Issue: Lagarosiphon

What is it?

Lagarosiphon major (oxygen weed) originates from Southern Africa and was first recorded in NZ in 1950. It was introduced as an aquarium plant but can now be found all over the country

Why is it an issue?

- Grows 2cm a day to reach 5 metres
- Quickly dominates waterways
- Lacks natural predators and disease
- Native species cannot compete with the altered pH and light conditions created by dense weed beds
- 500ha of the lake bed (1/5th of total lake) is suitable for Lagarosiphon
- 139ha is used for recreation
- In recent years we have seen a decline in water-orientated activities due to the increasing safety risk of weeds entangling around feet, propellers and possessions.

'No-management' is not an option for Lake Dunstan. Although it is found all around the lake, it will continue to threaten public safety, water quality and biodiversity as beds become more dense.

Tackling the issue

LINZ has responsibility for the management of Crown owned lands and waterways including the bed of Lake Dunstan and associated weed/pest control programmes.

Contact Energy and **ORC** also financially support management activities in the area.

What has been done

Lagarosiphon is an incredibly difficult pest to remove from water bodies. Various methods are used to control it, each dependent on the characteristics of each location.

In 2016 LINZ created the 'Lake Dunstan Weed Management Committee' to tackle the weeds.

Lake Wanaka is upstream of Lake Dunstan and therefore has priority on weed removal before clearing can begin downstream.

NZ spends millions every year to control aquatic weeds. Enforcing the 'Check, Clean, Dry' initiative reduces the risk of spread to non-infected water bodies.

What will be done

LINZ, NIWA, local stakeholders and council are continually improving practices and researching new methods to help combat this issue.

LINZ and NIWA annually review management and plan for the next years methods.

Once removed from upstream and Lake Wanaka, clearing can begin in Lake Dunstan and bottom lining can prevent regrowth

Learn more on our website:

www.lakedunstan.org

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Issue: Silt/Sediment

What is it?

Most of the sediment comes from the Shotover River which feeds into the Kawarau river; 1.6 to 2 million m³ annually. Before the dam, sediment would be deposited in the Pacific ocean 75 km southwest of Dunedin.

Why is it an issue?

- The Kawarau arm is no longer viable for recreational activities such as swimming, fishing or boats due to sediment shifting the shoreline and blocking the boat ramp.
- The visual beauty of Old Cromwell is impacted by the driftwood and Lagarosiphon that wash onto the sediment.
- Sediment contains organic matter that removes oxygen from the water as it decomposes. Anaerobic conditions can alter pH levels, create algae blooms, cause swimmer's itch and local extinction of native species.

Ways to solve/ manage the issue

- The issue we face is how to manage the sedimentation and the transition of the Kawarau Arm.
- Accelerating the sedimentation will create land that can be planted and landscaped for recreational use.
- Dredging of the sediment and moving it elsewhere would allow access to the boat ramps and swim areas lost. Both come with benefits and problems that Contact Energy are currently accessing.

Reports before the dam concluded that sediment buildup was expected in the Kawarau Arm. The issue however is the poor managed of its transition.

Tackling the issue

Contact Energy is legally responsible for the effects caused by the Silt in the Kawarau Arm.

The Lakebed and shoreline of the Kawarau arm is Crown land managed by **LINZ.**

What will be done

Contact Energy has monitored the area since 1993 but has not implemented any significant management other than compliance with consent conditions to remove silt at the Bannockburn Inlet and Lowburn Inlet.

LDCT has recently sought the legal opinion of a specialized RMA barrister to support the legal opinion that Contact Energy is responsible for the effects caused by the Silt in the Kawarau arm. This opinion was supported by the ORC.

Contact energy is currently creating new plans to manage the visual amenity values and transition of the Kawarau Arm.

Issue: Water Quality

What is it?

Land Air and Water Aotearoa (LAWA) measure water clarity, chlorophyll content, total phosphorus and total nitrogen to produce a Trophic Level Index (TLI). For the last 10 years Lake Dunstan has scored 'good' and 'fair'. 'Good' = high oxygen content and low organic content where algae and other organisms are rare. 'Fair' = average due to moderate levels of nutrients and algae.

Why is it an issue?

- The '2015-2020 ORC water quality review' recorded phosphorus levels above the acceptable limit. High levels can de-oxygenate water, create algae blooms and increase pollutants that can threaten aquatic ecosystems, humans and pets.
- The 2018 CODC's 10 year management plan reports Cromwell's water supply does not meet the NZ Drinking Water Standards; Protozoa and viruses are not included in treatment. These can cause gastrointestinal and immune issues.
- Dense Lagarosiphon weed beds and sediment create anaerobic conditions and can create foul odours, algae blooms and swimmer's itch.

What will be done

Protozoa and virus protection to water treatment will commence in 2026

NIWA and LINZ are working on other solutions for Lagarosiphon as well as creating annual plans manage it in the lake.

Contact energy is currently creating new plans to manage the visual amenity values and transition of the Kawarau Arm.

As our population grows, improvements to water treatment plants is needed to prevent contamination by sewage runoff and agriculture.

Tackling the issue

The **ORC** is responsible for managing the region's groundwater and surface water resources.

The **CODC** is responsible for the control of activities and their actual or potential effects on the water surface and margins of the river.

LINZ has responsibility for the management of Crown owned lands and waterways including the bed of Lake Dunstan and associated weed/pest control programmes.

Contact Energy is legally responsible for the effects caused by the Silt in the Kawarau arm.

What has been done

The Cromwell Wastewater Treatment Plant upgrade was completed in 2018.

In 2016 LINZ created the Lake Dunstan Weed Management Committee to plan Lagarosiphon control in Lake Dunstan.

Issue: Recreation

What is it?

Lake Dunstan sold as ‘a place of incredible recreational potential’. It is used for a wide range of leisure activities including sailing, fishing, kayaking and swimming. As the population continues to grow, safe recreational space will be in higher demand.

Why is it an issue?

- The Kawarau arm is no longer viable for recreational activities due to sediment shifting the shoreline and blocking the boat ramp.
- In recent years there has been a decline in water-orientated activities due to the increasing safety risk of weeds entangling around feet, propellers and possessions.
- Dense Lagarosiphon weed beds and sediment create anaerobic conditions by removing oxygen from the water and can create foul odours, algae blooms and swimmer's itch.

Tackling the issue

The **ORC** is responsible for determining land use consent and managing the region’s groundwater and surface water resources.

The **CODC** is responsible for the control of activities and their actual or potential effects on the water surface and margins of the river.

LINZ has responsibility for the management of Crown owned lands and waterways including the bed of Lake Dunstan and associated weed/pest control programmes.

Contact Energy is legally responsible for the effects caused by the Silt in the Kawarau arm.

In 30 years Lake Dunstan has fallen into a state of despair. Native wildlife is sparse, water-sports are at risk of vanishing and the lake looks increasingly unappealing.

Ways to solve/manage the issue

- A reduction of weeds in key areas would provide a safer environment for swimmers, boats and fishers.
- As the Kawarau Arm transitions back into a river, Contact Energy need to ensures it is visually appealing and beneficial to the community and wildlife.
- Water and wastewater infrastructure needs to grow with the population.

What will be done

Contact energy is currently creating new plans to manage the visual amenity values and transition of the Kawarau Arm.

NIWA and LINZ are working on other solutions for Lagarosiphon as well as creating annual plans manage it in the lake.

Protozoa and virus protection to water treatment is to commence in 2026.

LINZ donated nearly $1 million to the LDCT for a landscape restoration project that will restore native biodiversity and increase recreational use.

Issue: Pests

What is it?

Pests have been introduced to NZ since humans first arrived 750 years ago. There are 51 plants and animals legally declared as pests in Otago. The Otago region covers 12% of NZ and is considered the most biodiverse.

Why is it an issue?

- Agriculture is Otago's major source of revenue, making $214 million in 2020 (5% of NZs Agricultural GDP). Pest impact production value and can spread disease.
- 5% of Otago's GDP is tourism which relies on picturesque landscapes for hikers, cyclists and water activities.
- Rabbits have become the most devastating pest in the region. They have caused extensive damage to pastoral land, grassland ecosystems and shoreline.
- Lagarosiphon is incredibly successful as it lacks natural predators. Native species cannot compete with the altered pH and light conditions created by dense weed beds.
- In recent years there has been a decline in water-orientated activities due to the increasing safety risk of weeds entangling around feet, propellers and possessions.

Tackling the issue

The **ORC** is responsible for providing leadership on biosecurity issues and strategies.

Landowners are responsible for pest control on their land and the **ORC** enforces this.

LDCT's 'Bridge to Bridge' restoration project will work to remove pests such as lupins and rabbits from the shoreline. They will be replaced with native plants and animals.

Ways to solve/manage the issue

Management is dependent on the species' individual behavioural and ecological characteristic as well as their impact on the environment. In the case of rabbits, regular and assertive methods are needed.

Lagarosiphon is an incredibly difficult pest to remove from water bodies. Various methods are used to control it, each dependent on the characteristics of each location.

What will be done

The ORC's Biosecurity Strategy Plan is focused on pressuring landowners to improve pest control on their land. They have admitted they previously have not done enough to combat rabbits in Otago.

NIWA and LINZ are working on other possible solutions for Lagarosiphon as well as creating annual plans manage it in the lake.

Learn more on our website:
www.lakedunstan.org

Issue: Biodiversity loss

What is it?

82% of plants and 70% of birds are endemic to NZ. Cromwell was dominated by tussocks, kanuka shrublands, beech and totara. A wide variety of birds (e.g Kiwi, Tui and Moa), unique reptiles (e.g. Otago skink) and invertebrates (e.g. Cromwell chafer beetle) called it home.

Why is it an issue?

- Pest plants grow faster and more successful than native. Ecosystem collapse and local extinction has occurred as conditions are changed (e.g. shading, soil pH, local weather).
- The large appetites of rabbits and burrowing habits have caused extensive biodiversity loss through soil degradation and plant damage.
- Predation on birds, bats and reptiles by cats, stoats and rats has drastically reduced native fauna in the region.
- Native fish and invertebrates have seen significant population decline due to introduced fish (e.g.Trout), weeds (e.g Lagarosiphon) and migration barriers (e.g Clyde Dam).

Ways to solve/ manage the issue

- Management is dependent on the species' individual behavioural and ecological characteristic as well as their impact on the environment. In the case of rabbits, regular and assertive methods are needed.
- Various methods are used to control lagarosiphon, each dependent on the characteristics of each location.
- Collaboration is the key for pest removal and biodiversity restoration.

Learn more: www.lakedunstan.org

The Otago region covers 12% of NZ and is considered the most biodiverse. Biodiversity is important to our economy, culture, health and mental wellbeing.

Tackling the issue

The **ORC** is responsible for providing leadership to manage biosecurity issues and strategies.

Landowners are responsible for pest control on their land and the **ORC** enforces this.

LINZ is responsible for biosecurity on land they manage and collaborate with other parties to combat pest species and restore biodiversity.

What will be done

The ORC's Biosecurity Strategy Plan is focused on pressuring landowners to improve pest control on their land.

NIWA and LINZ are working on other possible solutions for Lagarosiphon as well as creating annual plans manage it.

There is many efforts to restore biodiversity including the $5.5 million allocated for wilding conifer clearing and Mōhiki Trust.

LDCT's 'Bridge to Bridge' restoration project will work to remove pests such as lupins and rabbits from the shoreline. They will be replaced with native plants and animals.