National Summary of Data

Centers for Disease Control and Prevention (CDC) – National Park Service (NPS)

Healthy Foods Evaluation

Fall 2011

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BACKGROUND

The Centers for Disease Control and Prevention (CDC) – National Park Service (NPS) Healthy Foods Evaluation is a collaboration to provide baseline data that will inform NPS food policy, system and environment changes. In April 2011, as part of the Healthy Parks Healthy People US initiative, NPS Director Jon Jarvis announced a new service-wide Healthy and Sustainable Foods Strategy to "ensure access to healthy, sustainable and high-quality food at reasonable prices" and to serve as a model for state and local parks (http://home.nps.gov/news/release.htm?id=1144). This commitment was reinforced by the *NPS Call to Action* for NPS employees and partners that advances NPS toward a shared vision for its 2016 Centennial, including a core goal of "Eat Well and Prosper: encouraging park visitors to make healthy lifestyle choices and positioning parks to support local economies by ensuring that all current and future concession contracts require multiple healthy, sustainably produced, and reasonably priced food options at NPS food service concessions" (http://www.nps.gov/calltoaction).

NPS, a bureau within the Department of the Interior, manages 397 NPS units (hereafter referred to as "national parks"), employs 22,000 staff, hosts 221,000 volunteers and offers meals to over 280 million visitors annually, making NPS a major employer and one of the largest tourist destinations and food providers in the US (http://www.nature.nps.gov/stats/ and http://www.nps.gov/faqs.htm). Food and beverages are offered in a variety of venues, including restaurants (ranging from upscale sit-down to casual snack bars and cafeterias), retail operations including convenience and grocery stores, as well as vending machines.

Despite recent efforts that link parks to health promotion, NPS has little data about the nutritional content or quality of foods sold in national parks. Thus, an important step in the Healthy and Sustainable Foods Strategy was a baseline assessment of the food environment (i.e. food and beverage availability, pricing and promotion). The Healthy and Sustainable Foods Strategy will address needs identified by the baseline assessment.

METHODS

Sample. In fall 2011, data were collected among 47 national parks in 33 states at NPS restaurants, snack shops, stores and vending machines. The NPS Commercial Services Program provided a detailed list of all national park food and beverage venues (i.e. restaurants and snack shops), and retail food concessions (i.e. convenience and grocery stores). Because of geographic and financial constraints that limited availability of staff for assessment, this survey included a convenience sample of parks. However, national parks in our convenience sample were selected by CDC and NPS to ensure that parks with the following characteristics were represented: all seven NPS

administrative regions, parks of varying type (e.g. national recreation areas, national monuments and national parks), size, annual visitation, location (i.e., urban versus rural), and concession vendor type (i.e., large foodservice companies versus small business owner).

Tools. To evaluate access, availability, pricing and promotion of nutrition offerings in park concessions, CDC scientists adapted the Nutrition Environment Measurement Surveys (NEMS; http://www.med.upenn.edu/nems/about.shtml), which are validated observational tools originally developed for assessing the nutrition environment in community food and retail outlets, specifically restaurants, stores and vending machines. CDC scientists also adapted components from the Nemours Healthy Vending Guide (http://www.cspinet.org/new/pdf/HealthyVendingGuide.pdf) for the vending machine module. CDC developed a tool module using components from the Harvard Prevention Research Center's City Agency Sugar Sweetened Beverage and Water Access survey to evaluate free drinking water access in national parks (http://www.bphc.org/programs/cib/chronicdisease/healthybeverages/Forms%20%20Documents/toolkit/AppendixG_Tool-for-Assessment-of-Beverage-Access-in-City-Agencies.pdf).

Five distinct tool modules were used to collect data from varying settings/sources within parks: restaurants, stores, snack shops, beverage or food vending machines and free drinking water access points. During May 2011, these evaluation tools were piloted in 11 national parks in 6 states; minor modifications to the surveys and protocols were made based on surveyor feedback and data quality. Pilot data were not included in the fall 2011 study results or in this report. A subset of surveyors piloted a novel mobile phone application of CDC's Epi-Info7 that allowed capture of unique data elements, including photographs, GPS coordinates and barcodes and saved hundreds of person-hours in data entry time. These data elements were not included in the reported results of this study, but may assist NPS staff in identifying the locations of free drinking water access points and vending machines.

Surveyors/Training. Over 40 public health staff, including CDC Epidemic Intelligence Service (EIS) officers, other CDC personnel, state/local health department employees and non-profit partners conducted these surveys in national parks. All surveyors were trained via web teaching modules on the Nutrition Environment Measurement Surveys (NEMS) website (http://www.med.upenn.edu/nems/) and a 90-minute webinar with CDC. We did not do formal assessments of test-retest reliability or inter-rater discrepancies for the tools used in this survey. However, NPS survey tools for stores and restaurants differ little from the original NEMS surveys; prior studies indicate that the inter-rater reliability kappas for NEMS-Stores range from 0.84-1.00 and mostly greater than 0.80 (range 0.27-0.97) NEMS-Restaurants. Test-retest reliability for

NEMS-Stores ranges from 0.73-1.00 and mostly greater than 0.80 (range 0.46-1.0) for NEMS-Restaurants (http://www.med.upenn.edu/nems/).

Data Collection & Statistical Analyses. A general protocol outlined methods for identifying concessions, vending machines and drinking water sources to evaluate. Only public-facing food service venues were surveyed; employee-only food service settings/sources were not evaluated. Each surveyor was provided with a list of required concessions to assess, which included at least one restaurant, store and snack shop if these types of concessions existed in the park. If there were multiple restaurants, stores or snack shops in a given park, then one venue of each type was chosen by the NPS Commercial Services Program to be assessed based on their familiarity of venues most representative of the food service in the parks. If time permitted, a surveyor was encouraged to assess additional restaurants, stores and snack shops with a goal of complete ascertainment of all venues in the park. In 95% of national parks surveyed, all food service venues (i.e. restaurants, stores and snack shops) were surveyed.

There is no census available from the National Park Service indicating presence or location of vending machines or free drinking water access points in the parks. Thus, the percentage of vending machines or drinking water sources within the parks surveyed could not be calculated. Vending machines and drinking water sources were identified for assessment by the surveyor via three methods: 1) inquiring at the main visitors' center for locations, 2) using park maps, and 3) actively looking near restaurants, stores, snack shops, bathrooms, visitors' centers, scenic vistas, picnic areas and campgrounds. Surveyors were asked to assess as many vending machines and drinking water sources as possible during their time in the park, while ensuring that all restaurants, stores and snack shops on their required list were assessed.

Data collected were meant to represent the food environment as seen from the perspective of the typical consumer. Surveyors observed the physical environment, including menus, signage and displays and only on rare occasion asked straightforward questions of available concession staff (i.e. "what are your hours of operation?" or "is whole wheat bread available?"). More complex nutritional assessments that would require the use of recipes, nutrition labels or detailed questioning of concessioners were not performed during this study.

To assess mean price of a series of items, surveyors collected data for particular items defined specifically by protocol (NEMS protocols available at http://www.med.upenn.edu/nems/; NPS nutrition environment assessment tools protocols available upon request). For example, if diet soda price data were being collected, surveyors were asked to indicate the price (dollars) and size (milliliters or ounces) of the least expensive bottle of artificially-sweetened diet soda available (if two were the same price, they were asked to record information on the diet soda with the

name starting with the letter closest to A in the alphabet). During analysis, price per ounce of the available item was calculated for each item and then compiled among parks using means and standard errors.

Data were collected either manually or on mobile phone-based Epi-Info 7 using standardized questionnaires and detailed tool module protocols. Completed questionnaires were mailed to CDC. All primary data were reviewed by the study organizers to check consistency across responses and data entry quality checks were performed on 10% of entries (yielding an error rate of <1%). Rare logical inconsistencies (e.g. soda price written but there was no check for presence of soda) were rectified; discrepant data that were not resolvable based on the written information were deleted. Descriptive analyses, including frequencies, percentages and means ± standard errors (SE, a measure of variance) were performed in SAS version 9.3 (SAS Institute, Cary, North Carolina) using appropriate survey procedures to account for vendor clustering within parks.

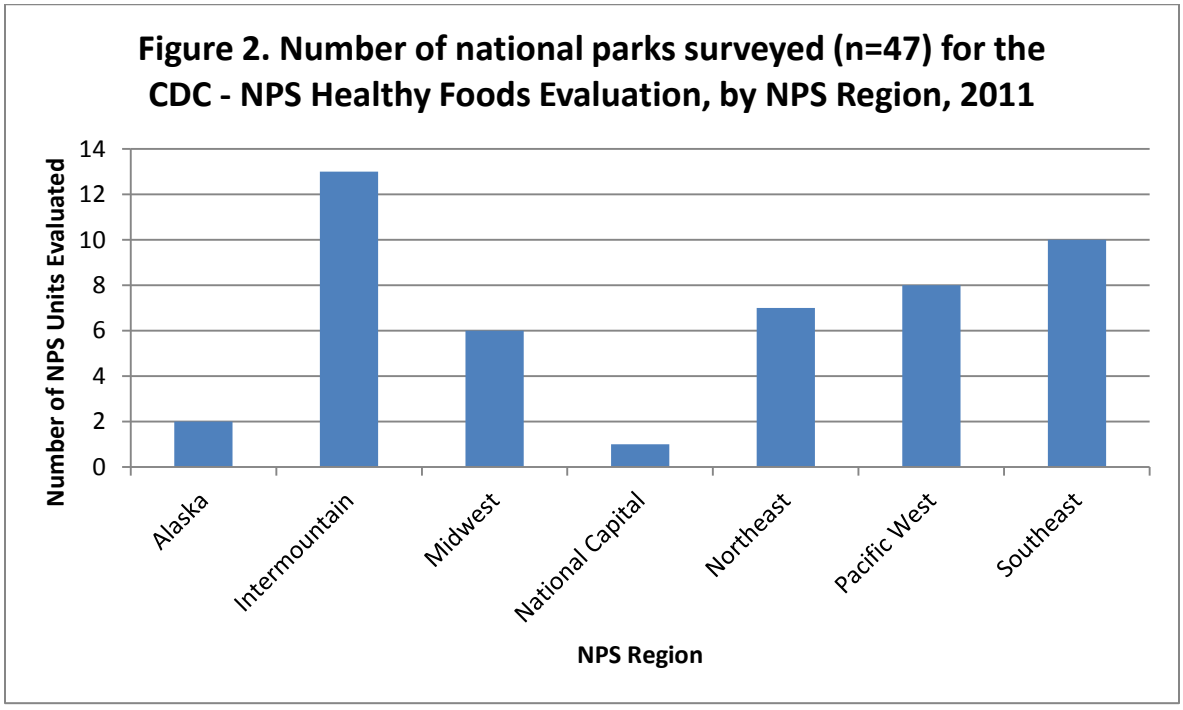
For purposes of this report, we based our definitions of healthful versus less healthy on NEMS or Nemours protocols and when those weren't available on the Dietary Guidelines for Americans for 2010.

RESULTS

General

Overall, 47 national parks in 33 states (Figure 1), including all seven NPS regions, were surveyed (Figure 2). Among these national parks, we assessed 83 beverage vending machines, 17 food vending machines, 79 restaurants, 55 snack shops, and 352 free drinking water access points. National parks in our sample included 26 national parks, 5 national monuments, 5 national recreation areas, 5 national seashores, 1 national historic site, 1 national lakeshore, 1 national memorial, 1 national preserve, 1 national scenic riverway and 1 national parkway. The number of annual visitors ranged from 15,793 to 14.5 million (median: 1.25 million).

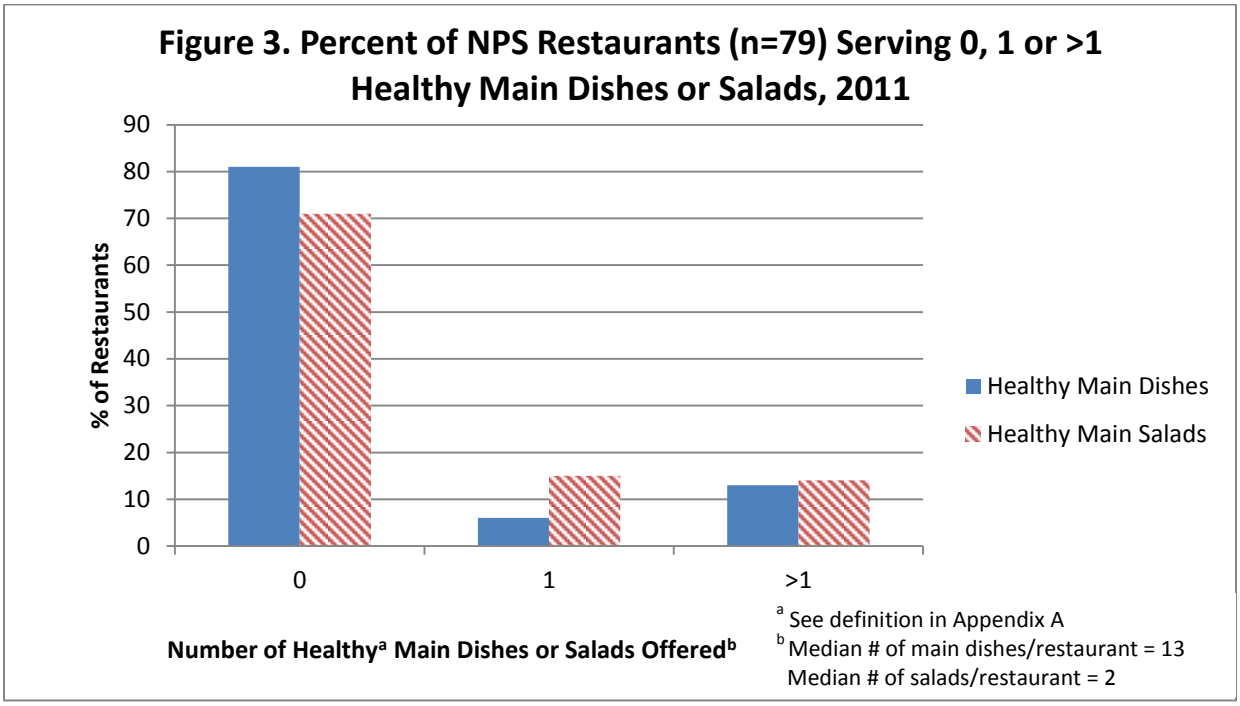
Figure 1. National Park Service units surveyed in the CDC – NPS Healthy Foods Evaluation, 2011



Restaurants

Seventy percent of national parks sampled contained at least one restaurant that was surveyed (the other 30% of parks did not have a restaurant), and 18 out of 47 parks had more than one restaurant assessed. Among the 79 restaurants in our sample, 68% (±6%) were full-service sit down restaurants, 24% (±5%) were fast casual (i.e. customers order at a counter) and 8% (±4%) were other types of establishments. Only 5% (±4%) restaurants featured signage promoting healthful eating (e.g. "try our fresh tasty salads"), while 10% (±3%) restaurants featured signage promoting less healthy eating (e.g. "ice cream – a delicious cold treat"). Promotion of local/regionally-produced or sustainably-produced items (see Appendix A for definitions) was featured in 14% (±5%) of restaurants.

All restaurants had main dishes listed on the menu; however, only 19% (±6%) of restaurant menus had at least one identifiable healthy main dish (defined by protocol, see Appendix A for definitions). Nearly all restaurants (95%) served at least one vegetarian main dish; however, 81% (±6%) of restaurants serving vegetarian main dishes had zero identifiably healthy main dishes, including the vegetarian options (this may reflect the fact that less healthy options like cheese pizza are vegetarian, or perhaps limitations in our protocol's ability to detect healthier vegetarian items). Main course salads were listed on the menus of 78% (±4%) of restaurants; among these, 38% (±8%) had main course salads identified as healthy and 31% (±8%) had low-fat or fat-free salad dressings available. Twelve percent (±3%) of restaurants had salad bars. (Figure 3)



Half of the restaurants (53%±6%) offered fresh or canned fruit without added sugar as a side item, and slightly less than half (46%±8%) offered vegetables that were non-fried and without sauce, whereas French fries were offered in 59% (±6%) of restaurants. Whole wheat or whole grain bread was available in 44% (±7%) of restaurants. For desserts, 69% (±5%) of restaurants offered ice cream, whereas just 5% (±2%) offered frozen yogurt.

Beverage options included free plain water in 97% (±3%) of restaurants, and at least one brand of bottled water was offered in nearly half of restaurants (47%±8%). All restaurants served at least one variety of healthful/low-calorie beverages, including free plain water (Table 1). Although healthier 100% juice was available in 78% of restaurants, low-fat/nonfat milk (≤1%) was available in just 35% of restaurants. Less healthy juice drink and flavored milks sweetened with sugars were offered in approximately half of restaurants. The mean price per ounce of sugar-sweetened soda and diet soda were very similar ($0.158±$0.01 for diet soda and $0.157±$0.01 for sugar-sweetened soda), as were the prices of 100% juice ($0.23±$0.02 per ounce) and juice drink $0.21 (±$0.02). The mean price per ounce of bottled water was $0.13 (±$0.01).

Table 1. Drink varieties available in restaurants (n=79) during the CDC - NPS Healthy Foods Evaluation, 2011

More Healthy[a] or Low-calorie drink[b]	% (±SE)	Sugar-sweetened drink	% (±SE)
100% fruit juice	78(5)	Juice drink	50(8)
Coffee	96(2)	Sugar-sweetened coffee	32(7)
Diet soda	99(1)	Soda	97(2)
Low-calorie energy drink	3 (2)	Energy drink	5 (2)
Low-calorie flavored water	7 (3)	Flavored water	5 (3)
Low-calorie sports drink	5 (3)	Sports drink	18(4)
Lowfat/nonfat milk	35(7)	Flavored milk	45(8)
Non-flavored dairy alternative	19(6)	Flavored dairy alternative	17(6)
Unsweet or low-calorie tea	92(3)	Sweet tea	43(7)

[a] More Healthy defined as plain drinking water, unflavored low-fat/nonfat milk (≤1%), or 100% juice

[b] Low-calorie defined as ≤10 calories per 8 fluid ounces

Nutrition information (e.g., calories, sodium or fiber) was displayed in only 1 out of 79 restaurants surveyed, and healthy menu items were identified as such on the menu with a label or icon in only 6% (±5%) of restaurants. Seventeen percent (±5%) of restaurants had less healthy items, such as candy, displayed at the point of purchase.

Sixty-three percent of restaurants had a kid's menu; among these, 54% (±10%) featured at least one healthy main item and 68% (±8%) had at least one healthy side item (see Appendix A for definitions). No kid's menus listed nutrition information, including

calories, fat or fiber. Among the 26 restaurants that served kids side items, 23 allowed substitution of a healthy side for a less healthy side, and none charged more money for the substitution. One-quarter of restaurants' kid's menus offered a healthy dessert (25%±9%). While 86% of kid's menus listed 100% juice as a drink option, only 19% of those restaurants served a portion less than 6 ounces (the maximum daily juice intake recommended by the American Academy of Pediatrics for children 1 to 6 years of age; AAP Policy Statement: The Use and Misuse of Juice in Pediatrics, found at http://pediatrics.aappublications.org/content/107/5/1210.full). Another healthful drink option for children, unflavored low-fat/nonfat milk (≤1%), was offered in only half (49%±9%) of restaurants with kid's menus. Lastly, free refills on kid's menu less healthy drinks (e.g. soda, juice drink) were available at 77% (±7%) of restaurants.

Potential Action Items for Restaurants:

- Increase availability and promote/label healthy main dishes, healthy salads and healthy salad dressings so that they are easily identifiable to the average consumer
- Increase availability of unflavored low-fat/nonfat milk (≤1%)
- Increase availability of whole wheat or whole grain bread
- For kid's menus: increase availability of more healthful low-fat/nonfat milk (≤1%) and 100% fruit juice that are served in appropriate quantity for children
- For kid's menus: serve portion sizes of 100% juice no larger than 6 ounces, the maximum amount recommended per day by AAP

Venues selling snacks

Fifty-five concession venues selling snacks were surveyed using the snack shops tool module among 32 national parks (the remaining parks did not have eligible venues). These venues selling snacks included 24 snack shops, 17 gift stores, 8 specialty shops (coffee or ice cream), 3 visitor centers, and 3 food carts. Among these, just one venue provided nutrition information via menu or signage. Although 1 venue featured signage promoting healthful eating (e.g. "try our fresh tasty fruit"), 6 venues featured signage promoting less healthy eating (e.g. "killer chocolate brownies available"). Promotion of local/regionally-produced or sustainably-produced items was featured in 17% (±6%) and 9% (±3%) of venues, respectively.

For beverage options, 72% (±11%) of snack shops, specialty shops and visitor centers offered free plain drinking water. Among venues that sold beverages, bottled plain drinking water was available in the majority of venues (73%±8%). Drink varieties commonly sold included diet soda, sugar-sweetened soda, coffee, unsweetened and sweet tea, sports drinks, 100% juice and juice drinks (Table 2). Nearly half of venues sold 100% juice and half sold juice drink, which is sweetened with sugar. Low-fat or nonfat milk (≤1%) was sold in less than 1 in 10 venues. The mean price per ounce of

juice drink was $0.14 (±$0.01) versus $0.19 (±$0.02) per ounce for 100% juice. Bottled water was sold for $0.09 (±$0.01) per ounce, on average. The mean price per ounce of sugar-sweetened soda was $0.13 (±$0.02) per ounce versus $0.15 (±$0.01) per ounce for diet soda.

Table 2. Drink varieties available in snack shops selling beverages (n=50) during the CDC - NPS Healthy Foods Evaluation, 2011

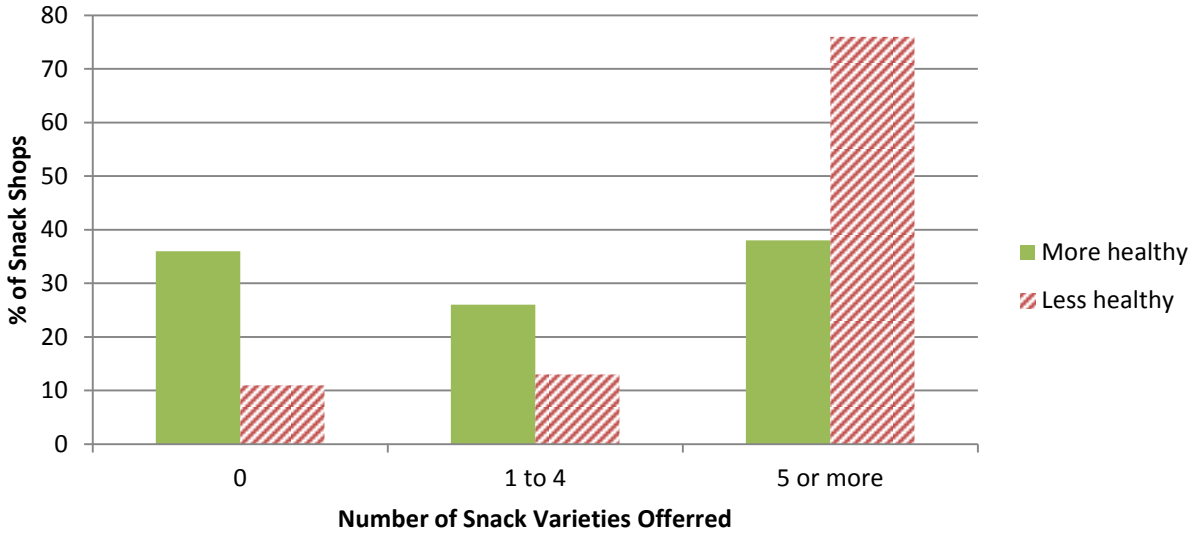
More healthy[a] or Low-calorie drink[b]	% (±SE)	Sugar-sweetened drink	% (±SE)
Overall	86(5)	Overall	86(5)
100% fruit juice	48(6)	Juice drink	48(8)
Coffee	59(6)	Sugar-sweetened coffee	41(7)
Diet soda	80(6)	Soda	82(5)
Low-calorie energy drink	14(7)	Energy drink	30(8)
Low-calorie flavored water	14(5)	Flavored water	26(9)
Low-calorie sports drink	2 (2)	Sports drink	44(8)
Lowfat/nonfat milk	9 (4)	Flavored milk	26(6)
Non-flavored dairy alternative	13(5)	Flavored dairy alternative	10(4)
Unsweet or low-calorie tea	48(6)	Sweet tea	50(9)

[a] More healthy defined as plain drinking water, unflavored low-fat/nonfat milk or 100% juice

[b] Low-calorie defined as ≤10 calories per 8 fluid ounces

Half of venues served main dishes; among these, just 12% had at least one identifiably healthy item (based on criteria in Appendix A). Fruit was offered at half (47%±6%) of venues, but non-fried vegetables were available at only 14% (±5%). While regular chips were sold at 57% (SE 7) of shops, baked chips or pretzels were sold at just 13% (±5%); candy bars were sold at more than half of shops (55%±10%), while more healthful granola or energy bars (based on definition in Appendix A) were available at 38% (±9%). Additionally, more healthful granola or energy bars were nearly double the price of candy bars (mean price per ounce was $0.66 for candy bars versus $1.06 for granola or energy bars). Less healthy varieties of snacks were substantially more frequently available than healthier options (Figure 4).

Figure 4. Percent of Snack Shops Offering 0, 1 to 4, or ≥5 Varieties of Healthier versus Less Healthy Snacks, NPS Snack Shops (n=55), Fall 2011



Potential Action Items – Snack Shops:

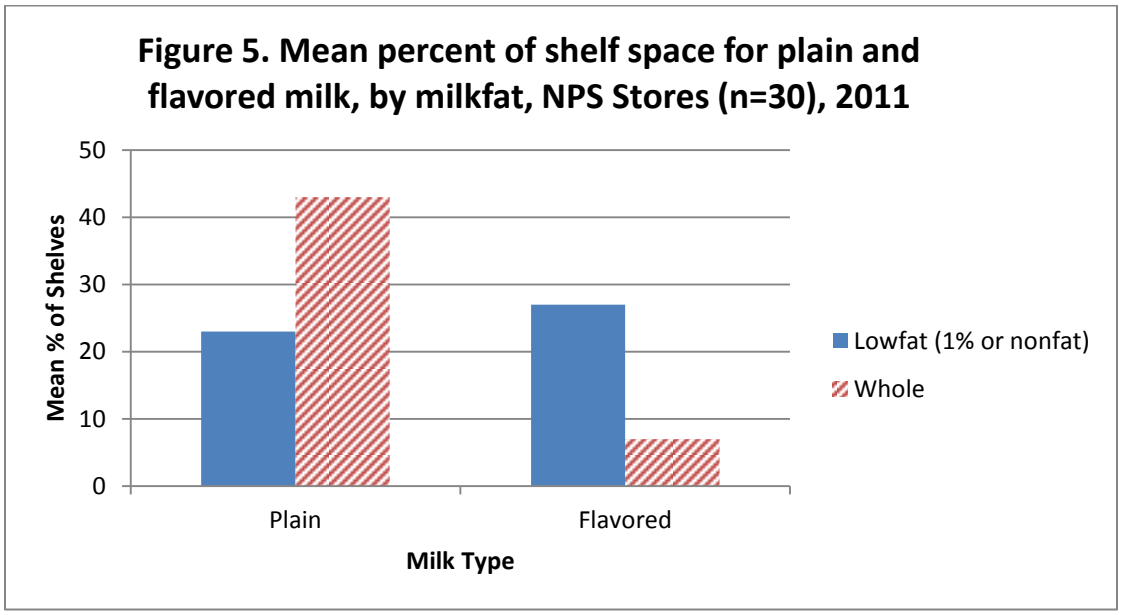
- Increase the proportion of snack items that are more healthful like fruits, low-fat/nonfat yogurt, or nuts
- Among snack shops serving main dish items, increase availability and promotion of healthy main dishes, so that they are easily identifiable to the average consumer
- Increase availability and promotion of more healthful drinks for children (like low-fat/nonfat milk (≤1%), 100% juice and plain drinking water) as well as low-calorie specialty drinks such as flavored waters.

Stores

Thirty venues were surveyed using the NPS stores module among the 15 national parks in our sample that had full-service grocery or convenience stores. A quick-order snack shop (with a separate cash register) was present in 55% of stores (±7%); among these, none served any identifiably healthy main or side items (based on criteria in Appendix A)). Sixty-two percent (±14%) of store snack shops sold fruit, 44% (±14%) sold vegetables, and 63% (±14%) sold French fries.

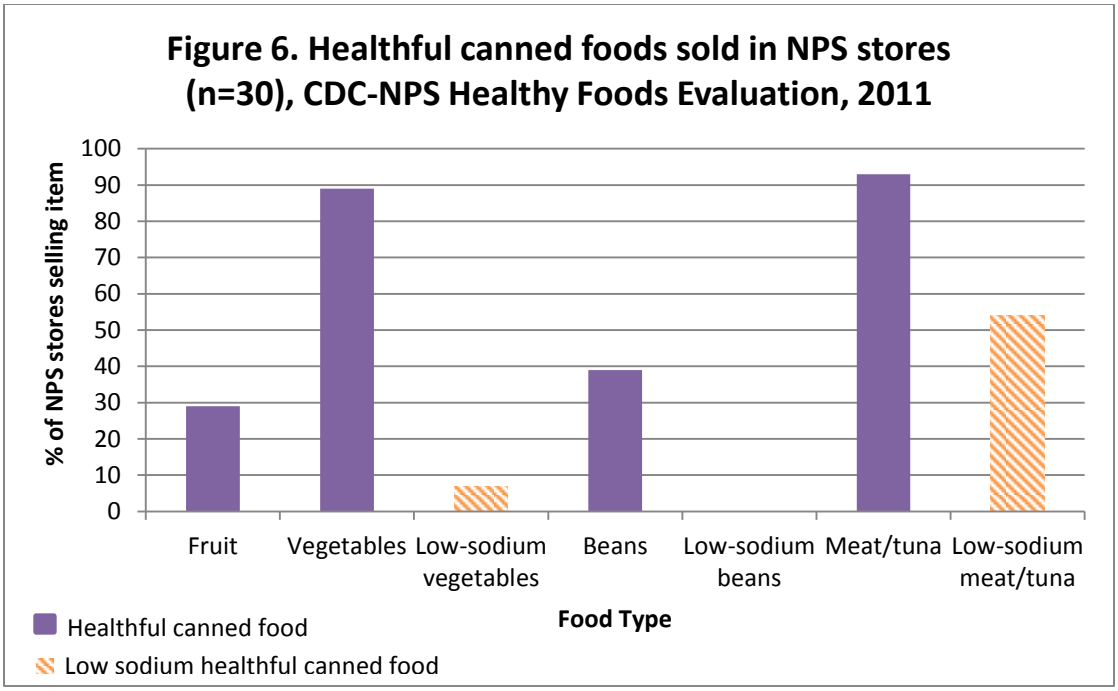
In grocery and convenience stores, signs identifying local or regionally grown items (e.g. “locally grown peaches, $1 per pound”) were infrequent (20%±12%) and signs promoting sustainably or organically grown items (e.g., “try our delicious organic produce”) were found at just one store. Candy was present at the point of purchase in 77% (±8%) of stores, whereas fruit was offered at the point of purchase in 27% (±10%).

Low-fat/nonfat milk (≤1%) was available for purchase at approximately half of stores (53%±15%). Whole plain milk occupied a higher proportion of shelf space (43%), on average, than low-fat/nonfat plain milk (23%); however, low-fat/nonfat sugar-sweetened flavored milk (27%) occupied far more shelf space than whole flavored milk (7%) (Figure 5).



Among stores that sold fruit (23 out of 30), grocery stores sold an average of 7 (±1.0) types and convenience stores sold 2 (±0.3) types. Among stores that sold vegetables (16 out of 30), grocery stores sold an average of 8 (±2) varieties and convenience stores sold just 1 (±0.2) variety.

Canned items were sold in the majority of stores (93%±5%). Among stores selling canned foods, vegetables and meat/tuna were most common; low-sodium (≤200 mg/serving) options were far less frequently found than their higher sodium counterparts (Figure 6). Twenty-three out of 30 stores sold hot dogs; among those, all offered regular-fat hot dogs or franks, whereas just 9% (±6%) sold low-fat hot dogs or franks.



For beverages, all stores sold sugar-sweetened and diet soda; 87% (±6%) sold 100% juice, and slightly fewer stores (73%±7%) sold sugar-sweetened juice drink. Only 20% (±8%) of stores had nearly as much shelf space for water as for sugar-sweetened drinks (defined as a ratio of water to sugar sweetened drinks between 1:3 and 1:1).

Low-fat baked goods, such as low-fat bagels or English muffins were offered in nearly half of stores (43%±12%), whereas regular baked goods, such as muffins or danish were available in nearly twice as many stores (70%±11%). From a food composition perspective, low-fat bagels had, on average, about 40% of the calories, >90% less fat and almost twice the fiber of regular muffins (Table 3; calorie, fat and fiber data collected per NEMS protocols).

Table 3. Nutrition information for bagels (low-fat) versus muffins (regular) sold in NPS stores (n=30), CDC-NPS Healthy Foods Evaluation, 2011

	Bagels (low-fat) n=11	**Muffins (regular) n=14**
Nutrition measure	Mean (±SE)	Mean (±SE)
Calories (kcal)	245 (9)	615 (25)
Fat (grams)	1.7 (0.2)	30 (2)
Fiber (grams)	2.6 (0.6)	1.4 (0.4)

Among stores selling bread (25 out of 30), whole wheat bread was available in 72% of stores (±9%). However, white bread was available in nearly all (92%±6%). Whereas the mean price per ounce of whole wheat and white bread were similar ($0.19 and $0.18, respectively)), the average cost of a loaf of whole wheat bread was higher ($4.17 for

whole wheat, $3.81 for white). Cereal was sold in approximately three-quarters of stores (77%±10%); however, the average price of sugar-sweetened cereal (≥7 grams sugar per serving, Appendix A) was considerably lower at $0.62±$0.05 per ounce than that for low-sugar (<7 grams sugar per serving) cereals ($0.80±$0.10) (per standard protocol, surveyors chose the smallest size container when recording size and price information).

Protein sources were available in many stores. Commonly sold items included eggs (73%± 9%) and cold cuts such as turkey, ham or roast beef (83%±5%). Less healthy protein sources (≤30% of calories from fat, based on nutrient information in the USDA National Nutrient Database for Standard Reference and recommendations from the Dietary Guidelines for Americans 2010) were offered, including bologna (59%±11%) and regular cheese (77%±6%). Less commonly offered healthier protein sources included low-sodium cold cuts (7%±5%) and reduced fat cheese (27%±11%). Healthier protein sources were, on average, more expensive per ounce than less healthy choices (e.g., turkey ($0.56±$0.07) versus bologna ($0.40±$0.03) or reduced fat cheese ($0.66±$0.12) versus regular cheese ($0.54±$0.06)).

Potential Action Items - Stores

- Increase availability and varieties of low-sodium canned goods
- Increase availability of low-fat baked goods such as bagels (with considerably healthier nutrition profiles than their regular counterparts like muffins)
- Increase availability of whole grain products like whole wheat breads or whole grain cereals
- Increase promotion of healthier foods already commonly available (like fresh or canned vegetables, 100% juice, or low-fat/nonfat milk (≤1%))
- Offer healthful options at the point of purchase

Beverage Vending Machines

Eighty-three beverage vending machines were evaluated in the 22 national parks in our sample that contained beverage vending machines (47% of surveyed parks). Among these vending machines, 32% (±7%) were positioned next to food vending machines, while 57% (±12%) were positioned next to another beverage vending machine. Only 5% of beverage vending machines identified specific healthful items with icons or labels, and none had nutrition information posted on or near the machine. Over half (58%±9%) of machine exteriors featured an image of at least one less healthy food or beverage option on the front or side display; 29% (±10%) depicted at least one healthier choice.

For beverage options, the mean proportion of beverage machine buttons/slots devoted to sugar-sweetened drinks was 57% (±3%); however, the mean proportion of buttons/slots for diet drinks (non-calorically sweetened) was 17% (±1%) and for healthful drinks (water, low-fat or nonfat milk (≤1%) or 100% juice) was 26% (±3%) (Table 4). A proposed option for a NPS definition of a "healthier" beverage machine is one in which more than half of options are healthier or diet drinks. In September 2011, just 36% (±6%) of beverage vending machines met these potential criteria.

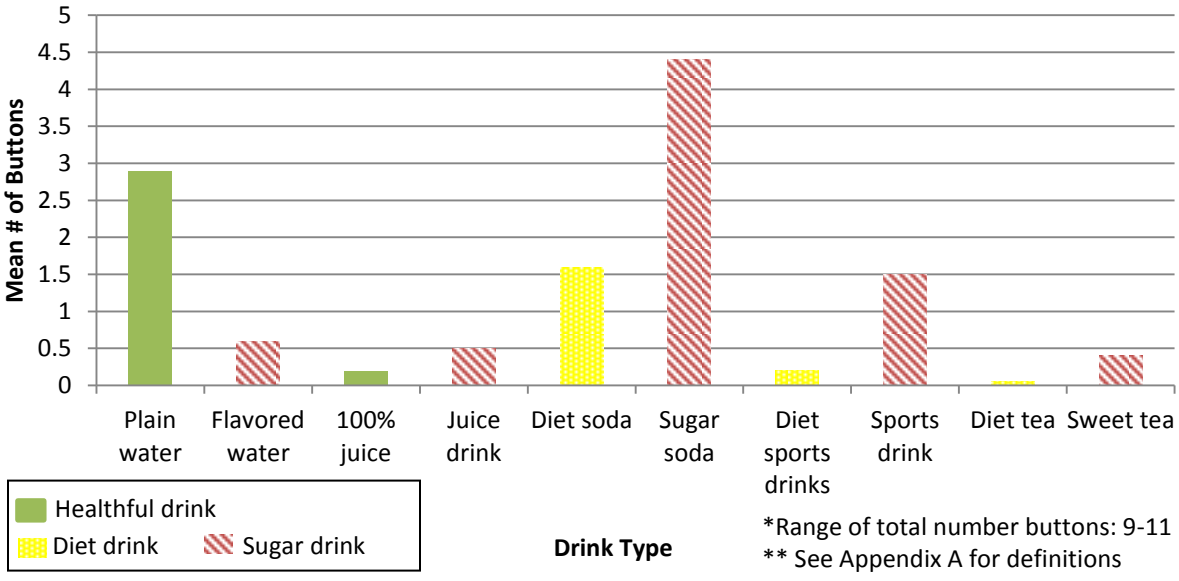
Table 4. Mean number and proportions of buttons per vending machine devoted to diet, healthful and sugar-sweetened drinks*, NPS beverage vending machines (n=83), 2011

	Mean Number	±SE	Mean Proportion	±SE
Buttons for DIET drinks	2.1	(0.4)	17%	(1)
Buttons for HEALTHFUL drinks	2.7	(0.3)	26%	(3)
Buttons for SUGAR drinks	6.2	(0.5)	57%	(3)

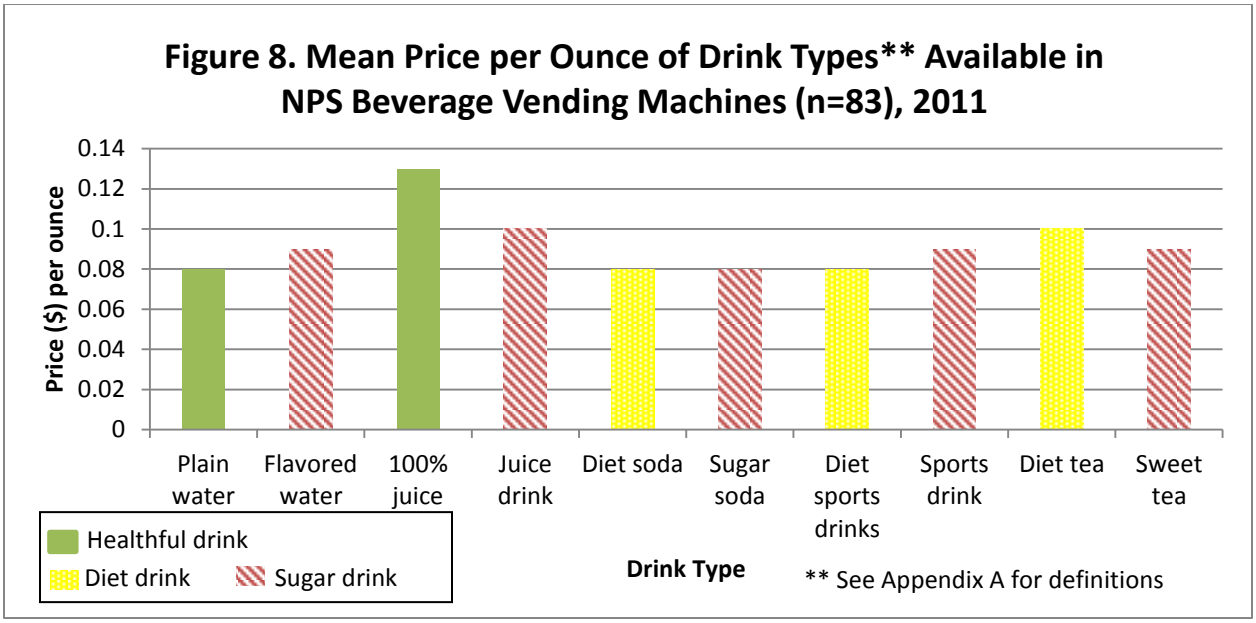
*See Appendix A for definitions

Specifically, sugar-sweetened soda had the highest mean number of buttons per vending machine (4.4±0.7); diet soda and plain water had a mean number of 1.6 buttons (±0.3) and 2.9 buttons (±0.4), respectively (Figure 7).

Figure 7. Mean Number of Buttons* Per Vending Machine Devoted to Drink Types, NPS Beverage Machines, 2011**



Pricing of healthful beverage options was often similar to less healthy beverages (Figure 8). However, 100% juice was, on average, more expensive ($0.13 per ounce±$0.01) than juice drink sweetened with sugar ($0.10 per ounce±$0.01).



Potential Action Items – Beverage Vending Machines:

- Adopt, promote, and market beverage machines that include a high proportion of healthier beverages
- Increase the number of buttons per machine devoted to healthful options
- If beverages are promoted on machine exteriors, promote those that are healthier

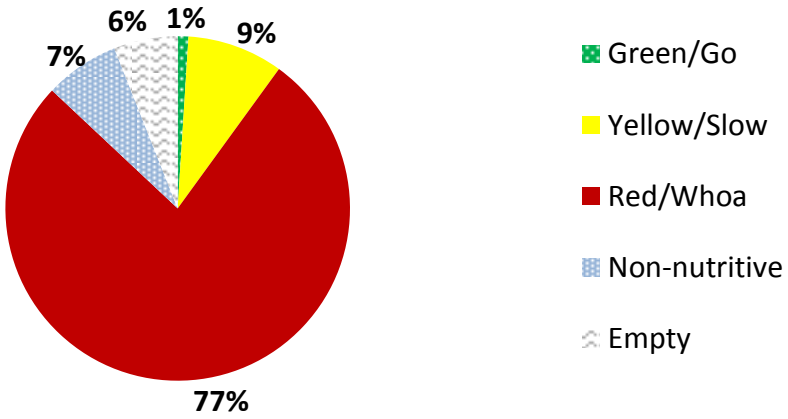
Food Vending Machines

Seventeen food vending machines were surveyed in the 8 national parks in our sample that contained food vending machines (representing 17% of all parks surveyed). Of these 17 food vending machines, nearly half (47%±16) were positioned next to another food vending machine, and all were positioned next to a beverage vending machine (100%±0). About a third of food vending machines were refrigerated (31%±11%). Only one food vending machine identified healthier items with icons or labels and none had nutrition information posted. One-quarter (25%±9%) of machines featured a depiction of at least one less healthy food or beverage option on the machine's front or side display; 19% (±10%) depicted a healthier option (and 81% lacked a depiction of a healthier option).

Particular foods were divided into categories for the purpose of this evaluation based on NEMS Vending guidelines: green/go (eat anytime), yellow/slow (eat occasionally), red/whoa (rarely eat) and non-nutritive (e.g., gum, breath mints) (see Appendix A for definitions). On average, NPS vending machines had less than 1 slot (±0.1) devoted to

green/go foods, 3 slots (±1) for yellow/slow foods, 26 slots (±3) for red/whoa foods and 3 slots (±1) for non-nutritive items (average total number of slots per machine=35±3). The mean proportion of red/whoa foods was substantially larger than the proportions of green/go, yellow/slow and non-nutritive foods combined (Figure 9).

Figure 9. Mean Proportion of Slots Devoted to Particular Food Categories, NPS Food Vending Machines, 2011



Potential Action Items – Food Vending Machines:

- Increase promotion and availability of healthier food options including green/go foods (eat anytime, like fruit cup in fruit juice) or yellow/slow foods (eat sometimes, like animal crackers)
- Consider adding healthier perishable items (e.g. yogurt, fresh fruit) to existing refrigerated food vending machines (nearly one-third of all machines surveyed were refrigerated)

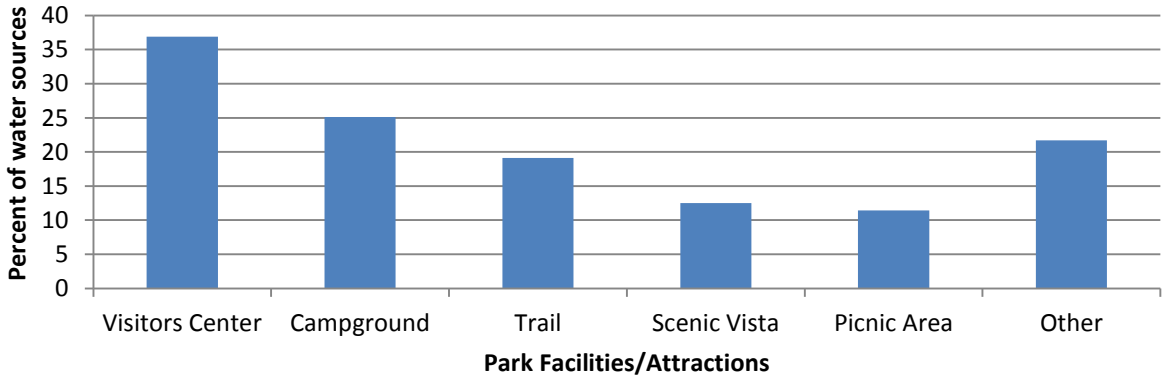
Drinking Water Sources

To evaluate NPS visitors' access to drinking water we surveyed a total of 352 plain drinking water sources in the 44 national parks in our sample with free drinking water access (94% of surveyed parks). Of these parks, 16% (±6%) displayed signs that promoted drinking water but no parks displayed signs regarding the health benefits of water intake. Water containers were available for purchase in approximately 11% (±5%) of parks surveyed. Most (80%±6%) parks had staff that could provide directions to free drinking water sources (per protocol, surveyors asked NPS staff at the main desk in the

Visitors Center for the locations of free plain drinking water sources), but only 12%±5% of parks had maps depicting the location of drinking water sources.

Of the 352 water sources evaluated, two-thirds (67%±5%) were water fountains, about one-fifth (22%±5%) were water spigots, 10% (±4%) were water bottle refill stations, and 0.6% (±0.4%) were water coolers. The majority of these drinking water sources (90%±3%) were operating properly and most (83%±4%) were considered to be in satisfactory condition; however, 15% (±4%) were noted to have visible dirt or rust. Regarding location, two-thirds of all water sources were located outside (66%±9%), often near bathrooms (70%±4%) and other buildings (71%±6%). The most common park facilities/attractions to which water sources were located near were visitor's centers (37%±5%) and campgrounds (25%±6%) (Figure 10).

Figure 10. Percent of Drinking Water Sources Located Near Particular Park Facilities/Attractions, CDC - NPS Healthy Foods Evaluation, 2011



To objectively assess aspects of drinking water source function that may be important to NPS visitors, water temperature and the time to fill a 3 ounce cup (a proxy for water pressure and water flow rate) were measured. Overall, the average water temperature was 62.8° F (±1.3° F) and the average 3-ounce cup filling time was 3.1 seconds (±0.2 seconds). Both water temperature and 3-ounce cup filling time were analyzed by the type of water source, indicating that water spigots had warmer average water temperature and shorter average 3-ounce cup filling time than water fountains or water bottle refill stations (Table 5).

Table 5. Average Water Temperature (° F) and 3-ounce Cup Filling Time (seconds), by Type of Drinking Water Source, CDC - NPS Healthy Foods Evaluation, 2011

	Temperature (° F)		3-ounce Cup Filling Time (seconds)	
	Number measured (n)	Mean (±SE)	Number measured (n)	Mean (±SE)
Overall	261	62.8 (1.3)	314	3.06 (0.2)
Water Fountains	185	62.5 (1.3)	213	3.69 (0.2)
Water Spigots	59	64.7 (2.9)	69	1.69 (0.2)
Water Bottle Refill Stations	16	60.8 (2.0)	31	1.83 (0.2)
Water Coolers	1	44 (NA)	1	1.6 ((NA)

Potential Action Items – Drinking Water Sources:

- Encourage NPS visitors to drink free plain water via signage, sale of refillable water bottles, or icons on maps depicting locations of free water sources
- When possible, decrease water temperature to the recommended 50° F for optimal drinkability (according to the American Refrigeration Institute)
- Increase promotion/education about the health benefits of drinking plain water

LIMITATIONS

This assessment study is subject to at least 4 limitations: 1) Our definitions of healthful versus less healthy were based on those of surveys and guidelines such as NEMS, Nemours or the Dietary Guidelines for Americans 2010 and focused on specific nutrients such as calories, saturated fat and sodium. As such, they may not truly reflect the overall health and nutrition profile of individual food and beverage items. Additionally, we based our definitions of healthful versus less healthy on NEMS or Nemours protocols and when those weren't available on the Dietary Guidelines for Americans for 2010; the NEMS and Nemours definitions are not necessarily the same as the Dietary Guidelines for Americans 2010. 2) Healthiness of main dishes and side items were based on the vendors' identification of the item as healthy to the public consumer (or on nutrition facts, which were very infrequently available); items labeled as healthy may not have been truly healthy while truly healthy items may not have been labeled as healthy, leading to misclassification bias. 3) Our convenience sample of parks and venues may have over-sampled parks or venues offering more/less healthful foods/beverages because a random sample was not logistically possible in this study due to limited resources. However, we made every attempt to sample as representative a group of parks as possible through discussions with the NPS Commercial Services Program, and 4) Due to resources we were not able to have the same surveyors

conduct the all of the audits, thus our large group of surveyors could have led to issues with data quality/inter-rater reliability. However, all surveyors followed a detailed protocol. Although we did not formally assess inter-rater reliability in this large group of surveyors, informal testing during the May 2011 pilot stage of the study as well as original NEMS inter-rater reliability scores (http://www.med.upenn.edu/nems/) suggest that our reliability was likely good.

FUTURE DIRECTIONS

NPS is developing new contract standards and guidelines as part of its Healthy and Sustainable Foods Program, which will likely incorporate components from the Health and Sustainability Guidelines for Federal Concessions and Vending Operations – released by the Department of Health and Human Services and the General Services Administration (http://www.gsa.gov/portal/content/104429). A follow-up assessment of nutrition environments in national parks is envisioned to evaluate progress in several years. Additionally, the assessment tools will be adapted for state or local parks and made available for practitioner and public use.

CONCLUSIONS

- Healthier food options were limited in national parks across all access points
    - <20% of restaurants had at least one identifiably healthy main dish available
    - One-third of snack shops failed to offer any healthy snack varieties
    - >75% of slots in food vending machines were devoted to high-calorie or high-fat snacks
- Healthier beverage options were generally available, but limited, in all national parks and were not well promoted
    - All restaurants served at least one healthy beverage, in addition to free plain water
    - Low-fat or nonfat milk, a healthy drink option recommended for children, was available in <10% of snack shops and 35% of restaurants
    - Nearly two-thirds of beverage vending machines had >50% of drink choices that were sugar-sweetened
    - <20% of parks used signs to promote drinking plain water
- Most national parks did not provide environments that promote the consumption of healthier foods and beverages
    - 5% of restaurants had signs promoting healthful eating
    - Icons identifying healthier items were used infrequently

    - Nutrition information was displayed in only 1 out of 79 restaurants surveyed
- Overall, eating and drinking offerings that were less healthy were more accessible and visibly promoted to visitors than healthier offerings

Based on the data provided in this report, the National Park Service can consider increasing healthy eating opportunities for its visitors, staff and volunteers by encouraging vendors to increase the availability and promotion of healthy food and beverages through some of the potential action steps outlined above in this report.

APPENDIX A – DEFINITIONS

Drinks:

Diet drink – Any non-calorically sweetened beverage (e.g. Diet soda, low-calorie sports drinks, low-calorie flavored waters)

Healthful drink – Beverages without added sugar or artificial sweeteners including 100% juice, low-fat/nonfat milk (≤1%) and plain drinking water

Sugar-sweetened drink – Beverages sweetened with various forms of sugars that add calories, including but not limited to soda, fruit ades, fruit drinks, sports and energy drinks.

Food Categories for Vending Machine tool module:

(http://www.cspinet.org/new/pdf/HealthyVendingGuide.pdf)

Green/Go foods – Vending machine items meant to be eaten almost anytime, including low-fat/fat-free popcorn, whole grain cereal or cereal bars, whole grain crackers, rice cakes, soy crisps, fruit cup in fruit juice, low-sodium jerky, fruits/vegetables or low-fat/fat-free yogurt

Red/Whoa foods – Vending machine foods meant to be eaten only once-in-a-while, including candy, candy bars, cookies, pies, doughnuts, pastries, muffins, pop tarts, buttered popcorn, chips, snack mix, cheese-flavored crackers, and fruit cups in heavy syrup

Yellow/Slow foods – Vending machine foods meant to be eaten only sometimes, including baked chips, animal crackers, graham crackers, cereal, nuts, seeds, peanut butter crackers, 100-calorie snack packs, fruit cup in light syrup, low-fat granola bar, trail mix, and dried fruit

Uses of term "healthy":

Unless otherwise specified, healthy was defined as per NEMS criteria. These criteria and the papers describing the validity of the NEMS tools/protocols can be found at http://www.med.upenn.edu/nems/about.shtml

Healthy dessert – A dessert without added sugar, including fruit without added sugar or less healthy topping, fruit with a healthy topping added (e.g., low-fat yogurt), or frozen yogurt.

Healthful granola or energy bar -- Defined per Nemours Healthy Vending Guide tables with specific nutrition criteria including maximum calories, saturated fat, fat and sugar content, see page 6 of document found at

http://www.nemours.org/content/dam/nemours/www/filebox/service/preventive/nhps/resource/healthyvending.pdf

Healthy main dish – A main dish (see definition below) that is marked as healthy by a symbol or notation (e.g., light fare, light, heart healthy) OR if nutrition information is available, meets the following criteria:

- For entrees:
    - ≤800 calories
    - ≤30% of calories from fat
    - ≤10% of calories from saturated fat
- For burgers/sandwiches:
    - ≤650 calories
    - ≤30% of calories from fat
    - ≤10% of calories from saturated fat

Healthy main salad – A main salad (see definition below) that is marked as healthy by a symbol or notation (e.g., light fare, light, heart healthy) OR if nutrition information is not available, can be dressed in low-fat or fat-free salad dressing and has no more than 3 higher fat ingredients (e.g., bacon, cheese, egg, nuts, salami, sour cream) OR if nutrition information is available, meets the following criteria:

- ≤800 calories
- ≤30% of calories from fat
- ≤10% of calories from saturated fat

Kids healthy main item – A lunch or dinner entrée that is easily identified as healthy because of preparation (grilled, broiled) and has an absence of less healthy main components (red meat, cheese, butter). Examples include peanut butter and jelly on whole wheat bread, spaghetti with tomato sauce, or grilled chicken and vegetables.

Kid's healthy side item – A listed item, not meant as the central component of a meal, that is easily identified as healthy (no sauce, no sugar-added) and has an absence of unhealthy main components (cheese, mayonnaise). Examples include vegetables without sauce, fruit without added sugar, rice, beans/legumes without unhealthy sauce, green salads, raw vegetables, and baked chips.

General:

Local/Regional – grown in nearby area

Low-fat milk – Milk with ≤1% fat content (includes 1% milk and 0%/nonfat/skim milk)

Low-sugar cereal* – Breakfast cereal with <7 grams of sugar per serving

Main dish* – An item that is meant to be the central part of a meal and is listed as an entrée or as a separate item (that is clearly not a side dish) and is distinctly different than other items in ingredients, portion of ingredients or preparation method

Main dish salad* – A salad that is of sufficient size to be the central part of a meal and typically includes at least one protein source as an integral ingredient

Non-nutritive foods – A vending machine food without nutritive value, including gum and breath mints (per USDA definition of foods with minimal nutritional value for the National School Lunch program, see http://www.fns.usda.gov/cnd/governance/regulations/7cfr210_09.pdf)

Organic – Foods produced using methods that do not involve modern synthetic inputs (e.g. irradiation, additives, genetically modified organisms, or chemical additives)

Promotion – Suggestive selling of particular items, typically by signage or displays (e.g., “fresh and tasty salads available!” or “try our delicious homemade apple pie”)

Sustainable – Foods produced by a system in which resources are used at the same rate that they are generated

Vegetarian (lacto-ovo) – Food without any animal meat sources; eggs, cheese and butter may be present (per Academy of Nutrition and Dietetics)

*Per NEMS criteria, see http://www.med.upenn.edu/nems/about.shtml