



## FOIA Document Context

This document, “Disposable Plastic Water Bottle Recycling and Reduction Program Evaluation Report” (Report), is being provided in response to FOIA 17-1198 Ross, regarding National Park Service (NPS) estimates for the effectiveness of the disposable water bottle sales elimination program. After reviewing program records, the Park Facility Management Division (PFMD) believes this was the “assessment” mentioned by an anonymous source in the Washington Post writeup entitled “National parks put a ban on bottled water to ease pollution. Trump just sided with the lobby that fought it.”

Though the Report’s original intent was to help NPS leaders understand and take action on the policy, the bureau lacked the data necessary to ensure the Report’s findings.

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National Park Service  
Department of the Interior



National Park Service  
*"Disposable Plastic Water Bottle Recycling and Reduction"*  
Program Evaluation Report

Park Facility Management Division

May, 2017

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## I) INTRODUCTION

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The mission of the National Park Service (NPS), a bureau within the U.S. Department of the Interior (DOI) is to “preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.” In support of the mission, the NPS seeks to ensure sustainable management of the national parks through development and implementation of programs aimed to reduce the environmental footprint of its operations and assets and improve resource efficiencies.

On December 14, 2011, NPS Director Jonathan Jarvis issued Policy Memo (PM) 11-03, “Recycling and Reduction of Disposable Plastic Bottles in Parks.” The policy allows parks to voluntarily establish disposable plastic water bottle sales elimination programs (DPWB SEPs) that aim to reduce the disposal of plastic water bottles in national parks.

This report summarizes the environmental benefits associated with the policy as of 2016; describes the monitoring and continuous improvement efforts taken by NPS; and identifies future program activities as required in Section E of the policy.

## II) BACKGROUND

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The PM 11-03 policy supports a life-cycle approach to reducing the generation of water bottle waste from purchase, use, and disposal. It emphasizes mechanisms that prevent the waste from being generated in the first place, primarily through the elimination of disposable plastic water bottles sold by NPS and its operating partners and concessioners.

The policy requires a four-pronged life-cycle approach as noted below:

1. **Disposable water bottle recycling** – Parks are encouraged to provide ample, well designed, and well-marked collection containers throughout the park.
2. **Sales reduction of disposable water bottles** – Parks are encouraged to reduce the sale of DPWB through the availability of reasonable priced reusable bottles and visitor education programs.
3. **Sales elimination of disposable water bottles** – Parks must assess the following elements of eliminating the sale of DPWB:
  - Amount of waste eliminated and pros/cons to park operations.
  - Infrastructure costs and funding sources for filling stations.
  - Potential contractual implications on concessioners, including consideration of new leaseholder surrender interest or possessory interest.
  - Operational costs of filling stations including utilities and regular public health testing.
  - Cost and availability of bisphenol A (BPA)-free reusable containers.
  - Potential effects on concessioner and cooperating association sales revenue.
  - Availability of water within concessioner food service operations.
  - Visitor education in the park and online so that visitors come prepared with their own water bottles.
  - Results of any consultation with NPS Public Health Office.
  - A sign plan to ensure visitors can easily find filling stations.
  - Safety considerations for visitors who may resort to not carrying enough water or drinking from surface water sources with potential exposure to disease.

- A system for annual evaluation of the program, including public response, visitor satisfaction, buying behavior, public safety, and plastic bottle collection rates.
  - Results of consultation with concessioners and cooperating associations.
  - Timeline of phase-in period.
4. **Visitor education on water bottle strategy** – Parks must develop a proactive visitor education strategy addressing visitor expectations and explaining the rationale for the park’s strategy to reduce, recycle or eliminate DPWB.

In the fiscal year 2016 omnibus appropriation bill, signed December 18, 2015, the following clause was included (emphasis added):

*Sales of Bottled Water at Park Units. The Committees are aware of concerns raised about Director’s Policy Memorandum 11-03 relating to disposable plastic water bottle recycling and reduction, which provided park units the option to eliminate the sale of bottled water on a park-by-park basis. The Committees understand that 19 parks have eliminated the sale of disposable water bottles as a result of this policy and direct the Service to **provide, not later than 60 days after enactment of this Act, a report that details the data the Service reviewed and the justification for making the determination to ban bottled water at each affected park unit.***

The NPS responded to the Committees with the requested information:

1. The full text of PM 11-03.
2. The list of parks that have implemented a disposable plastic water bottle sales elimination program to date.
3. The justification packages for each park that supported the regional directors’ decisions.

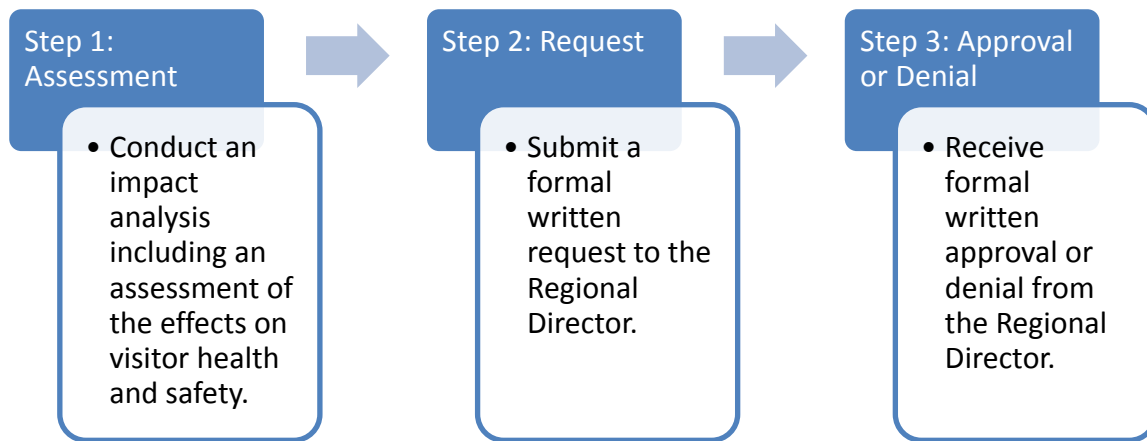
#### **A) Process for Meeting Policy Requirements**

Prior to requesting approval from the regional director to become a participating program park, a park must follow PM 11-03 policy guidelines that require the following:

- Complete an analysis (addressing the factors [above](#)) to ensure employees and visitors are provided with adequate alternative safe drinking water sources.
- Have a plan in place to reduce and/or eliminate the sale of disposable plastic water bottles.
- Install conveniently located water bottle filling stations.
- Communicate and educate its visitors about its DPWB SEP.

A regional director may deny the park from becoming a participating program park if any of the above elements were not adequately addressed in the park’s formal request.

### Visual 1: Three-step process for a park to participate in the NPS DPWB SEP.



*Note: For purposes of the program and this report, only those parks that completed steps 1-3 above were considered to be participating parks of the program.*

### **B) Program Catalyst**

The NPS developed the DPWB SEP policy after Grand Canyon National Park, located in the Intermountain Region, initiated its own elimination program in 2010 which garnered a mix of industry and public interest. Working in conjunction with Grand Canyon National Park, the NPS took steps to re-assess the park’s policy and program implications. During this time, an online petition in support of the park’s program was established on the “Change.org” website. The [petition](#) was signed by more than 100,000 people and with the support of the public and NPS, Grand Canyon National Park continued the implementation of its program.

To ensure program consistency for other parks that wanted to participate in the program, the NPS developed PM 11-03, which established a national framework to guide parks through the voluntary process of establishing DPWB SEPs and set program requirements to monitor program effectiveness and opportunities for improvement.

### **C) Monitoring and Continuous Improvement**

To monitor and track program success and challenges, Section E. of PM 11-03 requires monitoring and continuous improvement to determine park and NPS-wide environmental impact, visitor welfare, acceptance and support, and effects on concessioners and cooperating associations. Specifically, PM 11-03 requires the NPS to:

- Coordinate with producers, suppliers, and the scientific community to gather information on environmental impacts, new technologies, and industry best practices.
- Implement pilot projects and ideas where appropriate.
- Review and revise the program periodically.

### III) PROGRAM REPORTING

This section summarizes key actions the NPS has taken to date to address PM 11-03 Section E. “Monitoring and Continuous Improvement.”

#### A) Participating NPS Park Units

The NPS maintains a master list of parks that participate in the DPWB SEP (Table 1 below). In addition to the inventory, the NPS maintains a file repository for each park including the park’s request to the regional director, impact assessment files, and supporting information.

**Table 1: List of the 23 NPS Parks with Formal Approval to Implement DPWB SEPs\***

Park #	NPS Region	Park Alpha Code	Park Name
1	IMR	ARCH	Arches National Park
2	IMR	BRCA	Bryce Canyon National Park
3	IMR	CANY	Canyonlands National Park
4	IMR	COLM	Colorado National Monument
5	IMR	FOLA	Fort Laramie National Historic Site
6	IMR	GRCA	Grand Canyon National Park
7	IMR	PECO	Pecos National Historical Park
8	IMR	PEFO	Petrified Forest National Park
9	IMR	SAAN	San Antonio Missions National Historical Park
10	IMR	SAGU	Saguaro National Park
11	IMR	SAPU*	Salinas Pueblo Missions National Monument
12	IMR	TICA	Timpanogos Cave National Monument
13	IMR	ZION	Zion National Park
14	MWR	MORU	Mount Rushmore National Park
15	MWR	WICA	Wind Cave National Monument
16	NCR	ANTI	Antietam National Battlefield
17	SER	BISC	Biscayne National Park
18	SER	CAHA	Cape Hatteras National Seashore
19	SER	FORA	Fort Raleigh National Historic Site
20	SER	FOSU	Fort Sumter National Monument
21	SER	MACA	Mammoth Cave National Park
22	SER	WRBR	Wright Brothers National Memorial
23	PWR	MORA	Mount Rainier National Park

*\*Note: Sixteen additional parks provided data to NPS SOCC in response to 2016 data calls collecting information about DPWB SEP implementation. Please note data from these additional parks was not accounted for in this*



*report because they were not included in regional responses as approved participating parks. Additionally, although SAPU received approval from the regional director for their DPWB SEP, they have not yet installed any water bottle filling stations and as a result, were unable to provide any water bottle filling station usage data.*

## **B) Data Sources**

As indicated above, and as incorporated within the NPS response to the request from the 2016 omnibus appropriation's bill, the NPS recognized 23 participating parks in the program ([Table 1 above](#)).

In September 2016, the NPS initiated a data call to the regional directors that requested each participating park gather information on water bottle filling stations, including descriptive information about the filling stations, the dates the filling stations were installed and available refill counter data that showed station usage. For those filling stations that did not have refilling counter data available, parks were asked to provide, where possible, any other estimation of usage such as metered total volume of water dispensed, or estimated number of bottle refills per day. The information collected from this data call was input into a tool that calculates the environmental benefits (see [EBC Tool below](#)). It should be noted that there are some NPS park units that provided data in response to the data call but were not authorized participants of the program. Although this additional data would increase the environmental benefits stated in this report, the data was not included in program analyses because the park are not authorized program participants.

## **C) Program Tools and Measurement Protocol**

In 2016 the NPS developed two program components to track and monitor benefits from the participating parks. Components include a documented environmental benefits measurement protocol and an environmental benefits calculator (EBC) tool.

### **1. EBC Tool**

The EBC tool measures the benefits associated with reduced generation and disposal of DPWB at each park. Park-level benefits are then summarized at the bureau-wide level. The EBC tool includes categories of information such as:

- Background park information.
- Summary of pertinent data provided in each park's policy request and assessment.
- Water filling station usage information.

These data were input into the EBC tool and calculated the resulting environmental benefits in the categories listed below:

- Prevented number of disposable plastic water bottles sold/used/discarded per year.
- Prevented pounds of polyethylene terephthalate (PET) generated per year.
- Prevented air emissions per year.
- Prevented energy use (energy savings) per year.
- Prevented (saved) landfill space per year.

## **2. EBC Protocol**

The EBC protocol defines the approach used to structure the EBC tool. The protocol defines and documents:

- The data sources used in the EBC tool.
- Justification for data source selection.
- Limitations to collecting certain data types and sources.
- Factors, conversions, calculations and estimations used in the tool.

The basis of the factors, conversions, and calculations used to generate the environmental benefits is based on the peer reviewed, U.S. [Environmental Protection Agency \(EPA\) Waste Reduction Model \(WARM\), Version 14](#), and from the National Association for PET Container Resources (NAPCOR), a trade association for the PET plastic packaging industry. Solid waste planners and organizations use the EPA WARM model to track greenhouse gas emissions that result from different waste management practices, such as from source reduction as in the case of the NPS program. NAPCOR provides resources and statistics aimed to promote the use of PET and facilitate its recycling.

## **3. Calculation of Environmental Benefits**

The protocol for tracking and calculating the program's environmental benefits are summarized below:

1. The EBC tool uses digital counter data and usage estimates provided by parks to calculate bottles/year.
2. Bottles/year is divided by park visitation amounts to calculate bottles/visitor/year rates.
3. Bottles/visitor/year rates are averaged across the portfolio of parks that provided filling station data to create an average bottles/visitor/year rate.
4. This rate is then applied to the parks that did not provide ANY filling station usage data.
5. Data calculations summarized above result in annual bottles/year for each filling station.<sup>1</sup>
6. The summation of bottles/year amounts is then calculated at the 95% confidence interval to give both lower and upper boundaries.

The EBC tool uses factors and conversions from EPA's WARM model version 14 to analyze the 95% confidence interval lower and upper boundaries to generate environmental benefits – specifically energy, GHG's, PET, and landfill savings.

For specific details, please refer to the NPS "Recommended Protocol for Analysis of Environmental Benefits: Policy Memorandum 11-03 Disposable Plastic Water Bottle Recycling and Reduction."

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<sup>1</sup> Filling stations located at each of the 23 parks were brought into service in different months and years since the program's inception. Due to the varying lengths of program operation, presenting the results on an annual basis is the most effective way to communicate results.

## IV) ENVIRONMENTAL BENEFITS DATA ANALYSES AND RESULTS

The following table provides a summary of the resulting environmental benefits.

**Table 2: Summary of Annual Environmental Benefits from 23 Parks with DPWB SEPs.**

Range of DPWB Prevented (per year)	Range of Pounds of PET Prevented (per year)	Range of Emissions Prevented (MTCO <sub>2</sub> e/year)	Range of Energy Consumption Prevented (MBtu/year)	Range of Landfill Space Conserved (per year)
Assume average bottle size of 16 ounces.  Data is presented at the 95% confidence interval.	Assume average bottle size of 16 ounces and 18 bottles per pound.	Includes emissions from avoided PET bottle production and transport (source reduction) and avoided disposal (landfilling or recycling)	Includes energy savings from avoided PET bottle production and transport (source reduction) and avoided disposal (landfilling or recycling)	Cubic yards/year
1.32M – 2.01M	73,624 – 111,743	93 -141	2,209 – 3,353	276 - 419

Data collected from the parks entered into the EBC tool show that on an annual basis, the parks with approved programs prevent between 1.32M – 2.01M DPWB from being purchased, used, and discarded.

Associated life-cycle environmental benefits include:

- **Pounds of PET** – Prevents between 73,624 and 111,743 pounds of PET from being purchased, used, and discarded per year.
- **Emissions** – Prevents between 93 and 141 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e/year) per year. This is equivalent to between 9.8 and 14.9 homes’ energy use for one year, or between 215 and 326 barrels of oil.<sup>2</sup>
- **Energy** – Prevents between 2,209 and 3,353 million British thermal unit (MBTUs/year) of energy per year. This is equivalent to energy usage of 24.5-37.2 homes for one year<sup>3</sup>, or between 397 and 603 barrels of oil.<sup>4</sup>
- **Landfill Space** – Saves between 276 and 419 cubic yards per year.

As parks continue to implement their DPWB SEPs, these numbers and the resulting environmental benefits are expected to grow.

<sup>2</sup> <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

<sup>3</sup> <http://www.eia.gov/todayinenergy/detail.php?id=6570>. According to the website, the average household consumed 90 million British thermal units (Btu) in 2009.

<sup>4</sup> <https://www.unitjuggler.com/convert-energy-from-MMBtu-to-boe.html?val=3079>

## A) Discussion of Results

In 2012, the NPS published the Green Parks Plan (GPP) and released an updated version in 2016. This document represents the NPS strategic vision for sustainable operations. It established goals for energy, water, and GHG reduction, among others. The resulting benefits from the DPWB SEP directly contribute to several NPS Green Parks Plan goals:

- **Be Climate Friendly and Climate Ready** – Preventing the sale, use, and disposal of DPWB equates to GHG savings of 93-141 MTCO<sub>2</sub>e/year.
- **Buy Green and Reduce, Reuse, and Recycle** – Preventing the sale, use, and disposal of DPWB equates to 276-419 cubic yards of landfill space per year.
- **Adopt Best Practices** – Park efforts to increase recycling, enhance visitor education on environmental issues, and eliminate the sales of DPWB represents just a few ways in which the NPS strives to incorporate sustainability into its operations.
- **Foster Sustainability Beyond Our Boundaries** – Visitors who bring or purchase refillable water bottles and refill them at a water bottle filling station are directly engaging and participating in park sustainability efforts.

Annual savings of 1.32M – 2.01M water bottles/year demonstrates the program has significant positive environmental benefits that encompass the entire life cycle of DPWB. It also indicates that parks support the PM11-03 and are seeing tangible outcomes. The policy further demonstrates the commitment of the NPS to environmental stewardship, to reducing the environmental footprint of the NPS, and to the concept of sustainability.

## B) Lessons Learned from Other Organizations and Available Tools

Other organizations have begun implementing water bottle elimination programs, or are employing other initiatives that promote the consumption of safe, clean drinking water in reusable containers as a substitute to DPWBs. The section below provides useful resources, websites, and summaries of other initiatives from which the NPS may learn.

### 1. The U.S. Environmental Protection Agency (EPA)

In addition to EPA's WARM model, the agency hosts several websites, tools, and other resources on the topics of recycling, source reduction, waste management, and more. A new [Materials Management Wizard](#) helps users find the most relevant tool and resource for their specific reuse project. For example the site offers access to the EPA's Safe Drinking Water Information System (SDWIS). This system provides a searchable database the public can use to determine if their local public water system was cited for any EPA drinking water violations in the past, and what those citations entailed.

In 2015, the EPA launched, along with the University of California and the Product Stewardship Institute, a tool on [marine debris and plastics reduction](#). While its focus is on colleges and universities, the toolkit provides practical steps to helping academic campuses reduce their use and generation of plastic waste, including but not limited to DPWB.

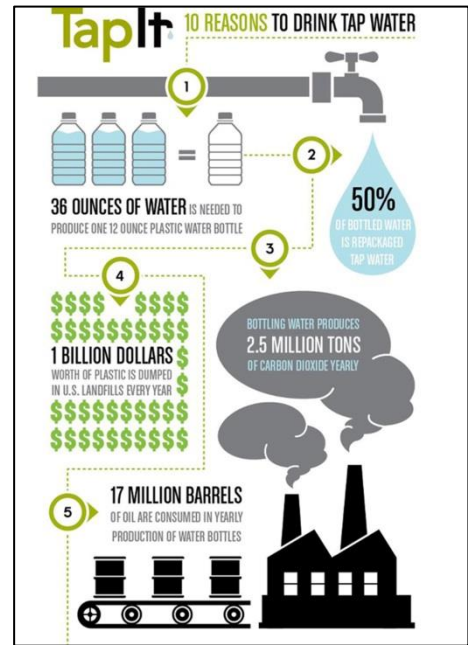
In 2005, the EPA produced a "[Water Health Series: Bottled Water Basics](#)" report that explained many commonly used water terms such as mineral water, artesian water, purified water, and drinking water. The report included recommendations for consumers to read labels to better understand the various

water choices in the market, and included a discussion of contaminants in drinking water and methods of treatment. The report also informs readers that bottled water sold in the United States must meet the Food and Drug Administration (FDA) standards for physical, chemical, microbial, and radiological contaminants. The FDA standards are based on EPA standards for tap water provided by public water supply systems.

## 2. TapIt

TapIt is a water bottle refilling program in the greater Washington D.C. area. The TapIt campaign is a part of Metropolitan Washington Council of Government's (COG) Community Engagement Campaign (CEC), a partnership between COG and regional water supply and wastewater members to engage the citizens of the National Capital Region in wise water use and source water protection, via public messaging. The premise of the TapIt Program is that an individual can ask a participating partner (such as a restaurant) to refill a beverage container with drinking water free of charge. The TapIt website and app include a list of participating businesses and organizations, giving members the benefit of additional advertising and increasing general foot traffic to the business and area. Partners also have access to a window decals, magnets, stickers, flyers, and information tents. TapIt currently has over 600 partners in the D.C. metro area with over 1,000 locations that offer a free water refill. The TapIt app has had approximately 5,200 downloads to Apple and GooglePlay devices since the summer of 2015. The program does not monitor the quantity of water bottle refills that its partners provide.

The TapIt website is easy to navigate and provides visual infographics that help partners and individuals understand the environmental impacts (see Visual 2). TapIt also partners with D.C. Water to conduct taste challenges in which the public samples both tap water and bottled water and votes for their preference. According to TapIt, in a recent taste challenge more than half of the 800 people who participated either thought that tap water tasted better, or could not tell a difference between tap and bottled water.



Visual 2: Infographic provided by TapIt. Source: TapIt.

## 3. City of San Francisco

The City of San Francisco has taken many steps to become more sustainable. San Francisco encourages residents to drink tap water and rely less on packaged or bottled water. The City of San Francisco states their "water delivery system consistently provides among the purest, safest drinking water in the nation from spring snowmelt stored in the Hetch Hetchy Reservoir and flowing down the Tuolumne River."

In 2007, the mayor of San Francisco instituted an Executive Directive that prohibited the purchase of bottled water by City Departments with city funds, unless an employee contract required otherwise. Executive Directive 07-05 applied to city contractors and city funded and/or sponsored events. The



Executive Directive also required that each city department complete an audit to determine the “viability of switching from bottled water dispensers to bottle-less water dispensers that utilize Hetch Hetchy supplied water.” Finally, by the end of 2007, all city departments and agencies were required to install bottle-less water dispensers that once again used the Hetch Hetchy water supply. As a result of the Executive Directive, the San Francisco Department of Environment claims that by eliminating the purchase of single serve bottled water and five-gallon bottle delivery at over 100 department locations, the city saves over \$150,000 per year.

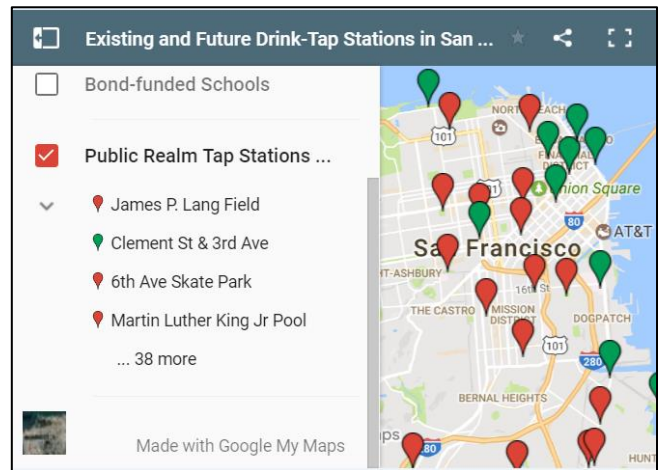
In 2012, the Port of San Francisco adopted a similar ban as part of the Port’s “[Policy for Zero Waste Events and Activities](#),” and restricted the sale, use and disposal of DPWB on Port property at events of over 5,000 attendees. While the Port does not monitor or track how successful the policy is at preventing the use of DPWB, Port officials stated they have issued 110 event permits since implementing the ban. Additionally, Port officials learned from their experience developing and implementing the policy. Lessons included:

- Ensure event organizers know the locations of water spigots and other sources of potable water on the property, so they can plan for alternatives to providing single-serving DPWB.
- Determine an appropriate threshold trigger amount for banning DPWBs at events (e.g., the 5,000 event participant level).
- Anticipate responses to alternatives suggested by event organizers. For example, while the Port policy prohibited plastic water bottles, event organizers asked if boxed water was acceptable. Boxed water is a mixture of cardboard and plastic and may not be readily recyclable as either paper or plastic.

The 2013 34<sup>th</sup> Americas Cup was the largest event to occur on Port property since 2012. Organizers trucked in potable water and provided free drinking water stations for spectators. During the event, they dispensed over 38,000 liters of water to spectators, equivalent to avoiding over 80,308 16-ounce plastic water bottles.

In 2012 the City of San Francisco passed an [ordinance](#) requiring new construction buildings, both city-owned and privately-owned, to install water fountains that can refill reusable bottles. At this time, the San Francisco Department of Building Inspection does not track any performance metrics related to the ordinance such as number of bottle filling stations installed since the ordinance took effect.

Over the past several years, the City of San Francisco installed water bottle filling stations throughout the city and in the San Francisco Unified School District public schools. The City even created a [short video promoting the use of the filling stations](#). To date the City has installed 31 refillable water bottle stations in public areas, and 51 stations in the San Francisco Unified School District public schools. The city plans to install 20 more stations throughout the city and another 22 stations in schools this fiscal year. One of those filling stations already installed, located at the California Academy of Sciences in Golden Gate Park, is equipped with a digital counter. This particular station has saved 190,671 DPWB (as of December 2016) since it was installed in 2011, equating to preventing the use of over 38,000 DPWB per year. A second bottle filling



Visual 3: Interactive map of water bottle refilling stations located throughout the City of San Francisco. Source: San Francisco Public Utilities Commission.

station installed in a light commercial area and residential neighborhood does not have a digital counter, but does have a traditional water meter. The station was installed in November 2015 and dispenses approximately 1,000 gallons per month, for a total of approximately 12,000 gallons dispensed since its installation, equivalent to 750 16-ounce DPWB. The City recently partnered with the University of California San Francisco Medical School and the San Francisco Health Improvement Program to study the public health benefits of the filling stations in public areas. No data is yet available from this study.

Finally in 2014, the City passed an [ordinance](#) to phase out the sale of plastic water bottles that hold 21 ounces or less in public spaces<sup>5</sup>. The specifics of the ordinance include:

- Prohibition of selling or distributing bottled water at any permitted indoor or outdoor event held on City property.
- City departments must identify which areas have a reliable on-site supply of potable water that can be used for events.
- Prohibition of City departments from using city funds to purchase bottled water.
- An exemption for the sale or distribution of bottled water to participants in an athletic event.
- An exemption for an event sponsored by a not-for-profit organization that has over 250,000 attendees.
- A City department may waive the requirements of the ordinance if the permittee demonstrates the ordinance would cause undue hardship, or would not be feasible.

While the City's Department of Environment does not currently have measurable performance data on success of the ordinance, the Department did confirm they had not received any requests for waivers from the ordinance since its inception.

#### **4. Town of Concord, Massachusetts**

In 2013, the town of Concord, Massachusetts passed a [bylaw](#) that prohibits the sale of non-sparkling, unflavored drinking water in single-serving PET bottles of 34 ounces or less throughout the town. The bylaw took effect January 1, 2013 and is still in effect. The town of Concord, Public Health Department which is tasked with enforcing the bylaw, was contacted for additional information about the number of plastic bottles saved, and other indicators of performance. The Public Health Department responded in January 2017 and stated they do not track or monitor the resulting benefits of the plastic water ban in the town, nor do they collect or track the number of plastic bottles prevented from being sold, transported, or discarded as the result of the bylaw.

In February 2016, New York Public Radio, WNYC, [interviewed Concord residents](#) about what advice they would give other organizations and municipalities that wanted to implement similar prohibitions on DPWB. Residents responded with the following advice:

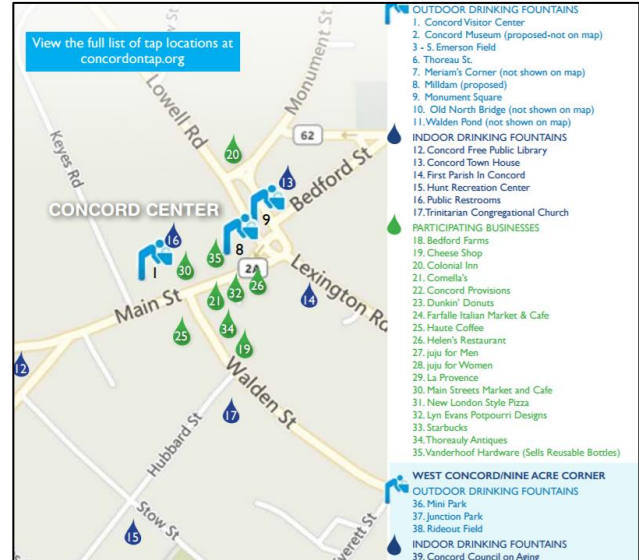
- Ensure there are an adequate number of water fountains that can accommodate the refilling of reusable water bottles in the area affected by a DPWB ban. Additionally, consider the local climate and how it might affect implementation of the ban. For example, some geographic areas

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<sup>5</sup> Note: As of January 2017, the City of San Francisco Board of Supervisors approved amendments to the ordinance that are currently awaiting signature by the Mayor. The amendments expand the ordinance to include "packaged water" meaning drinking water in a sealed box, bag, can, glass bottle, rigid plastic bottle, or other container with a capacity of five gallons or less.

(such as Concord, MA) must turn off public water fountains over the winter season to avoid pipe bursts, which limits the public's access to free sources of tap water.

- Provide easy and plentiful access to free tap water. After the bylaw was passed in Concord, MA, a program called “[Concord on Tap](#)” was started which aimed to increase citizen and visitor access to tap water and help local businesses “adapt and thrive.” Businesses are getting involved by offering free access to tap water for anyone that brings in a reusable container. Businesses that offer this service receive a “Concord on Tap” window decal, advertising that the public may refill their water bottles free of charge.
- Focus program marketing on the perception that people have about the taste and quality of bottled water being superior to that of tap water within a specific geographic area. People may believe bottled water is healthier and safer to drink compared to tap water. While that may be the case in some areas of the country, it is generally not the case throughout the United States.<sup>6</sup>



Visual 4: Town of Concord, MA map available online and in the visitor center which denotes all water fountains and participating “Concord on Tap” businesses that offer free water bottle tap refills.

## 5. Detroit Zoo

In 2013, the Detroit Zoo launched an initiative to discontinue the sale and use of bottled water on zoo property. The initiative was part of the zoo’s “[Greenprint](#)” sustainable roadmap. The “Greenprint” roadmap is an ever-evolving plan that guides the zoo’s operations and facility improvements. “Greenprint” includes the areas of:

- Awareness and Innovations
- Energy
- Water Management
- Waste Management
- Shade of Green and What You Can Do

Prior to the elimination program, the retailing of bottled water was a significant revenue stream for the zoo – its 1.4 million visitors spent \$250,000 per year (an estimated 62,500 DPWB)



Visual 5: Photo of 1 of 20 water bottle filling stations installed throughout the zoo. Source: Detroit zoo.

<sup>6</sup> According to the EPA, their compliance data show that more than 90 percent of the nation’s water systems consistently meet those standards. <https://blog.epa.gov/blog/2016/04/moving-forward-for-americas-drinking-water/>



on bottled water purchases. Zoo officials took three years to completely phase out the sale of bottled water on zoo property, during which time they installed 20 water bottle filling stations and listed the station locations on the zoo's map. They also started selling reusable plastic water bottles with the zoo's logo for a lower cost of \$2.59 compared to bottled water which was sold for \$3.99. Additionally, information about the water bottle initiative was posted on the zoo's [website](#) to alert visitors prior to their arrival. The three-year phase in period was completed in 2016. Zoo officials state that as a result of the initiative, the use of an estimated 60,000 DPWB is prevented each year.

## **6. The National Aquarium**

For several years the National Aquarium located in Baltimore, Maryland has been educating visitors about the negative impacts of plastics in marine ecosystems. In 2013 the aquarium began installing water bottle filling stations and installed graphic education and interpretive panels that highlighted the problem of plastic pollution in oceans and waterways. That year they sold over 50,000 DPWB. In April 2014, as part of their sustainability commitment to "walk the walk," the aquarium decided to eliminate the sales of DPWB, though continued to offer sales of other beverages in plastic containers. They began selling BPA-free aquarium branded reusable water bottles filled with purified water for \$3.99; which was \$1.00 less expensive than the bottled water previously sold. They offered free water refills and refills of fountain soda with a compostable cup. They also offered fruit-infused water, and offered hot and iced coffee and hot and iced tea in compostable/recyclable cups.

In 2013 DPWB sales amounted to \$166K, then dropped to \$32K in 2014 and reached \$0 in 2015 and 2016. The National Aquarium noted that as the sales of DPWB were eliminated, the aquarium saw an increase in the sale of reusable water bottles. In 2014 the aquarium had \$50K in the sale of reusable bottles; in 2015 the total increased to \$79K; and in 2016 the total increased to \$134K. In fact the reusable water bottles are now consistently in the top three products sold at the aquarium. Additionally, the sale of beverages in compostable cups increased from \$246K in 2013 to \$281K in 2016. To continue on their path towards sustainability in 2017 the aquarium plans to eliminate all bottled beverages sold in disposable plastic bottles.

The aquarium offers the following lessons learned for other organizations planning to implement similar DPWB SEP:

- Develop a marketing campaign to strengthen the message of why the organization eliminated the sales of DPWB and provide information and messaging to employees who interact with visitors.
- Communicate the plan internally within the organization and ensure employees and departments understand their role.
- If working with partner groups (e.g., vendors), get them involved early in the process to help make decisions and consider potential impacts.
- Be innovative and listen to visitor input that will help improve results and meet the needs of the visitors.
- Have a plan in place to track the results of the program over time.

### C) Key Observations from Other Programs

Based on research into the programs discussed above, the NPS may consider enhancing the current program guidance with the following elements:

**Table 3: Potential Opportunities for Program Enhancement**

Element	Applicability to NPS
Communication Tools: Infographics	Translate environmental benefits in easy-to-understand visual communication tools such as infographics. Infographics can be used to convey impacts at NPS regional and park-levels. Focus marketing materials on the misperception visitors may have about bottled water being healthier and safer to drink compared to tap water.
Communication Tools: Markings and Signage	Increase visitor awareness about the locations of water bottle filling stations. Consider developing icons placed on park maps and integrated into web apps and websites denoting the location of water filling stations. Provide window decals for concessioners and cooperating associations that offer free drinking water refills to visitors and develop a video that can be used to educate visitors on the benefits of the park's DPWB SEP.
Maximizing Visitor Use and Accessibility to Water Sources	Partner with concessioners and cooperating associations selling food and beverages. Consider a program where any participating partner will refill a container with drinking water, free of charge. Also, consider the climate of a park when evaluating the feasibility of a DPWB SEP. Parks that have cold winter climates where freezing water pipes are a concern may not be able to offer as many free, accessible tap water sources in outdoor water bottle refilling stations.