



Our Lakes:

How the communities of
Queenstown and Wanaka use and
value their lakes.



Catchments Otago



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Executive summary

This report summarises survey and interview data on local beliefs, attitudes and concerns towards lakes Wanaka and Wakatipu, with an emphasis on lake Wanaka. While there are some differences between these communities, they also share much in common.

The main findings are:

- The local community shouldn't be thought of as simply those permanently residing in the area but also includes those living further afield who have a strong and regular connection to the lake through holiday-home ownership or through regular visits to the area.
- There is consistency in environmental values, with most viewing the environment as valuable in-and-of-itself. There is a marked preference for active management of the environment.
- The main uses of the lakes are walking, biking, sitting and picnicking besides them.
- Work and business accounted for very little of the community's use of the lakes.
- Both lakes are primarily valued for their aesthetic value, both for itself and for what it brings to the area.
- Most community members are confident that their lake is healthy.
- A substantial component of the Wanaka community are pessimistic about the current health of their lake.
- There is a very strong and consistent view that the water should be maintained to a high drinking-quality standard; there is less consistency on water clarity.
- Rubbish in the lake or lakeside, lake snow/snot, and water cleanliness are the primary concerns.
- Two-thirds of the local community have concerns about the well-being of the lake over the next 20 years.
- Cleaner water and fewer invasive species are the community's main aspirations.
- Interviewees express a fear that the quality of lake water is deteriorating, or will in the near future.
- Some people who are very engaged with the lake don't want to talk about it.

Table of Contents

| | |
|---|-----------|
| EXECUTIVE SUMMARY | II |
| INTRODUCTION | 2 |
| METHODOLOGY | 2 |
| WHO IS THE COMMUNITY? | 4 |
| ENVIRONMENTAL VALUES | 4 |
| SUMMARY | 6 |
| THE USE AND VALUE OF THE LAKE | 7 |
| SUMMARY | 9 |
| LAKE HEALTH AND WATER QUALITY | 10 |
| SUMMARY | 11 |
| THE LAKE AND ITS FUTURE | 12 |
| SUMMARY | 13 |
| CLOSING WORDS FROM THE COMMUNITY | 14 |
| REFERENCES | 15 |
| APPENDICES | 16 |

Introduction.

Lakes Wanaka and Wakatipu are jewels in Otago's natural environment. Not only are they valuable for their own sakes, but they are special to residents and memorable for tourists. They are a central part of the cultural, social, recreational and economic life of the region.

However, along with other fresh water bodies in New Zealand, there are increasing concerns about the health of the Lakes. Due to dairying and other farming, and urban development, many New Zealand rivers and lakes are experiencing rising levels of nitrogen, with some experiencing problems with phosphorus and E. Coli. This is made evident by significant declines in native fresh water flora and fauna. Many waterways are also suffering from infestations of invasive fresh water plants, such as lagarosiphon and lake snow/snot. (Ministry for the Environment and Stats NZ, 2017)

Lakes Wanaka and Wakatipu are administered and monitored by the Otago Regional Council. The Council recognises that for this environmental work to be successful, more engagement with the local community is needed. The local governing bodies rightly have an interest in knowing and understanding local the community's concerns and aspirations for their lakes, and this understanding will enable better communication and engagement.

For communication and engagement to be successful it has to be a cooperative effort involving scientists, decision makers, and members of the local community. This report serves two joint purposes then: one, it gives scientist and decision makers a better understanding of how the local communities (broadly construed) use, value and worry about their lakes; two, it provides an opportunity for the voices of local people to speak to scientists and decision makers.

How do members of the community use their lake? What concerns them? How do the community feel about their lakes now and into the future?

This report summarises survey and interview data on local beliefs, attitudes and concerns towards lakes Wanaka and Wakatipu, with an emphasis on lake Wanaka.

Methodology

This study took a two-step approach: a general quantitative survey and some follow-up phone interviews.

Survey data was gathered from the 31st of March to the 2nd of April. Wakatipu data was collected in paper surveys during an evening event jointly run by the ORC and Catchment Otago to inform engage the community about lake health, monitoring and management.

Wanaka data was collected as part of a day-time event, again jointly run by the ORC and Catchment Otago. This event was meant to attract families and the local community more broadly, by including child friendly activities such as face-painting, dress ups and Lab-in-a-Box, as well as informative displays aimed toward adults. These surveys were collected by iPad. Despite differences in collection method and lake named, the survey questions were identical. (See appendix A) We had 67 respondents to the Lake Wanaka survey, and 32 respondents to the Lake Wakatipu survey, giving us a total of 99 responses. This sample size, while too small to be comprehensively representative of the local community, is sufficient, especially when combined with the interview data, to provide a core understanding of the community's values, concerns and aspirations.

To supplement the quantitative data gathered in the survey, we also gathered more in-depth qualitative information through interviews and open-ended questions (see appendix B) with local residents. These questions covered much of the same ground as the survey, but gave community members a chance to enlarge upon their answers. Qualitative data fleshes out the numerical information we present, giving residents a voice to speak of how they use, value and worry about their lake. (Gomm, 2008)

How to use this report

To present the information in the most accessible and meaningful way, this report provides data from both the broad survey and the in-depth interviews for each topic.

The report is divided into 4 topics:

- ⇒ Who is the community
- ⇒ The use and value of the Lake
- ⇒ Lake health and water quality
- ⇒ The Lake and its future

In each section, the general survey data is presented first, and a box (like this one) entitled "Voices from the Community" follows to add more details and to paint a fuller picture of the views expressed. In these "Voices from the Community" boxes, you'll find both quotes that show views and values expressed during the interviews and answers to open-ended survey questions.

Neither the survey data nor the interview data alone should be taken to provide a complete understanding. These should be read together and taken as complementary.

Who is the community?

Our survey population was representative of the target population and largely comparable to the general Otago populations and the population surveyed by the ORC for their Waterways Research (2016). The one distinction is that this report's population is slightly older as we primarily targeted Wanaka. **Wanaka has a median age of 41.1 years of age** compared to 36.4 for the Queenstown-Lakes District (QLD) (Stats NZ), and 33.6 for Otago more broadly.

| Age | This report | Otago Pop | ORC (Otago-wide) survey |
|--------|-------------|-----------|-------------------------|
| 18-35 | 11% | 31% | 22% |
| 35-59 | 68% | 41% | 44% |
| 60+ | 22% | 28% | 33% |
| Gender | | | |
| M | 47% | 48% | 42% |
| F | 53% | 52% | 58% |

Our population was 90% from the Otago region, with 75% of our population coming from the QLD. In particular, 42% came from Wanaka and 23% from Queenstown. Of the 10% that came from beyond the Otago region, 7% came from other parts of NZ, including a number from Canterbury, and 3% from overseas. **The non-QLD population is an important part of the Wanaka and Queenstown communities as a number of them are holiday-home owners who regular visit and contribute to these places.**

| | |
|---------------------------|-----|
| From Wanaka | 42% |
| From Queenstown | 23% |
| From elsewhere in the QLD | 10% |
| From elsewhere in Otago | 15% |
| From elsewhere in NZ | 7% |
| From Overseas | 3% |

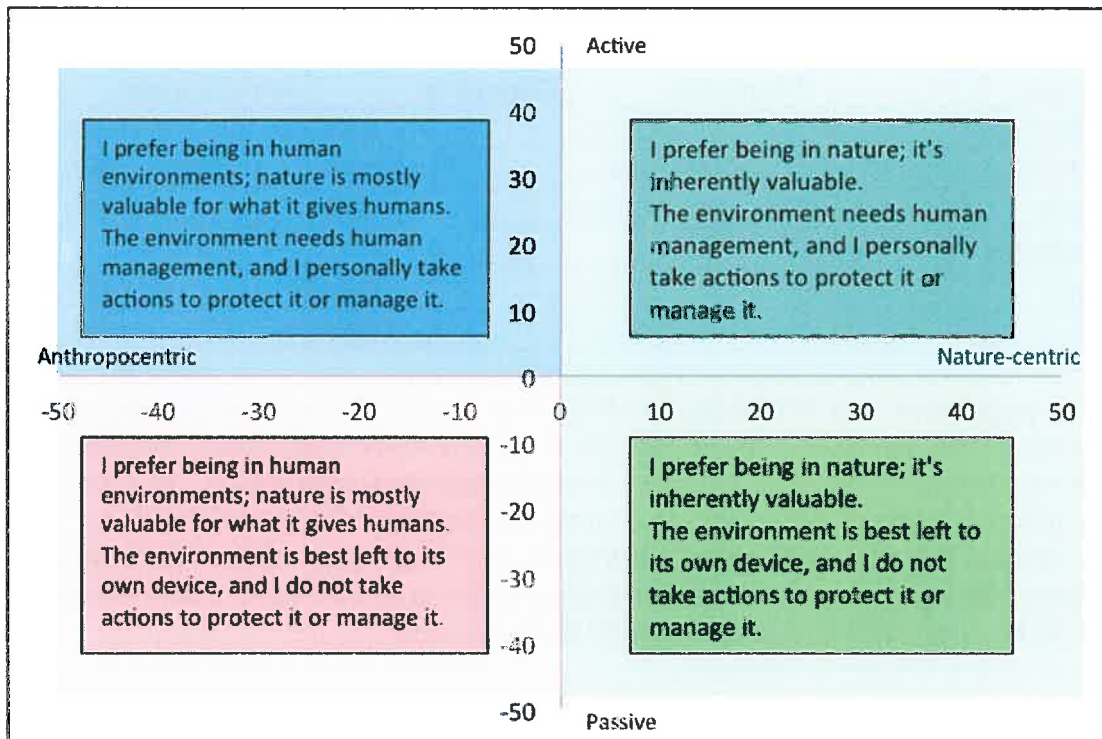
The surveyed population worked in a wide variety of industries including the arts and entertainment, business and financial, information technology, construction, education, farming, healthcare, management, office and administrative, sales and retail, tourism, and retired.

Environmental values

The local community showed a remarkably consistent set of environmental values when assessed on the following two dimensions:

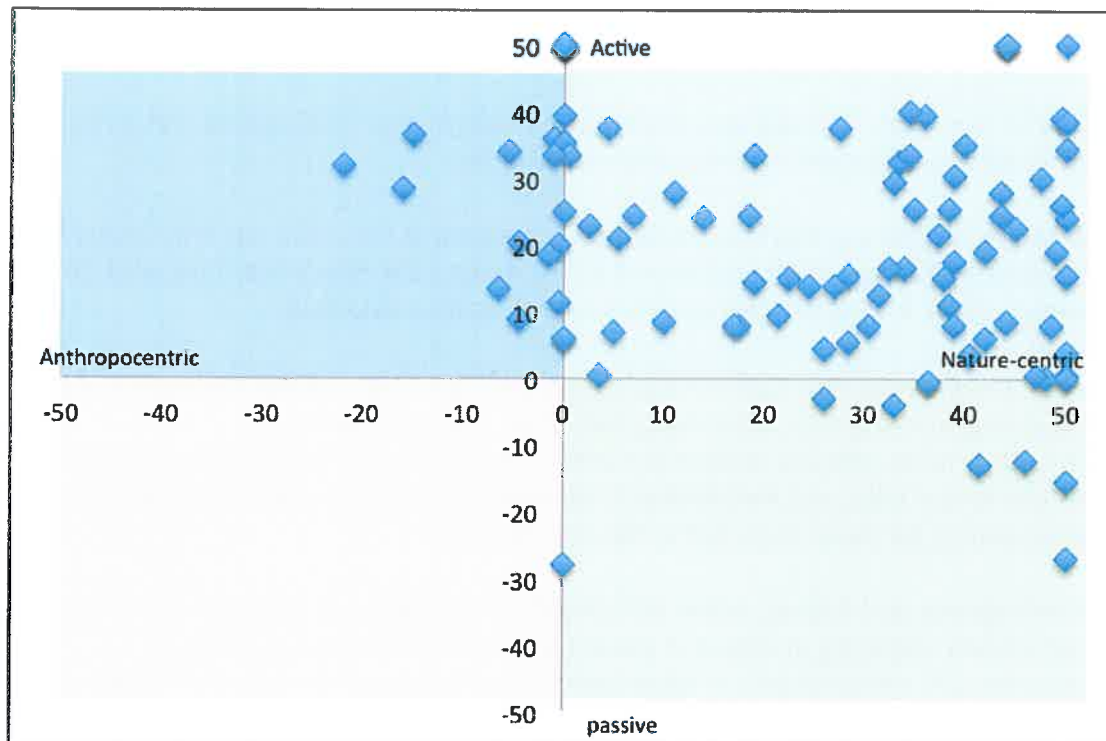
- a) Anthropocentric values (that the environment is valuable first and foremost for what it brings to humans) vs nature-centric values (that the environment is valuable in and of itself, and
- b) Active management (that humans should actively participate in the management of the environment) vs passive management (that the environment should be left to its own devices)

These two dimensions give the 4-field matrix below:



The local community is remarkably consistent, with the vast majority sitting in the top-right Active/Nature-centric quadrant. Although scattered throughout that quadrant, there are two dominant clusters: the largest cluster expresses strong preferences active management and hold the environment to be inherently valuable, and the second, smaller cluster, expresses ambivalence towards human interaction and management, while still holding the environment to be inherently valuable.

About a quarter of the respondents (26.3%) did not share the majority nature-centric view, but did all express a preference for active management. Just under 15% expressed a preference for passive management, alongside heavily nature-centric values (except for one outlier). No respondent expressed the view of the bottom left, 'anthropocentric values' × 'passive management'.



Summary

The local community is slightly older than Otago more generally, and comes from a diverse background in terms of employment. Importantly, the local community shouldn't be thought of as simply those permanently residing there. The local community also includes those living further afield who have a strong and regular connection to the lakes through holiday-home ownership or through regular visits to the area.

The local community has a consistent take on environmental values, mostly viewing the environment as valuable in-and-of-itself, though its value to humans is not negligible, and there is a marked (and quite strong) preference for active management of the environment.

The Use and Value of the Lake

People use lakes Wanaka and Wakatipu in many ways, both active and passive, for business, pleasure, exercise and community.

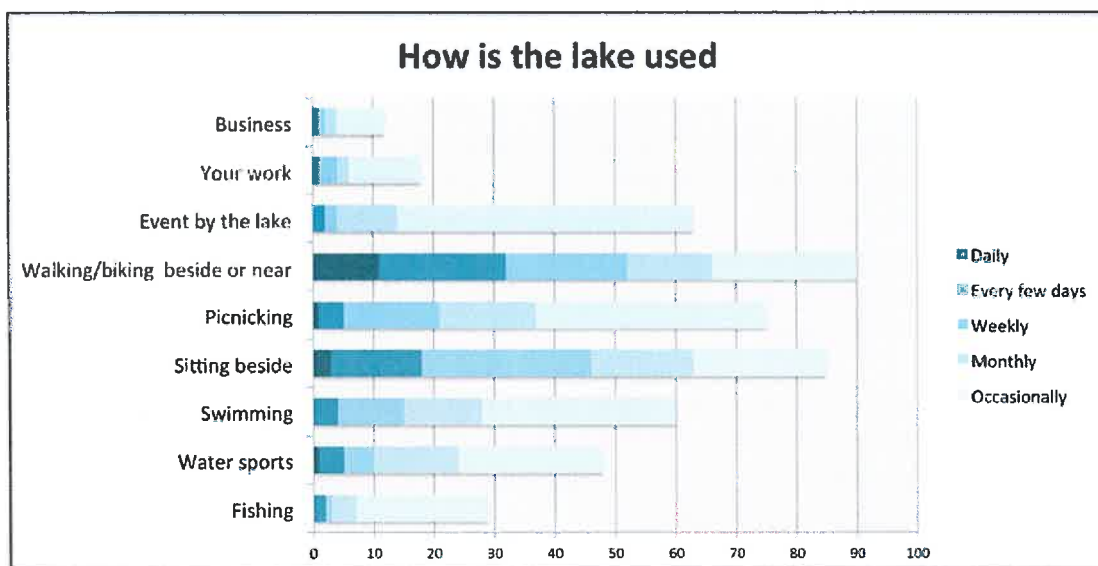
Of the surveyed population, we found that the most common use was lakeside walking or biking. 11% said they did this daily, 21% every few days, and 20% weekly. Only 4% of the respondents said they never do this.

Many people also reported sitting beside the lake as one of the main uses, with 3% doing so every day, 15% every few days, and 28% weekly.

The other most popular uses of the lake were picnicking by the lake, attending events by the lake, and swimming in the lake, all of which were done at least occasionally by more than half of the community.

Water sports and fishing, while still popular, were less so, with less than half the population engaging in either of these (48% and 29% respectively).

Interestingly, respondents predominantly had not used the lake for business (12%) or work (18%).



Some respondents also told us other ways they use, or would like to use, the lakes. For Lake Wanaka a number of respondents said they especially enjoyed looking at it, the view, and taking photos; the aesthetics of the lake. Another reoccurring use was as drinking water. The lake is also used for educational activities (with local primary schools), and to gather as a social meeting place, with family and friends.

For Lake Wakatipu other uses include access for hunting/fishing, the peace, quiet and communing with nature it provides.

Voices from the Community

When asked about what they want from their lake, some responses explicitly focused on the health of the lake – ‘just to keep it clean’, ‘drinkable water’, and ‘lagarosiphon free!’. One respondent wished for ‘mahinga kai’, and one cheeky respondent called for ‘slushies (or smoothies)’.

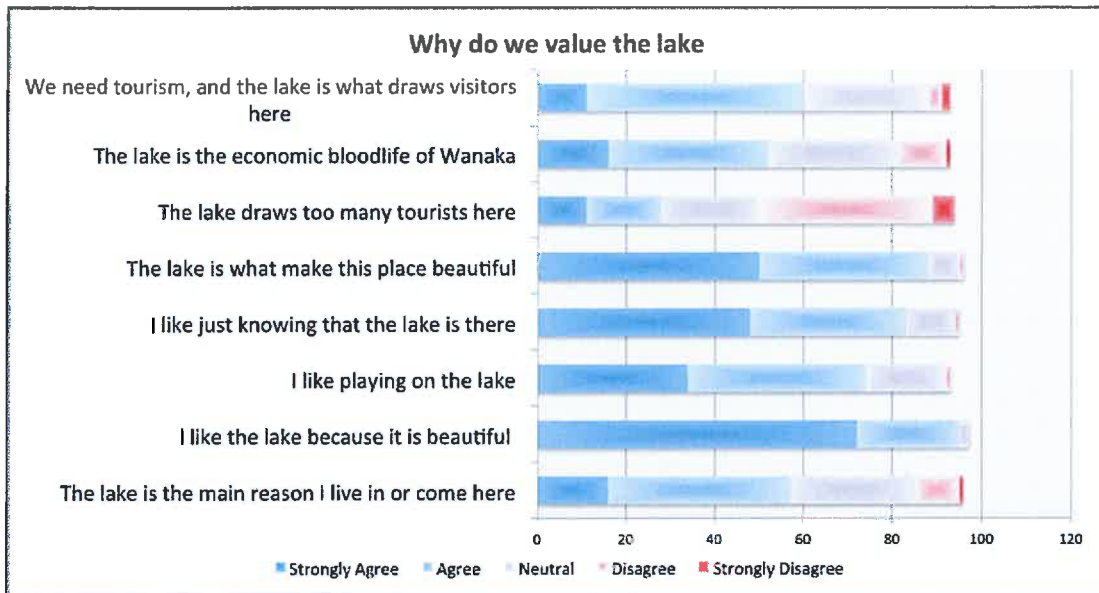
‘I sail at least once a week during the day light saving season. I coach sailing too ... I’m probably on the lake sailing 2-3 days a week’. (Male, 35-59, Wanaka)

‘Our usage is just an everyday part of our lives ... [the lake] is very present in our lives on a daily or weekly basis’. (Male, 60+, Wanaka)

People’s reported values of the lake were again both active and passive, with aesthetics clearly very important to people. 72% of respondents strongly agreed with the statement ‘I like the lake because it is beautiful’, and 50% of respondents strongly agreed that ‘the lake is what makes Queenstown/Wanaka beautiful’.

Active enjoyment was also important to respondents, but the Wanaka and Queenstown communities saw this quite differently. 47% of Wanaka respondents strongly agree that ‘I like playing on the lake’ and 44% agree. Wakatipu respondents, however, were slightly less agreeable, with only 14% strongly agreeing and 41% agreeing, while 41% remained neutral.

Perspectives on the value of the lakes for the economy and tourism were more complex. While 49% of respondents agreed (and 11% strongly agreed) that their community ‘needs tourism and the lake is what draws visitors here’, nearly 30% of respondents agreed or strongly agreed with the statement ‘the lake draws too many tourists here’.



Voices from the Community

‘The fact that you can dive off your boat in the middle and swim in it and drink it, and I know how rare that is internationally’ (Male, 35-59, Wanaka)

‘Some people have become negative because of the people it draws, and feel that is detracting from Wanaka. But I think because it draws so many diverse people that’s what makes it so pleasant’. (Male, 35-59, Christchurch)

‘It’s quite a clean lake, really. It is swimmable. If your child accidently swallows a bit of water you’re not worried they’re going to come down with something.’ (Male, 35-59, Wanaka)

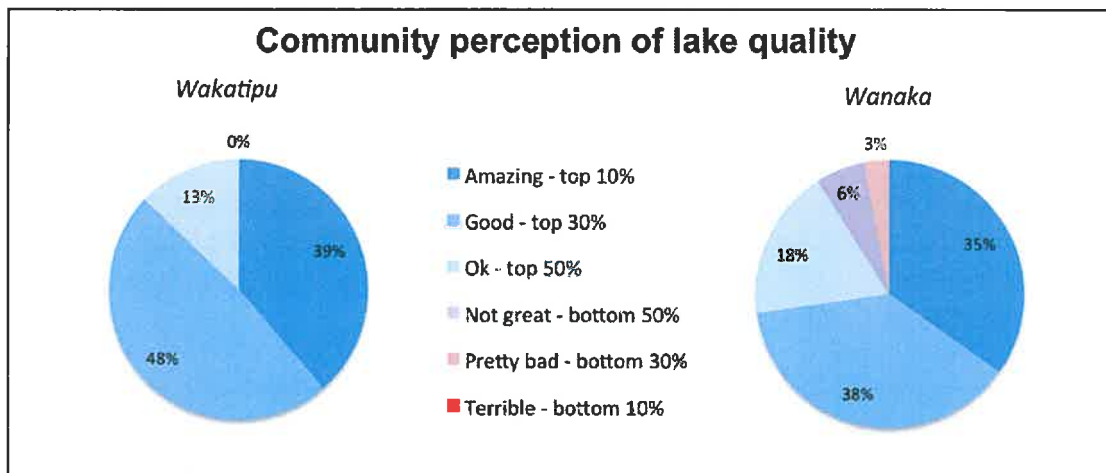
Summary

The main uses of the lakes are walking, biking, sitting and picnicking besides them, while work and business accounted for very little of the community’s use of the lake.

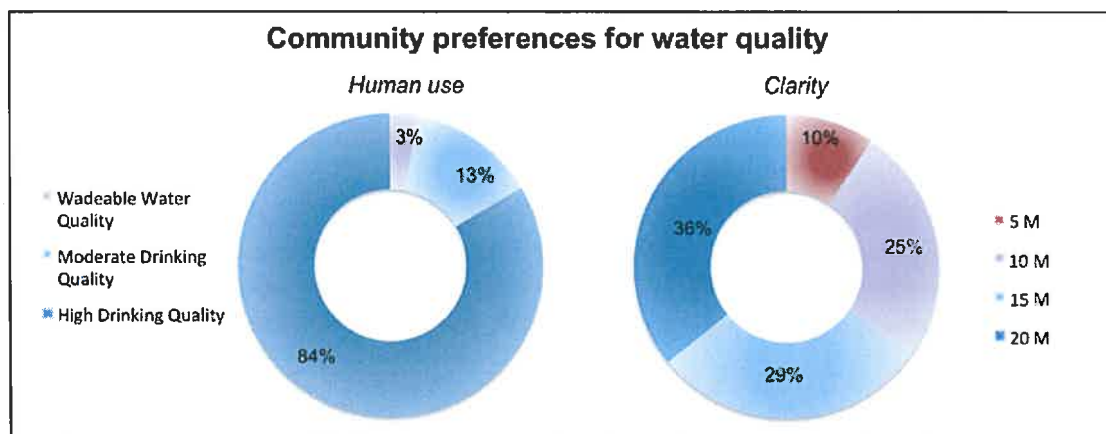
The lake is primarily valued for its aesthetic qualities, both for itself and for what it brings to the area. Playing on the lake is also valued highly by the local community, and more so in Wanaka than in Queenstown.

Lake health and Water Quality

In general, people felt very confident that their lake is healthy and has high water quality compared to other lakes in New Zealand. About a third of respondents thought both lake Wakatipu and lake Wanaka were in the top 10% of New Zealand lakes. Both lakes are indeed very healthy in terms of water quality, and both lakes rate in the 'Very good' category for water quality based on LAWA's trophic level index (LAWA). But while, lake Wakatipu was believed to be in the top 50% by all respondents, lake Wanaka got more mixed reviews, with about 10% believing Lake Wanaka to be in the bottom 50% of New Zealand lakes, including 3% believing it to be in the bottom 30%.



When asked 'what do you think a "healthy lake" means', over 80% of respondents agreed that it should meet a strict drinking water standard. There was a greater range of responses around the water clarity of a healthy lake. When asked about how clear the water should be (clarity to 5; 10; 15; or 20 metres), just over a third responded that a healthy lake should have clarity to 20 metres, with more lenient options deemed acceptable by most respondents.



People reported to finding out about lake health from a variety of sources. The most common source was through the media (60%), followed by organisations

such as the Otago Regional Council, University of Otago, and Guardians of the Lake (57%). Surprisingly, less than half relied on people they knew such as friends (41%). Many people also reported finding out about the lake's health through personal experience and interaction with the lake. A few also mentioned social media, and about 5% said they didn't know or hear much about lake health.

Voices from the Community

I know about the lake ... 'by looking at it & swimming in it'; 'I'm in the lake weekly, so self-monitor'; 'can see it has deteriorated since I was a kid'.

'It is easy to lose quality, and very hard to regain it. ... If we do not put money now into assessing the quality of our lakes, not just Wanaka, but Wakatipu, Hawea, we could very quickly reach a tipping point where it's too late. ... Prevention is much more cost-effective than cure'. (Male, 60+, Wanaka)

'We're always very impressed how proactive all the administrators in the area are about the lake ... we're impressed how all the groups work together, and the communication with all the different groups. I think it's outstanding actually'. (Male, 35-59, Christchurch)

'I think the most important is water quality. I think that's the one that's most endangered, and I think that's the one that we can possibly make some difference on. ... It's just a bit more soupy than it used to be.' (Female, 60+, Wanaka)

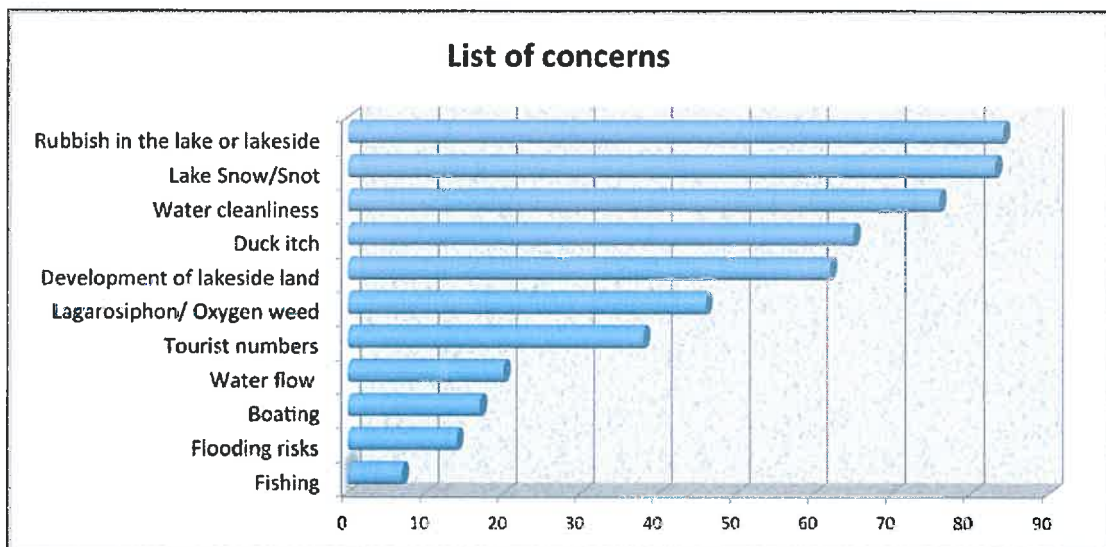
Summary

The local community is largely confident that their lake is healthy (as indeed they both are), though a substantial component of the Wanaka community are pessimistic about the health of their lake with just under a third believing it to be in the bottom 70% of NZ lakes.

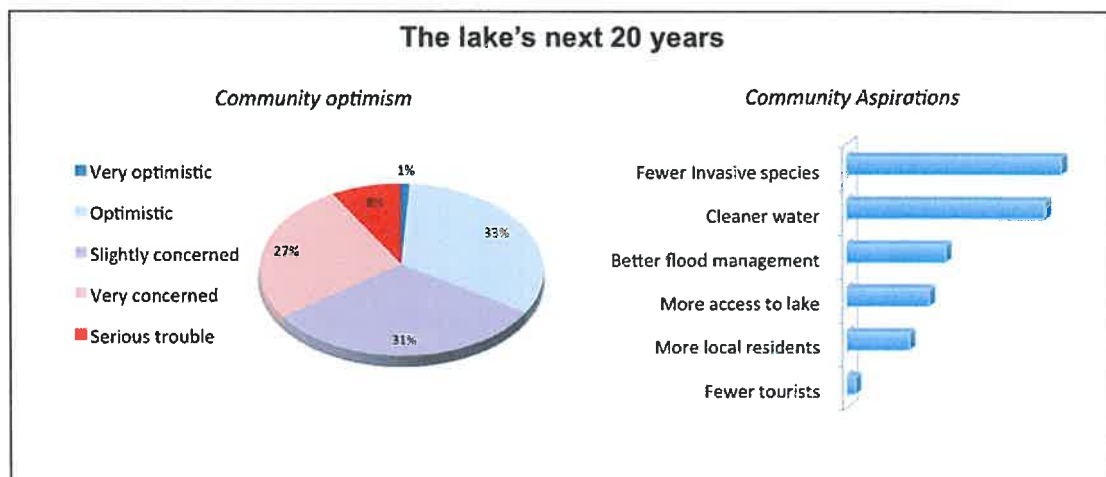
There is a very strong and consistent view that the water should be maintained to a high drinking quality, and, while views on water clarity is less consistent, there is a marked preference for clarity to 10 metres or beyond.

The Lake and its Future

Though people tended to claim Lakes Wanaka and Wakatipu are in reasonable health, they are worried about many things they fear will lead to declines in quality and lake health. Leading the charge are concerns over rubbish in the lake or lakeside, lake snow/snot, and water cleanliness. Lake snow/snot was clearly much more of an issue for the Wanaka community (95%, compared to 65% for the Wakatipu community), while tourist numbers (52%) and flood risks (32%) were a greater concern for the Wakatipu community compared to the Wanaka community (33% and 6% respectively).



These concerns were reflected in the community's dulled optimism about their lake's future over the coming 20 years, and many ranked cleaner water and fewer invasive species as their primary aspirations. The local community also expressed an aspiration for some increase in the local population, while holding the tourist numbers reasonably steady.



Voices from the Community

My concerns are that it deteriorates to a stage we can't drink in it and play in it. Or to a point that we can't recover it. It would be nice to have grandchildren who are able to drink it and play in it too'. (Male, 35-59, Wanaka)

'My husband's interesting. He's been a very good fisherman, a very keen fisherman, but when he's getting old and depressed, he sighs 'the lake is not what it used to be', he's very grumpy about that. You probably wouldn't get him talking about it.' (Female, 60+, Wanaka)

'Growth needs to be managed better to mitigate further storm-water run-off into the lake'. (Male, 35-59, Wanaka)

'The main thing is the spin-off from tourism, getting the tourism revenue back into conservation ... I think that's somewhere tourism falls short on in New Zealand, putting funding from tourism back into conservation'. (Male, 35-59, Queenstown)

Summary

Rubbish in the lake or lakeside, lake snow/snot, and water cleanliness are the primary concerns and two-thirds of the local community have concerns about the well-being of the lake over the next 20 years.

Cleaner water and fewer invasive species are their main aspirations.

Closing words from the community

The community also spoke about issues that were not directly addressed in the questions, but came out during the interview and which are of concern. We close the report with these as final thoughts.

Voices from the Community

'The lake is one of Wanaka's best natural features, we do just need to look after it, and be aware of what might go down the drain.' (Male, 35-59, Wanaka)

I just think there should be more roading access, and pull over points. There should be better walking access. (Male, 35-59, Queenstown)

Some of our little creeks seem to be brushed aside. The ORC has just given consent for a fish farm to be built, just 2 or 3 k out of Wanaka ... I think that was a really dumb idea. You're not allowed to put cows in the water so why fish? (Male, 35-59, Wanaka)

I think the water is very valuable and I'd hate to think we're going to sell the water or anything. (Female, 60+, Wanaka)

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Appendices

Appendix A – Lake Survey

(Lake Wakatipu survey was identical except Wakatipu named instead of Wanaka)

1. In the last six months have you used Lake Wanaka for (and how often):

| | I haven't | Daily | Every few days | Weekly | Monthly | Occasionally |
|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Fishing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Water sports | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Swimming | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Sitting beside | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Picnicing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Walking/biking beside or near | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Event by the lake | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Your work | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Business | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Other (please specify)

2. Is there anything else you'd like to use the lake for or get from the lake?

3. Do you agree or disagree with the following statements?

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The lake is the main reason I live in or come to Wanaka | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I like the lake because it is beautiful | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I like playing on the lake | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I like just knowing that the lake is there | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The lake is what make Wanaka beautiful | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The lake draws too many tourists to Wanaka | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The lake is the economic bloodlife of Wanaka | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Wanaka needs tourism, and the lake is what draws visitors here | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4. Where do you think the quality of Lake Wanaka is compared to other lakes in NZ?

- Amazing - top 10%
- Good - top 30%
- Ok - top 50%
- Not great - bottom 50%
- Pretty bad - bottom 30%
- Terrible - bottom 10%

5. What do you think a "healthy lake" means (part 1: water quality)?

- A lake with that meets only a wadeable standard of water quality
- A lake that meets only a moderate drinking water standard
- A lake that meets a strict or high drinking water standard

6. What do you think a "healthy lake" means (part 2: water clarity)?

- A lake with a water clarity of 5m
- A lake with a water clarity of 10m
- A lake with a water clarity of 15m
- A lake with a water clarity of 20m

7. How do you know about the health of the lake?

- Media (newspapers, TV, radio, internet news and info sites, etc)
- Friends and people I know
- Organisations like Uni Otago, Guardian of the lake, ORC, etc
- Other (please specify)

8. Do any of these issues worry you?

- Oxygen weed
- Lake Snow/Snot
- Duck itch
- Boating
- Fishing
- Flooding risks
- Development of lakeside land
- Water flow
- Tourist numbers
- Water cleanliness
- Rubbish in the lake or lakeside

9. How optimistic are you about the future well-being of the lake over the next 20 years?

- I'm very optimistic. I think the lake will be fine
- I'm quite optimistic, though we need to remain vigilant
- I'm a little concerned we're not taking good enough care of the lake
- I'm very concerned that unless we take some serious steps to manage our lake, we'll be in serious trouble before too long
- I think we're already in serious trouble. It's not a matter of managing the lake, it's a matter of saving it
- I don't think about what the lake will be like in 20 years


10. If you think of the lake 20 years from now, what would like to see?

| | More/better | | Same | Less/fewer | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Access to and ability to enjoy the lake | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Clean water | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Invasive species | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Local residents | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Tourists | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Flood management | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

11. Could you place your beliefs on these lines #1

| | |
|--|-------------------------------------|
| Nature is valuable for what it gives humans | Nature is valuable for its own sake |
| <input type="radio"/>  | |

12. Could you place your beliefs on these lines #2

| | |
|--|---|
| I feel good when I'm in natural environments | I feel good when I'm in human-made environments |
| <input type="radio"/>  | |

13. Could you place your beliefs on these lines #3

| | |
|--|---|
| I take actions to protect and improve the environment | I don't take actions to protect improve the environment |
| <input type="radio"/>  | |

14. Could you place your beliefs on these lines #4

I believe humans are best at
deciding what to do

I think nature should be left to
look after itself



15. What is your age?

- 18 to 34
- 35 to 59
- 60 or older
- Prefer not to answer

16. What is your gender?

- Female
- Male
- Prefer not to answer

17. Where do you live?

- Wanaka
- Queenstown
- Elsewhere in the Queenstown Lakes District
- Elsewhere in Otago
- Elsewhere in NZ
- Not in NZ

18. Which, if any, of the following industries do you work in?

- Arts, design, entertainment, sports and media
- Business and financial
- Community and Social Service
- Computer and mathematical
- Construction and extraction
- Education and training
- Farming
- Fishing
- Food preparation and serving
- Forestry
- Healthcare
- Installation, maintenance and repair
- Legal
- Management
- Office and administrative
- Production
- Protective services
- Sales
- Not currently in paid employment
- Retired
- Prefer not to answer
- Other (please specify)

19. In the next two weeks, we would like to interview members of the local community about this topic to find out as much as possible about community views as we can. If you would be willing to take part in a phone interview (approx 30 minutes), please provide us with your email address.

Thanks!

Appendix B

Lake Interviews

1. What are some of your favourite ways to use the lake?
2. What makes the lake valuable to you and to your community?
3. What concerns you about the lake?
4. If there was one thing you would like to have changed or improved about the lake, what would it be?
5. Do you have any other comments you would like to share?



Central Otago lakes science weekend

31st March - 2nd April 2017





Report prepared by:

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Catchments Otago
University of Otago

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Catchments Otago and Otago Regional Council joint Central Otago alpine lakes science weekend

Discussions between Executive Members of Otago Regional Council and Catchments Otago* in 2016 focussed in on identifying the perceptions, goals and aspirations of Central Otago Lakes communities for their lake systems.

Two unique, jointly-hosted Central Otago events were developed to:

- 1) enable residents an opportunity to learn more about their lakes and the people that use them;
- 2) facilitate the collection of survey and interview data on local beliefs, attitudes and concerns towards the alpine lakes.

The surveys conducted at both events by *Catchments Otago* researchers specifically explored three key themes from people attending:

- 1) How is your lake doing;
- 2) What are we currently doing with your lake (monitoring and management);
- 3) Taking your lake into the future: what do you want and what could we do.

A separate, companion report has been prepared detailing the survey results from the Community's voice about their lakes for Otago Regional Council.

* Established in 2016, the University of Otago Research Theme Catchments Otago brings together researchers from across the University to help develop land and water management strategies to address some of the challenges the region currently faces, as well as those that might arise in future.

Further information can be found at www.catchmentsotago.org

PechaKucha Night™ QUEENSTOWN

On Friday 31st March, a PechaKucha Night™ themed ‘The Lakes and I’ was held at Queenstown Primary School, comprising a wide range of speakers discussing their perspectives of the Central Otago alpine lakes. Using the PechaKucha 20 pictures for 20 seconds format, six speakers treated the audience to a visual journey through the local landscape, its history, visitors over the years and even its physical transformation into jewelry.

Randall Aspinall 4th Generation Farmer from Mt Aspiring Station
‘Farming in the Lakes Catchment’

Anna Claire Thompson Arrowtown Jewelry Artist
‘I love Lake Hayes’

Leah Kissick Wakatipu School Student
‘Local History through the eyes of Lake Wakatipu’

Pascal Sirguy School of Surveying, University of Otago
‘How much snow and ice is there?’

Peter Langlands Amisfield Winery Restaurant Forager
‘Foraging in Central Otago's waterways’

Chris Hankin Queenstown Department of Conservation Ranger
‘The natural world of Queenstown’s Lakes, large and small’



Randall Aspinall
‘Farming in the Lakes Catchment’



Anna Claire Thompson
‘I love Lake Hayes’

Lab at the Lake WANAKA

On Sunday 2nd April Pembroke Park in Wanaka was transformed into the 'Lab at the Lake', a family fun day, specifically showcasing what we do and don't know about Lake Wanaka, work currently done, and possible future work. The Lab in a Box, an Otago Museum mobile science laboratory funded by MBIE Curious Minds, housed fish, invertebrate and zooplankton hands-on displays, with live critters captured earlier that morning from Bullock Creek and Lake Wanaka itself.

The marquee housed *Catchments Otago* displays on the Mahu Whenua covenants, snow melt research using drones and a fun freshwater scientist/angler dress up booth. Otago Regional Council displays comprised Good Water Otago, Check Clean Dry, and LAWA. The hands-on displays were hugely popular and consistently busy, with children and adults alike jostling to look down microscopes at the live critters, see the drone, peer along clarity tubes and have their photo taken in the dress up booth.

A local face painter delighted children with her free stunning fish and invertebrate creations, while the Wanaka Branch of the Lions filled tummies with a free sausage sizzle, courtesy of *Catchments Otago*.

The community really embraced having the opportunity to chat with scientists from both *Catchments Otago* and Otago Regional Council and see critters from Lake Wanaka up close. The atmosphere was overwhelmingly positive, with estimates of over 450 people attending the three hour event. Following the Lab at the Lake event, digital copies of the *Catchments Otago* Lake Wanaka display posters were sent to Wanaka Schools for use in their science curriculums. Teachers from primary and secondary schools have uniformly been extremely positive with feedback about the Lab at the Lake event and the subsequently supplied material.



ORC and Catchments Otago staff at Lab at the Lake



Lab in a Box arrives in Wanaka



Setting up the Lab



Lab at the Lake



Stereo microscopes for hunting invertebrates, algae & zooplankton



Constantly busy with budding freshwater ecologists





Waiting their turn to see the live critters



Nostoc cyanobacteria lake ball bought in by a local youngster



**ORC water monitoring
& Good Water Otago**



Snow melt drone & video flyovers



Mahu Whenua covenants



**'Catch of the Day'
Dress up booth**



Fishy face painting - rainbow & brown trout

University of Otago staff present

Gerry Closs - Catchments Otago Co-Director
Kath Dickinson - Catchments Otago Co-Director
Phil Seddon - Catchments Otago Co-Director
Fabien Medvecky - Catchments Otago member
Mara Wolkenhauer - Catchments Otago member
Vicki MacKnight - Centre for Science Communication
Cynthia Lawrence - Catchments Otago member
Jason Augspurger - Department of Zoology
Sophie Fern - Department of Botany
Todd Redpath - School of Surveying
Pascal Sirguy - School of Surveying
Rosemarie Neuninger - Department of Food Science

Otago Museum staff present

Craig Grant

Otago Regional Council staff present

Adam Uytendaal
Charlotte Panton
Nicole Foote
Eleanor Ross
Richard Lord

Catchments Otago Lab at the Lake posters

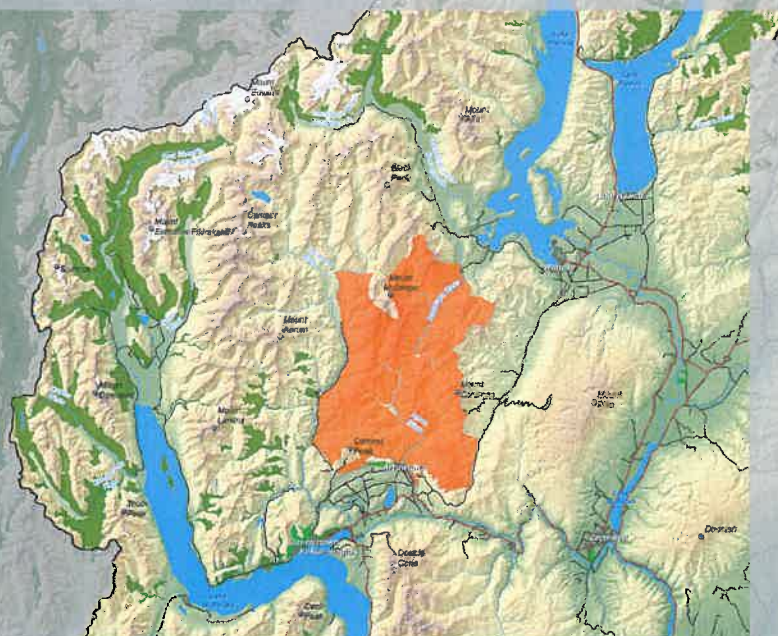
Mahu Whenua Covenants
Zooplankton and Algae in Lake Wanaka
Fish Species in Lake Wanaka
Seasonal snow: seen from above

Advertising material

Mahu Whenua covenants



In 2015, the Queen Elizabeth II National Trust celebrated the formal opening of the largest private land covenant agreement ever initiated in New Zealand with the Mahu Whenua covenants. Protecting 53,000ha of contiguous landscape over most of Motatapu, Mount Soho, Glencoe, and Coronet Peak stations, they cover a large part of the country between Lake Wanaka and Arrowtown, and are bordered by the Shotover River and the Cardrona Valley. The covenants protect iconic high country landscapes, the habitat of unique native plants and animals, public access, and important historic, cultural and recreation values.



Freshwater Invertebrate Species

Several charismatic, yet ecologically sensitive, species (including Mayflies, Stoneflies, and Dobsonflies) inhabit streams within Mahu Whenua, indicating high water quality and good fish habitats.



Swimming mayfly; *Nesameletus* *



Green Stonefly; *Stenoperla* *



Dobsonfly; *Archichauliodes* *

Plant species

Snowbank plant communities occur where snow lies for extended periods. Slim snow tussock (*Chionochloa macra*) is found above 1500m, narrow-leaved snow tussock (*Chionochloa rigida*) dominates below 1500m. Between 900–1000m, hard tussocks dominate (*Festuca novae-zelandiae*).

Grey shrublands are dominated by tree daisies (*Olearia* species) and mingimingi (*Coprosma propinqua*). Mountain ribbonwood (*Hoheria lyallii*) is largely confined to gullies below 1000m. Mountain beech forest remnants with occasional silver and red beech are common in the Motatapu Valley.

Animal species

Grey warblers, silvereye (waxeye), riflemen, fantails, bellbirds, tomtits, South Island oystercatcher, spur-winged plover, harrier hawk, paradise shelduck and the Eastern falcon inhabit the covenant's shrublands and forests. Kea frequent the mountain tops and New Zealand Pipit are widespread in the grasslands.

Skinks live in amongst the tussocks and rocks, as do insects including Hamilton's Mountain Black butterfly, the giant ghost moth, the rare butterfly *Erebiola butleri*, colourful grasshoppers, flightless stoneflies, and giant dragonflies.



Eastern Falcon ¹



Mountain Black butterfly ²



Kea ³

* © Steve Moore (deceased); ¹ © Craig MacKenzie
² © Te Papa; ³ © Mark Fraser;



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Zooplankton and Algae in Lake Wanaka

Zooplankton

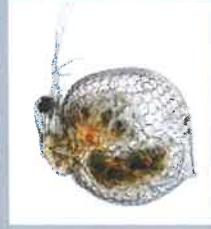
Zooplankton come in a huge range of sizes; some are visible to the naked eye and others are microscopic. They are mostly grazers that eat algae and are a vital part of freshwater food chains.

Water Fleas - Cladocerans

Some of the largest zooplankton found in Lake Wanaka, cladocerans reproduce asexually (clones) and range in size: *Daphnia pulex* 3mm, *Ceriodaphnia dubia* 1mm, *Bosmina meridionalis* 0.5mm.



Daphnia



Ceriodaphnia



Bosmina

Copepods

Reproducing sexually, *Boeckella dilatata* range in size: females 1.3mm and males 0.9mm



Boeckella

Rotifers

Often termed 'wheel animals', they show bilateral symmetry and range in size from 0.1-0.5mm.



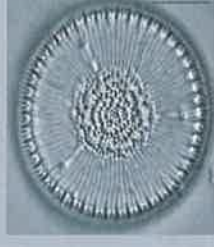
Rotifer

Algae (Phytoplankton)

Phytoplankton are usually only visible under a microscope, unless individual cells clump together. They can live as single cells or as long strings. Phytoplankton convert sunlight and carbon dioxide into food, with oxygen as the by-product.

Lindavia or Lake Snow

Lake snow is an aggregation of *Lindavia intermedia*, a single celled diatom that is joined into clumps by mucous. The mucous makes Lake Snow very sticky, but it is non-toxic, both to humans and pets. It can spread fast as only one cell can start a new bloom.



Other Diatoms

Diatoms have distinctive transparent cell walls made of silica, like glass, and are often termed 'algae in glass houses'. Consisting of two halves called valves, they have elaborate perforation patterns on the surface.



Aulacoseira



Navicula



Cyclotella



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Photograph: Lake Otago, University of Otago, New Zealand

Fish species in Lake Wanaka

The deep glacial lake of Lake Wanaka is New Zealand's fourth largest lake and the source of the Clutha River, the second longest river in the country and longest in the South Island. The lake has two main inflowing tributaries, the Matukituki and Makarora Rivers, and is home to three New Zealand native fish species (Koaro, Common Bully and Long Fin Eel) and three self-sustaining introduced fish species (Land-locked Chinook Salmon, Rainbow Trout and Brown Trout).



Koaro *

Juveniles are one of the five whitebait species, identifiable from the other four species as long, tube-shaped and **surprisingly good at climbing up rocks and waterfalls**. They are classified as being "at risk" for extinction, with their population declining.

Average adult size shown: 8-10 cm; 5-10 g



Common bully *

Present throughout New Zealand, adult males make a nest, attract females to it and guard the hatchlings. They are well camouflaged fish who feed on small insects.

Average adult size shown: 5-7cm; 4-6 g



Long fin eel or Tuna *

Before the introduction of trout and salmon, long fin eels were the biggest predators in Lake Wanaka. They can live up to 100 years in freshwater and head out to sea to spawn before dying. Due to habitat modification, their numbers are declining.

Average size caught: 100 cm; over 20 kg



Chinook or Quinnat Salmon *

First introduced to Lake Wanaka in 1918 from California, Chinook Salmon spend their entire life in the lake, rather than going out to sea soon after they hatch. Adults only spawn (lay eggs) once in their lives, then die.

Average size caught: 35-40cm; 0.4-0.8kg; adult shown



Rainbow Trout *

Native to California and introduced to Lake Wanaka in the 1900's, Rainbow Trout live in the deeper waters of the lake, feeding mostly on small fish. They only live 4-5 years and inhabit warmer waters than brown trout, so are spread throughout New Zealand.

Average caught: 45-50 cm; 1.2-1.5kg; adult shown



Brown Trout *

Native to Europe and introduced to Lake Wanaka in 1885, Brown Trout eat large insects and small fish. They are very shy, hiding if they see movement on the lakeside. Adults can live for 8-10 years and spawn (lay eggs) every year.

Average caught: 45-50cm; 1.2-1.5kg; adult shown



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* Photos courtesy of Stella McQueen
Photo courtesy of Fish and Game New Zealand
% Photos courtesy of Rachel Paterson
Background photo courtesy of Marc Schallenberg

PechaKucha Night
QUEENSTOWN

Free entry

THE LAKES AND I

Friday 31 March
Queenstown
Primary School

Doors open 7:30pm
Starts 8 pm – 10pm

RSVP contact@catchmentsotago.org



Lab at the Lake

A family fun day featuring scientists and the mobile laboratory, Lab-in-a-Box

Sunday 2 April
Pembroke Park,
Wanaka
Open 10am – 1pm

Free entry and sausage sizzle

Bring your own critters and we can help you identify them!

