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National Park Service Office of Public Health Summary of Activities

Fiscal Year 2008 (October 1, 2007—September 30, 2008)

Introduction

Mission

The mission of the NPS Office of Public Health is to assist the Service in providing for the sustainable enjoyment of our National Park System by protecting and promoting public health, reducing the risk of disease transmission, and responding and preparing for public health emergencies.

Major program Elements

- Environmental Health
  - On‐site Evaluation and Consultation
    - Drinking Water Safety and Waste Water Disposal
    - Food Safety
- Zoonotic and Vector Borne Disease Prevention
- Disease Surveillance and Outbreak Response
- Comprehensive Public Health Protection and Promotion
- Emergency Preparation and Response

Staff

The National Park Service Office of Public Health (OPH) is a division within the WASO Visitor and Resource Protection Directorate. OPH is comprised of 14 employees, of whom 13 are Commissioned Corps officers detailed from the U.S. Public Health Service (PHS).

Most OPH staff are public health consultants stationed across the NPS system; these 10 consultants have varied backgrounds, including engineering and environmental health, and report to OPH. In addition, 4 field staff are directly assigned to park units and are supervised locally.

Public health staff are supported by OPH WASO staff, including the Director, the Assistant to the Director for Personnel, the Assistant to the Director for Epidemiology, and the Assistant to the Director for Science.

Other PHS officers are directly assigned to the Department of the Interior, NPS units, and other WASO divisions.
Environmental Health: Food and Water/Waste Water Evaluation Data Summary

Background on Environmental Health Database

OPH began maintaining evaluation data in a standardized, electronic database in 2007. This database was developed by LCDR Adam Kramer and was implemented in a step-wise approach. Data for most food evaluations were entered starting in May 2007; pilot efforts to capture water and wastewater evaluation data were initiated in May 2008. All of the following charts are based on data entered into the electronic database.

Overall Park Visits and Evaluations

NPS PH consultants park visits FY 08 totaled 214 (with visits where both EH survey and food evaluation occurred at the same site within the same month counted as 1 visit).
Overall Number of Evaluations by Type and Region

A large portion of the food, water, and waste water evaluations were completed in the Intermountain region (IMR) and Pacific West/Alaska region (PWR/AKR), but proportionately, most consultants are also located in those regions, with 4 consultants in the IMR region and 2 in the PWR/AKR region (with an additional 3 park sanitarians stationed in the Pacific West). Additional consultants are placed where there is greater demand for their services due to larger land areas and more facilities requiring water, wastewater, and food evaluations.

Food Service Evaluations

- 578 of 583 (99%) food service evaluations were completed and entered into the electronic database.
- Of 578 food service evaluations analyzed, 89% were rated “satisfactory”, the highest rating possible.
- Restaurants and snack bars constituted 66% of all food service evaluations conducted. Not surprisingly, restaurants and snack bars also represented the largest number of evaluations with 3 or more critical violations. Per the 2005 Food and Drug Administration (FDA) Food Code, a critical violation is issued if a facility is not in compliance with an item that is likely to contribute to food contamination, illness, or an environmental health hazard.
<table>
<thead>
<tr>
<th>Type</th>
<th>Number of Evaluations</th>
<th>Number of Evaluations w/o no critical violations (CVs)</th>
<th>Number of Evaluations w/ 1 or more CVs</th>
<th>Number of Evaluations w/ 3 or more CVs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backcountry</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Bar</td>
<td>22</td>
<td>17</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Daycare Center</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Grocery</td>
<td>101</td>
<td>82</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
<td>10</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Pre-packaged</td>
<td>27</td>
<td>21</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Restaurant</td>
<td>215</td>
<td>105</td>
<td>110</td>
<td>42</td>
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<tr>
<td>Service Facility</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Snack Bar</td>
<td>164</td>
<td>122</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td>Temporary</td>
<td>15</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>578</strong></td>
<td><strong>372</strong></td>
<td><strong>206</strong></td>
<td><strong>58</strong></td>
</tr>
</tbody>
</table>

- The top 10 critical food violations that were cited for all facility types are as follows:
  1. Not keeping items appropriately cold (cited in 16% of all evaluations)
  2. Not washing hands (5%)
  3. Food contacting dirty surface (5%)
  4. Not cooling food fast enough (4%)
  5. Food not hot enough to prevent growth of organisms (3%)
  6. Food contamination from bare hand contact (3%)
  7. No expiration date on food (3%)
  8. Cross contamination of food (e.g., raw foods touching cooked products) (3%)
  9. Not controlling pests (e.g., flies, rodents) (2%)
 10. Not sanitizing equipment (2%)

Based on food service evaluations and critical violations observed, appropriate management strategies and interventions were discussed with food facility operators, concessioners, and NPS staff.

- Of the FDA risk factors commonly associated with foodborne illness, the top 3 risk factors observed were:
  - Inadequate temperature control of foods (cited in 26% of all evaluations)
  - Food cross-contamination (15% of all evaluations)
  - Hand washing and bare hand contact (11% of all evaluations)
Water Evaluations

- 359 of 538 (67%) water evaluations were completed and entered into the electronic database.
- Of 359 water systems analyzed, 71% were public water systems utilized by at least 25 persons or have 15 service connections. Second in number of systems evaluated were small non-public water systems (e.g., small ranger station). Eight percent of evaluations were of distribution/municipal systems where NPS units distributed water primarily maintained by non-NPS entities. Other systems constituting 3% of water systems evaluated were non-potable water systems not used by the public (e.g., fire hydrants).

Water and Wastewater Recommendations

- Recommendations were made by public health staff regarding areas for improvement. Both water and wastewater recommendations are classified as major, minor, or unclassified (i.e. noted but not categorized as major or minor). Recommendations are categorized by the area along the water or wastewater system that the observation was noted. If a problem is noted across multiple water or wastewater systems, the recommendation can be classified as system-wide, whereas if a problem is associated with a single system, then the recommendation can be classified as specific. Unclassified recommendations were not categorized into more specific steps in the treatment process.
- For water systems, most of the recommendations were categorized as minor. Treatment, distribution, and source portions of the water system had the most major problems, while storage, treatment and source had the most minor problems.

### Systemwide and Specific Water Recommendations as Indicated by Area Along Water System (N=671)

<table>
<thead>
<tr>
<th>Water System Components</th>
<th>Systemwide</th>
<th>Specific Water Recommendations as Indicated by Area Along Water System (N=671)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOURCE</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>RAW WATER</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>TREATMENT</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>PUMP STATIONS</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>STORAGE</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>DISTRIBUTION</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>SECURITY</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>BACKFLOW</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>UNCLASSIFIED</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

Number

- Unclassified
- Minor
- Major
Wastewater Evaluations

- 342 of 564 (61%) wastewater evaluations were completed and entered into the electronic database.
- For wastewater systems, most of the recommendations were categorized as minor. Treatment, collection, and discharge portions of the water system represented the majority of recommendations made.

### Systemwide and Specific Wastewater Recommendations as Indicated by Area Along Wastewater System (N=312)

<table>
<thead>
<tr>
<th>Wastewater System Components</th>
<th>Collection</th>
<th>Treatment</th>
<th>Discharge</th>
<th>Security</th>
<th>Unclassified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>6</td>
<td>45</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

- **Edible**

  - Major: 115
  - Minor: 120
  - Unclassified: 45
Environmental Health Success Stories

High Levels of *Escherichia coli* and Fecal Coliform Detected in Cave Waters at Mammoth Cave National Park

In October 2006 a researcher from Western Kentucky University reported high levels of *E. coli* in cave water samples from various locations at Mammoth Cave National Park (MACA), including high-use areas such as the Historic Entrance and Mammoth Dome. *E. coli* is a bacterium found in human and wildlife feces, and is an indicator of disease transmission potential. As a precautionary measure, tours of the historic section of the cave were temporarily closed and a news release was issued to the public. CAPT Theresa McDarmont assisted the park in addressing this issue by consulting with CDC officials and national water safety experts. In FY08, fluorescent dye tests were conducted at the park, which identified the likely source of contamination as a break in an old sewage line, which was later repaired. Although recent *E.coli* or fecal coliform tests have not exceeded applicable public health standards, low levels of these contaminants continue to be found in the cave waters. PHP partially funded these studies and a FY09 project to continue water safety monitoring at MACA.

Special Study of Shenandoah National Park’s Water and Wastewater Systems

In 2008, CAPT Richard Durrett and CAPT Bob Reiss conducted an evaluation of all water and wastewater systems at SHEN. Preliminary review in 2006 indicated that most water systems were artesian wells constructed in the 1930’s which were vulnerable to possible water contamination from surface water runoff. CAPTs Durrett and Reiss partnered to provide a comprehensive report of findings, concerns, and recommendations to the park regarding their water supplies and wastewater disposal systems. The park plans to develop a work prospectus for converting artesian wells to drilled wells as funding becomes available.

Elevated Levels of Arsenic Reported at Rock Creek Park

In 2008, high and potentially dangerous arsenic levels in soil were identified at ROCR using satellite imaging. CAPT Richard Durrett worked closely with the park, USGS, EPA, CDC, the DC Health Department, and the DC Mayor’s Office in responding to this high-profile incident. One section of the park was closed for a few weeks but was reopened after follow-up soil samples indicated that arsenic levels at the park were within normal limits.

Closure of Food Facility in San Francisco Park

After evaluating a food facility located in a San Francisco park last February, CAPT Paul Robinson recommended to the park superintendent that the facility be closed down. Several critical violations were noted, including 1) poor management leadership, 2) lack of knowledge among staff regarding food safety, and 3) the potential for cross-contamination of foods, a repeat violation for this facility. CAPT Robinson immediately met with the facility’s managers to discuss the situation and worked with them over several months to develop a corrective action plan (CAP). The CAP outlined specific measures the operation would implement and included both interim actions to immediately address violations and
long-term changes to strengthen operational control. In this situation, the park, organization management, and regional public health consultant collaborated to put in place effective and meaningful controls over food safety hazards in order to protect public health.

**Disease and Outbreak Response**

All public health staff assisted in responding to infectious disease case reports, outbreaks, and other incidents potentially involving human disease transmission. These public health responses were primarily coordinated by the WASO medical epidemiologist.

**FY08 Summary**

- 60 incidents at 36 NPS units/offices in 7 regions
  - 76% increase from FY07 (34 incidents)
- Responses included collaboration with 15 state and 19 local/county health departments
- CDC assisted with 5 incidents
- Most incidents occurred in the IM (48%) and PW (20%) regions
  - 5 parks had 4 or more incidents (GLAC, GOGA, GRCA, YELL, and YOSE)
- Incidents involved visitors (42%), employees (38%), visitors and employees (5%), and wildlife/environmental issues (15%)
Major responses
- Pneumonic plague at GRCA
- Bubonic plague in Wyoming (possible exposure at YELL)
- Measles at BRCA, GRCA, and YOSE
- Rocky Mountain spotted fever at FLETC
- Tularemia at GATE and YOSE
- Carbon monoxide poisoning at CACH

Other responses (examples)
- 15 norovirus/acute gastroenteritis outbreaks (25% of all incidents)
- Animal bites/rabies concerns at 6 parks
- Tuberculosis exposures at HFC, GLAC, and GOGA
- West Nile virus at ARPO, CHOH, EVER, and GWMP
- Unexplained death investigations at DEWA and in a BIA employee (both causes of death determined to be non-infectious)
- Staphylococcal infections at GOGA and GEWA

Disease Response Narratives

A. Plague in Western U.S. parks

Plague is a rare, but often fatal, bacterial infection that can be transmitted through fleabites, direct contact with infected animals, or inhalation of infectious droplets. Though rodents are the primary reservoir, over 200 mammalian species are known to be susceptible to plague, including rabbits, prairie dogs, and wild carnivores. Plague is considered endemic in much of the western U.S. and is a public health threat at many parks. In FY08, PHP responded to 5 plague incidents.

1. Pneumonic plague, GRCA—In November 2007, a wildlife biologist at GRCA was found deceased in his residence at the South Rim. A collaborative public health investigation, led by CDR David Wong and LT Matt Walburger, determined that the biologist died from primary pneumonic plague that was likely acquired through inhalation of aerosols generated during the necropsy of an infected mountain lion. Plague prevention and control measures were discussed with GRCA, and service-wide guidelines for safe handling of wildlife were developed. This case was the first necropsy-associated report of human plague as well as the first human case ever associated with a mountain lion.

2. Bubonic plague, Wyoming—In August 2008, a Boy Scout from Connecticut was diagnosed with bubonic plague after traveling to Wyoming. Based on the patient’s symptoms and travel history, YELL was considered a potential site of exposure. In conjunction with CDC and the Wyoming Department of Health, LCDR George Larsen coordinated an environmental investigation at the park. No rodent carcasses, fleas, or other evidence suggestive of a plague epizootic were found at YELL, and investigators concluded that the patient most likely acquired infection at a nearby Forest Service site. Through this investigation, YELL employees and visitors were educated on the potential risk for plague transmission.
3. Plague in wildlife—Plague-positive prairie dogs and a domestic cat were reported near park boundaries at BADL, FLFO, and SCBL. LCDR Adam Kramer, CAPT Joe Winkelmaier, and CAPT Bob Reiss assisted in the public health responses, including meeting with park managers, dusting prairie dog burrows, and consulting with state/county health officials and federal partners.

B. Imported Measles

Measles is a potentially fatal viral disease that is transmitted person-to-person through air or by contact with infected respiratory droplets or secretions. Although measles is no longer considered endemic in the U.S. due to high vaccination rates, many cases are imported each year by international travelers; U.S. citizens who are not immunized or under-immunized are at risk for secondary transmission. Measles virus is extremely contagious and can remain infectious in the air of an enclosed airspace for up to 2 hours after a person with measles has left the area.

In June 2008, a laboratory-confirmed case of measles was diagnosed in an Italian national who had traveled to 3 parks (BRCA, GRCA, and YOSE) while potentially infectious. All affected parks were notified, and local healthcare providers were alerted about the potential for measles transmission. No identified park contacts were at high-risk for complicated measles infection (e.g. pregnant women, infants, immunocompromised), and no additional cases occurred. The importance of following recommended immunization schedules was emphasized to park employees and concessioners. Through this investigation, CDR Wong collaborated with 3 state and 6 local/county health departments.

Disease Surveillance

Another duty of the WASO medical epidemiologist is to develop surveillance systems in order to improve detection of NPS-associated infectious disease case reports and outbreaks. In FY08, initial efforts were made to utilize health data from two different sources: 1) park-based data and 2) health department-based data (e.g. NPS-associated case reports that are reported to state health departments and the CDC).

Park-Based Surveillance—Web-based employee absenteeism reporting at YELL

In May 2008, a web-based reporting system was initiated to track health-related absences among employees at Xanterra and Delaware North, the 2 largest concessioners at YELL. Through this system, park managers, concessioners, and PHP staff were able to identify and monitor several clusters of gastrointestinal (GI) illness in real time (see below graphs). In future years, PHP hopes to expand this reporting system to other parks and to include other disease syndromes.
Note: This cluster of employee absences was likely related to a tour bus which entered YELL on 9/2/08 carrying many ill passengers. Using the absenteeism reporting system, LCDR Larsen noted the increases in GI-related employee absences on 9/5/08 and reinforced norovirus prevention and control measures with concessioners. Such prompt action may have limited the spread of disease and prevented a larger outbreak from occurring.
Health Department-Based Surveillance—Obtaining Buy-in from the Council of State and Territorial Epidemiologists

On June 10, 2008, CDR Wong and CAPT Higgins hosted and organized an NPS breakout session at the Council of State and Territorial Epidemiologists (CSTE) annual conference. The session was an opportunity for state epidemiologists, state public health veterinarians, and other health professionals to learn about PHP activities. Three oral presentations were given highlighting: 1) NPS disease surveillance, 2) a 2006 tick-borne relapsing fever case investigation at YOSE, and 3) a program to encourage the development of public health-focused interpretive programs for visitors. The session was attended by approximately 100-125 persons, and many epidemiologists expressed interest in helping to develop formal protocols for sharing infectious disease case reports with PHP. Plans are underway to host a roundtable discussion on NPS disease surveillance activities at the 2009 CSTE annual conference.