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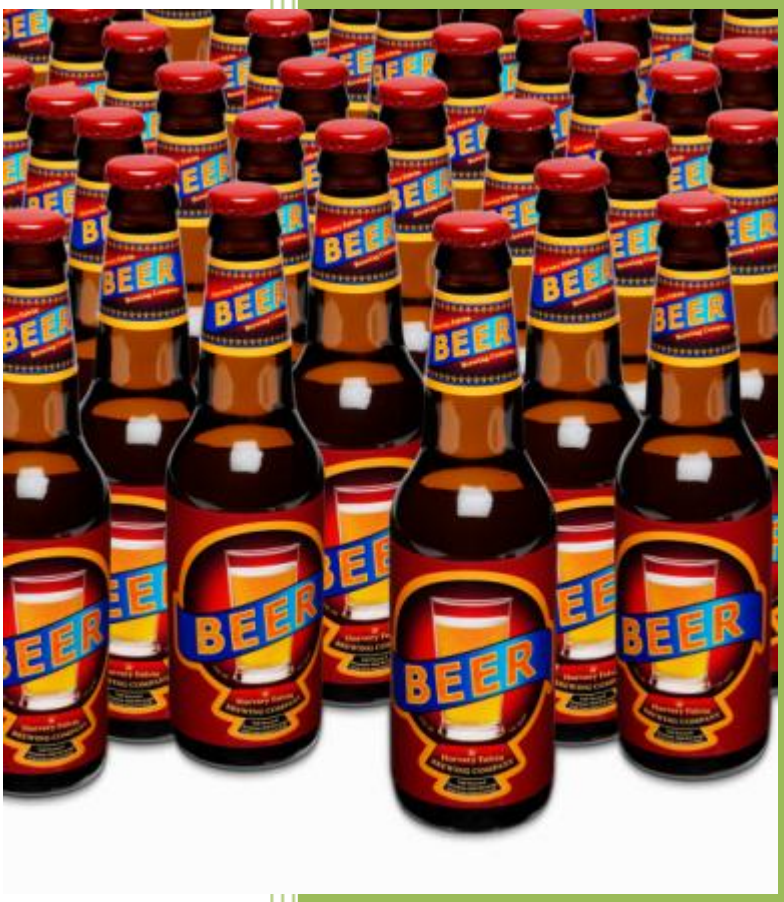
Uncapping the potential of glass packaging: Opportunities and obstacles to creating a refillable glass bottle system for Oregon breweries



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Oregon Recycling Markets Development Corporation

Prepared by

4R Sustainability, Inc.

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1. Background

A number of emerging industries in Oregon are gaining national recognition. Oregon is recognized as a leader in many sectors, including agriculture and forest products, information and digital technology, athletic and outdoor apparel, and, most recently, a rise in alternative energy firms. Two other Oregon industry sectors gaining national and international acclaim are the wine and beer industries. Oregon is home to 87 craft breweries,[1] with 38 of them located in the Portland metro area.[2] In 2005, beer production in Oregon grew 16 percent and contributed $2.25 billion to the state's economy. The growth of the Oregon craft brew industry is due, in part, to the high in-state consumption of local brews, which tallied 11 percent of all of the beer consumed by Oregonians in 2005. The average craft brew consumption in Oregon far outpaces the national average of just 3 percent of all beer consumed.[3]

While many of Oregon's breweries are local brew pubs, many of the larger breweries bottle their product for sale at retail locations. Not only do Oregonians show loyalty for Oregon beer, they also demonstrate environmental responsibility by returning a high percentage of these bottles for recycling through the statewide redemption system. Growth in craft beer production coupled with high in-state consumption and high levels of participation in bottle returns begs the question: Do conditions exist to create a refillable beer bottle system for Oregon breweries?

Refillable bottle systems require the right set of conditions to be in place in order to be viable both economically and practically. There has to be consumer support to return the bottles, a collection system that can begin the reverse logistics process, a facility or facilities for washing and repurposing the bottles and beverage manufacturers that use them again to package products. Oregon's seminal bottle bill has created a unique system for collecting used beverage containers. The economics of container redemption and the avenues of container collection are under consideration for modernization. Because this time of change is an opportunity to shape the system to meet the state's future beverage container collection needs, it was necessary to ask three questions:

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[1] Beer Media Kit: Facts, trivia and resources. (Portland: Portland Media Resource Center – Travel Portland, 2009), http://www.travelportland.com/media/mbmedkit/mb_facts_trivia.html.

[2] Oregon Beer: World class, local made. (Portland: Oregon Brewers Guild, 2009), http://oregonbeer.org/beer/.

[3] Beer Media Kit: Facts, trivia and resources. (Portland: Portland Media Resource Center – Travel Portland, 2009), http://www.travelportland.com/media/mbmedkit/mb_facts_trivia.html.

- Do conditions currently exist that would allow the opportunity for the use of refillable bottles by in-state beverage manufacturers, namely the craft brewing industry?
- If not, what are the obstacles that exist?
- What are the conditions that need to exist to make a refillable bottle system work in Oregon?

Climate for refillable containers

Refillable bottles once ruled the glass packaging landscape for beverages. Since the 1980s conditions for the use of refillable bottles in the U.S. have eroded to the point that use of refillable bottles is essentially non-existent. During the course of this research, the only instance that could be found of refillable glass containers at work in the U.S. is the regional use of refillable containers by the dairy industry. While the use of refillable bottles in the U.S. has all but stopped, the practice has been carried on in some European nations, such as the Netherlands, and was revived in Canada in the 1990s. Refillables in those countries continue to be used because they present an opportunity for economic savings and environmental benefits.

As laid out in the *Oregon Strategy for Greenhouse Gas (GHG) Reductions*, the state has set ambitious reduction goals to stabilize GHG emissions by 2010, reduce GHG emissions by 10 percent below 1990 levels by 2020 and by 75 percent below 1990 levels by 2050[4]. One strategy laid out in the report to reduce GHG emission is to "decrease the use of materials, particularly those with higher greenhouse gas emissions over their life-cycles.[5]" It is also the goal of the Metro regional government, Oregon's largest solid waste management district, to target waste generation through waste prevention strategies.[6] Product packaging is an important waste stream to consider when looking for waste reduction opportunities.

[4] Governor's Advisory Group on Global Warming, Oregon Strategy for Greenhouse Gas Reductions. (Salem: Oregon Department of Energy, 2004), p. 6-7.

[5] Governor's Advisory Group on Global Warming, Oregon Strategy for Greenhouse Gas Reductions. (Salem: Oregon Department of Energy, 2004), p. 99.

[6] Office of the Auditor, Waste Reduction and Outreach: Shift in Strategy Recommended. (Portland: Metro regional government, 2008), p. 11-12.

While it is likely that strategies will be employed to target the "low hanging fruit" to meet initial GHG reduction goals, some fundamental changes will have to be made to energy, transportation, commerce and materials management systems to attain the ultimate goal of a 75 percent reduction in GHG gas emissions in Oregon by 2050. Because refillable glass bottles present an opportunity for waste reduction, with an average of 15 trips per bottle, it cannot be ruled out that interest in, and the political support for, refillables might one day exist from stakeholders throughout the beverage supply chain.

Opportunities for refillable glass bottles in Oregon

This initial inquiry into the opportunities that might exist for refillable glass containers in Oregon focused specifically on the in-state craft brewing industry. Oregon ranks as third in the nation for breweries per capita, out ranked only by Vermont and Montana. [7] Oregon has seven in-state brewers that rank among the top 50 craft brewers in the nation by beer sales volume, including: Deschutes Brewery (Bend) at number seven, Full Sail Brewing (Hood River) at number nine, Rogue Ales/Oregon Brewing (Newport) at number 21, Bridgeport Brewing (Portland) at number 31 and McMenamins (Portland) at number 47. Deschutes Brewing, Full Sail Brewing, Rogue Ales/Oregon Brewing and Bridgeport Brewing also ranked among the top 50 overall brewing companies by beer sales volumes (according to 2007 numbers).[8]

It is important to note that not all brewers in the state bottle beer. Most brewers are one- or two-facility brew pubs. Results of the shelf study that was conducted during this project (see Appendix A) determined there are just 10 brands of Oregon beer that are bottled for sale at retail locations in 12-ounce glass bottles. However, those 10 brands come from just seven brewers, or bottling facilities. Pyramid, MacTarnahan's and Fire Station are bottled by Portland Brewing Company and some of the Henry Weinhards line is brewed and bottled by Full Sail (the remainder is shipped in from the Pabst Blue Ribbon facilities outside of the state). This study only pertains to the larger brewers that bottle beer for sale at retail locations. Because of the strength of the industry, coupled with in-state consumer support for local craft brewers, this study focused on the feasibility of in-state craft brewers using refillable glass bottles for in-state beer sales.

[7] Craft Brewing Statistics. (Boulder: Brewers Association, 2008), p.1.

[8] Brewers Association Releases Top 50 Breweries List. (Boulder: Brewers Association, 2008), p. 1-3.

2. Environmental benefits of refillable glass bottles

The overarching environmental benefit of choosing refillable bottles is the elimination of the need to mold a bottle for each beverage purchased off the shelf. While the recycled glass-to-glass market for brown glass in Oregon is strong, and thus reliance on virgin material is lessened, the glass recycling process remains resource intensive. And, in looking at product lifecycles, in most cases it is the product manufacturing process and product packaging, not the transportation of the product or management of scrap material at the end-of-life (EOL) that generates the greatest amount of GHG emissions.[9] Environmental benefits of the refillable bottle range from reduced air emissions, reduced water usage and greatly reduced energy consumption. One study suggests, in fact, that recycling glass has little environmental benefit in terms of energy or water savings.[10]

The number of trips a refillable bottle can make varies from about 15 lifetime trips up to 50 lifetime trips.[11] Variance in lifetime trips seems to be based on a number of factors, including the product contained being bottles (i.e., carbonated or non-carbonated), handling of the bottles and level of physical tolerance for nicks and scuffs on the bottles as well as consumer tolerance for the appearance of wear on the bottle. Because the number of lifetime trips will vary from system to system, it is important to note that each calculation of environmental benefit is based on a *specific* number of lifetime trips rather than all calculations being based on the *same* number of lifetime trips.

Air emissions

Air emissions that result from the life of a product can be one of the more difficult environmental impacts to calculate. This is because emissions occur at many steps of the product's life, particularly for an item that is repurposed multiple times. Several air emissions estimates have been published relating to the environmental benefits of refillable glass bottles. The first relates to the impact of a single bottle. An INFORM study estimated a refillable one-liter glass bottle making 10 trips generates a smaller amount of air pollution than that which is generated in the creation of one, new single-use one-liter

[9] Governor's Advisory Group on Global Warming, Oregon Strategy for Greenhouse Gas Reductions. (Salem: Oregon Department of Energy, 2004), p. 102.

[10] L.L. Gaines, M.M. Mintz. Energy Implication of Glass-Container Recycling. (Argonne, Illinois: Argonne National Laboratories, 1994), p.7.

[11] C. Morawski, A Case for Refillables? *Solid Waste and Recycling*. (November, 2008), p. 16.

glass bottle.[12] The second statistic demonstrates the air emissions that can be saved when you consider the system-wide uses of refillable bottles. According to a report by CM Consulting, 116,519 tonnes of CO_{2e} (CO_2 equivalent) were avoided in the 2006-2007 period as a result of using refillable beer bottles in Canada. [13]

Water

One of the myths of refillable bottles is that the water required in the washing process outweighs the water savings realized if the manufacturing of a new bottle were avoided. Using a modern bottle washing line, this is not the case. According to the same INFORM study, the water used to wash and process refillable bottles averages between 47 percent and 82 percent less than is needed to manufacture new single-use bottles.[14]

Additionally, water pollution is avoided when reusing refillable glass bottles. According to a study conducted by Argonne Energy Laboratories, effluent water contamination can occur at different points during the raw material extraction process involved in making new brown glass bottles.[15] While bottle makers, such as Owens-Illinois are committed to using recycled glass content in bottles, it is not yet technologically possible to manufacture a glass bottle that is made of 100 percent recycled content. The national average for recycled content inclusion for Owens-Illinois bottles is about 30 percent, according to Stephanie Johnson of Owens-Illinois. Bottles manufactured at the Portland plant are about 40 percent recycled content, a level which also attains the state-mandated level of recycled content. While recycling avoids some of the water contamination that occurs from the extraction of virgin materials, such as extraction and processing of soda ash, it is only through the use of refillable glass bottles that this form of water pollution can be greatly reduced.

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[12] D, Saphire. Case Reopened: Reassessing Refillable Bottles. (New York: INFORM, 1994), http://www.informinc.org/xsum_rebottle.php.

[13] C. Morawski, Beverage container collection in Canada: The update. Solid Waste and Recycling. August/September 2008, p.13.

[14] D, Saphire. Case Reopened: Reassessing Refillable Bottles. (New York: INFORM, 1994), http://www.informinc.org/xsum_rebottle.php.

[15] L.L. Gaines, M.M. Mintz. Energy Implication of Glass-Container Recycling. (Argonne, Illinois: Argonne National Laboratoires, 1994), p. 52.

Energy

The reduction in energy consumption realized through the use of refillable bottles is perhaps the largest environmental advantage in using refillable bottles. Glass bottle reuse offers the largest potential for energy savings when considering EOL options for glass bottles.[16] Reuse also has very low direct energy requirements as compared with both the manufacturing of a new glass bottles as well as the energy required to recycle glass cullet. When compared to a one-way glass bottle, at the same percent of recycled content, a refillable 12 ounce bottle that makes 25 trips will consume 93 percent less energy than a one-way glass bottle.[17]

3. Potential economic benefits

The scope of this project did not consider a full-system economic analysis; however, some of the potential savings that would result from the use of refillable bottles were reviewed for this first-phase study. In addition to having the optimal political climate and system requirements in place, refillable bottle systems also require a large initial investment as compared to using single-use containers.[18] Of course the largest investment is in the bottle washing equipment and facility. One way to reduce this primary cost would be to establish a single bottle washing operation that could serve the needs of all participating in-state craft brewers in Oregon. This could be managed in one of two ways, either as a co-operative operation managed by the craft brewers or as a facility that is owned and operated by a private investor. Additional system costs include handling and managing the reverse logistics of refillables and the actual cost of the bottles. So what are some of the potential economic benefits of a refillable system?

[16] L.L. Gaines, M.M. Mintz. Energy Implication of Glass-Container Recycling. (Argonne, Illinois: Argonne National Laboratories, 1994), p. 48.

[17] D, Saphire. Case Reopened: Reassessing Refillable Bottles. (New York: INFORM, 1994), http://www.informinc.org/xsum_rebottle.php.

[18] The Economics of Refillable Beverage Containers. (Washington, D.C.: Institute for Local Self-Reliance, 2002), http://www.grrn.org/beverage/refillables/economic.html.

Economic benefits for the brewer

Choosing refillable bottles yields the highest savings potential over any other cost-savings action that can be taken in the supply chain. Although a refillable bottle costs more than a one-way glass bottle because of its design and greater thickness, as the refillable bottle makes additional trips, the cost-per-filling begins to go down. During the course of this project, it was not possible to determine the exact cost of a refillable bottle similar to the long-necks used by the Canadian beer industry. The manufacturer of these bottles considered that information proprietary. One estimate however, did put the cost of refillables at about 16.7 cents each ($CN).

Information about the cost of a 500-mililiter bottle was available however. Because pricing was not available for a 12-ounce bottle, there will have to be some inferences made from the 500-mililiter bottle calculation for the purpose of this report. According to a study a decade ago, if a 500-mililiter bottle had 20 trips in its lifetime, the cost per trip averaged to be just 10.63 percent of the cost of a one-way bottle.[19]

Costs of 500-ml Beverage Containers in Europe

Container Type	Container Cost (Euros)	Trips Per Life	Production Cost per Trip (Euros)
Refillable glass bottle	0.103	20	0.005
One-way glass bottle	0.047	1	0.047

Source: Golding, Andreas. *Reuse of Primary Packaging.* Brussels: European Commission, 1999.

While the cost of glass packaging has increased over the past ten years, if these figures were calculated today, it would be a reasonable to assume the cost ratio of the production cost-per-trip has remained relatively the same over the past decade. If this spread still holds, brewers in Oregon could see almost a 90 percent savings in container packaging if they made the switch to refillable bottles for

[19] Golding, Andreas. *Reuse of Primary Packaging.* Brussels: European Commission, 1999. p. 71 .

in-state beer sales. One final, but more dated data point, estimated brewers could realize savings of $4-$15 a barrel (or per 31 gallons) if they switched to refillable glass containers.[20] More current economic analysis regarding the per-unit trip cost of refillables versus single-use containers would need to be obtained in subsequent planning stages of an in-state refillable system. In addition to the packaging savings that refillables offer, moving to an industry standard bottle (ISB), such as the one used in Canada, would reduce the need for having large inventories of custom bottles on hand, saving breweries money. In a similar vein, the united breweries could leverage buying power for an ISB because of the size of their combined order, further lowering packaging costs, even if the ISB is a specially molded, embossed bottle.

The potential economic benefit to be gained from switching to refillable bottles could give in-state brewers a slight economic advantage over the out-of-state competition. Additionally, participating in a refillable bottle system might create brand loyalty amongst Oregonians for in-state craft brewers. A collective marketing campaign that educated consumers about the uniquely Oregon refillable bottle could influence consumer choices. This could particularly be the case if breweries were able to go to a common bottle mold that consumers visibly recognized as the "green" packaging choice. It is important to note this marketing strategy in Canada is reaching beyond the beer industry and being tested by the water bottle industry. In terms of the bottled water industry, where the contents of the bottle are essentially indistinguishable by brand, choosing greener packaging is one of the few ways to set a brand apart. If a refillable container system were established in Oregon for breweries, a mirror system could also be established for the bottled water industry, if industry support existed.

Economic benefits for recycling markets

In addition to the economic benefit that might be enjoyed by craft brewers that switch to refillable bottles, the local recycling industry may receive a boost in two ways: increased employment opportunities in reuse and a cleaner stream of materials collected curbside. It has long been recognized that recycling employs more people than landfilling material. It is also the case that reusing beverage containers puts more people to work than recycling those containers. Three interesting statistics provide compelling evidence about how refillables can add important jobs to the recycling industry:

[20] D, Saphire. Case Reopened: Reassessing Refillable Bottles. (New York: INFORM, 1994), http://www.informinc.org/xsum_rebottle.php.

- The refillable system that includes collection, washing and processing of refillable containers in Ontario employs over 2,000 people.[21]

- "Of the 161,000 jobs that were directly connected to the manufacture and filling of beverage containers and to the distribution and selling of packaged beverages in Germany, 73 percent involved refillable containers. In that setting, 27,000 new jobs would be created by moving completely to refilling. If one-way containers completely overtook refillables, then 53,000 jobs would be lost."[22]

- The downstream result of one new job created in single-use containers can mean a loss of up to nine workers in the reuse industry.[23]

The establishment of a bottle washing operation would create a number of new Oregon jobs associated with the collection, washing and redeployment of bottles.

In terms of the impact refillables can have on the existing recycling system, material streams may be positively impacted if consumers are given yet another reason to keep glass containers out of the curbside mix. As a result, recovered paper and plastic consumers could see further reduction in glass contamination in their bales. In terms of the markets for glass, a reduction in the supply of glass cullet may result in a boost for cullet prices and strengthen demand. Also, should the economic situation become such that Owens-Illinois would close its Oregon plant, a refillable bottle system would create an alternative market for a segment of recovered glass packaging.

Lastly, the establishment of a bottle washing operation may turn out to be a business opportunity for a private operator. The operator would pick up pallets of cased bottles from redemption centers, sort them, wash them, recase them and deliver them to specific brewers.

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[21] Environmental Leadership. (Mississauga, Ontario: Brewers Retail, Inc., 2009), http://www.thebeerstore.ca/about/the_beer_store.asp.

[22] Golding, Andreas. Reuse of Primary Packaging. (Brussels: European Commission, 1999), p. 71-72.

[23] New Coalition for Re-use. (Brussels: European Environmental Bureau, 20 Apr. 1999), http://www.eeb.org/press/new_coalition_for_reuse.htm

4. Statutes and policies concerning a refillable glass bottle system

Refillable bottle systems only operate successfully if the right conditions exist, and the creation of an environment conducive to the use of refillables was fostered at the political level. Different legislative mechanisms, such as financial incentives for consumers to choose beverages in refillable containers, language that favors the distribution of beverages in refillables, and the structuring of a container collection infrastructure all influence the function of a refillable bottle system. As the Oregon bottle bill system comes under review, it will be critical that framers keep the needs of a refillable system in mind if one of the goals is to once again make the in-state market a place conducive for the reintroduction of refillable containers.

Review of Oregon Revised Statutes and the current bottle bill system

The Oregon bottle bill, House Bill 1036, was signed into law in July of 1971 with the intent to address the growing litter problem and boost material recovery. Oregon became the first state to pass a bottle bill. The language of the bottle bill can be found in the Oregon Revised Statutes, Chapter 459A (459A.700 to 459A.740) and 471.501. The original law placed a five-cent deposit on all malt beverages, mineral water, sodas and other carbonated soft drinks. The Oregon program is a full-refund system, meaning consumers receive the entire value of the deposit when a container is returned. Over time, different product packaging, such as PET, has been introduced; the language of the original bill was flexible enough to accommodate the use of new packaging materials.

An additional goal of the original 1971 bill was to promote the use of refillables which at the time enjoyed 36 percent of the beer market and 53 percent of the soft drink market.[24] The implementation of the new law had an immediate effect, increasing the number of beverages sold in refillable containers to more than 90 percent. To provide an incentive for continues purchase of beverages in refillable containers, the measure only put a two-cent deposit on those containers, as opposed to five cents for one-way containers. Other important provisions of the bottle bill include:

- Retailers were only required to take back containers for the brands they sold in their stores.
- Aluminum can users had to redesign of the can to no longer employ pull-tab openings.

[24] Oregon Bottle Bill: Then and Now. (Portland: Department of Environmental Quality, 2009), http://www.deq.state.or.us/lq/sw/bottlebill/thenandnow.htm.

- Container redemption was limited to 144 containers per customer per day.
- The law does not provide handling fees to grocers.

Redemption rates under the bottle bill began to decline around 1996. In 1995, return rates hit 90 percent.[25] The most recently calculated return rate for deposit containers, which is only an estimate, was 78.5 percent in 2005.[26] When the deposit container return rate is calculated for 2008, it is expected that there will be about a seven percentage point drop since 2005, bringing the deposit return rate to about 71 percent.

Until 2007, the bottle bill remained relatively unchanged despite inflation eroding the five-cent deposit value for decades. While the bottle bill was designed to be flexible enough to accommodate the introduction of new product packaging, the original language was written tightly enough that it could not accommodate the introduction of new beverages in single-serve packing, namely bottled water, non-carbonated flavored drinks, energy beverages and juices. During the 2007 legislative session, Senate Bill 707 was introduced and approved to address some of the dated aspects of the bottle bill program (amending ORS 459A.700, 459A.705 and 471.501)

The most notable change to the bottle bill was the expansion to include bottled water and flavored water beverages as of January 1, 2009. The bill also limited the number of containers that can be returned to retail establishments under 5,000 square feet to 50 or fewer and expanded the scope of containers that must be accepted by retail establishments larger than 5,000 square feet. The bill also created the Bottle Bill Task Force, a workgroup that made further recommendations in 2008 on how to potentially expand or modify the redemption program.

Review of proposed legislation

In the 2009 legislative session, House Bill 2184 was introduced as a new attempt to modernize the Oregon bottle bill. Some of the primary features of this legislation, which is based on Task Force recommendation, include:

[25] J. Glitz. Oregon's Bottle Bill at 30: How is it Doing?, (Arlington: Container Recycling Institute, 2001), p. 1.

[26] J. Henderson. The Expanded Bottle Bill. (Portland: Department of Environmental Quality, 2008), p.2.

- establishing an 80 percent recovery rate on deposit containers by 2015 and each year thereafter,
- requiring the state environmental agency to annually calculate the deposit container return rate,
- increasing the deposit to 10 cents per container,
- requiring the Oregon Liquor Control Commission to report on a number of issues, including whether a state-run redemption center system is necessary and on the collection and utilization of unredeemed deposits.

Relating to refillable containers, HB 2184 maintains the two-cent deposit on refillable containers. The measure also proposes revised language for ORS471.501 to read, "Nothing in this chapter prevents a brewery licensed under ORS 471.220 or a brewery-public house licensed under ORS 471.200 from establishing a refund value for malt beverage containers under the provision of ORS 459A.705 that is in excess of five cents per container for the purpose of encouraging purchases to return the containers directly to the brewery or brewery-public house."[27] Another bill currently under consideration, House Bill 3465, would require the Oregon Beverage Recycling Cooperative (OBRC) to provide container redemption data to the state.

5. Case Study: Nova Scotia

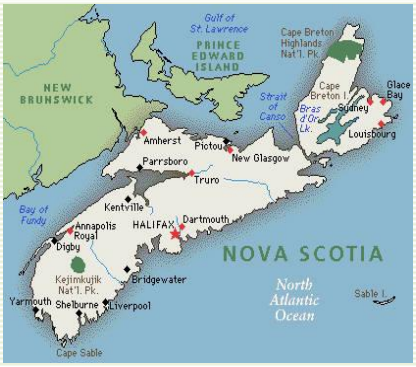
One of the largest refillable beer bottle systems operating today is in Canada. The Canadian system is unique in that the beer industry in Canada is largely influenced by the two major brewers, Molson and Labatt. For decades, the largest domestic brewers of Canada have used refillable glass bottles. The method for collection and recovery of refillable beer containers varies from province to province, with some relying on return-to-retail and other using redemption centers.

Up until the 1980s, Canadian beers were bottled in the uniform refillable "stubby." During the 1980s many breweries went to a private, company embossed bottles. Sorting and transporting the many different types of bottles added significantly to system costs. Labatt and Molson, being the two

[27] 75th Oregon Legislative Assembly. HB 2184, 2009 regular session.

Nova Scotia Statistics

- It is the seventh most populous province in Canada
- Geographically the second - smallest province in Canada at 55,284 square kilometers (21,300 sq mi)
- It takes about eight hours to drive the span of the province.
- Population of 939,531 people
- Halifax is the most populated area of the province with population of 282,924.
- Demographically, the vast majority of the province is rural.



largest brewers, agreed to go to a standard long-neck bottle in the 1990s.[28] The Canadian Brewers Association helped create a standard bottle agreement, which enabled smaller breweries to participate in the nationwide refillable bottle program. Today, about 40 Canadian brewers use the same standard, long-neck refillable bottle, which is molded by Owens-Illinois, Canada's only glass bottle maker.

On average, refillable bottles in Canada make 15 to 20 trips through the system. The national return rate for refillable glass beer containers is 98 percent. Because each province is responsible for managing its beverage container recovery program, national statistics on the environmental savings realized from the use of refillable glass is unavailable. However, some numbers are available from provinces. For example, the Ontario Deposit Return Program estimated the use of refillable glass in the province avoided 135,023 metric tons of CO_{2e} from 2007-2008.[29]

Nova Scotia beverage container collection program

As noted, return programs vary from province to province, some relying exclusively on return-to-retail and others using depots to collect deposit containers. Under the Nova Scotia Solid Waste-Resource Management Regulation made under Section 201 of the Environment Act, a beverage container program was established in 1996. Consumers pay a 10-cent ($CN) deposit on alcoholic and non-alcoholic beverage containers under 500 milliliters. Non-alcoholic beverages up

[28] Chronology: Use of standard beer bottles by the Canadian brewing industry. Ottawa: Brewers Association of Canada, c.2001).

[29] The Beer Store. Responsible Stewardship: The Next Piece. (Mississauga, Ontario: 2008), p.24.

to five liters also carry a 10-cent deposit. Liquor containers over 500 milliliters carry a 20-cent deposit. For non-refillable containers, it is a "half-back system," with consumers receiving half of the deposit at the time of return. For the return of an industry standard bottle (ISB), the refillable beer bottles used by many domestic brewers, consumers receive the full 10-cent deposit. Non-ISB beer containers, such as aluminum cans, will only get consumers a nickel back. Milk, other dairy products and milk-substitutes are the only beverages that do not fall under the scope of the beverage container deposit program. Depots receive 3.88-cents per non-refillable container, that rate is scheduled to increase to 3.99-cents on March 31, 2010. According to Jerome Paris, Director of Operations for the container recovery program, the handling fee gets reviewed and adjusted about once every three years.

The program is managed by the Resource Recovery Fund Board (RRFB), a non-profit organization that contracts with the Nova Scotia Department of Environment to operate a deposit and refund system for beverage containers, among other solid waste management duties.[30] All distributors of beverages are required to register with the RRFB and have containers approved. Beverage containers must be recyclable and meet material guidelines. According to Jerome Paris, the board holds veto authority on new packaging. If new packaging is introduced by a distributor that does not meet the recyclability requirements, the RRFB can prohibit the sale of that product in the province.

Eighty-three Enviro-Depots operate throughout the province, each privately owned and operated. The depots operate under an agreement with the RRFB. Three processing centers in the province handle the redeemed beverage containers. At the processing centers, beverage containers are sorted and baled. The RRFB then markets the bales. Proceeds from the sale of materials are used to finance the program, as are unredeemed deposits.

While the RRFB manages the oversight of the non-refillable container return system, depots contract separately with individual breweries to coordinate the return of refillable beer bottles. The most recently calculated current return rate for non-refillable containers in Nova Scotia is 78.1 percent. The RRFB does not calculate the return rate for refillables; however industry estimates put refillable beer bottle returns rates at about 97 percent in Nova Scotia.

[30] About RRFB. (Truro: RRFB Nova Scotia, 2009), http://www.rrfb.com/pages/about.html.

The province is divided into seven regions. The three processing centers are strategically placed to service the different regions of the province, one in the eastern, central and western areas of the province. About 47 percent of returned beverage containers come out of the Halifax region, with the remaining 53 percent coming from the other 6 rural regions. The RRFB is considering the elimination one of the processing centers and having just two service the province's depots.

Enviro-Depot operation

In addition to depots being required to take back beverage containers, the Enviro-Depots are also used as collection points for paint, old corrugated containers, scrap metal and other materials as required by the RRFB. All materials are collected by hand, without the use of reverse vending machines or automated sorting systems.

When a consumer brings containers in for return, the containers are manually sorted and placed into either a bulk bag (metal, plastic and beverage boxes) or a fish tub (non-refillable glass). Glass is sorted by color. Refillable glass containers are usually returned in the original 12-pack case and palletized for storage and later transport. Containers are not brand sorted.

Operationally, each depot generally has: necessary equipment for office function (fax, desk, cash register, etc.), video surveillance, sorting tables, pallet jacks or forklifts (and propane filling station if they have a forklift on site), brooms and shovels and garbage containers. The RRFB supplies depots with signage, brochures, shipping bags and tubs. In terms of staffing, the RFFB estimates that depots need one full-time employee per 1.5 million containers collected annually. The minimum square footage of a depot typically ranges from 2,500 to 3,000 square feet. Some of these depots also double as gas stations, convenience stores, scrap metal yards and other types of businesses.

Because each depot signs contracts with individual breweries, not all depots are obligated to take back refillable beer bottles. Each brewery collects refillables from depots and manages the repurposing of refillable bottles from that point on, including washing and inspection. In Nova Scotia, there are four brewers that have contracts with the Enviro Depots to have refillable bottles returned to them. Those four brewers include Labatt, Molson, Sleeman and Moosehead. As of 2007, depot operators received a handling fee of 3.63-cents per non-refillable container and received 2.57-cents for

refillable beer containers.[31] Today, the refillable handling fee is 3.03-cents due to cost-of-living increases. It is the case that in every province, depot operators receive less for handling refillable beer bottles than other non-refillable containers. The only exception is in Alberta, where depot operators receive 3.02-cents per aluminum can as compared to 3.96-cents per refillable beer bottle. The handling fee depot operators receive in Alberta for all other containers exceeds the handling fee they receive for refillable glass bottles.[32]

One of the main reasons depot operators receive less for handling refillable beer containers is the power of the beer industry to enforce their own handling fee. In Nova Scotia, the beer industry was not happy with how the handling fee was determined by the RRFB and threatened to walk away from the system. They negotiated a handling fee based on 2003 numbers and adjust it upward annually by two percent to accommodate cost of living increases. Unfortunately, the cost of doing business in Nova Scotia has increased at a higher rate than the calculated cost of living adjustment. This has resulted in depot operators receiving one of the lowest handling fees in Canada for refillable beer containers. Brewers have also argued that refillables are more environmentally friendly and should therefore not carry as high a handling fee. They also contend that refillables are often returned by consumers in cases, so there is less handling and sorting required when a customer drops the containers off. Bottle washing operations are run by the each brewer. Each bottling plant that uses the ISB has an on-site bottle washing line, including the bottling plants owned by Labatt, Molson and Sleeman.

6. Refillable system requirements

A perfect alignment of political support and programmatic features need to be in place in order for a refillable bottle system to operate efficiently. Most importantly, the beverage industry must support the use of refillable bottles, consumers must feel compelled to participate in a return program, a collection infrastructure where refillable bottles can be pulled from the stream of one-way bottles has to be established and the program must be solvent. Considering the information that is available about modern refillable systems and understanding the current bottle return program in Oregon, some

[31] C. Morawski. Who Pays What: An analysis of beverage container recovery and costs in Canada. Spring 2008, p. 74.

[32] C. Morawski. Who Pays What: An analysis of beverage container recovery and costs in Canada. Spring 2008, p. 74.

obstacles and opportunities become apparent regarding the state's ability to handle refillable bottles should they come to market.

Obstacles in Oregon

There are a number of unique obstacles that if unaddressed, would create significant barriers to establishing a refillable bottle system.

1. Many consumers of Oregon-made beers recognize a brand not only by labeling but by the look and style of the bottle as well. The majority of in-state craft brewers selling in glass use a uniquely molded bottle [See Appendix B: A shelf study comparison of packaging used by Oregon craft brewers]. According to Brian Butenschoen, Executive Director of the Oregon Brewers Guild, breweries that use a company embossed bottle have invested a great deal of time and resources in those containers. This presents two obstacles: convincing brewers to give up their unique bottle for products destined for in-state sales and then getting brewers to agree on an ISB.

2. According to the Oregon Brewers Guild, grocers have mandated that products be sold in packaging that is uniform between neighboring states (i.e., what is sold in Oregon must be identical to the product sold in Washington). This means packaging has to be the same weight, shape and size and have the same bar code and labeling. If considering the use of refillables for in-state sales only, this presents a major obstacle, as refillable bottles are inherently heavier than one-way bottles. If the cost difference between one-way bottles and refillable bottles is narrow, it might not be an issue to send refillable bottles into the Washington state market, knowing they will likely not be returned.

3. The current bottle return rate in Oregon is prohibitively low for supporting a refillable bottle system. Most return systems need a return rate of over 90 percent to be economical. It is important to note that the overall container return rate in Nova Scotia is close to that of Oregon, but they have managed to attain refillable beer bottle rates as high as 97 percent.

4. The prevalence of reverse vending machines as a collection mechanism for containers is prohibitive to establishing a refillable bottle system. The installation of reverse vending

machines in Oregon in 1994 is attributed to be a leading cause of the local Henry Weinhards brewery ending the practice of bottling beer in refillable bottles.[33]

Opportunities in Oregon

1. Efforts were undertaken in the 1990s to establish bottle washing operations for the wine industry in both Oregon and California. One obstacle to washing and redeploying wine bottles for subsequent refilling was the use of water resistant labels. Fortunately, it does not appear the use of press-apply labels which are water resistant are widely used among in-state craft brewers. Three of Oregon's largest breweries, Deschutes, Widmere Brothers and Bridgeport, use a water-based adhesive that makes the removal of labels simple after a few minutes of soaking.

2. One question that arose during the course of this research was the reaction that the local glass bottle manufacturer, Owens-Illinois, might have to the idea of in-state craft brewers switching to a refillable bottle for in-state sales. According to one industry expert, it is estimated that 30-percent of the bottles Owens-Illinois supplies globally are refillable bottles. Owens-Illinois could not corroborate that figure at the time this report was written. It is important to note that the market share for glass packaging is shrinking in the beer industry. A representative from Owens-Illinois confirmed the importance of refillable glass bottles in terms of holding the position of glass packaging in the market place. For these reasons, resistance from Owens-Illinois would not be likely.

3. While the presence of reverse vending machines was earlier cited as a major obstacle to a refillable bottle system, the Oregon Beverage Recycling Cooperative is working hard to create a network of depots that can accommodate the manual handling of refillable glass containers. Having a strong network of depots established throughout the state over the next few years, would create the necessary collection infrastructure to support the reverse logistics process for refillables.

[33] 1993/1994 Glass Market Profile. (Portland: Metro regional government, 1994), p. 3 http://www.p2pays.org/ref/11/10427.htm.

4. The bottle bill system in Oregon is currently under review and may be modified further in the 2009 or 2011 legislative sessions. This presents a unique opportunity to implement the tools that will increase redemption rates and potentially provide and enhanced environment conducive to the use of refillables by in-state brewers. Some of those tools include: an increased deposit, greater financial incentive for the use and purchase of refillable bottles, and modification of the collection system to include depots that accommodate manual handling of containers.

7. OBRC and a collection infrastructure for refillables in Oregon

The Oregon Beverage Recycling Cooperative is a major new force in the collection and recycling of beverage containers in the state. OBRC is a true cooperative, with membership including all of the beer distributors handling craft beer in Oregon and nearly every soda and bottled water distributor. After the merger earlier this year of Container Recycling, Inc. and the Beverage Recyclers of Oregon and additional investment in new processing centers, OBRC now transports and processes over 90 percent of the redeemed containers in Oregon. In addition to working with retailers, OBRC plans to establish container-redemption depots throughout the state. It is through these collection depots that recovery of refillable glass bottles would be made possible. Anticipated build out for the network of depots is as follows:

- OBRC submitted an application to the Oregon Liquor Control Commission (OLCC) on May 28, 2009 to establish the first bottle collection depot in Gresham. The goal is to have that facility up and running by mid-August. The next step will be opening a second depot in December 2009, and a third depot in the spring of 2010. This depot implementation strategy will allow a period of operation and observation prior to the beginning of the 2011 legislative session. During the 2011 session OBRC plans to present data on how the depots are functioning.
- It is not the intention of OBRC to have depots act as a collection point for other products and materials. In particular, one of the goals of OBRC is to make depots as accessible and convenient for consumers as the current beverage container return-to-retail option. One concern about operating a depot that functioned like some of the multi-purpose depots in Canada would be the difficulty of citing conveniently located facilities that collect potentially

hazardous products (batteries, light bulbs, paint, etc.). Another goal for OBRC is to create depots that are clean, safe and attractive for consumers. Altering the function of the depots to accept additional products may diminish the consumer-friendly environment OBRC is striving to create. For these reasons, the establishment of a depot system by OBRC should not be viewed as a potential collection opportunity for other product stewardship programs.

- Long-term, OBRC hopes to blanket the state with collection depots, making access easy for most Oregonians. During the first phase of the rollout, OBRC will most likely establish depots in both metropolitan and rural areas. Before a large-scale roll-out can occur, OBRC wants to ensure that a depot model can be created that is replicable and will equally meet the needs of all types of communities.

Depot operation

In multiple discussions with OBRC, the organization did not express any reservation about the ability to collect, sort and accommodate the handling of refillable bottles. The fact that OBRC had handled refillables in the past, namely bottles from the Henry Weinhards operation in the early 1990s, means they are familiar with handling procedures and collection requirements for refillable glass bottles.

Handling. Depots will be staffed to accommodate the manual receipt and sorting of containers. OBRC could handle the sorting of brand-specific beer bottles, however the economics of a refillable system would most likely require breweries to use an ISB bottle. OBRC anticipates handling fees for refillable beer bottles would be slightly higher than the handling fees for single-use containers. If refillables were used, they would likely initially represent a small portion of the beverage market and OBRC would have the space to handle these volumes without much modification to the depot. If the volume of refillables were to grow, OBRC believes the depots could be modified to handle larger volumes of refillables.

Equipment. OBRC expects to have the necessary equipment on hand at depots to accommodate refillables. Most likely, refillables would be cased and palletized. While every depot may not have a forklift on site, pallet jacks and hand trucks will be available. With the absence of a forklift, it will be necessary to use trucks with a lift gate to move the palletized or cased bottles.

Transportation. In terms of transporting refillable bottles, OBRC would be prepared to provide trucking services to a bottle washing facility or brewer. Alternatively, OBRC depots could accommodate the pick-up of refillable containers by another party.

Potential obstacles to collecting refillables

The only potential barrier to a refillable bottle system that was identified in discussion with OBRC would be figuring out how to manage the small volumes of refillables that might come into a specific depot. For example, if a bottle washing facility were established in Portland, and a depot in Medford only collected a few cases of refillables per day, how would those bottles be handled and stored until there were enough to truck them up to Portland? John Andersen, President of OBRC, offered a few handling and storage options that could address this issue. While the management of small collection volumes may initially require attention in the planning process, it would not be a barrier of significant proportion.

8. Recommendations and Conclusions

The reintroduction of refillables to the Oregon beverage market would serve a number of environmental goals set forth by state agencies, including being a mechanism for waste prevention and reducing greenhouse gas emissions. The establishment of a refillable system for in-state craft breweries would create a uniquely Oregon program that would further set our craft brewing industry apart, potentially strengthening brand loyalty for Oregon beer. The benefits of establishing a system would reach beyond the brewing industry into the recycling industry, creating new jobs around container reuse activities and providing another means by which to remove glass from the curbside mix.

If the reintroduction of refillable containers in Oregon is of interest to stakeholders, the window of opportunity to create an environment that will accommodate a refillable system is here. Internationally, there are a number of examples of modern refillable systems at work under a redemption system and many lessons that can be learned about the successes of these programs. Based on the findings of this study, several recommendations are offered about the next steps that should be taken for the establishment of a refillable bottle system in Oregon.

- A revised Oregon bottle bill should include: financial incentives for refillables, such as maintaining a reduced deposit value for refillable containers, a regular assessment of deposit

values so these values keep pace with inflation, and reporting requirements so the rate of deposit returns can be calculated annually.

- Grocers' associations should be consulted regarding interstate packaging requirements.
- The development of a statewide depot system that will act as a collection point for refillables should be supported.
- Once return rates improve and a depot collection system is slated for statewide expansion, in-state craft brewers should be consulted to gauge their interest in using refillable bottles for beer destined for in-state sale and consumption. If the industry expresses interest, an effort is needed to obtain important cost information from brewers about refillable bottle options. Bottle manufacturers would most likely share this information with breweries.
- A second-phase study should be undertaken that considers the full system costs for refillables, including: working with OBRC to estimate handling fees, establishing a bottle washing facility, creating a transportation network to manage reverse-logistics, and the calculation of the costs associated with moving away from company-specific bottles to an ISB. The study should also include an assessment of consumer willingness to participate in a refillable return program.

While some of the obstacles outlined in the report would have to be addressed to create the right conditions for the reintroduction of refillables, none of those obstacles were found to be insurmountable during this first-stage inquiry.

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Appendix A: A shelf study comparison of packaging used by Oregon craft brewers

Based on the information gathered from the refillable beer bottle system in Canada, the success of a similar system in Oregon would rely on the brewing industry's willingness to adopt an Oregon-specific industry standard bottle (ISB). To understand the prevalence of company-unique glass packaging used by Oregon brewers, a shelf study was conducted at four locations in the Portland metropolitan area. The results indicate that six local brands use non-company-specific bottles molded at the local Owens-Illinois plant and four use a specially molded, company-embossed bottle, also manufactured by Owens-Illinois' Portland plant.

During the course of the shelf study, information about the Oregon-made beers that were on the shelves included: the brewery, type of beer, location of the brewery, if the bottle was a company-specific bottle, bottle size, closure type (either crown or twist-off) and the bottle code embossed on the bottle. Without actually opening the bottles, it was difficult to determine the closure type. The data collected on closure type is based on the information available during the in-store shelf study. The bottle code appears as a series of letter and numbers which represent different pieces of information about the manufacturing of the bottle. A common bottle code read:

N21 O-I 08 P-2

The embossed label represents the following information:

N21 – is the plant number for the Owens-Illinois facility in Portland

O-I – is the company label

08 – represents the year the bottle was made

P-2 – is the mold number

Combined, the six brewers that use a generic bottle make up about a third of the Oregon-brewed beer on retail shelves. With the leverage of combined purchasing power, switching to a refillable ISB might not pose a significant cost to those breweries.

Store location: Fred Meyer, 7404 N. Interstate Ave., Portland

Date: April 17, 2009

Brand	Beer Type	Brewery Location	Bottle			Bottle Code
			Company Embossed (Y/N)	Bottle style (Long Neck/Short Neck/Stubby)	Closure (Crown /Twist)	
Deschutes	Mirror Pond	Hood River	Y	Long neck	Crown	N21 O-I 09 P-4
Deschutes	Cascade Ale	Hood River	Y	Long neck	Crown	N21 O-I 09 P-4
Deschutes	ESB	Hood River	Y	Long neck	Crown	N21 O-I 08 P-4
Deschutes	IPA	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Black Butte	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Cinder Cone	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	'09 Belgian Style	Portland	Y	Long neck	Crown	N21 O-I 08 P-5
Widmere	Pale Ale	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	Hefeweizen	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	Halo IPA	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	Drop Top	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Full Sail	IPA	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Full Sail	LTD	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Full Sail	Amber	Hood River	N	Long neck	Twist	N21 O-I 09 P-14 and N21 O-I 09 P-15
Full Sail	Pale Ale	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Full Sail	Session	Hood River	N	Stubby	Twist	N21 O-I 08 P-4

Pyramid	Curve Ball Blond	Portland	N	Short neck	Twist	N21 O-I 09 P-8
Pyramid	Apricot Ale	Portland	N	Short neck	Twist	N21 O-I 09 P-8
Pyramid	Thunderhead IPA	Portland	N	Short neck	Twist	N21 O-I 09 P-8
MacTarnahan's	Slingshot	Portland	N	Short neck	Twist	N21 O-I 09 P-8
MacTarnahan's	Mac's	Portland	N	Short neck	Twist	N21 O-I 08 P-8
MacTarnahan's	Blackwatch Porter	Portland	N	Short neck	Twist	N21 O-I 08 P-8
Bridgeport	IPA	Portland	Y	Long neck	Crown	N21 O-I 09 P-2
Bridgeport	ESB	Portland	Y	Long neck	Crown	N21 O-I 08 P-10
Bridgeport	Pale Ale	Portland	Y	Long neck	Crown	N21 O-I 09 P-2
Bridgeport	Stout	Portland	Y	Long neck	Crown	N21 O-I 09 P-2
Bridgeport	Haymaker	Portland	Y	Long neck	Crown	N21 O-I 08 P-2
Rogue	Dead Guy	Newport	N	Long neck	Crown	N21 O-I 09 P-14
Fire Station	Hefeweizen	Portland	N	Short neck	Crown	N22 O-I 08 P-8 Had old O-I logo
Fire Station	Blonde	Portland	N	Short neck	Crown	N22 O-I 08 P-8 Had old O-I logo
Fire Station	IPA	Portland	N	Short neck	Crown	N22 O-I 08 P-8 Had old O-I logo
Fire Station	Amber	Portland	N	Short neck	Crown	N22 O-I 08 P-8 Had old O-I logo
Henry Weinhards	Summer Ale	Hood River	Y	Short neck	Twist	N21 O-I 09 P-2
Henry Weinhards	Belgian	Hood River	Y	Short neck	Twist	N21 O-I 08 W2

Henry Weinhards	Blond	Hood River	Y	Short neck	Twist	N21 O-I 09 P-2
Henry Weinhards	Hefeweizen	Hood River	Y	Short neck	Twist	N21 O-I 09 P-2
Terminal Gravity	ESG	Enterprise	N	Short neck	Twist	N21 O-I 08 T-3 Had old O-I logo

Store location: New Seasons, 6400 N Interstate Ave, Portland

Date: April 17, 2009

Brand	Beer Type	Location	Bottle			Bottle Code
			Company Embossed (Y/N)	Bottle style (Long Neck/Short Neck)	Closure (Crown/T wist)	
MacTarnahan ’s	Slingshot	Portland	N	Short neck	Twist	N21 O-I 08 P-8
MacTarnahan ’s	Mac’s	Portland	N	Short neck	Twist	N21 O-I 08 P-8
MacTarnahan ’s	Blackwatch Porter	Portland	N	Short neck	Twist	N21 O-I 08 P-8
Pyramid	Rollick Amber	Portland	N	Short neck	Twist	N21 O-I 08 P-8
Deschutes	Cinder Cone	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Rogue	Brutal Bitter	Newport	N	Long neck	Crown	N21 O-I 08 P-13
Bridgeport	Stout	Portland	Y	Long neck	Crown	N21 O-I 08 P-2
Bridgeport	Beer Town Brown	Portland	Y	Long neck	Crown	N21 O-I 07 P-2
Bridgeport	ESB	Portland	Y	Long neck	Crown	N21 O-I 08 P-2

Store location: Trader Joe's, 2122 NW Glisan St., Portland, Oregon

Date: May 9, 2009

Brand	Beer Type	Location	Bottle			Bottle Code
			Company Embossed (Y/N)	Bottle style (Long Neck/Short Neck)	Closure (Crown /Twist)	
Deschutes	Mirror Pond	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Cascade Ale	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	ESB	Hood River	Y	Long neck	Crown	N21 O-I 08 P-5
Deschutes	Obsidian Stout	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Black Butte	Hood River	Y	Long neck	Crown	N21 O-I 09 P-4
Deschutes	Cinder Cone	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Green Lakes Org. Ale	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Bridgeport	Blue Heron	Portland	Y	Long neck	Crown	N21 O-I 08 P-2
Bridgeport	India Pale Ale	Portland	Y	Long neck	Crown	N21 O-I 09 P-2
Bridgeport	Rope Walk	Portland	Y	Long neck	Crown	N21 O-I 08 P-2
Full Sail	Ltd.	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Full Sail	Pale Ale	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Full Sail	IPA	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Full Sail	Amber	Hood River	N	Long neck	Twist	N21 O-I 09 P-14
Widmere	Drop Top	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	’09 Belgian Style	Portland	Y	Long neck	Crown	N21 O-I 08 P-5

Widmere	Hefeweizen	Portland	Y	Long neck	Crown	N21 O-I 09 P-5

Store location: Food Front Co-op, 2375 NW Thurman St., Portland

Date: May 9, 2009

Brand	Beer Type	Location	Bottle			Bottle Code
			Company Embossed (Y/N)	Bottle style (Long Neck/Short Neck)	Closure (Crown /Twist)	
Bridgeport	IPA	Portland	Y	Long neck	Crown	N21 O-I 09 P-2
Widmere	Drop Top	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	Hefeweizen	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Full Sail	Amber	Hood River	N	Long neck	Twist	N21 O-I 09 P-14
Full Sail	Pale Ale	Hood River	N	Long neck	Twist	N21 O-I 09 P-15
Deschutes	Green Lakes Org. Ale	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Black Butte	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Cinder Cone	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Deschutes	Pale Ale	Hood River	Y	Long neck	Crown	N21 O-I 09 P-5
Widmere	Drifter	Portland	Y	Long neck	Crown	N21 O-I 09 P-5
Bridgeport	Blue Heron	Portland	Y	Long neck	Crown	N21 O-I 08 P-2