



ORC ANNUAL PLAN SUBMISSION

1 Freshwater

Freshwater sources and uses in Otago are greatly varied. Almost a quarter of New Zealand's total lake surface area is in Otago – the Western Otago lakes are valued for recreational opportunities. Annual rainfall differs greatly across the region from less than 400mm near Alexander to 2400mm at the Clutha headwaters. Otago generates 17% of New Zealand's hydroelectricity. Given the breadth of this variation in both sources and uses, Generation Zero supports proactive and progressive action on freshwater management.

1.1

We support the Otago Regional Council's proposal for collaborative community partnerships – especially in supplying scientific knowledge to on-the-ground groups. Getting this part of the plan right is perhaps the most important measure to be implemented moving forward. One especially important place for Otago Regional Council to begin is regarding treaty partnerships with local iwi and hapū – including, Kai Tahū, Kati Mamoe and Waitaha.

1.2

The case study of the Columbia River basin reveals an effective partnership for building indigenous capacity for co-management of natural resources. This project brought together four first-nation tribes who were using the same water catchment for resource-gathering, and therefore were the first to see (and respond to) ecological development or issues. Local government provided scientific and professional training to the first-nations groups, thereby incorporating on-the-ground knowledge with indigenous knowledge in the management process. This allowed government and first-nation groups to pool resources, and build capacity and capability in freshwater management at a regional level. By collaborating and drawing from the same freshwater pool of resources, they were able to develop in-house expertise over time and support their own water-quality monitoring systems. Empowering iwi (and community groups) with scientific knowledge and practice will greatly reduce the burden on skilled workers in New Zealand, who are in short supply and frequently overcommitted. Addressing iwi right in freshwater management is a challenging task, but too important not to do well. Generation Zero has seen Kai Tahū treated more as a stakeholder than a partner – and when viewed as one interested party among many, their voice is diminished.

1.3

By supplying community groups who regularly use or monitor water catchments with scientific resources and knowledge, there is the co-benefit of gathering information on the unique factors influencing the environmental health of each site. While Generation Zero supports the proposed solar powered monitoring buoys due to its information gathering on ongoing ecological processes and longer-term changes, it is important to note that there is no single or ‘minimums-based’ solution to maintaining freshwater management. This is due to the unique ecology, water uses, geology and climate affecting each catchment. This means Iwi, community groups, and local authorities will need to oversee the planning processes at

each catchment to make sure the proposed management correlates with the issues presented at each site.

1.4

One of the biggest challenges facing freshwater management in the Otago region is run-off from agriculture and forestry taking place near catchments. An example of this is the Owaka river, which runs through the most intensive farming area in the region and 70% of the catchment is under pasture. By working directly with farmers and farming communities (especially by providing scientific training and resources) Generation Zero believes there is a fantastic opportunity to address knowledge gaps and improve catchment water quality in agricultural areas. An example of this can be seen in Motueka, where the effects of increasing farming activity resulted in dangerous levels of E. Coli in the Sherry river catchment. Farmers and scientists worked together to test the water, targeting the areas where more run-off was entering the river catchment. By identifying cattle creek-crossing as a key culprit of contamination, bridges were repurposed or built for moving stock, reducing E. Coli levels by 50 per cent. The success of the project resulted in the forming of the Sherry Catchment group, which works with individual farmers for specific plans for each property. This would be a fantastic option for farmers in the Otago region, where farmers face the difficulty of maintaining fences to keep stock from accessing waterways.

2 Climate change

Generation Zero believes that the ORC must provide specific goal orientated approaches for mitigating and managing the effects of climate change. Although we agree that assessing the

impacts of climate change in the Otago region is a good starting point, specified climate action plans and inventories must be introduced. These climate action plans must present comprehensive actions by Otago to lower their carbon footprints and pursue long-term social, economic and environmental agendas. The solutions Generation Zero have put forward in this section demonstrate the role that greenhouse gas emissions reduction targets can have in regions overall development.

2.1

The Queenstown District is New Zealand's fastest growing area. When accommodating for an increasing population Generation Zero believes green growth is an important opportunity. Specifically, Guangzhou, China planned for increasing population and rising demand for energy with a multi-sector, low-carbon plan for green growth, targeting industry, infrastructure and buildings. With energy consumption already high and demand increasing in urban and industrial areas, the Otago region can aim to reduce its carbon emissions and therefore manage the impacts of climate change, while maintaining growth by focusing on industrial planning, architecture (including improved planning and management of the Lower Clutha Flood protection scheme), government agencies and residential communities.

The co-benefits of this plan provide environmental, social, economic and health related advantages. For instance, the plan promotes environmental improvements by strengthening forest carbon sequestration with afforestation (benefiting Otago's biodiversity). In constructing new rail transits within the Otago region and improving the bus networks, the plan also reduces the reliability of personal vehicles. Due to the plan's initiatives, Guangzhou's air quality standard was met 85% of days in 2015, an increase of 8% compared to the prior year. Air quality is a major issue central Otago continues to face, highlighting the strong advantages of implementing low carbon, green growth initiatives.

2.2

A second climate change initiative that provided considerable co-benefits was Singapore's Climate Action Plan, providing the framework for both mitigating and adapting to climate

change impacts. As a dense and low-lying city state (similar to Otago's coastal settlements such as Dunedin), Singapore understood that they must be conscious of its energy consumption as it is vulnerable to the impacts of climate change. The Climate Change Plan allowed Singapore to use its density to its advantage, by ensuring building efficiency and low-carbon transport while at the same time also prioritizing adaptive measures. Results have already shown that the plan's dual focus on mitigation and adaptation is displaying impressive results, reducing the city's environmental footprint and increasing its resilience to climate change, something which would greatly benefit the Otago region. Under the plan, the use of solar power will increase, residents will have access to new career opportunities with the creation of jobs in green industries, the green economy is expected to rise by boosting GDP and the construction of bike paths will enable an active commuting option for residents contributing to general health and wellbeing of the Otago region.

2.3

Extreme rainy days are likely to become more frequent in Otago by 2090 under the highest emissions scenario. Specifically, seasonal projections show winter rainfall increasing by 4-10% in Dunedin and 4-27% in Queenstown by 2090. ORC therefore needs to partner with the national government to not only improve the management of its flood protection schemes but to potentially also implement projects to increase the flow capacity of flood prone rivers responsible for local flooding with Otago (Including lake Wakatipu and Wanaka).

2.4

Reducing emissions in line with the Paris agreement would mean that the worst climate scenarios won't come to pass, but even with limited global warming sea level rise and coastal flooding is bound to worsen. Particularly, NZ tide records estimate an average rise in relative mean sea level of 1.7 mm per year throughout the 20th century. Generation Zero therefore supports the ORC's plan to assess Otago coastlines and what this means for low-lying areas. Although again, we believe specific projects must be put in place. In the case of Hong Kong, the drainage services department invested \$2.7 billion in flood defence infrastructure,

including underground storage tanks, river widening and large drainage tunnels in dealing with sea level rise. This may be an opportunity that shows considerable benefits for many of Otago's coastline townships alongside managing and improving engineered coastal responses to climate change.

2.5

Generation Zero believes the ORC needs to work with both the Ministry for Environment and the Climate Change Commission to develop adaptation plans for Otago's coastal areas in relation to the effects of climate change. For instance, in areas such as Dunedin, current management schemes in dealing with the impact of coastlines are implementing coastal hazard responses such as the St Clair seawall. Engineered responses to coastal hazards ultimately affect longshore sediment transport, creating what is known as the 'end effect erosion', where an eddy pool of currents erode a section of the beach adjacent to the wall.



Figure 1: St Clair seawall: red line outlining the beaches equilibrium state.

Soft beaches (St Clair) adopt an equilibrium shape when adjacent to a headland (the seawater pool area at St Clair). Equilibrium state is where no more erosion occurs as the shoreline is everywhere in line with the incoming waves. A beach that has been unable to

reach this state will continue to erode until it can do so. This explains why St Clair has encountered issues since its first occupation in the 1800's.



Figure 2: St Clair seawall: yellow lines outlining the implementation of a breakwater instead.

Instead, a change can be made by pushing out the headland into the sea by a way of breakwater. Light yellow lines indicate where the edge of the beach would be as a result of the breakwater (darker yellow). This results in increased beach width with the sea wall being sheltered from permanent sand. Although this may present greater coastal benefits than otherwise shown by the current seawall initiative, the implementation of breakwaters and other engineered responses may simply slow down the effect of erosion. It is for this reason that Generation Zero believes the ORC must collaborate with the Ministry of Environment and the Climate Change Commission in adopting initiatives to better prepare coastal communities in relation to the impacts of climate change on water inundation.

3 Urban development

3.1

Central Otago is well known for some of the worst air pollution in NZ. Strengthening the existing 'clean heat, clean air' subsidy program is therefore of great importance. This saw

drastic changes, however, was operated on a ‘first in first served’ basis due to the subsidy cap of \$120,000. Getting a larger GOVT subsidy to accommodate for more households will show considerable benefits in areas such as Alexandra and Cylde. Low-income households were also accounted for by paying little to no cost in improving their heating source (great benefit of the program).

3.2

Generation Zero supports the use of rates and parking charges to reduce bus fares. Encouraging modal shift to public transport will result in many positive benefits such as a reduction in transport poverty and mitigation of Dunedin’s greenhouse gas emissions. It is important to ensure that all people in Dunedin are able to access affordable public transport to mitigate “the severe social consequences of transport poverty, not only for the people who are directly affected by it, but also for society as a whole”.¹ Many studies have shown that access to “public transport can reduce absolute poverty mainly by increasing economic efficiency. Decreasing costs and fares and promoting opportunities for the marginalized people of the society” would have a positive impact on many households in Dunedin.² Reducing bus fares also reduces transport-related social exclusion:

“the process by which people are prevented from participating in the economic, political and social life of the community because of reduced accessibility to opportunities, services and social networks, due in whole or in part to insufficient mobility in a society and an environment built around the assumption of high mobility.”³

¹ Lucas et al. (2016) ‘Transport poverty and its adverse social consequences’ *Transport*, Volume 169 Issue TR6, Institute of Civil Engineers Publishing. Accessed 4 April: https://www.researchgate.net/publication/292975806_Transport_poverty_and_its_adverse_social_consequences p. 353-354

² A. Barra & C. D. Nassi, ‘Considering poverty impact of fare policy studies for urban public transport’ *Transport Engineering Post-Graduation Program*. Federal University of Rio de Janeiro, Brazil. Accessed 2 April At: <http://www.codatu.org/wp-content/uploads/Considering-poverty-impact-of-fare-policy-studies-for-urban-public-transport-A.-BARRA-C.-NASSI.pdf> Also see: Gannon, C. & Liu, Z. 1997. Poverty and Transport. TWU-23 Discussion Paper. World Bank: Washington, USA.

³ Kenyon, S., Lyons, G. and Rafferty, J. (2006) 'Transport and Social Exclusion: Investigating the Possibility of Inclusion through Virtual Mobility', *Journal of Transport Geography*, 10, p. 210

3.4

Recycling funds raised through parking revenue will also encourage modal shift -- a key best practice objective in urban and transport planning.⁴ This method of increasing public transport ridership has proven effective in Queenstown where patronage increased 64% in 2017/18 and 182% in 2018/2019, compared to Dunedin's 8% increase.⁵ Mode shift such as that experienced in Queenstown⁶ has a number of benefits including improved public health, health and safety, economic.

3.5

Generation Zero supports the DCC and ORC collaborating to reduce the cost of public transportation through the introduction of flat fares and fare capping.

3.6

Generation Zero supports the DCC lobbying the NZTA to change the current farebox recovery ratio. The Farebox Recovery Ratio (FRR) is not designed for growth. If a council wants to grow patronage and their public transport network, this increases costs, 50% of which must be covered by fares. This is counterproductive as increased fares make Public Transport less accessible despite any improvements to the network. The Farebox Recovery Ratio blocks Dunedin from meeting its public transport potential.

⁴ Global Street Design Guide, 6.5.2 Transit Networks, p. 108, accessed from: <https://globaldesigningcities.org/publication/global-street-design-guide/>

⁵ Otago Regional Council (09 August 2019) '*Bus passenger numbers at an all-time high in Dunedin and Queenstown*', Media Release. Accessed 4 April: <https://www.orc.govt.nz/news-and-events/news-and-media-releases/2019/august/bus-passenger-numbers-at-an-all-time-high-in-dunedin-and-queenstown>

⁶ Queenstown Lakes District Council, (2015) Ten Year Plan 2015-2025 Accessed 4 April: <https://www.qldc.govt.nz/your-council/council-documents/ten-year-plan-ltp> p. 50

3.7

Ensuring bus services services are being maximised and coming up with effective pricing strategies is a must for the future of Dunedin. For instance, implementing incentives so people are using public transport as an alternative to private vehicles will be critical in reducing emissions created from transport in Dunedin.

3.8

The following measures Generation Zero recommends (reliant on the removal of the Farebox Recovery Policy) to incentivise public transport include:

- Daily Fare Caps
- Tertiary Student Discounts
- Increasing the free transfer time period to 1 hour
- Free travel for children under 12 and everyday \$0.99 child fares for those who are 12 to 15 years old
- Free weekends for families travelling together
- Weekend and Six-Hour unlimited pass add-ons for ORBUS Cards
- Introducing a Disposable paper-based ORBUS Card for Visitors
- Providing \$6 credit on all new ORBUS Cards

Case Studies:

Vancouver, British Columbia

A publicly-funded study commissioned by Vancouver City Council, at the School of Regional and Community Planning within the University of British Columbia recommended a variety of measures to make fare collection more efficient and cost-effective while addressing distinct income levels among the end users of the public transport system in Vancouver in the summer of 2016.² These measures included a minimum of two zones for which a fare is paid, the introduction of differential pricing for peak and off-peak hours, the introduction of an extra dollar surcharge on every individual fare collected for the busiest zone in the city during

peak hours, and the introduction of a super pass tier to guarantee unlimited ridership across all zones on evenings and weekends (as well as unlimited bike-sharing privileges).

Additionally, the study recommended the adoption of decreasing cost per kilometre and a maximum fare cap of about \$5 per day for regular (non-pass) fare users, as well as a rebate system to return a dollar or two to passholders who travelled outside of peak hours, the standardisation of cost to the passenger's wallet across all concession monthly passes. Alternatively, the study proposed free travel for certain times of day for regular fares and passholders, and a 'select your perk' programme for superpass tier holders where additional family members and group members could be added onto one's pass for no extra fee during evenings and weekends. The conclusion emphasised that messaging was most important to clarify to the public why the adoption of frequent public transport use would contribute to progressive mobility outcomes, including minimisation of the city's carbon footprint.

Key opportunities:

- Minimum zone fares
- Peak and off-peak pricing
- Surcharge pricing for busiest zones during peak
- Introduction of a super-pass tier for unlimited travel
- Decrease cost per kilometre
- Maximum fare cap per day
- Off peak rebates
- Free travel periods
- 'Select your perk' programme for super-pass tier holders
- Rolling out messaging to win over the hearts and minds of the public

Toronto, Ontario

Chin, Lai and Chow published the first case study on fare pricing policy specific to Toronto in the Transportation Research Record, funded by the Canada Research Chairs. The study confirms that a

simple distance-based formula will be inadequate to provide for all subsections of Toronto's population. The authors recommend further study of congestion-dependent pricing and schedule-based dynamic pricing when calculating fares. The authors contend that fixing fares across zones to around \$2 and considering some population sections for a distance-based add-on of about 6 cents per kilometre as a reasonable marker for future consideration by the Toronto Transit Commission and Metrolinx, the provincial agency which operates the city's automated fare payment system, Presto.

Key opportunities

- Looking beyond a distance-based formula
- Exploring congestion-dependent pricing and schedule-based dynamic pricing
- Fixed fare pricing with some distance-based add-ons

3.6

The overall accessibility of the Dunedin City is reliant on effective and enjoyable public transport. The implementation of cheaper fares and other incentives is likely to encourage Dunedinites to utilise the public transport options currently available to them. As the city's population grows, which is likely due to the hospital rebuild, greater public transport will be necessary in order to decrease urban congestion on the roads. These incentives are also incredibly valuable when it comes to the ORC looking towards a Carbon Zero future. Decreasing the number of private vehicles on the road, and replacing them with buses is much more sustainable due to the lowering of the overall carbon footprint. This sustainability can only increase as we move to a green transport future in terms of electric buses or the tram services.

3.7

Generation Zero also recommends the ORC replacing the current bus fleet with electric buses by the end of 2021.

3.8

Generation Zero supports the ORC transferring public transport governance to the DCC> For more information refer to the Public Transport Governance report.

4 Biodiversity & biosecurity

Conserving biodiversity is not only focused on protecting native species and habitats but is also about maintaining nature's capacity to deliver the goods and services that we all depend on, and whose loss comes at a high price. Generation Zero therefore agrees that addressing the level and balance of resources to be effective in both biodiversity and biosecurity in the future is of great importance for the Otago region. However, as mentioned in the ORC annual plan, spending on biodiversity is light. By increasing spending in this area and adopting specific innovative goals and objectives to control pest management in the region, ORC will see a rise in natural capital that is better managed sustainably for the benefit of future generations.

Biodiversity policies implemented by the ORC must be integrated to sectoral policies and be taken into account in wider policy concerns. Efforts have previously been made at a national scale in the direction of incorporating biodiversity strategies as an integral part of Otago's approach for smart, inclusive and sustainable growth. These include the NZ biodiversity strategy 2000-2020 and the Predator Free 2050 initiative. The ORC biodiversity strategy should encompass and fully acknowledge the economic value of ecosystem services and the need to restore them for the benefit of the region's economy as well as its wellbeing.

4.1

Generation Zero agrees that maintaining and restoring ecosystems and their services is an important objective for the ORC to focus on. Healthy ecosystems provide a stream of goods and services fundamental to society, such as food, fibres, clean water, healthy soils and protection against floods and erosion. When accommodating for rising populations, concern arises surrounding degrading ecosystems, drastically reducing the ability to deliver such valuable services. This issue is further heightened by the fact that these services are mostly public goods, meaning their economic value is not recognised. The EU Biodiversity Strategy 2020 implemented a strategic framework which Generation Zero believes would hold substantial benefits to Otago's biodiversity and biosecurity. For instance, ORC should map and access the state of ecosystems and their services to better access the economic value of such services and promote integration of these values. This integration can be done through developing a Green Infrastructure Strategy to promote the development of green infrastructure in Otago's urban and rural areas, including through incentives to encourage up-front investments in green infrastructure projects and the maintenance of ecosystems services. This can be done through improved partnerships and better targeted use of funding streams.

4.2

A second strategy is the possibility of increasing the contribution of agriculture and forestry into biodiversity. Specifically, improving the integration of biodiversity conservation into key policies for these sectors. Although efforts have previously been made to integrate biodiversity into the common agricultural policies, it is important to step up these efforts for greater integration throughout Otago. For instance, in the case of forestry, actions aimed to encourage forest holders to adopt forest management plans that integrate biodiversity measures and foster innovative mechanisms to finance the maintenance and restoration of ecosystem services that are generated by sustainably managed multifunctional forests must

be undertaken. Generation Zero also believes particular attention should therefore be involved in engaging stakeholders in the delivery of this target.

4.3

When protecting Otago's biodiversity, combating invasive alien species is of great importance. So much so that the implementation of eco sanctuaries have been introduced to assist in the recovery of some of the region's almost extinct native species. In order for these initiatives to work outside the sanctuary the Otago region have adopted a number of schemes to manage this, including the Halo Project and Predator Free Peninsula (all aligning with the goals of Predator Free Dunedin, 2050). Although not all alien species are harmful, many can be invasive, spreading rapidly across the natural environment, displacing and out-competing native species. According to the Ministry of Environment climate change projections, warmer temperatures in the Otago region, particularly with milder winters, will increase the spread of pests and weeds. Generation Zero therefore agree with the ORC that injecting more resources into pest management as they rise to the challenge of implementing the new pest management plan is therefore a vital step for Otago. However, in eradicating pests it is fundamental for the ORC to ensure the appropriate habitat is available for these native/endangered species. If not, the process of pest management is somewhat useless. Through community education alongside the initiatives mentioned in sections 4.1 and 4.2 the ORC can successfully manage the region's biodiversity and biosecurity for the benefit of future generations.