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Water Bottling in New Zealand: Industry overview and initial analysis of potential charges

Ministry for the Environment

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Contents

Executive summary

We have been asked by the Ministry for the Environment (the **Ministry**) to consider the extent of water bottling in New Zealand (**NZ**) and the economic value of water bottling for both water bottlers and communities. We have also been asked to give consideration to the implications of charging water bottlers for water.

This report has been compiled based on publicly available information, information sourced directly from the Ministry and regional councils, commercial data providers and from our experience working with a number of private sector investors who have tried (some successfully) to develop water bottling businesses in NZ.

There are significant limitations with the available data which have required us to make certain assumptions when forming a view as to the likely size of the NZ water bottling sector. These data limitations and assumptions are stated in this report. Notwithstanding these limitations we believe that conclusions can be drawn as to the scale and makeup of the industry with a reasonable level of confidence.

The extent and nature of water bottling

We started out by considering what bottled water is. For the purposes of this study we have assumed that water bottling comprises domestic and export bottled water produced from extractive water consents. In considering the make-up of the market we have considered the relevant NZ Customs classification of export and water bottling as defined by Standard 2.6.2 of the Food Standards Code.

In general our assessment is that the water bottling industry in New Zealand is very small currently when compared to the size it could be if all of the consented water was extracted. While there are data limitations, such information as is available indicates that the domestic industry enjoys sales in the vicinity of $140 million with export sales in the vicinity of $24 million. Employment is estimated at around 920 full time equivalents (**FTEs**). Given this small scale, the economic impact of the industry currently is very small. Further, any charge for water – whether levied at source or on end product based - on current volumes would be expected to generate moderate levels of revenue only.

Based on the data available, there appears to be approximately 52 local water bottlers who are currently using consented water to produce bottled water for domestic market. We estimate the size of the domestic market to be about $140 million[1] and utilising an estimated 135 million litres of water annually. The market is fragmented – with the top four companies accounting for some 70% of the market, and some 48 companies account

[1] This estimate is based on AC Neilson sales for supermarket, service station, convenience stores and selected distributor for the 12 month period to September 2017. We note there are some limitations with regard to extent to which this estimate covers all sales channels however we estimate this is the majority of the market.

for 20% of the market. The water bottling market in New Zealand is further discussed in Section 2 of this report.

The data suggests that current exports of bottled water are very small at an estimated $23.7 million[2] annually or 27.9 million litres. However, we note there are businesses that have been recently established – such as Miracle Water and One Pure in the Hawkes Bay and two businesses with plants under construction in Belfast Christchurch (Cloud Ocean Water and Southern Alps Artesian Water) – which are focused on the export of water and which have consents to take significant volumes of water. If businesses such as these prove successful then it is possible that the volume and value of exported water could rise significantly. For example, if the businesses referred to above fully utilised their consents for export the export volumes would be nearly 400 times current levels.

To date, however, the data suggests that the combined domestic and export water bottling industry is small in volume and value terms. Further, the amount of water actually used for water bottling is only a small proportion of the volumes consented for that purpose. We have analysed consent data for water bottling consents granted, exercised and used. This analysis is based on a sample of regions where the consents are exercised. As at the date of this report we have only been able to access very limited data on the actual volume of water extracted under the current consents. Actual extracted volumes is limited to the Hawkes Bay region, for all other regions we have not been able to access metering data collected by regional councils. Our detailed analysis of the consent data is considered in Section 2 of this report.

While the domestic water market appears to be growing quickly it is competitive and small relative to the volumes of water actually consented. Therefore, it would seem that any step change in the volume of water extracted for bottling purposes will be dependent on a material expansion of the export sector. The current size of the export sector currently indicates that it is not easy to establish export businesses of scale.

The development of a large export industry, which is of an order of magnitude bigger than the current niche market, will require very significant investment. This investment would be both in terms of physical infrastructure domestically and through all aspects of the supply chain needed to get product to the end market. As a consequence we expect that the development of the export sector is likely to favour models where the supply of local water is integrated into the supply chains of large, global food and beverage businesses or partnerships with investors with a presence in the target international market.

It is apparent that the water bottling industry comprises a range of very different business models and that these different models will place a different weight as to the value of water as a component of the final product delivered to an end consumer or customer. For certain high value, low volume products the brand can be directly associated with a particular characteristic of the ingredient water – such as location, composition or some other unique element. In other higher volume, lower value instances

[2] Based on NZ Customs data including 2201 for the 12 month period ending September 2017.

it is the product brand itself that makes a promise as to the underlying quality of the water.

In other models the same source water can reach the consumer in a range of forms whether through size of the end product or some other variation such as carbonation. Some businesses are based on simply providing access to a water resource for integration into a third party's supply chain – but even in this instance the value placed on the water can vary depending on the business model of that third party. Even where a business is based around the supply of water to a third party the model adopted can vary, with some businesses based on an intermediate model where water is extracted and packaged in bulk before being sold to a third party.

Globally the water industry is large and growing – though it appears to be dominated by large, global food and beverage businesses with established brands, distribution networks and market access. While the New Zealand industry is currently small it is likely that there is option value in the current consents which could be realised if the export market was developed.

The range of different business models, the fact that even established businesses are at different stages of maturity combined with data limitations make it difficult to form a view as to industry profitability. Further, the different models and differences placed on the value of water within these models make it difficult to determine at what point in the supply chain it might make sense to impose a charge for water or what impact that charge might have on profitability, consumer/customer behaviour or revenue gathered.

The economic benefits of water to water bottlers local communities

We estimated economic benefits of water bottling to local communities at about $60.7 million per annum based on return on capital and labour. Our approach and analysis is in Section 4 of this report. We did not consider costs to those same local communities.

This estimate is based on high level estimates of direct benefits. A full economic contribution model would be required to capture the indirect benefits (or "multipliers") of water bottling, but that is precluded by both data availability and the time and budgetary constraints of this project.

It is hard to generalise as to the economic benefits of water bottling given data limitations and the different business models. Whether there will be substantive economic benefits from a step change in the scale of the industry driven by increased export volumes will depend to a significant extent on the business models adopted by exporters. If these models are based on shifting large volumes in bulk then the benefits may be limited.

Impact of a water charge

We were not engaged to advise as to why a charge might be placed on bottled water and note that there are a range of reasons as to why such a charge might be considered including:

- To reflect the opportunity cost of bottled water;
- To reflect the cost externalities of bottled water;
- To reflect the benefits of bottled water to local communities.

We considered what the impact of a water charge could be, and specifically based on our preliminary economic analysis the extent to which a water bottler might pass a water charge on to consumers.

In the context of this analysis, we have currently only considered the impact of a water charge in the form of a cent per litre levy on the end products. However, we do identify the potential impact on price of charging for water at source. The results provide an indication of what the impact on demand might look like for different levels of charge. Section 5 of the report provides more analysis on this.

As noted above water bottling businesses vary hugely in terms of business model, scale, relative maturity and end market. Therefore it is difficult to generalise as to the impact of a water charge on the industry as the impact will be specific to each industry participant.

Our analysis suggests that demand for bottled water in New Zealand is likely to be responsive to price changes. This means that a water charge could have a significant impact on domestic demand. We have not been able to consider the extent a water charge would have on NZ export volumes.

The profitability of bottled water is not particularly high. As with most fragmented industries, the range of profit margin varies from negative to positive. Our analysis indicates a range of earning before tax of circa 5% to 30%. The market comprises a broad range of participants from large beverage companies, which include bottled water as part of their portfolio of products, to small boutique firms focusing on the premium end of the market.

Potential revenue gained from a charge on water bottling

We assessed the likely value of a water charge based on different ways it could be imposed and different levels of the charge. We focused a charge imposed at point of sale rather than at the point of extraction, primarily due to the limitation in data about consent utilisation. Section 6 of the report provides our detailed analysis.

In summary, we estimated the revenue based on various options of how a water charge could be imposed:

- **A water charge per litre**. We estimate the potential revenue from a water charge per litre to be imposed at source and based on current volumes to be between $158,000 and $1.4 million. This is based on a value of water in the range of 1 cent to 3 cents per litre and a levy rate of between 10% and 30% of this value.
- **A water charge based on a water bottler's sales**. We estimated the potential water charge revenue based on sales would be in the $8 million to $16 million.
- **A licence to produce bottled water**. We estimated that a licence fee would need to be about $102,000 (based on 5% of sales) and about $204,000. (based on 10% of sales) to result in potential revenue in the range of $8 million to $16 million.

If the charging regime captured revenue in the range of $8 million to $16 million we estimate that this could reduce profitability unless the market moved to pass the charge on to consumers. Depending on the point in the value chain at which a charge is applied, there could be significant adverse consequences where suppliers of water have entered into contractual arrangements which make it difficult to pass on any charge.

It is important to note that we estimated the likely revenue from a water charge based on our estimate of actual water used which is based on sales data, and not on the water use either granted or extracted under the consents.

While the industry appears to be profitable it is not excessively so, which limits the ability for participants to absorb charges without passing these through to consumers by way of price increases. We estimate price elasticity of bottled water based on the AC Nielsen data available and found that bottled water in New Zealand is likely to be *elastic*. This means demand is responsive to changes in prices for bottled water.

Further, while the established industry is profitable on balance establishing a water bottling business would appear to be a modest to high risk venture particularly as the domestic market appears well served and the international market for New Zealand sourced water is barely developed. These risks are likely to explain in part why there is a significant gap between the volumes of water consented for bottling and that actually being utilised for that purpose. Any charge on water would increase the risks associated with any start up.

1. Introduction

1.1. Scope and background

Deloitte (**Deloitte**, **we** or **us**) has been asked by the Ministry to consider the extent of water bottling in NZ and consider the economic value of water bottling for both water bottlers and communities. A detailed statement of work (**SOW**) and the list of questions we have been asked is set out in Appendix C.

This report has been compiled based on publicly available information, information sourced directly from the Ministry and regional councils, commercial data providers and from our experience working with a number of private sector investors who have tried (some successfully) to develop water bottling businesses in NZ. Information on scope and data limitations are provided in Appendix D.

1.2. What is water bottling?

In order to undertake our analysis it has been necessary to determine a definition of water bottling that is appropriate given the purpose of this study. Bottled water can be considered to comprise drinking water obtained from various sources such as wells, springs, artesian wells, and the municipal water supply. The drinking water typically undergoes a purification process before being packaged in a plastic or glass bottle. In our research we have found that bottled water can:

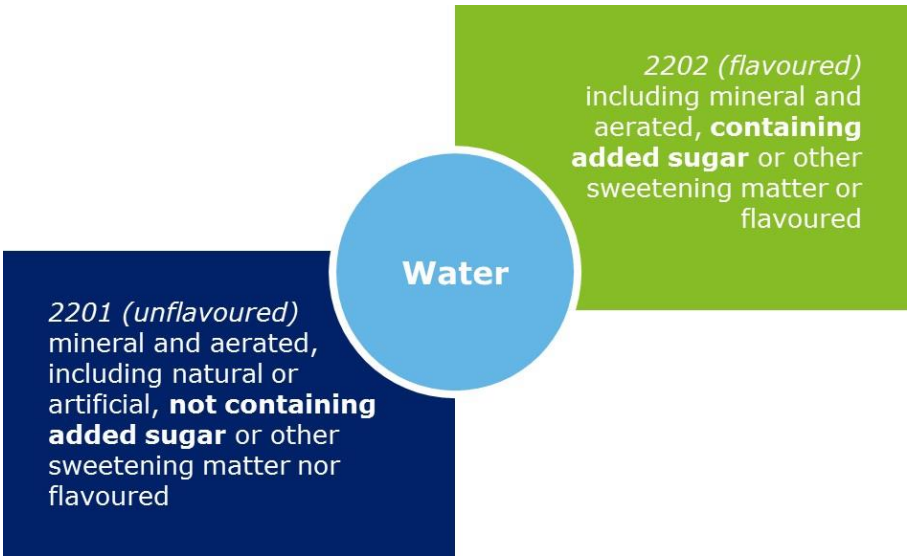
- Be still or sparkling (artificially carbonated);
- Be plain or artificially flavoured;
- Include minerals (mineral water) or not. Bottled water that does not contain minerals is often referred to as "spring water" but mineral water can come from springs; and
- Include naturally occurring or artificially added minerals.

The question "what is the definition of bottled water?" sounds like a simple one. But the definition of bottled water, as used by the United States Food and Drug Administration (**USFDA**), runs to 20 pages. However, in essence it is defined as "Bottled water is water that is intended for human consumption and that is sealed in bottles or other containers with no added ingredients, except that it may optionally contain antimicrobial agents or fluoride".[3]

The accepted definition of mineral water or spring water in NZ is set out in the Standard 2.6.2 Food Standards Code as ground water obtained from subterranean water-bearing strata that, in its natural state, contains soluble matter. For the purposes of this report we have been asked to quantify the market size for domestic and export water bottling. We have been unable to find robust data available in particular on the export market which uses the Food Standards Code definition.

[3] https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=165.110

Therefore, in assessing what data is available from public sources we have considered the NZ Harmonised System Classification 2012 (**NZHSC**) which is based on the World Customs Organization (**WCO**) Harmonized Commodity Description and Coding System (**HS**)[4]. The HS is used by NZ and more than 190 other countries as a basis for their customs tariffs and for the collection of international trade statistics. Under Chapter 22 "Beverages, Spirits and Vinegar" there are two relevant "waters" subcategories, **2201 (unflavoured)** and **2202 (flavoured)**. We note each definition has a number of sub-classes. For example 2202 includes "other non-alcoholic beverages". The definitions can be represented as:



2201. Waters (unflavoured)

- including natural or artificial mineral waters and aerated waters,
  - not containing added sugar or other sweetening matter nor flavoured
- ice and snow

2202. Waters (flavoured)

- including mineral and aerated waters,
  - containing added sugar or sweetening matter, flavoured;
- other non-alcoholic beverages,
  - not including fruit or vegetable juices of heading no. 2009

For the purposes of our analysis we have adopted the definition set out as per 2201 Waters (unflavoured). A high level analysis of the NZ export data for each of these categories is summarised in the following section.

[4] http://www.stats.govt.nz/methods/classifications-and-standards/classification-related-stats-standards/harmonised-system-2012.aspx

2. Extent of water bottling in NZ

2.1. Overview of regional council data

We have examined resource consent data provided to us by the Ministry. This data includes information on consents that explicitly allow the taking of ground or surface water for bottling. In most cases, details are provided which identify the following:

Table 1: Description of water consent data

Detail	Explanation
Issuer	The regional authority that issued the consent
Holder	The entity which holds the consent
Limit	A measure of how much water may be taken per day
Expiry	The expiry date of the consent
Exercise	Whether or not the consent has been given effect to
Restrictions	Whether or not there are any additional restrictions

Source: Deloitte analysis

Consent documents have been provided for some of the consents issued in the Hawkes Bay and Canterbury regions. Metering information – which measures the actual amount of water taken by a consent holder – has been provided for the Hawkes Bay region only. In determining the actual amount of water that is taken for bottling, we have additionally referenced import and export volumes and domestic consumption data. The lack of complete data, in particular metering data on actual usage of current consents, has created a number of limitations, which we have outlined throughout this section.

2.2. Amount of water taken under bottling consents

Determining whether a consent allows for water bottling relies on an interpretation of the purpose stated in the consent document. Based on the information provided, there are currently 79 consents[5] that permit the taking of water for bottling (this excludes any local authority consents which may allow takes from municipal supply). Table 2 below sets out a breakdown of the data by count and daily consented volume.

[5] We understand that there is one further consent permit however we have no details recorded against it so for the purposes of the analysis we have excluded it from the count.

Table 2: Summary of Regional Council consent data

	Exercised		Not Exercised		Unknown		Total	
	#	Daily m3	#	Daily m3	#	Daily m3	#	Daily m3
Bottled water	22	7,327	16	37,270	6	503	**44**	**45,100**
Mixed	23	13,058	8	9,639	4	3,778	**35**	**26,475**
Total	**45**	**20,385**	**24**	**46,909**	**10**	**4,281**	**79**	**71,575**

Source: Ministry for the Environment, Deloitte Analysis

Many of these consents allow for a variety of end uses and a number have not been exercised. We estimate[6] that by count 56% (44) of consents are for bottling only. Of these 50% are exercised, 36% not exercised and for 14% the status of exercised/not exercised is unknown.

From the total of 79 consents, there are 22 (28%) which are for bottling only and exercised. We explore mixed use and unexercised consents in greater detail below. Appendix B sets out the mix of exercised and consent types across the country.

There is a significant variation in the daily extraction limits prescribed in consents. Figure 1 (left) below shows the distribution of bottling only and mixed consents by daily limit, measured in m3[7] per day. The variation in limits mean that while 28% of consents are considered to be bottling only and exercised, this accounts for only 10% of the total limit.

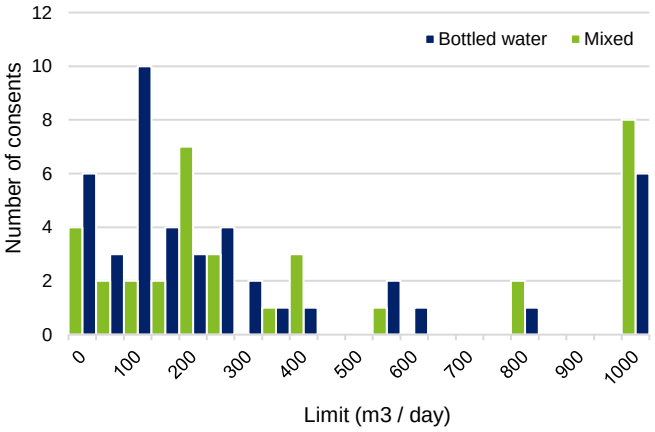
The data is further distorted by a recently granted consent in the West Coast to Okuru Enterprises (**Okuru**) for 26,000 m3 per day[8] (or 36% of NZ consented volumes) which is yet to be exercised. We have decided that for the purpose of the analysis presented throughout this report to exclude Okuru from all analysis on the basis that it skews the data from an analysis perspective and in our view is unlikely in the near to medium term to be exercised given the practical issues around consenting of the export infrastructure the project requires.

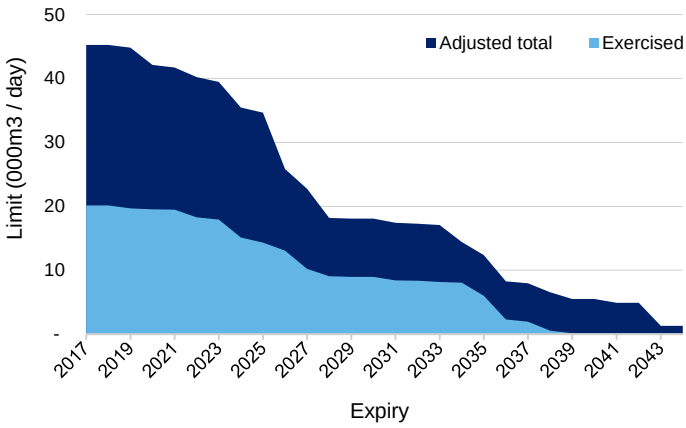
Excluding Okuru, 16% of the NZ total limit is for bottling only and exercised. This is equivalent to circa 7,300 m3 per day, or three Olympic swimming pools. In comparison the total consented limit is circa 71,500 m3 per day, or almost thirty pools.

[6] In some cases it is not clear whether a consent is bottling only. E.g. bottling and factory use, commercial purposes etc. We applied some judgement when classifying the consents as bottling or mixed.
[7] 1 m3 = 1,000 litres
[8] The consent allows for a maximum of 800 litres per second, which for 9 hours per day is approximately 26,000 m3.

Figure 1 below (right) shows the consented volumes excluding Okuru and the impact on consented volumes as consents expire.

Figure 1: Distributions of consents by limit (left), and total daily limit over time (right)





Source: Ministry for the Environment, Deloitte analysis

The limits on consents are defined in various, and sometimes multiple ways. There is no consistent volume per period measure. A single consent may have different limits defined per day, per week, and at different times of the year. Consents may also be subject to additional restrictions depending on water level or flow. This makes it difficult to define a standard measure of limits. Weather dependent restrictions also mean that standardised volume per period measures of limits are likely to be overstated.

For the purpose of this report so we can have annual volumes to consider we assume that all exercised, bottling only consents are fully utilised with no waste 250 days of the year – this provides for a theoretical annual production of bottled water of c.11.3 million m3 including Okuru and c. 4.8 million excluding Okuru.

We have considered the size of the domestic and export market compared to this theoretical annual production. Annual trade data from NZ Statistics up to Q3 2017 indicates that 27,850 m3 of water was exported from New Zealand. Annual domestic sales data from AC Neilson for bottled water up to Q3 2017 were circa 135,000 m3 but we note this also includes imports. The total of exports and domestic sales makes up only 1.4% of the theoretical annual production of 11.3 million m3 (assuming Okuru was included in the volume). It should be noted that the export and domestic data is likely to include products that use municipal water supply which do not comprise part of the consent data.

The table below sets out our estimate of the market size. The key limitation to this analysis is being able to identify the volume of water that is sold outside of the NZ supermarket sales channel. It is likely, but at this time cannot be verified, that a proportion of the domestic sales may include production from municipal sources. Further analysis including sourcing more detailed metering information from regional councils is likely to be required to confirm this.

Table 3: Estimate of domestic water bottling production

	Volume (Million Litres)	Value ($m)
2201 (Unflavoured) - Exported	27.9	23.8
Annual supermarket sales	85.0	89.8
Other domestic sales channels	50*	50.4
Total market size	**162.9**	**164.0**
Less imports	(5.1)	(3.2)
Estimated domestic production	**157.8**	**160.8**
(includes consented and municipal supply)		

Source: Stats NZ, AC Nielsen

We have derived a proxy of this volume figure as the AC Nielsen figure was not available

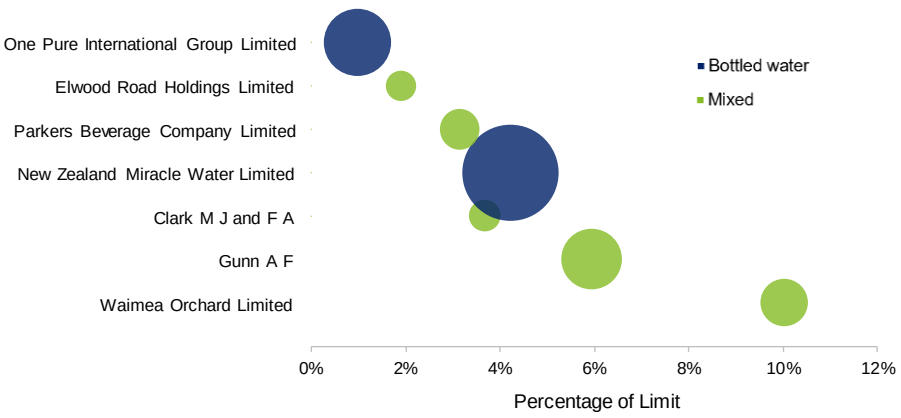
The figures presented above represent sales of domestic and export water but do not provide any particular insight as to the volume of water that is drawn from the approved consents. With a full metering dataset we would simply be able to total the water extracted from various consents. However as noted above the only regional council for which that is possible is Hawkes Bay. Accordingly in estimating what volumes of water are being used from consents we explore two techniques to assess the likely actual take of water for bottling.

Method 1: Our primary approach is to extrapolate the metering data from Hawkes Bay onto the entire country which obviously has significant limitations and the results should be treated with considerable caution. We have also successfully matched consent holders to supermarket sales data in a limited number of cases.

Figure 2 below shows the actual take and relative size of limits for consents in Hawkes Bay with non-zero meter readings during 2017. The largest take was c.10% for Waimea Orchard, which is a mixed consent for irrigation for use on the orchard and water bottling. It would appear that Waimea Orchards does not produce any bottled water.

Among the bottling only consents, New Zealand Miracle Water utilised 4.2%, while One Pure utilised only 1.0% of their consents respectively. Both of these consents have limits greater than 1,000 m3 per day, meaning they are not representative of the typical bottling only consent for which the average daily consent (excluding Okuru) is 440 m3 per day. It is possible that large consent holders take less as a proportion of their limit, given the constraints imposed by the market for bottled water but we are not able to verify this.

Figure 2: Hawkes Bay metering data



Source: Hawkes Bay Regional Council

Method 2: Drawing from supermarket sales volume data, we have cross-referenced several consent holders to calculate an implied take. Matching consent holders to manufacturers is limited by a lack of transparency in the bottled water value chain – wherein the name held for a consent holder has no reference to the common bottled water brands. This analysis also fails to account for alternative distribution channels such wholesale, direct, or export, for which we do not have robust data which is at a granular enough level.

The table below shows average daily sales compared to consent limits and resulting implied takes. Antipodes is a premium brand that is likely to distribute significant proportions of volume through alternative channels. This may explain its comparatively low implied takes. Frucor has the third largest volume share in the supermarket data. It has an implied take of 13% which is higher than the general level observed in the metering data from the Hawkes Bay. One Pure has an implied take of 0.05% which is significantly lower than its metered take of 1% which can be found in the Hawkes Bay data. This may be partly explained by a lag between extraction and sale, as One Pure's 2016 meter reading was only 0.4%. However this is still ten times the implied take from sales. A case study on One Pure is provided in Appendix A.

Table 4: Implied Take Analysis

Consent Holder	Average daily sales (L)	Daily consent Limit (L)	Implied take[9]
Antipodes	134	800,000	0.02%
Frucor	26,844	203,000	13.2%
One Pure	534	1,111,000	0.05%

Source; AC Nielsen, Ministry for the Environment

The implied takes from the supermarket data are overall significantly lower than the metered takes. We expect this is partly explained by alternative distribution channels, which are excluded. The implied takes also fail to account for waste or other uses of the water, although none of the consent holders listed in the table have mixed use consents.

[9] Based on supermarket volumes only.

The conclusion emerging from the data, supported by our favoured approach of using the actual Hawkes Bay data, is that actual volumes of water taken for bottling are a fraction of the limits prescribed in the consents. Actual and implied take figures are less than ten percent of the consented limit, with aggregate sales data suggesting a similar range. We estimate however that for mixed consents where the primary use is likely to be for irrigation we would expect utilisation of consent volumes to be much higher.

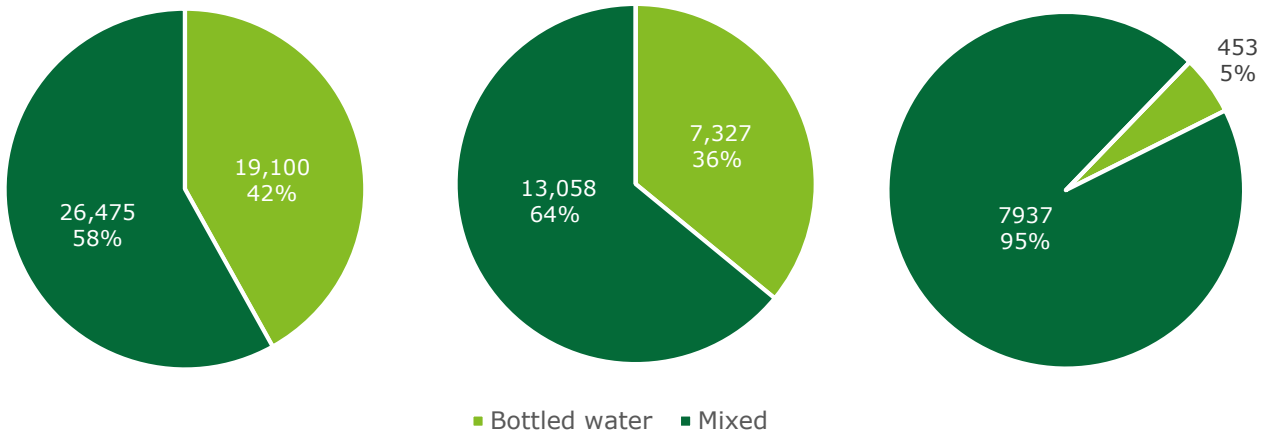
For further analysis, we recommend that where possible, the full set of consenting and metering data be collated for each Region.

2.3. Mixed use consents

As highlighted previously, consents may be granted for water bottling in addition to other activities. In some cases water bottling is not explicitly defined but falls within a broad description of activities. Typical alternative uses range from distinct applications such as irrigation for crops, to general site maintenance.

We have categorised consents as either bottling only or mixed use according to the consent purposes provided in the data. This requires some discretion as to whether water bottling is likely to be the primary activity of the consent holder. We have applied judgment based on a plain reading of the stated purpose and with reference to consent documentation where this information was available.

Figure 3: Limit by use (left) exercised only (centre), and exercise only for Canterbury (right)



Source: Ministry for the Environment, Deloitte analysis

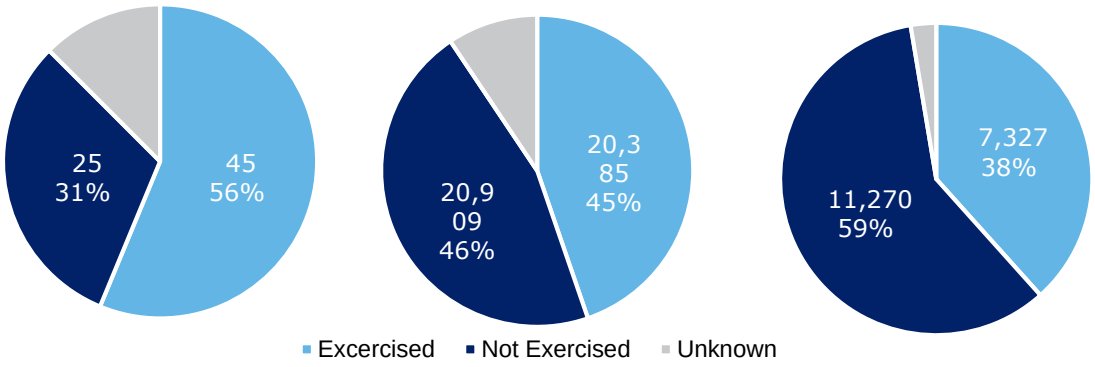
Figure 3 above show the cross-section of consents according to whether they are bottling only or mixed use. Due to variation in the limits, it is important to consider both the number of consents as well as the limits. The Okuru Enterprises consent has been excluded from the limit analysis. This shows that while 44% of consents are mixed use by count, they account for 58% of the available limit, meaning the average bottling only consent has smaller daily limit than the average mixed use consent. We are unable to determine whether the actual take varies between mixed use and bottling only consents. Appendix B contains a breakdown of consents per use by regional authority.

Our review of the consent applications that we have been provided with indicates a number of reasons for mixed consents. These range from a Coca-Cola Amatil consent in Canterbury which includes alongside the commercial bottling purpose that the water (being a single shed in a rural lifestyle area) can be utilised for firefighting if required; through to a significant berry orchard which proposes using water for irrigation but which does not appear to have any intention to use the water for bottling (notwithstanding the fact that the consent permits this activity) given that the Assessment of Environmental Effects (**AEE**) does not even mention bottling at all. Figure 4 (right) shows the same split for Canterbury which has one of the largest proportion of mixed consents.

2.4. Unexercised consents

A consent is exercised if it has been given effect to. It is a binary measure, meaning a consent is either exercised or not. This is distinguished from utilisation, which measures the amount of water taken. Depending on regional rules and policies, consents will can lapse if they are not exercised before a prescribed date. This date is distinct from the expiry date, and may be defined in the consent. If no date is defined the consent will lapse if not given effect to after five years from issuance.[10] It is not clear whether a water bottling consent is considered exercised once water is extracted, or once infrastructure to extract the water has been installed.

Figure 4: Consents per exercise status by count (left), limit (right), and limit for bottling only (right)



Source: Ministry for the Environment, Deloitte analysis

Figure 4 above shows the cross-section of consents analysed by whether they have been exercised or not. Approximately one third of consents are not exercised. These account for nearly half of the total limit. This statistic could be affected by timing if large bottling consents have only recently been granted. Almost two thirds of the bottling only total limit are not exercised, suggesting it is the bottling, rather than the mixed consents, which primarily create this disparity.

There are many reasons why a consent may not be exercised. There will be some lead time between securing a consent and giving effect to it. However this seems unlikely to explain two thirds of consented take not being exercised. Consents may be secured prior to forming a business case and subsequently left to lapse when the investment is abandoned. If the cost of

[10] Resource Management Act 1991, s 125(1)

securing a consent is sufficiently low, it is likely that there is considerable option value in holding a consent with the possibility of future use. This may also explain why many mixed consents appear to include bottling as an 'add on' to an alternative primary use. Appendix B contains a breakdown of consents by exercise status for each regional authority.

2.5. A local perspective

This section focuses on the production and sale of bottled water in New Zealand.

Table 5 below provides a snapshot of the value of domestic sales via supermarkets, exports and imports.

Table 5: The size of the bottled water industry in New Zealand

	Domestic	Exports	Imports
Sales value (NZD millions)	140.2	23.7	3.2

Source: AC Nielsen data (2017), Statistics New Zealand (2016)

Some of our key assumptions underlying our analysis are:

- To try and quantify the size of the domestics market for bottled water we have sourced quarterly sales information from AC Neilson. This data shows total annual sales for the 12 months ending 08 October 2017 of $140.2 million. Of this supermarkets represent $89.8 million (72.6%), service stations represent an additional $23.3 million (18.8%), convenience stores $9.1 million (7.3%) and the two largest wholesalers (Gilmores and Trents) are $1.6 million (1.3%), and Just Water International are 16.4 million (11.7%).
- Other than the aggregate Statistics NZ data which shows total exports of bottled water of $23.7 million we do not have more granular information on the export market. We understand that New Zealand Customs does hold more detailed information but that confidentiality concerns are such that we have not been provided with this information.
- Due to the lack of data, the analysis in this section of the report only covers domestic sales to the retail channel via supermarkets. We have treated exports as if they are part of the domestic market. We do however recognise that the value of exports will be higher than domestic bottled water.
- Our preliminary analysis assumes that all volumes exported and sold (domestically) will be affected by the water charge if one was applied.
- We assume that competition among brands in New Zealand is sufficient to consider these as substitutes. We consider that if there is an increase in price of national brands, demand will switch to other local brands or imported products.

Demand for bottled water in New Zealand

According to the Beverage Council of New Zealand, sales of bottled water have grown by 25% in the past two years.[11] Figure 5 illustrates the trend in bottled water sales in New Zealand across the most recent eight quarters. From Figure 5 it is clear that sales of bottled water is higher in summer months compared to winter months.

Figure 5: Bottled water sales in New Zealand, 2014 to 2017

Source: Deloitte based on AC Nielsen data

Note: Data comprises supermarket retail channel only

Who are the suppliers of bottled water to the domestic market?

Table 6 shows the current water bottlers supplying the domestic retail supermarket channel, with their respective volume and value shares. We note that in total there are 64 water bottling companies operating in the retail supermarket channel.

Table 6: Domestic volume and value shares by water bottler in New Zealand (based on sales via supermarkets)

Manufacturer	Value ($, million)	Value share (%)
Frucor Beverages Ltd	17	19%
Rio Beverages Ltd	15	16%
Progressive Group	14	16%
Coca-Cola Amatil (Own Brands)	14	16%
Foodstuffs Group	7	7%
Pure NZ Spring Water	5	6%
Others	18	20%
Total	**90**	**100%**

Source: Deloitte based on AC Nielsen data

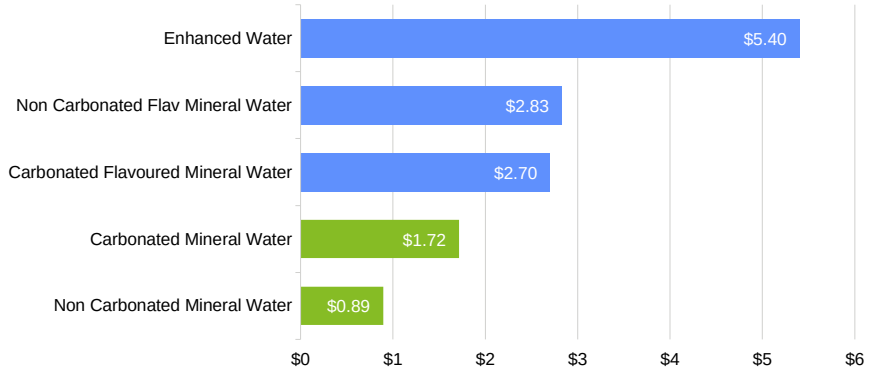
[11] http://www.nzjba.org.nz/

Frucor Beverages had the highest sales in 2017, recording a value share of 19%, and was followed by Rio Beverages Ltd, Progressive Group and Coca-Cola Amatil (NZ) each with 16%.

Prices

A variety of products with different features and prices are now available in the bottled water market. Below is an illustration of the prices for different bottled water products. The figure illustrates that prices for bottled water varied across the various type of bottled water, and there is a wide range of prices for each type of bottled water, depending on brand and packaging. It is important to note that the first three product categories are for flavored products which command a higher average price.

Figure 6: Average price per litre of bottled water by bottled water type ($/litre)



Source: Deloitte based on AC Nielsen for the most recent quarter

It is unknown how the retail price of bottled water is affected by its attributes. The price of bottled water depends upon its extrinsic and intrinsic characteristics. Intrinsic characteristics include the water's mineral composition, and taste. Extrinsic characteristics include the bottled water's brand, packaging and origin. One recent international study found that bottled water is mainly affected by extrinsic drivers.[12] We explain below why we think the New Zealand market shows a similar result.

Brands

Bottled water sold across supermarkets is highly differentiated and its retail price is most likely affected by extrinsic characteristics.

Some of the largest brands in New Zealand are Kiwi Blue by Rio Beverages and Pump by Coca-Cola, each of which recorded value shares of 16% in the retail bottled water industry based on supermarket data. Both brands are spring waters, with spring water remaining the most significant water type by volume consumed in New Zealand.

[12] What is the value of bottled water? Empirical evidence from the Italian retail market. <http://daneshyari.com/article/preview/988233.pdf>

Packaging
Different types of packaging, plastic bottles and glass point to different upstream suppliers. Retailers require varied packaging formats as each packaging format has its own particular customer base. About 90% of all bottled water sold in supermarkets across New Zealand is sold in plastic bottles, 3% in glass bottles, and the balance is sold in a box or a can.

2.6. An international perspective

To determine the amount of bottled water that is imported and exported, we have had reference to trade data from Statistics New Zealand. There are two HS categories that include mineral and aerated water:

Table 7: NZ Customs description of products

Classification	Details
2201 (Unflavoured)	Waters, mineral and aerated, including natural or artificial, not containing added sugar or other sweetening matter nor flavoured
2202 (Flavoured)	Waters, including mineral and aerated, containing added sugar or other sweetening matter or flavoured

Source: Statistics New Zealand

Water sourced from consents may be included in either category in either a sweetened or unsweetened form. It is possible that products sourced from municipal supply are also included. Classification 2201 (Unflavoured) includes artificial mineral water, while 2202 (Flavoured) includes mineral and aerated water but by definition may also include municipal supply.

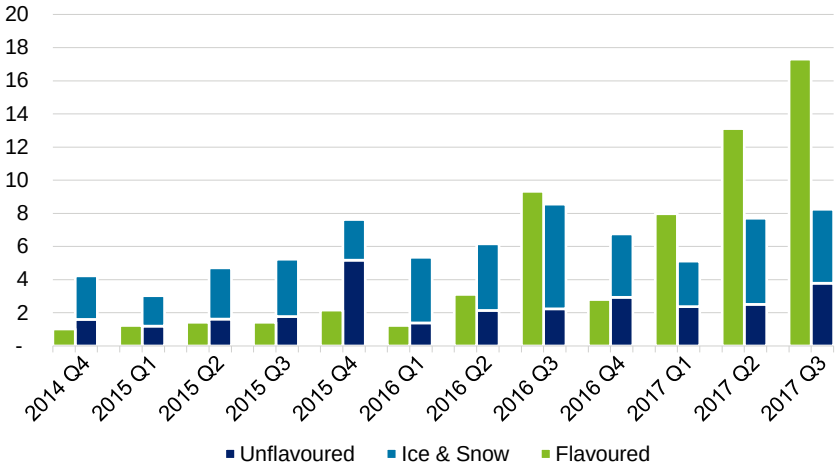
The trade profiles of these two classifications have diverged in recent quarters.

Figure 7 below shows that export volumes of flavoured water increased significantly in recent quarters. Most of this increase is due to increased exports to Australia.

Table 8: Summarised export volumes

	2015	2016	2017
2201 (Unflavoured)	17,187	27,689	27,848
2202 (Flavoured)	5,125	15,831	41,187
Total	**22,312**	**43,520**	**69,035**

Figure 7: Export volumes (Million Litres)



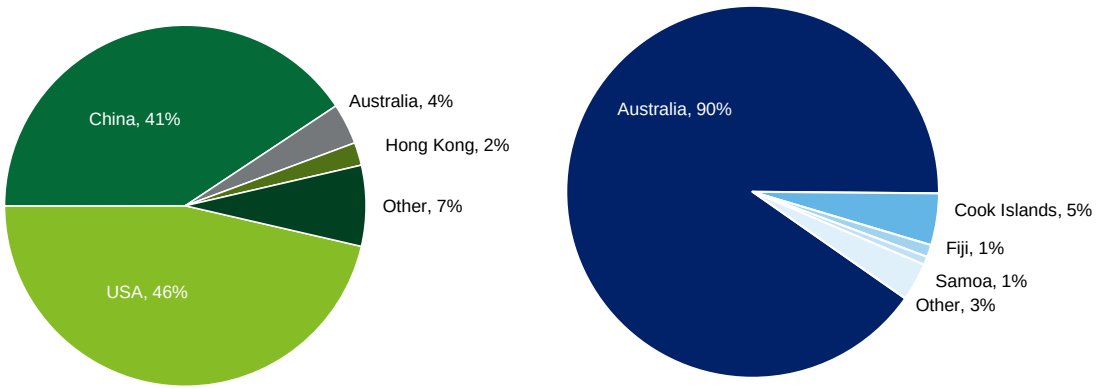
Source: Statistics New Zealand

In theory, domestic consumption data can be overlaid with trade data to determine an estimate for domestic production. There are issues with this approach due to insufficient granularity in the data. In particular the impact of municipal supply cannot be identified.

Major trading partners also vary between the two classifications.

Figure 8 below shows the top five trading destinations for exports from New Zealand of unflavoured water (left) and flavoured water (right). Volumes are based on the four quarters up to Q2 2017. USA comprises 46% of 2201 with China and Hong Kong making up a further 43% of exported unflavoured water, followed by Australia. Flavoured exports overwhelming go to Australia.

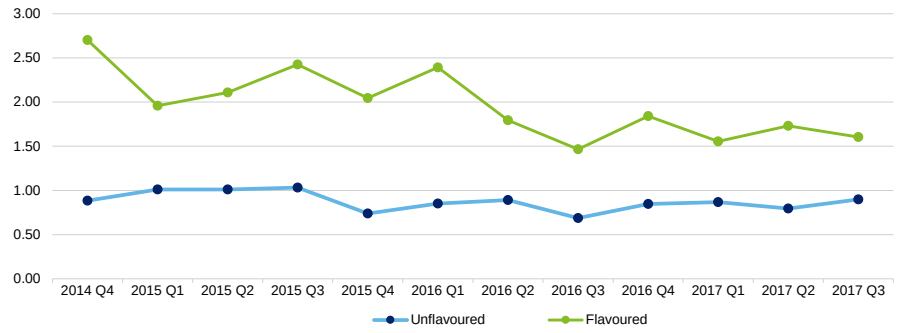
Figure 8: Major trading partners (exports volume) – Unflavoured (left) and Flavoured (right)



Source: Statistics New Zealand

Price per litre also varies between the two classifications. Figure 9 below shows the value of flavoured water is marginally higher in all quarters. Unflavoured water typically trades below $1.00 per litre. Flavoured water has been at or above $2.00, but has decreased closer to $1.50 as exports to Australia have increased.

Figure 9: Price per litre of exports



Source: Statistics New Zealand

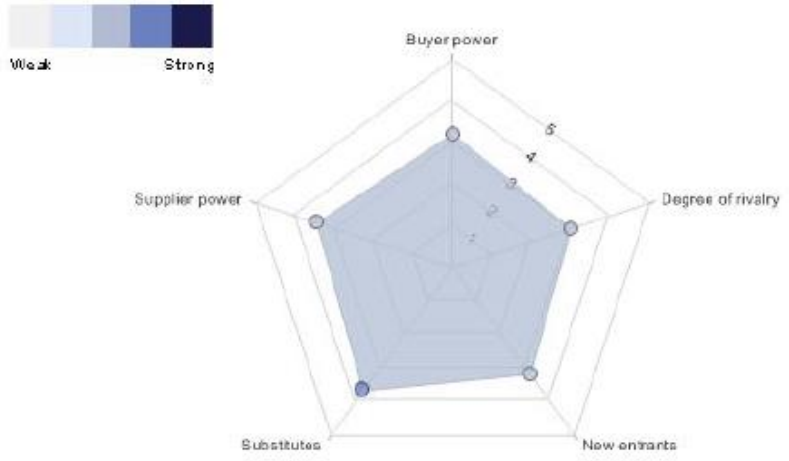
2.7. Global perspective on the water bottling industry

The analysis above suggests that the combined domestic and export water bottling industry in NZ is small in an absolute sense and also in terms of the proportion of the consented resource actually utilised. While the domestic market is growing quickly it is unlikely to be able to absorb significant additional volumes. Therefore, if the industry is to achieve a step change in scale this is likely to require a significant increase in exports. We note that the export sector does have the potential to expand significantly. The Miracle Water and One Pure operations (discussed below) have completed construction of their respective bottling plants and are now in the process of executing their business plans. These plants have consents to take 1.305 million m3 per annum. Similarly, two plants under construction in Belfast, Christchurch (Cloud Ocean Water and Southern Alps Artesian Water) have combined consents to take a reported 9.0 million m3 of water. The consented take from these four operations is over 370 times the volumes actually being exported currently.

However, a step change in actual exports, irrespective of water volumes available will bring challenges.

A recent market line report provided an illustration of the forces driving competition in the global bottled water industry[13], as shown in Figure 10 below.

Figure 10: Forces driving competition in the global bottled water industry



Source: Market line (2015)

A large number of food and beverage companies own several bottled water brands. Rivalry is therefore amongst the larger food and beverage companies. Two key interrelated activities for bottled water companies are: [14]

- Brand ownership: creation and promotion of bottled water
- Bottling: preparation, packaging, marketing, sale and distribution of bottled water.

Bottled water companies differentiate their products by brand, packaging, a range of flavoured waters, still or sparkling water, different price ranges and the source of their water. According to the Market Line report, such differentiation as is available in the bottled water market tends to constrain buyer power somewhat.

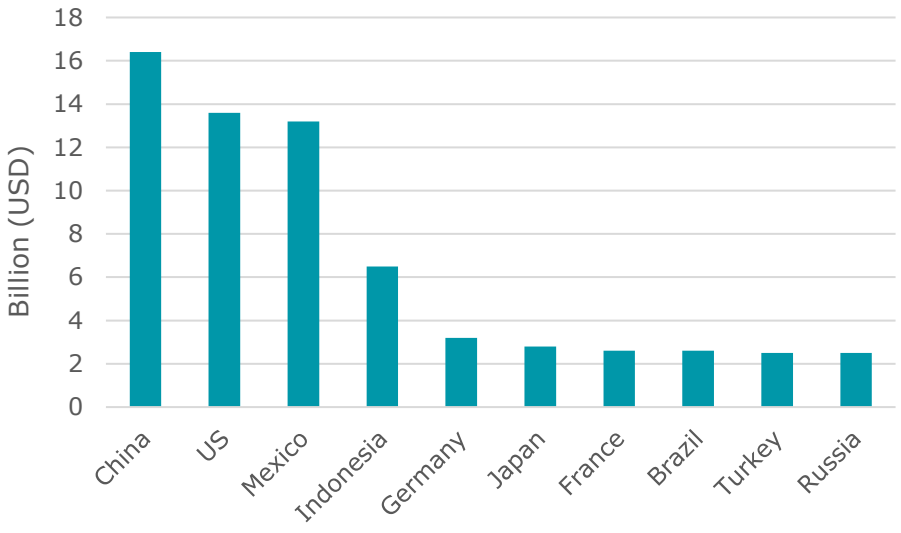
Bottled waters compete for retail space in various retail channels. It is unlikely that any retailer would stock only bottled water, and risk losing sales of potential alternatives such as soft drinks, fruit juices and milk. This will depend on the degree of substitution and consumer preferences within each domestic market.

Buyers of wholesale bottled water are primarily food and beverage retailers, whether they are bars, restaurants, cafes, supermarkets, convenience stores or independent retailers. They are often relatively large companies that may be able to exert buyer power. Buyer power is mitigated by the fact that retailers have to sell products that reflect their customer's preferences. It is therefore important to have a strong brand in the bottled water industry to counter this buyer power. Some retailers also offer their own branded bottled waters increases their relative power in this industry.

[13] Market Line Industry Profile. July 2015. Global bottled water.
[14] See, for example, European Commission decision case M.2276- The Coca-Cola Company/Nestle/JV, footnote 1 and case M.7763- TCCC/Cobega/CCEP, paragraph 11

Figure 11 illustrates the top ten bottled water markets worldwide.

Figure 11: Retail sales for top 10 Bottled water markets worldwide (2015, USD Billions)



Source: Deloitte based on Mintel Market Size, 2016; Global Trade tracker, 2016

2.8. What charges currently exist for water?

Historically the NZ government has not levied any material charge on water for bottling. The Ministry has provided us with information on two jurisdictions which do levy water bottling: South Korea and Fiji. South Korea is the only jurisdiction in an OECD survey of 73 countries that has charges specific to water bottling. South Korean water bottlers are charged $2.43 NZD per m3 (0.24 cents/litre), with 40% of the revenues raised earmarked for environmental investments.

In 2010, Fiji was reported to have increased its charge on those water bottlers extracting more than 3.5 million litres per month from US 0.18 cents/litre to US 8.0 cents/litre (US$80/m3). This affected only one company (Fiji Water, owned by an American company which also bottles New Zealand water). We have been unable to find out whether Fiji Water reduced its water take below the trigger level for the charge, and sourced more water from non-Fijian sources, or has continued to extract above the trigger and is paying the increased charge.

In many places water is traded, illustrating that it does have an observable market value – though these are typically for either agricultural, commercial or municipal uses. For example, in areas of relative shortage such as Canterbury, irrigation water trades for between 70 cents and $1.60 per m3.[15] That is, between 0.07 and 0.16 cents per litre.

[15] http://www.stuff.co.nz/environment/91957274/When-the-river-runs-dry-The-true-cost-of-NZ-water The article also reports that water is traded in Otago and Marlborough but on a more ad hoc basis.

3. Snapshot of water bottling industry structure and profitability

It is difficult to generalise about the profitability of water bottling. Water bottling businesses differ markedly in terms of scale, age and stage of development and business model. On balance it appears that the sector is profitable but not excessively so – with both the domestic and international markets highly competitive.

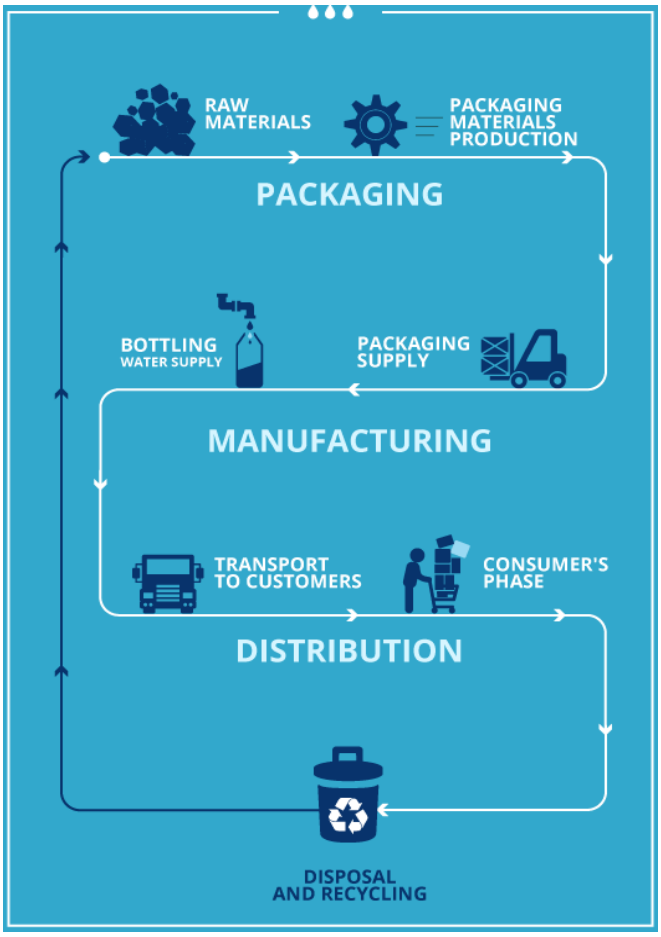
3.1. Nature of bottling firms

Water is extracted for a range of purposes, including for irrigation, industrial use, or consumption. Each of these has its own cost drivers and means of generating a return on their extraction. We are focusing on consumption of water as an end product, rather than as an input into further value-added goods, even for beverages such as fruit juices, beer, or wine.

3.2. Supply chain of bottled water

The overall supply chain is presented below based on Nestlé's water bottle life cycle. In the upstream, a water bottler would need raw materials, including water and bottles and other packaging material, transport to and from its water bottling plant, and then transport to and from a distribution channel where the end consumers ultimately purchase the bottled water.

Figure 12: Bottled water supply chain



Source: Nestle Water life cycle[16]

The cost structures, risk, and returns to entities undertaking each of these facets will vary significantly. A business of this nature involves a range of activities which may be undertaken by one or more entities, and a business owner or investor could participate anywhere along this spectrum:

Land owner	Water rights owner	Extractor	Bottler	Transporter	Distributor	Marketer	Retailer

There are different levels of risk and reward along the different parts of the spectrum. Accordingly, there is scope for a range of business models which vary significantly. For example the owners of water rights (consents) for extraction may:

1. Provide access to the water in return for a fee;
2. Extract water and sell it to a third party for bottling, either locally or internationally;
3. Extract the water and bottle it for a third party; or
4. Extract the water, bottle it, and sell the product, either locally or internationally.

[16] https://simonsunwar.wordpress.com/2016/03/10/supply-chain-for-bottled-water/

Some of the considerations that arise from each of these scenarios are outlined below.

Access in return for a royalty
This is the earliest stage in the value chain. The water rights owner would grant a commercial business exclusive access to the water source in return for revenue in the form of royalties. The risk and reward are minimised for the water rights owner. We are aware of agreements where water royalties paid to the water rights owner are in the order of NZ$0.01-0.025 per litre extracted, though this figure may vary considerably. The ongoing costs for the water rights owner are close to nil, and risks associated with transport, distribution, marketing and retailing the water extracted are the responsibility of the commercial partner.

Extraction to third party for bottling
Some current and proposed water extraction operations pump extracted water into trucks for bottling at another site[17]; into large bladders for export[18] and bottling overseas; or even piped directly into a ship for transport overseas[19]. A key consideration in these circumstances is logistics – water is a relatively bulky and heavy product with a low unit value, and moving significant quantities can be expensive and difficult to manage. Successful operations would therefore need to have access to nearby transportation hubs, particularly ports, or costs would quickly become prohibitive.

Contract bottling
Some extraction operations involve the construction of a full water bottling plant, providing a contract bottling service to new or existing water businesses. Payment would be received based on the volume produced under contract, but the responsibility for raw materials, transport, sales or marketing would largely be the responsibility of the branded water business being supplied. Such a business would not achieve the premiums available from retail sales, but also avoids the costs and risks associated with building its own brand in a competitive market.

Full supply chain
A business extracting and selling its own product manages each step of the spectrum from extraction and bottling, through to marketing, sales and distribution. Sales could be aimed towards either or both the domestic and international markets. The challenge for these businesses is establishing the brand position and the logistics and distribution networks required to generate scale and profitability.

3.3. Commercial risks involved in water extraction

While the share of risks between the parties involved in the extraction, bottling, distribution and sales of bottled water will vary depending on the nature of the arrangements made between the parties, overall many of the same risks exist in any such business. Regardless of who is ultimately responsible for distribution, marketing and sales, to extract water for sale requires significant investment in developing a plant to extract, treat, and package water (whether in PET or glass bottles, or bladders for transport). An individual party can manage its risk through the business model it intends to use; however ultimately if the water cannot be sold profitably,

[17] Coca-Cola Amatil (Christchurch)
[18] New Zealand Miracle Water (Hawkes Bay)
[19] Okuru Enterprises (West Coast)

then the business may fail, and even a party only receiving royalty income will lose their revenue stream – they will however have avoided potentially spending millions of dollars in capital costs, marketing, distribution etc.

Finding and developing an appropriate water source is one of the first challenges facing any water bottling proposition. Relying on reticulated water sources may ameliorate this risk, although some territorial authorities charge rates or levies on commercial water usage. Relying on a dedicated water source requires careful consideration and contractual arrangements to ensure risks are shared appropriately between the parties to a venture.

The cost of developing the infrastructure depends on many factors including the nature of the water source, location, type and capacity of plant. Based on publicly-available information, as well as our own knowledge of similar projects, a complete large-scale bottling operation typically costs in the order of $10 million to $40 million to prepare the site, construct the building, and install the plant and equipment. This is one of the main challenges facing the development of water extraction opportunities, as sourcing the capital to undertake such an investment can be difficult, particularly if it is for a start-up business as opposed to representing an expansion investment for an entity with an established business and brands. We note that other than for the very large multi-product providers such as Frucor and Coca-Cola Amatil branding is often developed around the particular qualities of the water source and therefore reliant on consenting particular sources.

The costs of manufacturing will generally be higher for entities which bottle the water themselves, with additional costs for bottles and the bottling process. Using a third-party bottler will generally result in higher operating costs because of the additional handling required to extract the water into a container, transport it to the bottling site, offload it, then bottle and reload the water for shipment elsewhere. These costs can be sufficient to make such a proposition uneconomic.

If water is shipped offshore in bladders or other large scale containers to an overseas party, then costs associated with bottling are avoided, but opportunities to add value in New Zealand – through packaging, branding and retail sale – are also lost. The value that can be realised from a full supply chain water bottling operation will depend upon the targeted market niche and the value and volumes that can be generated, as well as all the typical pressures facing any wholesale or retail supplier of a commodity that cannot be readily differentiated other than through marketing and branding.

The primary risks for both domestic and international sales relate to market penetration. The domestic market is both saturated with supply (Frucor, CCA, Antipodes, etc.) and small in size, certainly in comparison with the global market. Domestic distribution channels are also dominated by a few large supermarket players. To successfully distribute internationally, a bottler would need to establish or use existing key relationships to open a route to market. There are considerable execution risks regarding this approach, and building a position in the market may take considerable time and funds.

We assume that the challenge of settling on funding and executing a viable strategy is one of the reason a number of consents remain unexercised and for the small scale of the export industry currently. The process of applying for and obtaining a consent is relatively straight forward compared to that of developing and executing a successful business plan to develop a new bottled water brand in a crowded domestic and international marketplace.

3.4. Cost structure

Based on the information we have obtained we estimate there are some 27[20] water bottling plants in New Zealand. Each of these is likely to be operating under a version of one of the business models summarised above. Little material is publicly available for businesses operating in the New Zealand domestic market, with the only water bottling company listed on the NZX being JWI which we note uses municipal sources.

Capital costs
In terms of capital costs, the only plants for which information is publicly available are the One Pure operation at Awatoto and the Miracle Water plant at Whakatu, as shown below.

Table 9: Capital costs of announced water bottling plants

Plant	Cost to build	Plant details
Miracle Water, Whakatu	$20 million	70-80 employees, 500,000m^3, per year, with 900,000m^3 per year from July 2017
One Pure, Awatoto, Napier	$40 million	14-20 employees, 405,000m^3 per year

Source: Deloitte analysis

While the Miracle Water plant is intended to export 7 litre bladders of water to China, the One Pure plant will produce bottled water; this may be a factor in the additional construction costs quoted for the latter. We have also been involved in other projects developing business plans and raising capital for water extraction and bottling. The capital costs for these projects were similar, although generally lower due to their size, than the projects outlined above.

Businesses seeking to construct bottling operations therefore need to raise or access equity or debt capital sufficient to finance construction, as well as meet working capital and further operational investment as the business starts and continues to grow. The need to access risk capital is likely to explain why many existing plants are either foreign-owned or have been funded to a significant extent by foreign investors. These investors often also have access to markets in their home countries, which eases concerns about establishing viable distribution opportunities and developing these into networks.

[20] http://www.scoop.co.nz/stories/BU1708/S00446/water-bottlers-will-close-if-labour-policy-implemented.htm

Industry Profitability

We have also looked at profitability of water bottling businesses in New Zealand and overseas. Very little material is publicly available for water bottling businesses, with JWI being the only company in New Zealand for which such information is available. Other companies which incorporate bottled water within a suite of products also release accounts, but these do not disclose the contribution of different products.

We have used industry sector reports from analysts, including Plunkett Research, to inform our view based on international data. Based on US data for the 2010-2015 period in the NAIC code 312110 (soft drinks, bottled water, beverages and ice manufacturing), Plunkett Research indicates that expenses as a percentage of total revenues within the industry are distributed as shown below.

Table 10: Expense breakdown for beverage manufacturers

Expenses and margins	31211	All industries
Revenue	100%	100%
Cost of goods sold	45%	56%
Employee benefits	16%	13%
Taxes paid, general	2%	2%
Repairs	1%	1%
Bad debts	0%	1%
Interest	3%	3.13%
Advertising	5%	1%
Other expenses	11%	14%
EBITDA[21]	21%	14%
Depreciation and amortisation	5%	4%
EBIT[22]	16%	11%
NPBT[23]	11%	6%
Income taxes paid	4%	1%
NPAT[24]	8%	5%

Source: Plunkett Research

[21] Earnings before interest, taxation, depreciation and amortisation (**EBITDA**)
[22] Earnings before interest and taxation (**EBIT**)
[23] Net profit before tax (**NPBT**)
[24] Net profit after tax (**NPAT**)

We have also looked at profit margins from the bottled water sector internationally based on data from the last financial year, which suggests somewhat lower typical performance than the average performance indicated by the Plunkett Research figures above. These figures are based on data from 49 companies spread across Australasia, North America, and parts of Western Europe. Weighted average figures have been weighted on the basis of revenue.

Table 11: Profitability analysis

	GP[25] margin	EBITDA margin	EBIT margin	NPBT margin	NPAT margin	ROA[26]	ROE[27]
Average	46%	10%	7%	6%	4%	8%	14%
Weighted average	51%	19%	16%	13%	10%	10%	31%
Lower quartile	39%	1%	4%	1%	1%	4%	2%
Median	47%	11%	8%	5%	4%	6%	12%
Upper quartile	54%	16%	13%	12%	8%	11%	23%
JWI	93%	27%	15%	14%	9%	15%	12%
Example 1 (actual)	44%	9%	6%	4%[28]	4%	7%	NM
Example 2 (business case)	37%	36%	34%	34%	24%	44%	36%
Example 3 (business case – low)	29%	12%	7%	5%	3%	11%	12%
Example 3 (business case – high)	41%	26%	18%	16%	12%	18%	18%
Example 4 (business case)	41%	38%	37%	38%[29]	27%	34%	40%

Source: CapitalIQ, Deloitte research

The table above shows the benefits of scale when considering financial performance. While there is a clear increase in gross profit margin once figures are weighted on revenue, these differences are amplified at the EBITDA EBIT level, and to a lesser extent at the NPBT and NPAT level. This is likely to represent the benefits of being part of a large enterprise when it comes to marketing and distribution, which are a considerable cost and source of risk for a small business.

The figures summarised above from public information do not seem unreasonable given our experience with existing or proposed water bottling operations. Generally performance for proposed businesses has been expected to lie towards the upper end of the range implied by the summary statistics above. In our experience across many private sector ventures, business plans and proposals typically reflect expectations that are optimistic and which are often not matched by the ultimate reality. An example of the challenges associated with executing such planning are the publicised challenges of the Miracle Water plant at Hastings, a start-up

[25] Gross profit (**GP**)
[26] Return on assets (**ROA**)
[27] Return on equity (**ROE**)
[28] Anecdotal 1 accrued sufficient losses to offset reported taxable income
[29] Anecdotal 4 received net interest income which was therefore not included in EBIT(DA) figures

business which has reportedly lost significant production due to packaging issues[30].

Clearly even comparing just the Hastings and Awatoto plants, water extraction rights at Hastings are twice as high as Awatoto, capital costs are half as high, while staff levels are four to five times the level of the Awatoto plant. The cost structures of these businesses will therefore differ markedly.

We have tried to further break down selected costs facing some businesses we are aware of in the New Zealand context. Costs may vary markedly depending on the proposed business model and costs may be classified or reported differently between companies. For example for many companies, marketing and sales costs are likely to be largely incorporated within employee or travel costs. While the figures differ from the international data available, material and employee costs are not inconsistent.

Table 12: Operating cost breakdown for water bottlers

	Raw material	Employee	Other production	Transport	Sales/ Marketing
JWI	8%	38%	n/a	n/a	n/a
Example[31] 1 (actual)	44%	20%	6%	15%	<1%
Example 2 (business case)	14%	3%	2%	36%	6%
Example 3 (business case – low)	58%	8%	1%	5%	
Example 3 (business case – high)	33%	13%	1%	12%	
Example 4 (business case)	51%	3%	1%	2%	
Average	**35%**	**14%**	**2%**	**14%**	**3%**

Source: Annual reports, Deloitte research

The research above indicates that the NPBT margins interquartile range is 1-12% for the regions examined. This represents the profit remaining after all operating and financing costs are met. Company taxes are generally imposed on corporate profits as represented by NPBT.

[30] http://www.stuff.co.nz/business/76117504/Hawkes-Bay-companys-first-shipment-of-drinking-water-rejected-by-China, http://www.stuff.co.nz/business/88627385/Hawkes-Bay-water-bottling-plant-lies-dormant-for-four-months

[31] The "Examples" in the table are based on real data for entities that are not disclosed for reasons of confidentiality

4. Benefits of bottling to local communities

The main direct benefit to local communities from water bottling activities is employment. In principle, profits are also important, but unless the company concerned is privately owned by local residents, profits will mostly be distributed to shareholders.

4.1. Economic contribution theory

A full economic contribution model would be required to capture the indirect benefits (or "multipliers") of water bottling, but that is precluded by both data availability and the time and budgetary constraints of this project.

As this section makes some high level estimates of direct benefits, it useful to have some understanding of the theoretical approach to estimating economic contribution by presenting information on the models which underpin such calculations.

An economic contribution study quantifies the value of a given industry or firm to the economy, within a reference year. In this context, the value of water bottling to the New Zealand economy stems from its operational activities and its expenditure on intermediate goods.

The economic contribution from water bottling operations is the sum of direct and indirect components.

- The direct component measures economic activity directly associated with the production of bottled water – that is, the payments to the factors of production. For example, labour is a key input in the service provision process, with the total costs of workers representing a component of the activity generated by water bottling.
- The indirect component measures the economic activity supported by water bottling through its demand for the outputs of other upstream industries such as bottle manufacturing, label makers, electricity utilities, and suppliers of water (where those are independent entities from the bottler).

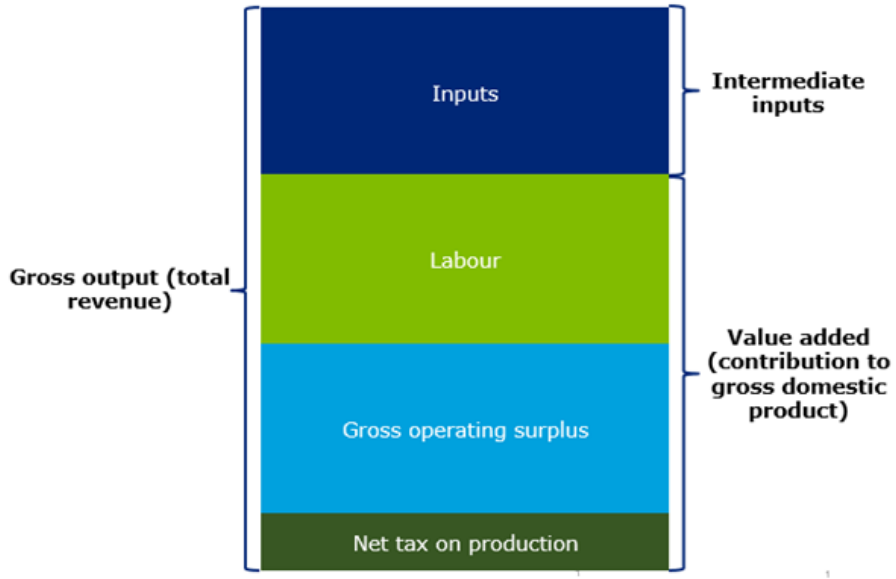
As each supplier to water bottling activities will in turn have its own suppliers, economic contribution analysis measures the full effect of such "multipliers" using input-output (**IO**) tables, which show the flow of resources between industries in an economy.

- There are also downstream impacts, such as in transport, retail and advertising. However to capture these would require a full scale computable general equilibrium (CGE) model. This is beyond the scope of this exercise – and cannot be approximated by 'back of the envelope' calculations.

The IO tables also provide information on three widely used measures of economic activity, each of which tells a different story about the economic contribution of a firm's activities.

Figure 13 provides a useful summary of the components that make up gross output. The value of intermediate inputs can also be calculated directly by summing expenses related to non-primary factor inputs (for example, materials from local suppliers and externally sourced services).

Figure 13: Measuring direct economic activity



Source: Deloitte Access Economics.

Value added measures the value of output (goods and services) generated by a firm's factors of production (labour and capital). The sum of value added across all entities in the economy is approximately equal to GDP. Value added is the sum of:

- Labour income, which represents the value of output generated by a firm's direct labour inputs, and is measured by the wages and salaries paid to employees, in addition to other costs associated with employees such as bonuses, company vehicles, allowances, severance payments, superannuation, and fringe benefits tax;
- Gross operating surplus (**GOS**), which is the capital analogue to labour income, and measures the value of output generated by a firm's direct capital inputs. In addition to profit this includes depreciation, interest payments and taxation, as these are all paid from returns to capital. GOS is often measured as earnings before interest, taxation, depreciation and amortisation. GOS includes corporate tax paid by companies;

- Net taxes on production, which are calculated as taxes on production less subsidies provided for production. This generally includes taxes paid by companies (though not company income tax, as this is captured in GOS) and taxes on employment;
- Gross output measures the total sales value of all the goods and services that are supplied by a firm. This is a broader measure than value added because in addition to the value added generated by the firm, it also includes the value of intermediate inputs that are utilised during the production process; and
- Employment is a fundamentally different measure of activity from those above. It measures the number of workers who are employed by a firm, rather than the value of the workers' output. It is typically measured using (FTE) employees.

4.2. Employment from New Zealand bottled water production

Ranging from micro water distillers in New Zealand, to some of the world's largest beverage companies like Coca Cola, the ratio of sales to employees is surprisingly consistent. We estimate the average revenue per employee is around $416,000, with a standard deviation of $110,000 (that is, most of the results fit within plus or minus 25% of the average.)

Data from AC Nielsen reports total sales of $89.8 million[32] in the year to October 2017, from 52 companies, equivalent to average sales of $1.7 million per company. However, this in turn would indicate the average company has 4.2 employees, which is patently untenable.

Some of the problem lies in the distribution of sales. On one hand, three companies account for more than half of total sales. On the other, half the companies collectively account for one percent of sales.

Part of the problem is that the AC Nielsen data does not cover all sales. Exports for instance are not included. Neither are companies that provide water coolers to offices but not supermarkets. For example, JWI's sales of $16.5 million rank it third largest in our list, but it is not included in the Nielsen supermarket data. AC Nielsen data covers supermarkets, service stations and convenience stores and some coverage of wholesalers. We suspect it doesn't cover many other places that sell bottled water such as restaurants, cafés, hotels, clubs, etc. We also suspect that many of the smaller boutique water producers target this higher value end of the market, rather than high volume, low margin supermarket sales.

Accordingly, for mid-range producers, we have assumed sufficient "non-Nielsen" sales to allow them to have a minimum of a dozen employees.

- At the bottom end, the 26 suppliers who collectively only supply one percent of the market are just aggregated as "other". Around half of them appear to be importers, and around a quarter have Nielsen sales of under $1,000 which may indicate they are no longer functional entities or potentially harder to measure is if they have established other distribution/sales channels.

[32] Supermarket sales only

- At the top end no such adjustments are necessary. Most of the larger participants are listed companies so employment is known (although not necessarily the fraction devoted to bottled water amongst other beverages).

Figure 14: Location of springs in New Zealand

Source: Coriolis (2017)

Overall, we estimate that the New Zealand bottled water industry employs around 840 people (see Table 13 below).

Table 13: Employment and revenue of companies producing bottled water

	Manufacturer	Sales ($m)	Modelled / actual employment	Location(s)
1	Coca-Cola Amatil / Rio Beverages	$28.9	69	Auckland, Christchurch, Putururu
2	Frucor Beverages Ltd	$16.9	41	Auckland
3	Progressive Group	$14.4	35	Thames
4	Foodstuffs Group	$6.7	16	Auckland
5	Pure NZ Spring Water	$5.0	14	Auckland
6	Tongariro	$3.0	11	Taupo
7	Natural Dew Ltd	$2.7	12	Auckland
8	Premium NZ Trading Company	$1.8	10	Auckland
9	The Better Drinks Co	$1.5	10	Auckland

	Manufacturer	Sales ($m)	Modelled / actual employment	Location(s)
10	Ch'i International	$1.2	12	Auckland
11	Inverhouse Distillers	$0.6	11	Hastings
12	Spring Fresh	$0.5	21	Lincoln
13	Davies Foods Limited	$0.5	21	Hamilton
14	Back To Balance 2009	$0.4	21	Auckland
15	Aquifer Hb Limited	$0.4	16	Hastings
16	Aquaceuticals NZ Ltd	$0.3	17	Otakiri
17	One Pure International	$0.3	17	Auckland
18	Otakiri Springs Ltd	$0.3	17	Whakatane
19	Nestle New Zealand Ltd	$0.3	19	Auckland
20	Antipodes Water Co Ltd	$0.3	20	Whakatane
21	Others within supermarket channel	$4.1	21	various
22	**Total sales via supermarkets**	**89.8**	**431**	
23	Other domestic sales channels	50.4	354	various
24	Export sales	23.7	117	various
	Total	**$163.9**	**902**	

Notes: Other domestic sales channels include Just Water International. Water sales and employment data used where known, otherwise latter is derived from Nielsen data for former. Importers are not included. An estimate is also derived for other domestic channels and exports based information available from Coriolis (2017), and global company annual reports.

Source: AC Nielsen, company annual reports, Coriolis (2017)

How much are these jobs worth? The number of water producers which list both their total employment and their labour costs is very small.

- JWI had labour costs of $6.3 million in 2017. Colioris (2017) stated that Just Water International had 84 full time employees and 40 casual employees in 2017. We have assumed that casual employees work half the hours of full time ones, then this would translate to 104 full time equivalents. This would indicate the average wage at Just Water International was $60,356 in 2017.
- Coca-Cola Amatil had 14,000 employees in Australasia in 2016, with labour costs of $915 million. This translates to $65,393 per employee.

Assuming an average wage of $62,874 then the estimated 916 FTE in the New Zealand bottled water industry would generate **$57.6 million** dollars in benefits to local communities.

4.3. Profits for local communities

As with employment, data on the profitability of water bottling companies is very limited. Such returns data as is available tend to be from mixed beverage companies or foreign companies (or both). The variability of profit to sales ratios are also considerably greater than employment to sales ratios (Table 14). However, across profit to revenue and return on equity, there is at least some indication that most companies cluster around the midpoint, rather than having a straight line distribution behind highest and lowest returns.

Table 14: Estimated profit to revenue and return on assets of companies producing bottled water

	Company	Type	Nation	Year	Profit to Revenue	Return on equity	Source
1	Confidential NZ business case (bottling plant)	Water	NZ	2010	37%	44%	Deloitte, not published
2	Coca-Cola NZ+Fiji	mixed	NZ	2017	19%	21%	Coca-Cola Amatil (2016)
3	Just Water International	Water	NZ	2017	17%	20%	Coriolis (2017)
4	Confidential NZ business case (full chain)	Water	NZ	2016	na	28%	Deloitte, not published
5	Nestle	mixed	Global	2014	16%	20%	MarketLine (2015)
6	Coca Cola Global	mixed	Global	2014	15%	23%	MarketLine (2015)
7	Average US firm	Water	US	2013	na	20%	Plunckett (2013)
8	Pepsi	mixed	Global	2014	10%	37%	MarketLine (2015)
9	Danone	mixed	Global	2014	5%	10%	MarketLine (2015)
10	The Better Drinks Co	mixed	NZ	2016	-19%	-32%*	Coriolis (2017)
	Average				**13%**	**25**	

Note: Technically, as The Better Drinks Co has both negative returns and negative net assets, dividing the former by the latter would yield a positive number. As that would be meaningless, a negative sign is assigned here.

Source: as per last column.

Figure 15: Estimate profit to revenue and return on equity bottled water producers

Given there is so little equity data, and revenue is reasonably well approximated by Nielsen data, average profit to revenue in the range of 10.0% to 12.5% is preferred as the metric for community benefits over average return on assets (19.0%).

- In addition, erring on the side of caution, profits to revenue is both smaller than return on assets and has a lower spread.
- There is a large variation in both metrics, but it is still probably reasonable to assume that the average can apply to the industry as a whole.

Overall, it is estimated that the water-bottling operations of NZ beverage companies generated around $28 million in profits in 2016-17.

- Note that in the previous section, Nielsen supermarket sales was not large enough to generate viable employment numbers for boutique producers, so a formula was applied to estimate sufficient non-supermarket sales to enable a minimum firm size. Estimated profits are also based on those additional assumed sales. However, those additional sales have not been quantified, as the alternative assumption of higher profit margins for boutique producers yields the same result.

As around 70% of the companies on this list are privately owned domestic firms, it might be reasonable to expect that water bottling profits would be spent in the communities where the springs are located. However, around 90% of the revenue is from foreign owned or NZ listed companies, so only around 10% of the profits will accrue in local communities. So the economic benefits to communities where the springs are located may be small.

- Around 40% of profits ($10.3 million) are from foreign companies and assumed to be repatriated offshore. Around 50% ($17.7 million) is from listed NZ companies and assumed to be distributed to shareholders nationwide and beyond – there are international investors who invest in NZX. Around 10% of the profits (**$3.1 million**) accrues to privately owned NZ firms, which are assumed to be spent in local communities.

Table 15: Employment and revenue of companies producing bottled water

	Manufacturer	Sales ($m)	Estimated profits	Estimated distribution of profits
1	Coca-Cola Amatil / Rio Beverages	$28.75	$6.01	Foreign
2	Frucor Beverages Ltd	$16.91	$2.15	Foreign
3	Progressive Group	$14.37	$1.82	Local
4	Foodstuffs Group	$6.69	$0.85	National
5	Pure NZ Spring Water	$5.00	$0.76	Local
6	Tongariro	$2.95	$0.57	Local
7	Natural Dew Ltd	$2.69	$0.65	Local
8	Premium NZ Trading Company	$1.80	$0.54	Local
9	The Better Drinks Co	$1.53	-$0.29	Foreign

	Manufacturer	Sales ($m)	Estimated profits	Estimated distribution of profits
10	Ch'i International	$1.22	$0.63	Local
11	Inverhouse Distillers	$0.61	$0.58	Local
12	Spring Fresh	$0.47	$0.06	Local
13	Davies Foods Limited	$0.47	$0.06	Local
14	Back To Balance 2009	$0.38	$0.05	Local
15	Aquifer Hb Limited	$0.35	$0.04	Local
16	Aquaceuticals NZ Ltd	$0.33	$0.04	Local
17	One Pure International	$0.31	$0.04	Local
18	Otakiri Springs Ltd	$0.29	$0.04	Local
19	Nestle New Zealand Ltd	$0.27	$0.03	Foreign
20	Antipodes Water Co Ltd	$0.25	$0.03	Local
21	Others within supermarket channel	$4.1	$0.53	Foreign
22	**Total sales via supermarkets**	**89.8**	**15.2**	
23	Other domestic sales channels	50.4	**$6.39**	
24	Export sales	23.7	**$3.01**	
	Total	**$163.9**	**$24.6**	Foreign

Notes: water sales and profit to revenue used where known, otherwise latter is derived using NZ and global averages against Nielsen supermarket sales for former. Importers are not included.

Source: AC Nielsen, company annual reports, Coriolis (2017), New Zealand Companies Register

Based on the above analysis we estimated economic benefits of water bottling to local communities to be approximately $60.7 million per annum based on return on capital and labour.

As noted above we haven't undertaken a full economic contribution analysis but expect that the indirect components and downstream impacts could materially increase these benefits. We note that we would expect the downstream impacts (benefits) for exported bottled water to be materially lower on a unit basis than for domestic activity. Much of the impact of this activity will occur offshore. Further, this downstream activity is likely to be of higher value.

This estimate is based on high level estimates of direct benefits. For a full economic contribution model would be required to capture the indirect benefits (or "multipliers") of water bottling, but that is precluded by both data availability and the time and budgetary constraints of this project.

5. Impact of a charge

The results in this section provide an indication of where the impacts of a charge may come from and options as to how a charge may look.

We considered the impact of a water charge as follows:

- What is the likely impact on the retail price?
- What is the likely impact on demand?
- What is the likely impact on consumers across socio-economic classes?
- What is the likely impact on water bottlers?

5.1. Impact on price

What is the impact of the charge on the prices paid by customers? Specifically, to what extent is the tax passed through to customers and to what extent is it absorbed by suppliers?

A key determinant of the impact of the water charge on bottled water will be the extent to which the introduction of the charge leads to changes in retail prices of bottled water. This in turn will be determined by the extent to which manufacturers (and retailers) decide to pass on the charge by way of increased prices.

Experience in other countries suggests that companies do not always simply increase prices by the amount of the tax. In some cases, such as California[33], the full increase of the tax has not been passed on, and in other cases, such as in Mexico where a tax was levied on sales of soft drinks,[34] manufacturers have used the introduction of the tax as an opportunity to increase prices by more than the tax level imposed.

Because it is uncertain how exactly New Zealand water bottling companies may respond to a water charge, we considered what the likely impact could comprise a range of scenarios which we have derived from economic theory.

In building up our model logic we have considered different pass-through rates under different competitive models, ranging from a workably competitive market to a monopoly. In summary:

[33] John Cawley and Davi Frisvold.2015. "The incidence of taxes on sugar-sweetened beverages: the case of Berkeley, California", NBER Working Paper Series, 21465
[34] Jeffery Grogger. 2015 "Soda taxes and the prices of sodas and other drinks: evidence from Mexico, NBER working paper, 21197.

The rate of pass-through of changes in marginal costs of an input to changes in prices depends on the "curvature" of demand, whether firms have increasing, decreasing, or constant returns to scale, and the intensity of competition among firms.

- Many theoretical models predict that pass-through is higher if the intensity of competition among firms is less.
- Pass-through of industry-wide cost changes, such as the water charge, that affect all firms equally is generally expected to be greater than that of firm-specific cost changes that affect only one firm or a subset of firms in the market.

Table 16 shows the average retail prices per bottle for different types of bottled water before the imposition of a water charge, and how these prices are expected to change once the water charge is introduced.

In our research based on bottled water worldwide we found that a water charge is typically not higher than 10% of the retail price. For purposes of our analysis, we assumed this as the maximum level to test the impact of the charge. We also assumed that the ultimate water charge is likely to fall within the range of zero to this possible maximum. This implies that the impact is within the range of zero to the possible maximum.

It should be noted that we did not consider the extent of any buyer power in this analysis, which could reduce the extent of water bottlers' ability to pass the water charge on to consumers.

Table 16: Likely impact on retail price if water charge is 10% of the retail price

Bottled water type	Average retail price*	Water charge (10 % of retail price)	Likely price increase		
			Competitive	Oligopoly	Monopolistic
Carbonated mineral water	1.72	0.17	0.10	0.16	0.19
Non-carbonated mineral water	0.89	0.09	0.05	0.09	0.10
Carbonated flavoured water	2.70	0.27	0.16	0.25	0.30
Non-carbonated flavoured water	2.83	0.28	0.17	0.25	0.31

Note: Premium brands are not included in the average prices presented in this table

Source: Deloitte based on AC Nielsen data, most recent 2017 quarter

Table 16 above shows that depending on the intensity of competition, the pass-through level of an assumed water charge of 10% could range from 6% to 11%.

We also considered what the impact on the price would be, if we assume full pass-through of a water charge based on different water charge levels. In this case, we assumed water charge levels of 5%, 7%, 8.5% and 10% of the retail price. Table 17 below show how this impact would look like by bottled water type.

Table 17: Likely impact on retail price if water charge is varies from 5% to 10%

Bottled water type	Average retail price*	Different water charge levels (% of retail price)			
		5%	7%	8.50%	10%
Carbonated mineral water	1.72	0.09	0.12	0.15	0.17
Non-carbonated mineral water	0.89	0.04	0.06	0.08	0.09
Carbonated flavoured water	2.70	0.14	0.19	0.23	0.27
Non-carbonated flavoured water	2.83	0.14	0.20	0.24	0.28

Note: Premium brands are not included in the average prices presented in this table

Source: Deloitte based on AC Nielsen data, most recent 2017 quarter

We would note that depending on how a water charge was introduced it could potentially increase the price of beverages such as coke and fruit juice if the charge was applied universally to all beverages sourcing water. Alternatively, if the charge was applied only to bottled water this could increase the effect on demand of a charge if it promoted greater substitution of other beverages for water. We did not consider this impact for the purposes of this engagement.

5.2. Impact on demand

This section considers how consumers may adjust their consumption patterns in response to the likely price changes.

The analysis relies on two concepts to consider the likely response to changes in the prices for bottled water as a result of a potential water charge:

- Own price elasticities - which indicate the responsiveness of demand for a product to a change in price for that product. A low price elasticity will have a low effect on demand, where a high price elasticity will have a big effect on sales.
- Cross-price elasticities - which indicate the responsiveness of demand for a product in response to change in the price of another product.

Table 18 shows the estimated own-price and cross-price elasticities for a number categories of beverages drawn from international studies in the United Kingdom (**UK**) and Australia.[35] [36]

[35] Oxford Economics. The Economic impact of the soft drinks level. August 2016. A report prepared for the British Soft Drink Association. In Adams DM Briggs, Oliver T Mytton, Ariane Kehlbacher, Richers Tiffin, Mike Raynor, Peter Scarborough. 2013. "Overall and income specific effect on prevalence of overweight and obesity of 20% sugar sweetened drink tax in the UK: econometric and comparative risk assessment modelling study", British Medical Journal, 347.

[36] Anurag Sharma, Katharina Hauck, Bruce Hollingsworth, Luigi Siciliani. 2014. The effects of taxing sugar-sweetened beverages across different income groups. Health Economics 3070:

Table 18: Own and cross-price elasticities of demand for beverages in the UK and AUS

Beverage	Elasticity- UK	Elasticity- AUS
Water	**-1.17**	**-1.65**
Diet	0	0.31*
Sugar Soft Drinks	0	0.37*
Juice	0	0.32*
Milk	0	-1.58

Note: Own price elasticity is shown in bold, *indicate coefficients that were not significant in the research, so we cannot rely on them.

Source: Briggs et al 2013, Sharma et al 2014

According to this table, the own-price elasticity for water means that a one percent increase in the price of water would be expected to lead to a 1.17 percent reduction in demand for water. In terms of cross elasticities, i.e. the zeroes in the row of water (UK study) indicate that a change in the price of water would not be expected to have any impact on the demand for other drinking beverages.

For purposes of our analysis, we assumed the zero cross-elasticities are mostly likely to be observed within the New Zealand context. This implies that if the water charge is restricted to bottled water only, consumers are unlikely to switch to other soft drinks as a result of the water charge. If, however, there is a strong degree of substitution between bottled water and soft drinks the effect of a water charge in New Zealand could incentivise consumers to switch from a healthy alternative to sugary drinks.

We then used the elasticities, based on NZ data, and international studies, to estimate how responsive demand is to a change in price for bottled water. The table below shows the estimated likely impact of the introduction of the potential water charge.

Table 19: Likely change in volumes in response to a likely water charge (absolute change in demand (#water bottles), and percentage change)

Likely price increase	Elasticities			
	-0.1	-1.2	-1.6	-2.00
6%	-0.6%	-7.2%	-9.6%	-12.0%
8%	-0.8%	-9.6%	-12.8%	16.0%
10%	-1.0%	-12.0%	-16.0%	-20.0%

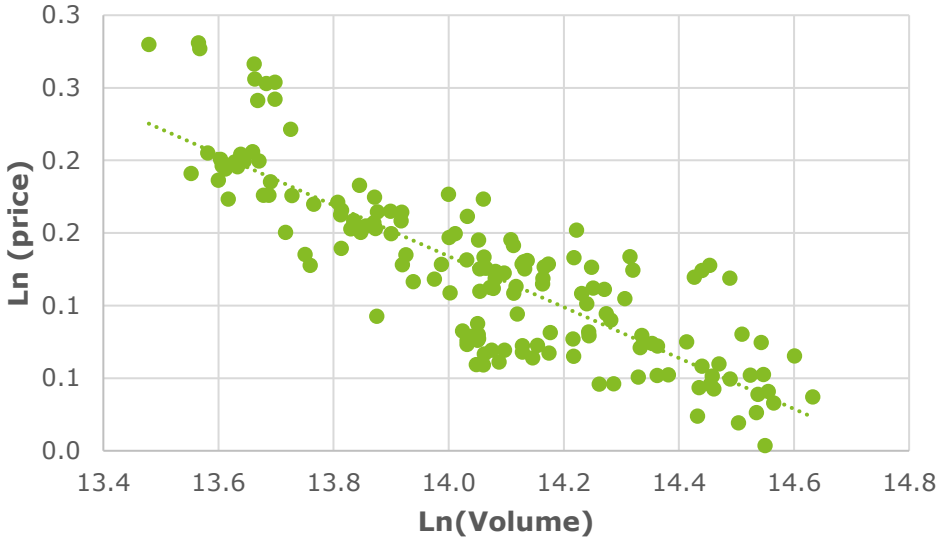
Note: The ranges of the likely impact of the price is based on our pass-through rates determined, and an assumption of a water charge of 10% on the retail price

Source: Deloitte

We think that the impact of a water charge on demand is more likely to be in the upper range, or the grey area in Table 19 above. Our reason for this view is as follows.

We tested what the likely own-price elasticity is in New Zealand based on AC Nielsen data. We found that responsiveness of demand to price change is consistent with what you would expect in a workably competitive market. Based on the data available, we illustrate this figures below. The figure is based on the total supermarket sales, on a weekly basis for the last three years (each dot represents price and volume information per week).

Figure 16: Demand responsiveness to changes in prices for bottled water in New Zealand



Source: Deloitte based on available Nielsen data

We estimated a "back of the envelope" price elasticity of bottled water based on the Nielsen data available and found that bottled water in New Zealand is likely to be *elastic*. This means demand is responsive to changes in prices for bottled water.

5.3. Impact on water bottlers

The impact on water bottlers will depend on the change in sales volumes, and the change in their profit margin.

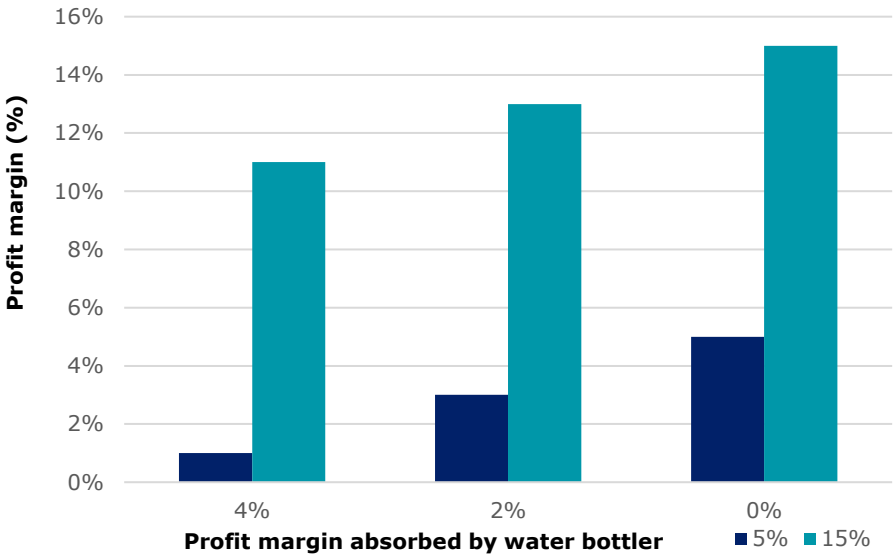
The extent of the change in their profit margin will mostly depend on the share of the water bottler's price in relation to the total retail price, whether the water bottler absorbs the water charge, or whether the water bottler decides to pass the water charge on to consumers. On the one hand, because the domestic market is fairly fragmented, some water bottlers may absorb the cost to remain competitive.

Based on the range of possible pass-through rates of a water charge of 10% of the retail price, and the observed profit margins in this industry (i.e. 5% to 15%), the likely effect on the profit margin is illustrated in Figure 17 below.

We note that some water bottlers could have a profit margin of 30%, but this is unlikely and is therefore not illustrated in Figure 17 below.

The effect on the profit margin could be more significant depending on the decrease in volumes purchased by consumers and the cost structures of the different industry participants (and in particular the mix of variable to fixed costs).

Figure 17: Likely impact on water bottler's margin



Source: Deloitte

5.4. Impact on consumers

We don't have the data currently available, but it would be critical to illustrate what the impact of the water charge could be on the consumers in different socio economic classes if water charges were to apply to the domestic market. Due to the lack of data, we refer to two international studies that considered this impact. One study was conducted in Mexico and another study was conducted in the US.

The study in Mexico found that a tax, in that case a tax on sugary drinks, had a higher impact on the lower socio-economic class consumer than the medium or high socio-economic class consumers.

The study in the US found a similar result. In Washington, a tax was imposed on bottled water, and then removed at a later stage. [37] Overall, the tax was 9.5% and changed the quantity of bottled water sold by 6.6%. The study found the effect of the water charge based on different income groups, with quintile 5 being high-income areas and quintile 2, low-income areas.

We considered what the impact of a water charge is, and specifically, to what extent would a water bottler pass the water charge on to consumers.

In the context of this analysis, we have only considered the impact of a water charge in the form of a cent per litre. The results provide an indication of where the impact is expected to be in a New Zealand context. Key points to note are:

- Depending on the intensity of competition, the pass-through level of an assumed water charge of 10 cents per litre could range from 6 cents per litre to 10 cents per litre.

[37] Peter Berck, Jacob Moe-Lange, Andre Stevens, and Sofia Villa-Boas. 2016. Measuring consumer responses to a bottled water tax policy. American Journal Agr. Econ 98(4): 981-996.

- Demand for bottled water appears to be quite responsive to price changes in New Zealand. This means that a water charge could have a significant impact on demand. If, for example, the water charge was 10 cents per litre, and a water bottler passed this charge in full on to the consumer, demand could drop up to 20%.
- A water charge is likely to have a higher impact on the lower socio-economic class consumer than the medium or high socio-economic class consumers.
- The profitability of bottled water is not particularly high. As with most fragmented industries, the range of profit margin varies – in this case from negative to 30%. There is a mix of large beverage companies, who include bottled water as part of their portfolio of products, to small boutique firms. So, the impact of the water charge depend on the company and their response to the water charge.
- We considered the impact on water bottlers based on their revenue before tax. Revenue before tax ranges between 5% and 15%. This illustrates that if the water charge is 10% of sales, and the charge is absorbed by the company, i.e. not passed on to consumers, the water charge could have an adverse effect on water bottlers, in particular the smaller boutique companies.

6. Value of water charge

There will be significant challenges associated with the application of a uniform charge for water across the sector. Any charge levied will need to be mindful of existing property rights. How much revenue is raised will depend on the point in the value chain at which a charge is levied. At current volumes the amount of revenue raised is likely to be modest – irrespective of how the charge is set.

Where to charge

While it is possible to derive an acceptable definition of "bottled water" it is far more complex to determine what is meant by the term "water bottler" given that industry participants will sit at one or multiple segments of the value chain ranging from the provider of the raw resource – water – to the ultimate retailer or wholesaler who distributes to the end customer. Given that the majority of bottled water is sold through retail outlets to end customers it is reasonable to assume that in most instances no entity owns the full end to end value chain. This reality creates a significant challenge when determining who the water bottler is and at what point in the value chain a charge is best imposed and how that charge is structured.

The two "book ends" for a charge are a charge at source or a charge on the end product. However, in theory a charge could be applied at some intermediate stage of the value chain such as the point at which the water transfers from the point of bottling to the next step in the value chain. Charges could be based on either volume or value.

Whatever the point at which the charge is levied or how this is set there are likely to be significant challenges given the very different ways in which industry participants look to create value from the raw resource.

A charge at source

A charge at source would see the charge imposed at the point of extraction. This is essentially a price paid for access to the resource set most likely on a volumetric basis – where a charge is imposed per unit extracted.

Benefits of a charge at source include:

- The charge would be directly related to the value of the underlying water resource rather than the value of the end product which incorporates a large number of factors which create value that are unrelated to the value of the underlying water resource.
- The charge could be levied uniformly irrespective as to the end destination of the bottled water – i.e. irrespective as to whether the ultimate product is targeted at the domestic or international market.

Challenges with this approach include:

- Different values for water: As noted above there are a range of very different business models at play in the sector from the provision of water with attributes that enable the end product to be positioned at the premium end of the market to the provision of large volumes utilised at the more commodity end of the market. The profitability on a per unit basis of the different models could vary widely and therefore so will the price parties are willing to pay for the water or the notional value placed on the water (if the water resource is integrated into an upstream value chain). We are aware of business models where water for bottling is priced at several cents per litres and other models where the value placed on water is a fraction of a cent. It will be difficult to set a uniform charge based on volume given these very different values.
- Isolating the revenue associated with the underlying resource: An alternative approach could be to impose a charge based on the revenue earned through the sale of the water resource. This approach would address the issue of the disparate per unit value placed on water. Further, given that we would expect that the costs of extraction (as opposed to transport, bottling and other activities further up the value chain) would be relatively fixed then revenue earned could be a relatively reliable guide as to value. However, revenue will only be visible where there is a demarcation between the rights holder and the party extracting the water for bottling purposes. Where ownership of water rights is integrated into a water bottling value chain then the revenue attributable to the water resource will potentially be harder to determine.
- Impact of a charge on existing rights holders: Consents to take water for bottling purposes are already held by individuals or entities. To the extent that those parties are already or intend to utilise that resource it will be their expectation that they receive – directly or indirectly – the revenue associated with a right that they already own. If it is possible to establish a value for the water resource using one or other of the approaches above the issue then becomes how that charge is levied against/paid for by a party that already holds that right and at what rate. For example if a value is established at 1 cent per litre – that provides an indication of the value of the resource to the rights holder rather than indicating the appropriate level of any charge. Decisions would still need to be made as to the rate at which any charge is imposed. A further complication will arise where rights holders have already on-sold access to the water to a third party for a contracted price. In this situation it may not be possible for the rights holder to pass on any charge with the potential – depending on how the charge is set – that the charge could put the rights holder in a loss-making position.
- Amount of revenue raised: Assuming that it would not be intent of any charging regime to appropriate the property rights of existing consent holders then it would seem reasonable to assume that any charge imposed would only represent a relatively modest percentage of the value attributable to the water resource. Given that the value placed on water under any plausible scenario will be

low on a per unit basis then the revenue raised from charging on this basis could be very low – as illustrated by our analysis below.

A charge on the end product

A charge on the end product would see the charge levied at the point of sale to the end customer. The benefits of a charge on the end product are:

- The revenue earned from the sale of the end product will be more easily able to be established than would be the case for charges levied based on the price paid for water at source.
- Revenue will capture the differences in value between the different products taken to market.
- The revenue base against which the charge could be levied will be materially higher than a revenue base linked to the price paid for water at the point of extraction and therefore the revenue raised from such a charge is likely to be considerably higher.

Challenges associated with a charge levied at the point of sale to the end customer include:

- Impractical to charge on exports: it is highly unlikely that revenue earned by NZ water bottlers who are exporting their product will reflect the sale price to the end customer. Rather, the likelihood is that sales will be to intermediate parties who will then integrate the product into an international value chain. *Therefore, it is likely that for exports the point of sale would need to be at the point of export – at which stage per unit values are likely to be materially lower than at the point of sale for domestic products.*
- Impact on existing export contractual arrangements: Existing export businesses will almost certainly have contractual arrangements in place that govern – amongst other matters – the price at which product is sold. Depending on the nature of these arrangements it may be contractually or commercially impractical for water exporter to recover some or all of any charge levied. In which case – depending on the margins being achieved and the rate at which any charge is levied – such businesses could become uneconomic.
- Equity of the charge: A charge levied based on price achieved at the point of sale of the end product will reflect a charge against revenue generated by a significant range of factors other than just the water component. The price paid for the end product will reflect the need to earn a return on the capital invested at all points in the value chain including investment in plant and equipment, brand development, transport and distribution arrangements, sales and marketing and the cost of all the intermediate factors of production. *The value attributable to the water dimension of the end product under any scenario will be tiny – so a charge levied at the point of sale of the end product is a charge levied on bottled water not on water used for bottling purposes.*
- Setting the rate at which the charge is levied: The analysis incorporated in this report demonstrates the wide range within which the price of bottled water falls. There is likely to be a similarly wide range in the margin achieved. Therefore a charge levied based on revenue earned from the sale of the end product is likely to

impact water bottlers to very different extents – with again the risk that a charge may make some businesses uneconomic.

Value of a water charge

One of the challenges of imposing a potential charge on profits is that expenses can be manipulated to reduce tax exposure through a range of measures. A charge based on revenue avoids this risk but depending on the rate at which this is set runs the risk of eliminating profits in the industry for many companies.

A water charge for extraction at source is likely to generate limited income depending on assumptions made as to the appropriate rate of charge. For example at the royalty rates for extraction in New Zealand that we are aware of - in the range of $0.01 to $0.025 per litre - there may be limited scope for charging unless the charge is set at a significant proportion of the royalty rate. For example, an additional water charge of $0.01 per litre represents a 100% increment on the current low end of the royalty range.

We note, however, that this situation arises in circumstances where there is a charge applied to an existing consent holder. Going forward, one option could be that a standard charge is set by and payable to the Crown for the water right with any income earned by the consent holder being based on an additional charge over and above that paid to the Crown.

A charge imposed at source, potentially based on volume, may be a means of encouraging a focus on higher-return propositions. A volume-based tax may represent a significant barrier, particularly for lower margin products such as bulk supply for bottling offshore. For a premium brand of bottled water the same volume charge may represent a relatively small imposition, as profitability may be a function of price rather than quantity. However, such businesses typically need to invest heavily to establish distributions arrangements and to position their brands so any charge will represent a further cost and business risk unless there is confidence that the charge can be passed on to consumers.

Charges based on volume or revenue may be harder to manipulate, but they also impose a greater imposition on water extraction and bottling, representing a fixed rather than variable cost. When a company is struggling or even unprofitable, profit-based charges are reduced, and accumulated losses may be used to offset future profits if the company recovers. This is not the case on volume or revenue based charges.

There are a range of potential charges modelled in this report from a pure royalty approach with a "charge per litre" at the source through to a percentage of sales price. When measuring the impact of an intervention, any model developed to quantify such impacts always needs a base case by way of comparison.

The charge in the **base case scenario** in this report is zero, reflecting the current situation.

If the government was to levy under a **low range scenario** where the charge on bottled water is minimal (i.e. a fraction of a cent per litre), it is conceivable that the compliance costs on both producers and the government could exceed the revenue collected. In this case, zero might still be the optimal charge.

In the **mid-range scenario**, a charge of one to two cents per litre could be levied to represent the opportunity costs of alternative uses of the water (such as irrigation) and to internalise the environmental externalities perceived to be associated with bottled water. A charge of this size could be absorbed by producers, with the result that there could be no change in sales volumes under this scenario either.

In the **high range scenario**, given some bottled water consumers are willing to pay hundreds of times more for essentially the same water as from municipal supplies, many of them might be willing to pay an extra $1 or more per litre for their favourite brand. If so, this approach would maximise revenue, and associated benefits to communities and the environment. However it could also substantially reduce sales volumes as there are likely a number of consumers which may look to shift consumption to other similar products.

6.1. How to charge?

A charge per litre of water sold. If the rationale for a charge is primarily to reflect the opportunity costs of water used in bottling, then a volumetric charge would be most appropriate way to levy it.

A charge based on sales. If the aim of a charge is to maximise revenue for environmental amelioration, then an excise of a percentage of final sale value would achieve this. As water is currently free (apart from costs associated with securing consents) and bottles cost around two cents each, it might be assumed that the profit margins on bottled water are substantial.[38] However, the research presented in this report indicates that this may not in fact be the case as there are significant additional costs associated with getting the product to the end market and the cost of investing in product brands, which is achieved through substantial and ongoing marketing expenditure. Further, profitability is likely to vary hugely depending on the maturity of the underlying business – for example a start-up business is likely to be more heavily impacted than a business that is more established.

A licence to produce bottled water. If the aim is for simplicity or to incentivise parties applying for consents to actually utilise the consents and to only apply for volumes realistically needed for their proposed business then some form of licencing may be an option. This would involve a fixed fee being levied – either on a one-off or ongoing basis – based on the volume of water consented.

The licence fee could be structured in a number of ways. For example a fixed fee could apply at different thresholds – so a fee might be set at $X dollars from 0 to 100,000 m3, $Y dollars from 101,000 m3 and so on. Depending on how the licence is structured this approach could incentivise parties to develop business models based on a higher value add/more significant local content than models based simply on moving large volumes directly offshore such as where water is simply put into bladders to be exported – or even just into a pipe that goes straight into a ship for the same purpose.

[38] https://www.economist.com/news/economic-and-financial-indicators/21632569-price-making-plastic-bottle

6.2. When to apply a water charge

At the point of extraction. If the purpose of a charge on water is to charge for the use of a societal resource, then the charge could represent a 'sale' price of water from the Government (representing society) to the producer of such a resource. This would be administratively easy, as it would capture the water before it is put into bottles, bladders or pipelines. Conversely, depending on how the charge is structured it could also impose a cost on production of soft drinks, other beverages like reconstituted juices and even possibly foodstuffs with high water content such as cans of soup.

How far reaching a charge would be would depend on what Government is trying to achieve – *if the focus is on businesses making money from effectively just packaging and selling the raw material then the charge could be limited simply to bottlers (including bladders) but exclude any process that adds additional value/content.*

At the point of bottling. This would avoid the issues of charging for water used for other beverage purposes, although it will be important to define "bottling" sufficiently broadly so that water exported in bladders or by shipload is not excluded.

At the point of final sale. This would avoid cascading costs from the first two scenarios. For example, in the first scenario the charge paid by the extractor could be passed on to the bottler, the distributor, and the retailer. With profit margins added at each stage, the final impost on consumers could be substantially larger than the original charge. This could have adverse impacts on allocative efficiency. Conversely, this would be administratively more complex, given the multitude of final points of sale.

We assessed the likely value of a water charge based on different ways in which a charge could be imposed, and different levels of the charge. We focused on a charge imposed at the point of sale rather than at the point of extraction.

It is important to note that we estimated the likely revenue from a water charge based on the actual water used, and not on the water use granted under the consent, or water extracted under the consent. Actual water usage is based on official data sources to the extent that it is available.

We estimated the revenue raised based on various options of how a water charge could be imposed. How the water charge is imposed depends on the rationale for the charge. The options considered are:

- A water charge per litre;
- A water charge based on a water bottler's sales; and
- A licence to produce bottled water.

We also estimated the potential revenue for each of these options based on different scenarios. We present and discuss our results for each option below.

A water charge per litre (charged at source not on sales)
We estimated the potential revenue from a water charge per litre levied at source to be between $158,000 to $1.4 million based on estimates of current volumes sold within the domestic market and internationally utilised. In order to determine the potential revenue on a per litre cost basis, we made the following assumptions:

- A 1 cent per litre and a 3 cent per litre price payable to the consent holder by parties seeking access to the water resource for bottling purposes and a charge levied on the consent holder at a rate of 10% and 30% of the price received per litre.
- We used the AC Nielsen volumes for the most recent year. This total volume figure includes all retail channels. We also included export volumes for 2017. The total volumes are 157.8 million litres (net of import volumes).
- We assumed that bottled water is elastic, and the volumes used in our calculations are those volumes that reflect demand response as a result of a change in price due to the water charge.

While the above seems overly complicated it is an important scenario to consider. In a conceptual example, a consent holder has received consent to extract 100 m3 of water per day. They have no interest in participating as an integrated water bottler. Accordingly have agreed with another party who will pay 2 cents per litre for the water. Our scenario assumes the original consent holder with pay a rate of 10% to 30% (or $0.002 to $0.006) per litre to the government.

Charge based on sales
We estimated the potential water charge revenue based on current sales would be in the range of $8 million to $16 million.

To determine the potential revenue on a per litre cost basis, we made the following assumptions:

- A 1% charge on sales value, 5% charge on sales value and a 10% charge on sales value.
- We used the AC Nielsen values for the most recent year. This total volume figure includes all retail channels. We also included export value for 2017. The total value is $160.8 million.
- We assumed full pass-through of the charge- thus impact on profitability is only through the likely decrease in sales as a result of a higher price.

It is to be expected that the revenue that could be earned based on sales of the end (or intermediate) product will be materially higher than that gathered by a charge based on the value of water at source. *As noted above a charge based on the price achieved based on the end product captures values attributable to a range of intermediate factors and the reality that the value attributable to the water component represents a small fraction of that end value.*

A licence to produce bottled water
Our approach to determine the potential revenue based on a licence to produce bottled water was that if the level of revenue estimated from a charge based on current sales was translated into a simple licence – i.e. where revenue is simply divided by the number of consents then this would imply a licence per consent in the range of $102,000 to $204,000.

Appendix A - One Pure Case Study

Background

The Hawkes Bay metering analysis and consent holder to supermarket sales matching exercise each provided insights into the bottling activities of One Pure International Limited. We have elected to single out One Pure for further analysis in an attempt to determine how well One Pure represents the sample of exercised, bottling only consents. The One Pure consent was issued by Hawkes Bay Regional Council for "taking water…for the purpose of manufacturing beverages in a bottling operation". The table below summarises our initial observations from the consent document.

Table 20: One Pure Consent Analysis

Key Dates		Limits	Key Restrictions
Issued	10/07/2015	25 litres / second	Minimum water level
Lapse	31/05/2017	7,800 m3 / 7 days	Water quality sampling
Expiry	31/05/2027	405,600 m3 / 12 months	Regular metering

Source: Hawkes Bay Regional Council

The consent has a duration of 12 years and would have lapsed if not exercised within two years, which is materially less than the default five year lapsing period. The remaining duration is typical of the bottling only, exercised sample. The consent limit is defined according to three volume per period measures. The annual limit is equivalent to the seven day limit. The 25 l/s measure is approximately equivalent under a 12 hour day assumption. This illustrates the potential for misrepresentations in the data if daily rates are derived under different assumptions. One Pure is also subject to the following minimum water level requirement.

> *Taking of water authorised by this resource consent shall cease when the static water in well no. 16341 falls to at or below 1.8 metres above mean annual sea level. The taking of water shall then not resume until the static water level exceeds 1.7 metres above mean sea level.*

This restriction illustrates a further problem with defining a standard measure of limit. This type of restriction depends on exogenous constraints which cannot be accurately reflected in the data. Such restrictions appear to be common within the consent documents we have examined.

Actual take

One Pure extracted 3,000 m3 in 2017 YTD and 1,500 m3 in 2016. This is equivalent to 1.0% and 0.4% utilisation of limit respectively. Annual supermarket sales for One Pure were 195,000 litres, which implies a utilisation of 0.05% of limit. The disparity between these values indicates that a significant amount One Pure's volume is distributed through alternative channels such as export, wholesale or direct. There is also likely to be some waste in the bottling process. Given the lack of data, we have opted to qualitatively investigate the possible reasons for this volume gap.

Marketing assessment

Our qualitative assessment of One Pure is based on a high level marketing analysis based on publically available information on the brand, and supermarket sales data.

Product and pricing

One Pure has a broad product line of bottled water. Its products are primarily differentiated across the following attributes:

- Still versus sparkling;
- Size of container (ranging from 300ml to 10L); and
- Glass or plastic packaging

The majority of One Pure's supermarket sales volume are from 1.5L plastic, still bottles. This may be more descriptive of the channel rather than the manufacturer. This particular product has the lowest price ($/L) in the range, other than the 10L box, however at $1.36 per litre it is still higher than average.

The table below shows the prices of One Pure products featured in the supermarket data. In general One Pure appears to pursue a premium pricing strategy. Most of its products are well above the average price in the supermarket sample. This is supported by a significant proportion of premium product attributes such as glass and small volume packaging, and sparkling water.

Table 21: One Pure Pricing Table

Size (mL)	Packaging	Type	Price ($/L)
10,000	Pet	Still	0.66
1,500	Pet	Still	1.36
1,500	Pet	Still	1.88
500	Pet	Still	2.60
750	Glass	Still	3.43
750	Glass	Still	4.00
750	Glass	Sparkling	4.14
750	Pet	Still	4.14
500	Glass	Still	4.54
500	Glass	Sparkling	4.67
300	Glass	Sparkling	5.00
750	Glass	Still	5.13
750	Glass	Sparkling	5.16
500	Glass	Still	5.50
320	Pet	Still	6.00
300	Pet	Still	NA

Source: AC Nielsen

Distribution
The previous analysis revealed that One Pure most likely distributes a significant proportion of volume through channels other than supermarkets. The One Pure website suggests that it exports to China, Hong Kong and Singapore, although no specific distributors are listed. One Pure also offer direct distribution through an online store from which cases of typically twelve or twenty four bottles can be purchased and shipped within New Zealand.

Promotion
One Pure has a communications strategy that supports a premium position with the market. Promotional activities include sponsorship with well-established premium brands such as Hilton Queenstown and Lamborghini as shown in Figure 18 below.

Figure 18: One Pure Sponsorships

Source: One Pure website

These sponsorships also indicate an attempt to align the brand with sports organisations such as Ironman New Zealand and New Zealand Badminton. This appears to be related to a market development strategy pointed toward the premium sports water market. One Pure's product line includes a 750mL 'Sport Bottle' offering, and its mission statement includes an aim of sharing the health benefits of mineral water. The emphasis on health and wellbeing suggests that One Pure is not simply pursuing the export market by generating brand equity through an association to New Zealand.

Insights
This assessment indicates that One Pure is using direct distribution and is also likely to be exporting to China and Singapore. An emphasis on alternative distribution channels may be typical among boutique premium brands. This could explain the low implied takes for McCashins and Antipodes, which are also position as premium brands. It is unclear to what extent these brands distribute through export channels compared to alternative domestic channels. In the case of One Pure, the marketing strategy appears to suggest that domestic sales are at least equally pursued.

Appendix B - Consent Maps

Figure 19: Consent limits by exercise status

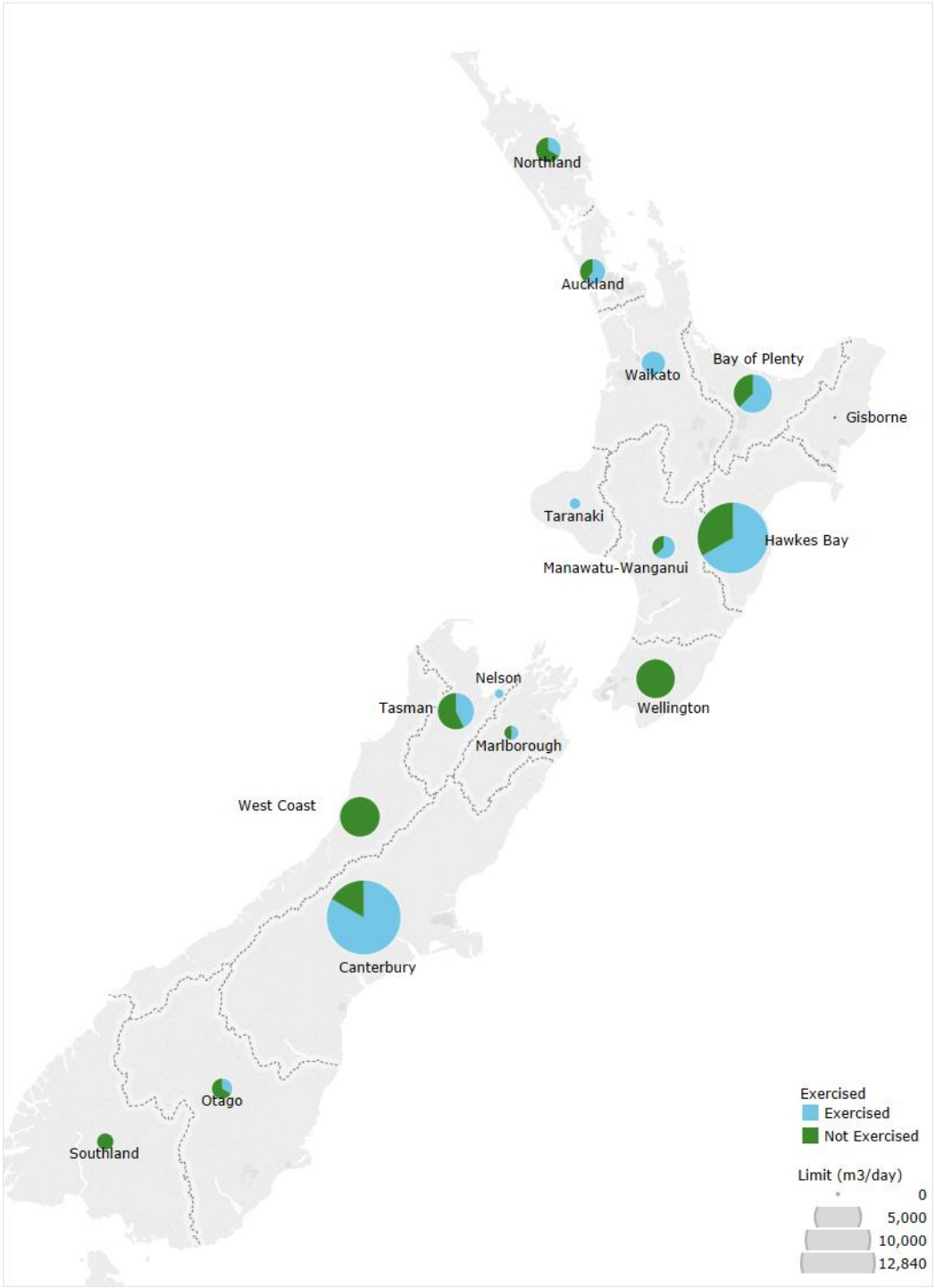


Figure 20: Consent limits by use

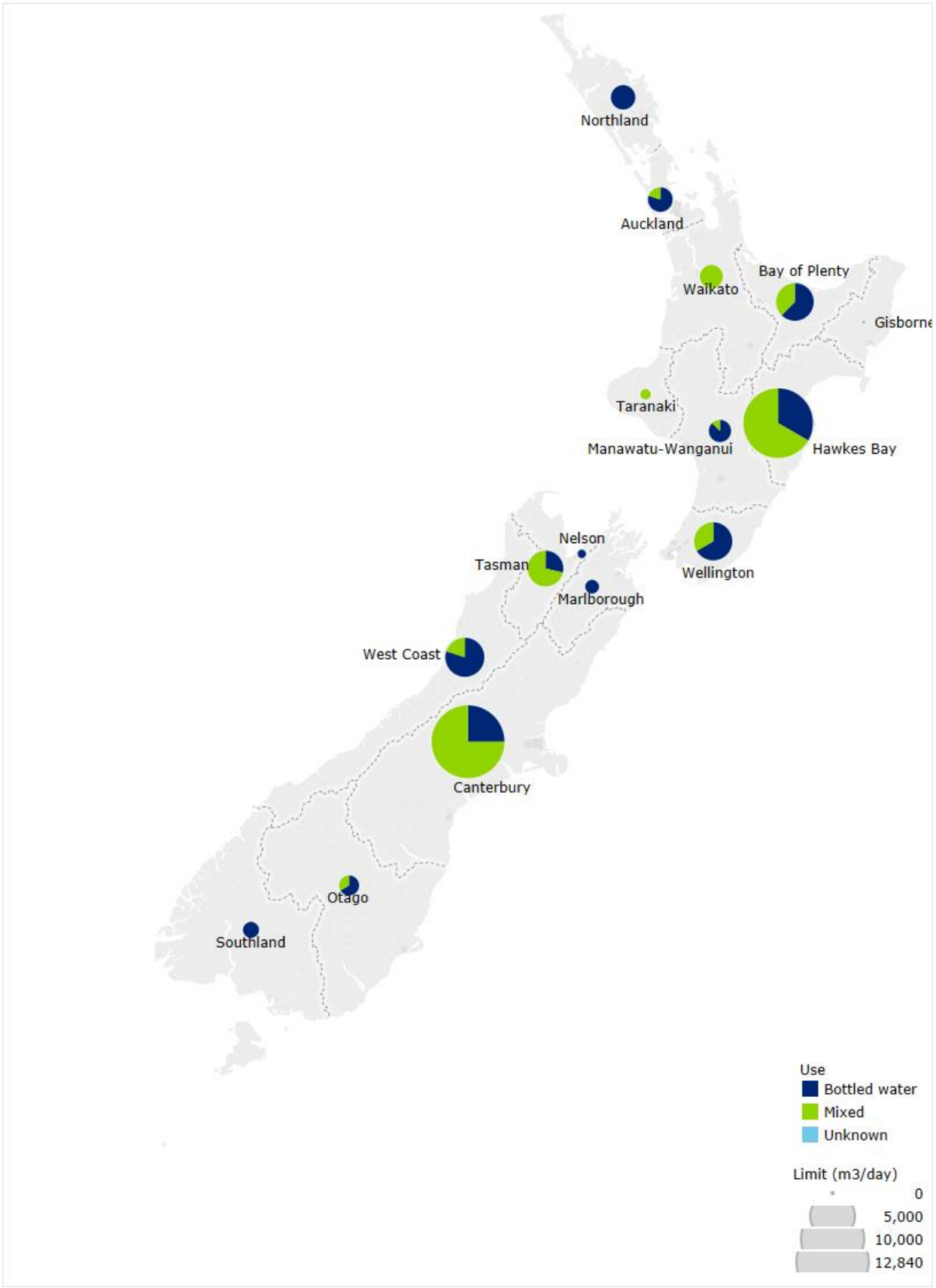
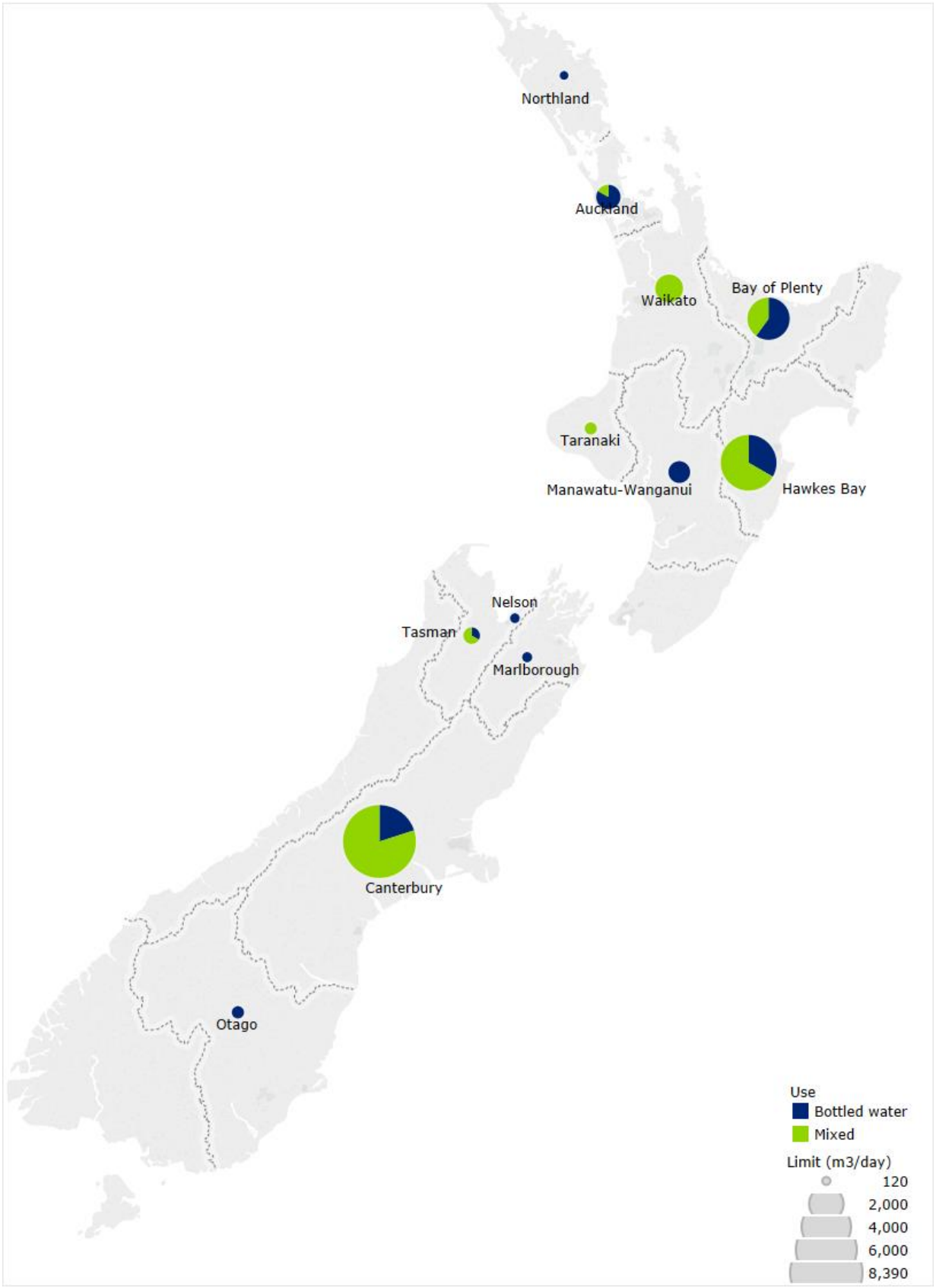


Figure 21: Consent Limits by use (exercised)



Appendix C - Statement of Work

1. <u>The extent of water bottling in New Zealand</u>

- **The actual amount of water taken for water bottling under these water bottling consents.** Research would involve analysing both consents and metering data for water bottling. It would also involve analysing the mixed use consents to determine (if possible) the amount of water used for bottling under these consents.

- **Why water bottling is included in mixed-use consents.** Research should provide more information on the water bottling component of mixed-use consents. Is it generally unused? What companies/people tend to hold these mixed use consents. Why are mixed-use consents generally granted? Note: Regional Councils will be asked by the Ministry to provide information regarding the above, however, it will need to be analysed for the purposes of the report.

- **Number of consents that are exercised and unexercised.** Research should provide more detail on how many consents are exercised and unexercised. This would involve looking into whether consents that are currently unexercised have been exercised in the past. It would also involve providing more information around consents where the status is undetermined. Note: Regional Councils will be asked by the Ministry to provide information regarding the above, however, it will need to be analysed for the purposes of the report.

- **Why some consents for water bottling are not being utilised.**

- **Trend analysis on the number of consents for water bottling over time**
  Trend analysis is contingent on the quality of council records and may not be possible for all councils.

- **The amount of water bottled from municipal supply (even if on a small scale).**
  We understand that some water for bottling in New Zealand comes from municipal supplies and not from groundwater directly. We need to estimate this take to provide a fuller overview of water bottling. Note: Regional Councils will be asked by the Ministry to provide information regarding the above, however, it will need to be analysed for the purposes of the report.
  For context, we are seeking some analysis of the amount of water used for other types of beverages compared to water bottling, e.g. soft drinks and alcoholic drinks. Most of this we assume comes from municipal supply as opposed to ground water.

- **What are the regional council's charging regimes / cost recovery mechanisms for water bottling**
  All consents are likely have cost recovery charges associated with them. Analysis of the charges will provide a view the direct costs to regional councils of managing these consents. Note: Regional Councils will be asked by the Ministry to provide information on the above questions, but it will need to be analysed for the purposes of the report.

- **Volume of water exported.** This would include information regarding the volume of bulk water— water stored in a large tank that is exported, alongside and the volume of bottled water that is exported. It would also compare the volume of bottled water that is exported as opposed to kept domestically. Note: the Ministry will provide information from Statistics NZ in this regard however it will need to be analysed for the purposes of the report.

- **How do we define water bottling?** This would involve exploring and refining the definition of "bottled water". E.g. should flavoured water / soft drinks be included in the definition. How would this relate to taking municipal water and selling in other ways – such as water trucks servicing non-municipal households and baches. Note: The Provider is required to propose a spectrum/framework to define the boundaries.

2. The economic value of water to water bottlers and communities

The research would need to provide data on the following:

- **Analysis of the cost structure of water bottling companies.** This would include capital costs, distribution costs and other costs, and include profitability. This could also involve looking at market segments, such as comparing standard to 'high end' bottled water.

- **What is the value of water bottling to local communities?** This would be primarily through employment and wage figures, if obtainable through the StatsNZ Datalab or other sources e.g. a StatsNZ customised work request.

- **What would the impact of a charge be on water bottlers?** This involves analysing how a range of charges would affect the cost structure of water bottlers. Analysis could be per unit or as a percentage of overall profit. These changes could be a direct extraction charge for example: [x] cents per litre extracted by the bottler or a royalty of profits. The Provider will be required to consult with the Ministry during the analysis on the range of charging options.

- **What would the value of a charge be for New Zealand / local communities?** This involves looking at the potential revenue gained from a charge on water bottling including the total quantum likely to be raised and which regions would produce the most revenue.

Appendix D – Data and scope limitations

While there have been no restrictions placed on us by the Ministry, the majority of the report and analysis was compiled in a short timeframe (approximately 2 weeks) and as such we have not been able to explore all avenues of our SOW in full. In addition, given time constraints we have not been provided with the full list of information from the regional councils that was originally envisaged. As a result a number of the conclusions in the report need to be carefully considered as these are based on extrapolated regional trends which may not be indicative of NZ as a whole.

In undertaking our analysis we have been limited by significant gaps in the data available. In particular very limited data was provided in relation to the quantum of water actually extracted where water has been consented and those consents utilised.

Also, there is limited data available in relation to industry profitability due to a number of factors including:

- Water businesses are often integrated within the operations of diversified beverages businesses
- Standalone water businesses are typically privately owned and there is limited publicly available information in relation to the financial performance of these operations
- The export water bottling industry is very small with a number of established operations still in a start-up mode so the current industry structure may not reflect what the export sector could look like once it matures

Our analysis focusses on water that is currently consented for water bottling purposes and what a charging regime could potentially look like in a context where rights to water have already been granted. We have given no consideration as to (i) the extent to which further consents for water bottling could potentially be granted or (ii) what levy or other charging arrangements could be applied to new as opposed to existing consents.

Glossary

Abbreviation	
ABWI	Australasian Bottled Water Institute
AEE	Assessment of Environmental Effects
CGE	computable general equilibrium
EBIT	earnings before interest and taxation
EBITDA	earnings before interest, taxation, depreciation and amortisation
FSANZ	Food Standards Australia and New Zealand
FTE	full time equivalents
GOS	gross operating surplus
GP	gross profit
HS	Harmonized Commodity Description and Coding System
IO	input-output
JWI	Just Water International
L	litres
m	millions
MC	marginal cost
mL	millilitres
MOH	Ministry of Health
MR	marginal revenue
NPAT	net profit after tax
NPBT	net profit before tax
NZ	New Zealand
NZD	New Zealand Dollars
NZHSC	New Zealand Harmonised System Classification 2012
the **Ministry**	Ministry for the Environment
the **SOW**	The Statement of Work: a detailed list of questions we have been asked, set out in Appendix C
UK	United Kingdom
US	United States
USD	United States Dollars
USFDA	United States Food and Drug Administration
WCO	World Customs Organization
we or **us**	Deloitte

Deloitte.