

# **The Feasibility of Eliminating Disposable Plastic Water Bottles at Illinois Wesleyan University**

Joseph Daniels  
Environmental Studies 480  
Senior Seminar: Creating a Sustainable Society  
Illinois Wesleyan University  
Final Research Report  
10 February 2013

## ***Executive Summary:***

This report looks into what needs to be done to eliminate the sale of disposable plastic water bottles at Illinois Wesleyan University (IWU) in Bloomington, IL. It discusses the negative effects of the bottled water industry, and why a ban would benefit IWU students, faculty, and staff. What other college campuses have done to eliminate bottled water, and how their strategies could be applied at IWU is discussed, but it is recognized that every campus is different and has its own unique challenges to overcome. Therefore Illinois Wesleyan's particular case is considered in-depth, including a look at Bloomington, IL's public drinking water, IWU's current stance on sustainability, and the views of the IWU community.

A review of the literature concludes that the bottled water industry is polluting, costly, and dangerous to the health of the consumers and the environment. Bottled water companies are bottling what is often just municipal tap water, and selling it to the consumer at a highly inflated price. Increasing profits is often more important than protecting the communities from which the water is pumped. The production and distribution of the bottles is polluting to the environment and harmful to the local residents. Chemicals in the plastic bottles often leach into the water, which can be harmful to the consumer. The water bottles also create many problems after disposal, often ending up in landfills or in waterways rather than being recycled.

Several schools around the country have already succeeded in eliminating the sale of disposable plastic bottles, including a few that are considered IWU's peer institutions. Looking at what some of these schools have done has helped to provide an example of what IWU would have to do to implement a ban with maximum student support. Working with the campus administration and food provider was stressed as important to ensure a smooth transition away from bottled water. Educational campaigns were also important to increasing student support.

IWU has been concerned with sustainability initiatives on campus for some time now. Students have expressed interest in a bottle ban, and eliminating the sale of bottled water would be congruent with the university mission of sustainability. Sodexo, IWU's food provider, has also expressed interests in sustainability initiatives, such as lowering its overall waste and carbon output. There would be difficulties to work with beforehand, but from the information gathered, a ban of bottled water sales is definitely a feasible option for Illinois Wesleyan University in the near future.

## ***Introduction***

Water is a resource we all need to survive. Over the past few decades, people have figured out a way to profit off of this basic human need. By bottling water in disposable plastic containers, companies have made hundreds of billions of dollars at the expense of the consumer and the environment. However, not all are as profit driven as these companies. Many college campuses around the country have recently started to ban bottled water at their institutions. Single use plastic water bottles are unnecessary, polluting, and potentially hazardous to one's health. For example, many carcinogenic chemicals have been found in bottled water, including, but not limited to benzene, toluene, and styrene. Moreover, in terms of long-term sustainability, the production of these bottles uses over 74 million gallons of oil every year in the United States alone (Walrath, 2010). Illinois Wesleyan University (IWU), a liberal arts college of 2,050 students in Bloomington, Illinois, is committed to promoting sustainability initiatives, and a program to eliminate bottled water would reduce the campus' environmentally degrading footprint. It would also be a way of protecting the long-term health of students. This research project examines the desirability and the practicality of getting rid of bottled water at Illinois Wesleyan University. It further examines the potential barriers to successful implementation of eliminating bottled water on campus, and identifies solutions to these problems.

Eliminating single use plastic water bottles on IWU's campus is not a new idea. A few students in IWU's student-run environmental advocacy club, the Sierra Student Coalition (SSC), started working towards this goal in the spring of 2012. Efforts have focused on the promotion of tap water through advocating the installation of and finding funding for two filtered hydration stations on campus, installed on campus in October 2012. These hydration stations allow students to refill their reusable bottles with water quickly. The filters in these stations are important in increasing the desirability of tap water because one reason historically attributed to IWU students purchasing disposable bottled water has been the unpleasant taste of Bloomington tap water. To further encourage a switch from disposable plastic bottles to the tap, SSC has also worked with the campus' Office of Residential Life and the Residence Hall Association to provide the incoming first-year class with free reusable aluminum water bottles. The steps taken by SSC have made it easier to opt out of buying bottled water, but have not eliminated the sale for such water on campus.

This paper starts with a review of the literature on tap and bottled water. It provides the necessary background information to understand why bottled water poses a threat to the consumer and the environment. Following the literature review is a section on the research design and methodology of the project. This includes information on what other schools have done to eliminate bottled water sales, and a look at the Illinois Wesleyan case. An analysis of information gathered discusses the significance of the findings. Finally, the paper ends with a discussion of what research can be conducted in the future. The aim of this research is to assess the feasibility of eliminating bottled water at Illinois Wesleyan University, and to identify how a program to do so could be successfully implemented.<sup>1</sup>

---

<sup>1</sup> Special thanks to Carl Teichman, Director of Community and Government Relations at IWU who had expressed interest in the project, and provided useful advice and direction through e-mail and face-to-face meetings. Dean of Students Karla Carney-Hall has a large role in negotiating dining contracts, and also provided guidance and support throughout the project as well.

## ***Literature Review***

Disposable water bottles have been an increasingly popular source of hydration ever since Perrier introduced them as a status symbol in the late 1970s (Soechtig, 2010). In 2007, more than 29 billion bottles were sold in the United States alone, a number that has only increased over the past several years (Selina, 2008; Soechtig, 2010). While this may sound like a complete success story in an economy focused on growth, there are many negatives to the industry as well. These downsides include the economics of bottled water versus tap water, the environmental health impacts of bottled water, the regulations of bottled water, and the additional environmental impacts associated with the disposal of the plastic bottles. After first providing some background information on the production of plastic bottles, the literature on each side of these negative effects of bottled water is reviewed.

## **Production of Bottled Water**

The production of bottled water requires a large amount of energy, water, natural gas, and petroleum. In 2007, the US bottled water industry consumed the energy equivalent of between 32 and 54 million barrels of oil. If plastic production, water extraction, bottling, and transportation are taken into consideration, bottled water can use up to 2,000 times more energy to produce than tap water. In addition to this, the plastic itself requires close to 74 million gallons of oil a year to produce (Food and Water Watch, 2011; Soechtig, 2010). The use of oil leads to greenhouse gas emissions and increased dependence on fossil fuels. In contrast, tap water is derived from local sources, which decreases the energy cost of transportation. Moreover, though the purification process and the pumping of tap water require energy use, eliminating the need to produce and fill bottles saves much more energy.

Bottled water requires much energy and many resources as a result of the way in which the plastic is produced and distributed. Most disposable water bottles in the United States are made of a soft plastic known as polyethylene terephthalate (PET). PET is lightweight and clear, and was first used for water bottles in 1989 (Soechtig, 2010). It is commonly used to bottle many brands of soda, sports drinks, and condiments. The PET used to produce plastic bottles is made from resins, which are derivatives of both petroleum and natural gas. Refined petroleum and/or natural gas are transported to the plastic manufactures, where the cracking and processing of the plastic can begin. Cracking is the first process in which hydrocarbons from refined petroleum and natural gas are heated to extremely high temperatures in order to break down the larger molecules into smaller hydrocarbons. This process releases carcinogenic vapors into the air. The simpler hydrocarbon molecules are processed to make plastic resins. The resin is then transported to another location to be formed into water bottles through a process known as blow molding (EPA, 2010; Connacher, 2007). Refining the petroleum and natural gas to acquire the derivatives needed for the resins results in greenhouse gas (GHG) emissions and the release of carcinogenic chemicals into the air. This process requires many components, including chemicals to be used as catalysts. Many of the components have the potential to leach from the bottle walls once filled with water<sup>2</sup>. The process is energy intensive, harmful to the environment, and costly.

## **Economic Impacts of Bottled Water**

A considerable amount of money goes into, and is spent on bottled water. While the businesses

---

<sup>2</sup> One such catalyst is antimony oxide, which is responsible for the antimony that leaches into many bottles of water (Andrady, 2003).

are taking in the profits, bottled water is neither in the individuals' nor the communities' best interest. Worldwide, \$100 billion is spent annually on disposable water bottles. In comparison, on average, tap water costs the consumer between \$.002 and \$.003 per gallon, while the typical bottled water brand can cost more than 1000 times higher than tap water<sup>3</sup> (Selina, 2008; Soechtig, 2010). Locally, the city of Bloomington charges \$.023 per gallon for the first 2,300 cubic feet per month, with the cost per gallon decreases as the volume used increases (City of Bloomington, 2012).<sup>4</sup> Even with the higher price of water per gallon in Bloomington relative to the nation at large, tap water is still at least 540 times cheaper than purchasing a single bottle of water on IWU's campus.

Swiss run Nestle Co. owns more than seventy bottled water brands worldwide, and has a history of entering communities, exploiting their water resources, and barely putting any money back into the community. In Michigan (where Nestle produces the brand "Ice Mountain"), the company entered a community and started pumping from its main water source. Rather than paying the proper amount for drawing water, Nestle received large tax cuts and \$1.8 million a day in profits. The same goes for a community in Maine that produces Nestle's brand "Poland Spring" (Food and Water Watch 2011; Soechtig, 2010; Selina, 2008). Companies like Nestle are paying less than the consumer for primary water resources and not paying proper taxes, yet they proceed to bottle and sell the water at a premium, earning a handsome profit. Meanwhile, there is often little regard for the communities from which the water is extracted, causing environmental degradation.<sup>5</sup>

### **Environmental Health Impacts of Bottled Water**

The factories that produce PET plastics release toxic gasses that have proven harmful to those in surrounding communities. Cancer rates, respiratory ailments, and other health problems have been shown to dramatically increase in the communities around the factories (Soechtig, 2010). Moreover, living near a PET factory lowers the value of a house and often makes it extremely difficult for homeowners to sell their homes; therefore many become financially obligated to stay in an area that may end up killing them over time (Soechtig, 2010). Those living around the factories are not the only people at risk for harmful exposure to chemicals from the plastic.

The negative effects of plastics are not confined simply to production of PET. The breakdown of PET plastics can lead to health problems through the process chemical leaching. Different studies have found various types of pollutants in bottled water as a result of leaching from PET bottles. Those most commonly found are antimony, phthalates (diethyl phthalate, dimethyl phthalate, and di-n-octyl phthalate), toluene, and styrene (Reimann et al 2010; Sax, 2010; Soechtig, 2010). Potential health effects of long-term exposure to these chemicals are extensive. Antimony can cause an increase in blood cholesterol and estrogen levels, and a decrease in blood sugar. Toluene can cause

---

<sup>3</sup> The price of a gallon of bottled water at Illinois Wesleyan University is \$12.42. This is based on the individual sale price Sodexo charges for a .5 liters of *Ice Mountain* brand water. Usually the price of bottled water decreases when purchased in bulk, but a bulk option is not available to students at IWU.

<sup>4</sup> Water is more expensive in Bloomington than the national average of \$.002-\$.003 due to an increased emphasis on capital development aimed at constant improvement of water quality standards (City of Bloomington, 2012).

<sup>5</sup> The land in several of the communities in which bottled water companies have entered has subsided after intense pumping. This is a result of water being pumped at such a quick rate that the ground water has no time to recharge, and the ground slowly sinks. In many cases, community tax dollars are used to fix these issues (Selina, 2008).

problems with the central nervous system, kidneys, and liver. Styrene exposure can lead to kidney, liver, and circulatory problems (EPA, 2009). The literature review by Sax<sup>6</sup> also details endocrine disruptors and the levels of phthalates in PET water bottles and other beverage containers. Sax's review demonstrates a growing literature that has shown that the phthalates in water bottles can cause adverse affects that include, but are not limited to increased weight gain, insulin resistance, problems with infant male sex organs, decreased levels of sex hormones, and other reproductive issues for both males and females. In one case, the water in PET bottles triggered a 78 percent increase in the growth of breast cancer cells compared to control water (Sax 2010, Larsen 2010).<sup>7</sup>

Two variables that have been found to have a large affect on bottled water leaching are temperature and storage time. While not all studies controlled for temperature and storage time, those that have have drawn similar conclusions. Plastic bottles that contain Bisphenol A (mainly large quantity refillable water jugs) have been shown to have higher levels of the chemical in the water when tested after a long storage period or careless exposure to heat (Cao et al. 2008). Concentrations of antimony, a known endocrine disrupter, were found to significantly increase when the water in the bottles reached a temperature of more than one hundred degrees. At 175 degrees, the maximum concentration for antimony in drinking water mandated by the EPA was already exceeded by a factor of almost four (EPA, 2009; Reimann et al. 2012). Most water bottle companies state that their bottles are leach resistant, but only two to three percent of those examined did not leach (Connacher, 2007). This is important because antimony is one of the most commonly found chemicals to leach into bottled water. The leaching reported in this study was below FDA standards, but exceeded the maximum limits of antimony allowed in countries in the European Union (Connacher, 2007). Leonard Sax found that PET bottles leached faster when incubated at higher temperatures. While not many people intentionally heat up their water bottles before drinking, closed-container trucks carrying bottled water can easily exceed 140 degrees Fahrenheit. Temperatures in cars parked in the sun for more than six hours can reach 170 degrees Fahrenheit (Sax, 2010; Soechtig, 2010). Thus according to Reimann's findings, the temperatures in these trucks or cars are hot enough to lead to substantial leaching.

Results vary depending on the study. The main pollutant may be one chemical in one study, and something different in another. For example, studies conducted by Charles Reimann concluded that antimony was the only pollutant found with any significant leaching, while Leonard Sax's literature review discussed phthalates in much more detail than antimony (Sax, 2010; Reimann et al. 2012; Reimann *et al.* 2009). Both of the articles were peer reviewed and contained sufficient information describing their research process. A weak point of Sax's review was that it did not go into much detail on the methods of the individual studies. While reviewing the literature, however, Sax discussed many relevant factors that could have impacted the results of not only these studies, but also many other studies conducted on bottled water quality. One such factor was that not all PET plastics are synthesized exactly the same way, and therefore may not leach the same amount of a particular chemical as the next. Another factor is the quality of the water source. Some substances could have been in the water prior to the bottling process, and the only way for these studies to have

---

<sup>6</sup> Literature review titled *Polyethylene Terephthalate (PET) May Yield Endocrine Disruptors* (Sax, 2010).

<sup>7</sup> Neither Sax nor Larson mention if the water used in the breast cancer study has been stored for any significant period of time. Storage time can prove vital when considering the amount of possible phthalates in bottled water. But Sax does note that on average, it took around nine months of storage to show any sign of leaching (Sax, 2010).

been completely sound would have been to eliminate that variable by testing the water sources used in all of the bottles (Sax, 2010). While this does not discredit the findings in his review, the question of water contamination prior to the bottling cannot be ignored.

In brief, much research has been conducted over the years on the quality of bottled water and chemical leaching. The evidence suggests that there are a variety of pollutants that have the potential of finding their way into our bottled water, but many are found in concentrations that are just above detection and below regulation levels. While all of the above mentioned articles on chemical leaching had slightly different aims and conclusions, they stated that there are chemicals leaching into our bottled water and that there is a possibility for those levels to exceed standards. The articles also show that temperature and storage time are often not thought of, but need to be considered when creating regulations. In addition, the original source of the water used in the bottling process is also a key component to consider when discussing the safety of drinking water.

## **Regulations**

Setting regulations on both bottled and tap water is something that we have entrusted to our government officials. Importantly, however, while regulations on tap water have increased over time, those on bottled water are not nearly as strict. Private bottled water companies lead the consumer to believe that their product is safer and cleaner than tap water, but many times, this may not be the case. This section will look at the history of tap water regulations and the national regulations set forth by the United States Environmental Protection Agency (EPA). The following will specify the regulations on the bottled water industry.

### *Tap Water*

Tap water regulations in the United States are very strict, and have progressed over the years. While clean drinking water was provided to municipalities before 1974, the Safe Drinking Water Act (1974) helped to ensure stricter standards for drinking water around the United States. On the date the act went into effect (June 25, 1977) the EPA released a press statement asserting that new regulations would require the country's 40,000 community drinking water systems and 200,000 other public water systems to test their water on a routine basis to verify its cleanliness. Arguably one of the most important aspects of the law requires water providers to notify their consumers if the health standards or sampling requirements are not being met. This was the first time that all public water systems became subject to a uniform and systematic sampling program. If levels of contaminants reach higher than normal levels, the water department is then required to immediately notify the consumer through various forms of media. Upon release of the law, the agency made sure to mention that this was only the starting point and that it would still have a long way to go in order to improve the nation's drinking water (EPA, 1977). Examining a press release from the day the law went into force allows for comparison between what the EPA claimed that it would do, and what is still in place today. It could have been a set of ambitions that did not amount to anything, but many of the stipulations of the act are still in place today, if not improved upon.

Easily searchable on the EPA's website is a list of the water regulations as they stand today. The four-page list names in alphabetical order the pollutants that are commonly found in tap water, and the allowable amounts of the pollutants in any public water system at any given point. The pollutants are categorized by color into disinfectants, inorganic chemicals, organic chemicals, disinfection byproducts, microorganisms, or radionucleotides. The second column lists the current

maximum contaminant level (MCL) in milligrams per liter squared. Following this are the potential health effects of long-term exposure at the maximum contaminant level and common sources of the contaminant in drinking water. The last column states the public health goal (levels that municipalities are encouraged to aim toward) of each contaminant, which ranges from zero milligrams per liter squared to the current MCL (EPA, 2012).<sup>8</sup> While it was difficult to obtain a similar, consumer friendly list of regulation levels in 1977<sup>9</sup>, this particular lists shows how simple the EPA has made it to view the regulations that it now has on a large number of contaminants. The ease of searching for regulations is important for an act that strives for increased public health. By including a section on public health goals, the EPA has indicated that constantly improving water quality standards are still important to the agency as was originally stated in the 1977 press release.

### *Bottled Water*

Regulation of bottled water is not nearly as transparent as that of public water systems. On paper, the bottled water industry is regulated on state and federal levels, as well as by the International Bottled Water Association. Bottled water is considered a food product by the Food and Drug Administration (FDA), and therefore falls under the FDA's jurisdiction and regulations. FDA regulations are not as stringent on bottled water as those the EPA has on tap water, though they are put in place to provide the same protection for public health as those on tap water (Raj, 2005; BWD 2012). According to testimony by Joshua Sharfstein, Principal Deputy Commissioner of the FDA, bottled water is regulated on the basis of FDA regulations concerning chemical, physical, microbial, and radiological contaminants. Regulations require that the water be processed, bottled, and transported under safe conditions, and be properly labeled. Whatever methods are used, bottlers are responsible for making sure that their water can pass the test used by the FDA in its own laboratories. Sampling and testing by the FDA is conducted more frequently for factories that have had several violations. Violations usually consist of water with higher levels of a pollutant than FDA standards (Sharfstein, 2009). The companies that have positive service records are not tested as frequently. The problem with this system is that all it takes is for one mistake or abnormality in the water to cause a problem. If testing is not done fairly frequently, there is a better chance of a contaminant making it to the consumer. So while there are regulations on the bottled water companies, they may be sporadically and irregularly applied (Soechtig, 2010, Sharfstein, 2009). Perhaps as a result, bottled water companies often check water quality less frequently than municipalities (whose water departments are required to check tap water multiple times a day and report any negative findings immediately). The practice of checking water on a regular basis is important to ensure that pollutants that have made their way into the water are detected as soon as possible.

There is a clear lack of FDA regulation on bottled water, but even regulations enforced sporadically are better than no regulation by the FDA whatsoever. Many private companies that produce bottled water obtain it from the local municipal water, bottle it, and distribute it in the same state (Soechtig, 2010). While this may be an efficient bottling system, those products produced and distributed in the same state are not subjected to FDA regulations. This eliminates one of the major agencies ensuring clean and safe bottled water (Soechtig, 2010, Food and Water Watch 2011). That

---

<sup>8</sup> Depending on the perceived health risks of certain chemicals, the MCL can range from zero milligrams per liter squared to a level of a contaminant below which there is no known or expected risk to health (EPA, 2012).

<sup>9</sup> I searched the EPA's website for a similar list of regulations, but was unable to find such a document. The EPA had archived documents on regulation, but they were lengthy, and individual to the contaminant.

is not to say that the FDA is extremely effective safeguard to the quality of bottled water in cases where state lines are crossed. The documentaries “Tapped” and “Flow,” point out that the FDA has only one person in charge of regulating the entire multibillion-dollar industry, and that she has other responsibilities not pertaining to bottled water as well (Soechtig, 2010; Selina, 2008). While the FDA may employ many inspectors, there is only one person that oversees the inspection process as a whole (Scharfstein, 2009). Directors of both “Tapped” and “Flow” argue that such a large industry should have more than just one person in the FDA in charge of regulating the entire bottled water industry. The current system has several loopholes that need to be fixed for maximum consumer safety.

The United States water regulatory system has come a long way over the years. While both the EPA and FDA strive for excellence in regulating their respective drinking water sources, this may sometimes not be enough. Municipal tap water regulations became legitimate and transparent with the Clean Drinking Water act in 1977, and have helped to improve tap water quality in public municipalities all over the country. Bottled water regulations are confusing, not as easily definable, and less subject to implementation. Finally, as discussed in the next section, the regulations do not address the issue of disposal of the plastic water bottles.

### **Environmental Impacts of Bottled Water**

Plastic water bottles have become a significant source of pollution over the past few decades. The plastic bottles add solid waste to landfills and pollute groundwater and marine ecosystems. Most people do not put much thought into what happens to water bottles once they are disposed. While water bottles are recyclable, many are not actually fully recycled. On average, of the 80 million bottles Americans consume daily, 30 million of those automatically end up in landfills without any effort of recycling. Even then, many of the bottles that are placed in recycling bins never complete the recycling process and end up in landfills anyways. There are many reasons for this. One is that many sorting facilities are not able to deal with the differences in the type of plastic in the cap versus the bottle, and therefore simply discard the entire bottle. In total, only about 12 percent of all plastic bottles *complete* the recycling process (Soechtig, 2010; James, 2007).

Many of the plastic bottles that are not recycled end up in landfills. Between 1960 and 2007, the percentage of plastic municipal solid waste increased from around .5 percent to around 17 percent. PET plastic, the type of plastic used to make water and soda bottles, totals 11 percent of the plastic in landfills (Sauing *et al.*, 2010). A study conducted on landfills that are no longer in use found high levels of endocrine disrupting chemicals in the groundwater surrounding the landfills. This means that chemicals are leaching from landfills that were supposed to be closed off, and it was concluded that chemicals from plastics and plasticizers were a main source (Kuch *et al.*, 2009). This study was conducted on landfills that had been closed since the 1970s, providing time for significant leaching into the surrounding water. Though plastic disposable water bottles have only recently gained widespread popularity, and do not represent the source of the plastic leaching from landfills in this study, we can expect them to be a significant source of leaching in the future.

Another significant environmental concern with regard to plastics deals with marine waste. Many bottles that are thrown away, but do not make it to the landfill, have entered our waterways. Located in the Pacific Ocean is a garbage patch consisting mainly of plastic products that is nearly twice the size of Texas. The United Nations claims that there are 46,000 pieces of plastic in every

square mile of ocean in the patch. The plastics in the patch come from a variety of products, but beverage containers make up a large percentage of the overall waste (Soechtig, 2010; Connacher, 2007).<sup>10</sup>

This plastic can have detrimental effects on marine life. The ever-growing mixture of plastic<sup>11</sup> is working its way into the food chain as it mixes with the plankton consumed by fish. Fish in the patch have been found to ingest larger plastic pellets, which often remain and accumulate in their system. There is evidence that suggests that the plastic particles can bind to relatively large amounts of persistent organic pollutants; when ingested this plastic leads to bioaccumulation of the pollutant when consumed by an organism at the bottom of the food chain (Claudio, 2012; EPA, 2011). Direct and indirect ingestion of plastic often leads to internal and external wounds, decreased feeding capacity due to digestive system blockages, and consequent decrease in mobility and predator avoidance. The deaths of sea turtles, whales, manatees, dolphins, and sea birds have been attributed to the ingestion of these plastics. Studies have shown a rise in plastic ingestion in the ocean since the 1980s, and the number of victims is most likely greatly underestimated as most go undetected (EPA, 2011). Clearly plastics are not a natural part of the North Pacific, but our plastics have now made their way into the oceans where they can negatively impact the quality of the marine ecosystems. The disposal of billions of bottles a year, and its effects on the land, ground water, and marine life, is a large environmental concern, and something that should not be overlooked.

### **Summation of literature**

Bottled water is degrading to the environment and costly to the consumer. Private water corporations are profit driven and have little concern for the areas in which they pump their water from. Much research has been conducted over the years on the safety of plastic water bottles on the consumer. Several studies have concluded that PET plastics used in water bottles can leach pollutants into the water, which in large enough quantities can cause bodily harm. Regulations on bottled water are often not as strict as those on municipal tap water; yet bottled water is advertised as fresh, healthy, and clean. Recycling of the bottles is not as fluid of a process as many are led to believe, and the environmental impacts of disposal are significant. The research suggests that tap water has a much smaller carbon footprint, and is cheaper and safer for the consumer and the environment when compared to bottled water. The information in this literature review provides the background information necessary to understand why students around the country are working towards eliminating bottled water sales at their schools.

### ***Research Design and Methodology***

#### **Purpose**

There are many difficulties to overcome before successfully implementing a ban of bottled water on campus. The purpose of my research is to determine the feasibility of eliminating bottled water at Illinois Wesleyan University (IWU) so as to reduce IWU's overall waste output, and to protect student health. To do so, it was necessary to gauge the IWU community's attitudes toward banning bottled water, look into what other college campuses have done to eliminate bottled water, and work out how best to address challenges to do so at IWU.

---

<sup>10</sup> Virtually no organism on earth can degrade plastic, meaning that every piece that has ever been made (minus those that have been incinerated) still exist in some form or another (Soechtig, 2010; Connacher, 2007).

<sup>11</sup> Much of the patch is of a soupy consistency with larger pieces floating around as well

## **Description of Research Design and Methodology**

The first part of the research examined what other universities around the country have done to get rid of bottled water at their schools. I examined important strategies that other schools that have been successful in implementing bottled water restrictions have employed. In addition, via e-mail I contacted student environmental leaders from different schools that have eliminated plastic bottles, and asked questions on their process and subsequent success (Appendix 1). Examining successful student initiatives makes it possible to avoid, and prepare for, potential barriers, thus easing the path towards successful implementation of a policy to eliminate bottled water.

The next part of my research entailed development of a survey to gain insight into current drinking water consumption habits of the IWU community, and on the willingness to eliminate disposable plastic water bottles on campus. It also examined the potential barriers that lay in the way of successful implementation of a bottle ban. My Environmental Studies senior seminar class and professor reviewed a preliminary copy of the survey. It was important to receive feedback to the survey before releasing it to the general community, and the input received allowed for meaningful revisions (McKenzie-Mohr, 2011). The final survey (Appendix 2) was released to IWU students, faculty, and staff, and was allowed to run for a ten-day period from October 15<sup>th</sup>-October, 25<sup>th</sup> 2012. The online survey was advertised on the university webpage “pipeline,” through social media, and was additionally sent out directly to those on the student senate e-mail list. This multifaceted advertising approach aimed to acquire input from more than just those with a vested interest in protecting the environment. A mix of yes/no and multiple-choice questions were asked, but open-ended answers were allowed on several of the questions.

Finally, a focus group was held a week following the release of the survey. The focus group was advertised using social media, IWU’s “pipeline,” and with flyers posted in areas of high student traffic around campus. The goal was to find six to eight IWU students from different majors and years in school. Unfortunately, though the methods I used to gather participants for the study were sound, the focus group was not as representative of the student body as desired.<sup>12</sup> The subject matter of the focus group (Appendix 3) was similar to that of the survey, and was held to substantiate much of the information that was brought forth in the survey<sup>13</sup> and the archival research, as well as to gain a more holistic view on what non-environmental studies student think about the ban. It concentrated on how to deal with the current obstacles to implementing a ban.

## **Research Findings**

### *Current Initiatives on College Campuses*

Many universities around the United States have succeeded in reducing or eliminating bottled water from their campuses by eliminating bottled water in vending machines, schools dining centers, and the like. Their actions have been in response to the increasing data on the negative environmental and health effects associated with plastic bottles, discussed earlier in this paper. The

---

<sup>12</sup> A representative focus group would have both male and female members representing a variety of majors, and range from first-year students to seniors. In general, the more the group represents the population as a whole, the more legitimate the focus group will be.

<sup>13</sup> The focus group was held while the survey was still open to the IWU community. I used the preliminary results obtained during the first seven days that the survey was open as a guide to several of the focus group questions.

list of schools that have succeeded in the ban is growing larger by the year, and includes The University of Vermont, Macalester College, DePauw University, Carleton College, and Washington University in St. Louis. At Washington University, there was a 95 percent decrease in bottled water consumption when it was taken off of the student meal plan (Reidel, 2012; Carlson, 2010; Spar, 2009; Food and Water Watch, 2012). While these universities often spend money up front on installing water filling stations and their filters to replace bottled water, they save thousands of dollars in the long term. For example, the facilities department at Washington University, which had previously bought one case of bottled water a day for the grounds crew, now saves \$5,000 a year by providing everyone on the crew with their own reusable bottles (Carlson, 2010). These universities were able to work out the logistics necessary to get rid of bottled water with their food providers and vendors, as well as gain support from their students. Bottle bans would not be a possibility without student support and outcry for change.

In 2010, the University of Vermont (UVM) student government vice president stated that it was an embarrassment that a school claiming to be at the forefront of environmental research still sold plastic bottles (Carlson, 2010). However, starting in the fall of 2012, after retrofitting its water fountains to fill reusable bottles, gaining increased student support, and working with campus beverage provider Coca-Cola as it neared the end of its contract, the University was able to successfully ban the sale of disposable plastic bottles on campus (Reidel, 2012).

A student involved in eliminating bottled water at UVM was able to offer key insights into overcoming obstacles and successfully implementing policies to get rid of bottled water. Maggie Galka is a junior Environmental Studies major at UVM, and a member of campus environmental action club VSTEP. According to Maggie, the whole process of eliminating bottled water took a couple of years, but was ultimately aided by the termination of the Coca-Cola contract. This gave student advocates for a ban on bottled water an opportunity to eliminate plastic bottles without having to push the administration to terminate a contract with a major corporation. As soon as this particular opportunity was discovered, members of the VSTEP group petitioned students around campus to gauge interest levels in such a project. With support from the general student population, VSTEP got involved with student government in order to be part of the negotiations on what the new beverage contract would look like. “We decided that there should be no plastic water bottles sold on campus, and that UVM should be able to sell products that are not just Coke products. That means that we can sell Pepsi, or products made by local vendors” (Galka, Personal Communication, September 16, 2012). Another important factor mentioned was close communication with the university administration throughout the process. As soon as adequate student interest was proven, students in VSTEP and administration were able to work with other departments and food providers like Sodexo to eliminate plastic bottles. In the case of UVM, Sodexo was not stressed as a barrier.

Macalester College is thought of as one of IWU’s peer institutions<sup>14</sup> and has also eliminated bottled water sales on its campus. Senior Brianna Besch is an active proponent of sustainability, and worked with other students toward a ban. Interestingly, one of her first words of advice was to stay clear of using the word ‘ban’ when introducing it to students. “The administration stressed that we use the term ‘discontinuation’ rather than ‘ban’ when advertising because students were still free to

---

<sup>14</sup> Illinois Wesleyan’s peer institutions include Augustana College, Carleton College, Denison University, DePauw University, Franklin and Marshall College, Kenyon College, Knox College, Lawrence College, Macalester College, Rhodes College, St. Olaf College, and College of Wooster.

buy bottled water elsewhere and bring it onto campus” (Besch, Personal Communication, October, 16, 2012). Correct wording is very important, and can sometimes mean the difference between success and failure. Besch also stressed the importance of working with the food provider rather than against it. Bon Appetite, Macalester’s food provider, was generally helpful throughout the whole process due to high levels of communication between the students and it. As a result of this communication, Bon Appetit agreed that students who forgot their reusable bottles could still fill up paper cups free of charge. In addition to working with the food provider, Besch and other students worked on a large educational campaign, rich in well-researched facts to inform students on why they should not buy bottled water. The campaign consisted of tabling to increase campus awareness of the proposed ban, visuals with graphics illustrating the downsides of bottled water, a film screening of the documentary “Tapped, ” and a sustainability book club reading on bottled water. Lastly, she stated the importance of providing reusable water bottles to at least the incoming first-year class every year in creating a culture of sustainability on campus.

Other peer institutions involved in reducing or eliminating bottled water sales from their campuses include Denison University, St. Olaf College, and Carleton College. Denison University has made several steps towards a sustainable campus, and has installed two hydration stations in an effort to reduce bottled water consumption. Members of the Denison community had an opportunity to show their commitment towards sustainability by signing a pledge with statements such as “I will drink water from a reusable container rather than drinking bottled water,” and ‘I will read the campus Sustainability Plan’”<sup>15</sup> (King, 2012). St. Olaf College has provided a filtered water station at the food pick-up point to encourage students to fill their water containers for free and reduce the purchasing of bottled water (St. Olaf College, 2012). Carleton College started its ‘Taking Back the Tap’ movement in the spring of 2011, and has since banned bottled water from campus vending machines and student-association funded events (Food and Water Watch, 2012). DePauw University completely banned the sale of bottled water on campus by the fall 2011 semester (Marino, 2011). Several peer institutions are in the process of or have already successfully banned the sale of bottled water on their campus, which makes it a much more attainable goal for Illinois Wesleyan University. These schools knew that a partial or complete ban of bottled water sales would lower profit margins, but still did it anyway.

DePauw’s General Manager of Dining Services saw the ban as a loss of a moneymaker “It’s a cheap product that many people buy because of its convenience” (Marino, 2011). While profit is something that cannot be ignored, Sodexo, food provider for both the University of Vermont and Depauw University, is devoted to sustainability and student needs, and plans for a ban thus went ahead. Among its many other sustainability goals, Sodexo’s 2010 Sustainability Report states that the company is striving to reduce carbon dioxide emissions and non-organic waste. The company is also concerned about providing the best service for its customers (Sodexo, 2010). While Sodexo may be losing profits by eliminating plastic water bottles from its repertoire, this desire is congruent with its sustainability report.

Barriers for eliminating bottled water include those listed by a student at St. Lawrence University<sup>16</sup> to the Association for the Advancement of Sustainability in Higher Education (AASHE), including finding an alternative to the current meal plan and preventing students from

---

<sup>15</sup> The Denison University Sustainability Plan is a 107-page document outlining the multifaceted approach in which it strives for improving campus sustainability. One aspect of the plan is to use reusable water bottles.

<sup>16</sup> Another peer institution of IWU with a student enrollment of 2,100 (Wagner, 2010)

purchasing soda rather than a water bottle (in the interests of their health). With those barriers considered, the environmental group at St. Lawrence University had still made progress on decreasing interest in bottled water through an educational campaign. It finally came down to several students who indicated that they would prefer the convenience of a bottled option to tap water, which impeded any further action (Wagner, 2010). Although successful in decreasing bottled water use, without action to address the convenience factor, St. Lawrence University was unable to successfully eliminate bottled water on campus. Illinois Wesleyan University is similar to its peer institution schools, and like some of them, it too uses Sodexo as its main food provider. While there are several similarities among these schools, a look must also be taken into IWU's particular stance towards sustainability.

### *The Illinois Wesleyan Case*

In 2007, IWU President Richard Wilson signed the Tallories Declaration<sup>17</sup>, becoming the first Illinois liberal arts university president to do so (IWU, 2007). By signing the declaration, President Wilson committed IWU to follow a path towards sustainability. Achieving the goals of a mission of sustainability does not come without barriers, such as those encountered by St. Lawrence University. However, like Macalester College, IWU does not have a beverage contract with a corporation that would impede process on the ban in Sodexo dining locations. Both the IWU administration and Sodexo management claim that student needs are their top priority, and that a ban would be possible if proper support is conveyed. Currently at IWU, Sodexo is responsible for providing water bottles in The Dugout, Hattie's Coffee Shop, Tommy's Grill, and in the Bertholf Commons with take away lunches. Like St. Lawrence University and many other peer institutions, IWU is interested in sustainability initiatives; however, it has only recently taken steps to eliminate bottled water. Before comparing IWU to its peer institutions, however, it is important to look at factors specific to location.

All schools face unique conditions, one of which is their geographical location and the specific regions' water treatment facility. While the entire country's municipal drinking water is regulated by the same government agency, the source of the water is usually different for every college. It is important to ensure that the tap water used by IWU is clean and safe to drink before banning bottled water sales on campus.

Bloomington, Illinois obtains its water from Lake Bloomington and Evergreen Lake<sup>18</sup>. Lake Bloomington is fed by runoff from 70 square miles of land (much of it agricultural), while the drainage area for Evergreen Lake is 41 square miles. As mandated by the EPA, the City of Bloomington Water Department (BWD) releases an annual consumer report on the quality of its tap water. The City of Bloomington's website lists the past ten of these annual reports online, going back to the year 2002. Comparing the 2002 and 2011 reports offers insights into what improvements have been made to Bloomington's infrastructure to improve water quality over time. Both the 2002 and the 2011 consumer reports start off with the same introduction, stating that the water department is committed to the residents of Bloomington, and that they are in compliance with all state and federal standards for appearance and safety. Their testing is conducted regularly by "sophisticated

---

<sup>17</sup> The Talloires Declaration is a ten-point action plan (Appendix 4) for incorporating environmental sustainability into higher education. It was composed at an international conference in Talloires, France, and has been signed by over 300 college and university presidents worldwide.

<sup>18</sup> Both Lake Bloomington and Evergreen are man made lakes about 15 miles north of Bloomington

and advanced procedures” (BWD 2002, BWD 2011). While the exact testing methods or frequency are not listed, mentioning that they are in compliance with state and federal standards makes it clear that at least the minimum guidelines are met.

Nationwide, drinking water departments have spent hundreds of billions of dollars to build and maintain drinking water treatment and distribution systems. From 1995 to 2000, more than \$200 billion was spent on capital investments to fund water quality improvements (EPA, 2009). Locally, the 2002 Bloomington water report mentions key improvements that took place over the past year to the water treatment plant<sup>19</sup>. While the 2011 report does not list any specific improvements to the treatment plant that year, it stresses that they are continually making improvements to the treatment facilities and are actively involved in reservoir and watershed management (BWD 2002, BWD 2011). Constant improvements in the water treatment systems ensure that technologies are up to date and aim to provide cleaner water than in the previous years. For Bloomington, this has meant an average decline in several different contaminants, including nitrates. The stress on constantly improving the Bloomington water system in the annual reports coincides with the EPA’s original goal stated in the Clean Drinking Water Act (EPA, 1977).

Drinking water pumped from surface water is prone to agricultural runoff, which can have detrimental effects on the water derived from these sources. Fortunately, there have been safeguards put in place to reduce the quantity of runoff in the water supply. One strategy is to dilute the water taken from Lake Bloomington with water from Evergreen Lake. Lake Bloomington has a higher concentration of seasonal runoff during the peak fertilizer application periods, so mixing that water with that water from Evergreen Lake dilutes the concentration of agricultural runoff in the water. The Bloomington treatment facility regularly invests in capital development policies, many of which are used to increase the quality of the water, including the increased filtration of agricultural runoff from the water (City of Bloomington, 2010; BWD, 2002).

The quality of local tap water plays a large part in a community’s willingness to support a ban on bottled water. Despite the improving quality of Bloomington tap water, it was important to gain input from students, faculty, and staff to find out if providing easier access to filtered water would increase support of a ban. The survey and focus group asked questions on the willingness to support a ban, and other questions to help understand that decision. Finally, the survey and focus group aimed to understand what IWU students, faculty, and staff thought were the biggest difficulties with a ban, and how they would recommend proceeding.

### *Survey Results*

A total of 146 IWU students, faculty, and staff completed the survey on bottled water (Appendix 2). 136 of the participants were students, and 11 were faculty or staff (one participant did not complete the survey).<sup>20</sup> Key topics covered in the survey included reasoning behind purchasing bottled water, location of purchases, and reasoning behind opposing or supporting a bottle ban on campus. The last question of the survey asked how environmentally conscious respondents claimed

---

<sup>9</sup> Increased clarifier capacity from twenty-two million gallons per day (MGD) to thirty MGD by installing new, more efficient systems. There was also a replacement of older lime slaking equipment with a more reliable and sophisticated system (BWD, 2002)

<sup>20</sup> A large enough percentage of those taking the survey answered every question, so the effect of missed questions on the results was minimal.

to be on a scale of one to five. Those who chose *one* claimed to be not at all environmentally conscious, and those that chose *five* claim to be very much so. The purpose of this question was to make sure that those taking the survey were representative of different groups on campus and not the two extremes (represented by a one or a five). 14 percent claimed to be at either extreme of the scale, and the majority of survey takers were somewhere in the middle<sup>21</sup>. The mean level of self perceived environmental consciousness was 3.55.

Sixty-two of respondents are on a meal plan, which means that bottled water is likely available to them as a meal exchange option; while only 38 percent are not on a meal plan. Still, 70 percent of those surveyed supported a ban of bottled water on campus. Of the 30 percent opposed to a ban (see Table 1 for survey questions and responses), 40 percent stated that they would change their minds if more filtered water fountains were installed around campus. When asked, as shown in Table 1, an overwhelming majority of respondents (95 percent) stated that they already owned a reusable water bottle, while only a very small percentage (five percent) indicated that that they do not. When asked why they own a reusable bottle, many stated that it is the most cost effective way of drinking water. Some simply do not like buying disposable water bottles and strive to be eco-friendly, while others just think that reusable bottles are more convenient. Several respondents mentioned that reusable bottles are the healthier option, while many cited the environment. The small percentage that do not own a reusable water bottle stated that they either do not like to carry it around from class to class, do not like the taste of the reusable bottles, or feel there is not enough filtered water on campus to warrant purchasing a reusable water bottle.

When asked about barriers that would restrict the ban of bottled water on campus as shown in Table 2, 41 percent thought that the largest problem with a bottle ban would be forgetting to carry a reusable bottle. Others believed that a ban would eliminate the healthiest beverage on the menu (25 percent), and that a ban would take away their freedom of choice (20 percent). 42 percent of those who answered the question on why one would buy bottled water (Table 5) claimed to do so out of convenience, while others claimed that bottled water is healthier and better tasting than Bloomington tap water. Only a small percentage answered ‘other’ in response to what barriers would restrict the ban of bottled water. Those answers included public disagreement of the ban, and not having an option to provide water for guests. One respondent to the survey claimed to believe that having water bottles in vending machines alone would solve the problem of those who need to purchase bottled water on rare occasions.

---

<sup>21</sup> With 37 percent answering 3 and 39 percent answering 4

Table 1: Yes or No Questions

<b>Question:</b>	<b>Yes (%)</b>	<b>No (%)</b>
Do you buy disposable water bottles?	31	69
Do you own a reusable water bottle?	95	5
If you had access to filtered tap water on campus, would you be more inclined to use a reusable water bottle?	92	8
Would you support a ban of disposable plastic water bottle sales on campus?	70	30
If not, would you still be opposed to a ban if there were more filtered water fountains on campus?	60	40
If IWU banned disposable plastic water bottles, would you buy them from another location?	20	80

*Responses from all respondents*

Table 2: Perceived Barriers

<b>Response to Question: What do you see as the biggest barrier to getting rid of bottled water on campus?</b>	<b>Percent of respondents</b>
It would take away the freedom of choice	20
It would take away the healthiest beverage on the menu	25
Forgetting to carry reusable water bottle	41
Other	14

*Response from all respondents*

Table 3: Location of water bottles sales

<b>Where do you buy your bottled water?</b>	<b>Percent of Respondents</b>
Dugout	46
Hansen	0
On campus vending machine	5
Off campus	49

*Response from those who claim to buy bottled water*

*Table 5: Reason behind purchase of bottled water*

<b>Why do you buy bottled water? Check all that apply:</b>	<b>Percent of total answers</b>
Convenience	42
It is the healthiest drink option	29
I don't like the taste of Bloomington tap water	18
Bottled water is cleaner than the tap	6
Other	5

*Response from those who claim to buy bottled water*

### *Focus Group and Results*

Preliminary survey results helped to guide the way in which questions were asked in the focus group, which aimed to substantiate the survey. The focus group consisted of six female students representing a range of different majors.<sup>22</sup> There were two first-year students, and four seniors. The participants generally identified themselves as somewhat conscious of issues pertaining to environmental degradation, but none had any extensive education or experience in the subject. Four of the six students own their own reusable water bottles and five have Brita Brand filters at home or in their rooms. These five students do not usually buy bottled water, but will on occasion, if they forget their reusable bottle or want the healthiest beverage on Sodexo's meal exchange plan. One participant reported purchasing bottled water semi-regularly, but reusing the disposable bottle before disposal.

Participants in the focus group were asked to discuss a series of questions concerning what they thought of a bottled water ban. Questions included what the participants thought would be the biggest barriers to overcome before a ban would be possible, and what they thought the best solutions were for overcoming those barriers. A common perceived barrier to eliminating bottled water was the convenience factor. It is easy to stop by a dining location such as The Dugout and grab a bottle of water on the go with lunch or dinner. Many would choose bottled water when running to class or in a hurry, rather than grabbing a less healthy beverage alternative. Another large barrier is the current meal exchange system. As it stands now, students on a meal plan are allotted a certain number of meals per semester. If not used in the buffet style dining center (Bertholf Commons), meals can be prepared in other on campus dining centers through the meal exchange service. Currently, meal exchange allows for an entrée, a side, and a beverage. No substitutions are allowed, and students must choose a beverage if they want to get everything that they are paying for. Those trying to choose the healthier option would rather drink water, as opposed to soda, juice, or milk. Although students may own a reusable water bottle, many feel they are wasting money if they do not get a beverage with their meal.

Most of the focus group stated that many people do not drink Bloomington tap water because of the bad taste and rumors that circulate about the poor quality of the water. The focus group was

---

<sup>22</sup> In recruiting focus group members I sought to obtain students representing a range of majors, across the four years of college, and to have both males and females represented. That proved not to be possible.

unsure of the validity of the rumors, and said that educational materials on the facts will benefit incoming students. Resident advisors (RAs) in dorms for first-year students usually briefly talk about recycling procedures to their residents, but that is the extent of educational materials concerning sustainability presented during orientation. The focus group believed that presenting the facts on bottled and tap water to first-year students would lower bottled water usage.

The six participants did not think that the barriers to eliminating bottled water would be too difficult to overcome. They recommended such alternatives to the current meal exchange program as refunds to the students' munch money<sup>23</sup> accounts if no beverage is purchased, or allowing for a substitution of a side instead of a beverage. Students that have forgotten their reusable water bottles could purchase paper cups for a small fee rather than buying a disposable water bottle. All six students thought that handing out reusable bottles to the incoming first-year student class this year was a good start, but that reusable bottles should be made available to the entire campus. The main barrier to overcome, however, is that of filtered water. The filtered water fountains already installed in both the science and music buildings have been successful, but the general consensus was that more would need to be installed around campus to further gain student support to ban bottled water. It is believed that once the fountains are strategically placed around campus, students will be much more inclined to regularly use and refill a reusable bottle.

Also discussed was The Dugout dining facility renovation plan. The Dugout is currently the location where the most people purchase their bottled water, and is about to undergo a major renovation. With the renovation, bottled water would be less accessible, and only available to be purchased in one area that is separate from most other food items. Instituting a ban coinciding with renovations would likely reduce negative reactions. Students, faculty, and staff would not be used to bottled water in the new set up, and always think of it as a 'water bottle free zone.' The group first thought that the IWU population would appreciate a transition period in which there would be a reduction in bottled water available before an all out ban. After further discussion, however, the six participants reached a consensus that it would be best to just eliminate the bottles all at once. In order to do so, there would need to be an educational campaign on the ban before the end of the school year. Educational materials would include colorful posters outlining facts about bottled water versus tap water. There could also be a week of reusable water bottle giveaways, games, campus events, and anything fun that would increase visibility and student awareness of the campaign.

Focus group participants unanimously agreed that the ban must start at the beginning of the next academic school year (2012-2013), and be accompanied by another educational campaign. Not only would it coincide with the Dugout renovations, but it would also make sure that the incoming first-year class never experiences a campus with bottled water sales. All six participants agreed that this timing would reduce the backlash by students. First-year students would get used to a campus without bottled water sales, and not know any different. Most displeased upperclassmen would likely also get used to the ban over time, similar to when Sodexo removed trays from the Bertholf Commons<sup>24</sup>. If the right steps are taken, the focus group participants believed that the IWU community would be receptive to the change to the campus beverage service.

---

<sup>23</sup> Munch money is allocated to IWU students with a meal plan, and can be used to buy items in Sodexo dining locations that cannot be purchased on meal exchange.

<sup>24</sup> Sodexo went "trayless" in IWU's main cafeteria at the start of the Spring 2010 semester. There was much backlash initially, but it dissipated over the course of about a month.

## *Analysis of Findings*

The results of my research on current campus sustainability initiatives indicate that there is a growing movement towards removing disposable water bottles. Each campus examined had its own particular barriers to overcome, and its own ways to implement a ban. The main barrier for The University of Vermont (UVM) was the Coca Cola vending machine contract, while the main barrier at Macalester College was gaining student support. All of the schools examined had to work to educate the student body and make sure that the ban would be received well. Proper wording, such as not publically calling elimination of bottled water a ban, was important. Schools like St. Lawrence that were not able to succeed in eliminating bottled water could not gain student support.

The survey of Illinois Wesleyan students represented a group of students, faculty, and staff that on average are environmentally conscious, but not overtly so. Both the survey and focus group showed that most IWU students, faculty, and staff are in favor of a bottle ban. Seventy percent of the respondents to the survey stated that they would support the elimination of bottled water, and nearly half of those against a ban would change their minds if more filtered water fountains were installed around campus. Those in the focus group declared that they would be in favor of the elimination of bottled water if all students were provided with reusable water bottles and if more filtered water fountains were installed around campus. At the end of the vending contract with Coca Cola, UVM had relatively little trouble working with its administration and its campus' Sodexo when it was able to prove that its students supported the ban.

The current meal plan system poses a large barrier to implementation of the bottle ban, however. Almost half of the survey respondents claim to purchase bottled water from The Dugout and are on the meal plan. It became clear through the survey and the focus group than many of the water bottles sold are a result of the meal exchange system. The renovations and new layout of The Dugout provide a perfect opportunity to eliminate water bottles altogether. An altered meal exchange system and new Dugout design would help with the ban, but would not automatically ensure success.

An overwhelming majority of the respondents to the survey already own a reusable water bottle. Just over a quarter of those who own reusable bottles, however, still regularly purchase disposable bottles. While the focus group stressed the importance of providing reusable water bottles to students, it is clear that that alone would not overcome a barrier. However, the process of handing out free water bottles to either first-year students or the entire campus would increase the visibility of the campaign, and could be accompanied with a pledge to stop the purchase of disposable water bottles. Handing out free reusable water bottles alone may not be enough to ensure that students will use them. The process of signing a pledge, however, will make the student feel accountable to using the reusable bottle over disposable bottles (McKenzie-Mohr, 2011)<sup>25</sup>. Educational materials combined with a petition (both which could be necessary to receive a reusable bottle) would increase the likelihood of success. It is important to create a culture of sustainability and reusable water bottle usage on campus. This could start by asking faculty, administrators, Resident Assistants (RAs), Sustainability Coordinators, and those in other leadership roles to commit to modeling such sustainable behaviors. When those in leadership roles portray carrying around a reusable bottle as the desired behavior, it is much more likely that others will follow. A culture of sustainability and

---

<sup>25</sup> IWU's Sierra Student Coalition had 439 students sign a similar pledge at the beginning of the Fall 2012 semester before receiving a free reusable water bottle.

reusable water bottle usage on campus would make it easier to remember to always carry around one's own bottle. Even with this change in culture, however, it is realistic to assume that there will be a small percentage of students, faculty, and staff that will still purchase disposable water bottles from off campus vendors.

About half of those that purchase bottled water claim to obtain it from off campus sources. A ban would still allow for people to purchase bottles elsewhere. The ban would still offer the freedom for students who are not on board with the ban to carry around bottled water on campus, though a majority of survey takers stated that they would not simply turn to another location to purchase their bottled water. That means that the ban would actually lower the overall consumption in bottled water among the IWU population rather than just having all bottled water consumers switching vendors.

The importance of educating the IWU community is key, and presenting the information in a memorable fashion is of utmost importance. The information presented would have to be concise, and only convey the information that is likely to make an impact. Powerful statistics are useful, and putting the information into conceivable figures will allow the public to relate (McKenzie-Mohr, 2011).<sup>26</sup> Another way to ensure that people notice the information is through the use of images with captions. Most people are not going to take the time to read an entire flyer filled with just facts, and are more likely to remember the images or relatable statistics. The educational materials would consist of flyers, posters, students sitting at tables outside of dining locations with information, and campus events. Possible events could include documentary screenings, a trivia game located in The Dugout, and water bottle handouts.

### ***Postscript***

Following my analysis of my research, I learned that Sodexo may already be eliminating bottled beverages from meal exchange next year with the remodel to The Dugout. In this scenario, the only beverages covered on meal exchange would be fountain drinks in the paper cups provided. There would still be bottled soda and water for sale, but it would not be located near the 'made to order' food. While this change to the meal exchange would likely reduce the sales of bottled water significantly, it offers a great opportunity to ban the sale altogether. Students that forget their reusable water bottles could use paper cups for water, rather than pay full price for bottled water. As noted earlier, there would likely be less negative feedback if the shift away from bottled water sales coexisted with this change in meal exchange.

What most of this comes down to is the convenience factor. For many it is more convenient to stop by The Dugout or other dining locations to pick up a water bottle on the go. Many have claimed that a disposable bottle is the best option when their reusable bottle is not available. This barrier may be difficult to completely overcome because even those that claim to be environmentally conscious forget their reusable water bottle from time to time. As suggested in the focus group,

---

<sup>26</sup> Macalester College did this by hanging up posters around campus with statistics comparing the environmental impact to conceivable figures, such as energy consumption in millions of barrels of oil. Showings of the documentary "Tapped" by Macalester College, and other schools helps accurately portray the problem of the bottled water industry in an effective manner. An example of putting information into conceivable figures would be saying that the Pacific Garbage Patch is twice the size of Texas, rather than presenting its size in square mileage.

however, providing paper cups for a small fee would provide a safety net for when people forget to carry around their own reusable bottle, so this barrier can ultimately be overcome. The small fee would not only help finance the cups, but would also act as a disincentive to forget to bring one's own bottle. A culture shift on campus would also likely decrease the number of students, faculty, and staff that forget their reusable bottles. Educational materials would likely ease in a transition, and would make it clear to the IWU community why a ban is important.

### ***Recommendations***

From the information gathered, a ban of disposable bottled water in Sodexo dining locations at Illinois Wesleyan University is possible. To ensure maximum student support, more research could be conducted to address different questions. Additional surveys or focus groups, both before and after a possible ban, will increase understanding of perceived barriers and help with making sure everything runs smoothly. The conducted survey did not ask any questions on major, year in school, or sex of the respondents. This information would have been useful in breaking down the demographics of survey takers even further than just dividing the respondents into students, and faculty/staff, and could help in the design of educational programs. Any other future surveys would include this information. Future focus groups will hopefully better represent the general IWU student population, consisting of both male and female participants from all years and majors. It is important to get the most representative and accurate information possible, so more research on different meal exchange plans and barriers would be beneficial. Possible educational campaign topics and strategies could also be tested through a focus groups.

It is important that a group of committed students continue to work with IWU administration and Sodexo for the rest of the semester to ensure maximum communication between all parties necessary for the ban to occur. It was made evident through conversations with IWU administration that the needs and concerns of students come before profits in a situation concerning eliminating bottled water. Working along-side administration, rather than against, would help to ensure that the right decisions are made, and that the needs of students are met.

More work must also be done to build up the infrastructure needed to ensure the success of a ban. This would include working with student senate and other on or off campus organizations to obtain funding for more filtered-water fountains around campus, as well as the replacement filters. In addition to the fountains and reusable bottles, it is important to make sure that there is a dedicated and educated group of students and/or faculty and staff to carry on the project in the future. If a ban of bottled water in Sodexo locations is enacted, students in the following years will still need to educate the IWU community on bottled water usage, find funding for more reusable water bottles and filtered fountains, and possibly work towards furthering the ban into other campus areas, such as catering.

### ***Conclusion***

The purpose of this study was to determine the feasibility of implementing a ban of bottled water at Illinois Wesleyan University, and to identify how the ban would be implemented. An in depth view of the literature examined the economics and production of bottled water, as well as the human and environmental health risks that bottled water poses. In addition, regulations on bottled and tap water were compared. Following the literature review was a section on initiatives at other universities to eliminate bottled water on their campuses. Illinois Wesleyan's specific case was

described, and tap water quality in Bloomington considered as well as details specific to IWU in particular. Input was gathered from IWU students, faculty, and staff on their attitudes towards a ban. The research has found solutions to certain barriers, and has paved the way for a ban in the near future. If key actions are taken, such as improving infrastructure and creating a culture of sustainability on campus, the elimination of bottled water would likely be a great success.

## Works Cited

- 2002 annual consumer report on the quality of tap water. (2002). Retrieved 09/24, 2012, from <http://www.cityblm.org/modules/showdocument.aspx?documentid=4179>
- 2011 annual consumer report on the quality of tap water. (2011). Retrieved 09/22, 2012, from <http://www.cityblm.org/modules/showdocument.aspx?documentid=4171>
- Carlson, S. (2010). *Thinking outside the bottle*. Retrieved 10/3, 2012, from <http://chronicle.com/article/Thinking-Outside-the-Bottle/124601/>
- City of Bloomington Illinois. (2012). *Water*. Retrieved 10/24, 2012, from <http://www.cityblm.org/index.aspx?page=208>
- City of Bloomington, I. (2010). *Interim water supply plan*. Retrieved 10/24, 2012, from <http://www.cityblm.org/modules/showdocument.aspx?documentid=4192>
- Claudio, L. (2012). Our food packaging and public health *Environmental Health Perspectives*, 6(120), A223.
- Connacher, I. (Director). *Addicted to plastic* (2007).[DVD] Oley, PA: bullfrog Films.
- Finch, H., & Lewis, J. (2003). Focus groups. J. Richie, & J. Lewis (Eds.), *Qualitative Research Practices* (pp. 170-195). London: Sage Publications.
- Food and Water Watch. (2010). *Turning trash into more trash*. Retrieved 10/14, 2012, from <http://www.foodandwaterwatch.org/blogs/turning-trash-into-more-trash/>
- Food and Water Watch. (2012). *Victories*. Retrieved 11/15, 2012, from <http://www.foodandwaterwatch.org/water/take-back-the-tap/students/victories/>
- Hanging on for pure life*. (2011). Retrieved 09/19, 2012, from <http://documents.foodandwaterwatch.org/doc/PureLife-web.pdf>
- How to kick the bottle with bottled water alternatives: Aashe conference notes*. (2010). Retrieved 09/19, 2012, from <http://www.aashe.org/resources/conference/how-kick-bottle-bottled-water-alternatives>
- Huerta-Saenz, L., Irigoyen, M., Benavides, J., & Mendoza, M. (2012). Tap or bottled water: Drinking preferences among urban minority children and adolescents. *Journal of Community Health*, 37(1), 54-58.
- James, D. (2007). *Twenty-first century waterfall, animating water bottle recycling rates*. Retrieved 10/14, 2012, from <http://www.cs.cornell.edu/~djames/bottledwater/>

- King, J. (2012). The 2012 Campus Sustainability Pledge: Denison University. Retrieved 11/15, 2012, from [http://www.denison.edu/sustainability/sustainability\\_pledge.html](http://www.denison.edu/sustainability/sustainability_pledge.html)
- Kuch, B., Kern, F. M., J., & Trenck, K. (2010). Effect-related monitoring: Estrogen-like substances in groundwater. *Environmental Science and Pollution Research International*, 17(2), 250-260.
- Larsen, L. (Ed.). (2010). *Environmental health sourcebook* (3rd ed.). Detroit: Omnigraphics.
- Mackenzie-Mohr-D. (2011). *Fostering sustainable behavior: An introduction to community-based social marketing* (3rd ed.). Gabriola Island, Canada: New Society Publishers.
- Marino, A. (2012). *University bans bottled water, installs filling stations on campus*. Retrieved 09/23, 2012, from [http://www.thedepauw.com/news/university-bans-bottled-water-installs-filling-stations-on-campus-1.1992340#.UF9-CxwkB\\_p](http://www.thedepauw.com/news/university-bans-bottled-water-installs-filling-stations-on-campus-1.1992340#.UF9-CxwkB_p)
- Raj, S. D. (2005). Bottled water: How safe is it? *Water Environment Research*, 77(7), 3013-3018.
- Reidel, J. (2012). *UVM one of first universities to end sales of bottled water, mandate healthy vending options*. Retrieved 10/3, 2012, from <http://www.uvm.edu/~uvmpr/?Page=news&storyID=13129&category=ucommfeature>
- Reimann, C., Birke, M., & Filzmoser, P. (2010). Bottled drinking water: Water contamination from bottle materials (glass, hard PET, soft PET), the influence of colour and acidification. *Applied Geochemistry*, (25), 1030-1046.
- Reimann, C., Birke, M., & Filzmoser, P. (2012). Temperature-dependent leaching of chemical elements from mineral water bottle materials. *Applied Geochemistry*, 27(8), 1492-1498.
- Saquin, J.M., Saquin, C.D., Knappe, D.R., & Barlaz, M. A. (2010). Impact of plastics on fate and transport of organic contaminants in landfills. *Environmental Science & Technology*, 44(16), 6396-6402.
- Sax, L. (2010). Polyethylene terephthalate may yield endocrine disruptors *Environmental Health Perspectives*, 118(4), 445-448.
- Selina, I. (Director). (2008). *Flow*. [Video/DVD] Oscilloscope Laboratories.
- Sharfstein, M. (2009). *FDA testimony: Regulation of bottled water*. Retrieved 09/23, 2012, from <http://www.fda.gov/NewsEvents/Testimony/ucm170932.htm>
- Sodexo Inc. (2010). *2010 sustainability report: North America*. Retrieved 09/19, 2012, from [http://bettertomorrow.sodexousa.com/pdf/Sodexo\\_Sustainability\\_Report\\_18.pdf](http://bettertomorrow.sodexousa.com/pdf/Sodexo_Sustainability_Report_18.pdf)
- Soechtig, S. (Director). (2010). *Tapped*. [Video/DVD]. Atlas Films.

- Spar, D., & Bebenek, K. (2009). To the tap: Public versus private water provision at the turn of the twentieth century. *Business History Review*, 83(4), 675-702. Retrieved from <http://search.ebscohost.com.proxy.iwu.edu/login.aspx?direct=true&db=aph&AN=47591904&site=ehost-live&scope=site>
- St. Olaf College. (2012). Recycling and Composting. Retrieved 11/15, 2012, from <http://www.stolaf.edu/about/sustainability/composting.html>
- Sullivan, M. J., & Leavey, S. (2011). Heavy metals in bottled natural spring water. *Journal of Environmental Health*, 73(10), 8-13. Retrieved from <http://search.ebscohost.com.proxy.iwu.edu/login.aspx?direct=true&db=aph&AN=60678155&site=ehost-live&scope=site>
- The Talloires Declaration*. (2007). Retrieved 10/3, 2012, from <http://www.iwu.edu/enviro/activities/talloires.html>
- US EPA. (1973). *EPA press release history: EPA safe drinking water standards go into effect today*. Retrieved 09/23, 2012, from <http://www.epa.gov/aboutepa/history/topics/sdwa/03.html>
- US EPA. (2011). *Marine debris in the north pacific: A summary of existing information and identification of data gaps*. Retrieved 10/16, 2012, from <http://www.epa.gov/region9/marine-debris/pdf/MarineDebris-NPacFinalAprvd.pdf>
- US EPA. (2012). *Drinking water contaminants* Retrieved 09/23, 2012, from <http://water.epa.gov/drink/contaminants/index.cfm#List>
- Wagner, M. (2010). *AASHE student diary series: Advice for banning bottled water on campus? (st. lawrence U)*. Retrieved 09/17, 2012, from <http://www.aashe.org/blog/aashe-student-diary-series-advice-banning-bottled-water-campus-st-lawrence-u>
- Ward, L. A., Cain, O. L., Mullally, R. A., Holliday, K. S., Wernham, A. G. H., Baillie, P. D., & Greenfield, S. M. (2009). Health beliefs about bottled water: A qualitative study. *BMC Public Health*, 9, 196-204.
- Water on tap: What you need to know*. (2009). Retrieved 09/19, 2012, from [http://water.epa.gov/drink/guide/upload/book\\_waterontap\\_full.pdf](http://water.epa.gov/drink/guide/upload/book_waterontap_full.pdf)
- Xu-Liang Cao, & Corriveau, J. (2008). Survey of bisphenol A in bottled water products in Canada. *Food Additives & Contaminants: Part B: Surveillance Communications*, 1(2), 161-164.

### **Personal Communications**

- Besch, B., Personal Communication, October 16, 2012
- Galka, M., Personal Communication, September, 15, 2012

**Appendix 1**

- 1) How long did this process of eliminating disposable bottled water take at your school?
- 2) How did students get involved in eliminating bottled water?
- 3) What were the barriers in place of successful implementation, and how did you overcome those?
- 4) What do you feel are the most important steps to take to ensure maximum success?
- 5) What advice would you give to students from other schools that are trying to ‘take back the tap?’

**Appendix 2**

***Drinking Water Survey***

The purpose of this survey is to understand the drinking water preferences of IWU student, faculty, and staff.

**I am:**

A student                      Faculty or Staff

**Do you have a meal plan with meal exchange?**

Yes                                      No

**Do you buy disposable water bottles?**

Yes                                      No

**On average, how many times per week do you buy a disposable plastic water bottle?**

1-2                                      3-4                                      5 or more

**Where do you buy your bottled water?**

Dugout              Hansen              Vending machine on campus      Off Campus

**Why do you buy bottled water? Check all that apply:**

- Convenience
- It is the healthiest drink option
- I don't like the taste of Bloomington tap water
- Bottled water is cleaner than the tap
- Other \_\_\_\_\_

**Do you own a reusable water bottle? Why or why not?**

Yes \_\_\_\_\_  
No \_\_\_\_\_

**If you had easy access to filtered tap water on campus, would you be more inclined to use a reusable water bottle?**

Yes                                      No

**Please read the following statistics:**

- On average, bottled water is 1900 times the cost of tap water
- Roughly 40 percent of bottled water is just filtered tap water.
- The chemicals that are used to produce the plastic in the bottles contain potentially harmful chemicals than can leach into the water. This leaching increases in high temperatures (such as in a delivery truck or car trunk in the summer), when stored over time, or used multiple times.
- In the United States, the production of the plastic bottles requires an estimated 74 million gallons of oil a year

**Would you support a ban of disposable plastic water bottle sales on campus?**

Yes  No

**Would you still be opposed to a ban of disposable water bottles if there were more filtered water fountains on campus?**

Yes  No

**If IWU banned disposable plastic water bottles, would you buy them from another location? If yes, why?**

Yes \_\_\_\_\_

No

**What do you see as the biggest barrier to getting rid of bottled water on campus?**

It would take away the freedom of choice

It would take away the healthiest beverage on the menu

Forgetting to carry a reusable water bottle

Other \_\_\_\_\_

**On a scale of 1-5, how environmentally conscious would you say that you are? 1- Not at all; 5- Very environmentally conscious**

1                      2                      3                      4                      5

**Appendix 3**

***Focus Group Topic Guide:***

*When:* Monday, October 22, 2012

*Where:* Center For Liberal Arts, Illinois Wesleyan University

*Who:* 6 IWU Students

**Objectives:**

- \* Determine what factors influence the decision to purchase bottled water
- \* Determine the barriers of eliminating the sale of bottled water on campus
- \* Gain input on possible alternatives to bottled water

*Introduction/ opening statement:* My name is Joe Daniels, and I am a student conducting research for my Environmental Studies senior seminar class. Illinois Wesleyan is considering discontinuing the sale of disposable plastic water bottles from their Sodexo locations. The purpose of this study is to gain student input on this issue.

*Ground Rules:* Last about 45-60 minutes. Feel free to speak freely, and I want to give everyone an equal opportunity to speak. Explain Institutional Review Board (IRB) protocol, and have them sign. **Start recording**

*Group introductions:* Name, year, and major

1. Environmental Background

- Prior classes
- Experiences

2. Current consumption

- Reusable water bottles
- Disposable water bottles
- Where do you buy them?

3. Barriers

- Perceived potential barriers?
- Meal exchange
- Lack filtered water
- Others?

4. Implementation

- New Dugout dining hall set-up/ Grab and Go station
- Change all at once, or over time

5. Ease of transition

- Ideas to make this easier on students
- Educational materials
- What would you want to see?

6. Map ideas discussed

7. Final thoughts

## **Appendix 4**

### ***The Talloires Declaration***

1. Increase Awareness of Environmentally Sustainable Development
2. Create an Institutional Culture of Sustainability
3. Educate for Environmentally Responsible Citizenship
4. Foster Environmental Literacy For All
5. Practice Institutional Ecology
6. Involve All Stakeholders
7. Collaborate for Interdisciplinary Approaches
8. Enhance Capacity of Primary and Secondary Schools
9. Broaden Service and Outreach Nationally and Internationally
10. Maintain the Movement