BEFORE THE FRESHWATER HEARING PANEL

UNDER	the Resource Management Act 1991 (the **Act**)
IN THE MATTER	of an original submission on the Freshwater Planning Instrument part of the Proposed Regional Policy Statement for Otago 2021 (**FPI-RPS**)
BETWEEN	**CENTRAL OTAGO WINEGROWRS ASSOCIATION**
	FPI009
AND	**OTAGO REGIONAL COUNCIL**
	Local Authority

BRIEF OF EVIDENCE OF JAMES DICEY ON BEHALF OF CENTRAL OTAGO WINEGROWERS ASSOCIATION

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BRIEF OF EVIDENCE OF JAMES DICEY ON BEHALF OF CENTRAL OTAGO WINEGROWERS ASSOCIATION

Introduction

1. My name is James Dicey.

2. I prepared a brief of evidence dated 23 November 2022 which was lodged before the Hearing Panel on the PRPS (Non-Freshwater).[1] That evidence is relevant to the FPI-RPS and so I produce this evidence again before this panel. To avoid repetition the parts that are highlighted grey are additions to that evidence. All other material, unless otherwise marked, remains the same.

3. I have prepared this evidence in support of a submission by Central Otago Winegrowers Association (**COWA**) who lodged a submission and further submission on the FPI-RPS.

Qualifications & Background

4. I am the owner of Grape Vision Limited, a vineyard development, management, brokerage, and consultancy business based in Central Otago. I have been involved in the grape and wine industry since 2004.

5. I hold a Bachelor of Commerce (1992) and Bachelor of Law (1993) from Otago University and a Graduate Diploma in Oenology and Viticulture from Lincoln University (2005). A copy of my curriculum vitae is attached to this statement of evidence as **Appendix 1**.

6. Originally, I qualified as a Chartered Accountant gaining experience with Deloitte in New Zealand, Amsterdam and London, prior to working as an independent contractor. My last contractor role was as a financial and IT risk manager with Diageo plc, a British multinational alcoholic beverages company that produces spirits, beer, and wine.

7. I joined Grape Vision Ltd as an operations manager in 2004 upon moving back to New Zealand. After gaining a Graduate Diploma in

[1] Evidence in Chief of James Dicey on behalf of OWRUG, Federated Farmers and DairyNZ.

Oenology and Viticulture, I continued to work for Grape Vision Ltd before purchasing the business in 2009.

8. I have previously appeared as an expert witness during arbitration, at the District Court and in the Environment Court.

9. Additionally, I have gained a detailed business and economic understanding of the Central Otago wine industry through owning my own brand (Dicey Limited) and through my role as director of Mt Difficulty Wines Limited, a position I held from 2004 until the company was sold to Foley Wines Limited on 3 January 2019.

10. Other positions I have held in the wine industry include:

    (a) committee member of the Central Otago Winegrowers Association for over 12 years, including acting as President for over five years;

    (b) sitting on the New Zealand Winegrowers Research Committee for four years;

    (c) being an elected Director of New Zealand Winegrowers Incorporated, the New Zealand wine industry member body, from 2016 to Sept 2020 (including deputy chair roles on the Finance and Sustainability committees); and

    (d) being a nominated Director of New Zealand Winegrowers Research Centre Limited (since its inception in 2017 until June 2020), a wholly owned subsidiary of New Zealand Winegrowers which instigates and oversees research.

11. Through my work with Grape Vision Ltd I have accumulated extensive experience and expertise in the development of vineyards and the production of grapes grown for both clients and myself. Since 2004, I have managed between 250 and 400 hectares of vineyard land in the Central Otago winegrowing.

Code Of Conduct For Expert Witnesses

12. I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note ~~2014~~ 2023. This evidence is within my area of expertise, except where I state that I am relying upon material produced by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Scope of Evidence

13. This evidence will address the following:

    (a) A description of the viticulture industry within Otago;

    (b) Unique characteristics of winegrowing areas of Otago;

    (c) Importance of water;

    (d) Investment timelines, and ability to adapt to change;

    (e) What pressures does the sector face?

    (f) Water quantity

    (g) Water quality

    (h) Supporting sustainability and innovation

    (i) Providing for viticulture in the FPI-RPS

    (j) Comment on Provisions of the FPI-RPS

A description of the viticulture industry within Otago

14. The modern viticulture industry in Central Otago started in the 1970's at Rippon Vineyard with experimental plantings[2]. In 1987 the first commercial Pinot Noir was produced by Gibbston Valley Wines. The development of the industry picked up pace in the 1990's with the majority of the vineyards planted between the late 1990's and mid 2000's.

[2] Rippon – Oram (2004: p 6)

15. Currently there are approximately 235 vineyards and approximately 2055 hectares planted in vines[3]. The plantings are predominantly within the territorial authorities covered by the Central Otago District Council (**CODC**) and the Queenstown Lakes District Council (**QLDC**). This is the 3rd largest area planted in New Zealand. The average vineyard is 8.7 hectares compared to the national average of 20 hectares. The chart below shows the number of vineyards by area within Central Otago:

Size	**Number**	**Percentage (%)**
0-5	119	50.6
5-10	56	23.8
10-20	38	16.1
20-50	19	8.1
50-100	2	0.8
100+	1	0.4
	235	100.0

Table 1 Vineyard Area

16. The plantings are spread in different sub-regions. The boundaries of these sub-regions are slowly becoming more tightly defined and would at present be classified as follows: Gibbston Valley and Wanaka (QLDC), Bannockburn, Bendigo, Pisa, Lowburn and Alexandra (CODC). The definition of these areas is based on geographical connection (and historical nomenclature), meso-climate and soils. The "Central Otago" Geographic Indicator (**GI**) has been accepted by the Intellectual Property Office of New Zealand[4]. More recently the "Bannockburn" GI has also been accepted. A GI is a sign used on

[3] NZ Winegrowers Vineyard Report 2022 – p6 - https://www.nzwine.com/media/22001/1-vineyard-report-2022.pdf
[4] IPONZ (https://www.iponz.govt.nz/about-ip/geographical-indications/) https://www.iponz.govt.nz/about-ip/geographical-indications/register/central-otago/ https://www.iponz.govt.nz/about-ip/geographical-indications/register/bannockburn/
15: NZ Winegrowers Vineyard Report 2022 (p20)

wines and spirits from a specific geographical location which possess a quality, reputation or other characteristic linked to that location.

17. The predominant variety planted is Pinot Noir at 80.5%[5]. This is the highest proportion of Pinot Noir planted in any major region in the world and the variety has been the flag bearer for the reputation of Central Otago wine and Pinot Noir synonymous with Central Otago in New Zealand. The variety is also developing this reputation globally. The chart below shows the number of hectares planted in major varieties:

Variety	**Planted Area (Hectares)**	**Percentage (%)**
Pinot Noir	1656	80.5
Pinot Gris	172	8.4
Chardonnay	92	4.5
Riesling	62	3.0
Sauvignon Blanc	40	1.9
Other	35	1.7
Total	2055	100.0

Table 2: Planted Varieties

18. An estimated 820 people are directly employed full time in the Central Otago wine industry, with additional jobs in vineyard and winery support industries[6]. During harvest this increases to well over 1000 jobs. The wine industry has tangible assets valued at >~$650 million and intangible assets worth an estimated $1 billion.

19. Tourism plays a significant role within the wine industry, with over 60 cellar doors throughout the region. An ability to directly access the end consumer of the wines produced and sell the wines at retail value significantly enhances the profitability and financial viability of a wine brand.

[5] Refer note 2 at page 20.
[6] Central Otago Winegrowers Strategic Review (2020).

20. The majority of small vineyards, in my experience, are owned by family operations. The larger properties tend to be owned by corporate wine companies who may own a number of smaller vineyards. The success of the industry has recently seen a number of wealthy individuals purchasing successful vineyards and brands to add to their portfolio.

Unique characteristics of winegrowing areas of Otago

21. There is a concept in the world of “fine wine” (typically defined as being wine of high quality) known as “terroir”. It is a French term for which there is no specific translation but is generally accepted to mean that the particular characteristics that a wine expresses comes from the environment it is grown in and the culture of the people who tend the grapes and make the wine.

22. Central Otago wines, and particularly the Pinot Noir it is becoming renowned for are the result of terroir. In the subsequent sections I will consider the different dimensions of the environment and culture that the grape vines are subject to. In the appendices I include maps showing the different ranges discussed below.

Altitude

23. Central Otago vineyards are planted between 150 metres above sea level (**masl**) to 500 masl, which is the highest in New Zealand. Additional altitude brings lower temperatures and affects the range of temperatures that the vines experience.

Growing Degree Days (GDD)

24. GDD is a measure of the accumulated heat that a vine receives over 10°C (which is considered to be the temperature that a grape vine starts to actively photosynthesize or grow at). Although Central Otago has a large range of GDD on average the vines experience on average some of the lowest GDD in New Zealand. This has driven the selection of varieties to those that consistently optimally mature in these conditions and make high quality wines. Central Otago is at the lower end of the ability to mature particularly Pinot Noir, which results in

intense flavours and aromas and contributes to the areas ability to produce high quality wines of this variety.

Geology

25. The geology of Central Otago is unique within New Zealand. Originally, a semi-tropical lake the ranges were formed via the Kaikoura Orogeny which has resulted in fold uplift mountains (between 20 million and 5 million years ago). The inland valleys have been subject to at least 5 glacial infill advances from 5 million years ago to approximately 250,000 years ago. All the soils that have been formed have been subjected to the geological activity Central Otago has experienced although they are all sourced from Otago Schist as the base material. Grapes have extensive root systems and will grow to great depths to source water and nutrients. Consequently, an understanding of the history of a particular site is necessary to understand the range of nutrients and water available to the vines.

Soils

26. Although a relatively small area is currently used to grow grapes in Central Otago there are a large number of very different soils present in this area. The soils range from sands, to silt, to loams and clays and typically they vary significantly within a very short distance. The ages of the soils also range from very young (circa. 20,000 years old) to very old (circa 300million+ years old) and have very different water and nutrient holding characteristics. These differences are evident in in the wines made from different soils (and geologies). Most soils in Central Otago have low to moderate water holding capacities.

Topography

27. Vines are grown both on the valley floors and on the remnant glacial terraces in Central Otago. Vines flourish on land classified on the Land Use Capability scale from 1 (being the most versatile – defined as “Land with virtually no limitations for arable use and suitable for cultivated crops, pasture or forestry”) to 6 (defined as “non-arable land with moderate limitations for use under perennial vegetation such as

pasture or forest"). LUC 4-6 typically includes varying angles of slope. A west facing slope increases the effect the sun has on heating the soil (and thereby enabling the vine to grow) by increasing the intercept angle.

Sunshine

28. Central Otago experiences over 2000 hours and some very high rates of Ultraviolet light – both of which affect the rate of photosynthesis. The high sunshine hours and UV mitigate the low accumulated GDD.

Diurnal Range

29. The winegrowing region of Central Otago experiences the highest range of daytime and night time temperatures within a 24 hour period. Heat is important for photosynthesis and sugar accumulation while the cold preserves the acids in the grapes.

Humidity

30. The humidity in the wine growing region of Central Otago is very low, sitting at around 65% during the morning, often dropping to 30% during the afternoon. The low levels of humidity means the vines are subject to lower levels of disease pressure, from diseases such as Botrytis Cinerea (which can result in devastating crop losses) that thrive in higher humidity environments.

Frost

31. Frost events during the growing season present the largest growing risk to viticulture. Depending on the time of year half an hour at -0.5°C can cause catastrophic damage to the green tissue (which includes the fruit). Wind machines and water frost fighting can effectively mitigate this risk, within limits (wind machines being effective to -2°C and water based systems to -5°C).

Nutrients

32. Soils in the Central Otago winegrowing region have low to moderate fertility (depending on the type of soil), but this can only be unlocked by rainfall or irrigation.

Rainfall

33. Central Otago is a semi-continental maritime influenced climate, the only place in New Zealand like it. This is caused by progressive mountain ranges from Fiordland where the moisture is deposited as it rises and falls over these mountains. As you move from Wānaka and Gibbston east the average rainfall progressively decreases across the sub-regions. The rain experienced in Central Otago is mostly in summer but is very inconsistent with large dumps of rain the norm. In these situations, particularly on dry ground, a lot of the rainfall does not penetrate the dry surface and is lost (and in extreme situations causes erosion). There is not enough consistency to the effective rainfall to enable grapes to grow in Central Otago. Dry farming is being trialled on a very small scale with limited success to date.

Importance of water

34. Water is one of the key requirements for growing grape vines. It is vital that the right amount of water be available to the grape vine during the different physiological stages of growth. The total volume needed per hectare depends on:

    (a) Growth stage – no irrigation is required during dormancy. During the start of the growing season enough water to grow a full-sized canopy is required. Late season sufficient water to enable the vine to maintain its canopy and crop load is required.

    (b) Vine age – as the vine is growing to maturity, they need more water to support the growth and also have less developed root systems. Therefore, they are more reliant on irrigation during this phase. A rule of thumb indicates 10l of water during peak needs per day per vine is required.

(c) Vine density – within limits the more vines per hectare the more water is required. The density vines are planted at in Central Otago ranges from 1667 to approximately 8500 vines per hectare.

(d) Crop levels – to effectively ripen a higher crop more canopy leaf is required and the higher the water requirements to grow and support this during the growing season.

(e) Soil type – the sandier a soil is, typically the lower its ability to hold water is and the more water is required to maintain the vines

(f) Rainfall – the more inconsistent the rainfall is and the period during which rain is absent mandates the rain be supplemented by irrigation.

35. No vineyards that I am aware of are planted without irrigation in Central Otago. Dryland farming is being trialled on a very small scale with limited success to date. As noted above, although Central Otago is predominately a summer rainfall area the rain events are not always regular and can arrive in bursts, not all of which is absorbed into the soil profile to become available for the grape vines. Short intense "droughts" (from the grape vines perspective) are experienced nearly every year. Thus, irrigation is required on all vineyards in Central Otago. A lack of water would prevent grapes from establishing and would compromise the ability to grow sufficient canopy and ripen an economic crop load.

36. The application of water to a grape vine is very efficient in viticulture. Data on soil and vine moisture is regularly collected and monitored and water is applied via micro irrigation using some form of dripper that delivers the water directly to the grape vine. The Sustainable Winegrowing New Zealand (**SWNZ**) system that over 97% of vineyards are farmed to requires this, as well as collection of data on rainfall and irrigation amounts. This data is reported and analysed and presented back to farmers on an anonymised basis to allow comparative analysis.

37. Water is also required to enable frost protection to occur on the colder sites within Central Otago. This is applied when the temperature approaches zero and as water changes from liquid to ice it releases latent heat that is transmitted through any ice formed to provide protection to the vulnerable green tissue. To provide a hectare of vines protection to -5°C 50,000 litres per hour needs to be delivered.

Investment timelines, and ability to adapt to change

38. Vineyards in Central Otago take three years to grow their first crop and 6 years to ripen their full crop. Vines take 10-15 years to start delivering site typicity and between 25-40 years to express site specificity (or "terroir"). Vines typically are economically productive for up 100 years and can continue to produce crops for much longer than that.

39. It takes considerable investment in land, vines, and the associated infrastructure to develop a vineyard. Given present costings the cost to plant a vineyard is approximately $75,000 per planted hectare, excluding the land cost (this currently ranges from $60,000 per hectare to well over $300,000 per hectare as unplanted land). It costs about $30,000 per planted hectare to get the vines to their first crop and another $15,000 per planted hectare to get the vines to full maturity. If a water-based frost protection system is required then another $25,000 per hectare can be added to the cost.

40. The life of irrigation infrastructure ranges from 25 years for above ground pipes, to 50+ years for underground infrastructure and dams. Pumps and associated electrical control equipment range from 10 to 20 years depending on the number of duty cycles. Considerable technical advances have meant that the irrigation systems are very sophisticated and are sized to deliver the exact amount of water required as economically as possible. The ability to alter the system has been reduced as this sophistication has increased as there is little to no "fat" in the system design, meaning there is limited ability to adapt to change.

41. The significant upfront investment to plant vines means that returns are required over a long period. Therefore, the ability to adapt a system where further investment is required can be very limited over short to medium term timeframes.

Pressures faced by the sector

42. The wine sector in Central Otago is faced with a number of challenges. These include:

    (a) Rising costs – due to inflation (both wage and materials/input inflation). There is an inability to consistently pass these costs on due to the presence of “price cliffs” (where sales volume drops materially above a certain price point), product swaps (where a cheaper lower quality product is substituted by consumers) and overseas and domestic competition from other regions within New Zealand.

    (b) Access to staff – the labour market is particularly tight at the moment due to the absence of seasonal/backpacker labour as a result of lower tourist numbers and the cost of international travel.

    (c) Access to land – there is competition for productive land at an economic scale due to competition from other sectors, the continued development of lifestyle blocks and the influence of urban creep.

    (d) Access to water – A number of the underground water sources in Central Otago have been over allocated and it’s very difficult to gain consent to access the water, even if it is underutilised.

    (e) Increased red tape (and associated costs of completion and compliance) – the never-ending compliance cycle has appeared to have accelerated in the last decade and this looks set to continue in the near term.

Water Quantity

43. The typical methods water is abstracted for use in viticulture are as follows:

    (a) Bore – on property or shared infrastructure;

    (b) Surface take – individual or shared schemes, from rivers/ creeks/ underground springs; and

    (c) In the case of takes in proximity to Lake Dunstan – a direct take is enshrined by the Regional Plan: Water (Rule 12.2.2.4) which permits the take and use of groundwater from within 100 metres of the main stem of Lake Dunstan. This operates as a form of ground/surface water take (via a direct line in to the lake or via an infiltration gallery).

Water Requirements

44. Water is essential for vines to physiologically function and produce a quality crop. One of the critical periods for water abstraction is within the growing months of October to April where vines are actively growing crops. To facilitate this growth, a sufficient volume of water is required on a consistent and reliable basis. Where reliability is lacking, storage may be necessary to bridge any shortfall in the capacity of the water source. In some instances, where the water source dries up (or goes below a minimum flow) during the summer months then water storage will be essential. This is typically through the use of a dam.

45. Another key use of water is for frost protection (otherwise known as frost fighting) where the reliance on water storage is significantly increased as it can require large amounts of water. For a 5mm impact sprinkler or rotator, 50,000 litres of water is required per planted hectare for each hour the system is operational. In my experience you need to allow for three 8-hour frost events and be able to store sufficient water to cover the inability to recharge the storage facility over this period from the water source. This can result in very large storage requirements and significant investment.

46. Based on experience, when I budget for the water either required to grow the vines to maturity or while they are cropping, I allow for 10 litres per vine per day. Mature vines on heavy soils with high water holding capacity at low cropping levels will need less than this but as a baseline 10 litres provides sufficient water for low water holding capacity soils in a dry season.

47. The above figure differs from the initial Aqualinc report commissioned by ORC in 2010 which has water use volumes that are, in my opinion, insufficient to support during vine development until maturity as well as during dry seasons. It was on that basis that I engaged with Aqualinc who agreed to produce an updated report for ORC has been published very close to the 10 litre figure (being 9.7 litres).[7]

48. I note that this report allocates water on a per hectare basis and then uses a vine density of 2500 vines per planted hectare to arrive at the 9.7 litre figure. In my view, this does not adequately account for the range of densities that vines are planted throughout Central Otago: ranging from 1667 vines per planted hectare to 8500 vines per planted hectare. At the upper end, this equates to 2.8 litres per vine per day which is insufficient and should be considered on a per vine figure.

Infrastructure

49. Water is delivered to vines through micro irrigation drippers which can deliver between 1 to 4 litres per hour, although these are typically 2 litres per hour on average. Irrigation drippers require minimum water quality to enable this flow to occur which normally means the water has to be filtered to an 80-100 micron level and then pumped on to the vineyard. Some vineyards do not require pumping and rely on gravity systems but most, particularly those on hill slopes, will require some form of pumping. With the desire to plant on slopes to reduce frost risk

[7] Aqualinc,"Irrigation Report: Guidelines for Reasonable Irrigation Requirements in the Otago Region" (24 April 2017), Otago Regional Council <https://www.orc.govt.nz/media/4499/aqualinc-irrigation-guidelines-2015.pdf> at page 14 at 5.2

and increase the effect of sunlight the cost of the infrastructure to enable this to occur can be significant.

50. The cost of infrastructure is a factor of the size, location, hill slope, water source and its unique requirements. As an indication of costs, the following pricing would apply to a 10 hectare vineyard close to the water source on a relatively flat site (other characteristics would result in an increase in cost):

(a) Water Take (between approx. $50,000-100,000)

(i) Bore: $100,000 (including bore development pump and power assuming the power is relatively handy).

(ii) Surface Take: $50,000 – $100,000 Infiltration gallery/ wellpoint.

(b) Headworks: (approx. >$42,500), including $10,000 shed, $15,000 power, $5,000 pump, $6,000 Variable Speed Drive, $4,000 filtration, $2,500 pipework.

(c) Mainline (approx. $25,000), including $10,000 pipeline, $15,000 trenching.

(d) Submains (approx. $45,000), including $20,000 pipeline, $25,000 trenching.

(e) Laterals/drippers/risers: (approx. $90,000) $65,000 piping/ drippers/ fittings, $25,000 installation

51. If a dam is required for storage then, for a 3 million litre dam on a relatively simple site, the dam in my experience will cost in the order of $175,000 assuming is does not require a building consent.

52. A water frost fighting system will require at least a 3 million litre dam plus the following:

(a) Engine/pump - $100,000

(b) Mainline – $40,000

(c) Submains - $25,000 plus $15,000 mole ploughing/trenching

(d) Sprinklers - $65,000 plus $15,000 installation

53. The major components of an irrigation system also have a finite life and will need replacement once they have worn out:

(a) Bore pump – 10 years;

(b) Irrigation Pump – 10 years;

(c) Variable Speed Drive – 10 years;

(d) Filtration – 15 years;

(e) Mainline/submains – 50 years; and

(f) Laterals/drippers – 25 years.

Water Quality

54. Vines are a parsimonious user of water and other inputs and nutrients. In my experience the objective of viticulturalists in Central Otago is the production of super premium and ultra-premium wines. This objective has helped put Central Otago on the national and international stage. To achieve this, growers set modest yield targets to ensure the grapes have concentrated flavour, aroma and colour. It is relevant to consider this approach against other forms of land use production such as pastoral farming which is often driven by a desire to maximise crop yield and dry matter. Against that background, viticulture is considered to be a very efficient use of water resources in terms of very low inputs both for water and nutrients.

55. Wine is judged on quality, not quantity. Finding the right balance between nutrient and water input therefore requires careful management. The natural effect of higher inputs is higher growth which does not create high quality wine. The desire for growers is to balance vegetative and reproductive growth which is effectively to use as little water and nutrients as possible so as to just meet the vines requirements and no more. This requires the adoption of numerous soil

and vine water requirement tools which have been developed, including water scheduling monitored on a weekly basis, to achieve the desired input.

56. A study using the Marlborough and Gisborne winegrowing regions focussed on water footprints and indicates that viticulture is both a particularly efficient use of water to achieve sufficient vegetative growth.[8] This study is also important for the observation that it is important to consider water issues at the local scale given the importance of site specific considerations to terroir (meaning all the environmental factors relevant to a site (region, climate, soils, aspect) that go into making wine).

57. The same research has also shown that grape vines are also low users of nutrients, in particular Nitrogen. Nitrogen is the key nutrient (assuming sufficiency of other nutrients) for growth and that the amount of Nitrogen required is typically available through the natural Nitrogen cycle. In those cases where nitrogen needs to be supplemented the level it is leached at such a low level to be considered negligible as the grower strives to just give sufficient Nitrogen to achieve balanced growth.

58. Water and nutrient usage are monitored (independently from processes under the Resource Management Act 1991) through Sustainable Winegrowing New Zealand (**SWNZ**). SWNZ is an industry-wide certification programme led by New Zealand Growers. As set out on the New Zealand Wine website, SWNZ is "a programme based on continuous improvement and adherence to standards that ensures members meet guidelines for sustainability practices in the vineyard and winery".[9] The programme is used by most growers:[10]

[8] The salient points of the study can be found in the free online version of the article, obtained at the following URL: https://www.sciencedirect.com/science/article/abs/pii/S0959652612005562
[9] New Zealand Wine "Sustainable Winegrowing New Zealand" <https://www.nzwine.com/en/sustainability/swnz/>
[10] Ibid.

> *"Today, 96% of New Zealand's vineyard producing area is SWNZ certified. Over 90% of the wine produced in New Zealand is processed in SWNZ certified facilities. This level of industry-wide participation in a sustainability scheme is a massive point of difference for wine produced in New Zealand. SWNZ certifies all parts of the production chain including vineyards, wineries, bottling facilities, and brands.*

59. Through the SWNZ programme, growers are required to monitor soil and/or vine water status and provide records of irrigation water applied. This monitoring is then benchmarked and used as a basis for driving better practice in the industry.[11] Data released in the New Zealand Winegrowers Sustainability Report 2022 reports the following statistics applicable to vineyard innovations and initiatives:[12]

    (a) 97% of vineyards optimise their water applications for irrigation.

    (b) 92% of vineyards have practices or initiatives to conserve or reduce water user

60. Nutrient use is likewise monitored to ensure the application is sufficient but not excessive. The data collected is independently audited and reported on.

Supporting Sustainability and Innovation

61. Vineyards utilise a number of practises to reduce their impact on the land, some of which are required to comply with the requirements of the SWNZ program, including:

    (a) Use of soil and vine water monitoring to ensure only water required to achieve target yield/grape quality;

    (b) Climate monitoring tools such as HarvestNZ vineyard level weather monitoring;

[11] New Zealand Wine "New Zealand Winegrowers Sustainability Report 2022" <https://www.nzwine.com/media/22253/nz-winegrowers-sustainability-report-2022.pdf>

[12] Ibid, at page 16.

(c) Pressure and flow testing to ensure leaks and faulty equipment are identified and fixed;

(d) At least biannual soil testing to create a nutrient replacement fertiliser program;

(e) Utilisation of cover crops including selection of crops to fix any nutrients at low levels in the soil;

(f) Use of grazing livestock to incorporate cover crops;

(g) Programs to increase biodiversity (e.g., bees, native plantings, etc)

62. In addition to the SWNZ program a number of vineyards are farmed organically, which essentially removes synthetic chemicals from the farming system and replaces them with non-synthesized chemicals or mechanical substitutes (e.g., under vine mowing or cultivation instead of using herbicides). Some 24% of vineyards in Central are certified to one of a number of organic methodologies, the highest proportion in New Zealand. This is against an average of 10% across New Zealand.[13]

63. Vineyard managers are constantly searching for alternative techniques to ensure as light as possible a touch on the land and are looking for methods to further reduce water and nutrient use. These include:

(a) Research into dry farming vines

(b) Utilisation of low water rootstocks

(c) Research using UV dosing to stimulate plant disease resistance and further reduce the need for agrichemicals (both organic and synthesised chemicals)

(d) Development of new disease resistant grape varieties

(e) Incorporation of biochar (a biological charcoal which incorporates stable carbon into the soil to aid water and nutrient retention)

[13] Above, n 11 at page 6.

Providing for Viticulture in the FPI-RPS

64. The level of investment required to establish a vineyard is significant and has positive effects on the economy and on the land that grapes are farmed on. Water is critical for the successful growth of grape vines in the Central Otago winegrowing region and it is a crucial element to have security of supply both at a sufficient volume and for a long period of time.

65. Enabling such an efficient use of water across the region (as opposed to less efficient uses) is supported by longer term water consents which recognise the objective reality that viticulture has both a low water use requirement and nutrient use.

66. In my experience and opinion, it is highly unlikely that additional investment (both renovating existing assets and development of new vineyards) will be made into the viticulture sector in the Central Otago winegrowing region without a planning framework that recognises and provides for the specific inputs/outputs of the industry.

67. The payback for investment in the wine industry is typically very long. In prior economic modelling I have undertaken using Net Present Value (**NPV**) and Internal Rate of Return models indicates that breakeven in a vineyard set up to supply grapes is between 15-20 years. Without sufficient security of the term of supply of water I would advise potential new investors not to invest in new plantings and would also advise significant caution for the redevelopment of existing assets.

68. Grape growing is a highly sustainable crop which has one of the lowest requirements for water and leaches virtually no nutrients. It adds significant value to the Central Otago region both economically and culturally and its proponents lead the agriculture sector with both sustainable practises and innovation to enhance the crop and the environment it is grown in. This connection is recognised using the French concept of Terroir where the quality the land is farmed is intrinsically linked to the quality and distinctiveness of the grapes grown and the wines flavours.

69. In my view, without the security of supply of water the grape and wine industry will stagnate and will be unable to continue to develop.

Comment on Provisions of the FPI-RPS

70. I have reviewed the COWA submission which seeks various minor amendments to the FPI-RPS. Although I am not a planner, I am familiar with the structure and content of the FPI-RPS having submitted evidence in support of the non-freshwater RPS. The purpose of this section is to therefore provide a commentary on relief sought by COWA and relevant parts of the s 42A Report on that relief.

71. COWA sought a slight amendment to SRMR-I6 Context which sought to distinguish the impacts on water quality across different forms of agriculture. The relief sought was to include the words "poorly managed agriculture" and demonstrate that *not all* forms of agricultural have contributed adversely to the biggest impacts on water quality. In my view, the current text has the effect of painting all forms of agriculture (which includes viticulture broadly) into a bad light. The broad brush conclusion therefore does not appear to be a helpful step into resolving those issues or enabling lower impact resource uses.

72. A new region wide objective (LF-FW-O1A) has been recommended by the s 42A Report Author in response to various submissions on the Freshwater Vision provisions. COWA sought recognition of the viticulture sectors sustainable production practices which support the social and economic wellbeing of people and communities. It also sought to enable innovative and sustainable water use, such as through enabling viticulture. I support the inclusion of the notified provisions applicable to innovative and sustainable practices, which viticulture embodies, into this new objective at (7). I also understand that the s 42A Report Author has broadened the references to particular types of land-based primary production so that specific types of land uses (i.e. agriculture or the food and fibre sector) are not singled out to the exclusion of others (like viticulture). I support this change as it enables recognition of viticulture as sought by the submission point.

73. I do note however, that the Objectives of LF-FW are somewhat removed from the benefits arising from the water that is used and simply focuses on the effects of the water body. While I acknowledge that is a top priority it seems to produce an artificial picture of how improvements to the environment and waterbodies can be achieved by enabling innovative and sustainable land use practices, such as through viticulture. For that reason, I consider there does need to be some recognition, as sought in the submission by COWA for the ways in which water can be used to provide for the social and economic wellbeing of people and communities.

74. COWA lodged a submission on LF-FW-P7 which sought the following addition:

> (7) <u>Freshwater is used efficiently taking in to account the nature of the waterbody that water is to be taken from and the land-use activity the water will be used for.</u>

75. The s 42A Report Author has now recommended a new policy LF-FW-P7A in relation to water allocation and use and responds to various submissions regarding water allocation and technical efficiency. I support the new policy which has been recommended which is favourable to the viticulture industry given that it has strict measures (to improve quality of wine) to ensure that no more water is used than is necessary.

Conclusion

76. The reality is that Otago possesses unique characteristics for producing high quality wine. These are not characteristics that can be replicated in other locations.

77. The wine industry that exists within Central Otago is built on these characteristics and as such cannot occur elsewhere. Therefore, the sector is particularly vulnerable to regulatory changes that alter its ability to make the most of the unique characteristics that it relies on.

78. Significant investment has also occurred to develop land for viticulture with long term returns the focus for most. The ability to 'pivot' to other land uses is limited and should be undesirable given the unique qualities of the Region and the wine it creates.

79. Viticulture has a very low impact on the land and is a particularly frugal user of water and has a very low level of nutrient leaching. Viticulturalists are very aware of the need for sustainable practises and are constantly innovating to further enhance the land and reduce the levels of inputs required in the search for increased grape and hence wine quality.

80. Security of supply of sufficient water for a long period of time is a key enabler for additional investment in the sector. Provisions of the FPI-RPS therefore ought to recognise this long investment period as against the low impact and high efficiency of viticulture.

Date 28 June 2023

James Dicey

Appendix 1 - James Dicey Curriculum Vitae

PROFESSIONAL EXPERIENCE

Grape Vision Limited

Viticultural Development & Management Sep. 04 – present
Owner/Viticulturalist

Development and implementation of viticultural program for ~55 vineyards spread over ~350ha. Recruitment, training and management of staff, including ~40 permanent New Zealanders in specialist roles and 50-110 seasonal Ni-Vanuatu via the RSE scheme. Client management. Budgeting and capital expenditure planning. Management of vineyard budgets with a combined value of >$8m. Materials procurement. Management of machinery operations. National and international viticultural and wine business consultancy. Fruit and wine brokerage. Vineyard development in all regions of Central Otago. Consultancy on reverse sensitivity issues in property development and expert witness

Dicey Limited

Wine Brand 2005 – present
Owner

Development of wine brand. Creation of website and associated social media. Securing and managing NZ, UK, US and Australian distribution.

Diageo plc

Premium drinks, London, Feb. 03 – Jul 04
Manager, Business Risk

Deliver IS based risk activities globally. Recent work includes assessing the project risks within SAP implementations as well as the managing the post implementation audit work on the GB, Ireland and Project Sheriff (US) SAP implementations. Development and maintenance of network with senior IS community to identify key IS risks that drives work. Influence the IS agenda to embed appropriate risk culture.

- Work identification and planning – using an extensive network of IS contacts identify key IS risks and develop work programs to assess, mitigate and audit these risks.
- Risk Consulting – risk assessment and mitigation planning for key IS and market risks. Risk consulting on projects and markets to improve the quality of the control environment.
- Risk Auditing – performed financial and IS audits primarily focussed on SAP enabled back offices.

Quickstart Consulting Limited

Project management (self employed), London, Oct. 99 – Oct. 02

Contracts included:

Saudi Aramco (contracted to Deloitte & Touche)
Oil Producer: Dhahran (Saudi Arabia) Aug. 02 – Oct. 02, period 3 months

Contracted by Deloitte & Touche South Africa to project manage a post implementation SAP R/3 review for Saudi Aramco. Complex environment (FI, CO, MM, IS Oil, PS, IM, AM, HR, QA, BW and PM) with high number of users (20,000).

- Project Management - Identification of project requirements, project planning and delivery of report against plan and budget. Staff management (16 staff/10 nationalities), resource allocation, mentoring and assessment.
- Control Frameworks – Identification and documentation of business processes and the development of control frameworks.
- Reporting – Development of reporting standards. Regular status updates to senior management.

Shell Marine Products

Marine Fuel and Lubricants Supplier: London (United Kingdom) Jul. 01 – Feb. 02, period 7 months

Contracted by Shell Head Office to project manage the development and support of core business applications that are used internationally (in over 25 countries, by over 300 users), including changing software suppliers to reduce costs.

- Project Management: development/rollout of a core business application (Rapid Lubricants Analysis 2) internationally, management of pilot phase, development of support model and integration to SAP (focussing on international VAT issues).
- Management of RFP process: managed change of 3rd party software developer.
- Third Party Management: contract drafting, service level negotiation, process/procedure definition and implementation.
- Strategic: Contribution to IT strategy, IT steering committee (business case/project definitions), staff management including project manager mentoring.
- Business Continuity Planning (BCP): Creation and implementation of Shell Marine Products BCP. Shaping the Shell BCP strategy and approach.

WebPerform Group

Internet Performance Services: London (United Kingdom) Nov. 00 – Jul. 01, period 9 months

Assisted Internet start up company (focussed on online performance assessment and improvement) to obtain £7m funding. Reporting directly to the Product Development Director, working as a Programme Manager developing the development and implementation of core business applications (including £1m budgetary control). Promotion to Information Manager with sole responsibility for the development of the business intelligence layer, reporting directly to the WebPerform executive.

- Programme Management: co-ordination and implementation of multiple software and organisational projects. Project management of the following projects:
  - SAP Implementation (FI/CO, Logistics, CRM/SM, and HR). Responsibilities included solution assessment, training, configuration and change management.
  - Bespoke Application Development – specification, analysis and implementation of a core database driven business intelligence layer including an ASP based front end for configuration. Responsibilities included managing testing (including UAT), user training and documentation.
  - Operational Process Development – Creation of pan-organisational operational processes and structures.
- Business Intelligence Layer: scoping, designing and implementing the Business Intelligence Layer

IPC Electric (part of IPC Media)

Publisher: London (United Kingdom) Oct. 99 – Jul. 00, period 10 months

Reporting directly to the Director of Product Development, with sole responsibility for the development, implementation and operation of a B2C e-commerce solution to provide multiple websites with e-commerce functionality, based on a single catalogue.

- Programme Management – Co-ordination of multiple project e-commerce and infrastructure requirements. Management of resource (financial and human) allocation and prioritisation.
- Project Management – Simultaneous project management (up to 4 concurrent projects) from conceptualisation to implementation/project close-down (budgets exceeding £1.5m).
- Other responsibilities – Policy development, third party management (contract/service), E-Commerce strategy development, business process design, front/back end design integration, software requirements specification, testing, operational management of processes (including logistics and fulfillment), international fulfillment and VAT implication analysis, design of support processes, staff selection/training/management, development of project management methodology.

Deloitte & Touche

Professional Services: Feb. 94 – Sep. 00 (New Zealand, Netherlands, United Kingdom)

Senior manager with a professional career starting in financial audit, progressing to IT audit (including significant security training). Transfer to Europe to focus on SAP assurance and implementation (primarily security and business process controls).

- Project Management – Identification of business requirements, project planning and delivery of product against plan and to budget.
- Business Process Mapping – Identification and documentation of business processes and integration to SAP R/3.
- Business Control Identification – Identification and documentation of SAP R/3 functional controls and development of manual controls to mitigate business risk.
- Security Configuration – Identification of security settings. Design, implementation and rollout of security matrix
- Clients included – Philips Luminaires, ASM Lithography, Delphi Automotive, Philips Automotive, Telecom NZ.

PROFESSIONAL QUALIFICATIONS

- Grad. Dip Viticulture & Oenology – Lincoln University, 2005
- Chartered Accountant – Institute of Chartered Accountant of New Zealand, 1997 (retired)
- Barrister and Solicitor – High Court of New Zealand, 1993
- Bachelor of Law (LLB) – Commercial Law Major (University of Otago, NZ), 1993
- Bachelor of Commerce (BCom) – Accounting Major (University of Otago, NZ), 1992

DIRECTORSHIPS

- New Zealand Winegrowers: 2016 – Sept 2020
- New Zealand Winegrowers Research Centre Limited: 2017 – June 2020
- Mt Difficulty Wines Limited: 2004 – 2019
- Seasonal Solutions Co-operative Limited: 2006 – 2016
- Motorsport New Zealand: 2021 – Present

INDUSTRY COMMITTEES

- 2016 – 2020: NZ Winegrowers Finance Committee (Deputy Chair)
- 2016 – 2020: NZ Winegrowers Sustainability Committee (Deputy Chair)
- 2006 – 2019: Committee Central Otago Winegrowers Association, including 5 years as President (past role)
- 2010-2014: NZ Winegrowers Research Committee
- 2014: Lincoln University Bachelor of Viticulture and Oenology course review committee member
- 2014-2016: Alternate Director for NZ Grape Growers Council

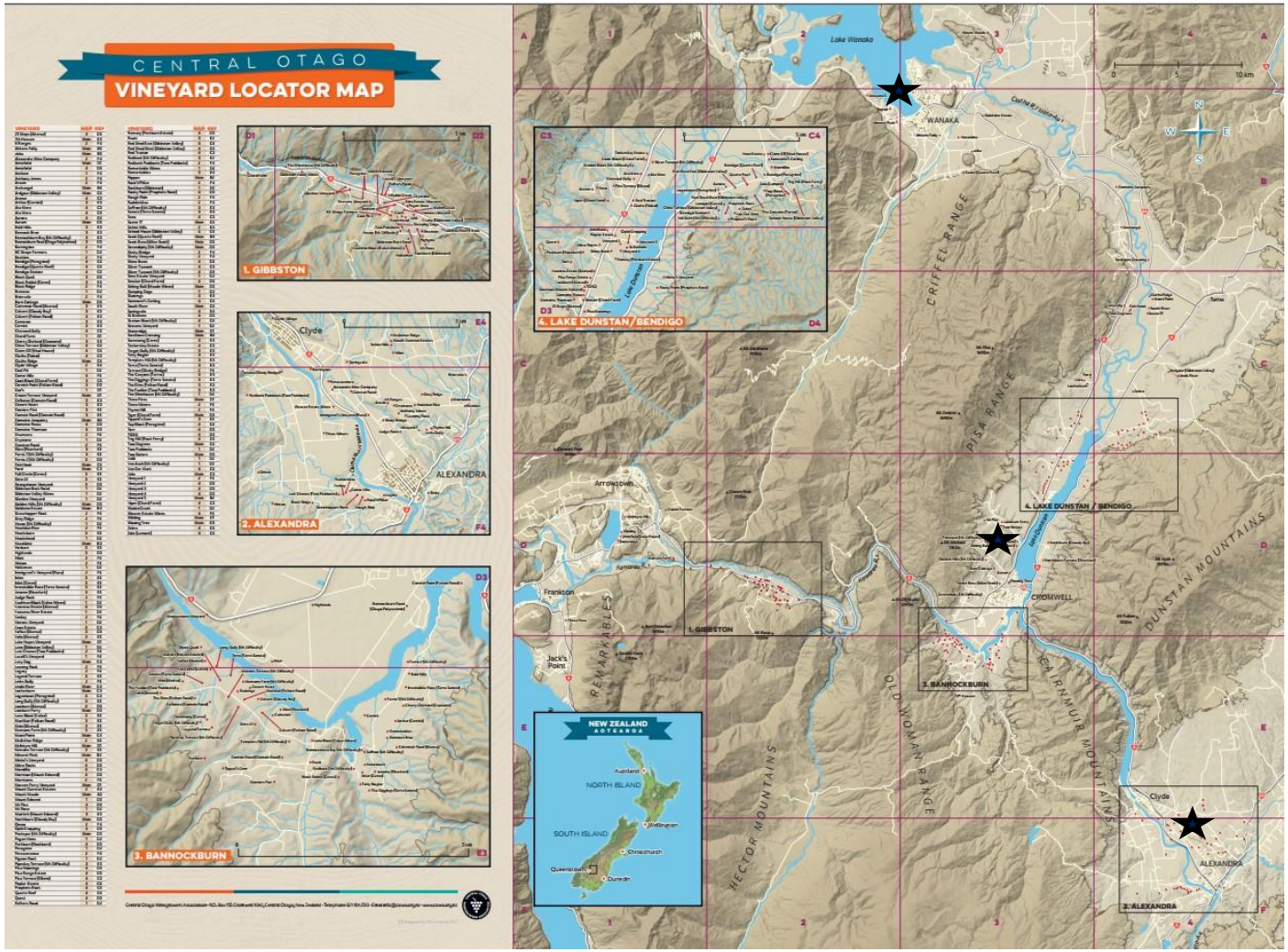
MAJOR AWARDS/TROPHIES

- Ceres Black Rabbit Riesling (2017) – Royal Easter Show Wine Awards Champion Riesling trophy
- Ceres Composition Pinot Noir (2016) – Decanter World Wine Awards New World Pinot Noir Best in Show
- Ceres Composition Pinot Noir (2010) – International Wine and Spirit Competition Bouchard Finlayson Pinot Noir trophy
- Remarkable Wines Pinot Noir (2006) – Decanter World Wine Awards New World Trophy
- Gourmet Traveller Wine 2018 New Zealand Viticulturalist of the Year

TRAINING

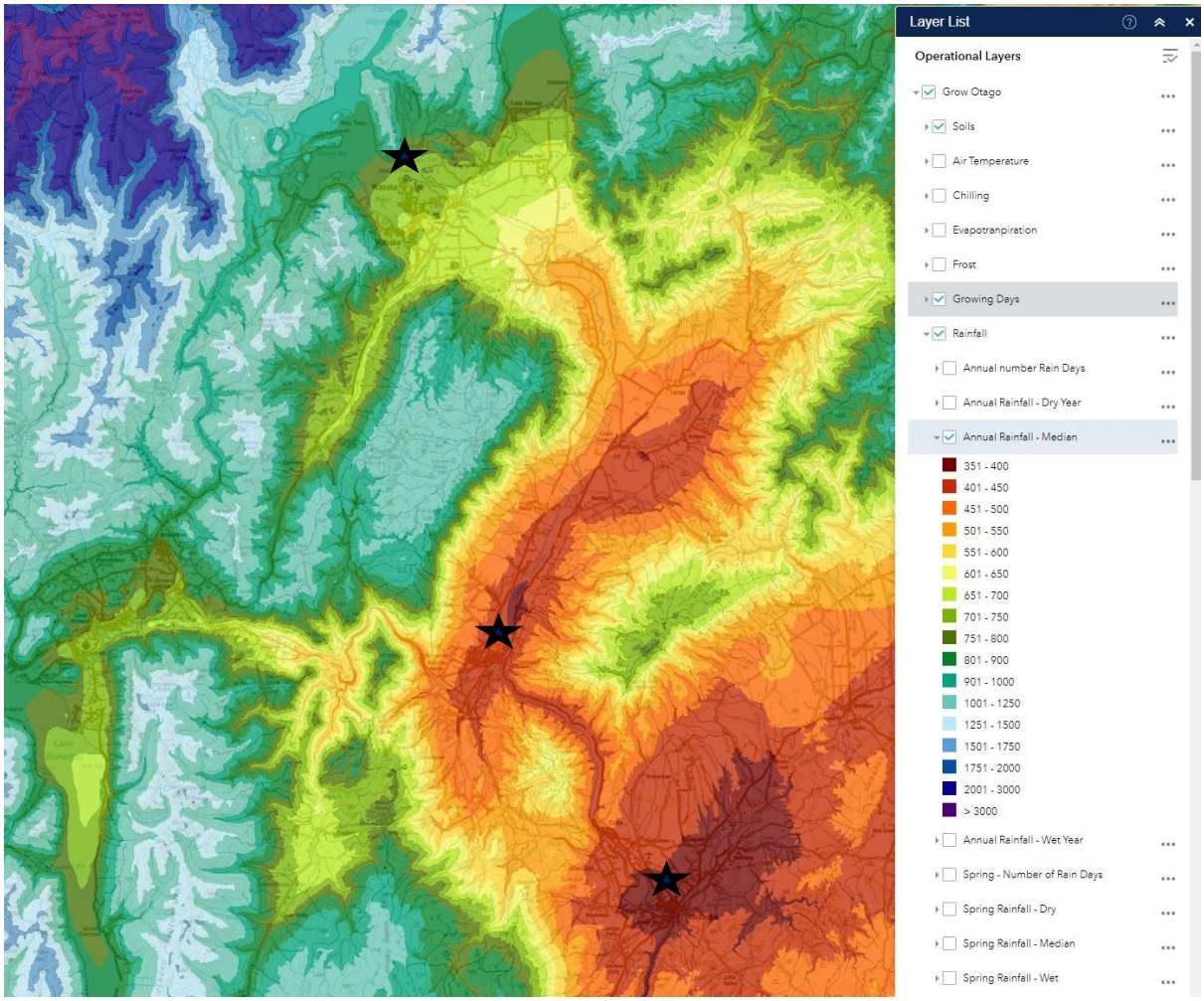
- Institute of Directors – Introduction to Governance, Invercargill 2009
- Risk Management Concepts – Diageo, London 2003
- SAP R/3 – Security Review and Implementation, South Africa, 1999
- SAP R/3 – HR module courses, SAP Training Academy, Manchester, 1998
- Computer Assurance – Basic/Advanced IS technical and audit training, Malaysia/Sydney, 1996/1997

Appendix 2 - Central Otago Vineyard Locator Map



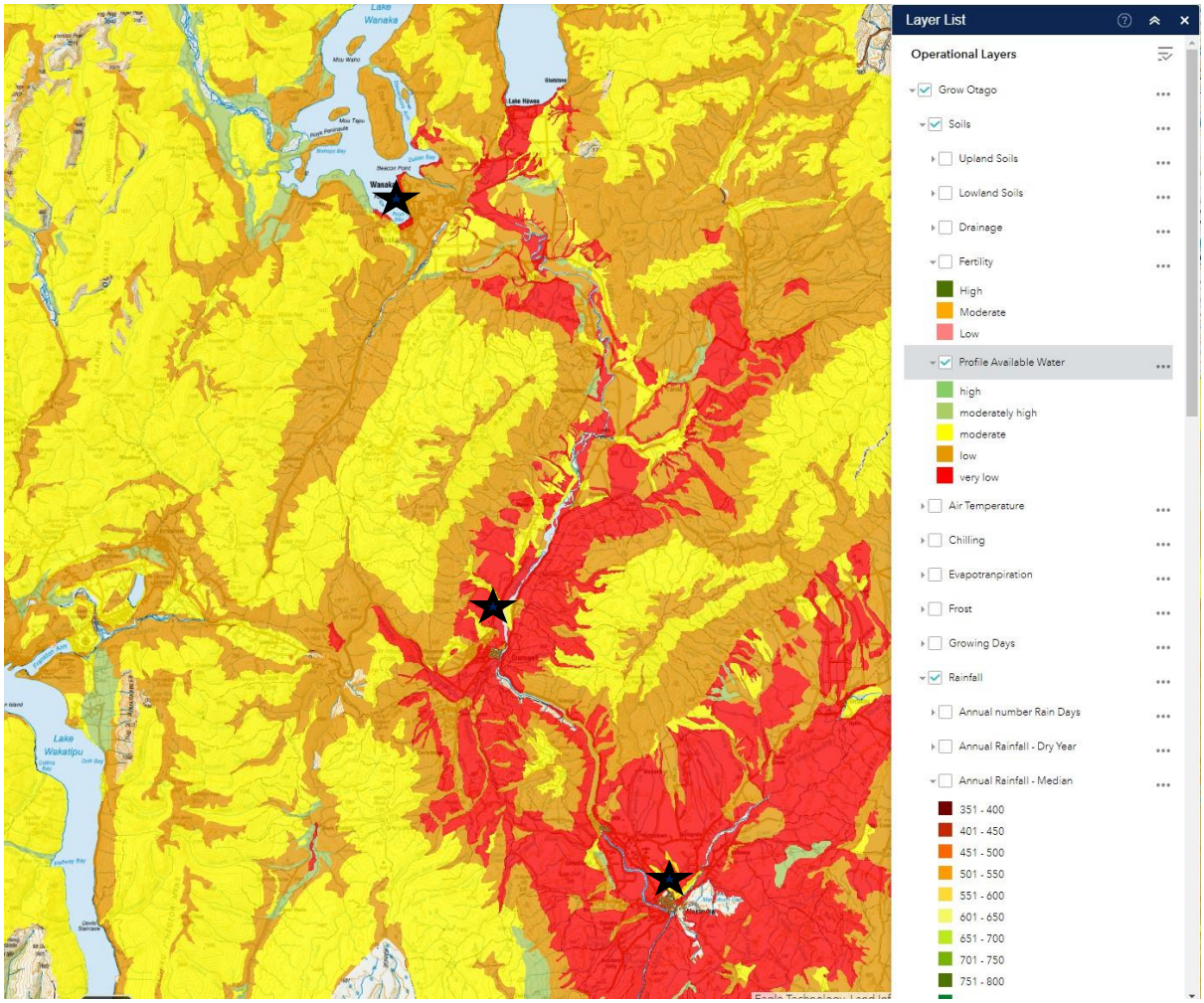
Appendix 3

Annual Rainfall – Median (Source: GrowOtago)



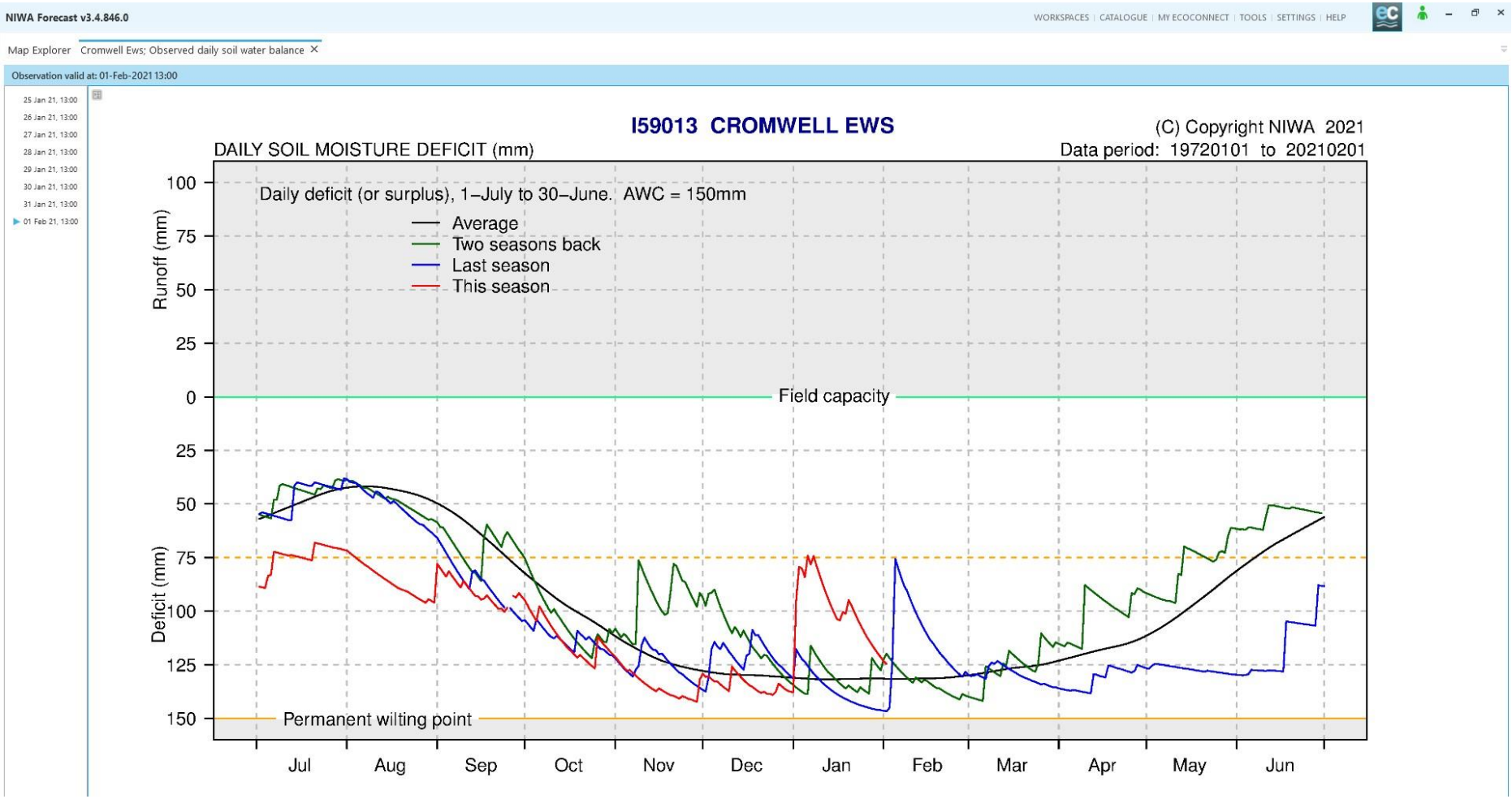
Appendix 4

Profile Available Water (Source: GrowOtago)



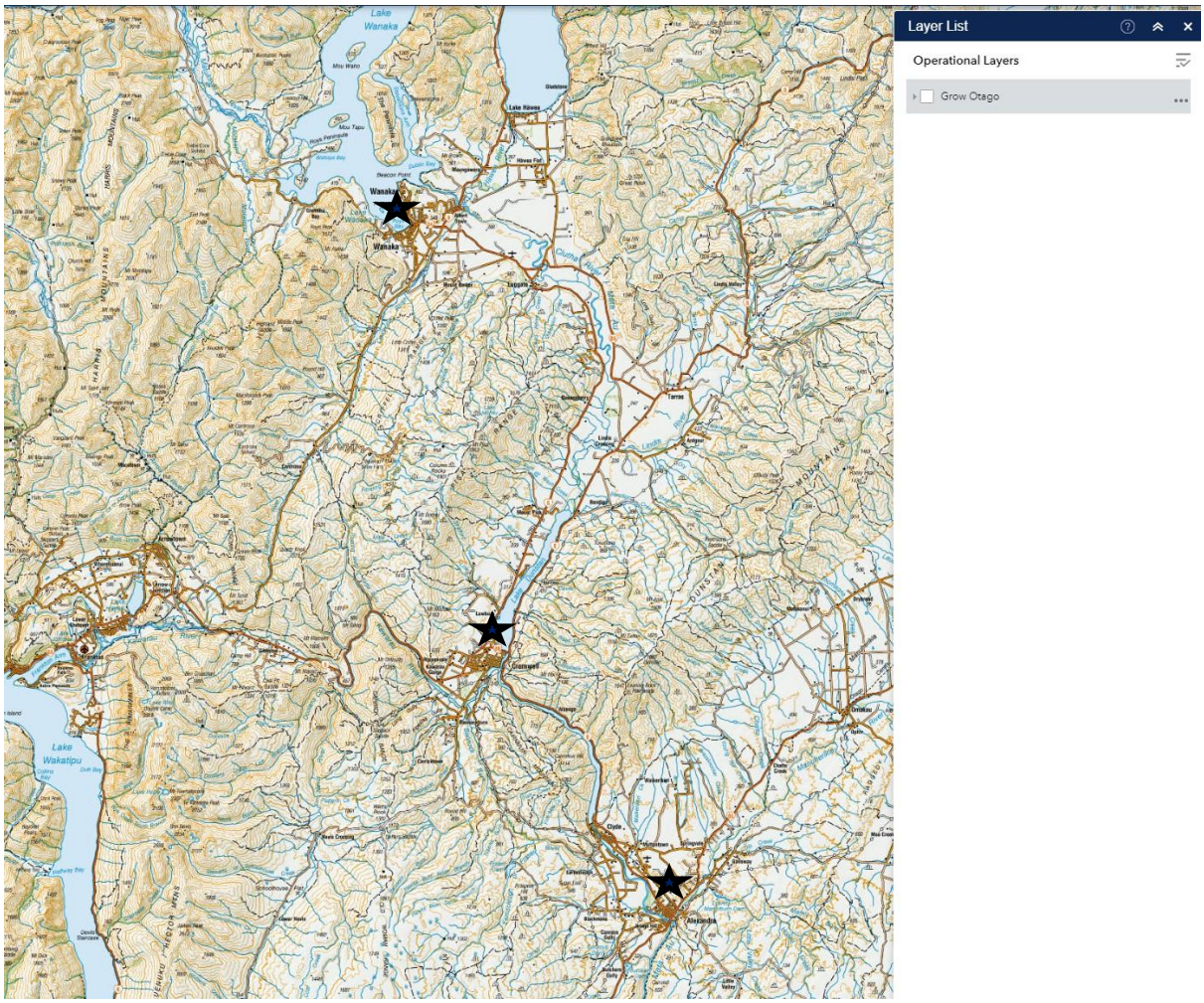
Appendix 5

Seasonal Water Balance (Source: NIWA EcoConnect)



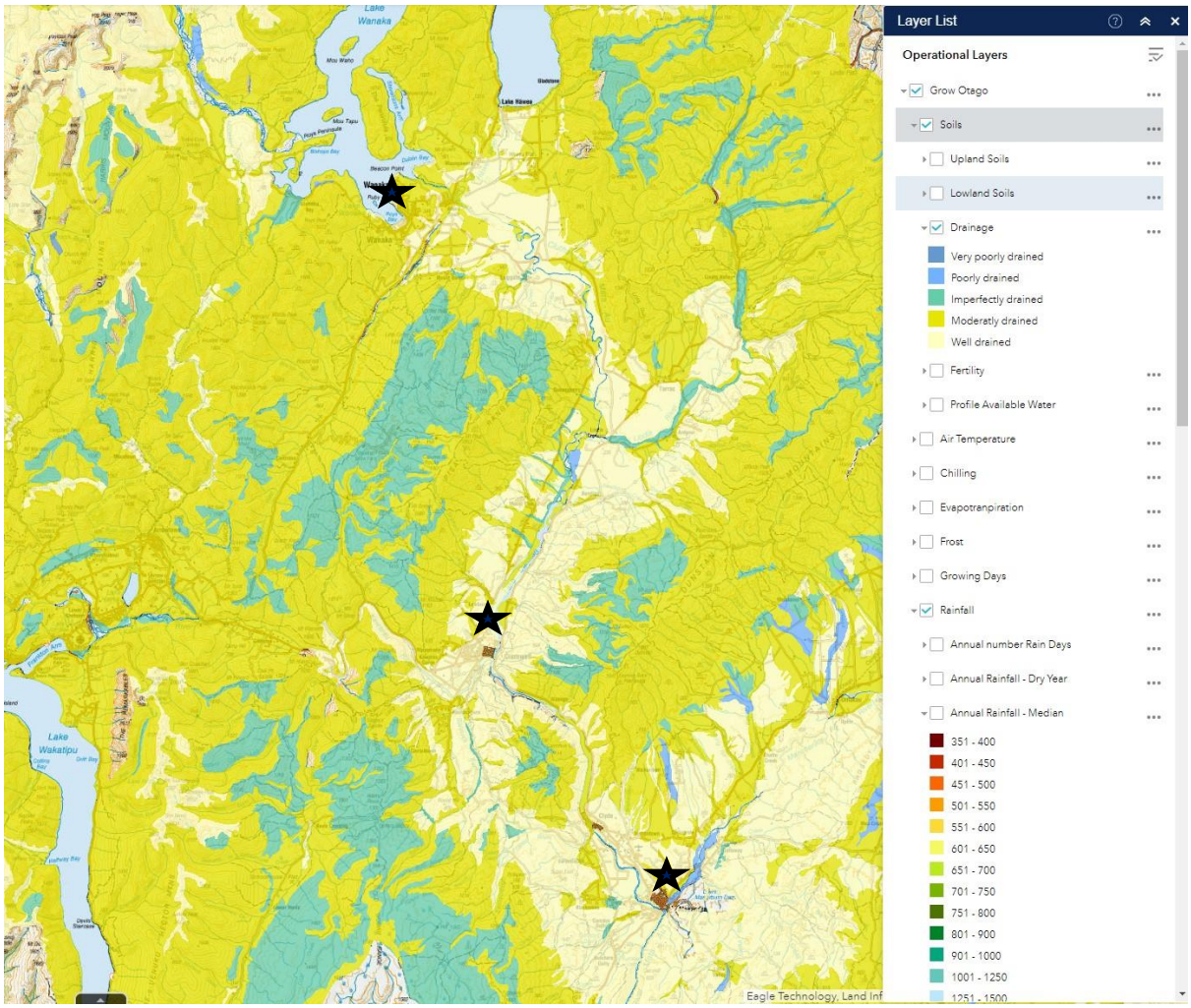
Appendix 6

Topography (Source: GrowOtago)



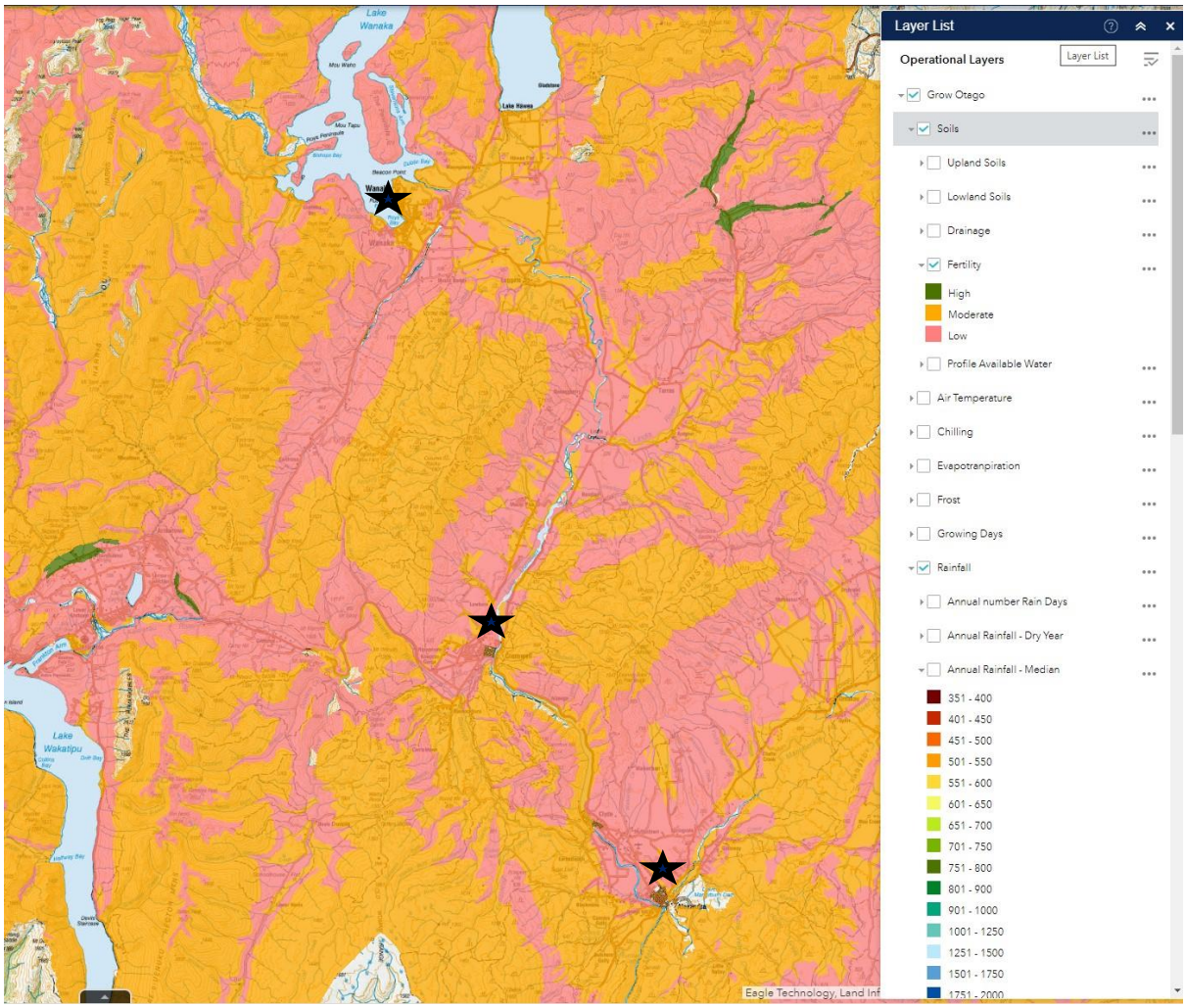
Appendix 7

Drainage (Source: GrowOtago)



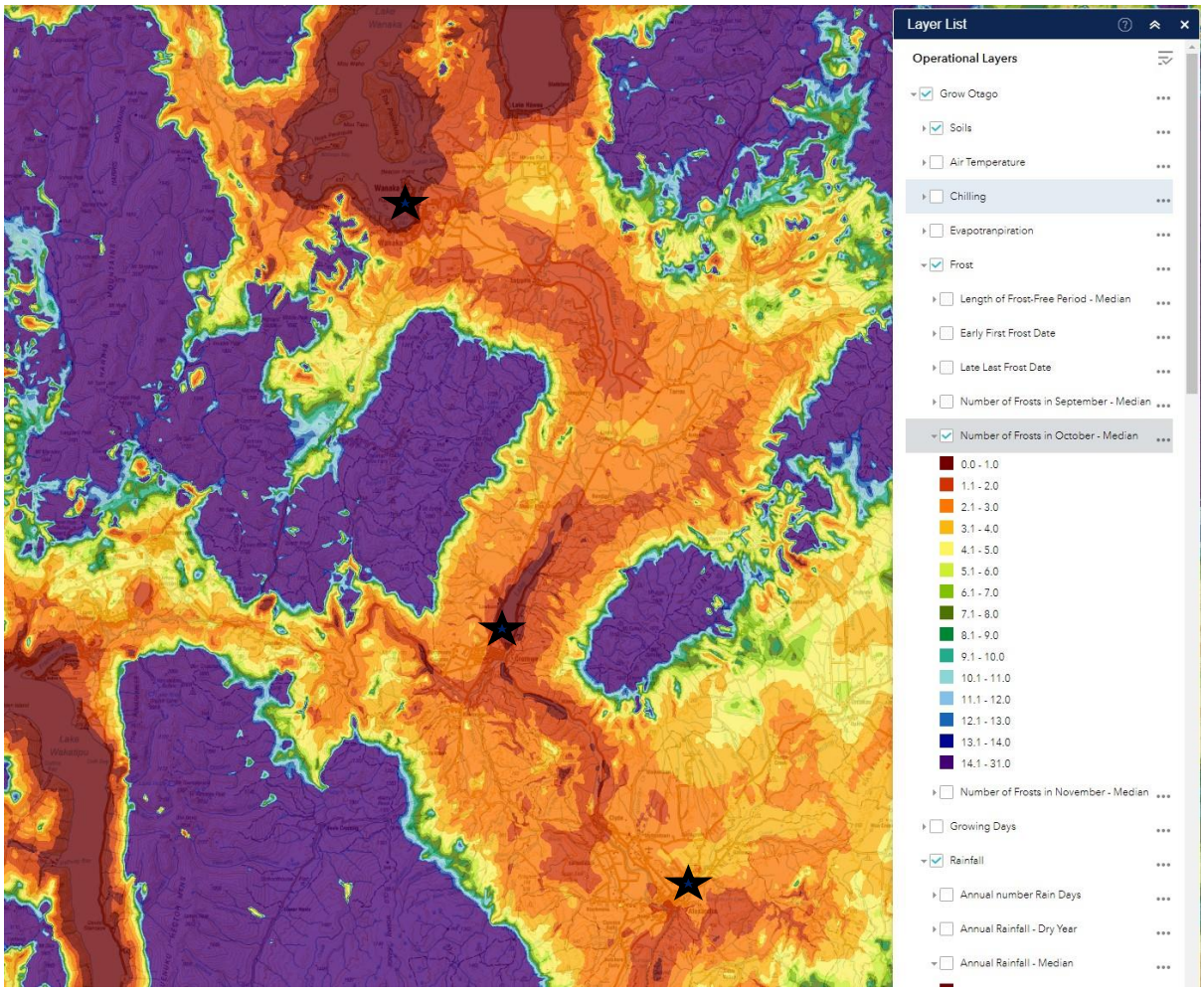
Appendix 8

Fertility (Source: GrowOtago)



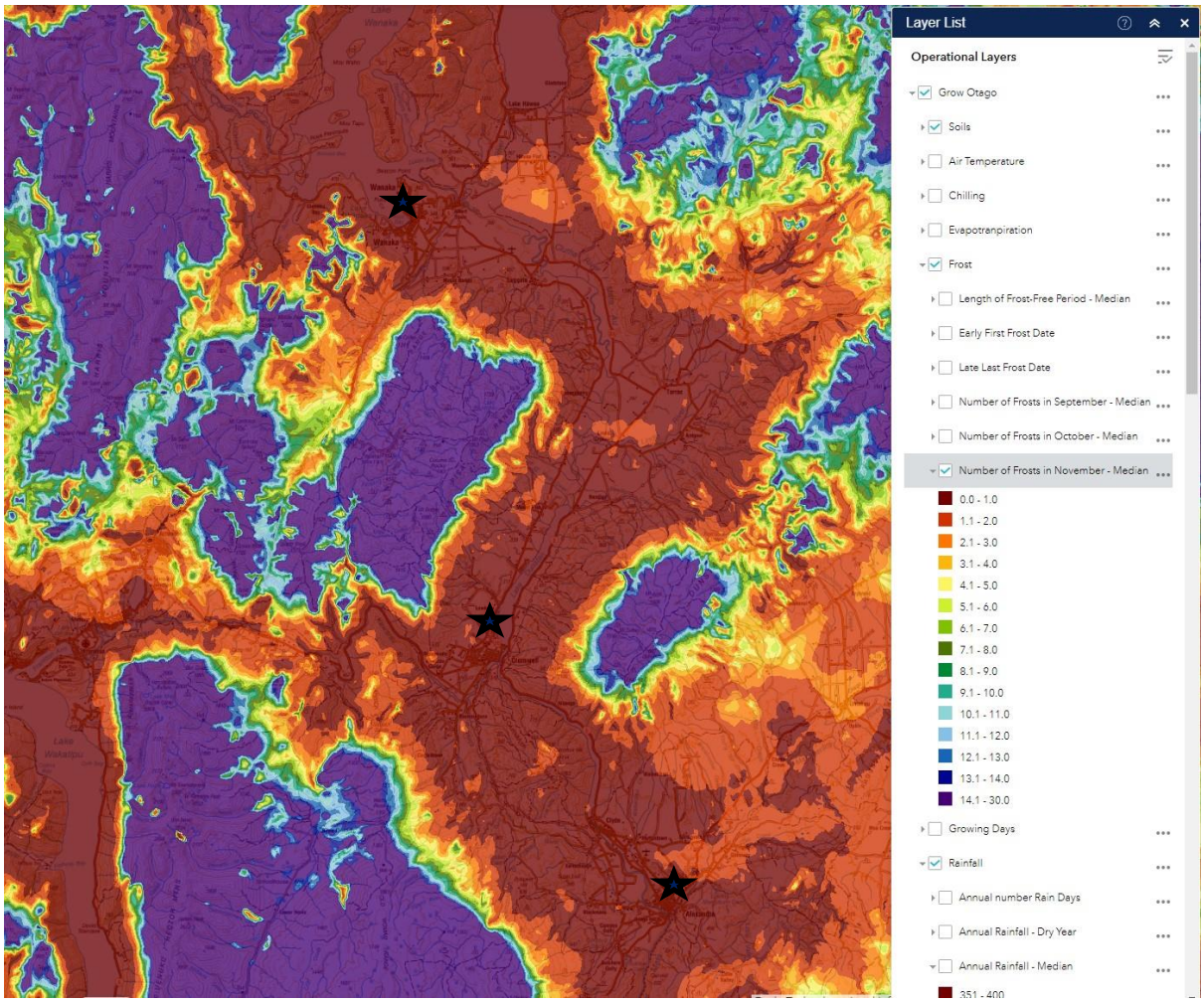
Appendix 9

Frost October (Source: GrowOtago)



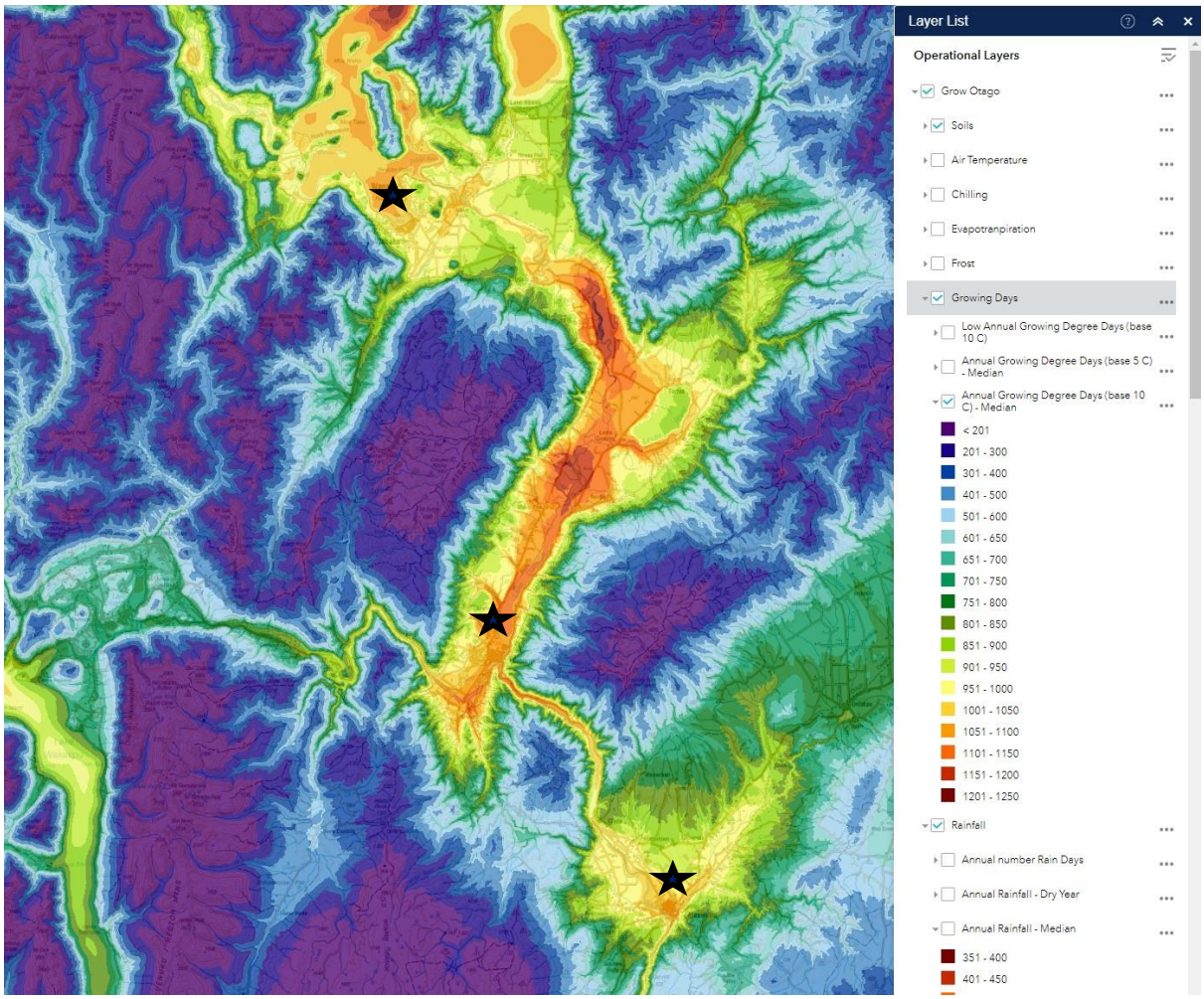
Appendix 10

Frost November (Source: GrowOtago)



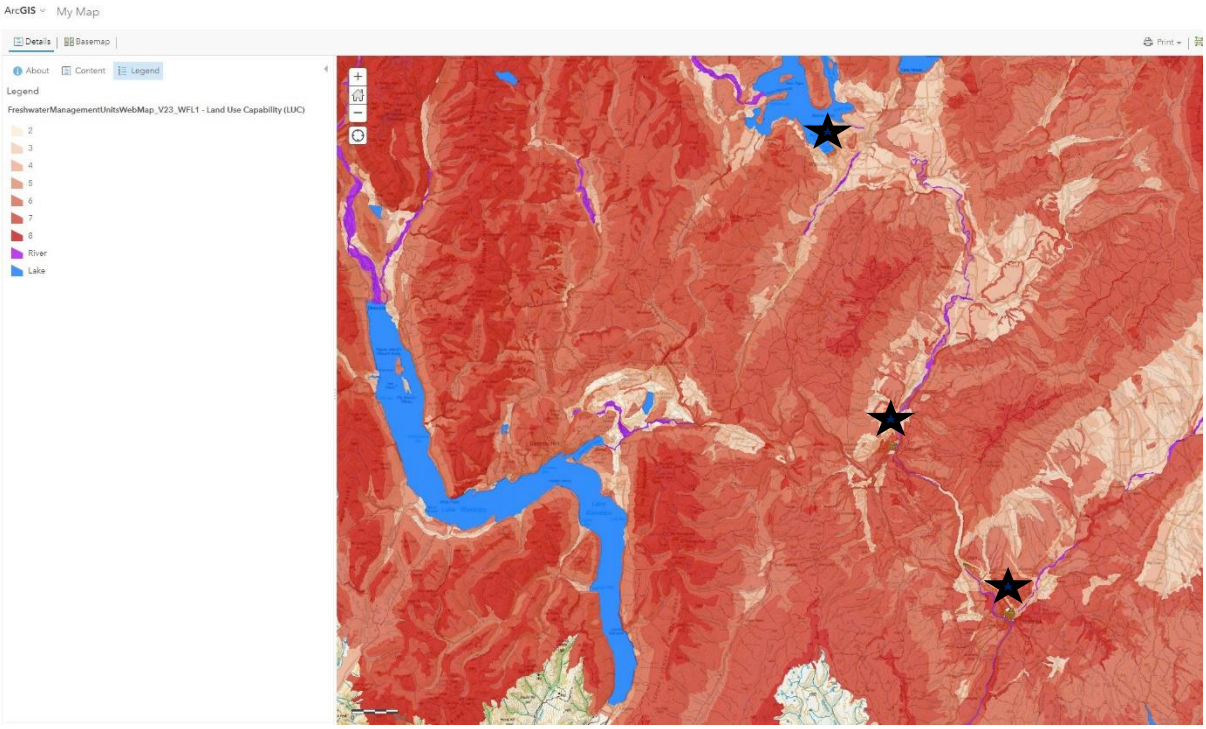
Appendix 11

Growing Degree Days (Source: GrowOtago)



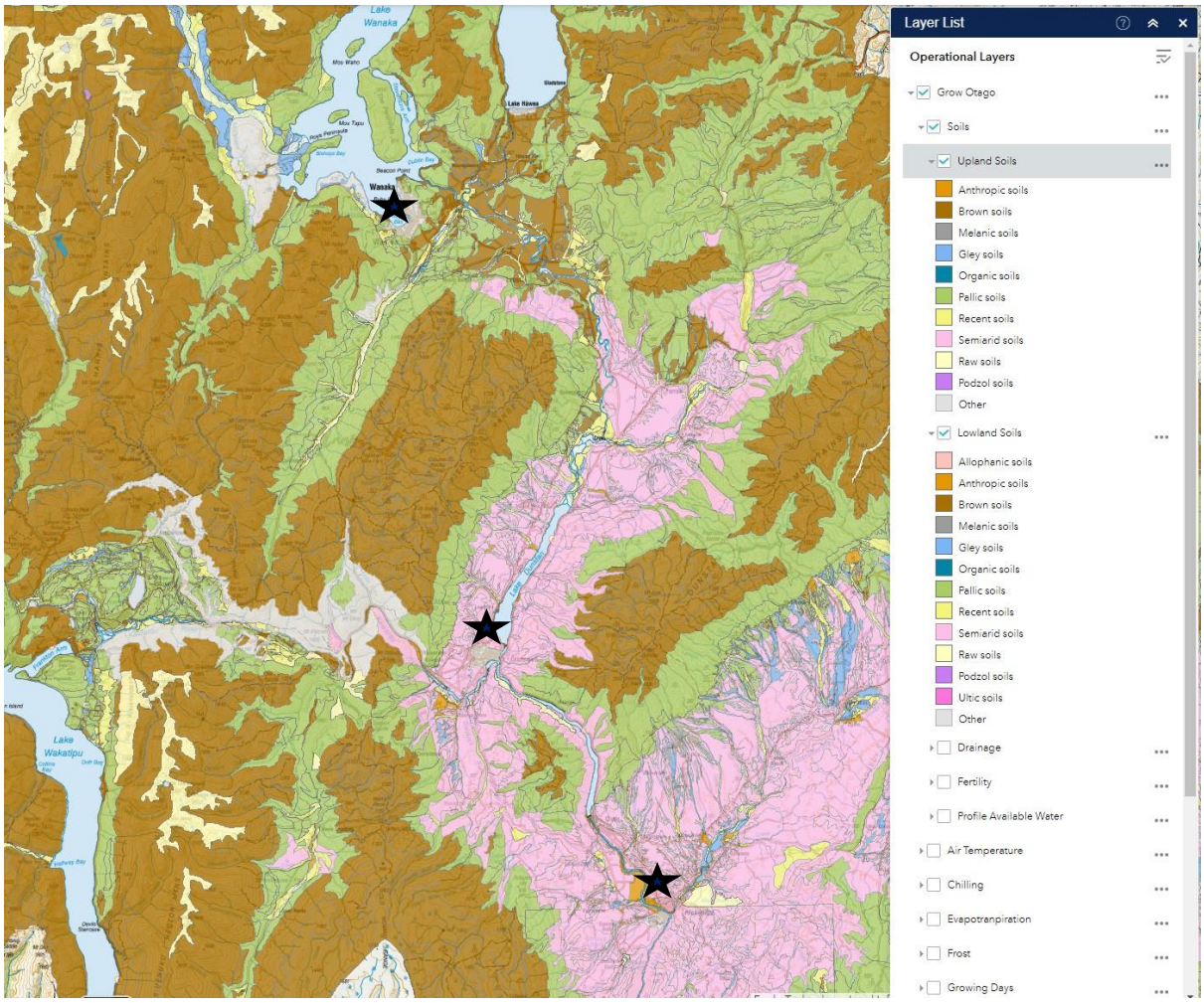
Appendix 12

Land Use Capability (Source: ORC)



Appendix 13

NZ Soil Classification Soil Orders (Source: GrowOtago)



Appendix 14

Annual Sunshine (Source: NIWA)