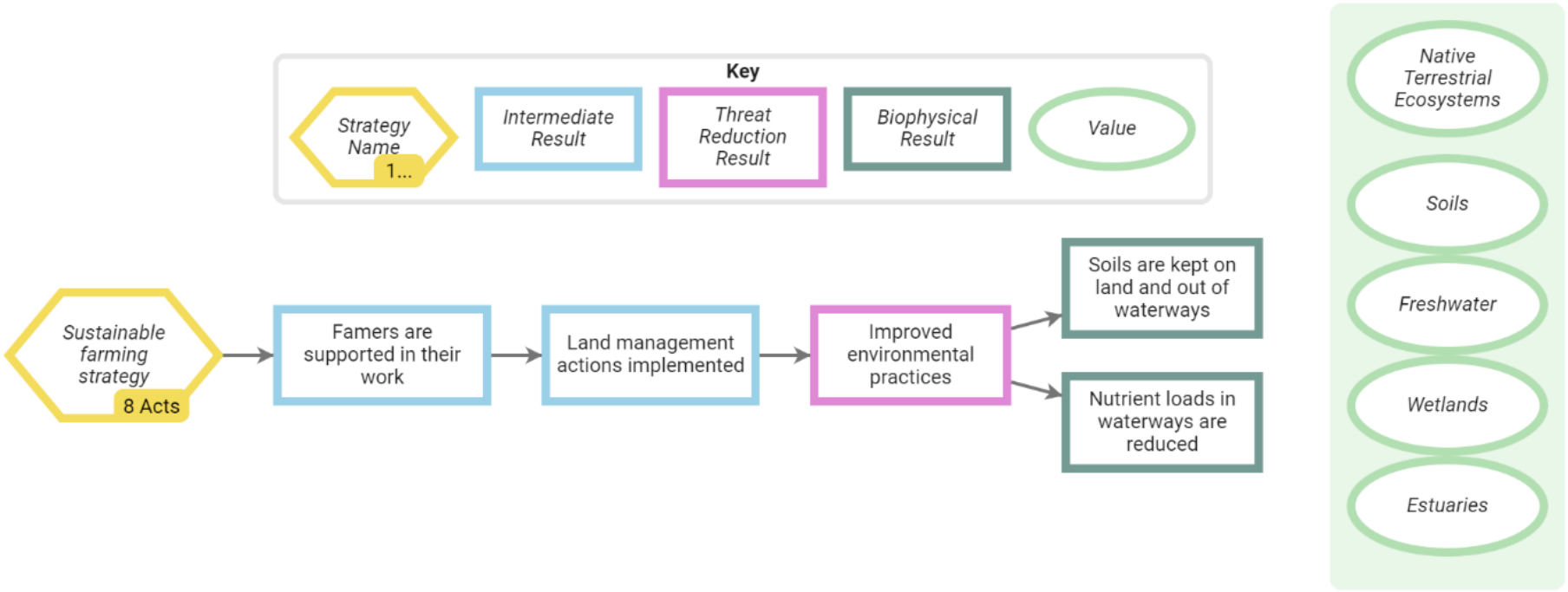

Figure 22. This diagram shows the results we expect to achieve by implementing the strategies of the sustainable farming programmes. A key is provided in the diagram

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Cost	Strategy effectiveness
Sustainable Farming	Medium	Medium	Cheap (not including funding for remediation work)	Medium

STRATEGY EVIDENCE

"Our Land and Water" National Science challenge has extensively studied the successes of catchment groups in promoting on-farm change. They have a collection of resources for catchment groups on their website. Both Otago Catchment Community (OCC) and the NZ Landcare Trust/Ngā Matapopore Whenua work extensively with rural communities to support catchment groups and have staff and resources to support catchment groups that have made significant differences to water quality in their catchments.

ASSUMPTIONS MADE

- Assumption that farmers have time and energy to be more actively involved in catchment groups. This is not necessarily the case, as farmers are currently under a lot of stress
- Assumption that focused and collective action will improve water quality. Evidence for this will come from the water monitoring that already happens, however it is important to remember that seeing changes in these measurements could take 15-20 years

STRATEGY MEASURES

The progress of this strategy will be monitored by the following measurements:

- Number of catchment group meetings and events, and the variety of folks who reflect the different land uses that attend these meetings and events.
- Number of focused land management actions that improve water quality

STRATEGY TIMEFRAME

This strategy was rated as beginning in the short term.

PEOPLE INVOLVED

- Led and monitored by Catchment Groups
- Supported by OCC, NZ Landcare Trust, ORC's catchment advisors. Water Quality State of the Environment is monitored by ORC
- Technical advice available from organisations such as:
    - Beef and Lamb
    - Ag Research
    - ORC for water quality and soil data
    - Fert reps
    - Farm Accountants (for cost feasibility)
    - Farm Consultants

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Initial actions which will enable us to progress this strategy are outlined below:

Foundational Action	Description	Who
Re-invigorated catchment groups	Re-invigorated catchment groups who support landowners in continuing their best-practice land management with actions including: • Field days, discussion groups, workshops, and farmer trial initiatives • Advice on best practice and accessing funds and resources	Catchment groups with the addition of other land users such as forestry. Industry bodies, OCC ORCs catchment advisors can run session on stream health assessment, Intensive winter grazing workshops, riparian management workshops. ORC can advice on monitoring and provide data

STRATEGY 4. SUSTAINABLE FORESTRY STRATEGY

DESCRIPTION

Foresters and forestry companies work with many rules and regulations and follow “best practice” industry standards all of which regulate the effects that forestry has on the environment. Some of these rules as the Government has signalled that it will overhaul the rules around freshwater management when it reforms the Resource Management Act. This uncertainty around the rules puts pressure on foresters, including those who go over and above the regulations and standards. Many forestry companies and those who manage the forests do not live in the area and are not part of the local community and therefore may not be aware of the concerns of the community. This strategy assumes that all forestry in the Catlins follows the regulations in the National Environmental Standards for Commercial Forestry (NES-CF). The strategy is to integrate foresters and forestry companies more closely with the local community, thereby giving them an even greater stake in the health of the area.

This is a pressure reduction strategy.

RELATED VALUES

This strategy will improve the health of the following values:

- Terrestrial Ecosystems
- Freshwater Ecosystems
- Wetlands
- Estuaries
- Soils

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are:

- Forestry companies and those working on Catlins forests are closely connected to and actively involved with the Catlins community
- Foresters are supported in the work that they do to enhance the environment on their land
- Community and contractors who are doing mammal and weed control, and native species monitoring have controlled access to forestry blocks
- Forestry activities keep soils on land and out of the waterways

The outputs of this strategy will be:

- Successful collaborative weed and mammal control programmes and native species monitoring that include forestry blocks
- Improved water quality

FOCUS AREAS FOR ACTIVITIES

As forestry blocks are present across the Catlins, this is a whole of area strategy.

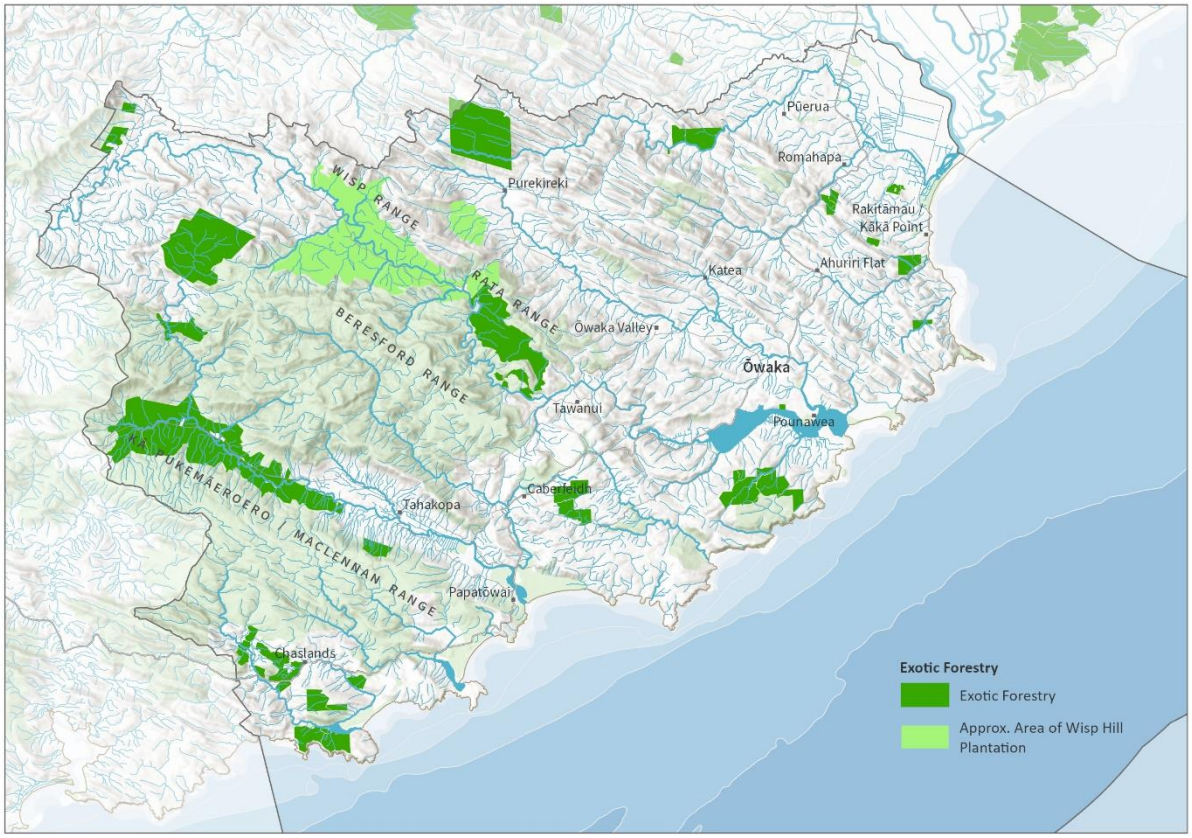

Figure 23. A map of The Catlins showing the location of forestry blocks

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are shown in Figure 24 below.

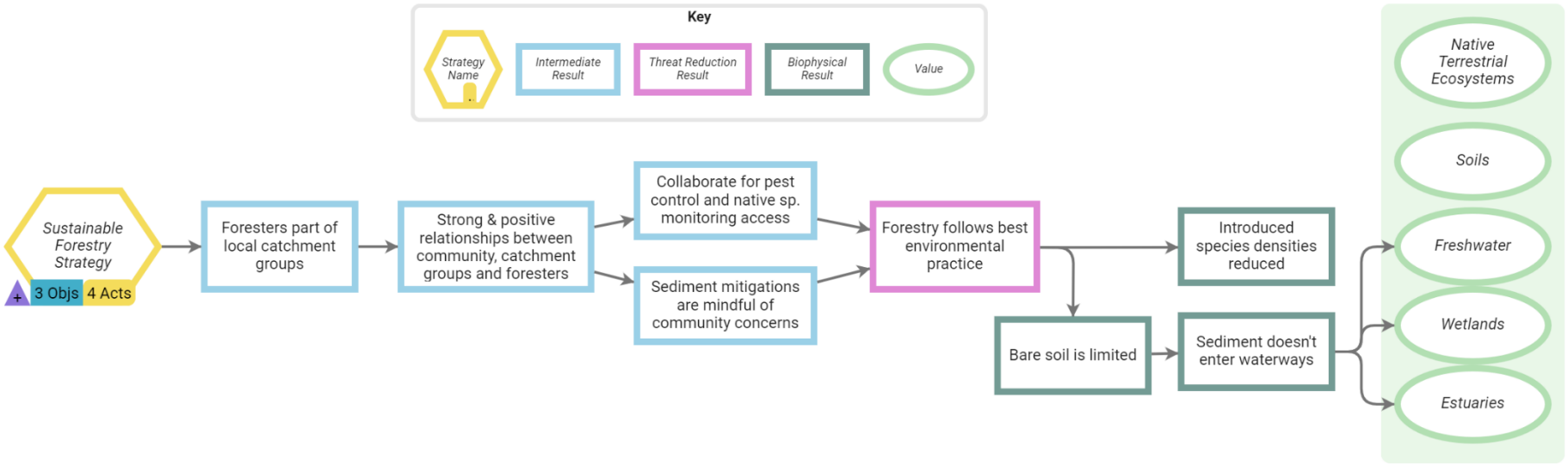

Figure 24. The diagram shows the results we expect to achieve by implementing the Sustainable Forestry strategy. A key is provided in the diagram.

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Cost	Strategy effectiveness
Forestry strategy	Medium	High (but it requires good will)	Cheap (while acknowledging that this takes the community and forester's time)	High

STRATEGY EVIDENCE

There is no researched evidence for this strategy in New Zealand. Internationally some work shows that relationships between landowners and foresters can show environmental benefits.

ASSUMPTIONS MADE

- We assume that if forestry companies are more connected to the people and area in which they work, they will feel more connected to the community, and will therefore align their work more closely to community aspirations.
- This strategy assumes that forestry companies and foresters have the time to be more actively involved in catchment groups. This is not necessarily the case, as foresters are currently under a lot of stress.

STRATEGY MEASURES

The progress of this strategy will be monitored by the following measurements:

- Forestry representatives are invited to and attend relevant catchment group activities
- Forestry blocks are successfully included in collaborative mammal and weed control operations and native species monitoring

STRATEGY TIMEFRAME

This strategy was rated as beginning in the short term.

PEOPLE INVOLVED

List the people/groups/agencies who will do the work and who will monitor the work

- Collaboration between Catchment Groups and forestry companies/foresters
- Supported by ORC

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Initial actions which will enable us to progress this strategy are outlined below:

Foundational Action	Description	Who
Relationship building	Ensure that forestry companies and foresters are connected to the community by: • inviting forestry to join catchment groups • including forestry companies in planning invasive mammal and weed control and native species monitoring • advocating for best forestry practice through ongoing engagement	Catchment Groups, forestry companies, Southern Wood Council Environment Groups Catchment advisor

STRATEGY 5. FISH SPECIES INTERACTION STRATEGY

DESCRIPTION

Trout were introduced to the South Island in 1867 and are prized by anglers for sport and food. Equally, however, the introduction of trout has been detrimental to native freshwater fish and invertebrates. The current National Policy Statement on Freshwater Management requires identification and mapping of desired native and introduced fish species to allow the enabling and restricting of fish passage. The ORC has begun some of this work, and, along with input from mana whenua; Fish & Game; DOC; and fisheries managers, it will form the basis of a fish species interaction strategy.

This is a pressure reduction strategy.

RELATED VALUES

This strategy will contribute to the health of the following values:

- Freshwater Ecosystems
- Estuaries

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are:

- Maintain spawning grounds and habitat
- Protect native fish populations and habitats, including from whitebaiting
- Identify areas where it is appropriate to protect the habitats of introduced fish that have recreational fishing value

The outputs of this strategy will be:

- The habitats of native fish are protected, and diadromous native species can move between the sea and freshwater
- Where appropriate, the habitats of introduced fish are protected and introduced fish can move between the sea and freshwater

FOCUS AREAS FOR ACTIVITIES

Mapping fish distribution (including historical and potential distribution), habitats of importance and barriers to fish passage are the foundational actions for this strategy. These actions will build on national fish passage work already underway, and utilise existing datasets from ORC, DOC and Fish & Game.

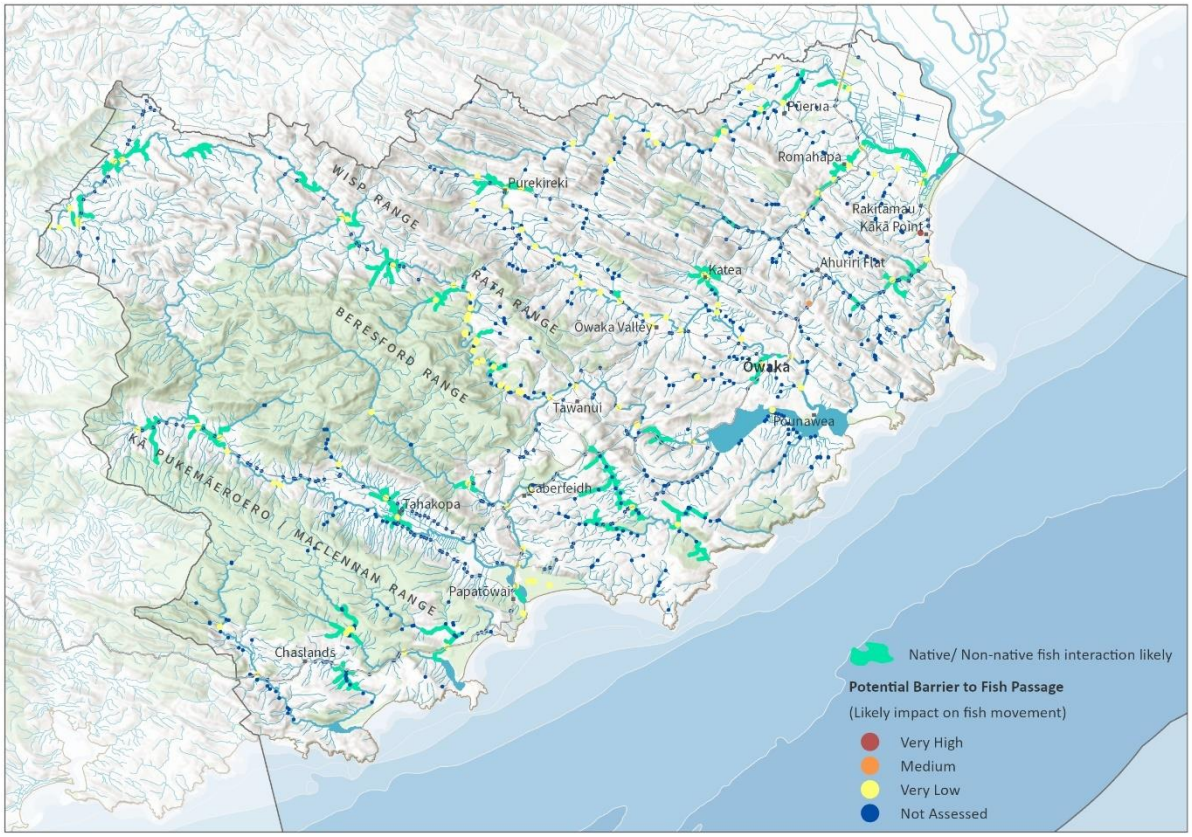

Figure 25. A map of The Catlins area showing the probable native / introduced fish interaction areas and the location of potential barriers to fish passage.

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are:

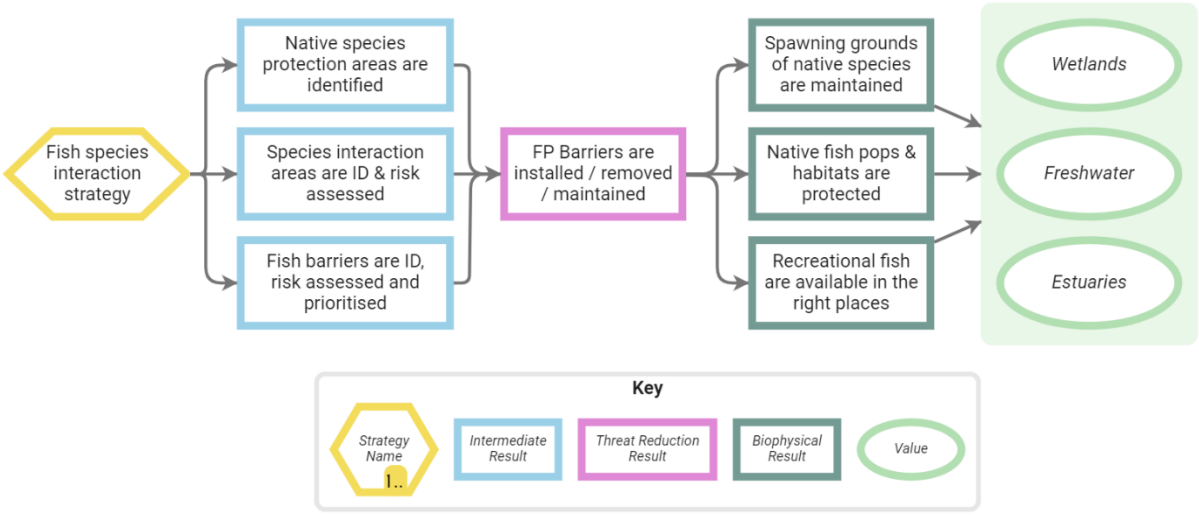

Figure 26. This diagram shows the results we expect to achieve by implementing the Fish Species Interaction Strategy. A key is provided in the diagram.

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Cost	Strategy effectiveness
Fish species interaction strategy (mapping)	High	High	Cheap	High
Fish species interaction strategy (barriers)	High	Medium to high	Expensive	Medium

STRATEGY EVIDENCE

Fish & Game report that trout barriers that have worked elsewhere to protect native fish species. Protecting the spawning habitat of native fish will protect stocks of native fish if predation pressure is lower than recruitment.

ASSUMPTIONS MADE

- That barriers are effective and there are no introduced fish access upstream areas.

STRATEGY MEASURES

The progress of this strategy will be monitored by the following measurements:

- Mapping of native and introduced fish completed
- Trout barrier work planned and completed

STRATEGY TIMEFRAME

This strategy was rated as beginning in the medium term.

PEOPLE INVOLVED

The strategy is led by ORC and supported by mana whenua, landowners, Fish & Game and DOC

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Initial actions which will enable us to progress this strategy are outlined below:

Foundational actions	Description	Who
Fish mapping	Identify areas that are important for native and introduced fish species. This work includes species and habitat datasets and incorporation of Mātauraka and community knowledge. Potentially include eDNA sampling	ORC, supported by Fish & Game, DOC, Forest and Bird, mana whenua and community. Catchment groups or individuals supported by ORC
Document and assess fish passage barriers on private land	Work with landowners to document the location and assess barriers. Work with landowners to document the location and assess fish barriers	Catchment groups or individuals supported by ORC

STRATEGY 6. OVER-HARVESTING STRATEGY

DESCRIPTION

Wild food harvesting of fish and shellfish is important to many who call The Catlins home and is also an activity that attracts visitors to The Catlins. There are established whitebaiting stands, and fish and shellfish are gathered from the estuaries, beaches, and rocks. National rules set catch limits and catch methods for many of these species, but these rules are infrequently policed. Locals report that the abundance and sizes of many species are not what they remember from when they were growing up.

The evidence for over-harvesting is currently qualitative but needs to be quantified to determine whether there is a need for greater surveillance and protection for these resources. As it is not safe or appropriate for kaitiaki rangers and locals to question people about their harvest/catch, this quantitative evidence needs to be collected based on the stocks and sizes of key organisms in the environment. This monitoring could be carried out either by community and mana whenua or be done by professionals.

This is a pressure reduction strategy.

RELATED GOALS

This strategy will contribute to the following values:

- Freshwater Ecosystems
- Estuaries

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are:

- Monitor and quantify the changes in abundance and size of key species
- Lobby for greater surveillance and protection of key species

The outputs of this strategy will be:

- A quantitative evidence base for decision-making

FOCUS AREAS FOR ACTIVITIES

- This is an area-wide strategy. See Figure 27 below.

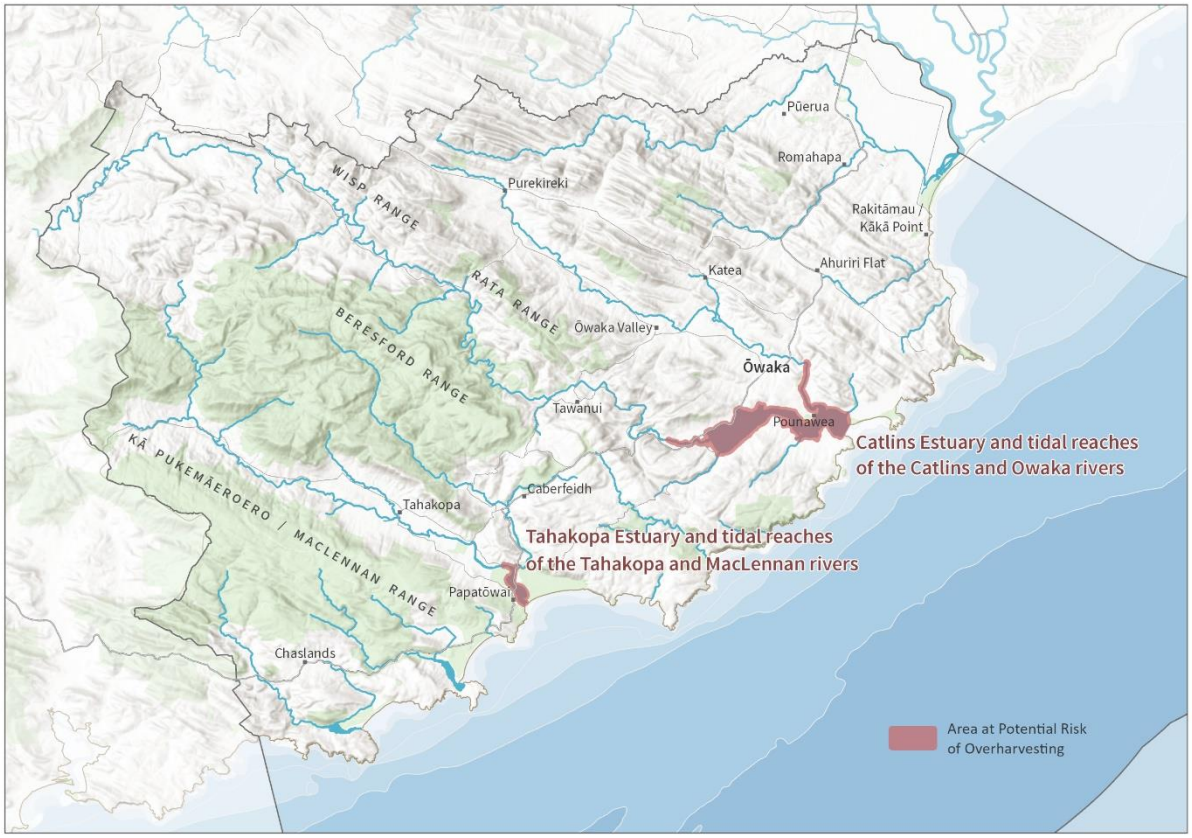

Figure 27. A map of The Catlins showing the location of the main areas thought to be at risk of potential fish and shellfish over-harvesting.

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are:

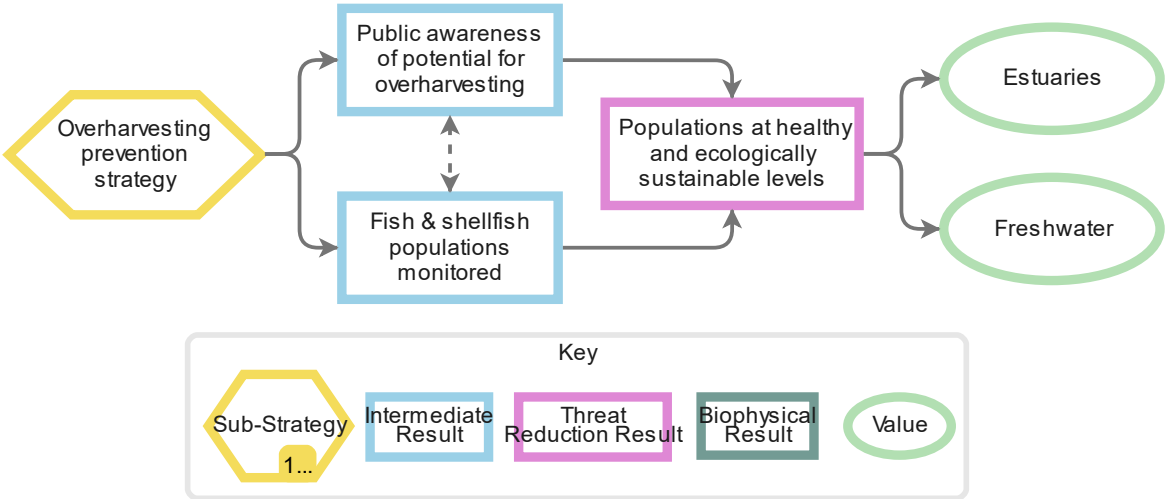

Figure 28. This diagram shows the results we expect the achieve by implementing the Over-harvesting Strategy. A key is provided in the diagram.

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Cost	Strategy effectiveness
Overharvesting strategy	Medium-High	Medium	Medium	Medium

STRATEGY EVIDENCE

In the Hauraki Gulf community shellfish monitoring programme, Waikato Regional Council supports community groups to survey the shellfish on Hauraki Gulf mudflats. By using consistent methods, these surveys have become part of a long-term fisheries monitoring dataset. Another long-term data set that can be investigated are customary permit data collected by iwi.

ASSUMPTIONS MADE

- Unreported harvesting over catch and bag limits is occurring in the area
- If people are aware of the limits, then they will keep their catch within the limits

STRATEGY MEASURES

- Greater visibility of fisheries monitoring
- Establishment of a community shellfish monitoring programme

STRATEGY TIMEFRAME

This strategy was rated as beginning in the short term.

PEOPLE INVOLVED

- Led by mana whenua and community
- Supported by the MPI (for shellfish) and DOC (for whitebait) and mana whenua

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Initial actions which will enable us to progress this strategy are outlined below:

Foundational actions	Description	Who
Community monitoring and education programme	Establish a community monitoring programme to establish an evidence base which will provide evidence for overharvesting. Ensure that catch limit signage is visible and current at popular access areas	Mana whenua Community DOC Supported by ORC

STRATEGY 7. HUMAN BEHAVIOURS STRATEGY

DESCRIPTION

The Catlins is home around 1600 residents and is visited by many visitors yearly. Living, working, and playing in a place always has effects on that place, but these effects need not be detrimental, especially if locals and visitors take care about the effects that their activities have on the place.

This strategy has four strands.

OFF-LEAD DOGS

Although dogs are much loved pets and working animals, when not under control, they can cause disturbance and even death to native wildlife. Dogs are known to kill both adult and juvenile hoiho/yellow eyed penguins in Otago (Hocken 2005) and nesting shorebirds in northern New Zealand were shown to perceive dogs as more of a threat than humans (Lord et al. 2001). Out of control dogs can also harass and harm valuable stock animals. This strategy seeks to minimise disturbance to sensitive wildlife by educating dog owners and better dog-control will equally benefit farmers.

VEHICLES ON BEACHES

International research shows that vehicles driving on beaches and dunes can pose a threat to sensitive vegetation and wildlife and erode dunes unless appropriately managed.

SEPTIC TANKS

Poorly managed and old septic tank systems potentially increase the nutrient and pathogen load (particularly *Escherichia coli* (*E.coli*)) in Catlins freshwater and estuarine ecosystems. *E.coli* is a useful indicator of faecal contamination and the presence of disease-causing organisms that can cause illnesses in humans. *E. coli* is present in the guts of all warm-blooded animals (mammals and birds) so although the *E. coli* load in the area's river catchments are high, it would take source monitoring to identify the fraction of *E.coli* load that can be attributed to humans. Nutrient load, particularly from nitrates, nitrites and phosphates are also high in some of the Catlins river catchments. This increased nutrient load can be attributed to both natural (human and animal) and artificial sources such as fertilisers. Hence the proper use and upkeep of septic tanks, along with introduced mammal control, introduced waterfowl control, sustainable farming practices are expected to all make some difference in the *E. coli* and nutrient loading of rivers in the area.

PLASTICS AND WASTE

Catlins locals report overflowing rubbish bins, especially in highly visited areas, litter not even placed in the bins, litter on beaches, and how hard it is to successfully use the farm-plastics collections services. Additionally, the Review of the Catlins Community Tourism Strategy includes waste and recycling as an important area to address.

RELEVANT BYLAWS AND GUIDELINES

This is a pressure reduction strategy, and each strand has associated bylaws and guidelines that are already in place.

- CDC's 2022 Regulatory Bylaw indicates on which beaches you can and cannot walk dogs, and that you must put dogs on a leash within 20m of wildlife, and DOC also has guidelines on where you can, and cannot, take your dog.

- The regulations that control the use of vehicles on beaches are complex: CDC's "vehicles on beaches" bylaw sets some rules, but other agencies including DOC, ORC, and NZ police also have responsibilities in this space.
- The ORC's "Otago Water Plan" currently regulates discharges into the environment, including septic tank systems. The Water Plan will be replaced by the ORCs Land and Water Regional Plan when this plan is notified. CDC also has a "Water Services Bylaw" which mentions sewerage.
- CDC has guidelines on waste minimisation, has a "Waste Management and Minimisation Plan" and has the "Solid Waste Bylaw" which covers waste within the district.

RELATED VALUES

This strategy will contribute to the health of the following values:

- Dunes and beaches
- Terrestrial ecosystems
- Freshwater Ecosystems
- Wetlands
- Estuaries
- Soils

STRATEGY OBJECTIVES AND OUTPUTS

The objectives of this strategy are:

- Locals and visitors understand and follow the bylaws and guidelines

The outputs of this strategy will be:

- Reduced impacts from these activities on wildlife and the environment

FOCUS AREAS FOR ACTIVITIES

This is an area-wide strategy. See Figure 29 below.

Figure 29. A map of The Catlins showing the location of the main areas thought to be at risk of harmful human behaviours.

THEORY OF CHANGE

When we successfully implement this strategy, the expected flow-on effects and expected results are:

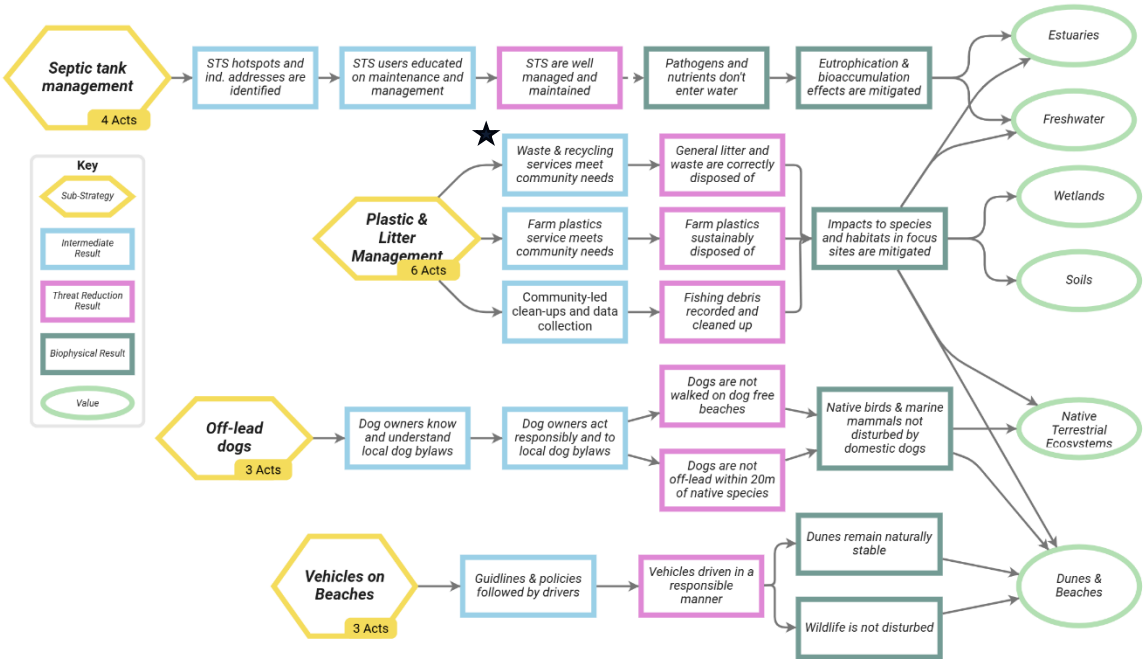

Figure 30. This diagram shows the results we expect to achieve by implementing the Human Behaviours strategy. A key is provided in the diagram. The * next to the "Waste and recycling services meet community needs" box denotes that this is the only part of Plastics and Waste strand that is part of buisness as usual for CDC.

STRATEGY EFFECTIVENESS

STRATEGY RATING

Each strategy was rated by the CICG on its potential impact, feasibility, and estimated affordability. These ratings were multiplied together to give the effectiveness of the strategy. The strategy effectiveness can be used to guide priority setting in subsequent operational and work plans.

	Potential impact	Feasibility	Affordability	Strategy effectiveness
Human behaviour strategy	Low	Medium	Cheap	Low

STRATEGY EVIDENCE

Behaviour change takes time, education, constant ongoing effort and an understand of people's motivations. For example, an Australian education campaign to keep dogs on leashes in koala habitat found that the strongest driver for owners putting dogs on leashes was the risk of fines and concerns for dogs' safety and wellbeing. Forest and Bird's 2023 report on vehicles on beaches in New Zealand recommends both resourcing the compliance and enforcement of the rules and providing better education about the rules concerning driving on beaches.

ASSUMPTION MADE

- That, if locals and visitors are aware of the guidelines and bylaws, that they will follow them.
- That breaches of the guidelines and bylaws are reported, investigated and can be remedied by the responsible agencies.
- That following the guidelines and bylaws is sufficient to prevent the harmful effects that these activities can have on wildlife and the environment.

STRATEGY MEASURES

Measures for monitoring this strategy will be collaboratively developed by the agencies involved as appropriate.

STRATEGY TIMEFRAME

This strategy was rated as beginning in the medium term.

PEOPLE INVOLVED

List the people/groups/agencies who will do the work and who will monitor the work:

- The lead and support agencies are outlined in the table below
- Input and support should be sought from mana whenua and community

ACTIONS REQUIRED TO IMPLEMENT STRATEGY

Initial actions which will enable us to progress this strategy are outlined below:

Strategy strand	Foundational actions	Description	Who
Septic tanks	Education	• Identify septic tank hotspots • Develop appropriate education campaign	ORC, with the support of CDC
Plastics and litter	Covered under current work plans	• CDCs transfer station review • CDC business as usual as per 2024 Waste Management and Minimisation Plan	CDC, with the support of the Regional Waste officer
Off-lead dogs	Covered under current work plan	• DOCs business as usual • CDCs freedom camping ranger	DOC, with the support of CDC
Vehicles on beaches	Covered under current work plans	• CDCs freedom camping ranger • CDC business as usual	CDC with the support of ORC, DOC

PROGRAMME 1. DUNE RESTORATION / MODEL BEACHES PROGRAMME

DESCRIPTION

The dune restoration programme or model beach programme stems from the CICG's ambition to have some parts of The Catlins dune system returned to an approximation of their original condition. Figure 31 illustrates the dune systems in The Catlins, and Value 6 describes the current state of the Catlins dunes. There are four strategies that collectively become the Dune restoration or model beaches programme:

- Weed control strategy
- Introduced mammal and bird control strategy
- Off-lead dog strand
- Vehicles on beaches strand

A 2016 report prepared for DOC by Dr Teresa Konlechner recommended focus areas for dune restoration. Following recent discussions with her, the dunes that the report recommended for restoration are eroding and a new set of priority dunes where the sand is gathering should be explored as the foundational action for this programme.

ACTIONS REQUIRED TO IMPLEMENT PROGRAMME

Initial actions which will enable us to progress this strategy are outlined below:

Foundational Action	Description	Who
Dune restoration coordination group	Form a group to lead dune restoration including: • List and map dunes on which sand is increasing • Prioritise that list for potential restoration including consultation with affected parties • Accessing fund and resources to begin the restoration work • Consult on restoration best practice	Community, mana whenua, CDC, other stakeholders ORC natural hazards may help prioritise the list ORC may help with mapping and science advice

THEORY OF CHANGE

When we successfully implement this programme, the expected flow-on effects and expected results are shown in Figure 31 below.

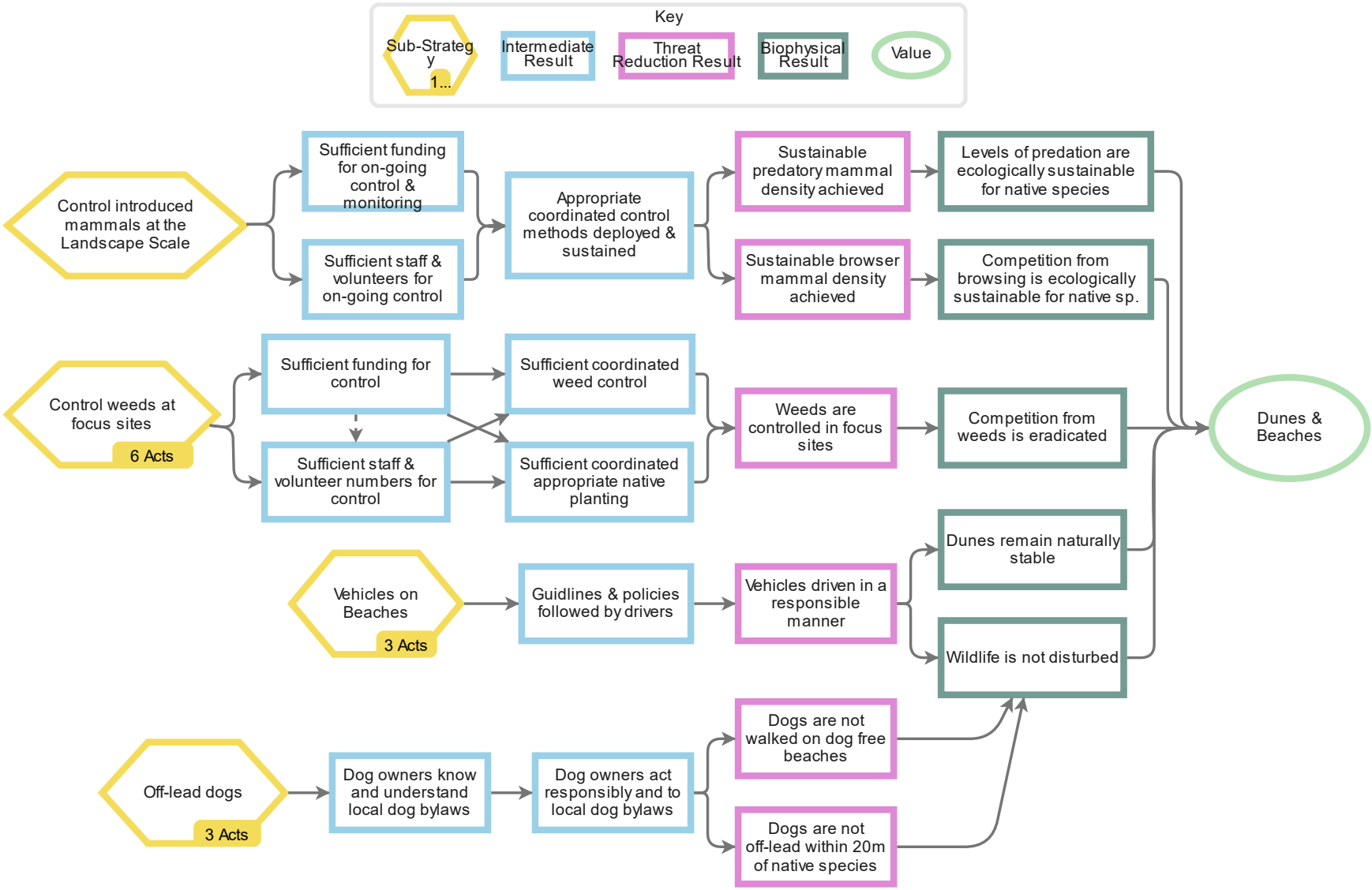

Figure 31. The diagram shows the results we expect to achieve by implementing the Dune Restoration Programme.

MONITORING FRAMEWORK

We monitor whether the plans' strategies and actions are making an impact on the health of the values. Monitoring is a vital part of adaptive management, which allows plans to be written based on the best available knowledge and continuously improved based on the monitoring results. As the plan progresses, strategies and actions can be improved based on the results of the monitoring.

This plan does not specify measures for cultural monitoring as those will be defined, when appropriate, by mana whenua.

REPORTING

The monitoring data will be reported on the Plan's online hub, which can be reached here.

COMMUNICATING THE PLAN

These four groups make up the audiences for the communication of this plan.

- This plan has been co-developed with representative from The Catlins community and mana whenua and the successes, failures and changes in the plan must be communicated to those who helped develop the plan.
- The wider Catlins community and stakeholders who are interested in The Catlins, should also be able to keep track of the plan.
- Mana whenua, both at a whānau and rūnaka level, but also including the landowners/trustees of SILNA land, and any parties leasing land.
- The wider natural resources management community may be interested in the successes and failures of the plan as these data increase the evidence base for others who are developing plans such as these.

COMMUNICATION ACTIONS

There are two main avenues for the communication of this plan.

- This document is the first output of the planning process and will be proactively and widely shared. It is important to note that this plan represents a snapshot in time, with the current concerns of The Catlins mana whenua and community, the current available knowledge and the current rules and regulations. This document should therefore be viewed as the basis and beginning of a conversation that will continue and evolve as time progresses.
- The second avenue for communicating this plan is an ArcGIS Hub, which is an online and interactive site that allow everyone to track the progress of the plan through dashboards and maps. This will be maintained by the ORC and interested parties will be able to add their actions and data to the Hub and follow the progress of the plan.

REVIEW

This plan is based on the principals of adaptive management, which recognises that knowledge of an ecosystem will always be incomplete, but incomplete knowledge cannot be a barrier to beginning work to protect and enhance the environment. Adaptive management plans are based on the best available evidence, from science, from Mātauraka Māori and from evidence provided by the community.

Adaptive management requires plans to be monitored and reviewed regularly, to allow new information as well as the lessons from current iteration of the plan to be incorporated into future plans and practice.

The temporal scope of this plan is 10 years, and the plan will be reviewed at the following milestones:

- There will be an 18-month health check. The early stages following a plans' launch can feel slow with multiple new work streams and a new team learning to work together. The 18-month health check will check to see which strategies are on track, which have yet to be begun and which need small changes or extra support.
- 5-year evaluation review. This is halfway through the scope of the plan and this review will be more thorough than the 18-month health check. It will monitor the progress and success of the strategies and reflect on the work to date. It will also re-examine the situation diagrams and theories of change on which the current plan is based.

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