

DRINK BEER, CONSERVE WATER

Introduction

In ancient Mesopotamia, water was rarely safe to drink. Luckily, along with the cultivation of cereal crops came the discovery of beer.¹ By 3000 BCE, Mesopotamians brewed over twenty kinds of beer.² Integral in ancient culture, beer was thought to be a gift from the gods.³ Although water is safe to drink today, beer is still popular and still a part of our culture.

As the world's second largest producer, the United States has a substantial beer industry.⁴ In 2010, the United States produced 194,169,303 barrels of beer.⁵ Americans spent \$167 billion on beer in 2009.⁶ The number of breweries increased considerably from 331 in 1933 to 1,693 in 2010.⁷ Today, the vast majority of beer companies are specialty and craft breweries.⁸

Water: Beer's Key Ingredient

Water is an essential element of beer. In 1516, Bavaria passed the world's first beer "purity law," limiting beer's ingredients to barley, hops, and water.⁹ Harpoon Brewery in Boston filters its water twice before adding it to mash, calling water "[t]he final key ingredient."¹⁰ Nimbus Brewery in Tucson attributes the company's taste entirely to the city's hard groundwater.¹¹ Because the groundwater is similar to water found in central Europe, "Tucson's water allows [Nimbus] to brew some of the finest quality ales found anywhere in the world."¹² But water is not only found in the beer. Water is used in every step of the brewing process--from irrigating the barley and hop fields, to heating the mash, to cleaning empty beer bottles.¹³ One 1889 court determined that when a brewery contracted for water, it was implied that the amount of water required was for everything in the brewing process: from "cleaning the brewery, for use in the boiler, washing out vats, beer-barrels, tubs, kettles, and other things connected with the brewery."¹⁴

Due to all the water that goes into making beer, a brewery can produce an enormous amount of wastewater. Many breweries--especially small ones--do not monitor or filter their wastewater. Yet, managing and pre-treating wastewater before it enters a municipal water treatment plant is key. For instance, bad pH levels, solids, fats, oil, and grease in brewery wastewater can clog or erode water pipes. Furthermore, too much water being dumped at one time can overflow a water treatment center.¹⁵

So how much water goes into making a barrel of beer? According to most industry estimates, the average brewery uses about five to six barrels of water to produce one barrel of beer.¹⁶ Therefore, if on average, it takes five barrels of water to produce one barrel of beer, in 2010 the country produced 194,169,303 barrels of beer, and one barrel equals about 32 gallons, then American breweries are using about 3.1 billion gallons of water a year to make beer!

The Brewer's Response

Due to increasing water demands, a number of breweries are beginning to implement environmentally friendly brewing methods. For example, MillerCoors's conservation efforts have made headlines in the past few years. Currently, MillerCoors uses 4.1 barrels of water per barrel of beer produced.¹⁷ Their goal: reduce water use to 3.5 barrels of water by 2015.¹⁸ The company plans to meet this goal by improving and modernizing its breweries. Improvements include cleaning bottles with air instead of water and no longer using water-based solvents in the packaging process.¹⁹ MillerCoors's Fort Worth brewery already exceeded its goal, using only 3.4 barrels of water per barrel of beer.²⁰ Craft breweries are also doing their part. Long Trail Brewing Company in Vermont launched its ECO Brew initiative over twenty years ago. ECO Brew's major focus is on water conservation. Through these efforts, Long Trail uses as little as two gallons of water to make one gallon of beer.²¹ One way Long Trail conserves water is through its Heat Recovery System, which captures steam given off during the brewing process and reuses it during the next brew. This system helps save 3.7 million BTUs of energy a day.²²

Sierra Nevada Brewing Company in California is also making water conservation a major priority. From drip irrigation systems in the hop fields to low flow toilets for its workers to recycling water during the brewery process--Sierra Nevada is looking to reduce water use at every step.²³ The company's onsite water treatment facility also radically reduces the impact of wastewater on the local municipal waste treatment system. In two steps, the facility filters wastewater of all organic compounds and restores the water to a proper temperature and pH level before sending it to the municipal treatment center. Currently, Sierra Nevada is working on a way to recycle its wastewater to irrigate its hop fields.²⁴

Finally, New Belgium Brewing Company in Colorado is devoted to environmental stewardship. An "Alternatively Empowered" business that limits its environmental impact is this company's mission. Its brewery is equipped with a porous asphalt sidewalk, bike parking, and landscaped with low water plants.²⁵ Its website even runs on wind power!²⁶

In 2008, New Belgium announced that its water use was down to 3.8 barrels of water per barrel of beer produced.²⁷ Its 2015 goal is 3.5 barrels of water per barrel of beer. One way the brewery conserves water during the packaging process is by recapturing and reusing it to clean the insides and outsides of bottles. Additionally, New Belgium works to efficiently divert water from the Colorado River.²⁸ Energy harvested from treating wastewater is also used to power the brewery. Fourteen percent of New Belgium's electricity is harvested from their onsite Water Treatment Facility.²⁹

New Belgium also supports conservation efforts through its Environmental Stewardship Grants. For every barrel of beer sold, New Belgium donates \$1 to a nonprofit.³⁰ In 2011, 40 percent of the grant money was given to water stewardship organizations and 19 percent to sustainable agriculture.³¹ Additionally, because 40 percent of the brewery's water comes from the Colorado River, New Belgium, along with the Clean Water Fund, donates money to nonprofits that work to protect, restore, and conserve the Colorado River.³²

Conclusion

To effectively conserve water in the production of beer, water use must be reduced during every step of the process: from irrigating the fields to brewing the beer to packaging the bottles. Treating and recycling wastewater is another important step toward water conservation. Fortunately, a number of popular breweries are doing their part to conserve water in a variety of ways. Because water use in breweries is generally not regulated, it is up to each brewery to make these initiatives on its own.

How can you be an environmentally friendly beer drinker? One way is to buy beer from a company that is dedicated to water conservation and environmental sustainability, such as one of the breweries mentioned above. Another way is to buy aluminum cans over bottles. Because aluminum cans are made from more recycled products than glass, and cans have no paper labels, less energy is used. Or, you can buy kegs. Kegs are repeatedly recycled and contain more beer, making it one of the least energy intensive beer containers of all.³³ Finally, do your planet a favor and recycle after you have enjoyed.

Footnotes

¹ Tom Standage, *A History of the World in 6 Glasses* 10-11 (Walter & Co. 2005).

2 Id. at 16.

3 Id. at 18.

4 In 2009, the United States produced 229,926 hectoliters of beer. U.S. production is second only to China. Beer Inst., World Beer Production, Brewers Almanac 2011, 40, [http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers% 20Almanac-%202011.xlsx](http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers%20Almanac-%202011.xlsx) (Sept. 1, 2011).

5 Beer Inst., Annual Domestic Production, Brewers Almanac 2011, 5, [http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers% 20Almanac-%202011.xlsx](http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers%20Almanac-%202011.xlsx) (Sept. 1, 2011).

6 Beer Inst., Alcohol Expenditures at Home and Away from Home, Brewers Almanac 2011, 44, [http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers% 20Almanac-%202011.xlsx](http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers%20Almanac-%202011.xlsx) (Sept. 1, 2011).

7 Beer Inst., Breweries and Wholesalers in Operation, Brewers Almanac 2011, 2, [http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers% 20Almanac-%202011.xlsx](http://www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001193/Brewers%20Almanac-%202011.xlsx) (Sept. 1, 2011).

8 In 2010, there were 1673 specialty breweries and 20 traditional breweries in the United States. Id.

9 Stan Hieronymus, History of Beer: Timeline, Craft Beer, [http:// www.craftbeer.com/pages/beerology/history-of-beer/timeline/](http://www.craftbeer.com/pages/beerology/history-of-beer/timeline/) (last visited Mar. 28, 2012). Many states continue to define the mixture of barley, hops, and water as beer. See, e.g., Mo. Ann. Stat. § 311.490 (West 2011), Mont. Code Ann. § 16-1-106(5) (2011), Del. Code Ann. tit. 4, § 101(5) (West 2011).

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11 The Brewery: The History, Nimbus Brewery, [http:// www.nimbusbeer.com/main.htm](http://www.nimbusbeer.com/main.htm) (last visited Mar. 17, 2012).

12 Id.

13 For more details on how beer is brewed, see The Brewing Process, Samuel Adams, <http://www.samueladams.com/discover-craft/brewing-process.aspx> (last visited Mar. 17, 2012).

14 Sedalia Brewing Co. v. Sedalia Waterworks Co., 34 Mo. App. 49, 57 (Mo. Ct. App. 1889).

15 Dana Johnson, Wastewater in the Brewery -- Are You Sending Money Down the Drain?, The New Brewer, July/August 2008, available at [http:// www.birkocorp.com/brewery/white-papers/wastewater](http://www.birkocorp.com/brewery/white-papers/wastewater).

16 Id.; Corporate Sustainability Report: Water, New Belgium Brewing Co., http://www.newbelgium.com/culture/alternatively_empowered/sustainable-business-story/planet/water.aspx (last visited Mar. 17, 2012).

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features.blogs.fortune.cnn.com/2011/06/07/how-to-drink-beer-and-save-the-environment/.

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19 Id.

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22 Heat Recovery, ECO Brewing by Long Trail Brewing, <http://www.ecobrew.net/beta/ecobrew.html> (last visited Mar. 17, 2012).

23 2010 Sustainability Report, Sierra Nev. Brewing Co., 14 (2010), <http://www.sierranevada.com/environment/images/2010SierraNevadaSustainabilityReport.pdf>.

24 Id. at 15.

25 FAQ -- Sustainability, New Belgium Brewing Co., <http://www.newbelgium.com/culture/faq.aspx> (last visited Mar. 17, 2012).

26 Wind Powered, New Belgium Brewing Co., http://www.newbelgium.com/culture/alternatively_empowered/wind-powered.aspx (last visited Mar. 17, 2012).

27 2008 Water Data, New Belgium Brewing Co. (July 9, 2009), http://www.newbelgium.com/culture/alternatively_empowered/sustainability-blog.aspx.

28 Corporate Sustainability Report: Water, *supra* note 16.

29 Executive Summary, New Belgium Brewing Co., 4 (2011), http://www.newbelgium.com/Files/Sustainability%20Story_Executive%20Summary_Nov2010.pdf (last visited Apr. 2, 2012).

30 Environmental Stewardship Grants Program 2012, New Belgium Brewing Co., <http://www.newbelgium.com/Community/local-grants.aspx> (last visited Mar. 28, 2012).

31 2011 Stewardship Grant Summary, New Belgium Brewing Co., 1 (2011), http://www.newbelgium.com/Files/Local_Grants_Program_2011_summary.pdf.

32 Executive Summary, *supra* note 29, at 2.

33 Whitford, *supra* note 16. But be mindful of plastic cups!