

Greening the Boston Marathon

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The Boston Marathon is one of the most anticipated one-day athletic events in the world because of its storied tradition and its multicultural participation. A vast amount of resources are prepared, consumed, and disposed of in the days before, during, and after the race. For a one-day event, the Boston Marathon produces a substantial amount of waste. In addition, both the organizers and the participants promote practices that are detrimental to the environment and contribute to the amount of waste produced. The purpose of this paper is to discuss ways to ‘green’ the habits of organizers and participants alike as well as reduce the size of the ‘ecological footprint’ that the Boston Marathon leaves in its wake every year.

But before delving into potential solutions, it would be in good order to mention some interesting facts about the marathon, first from an overhead perspective then more importantly from a ‘resource usage’ point of view. The Boston Marathon was founded in 1897, making it the 2nd oldest marathon in the country, 2nd only to the New York City Marathon, which was founded a year before. There are 15,000 official participants, meaning that they have run a qualifying time or better at a certified marathon around the world. In addition, there are 15,000 ‘bandit’ runners, which are basically runners who run ‘for the hell of it.’ There are 7000 volunteers for the race, 1 million spectators lined up along the course, and 120 million potential household viewers around the world [1].

Looking at Figure 1 from a ‘resource usage’ point of view, there are three major categories of resource usage. One is medical, where 500 bags of ice, 500 tubes of petroleum jelly, and 25000 aspirin tablets are made available. Another area is food, where 8000 pounds of pasta, 2000 quarts of tomato sauce, and 25000 PowerBars are consumed. The third area is course-related, where 1 million cups, 35000 gallons of

2001 Boston Marathon Resource List

PEOPLE

15,000 Official Entrants
50,000 People attending the Expo
7,000 Volunteers
1,000 Medical Personnel
1,500 Security Personnel
72 Race Officials
170 Massage Therapists
100 Physical Therapists
95 Athletic Trainers
11 Chiropractors
120 Podiatrists
30 Athlete Hospitality Volunteers
1,200 Members of the Media
120 Million Potential Household Viewers Worldwide
1 Million Spectators Along the Course
1,200 Total Uniform Police Officers
300 State Police on Separate Channels
20 Motorcycle State Police
10 Mounted State Police
500 Members of the National Guard

MEDICAL

500 Bags of Ice
380 Stretchers
1,500 Blankets
500 Tongue Depressors
200 Sick Bags
175 Ace Bandages
1,500 Gauze Pads
60 Rolls of Adhesive Bandages
250 Rolls of Moleskin
500 Surgical Soaps
500 Tubes of Petroleum Jelly
1,000 Adhesive Bandages
500 Towels
1,500 Intravenous Bags
500 Tourniquets
2 Oxygen Tanks
4 EKG Machines
4 Defibrillators
150 Blood Pressure Cuffs & Stethoscopes

MEDICAL (Continued)

80 Thermometers
16 Tympanic Thermometers
25,000 Aspirin Tablet
6 Lifeguard Stands
34,750 Gallons Belmont Spring Water
200 Bottles Antiseptic Handwash
500 Emesis Basins

EQUIPMENT

300 Digital Wireless Phones
100 Hard Wire Phone Lines
75 Chrysler/Dodge Jeep Vehicles
3,000 Signs
63,360 Feet of Rope
30,000 Feet of Fencing
20,000 Feet of Cable
10,000 Trash Bags
10,000 Cable Ties
300KW of Electrical Power
500KW of Electrical Power for Media
20 Tents
9 Million BTU's Temporary Heat
1,200 Tables
3,000 Barricades
200 x 1 Inch Rolls of Caution Tape
10 Fork Lifts
10 Scissors Lifts
600 Port-o-Johns
15 Lead Vehicles
200 Rakes and Shovels
40 Delivery Trucks
250 Buses
22 Baggage Buses
15,000 Runners' Bag/Packets
300 Barrels
400 Rolls of Paper Towels
48,000 Safety Pins
2,000 Chairs
65 Shuttle Buses in Hopkinton
16 Medical Buses
30 Countries' Flags
100 National Anthems
500 Pens and Pencils

<p>EQUIPMENT (Continued) 25,000 Feet of Ribbon 5 Command Posts 88 Orrefors Crystal Awards from Long’s Jewelers 700,000 Sponsor Brochures/Flyers distributed to runners 15,000 Runners’ Tee-shirts 15,000 Finishers’ Medals 400 Packets of Handi-Wipes 1 Million Paper Cups 500,000 Sponsors’ Samples to be given out to Runners 24 Golf Carts 50,000 Drywall Screws 600 Sheets of Plywood 1,000 Pairs of Work Gloves</p> <p>ENTERTAINMENT 6 Boston Nightclubs open for Post-Race Party 6 Live Performances by the New England Conservatory of Music</p>	<p>COURSE 8,000 Pounds of Ronzoni Pasta 2,000 Quarts of Tomato Sauce 2,400 Pounds of Fresh Vegetables 70 Pounds of Ground Black Pepper 25,000 PowerBars 15,000 Cups of Coffee/Tea 3,500 Gallons of Boiling Water 3,700 Hours of Preparation and Cooking Time 100 Waiter/Waitresses Including Chefs</p> <p>ADMINISTRATION 40,000 Race Applications Mailed Out 342 Qualifying Races Used for Boston</p> <p><u>Source:</u> 2001 Boston Athletic Association Marathon Media Guide</p>
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Figure 1: Interesting statistics about the Boston Marathon, including every facet of resource usage for the event.

water, and 3000 barricades are used [2]. So this begs the question: “What can be done to ‘green’ the Boston Marathon?”

As stated earlier, both the organizers and the participants of the event are culpable for the marathon’s impact on the environment. Likewise, both parties can develop ‘green’ practices that can reduce this negative impact. One area of resource usage that the organizers can change is the use of runners bags handed out at the marathon expo. The marathon expo is an event that takes place in the days before the race where runners can pick up their race number, buy marathon memorabilia, or visit various clothing vendors or information booths. The race numbers, brochures, and free products from

sponsors are provided in these runners bags which are given to the runners upon their arrival.

So why do these runners bags pose a risk to the environment? First of all, these bags are made out of plastic. Plastic is a non-biodegradable product whose manufacture and incineration releases a chemical called dioxin. Dioxin is carcinogenic, meaning that it can cause various forms of cancer, such as testicular cancer and breast cancer. In addition, those with increased exposure to dioxin are at greater risk for developing diabetes or reproductive disorders. What makes dioxin especially lethal is that it is inextinguishable. For males, this means that once dioxin has entered the body, there is no way to remove it, except to wait for it to decompose according to its chemical half-life properties. For females, dioxin can leave the body through breast milk, which means that even if they get rid of the chemical, they do so at the expense of their children's health [3]. Thus, the effects of dioxin can be both deadly and long-lasting. In addition, plastic also interferes with drainage lines and disposal systems as well as hinder the functionality of animal and plant life. In general, plastic disrupts the 'flow' of things.

A solution to the plastic bags is to simply get rid of them. Runners are perfectly capable of carrying brochures and products without the aid of a plastic bag. In addition, many runners may already have bags to begin with, be it athletic bags of their own or bags received from making purchases from vendors at the expo. For those who don't have bags, carrying the brochures and products by hand may be a little inconvenient, but it is a problem that is certainly manageable.

Another area of resource usage worth examining is the use of water stations. Water stations are provided along the course so that runners can stay hydrated throughout

the race. There are 24 water stations along the course, meaning that there is one water station for every mile or so. As mentioned earlier, there are 35000 gallons of water used during the race. This is a large amount, especially for a one-day event, and it contributes to the growing shortage in freshwater. According to the US Department of Energy, 97.3% of the earth's water is salt water, meaning that the amount of freshwater is in limited supply [4]. This supply is consumed mostly by irrigation systems and other processes, such as bottled water. Alternatives to the direct use of freshwater include desalinating salt water, recycling used water, and improving the efficiency of plumbing systems. However, while these processes are being explored and implemented, the direct use of freshwater continues to dominate.

A solution to this problem would be to decrease the number of water stations provided. As stated earlier, there is about one water station per mile, and all qualified runners would run a 9 minute-per-mile pace or faster. Thus, any qualified runner would be passing a water station at least once every 10 minutes. The cups used at the marathon are 6 ounces, so assuming that the slowest qualified runner drinks 6 ounces of water at every water station that he or she sees, the runner would be ingesting 36 ounces of water per hour. According to exercise physiologist and former world-class marathoner Pete Pfitzinger, runners can only empty their stomachs of 24-28 ounces of fluid per hour, or 6-8 ounces every 15 minutes [5]. The rest of the water would not benefit the runner, but would rather hinder the runner since that excess fluid would have to be excreted as urine. Thus, the decrease of water stations makes sense, especially from a physiological perspective.

This decrease in water stations would have a greater benefit than just reducing the amount of water used. It will also decrease the number of cups used, which would decrease the use of paper products. And interestingly enough, it would cut down on the use of clothing production. This is because for each water station, there are 60 volunteers needed to man those stations, and to make it easier for runners to identify them, Adidas provides each and every volunteer with a runner's jacket with the Boston Marathon logo on them. Thus, decreasing the number of water stations would decrease water consumption, paper consumption, clothing consumption, and waste production associated with these processes.

A third area of resource usage worth mentioning is one that affects the participants more than the organizers, namely the area of running shoes. It is a given that any participant in the Boston Marathon will be wearing running shoes. It is also a given that these shoes will contain polyvinyl chloride (PVC). PVC is a leading plastic that is found in construction materials, such as pipes, floor tiles, and home furnishings. But of more relevance is the fact that PVC is found in shoes, running shoes included. With PVC being a plastic, its production releases dioxin, whose effects on humans and the environment have been mentioned earlier. In addition, the disposal of PVC in landfills is susceptible to leaching, which is the process in which chemicals in PVC will leak into the soil and contaminate ground water as well as interfere with the functionality of roots and soil in the area. Finally, the recycling of PVC is not feasible, because the application of chemical additives to PVC makes it difficult to recycle. In addition, recycling such a product could actually produce a product that is even more environmentally hazardous than before.

A solution to this problem is to buy 'green' shoes. In other words, purchase shoes from manufacturers that are making efforts to eliminate PVC from their products. A Greenpeace survey was conducted just in time for the 2001 holiday season. Greenpeace contacted various shoe manufacturers and requested information on their plan for phasing out PVC from their products. Based on the level of commitment towards such a plan, Greenpeace rated these manufacturers on an A-F scale, as shown in Figures 2 and 3. Those receiving the top grades were Adidas, Asics, and Nike. Adidas was committed to a PVC phase-out in all of its products except for their high performance sports equipment products by the end of 2002. Asics promised to eliminate PVC from all of its products in 2002. Nike guaranteed to provide PVC-free footwear and non-silkscreen apparel by the end of 2002. All other companies had either a limited PVC phase-out plan, a lack of such a plan, or did not respond to repeated contact attempts [7].

A fourth area of resource usage that is often overlooked but is worth discussing is that concerning running apparel. For those economical or inexperienced runners, clothes made of cotton may be worn. The cotton in such clothing will most likely be conventionally grown as opposed to organically grown. This is a significant distinction, because conventionally grown cotton is much more harmful to the environment than is organically grown cotton. Conventionally grown cotton is one of the most heavily sprayed field crops in the world. It consumes 10% of the world's pesticides and 25% of all insecticides, according to Pesticide Action Network [8]. Since they are sprayed from the air, these toxic chemicals will drift over farmhouses, roads, water sources, and workers. This will lead to water and soil contamination as well as pose a threat to wildlife and human health.

The Greenpeace 2001 Athletic Shoe
Holiday Shopping Guide

PVC Phase-Out Plan Grades:

A = Excellent. Has published policy and plan to phase-out PVC no later than 2003; alternatives research ongoing for complete elimination

B = Above Average. Has no published PVC phase-out policy; eliminated some PVC; Phase-out start date set; alternatives research ongoing.

C = Average. Has no published PVC phase-out policy; eliminated some PVC; no PVC phase-out start date set; alternatives research ongoing

D = Below Average. Has no published PVC phase-out policy; has not eliminated any PVC; investigation into PVC phase-out ongoing

F = Fail. Has no intent to adopt PVC phase-out policy or no response to repeated inquiries.

Source: The Greenpeace 2001 Athletic Shoe Holiday Shopping Guide
http://www.greenpeaceusa.org/features/shoe_reportcard.htm

Figure 2: The grading scale used by Greenpeace in determining the quality of a shoe manufacturer's PVC phase-out plan.

But while some runners may hurt the environment with the purchase and use of cotton clothing, other runners avoid wearing cotton clothing, because of its poor performance during physical activity. When cotton becomes wet through rain or sweat, the material becomes very heavy, and the breathability of the shirt is greatly reduced. As a result, many competitive runners wear clothing that is made of synthetic fibers, such as Dupont's Coolmax material or Nike's DriFIT material. These fibers wick away sweat

2001 Greenpeace Grade Report on PVC Phase-out
Plans of Leading Shoe Manufacturers

Name	Grade	Comment
Adidas	A	PVC phase-out in all products except for high-performance sports equipment products by the end of 2002
Asics	A	All Asics products will be PVC-free in 2002
Converse	F	Non-responder
Etonic	C	Has eliminated some PVC; no commitment to PVC phase-out policy
Fila	F	Non-responder
Keds	F	Non-responder
K-Swiss	F	Non-responder
New Balance	C	Has eliminated some PVC; no commitment to PVC phase-out policy
Nike	A	PVC-free footwear and non-silkscreen apparel available by end of 2002
Puma	A	PVC phase-out in most products by the end of 2003
Reebok	F	Non-responder
Saucony	F	Non-responder
Spalding	F	Non-responder
Timberland	C	Introduced PVC-free boot, no commitment to PVC phase-out policy

Figure 3: The grades given by Greenpeace upon evaluation of the PVC phase-out plans of leading shoe manufacturers

Source: The Greenpeace 2001 Athletic Shoe Holiday Shopping Guide
http://www.greenpeaceusa.org/features/shoe_reportcard.htm

from the body to the surface of the material, which allows for easier evaporation. In other words, these materials will keep runners dryer and more comfortable throughout the duration of a run. But while these materials provide for better running performance, they don't provide a better alternative to conventionally grown cotton in terms of its environmental impact. Synthetic fibers are created from petroleum products and its production involves the use of or contains chlorine, benzene, and other harmful chemicals that can pose health and environmental risks during the production, use, and disposal of the end product [9].

There are solutions to the problems presented by existing running apparel. One is to wear clothes that contain organically grown cotton. This type of cotton is not sprayed with these highly toxic chemicals. While the organically grown cotton is more expensive and produces less yield come harvest time, it is a much more environmentally friendly option than conventionally grown cotton. For those competitive runners who demand high performance running apparel, there are 'greener' alternatives as well. For cold-weather conditions, a variety of companies have come out with a line of fleece outerwear that is made from recycled polyethylene terephthalate (PET) bottles. This will reduce both the consumption and waste produced by petroleum products. Patagonia, a performance outerwear manufacturer using such alternatives, stated that the amount of petroleum saved by using post-consumer recycled bottles rather than virgin materials used in the manufacturing process would be enough to power the city of Atlanta for one full year [10]. For warm-weather and ideal race conditions, clothing alternatives include wearing tanktops made from organic cotton or recycled material. For example, each Nike tanktop is made of Wellman Fortrel EcoSpun and contains material from about 1.5

Figure 4: A photo of the Patagonia Synchilla Snap-T available now. This product is made from post-consumer recycled plastic bottles.

Source:

http://www.patagonia.com/webapp/commerce/Pgonia/Product.jsp?merchant_rn=7385&cgrfnbr=124408&sku=25450&promo=yes

Figure 5: A photo of the Patagonia On-The Run Crew available now. This product is made mostly from organic cotton.

Source:

http://www.patagonia.com/webapp/commerce/Pgonia/Product.jsp?merchant_rn=7385&sku=52715

standard 2-liter bottles. In addition, the manufacturing process uses 43% less energy [11]. Some of these alternatives are shown in Figures 4 and 5. To find out if certain clothes or shoes are eco-friendly, it would be best to call the manufacturers and get this information directly. Figure 6 contains a list of phone numbers for various manufacturers of high-performance running shoes and/or running apparel.

Adidas	(800) 448-1796
Asics	(800) 333-8404
Brooks	(800) 2-BROOKS
Converse	(800) 428-2267
Etonic	(800) 225-6601
Fila	(425) 785-7530
K-Swiss	(800) 297-1919
Keds	(800) 428-6575
New Balance	(800) 253-7463
Nike	(800) 344-NIKE
Reebok	(617) 341-5000
Saucony	(800) 365-7282

Figure 6: List of shoe and/or running apparel manufacturers and their contact information

Source: <http://sneakers.pair.com/mfrs.htm>

For an annual one-day event, the Boston Marathon leaves a very large ‘ecological footprint.’ While the resource usage and personal habits have contributed to the event’s detrimental effect on the environment, both organizers and participants alike can take steps to shrink the marathon’s footprint. The traditional colors of the Boston Athletic Association and the Boston Marathon are blue and gold, but with a little effort, some green can be added to it as well.

Works Cited

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