

**National Park Service  
Visitor and Resource Protection  
Public Health Program**

**2005 Year End Report**





## **Year End Report- Fiscal Year 2005**

### **Introduction**

*“This will serve to introduce Lieut. Everett Judson, of the United States Public Health Service, who has been detailed by the Surgeon General at request of the National Park Service, to make a careful sanitary survey of water supplies in use in the park.*

*This work is of utmost importance, as a matter of public safety, and it is to the interests of concessioners and government employees, as well as travelers, that it be prosecuted successfully.*

*Concessioners and employees of this Department will please give Lieut. Judson such assistance as may be possible, and show him and his assistants every consideration practicable in connection with his work.”*

Armed with this letter of introduction from Acting Superintendent Chester A. Lindsley, dated June 13, 1918, LT Judson embarked on an 11 day drinking water safety survey of Yellowstone National Park, beginning a long and fruitful partnership between two federal agencies.

This proud tradition was again successfully carried out in fiscal year 2005 by the 31 officers of the United States Public Health Service Commissioned Corps (PHS) assigned to the National Park Service (NPS). These officers are joined by four Civil Service employees and together, this group forms the NPS public health team. These men and women conducted on-site evaluations of drinking water safety, waste water disposal, food safety, vector control and other public health issues. They worked to protect employee health, evaluate environmental compliance, oversee critical construction projects, design facility improvements, and conduct training for both NPS and concession employees.

Ten of these officers and one Civil Service employee are directly assigned to the NPS Office of Public Health, conducting on-site visits to park units, acting as general public health consultants to managers and staff of the regions as well as park units, and providing for management of the program. The Regional Public Health Consultants also serve as liaisons with local and state health agencies and with agencies that regulate drinking and waste water. In addition, one PHS officer and three civil service employees have responsibility for a single park unit where they are employed as public health generalists. Twenty one PHS officers do not report to the Office of Public Health but instead are assigned to specific programs, regions or parks, where they provide direct support. The activities of these three groups make up the collective efforts to protect public health within our national park system.

## **Public Health Program Fiscal Year 2005 Highlights**

- **On-Site Public Health Evaluations and Consultations** – the core mission of the Regional Public Health Consultants is to provide on-site evaluation and consultation to park managers and staff in the subject areas of drinking water safety, waste water disposal, food safety and zoonotic/vector borne diseases.
  - ✓ **Conducted 292 on-site visits**
  - ✓ **Completed 495 food safety evaluations**
  - ✓ **383 inspections / consultations for events at National Mall**
  - ✓ **Evaluated 544 drinking water systems**
  - ✓ **Reviewed the operation of 564 waste water systems**
  - ✓ **Provided consultation on vector borne disease at all 292 sites**
  
- **Public Health Emergencies** – all of the officers and employees affiliated with the Public Health Program assist in times of emergencies with public health issues within the national park system.
  - 70% of staff participated in the hurricane response
  - Detected, responded to and investigated disease transmission / outbreaks or serious potential for disease transmission (eg: plague in prairie dog colonies)
    - ✓ GRCA (multiple incidents)
    - ✓ BRCA (gastrointestinal outbreak)
    - ✓ DRTO (possible antibiotic resistant bacterial infections)
    - ✓ CURE (plague)
    - ✓ Multiple parks for West Nile Virus potential
    - ✓ MEVE (plague)
  - Assisted the NCR and Centers for Disease Control in the investigation of the possible detection by automated sensors on the National Mall of the causative agent for Tularemia
  - Leading NPS effort to prepare for and respond to the emergence of a new highly pathogenic form of Avian Influenza and the possible world-wide pandemic that it could create (also participating in DOI activities related to this effort)
  
- **Strategic Initiatives**
  - Continued efforts toward a more sustainable program
    - ✓ Completed a system-wide workload analysis
    - ✓ Implemented a participatory management model for the program
    - ✓ Continued exploring ways to measure outputs and outcomes
    - ✓ Submitted budget proposals that reflect strategic changes
  - Worked with the Centers for Disease Control and Prevention, GRCA and YELL, toward the establishment of an NPS disease surveillance system

## **Goals for Fiscal Year 2006**

- Fill SE Regional Public Health Consultant position that was vacated in 2005. This position was lapsed for the remainder of FY05 in order to meet budget ceilings.
- Increase the number of on-site park consultations by 10%. This will be accomplished by assigning an officer to the SE and by continuing to lapse the program Deputy Director position and re-programming some of that money to field use.
- Complete the NPS Avian Influenza Response Plan, test and distribute it to programs, regions and parks.
- Establish a formal NPS disease surveillance system
  - Continue pilot projects at GRCA and YELL
  - Create and fill the NPS Epidemiologist position
  - Establish a national disease transmission database
- Establish formal program output and outcome measurements
  - Pilot measurement efforts in a few program areas
  - Pilot a database to facilitate central collection and analysis of data
- Continue to strengthen strategic partnerships
  - CDC – diseases surveillance and laboratory support
  - States – disease surveillance
  - FDA and USDA – food safety
  - USGS National Wildlife Health Center – zoonotic and vector borne disease surveillance
  - NPS
    - Risk Management – connections in employee and public issues
    - Natural Resources – connections with wildlife and human issues
    - Concessions – cooperative solutions to improve visitor protection
    - LE and Interpretation – use of “Ranger Radar” to improve disease transmission detection
  - EPA – recreational water issues, drinking water and waste water
- Work with the Concession Program to establish a revised food safety evaluation rating system
- Work with Facilities Management to explore the possibility of adding some public health measures to the FMSS database, allowing for the indication of relative risk that a systems strengths or weaknesses create

**In Depth** Core subject areas and On-Site Consultations

In Fiscal Year 2005, the public health program was forced to lapse two vacant positions and eliminate a seasonal position due to a continued budget decline. In spite of this, the program managed to complete 292 visits to park units.

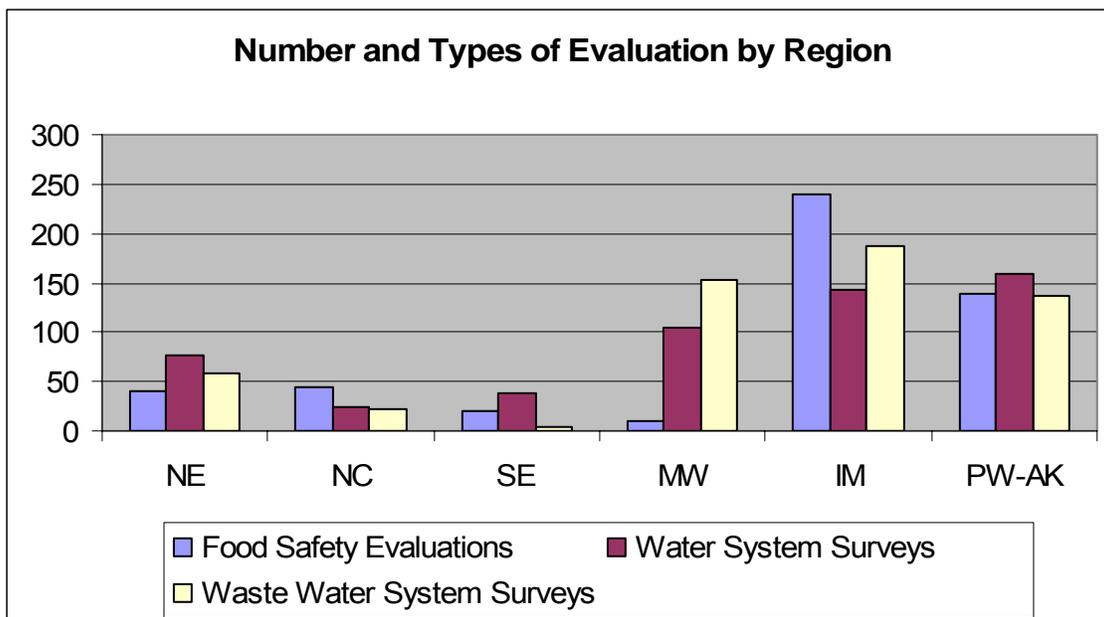
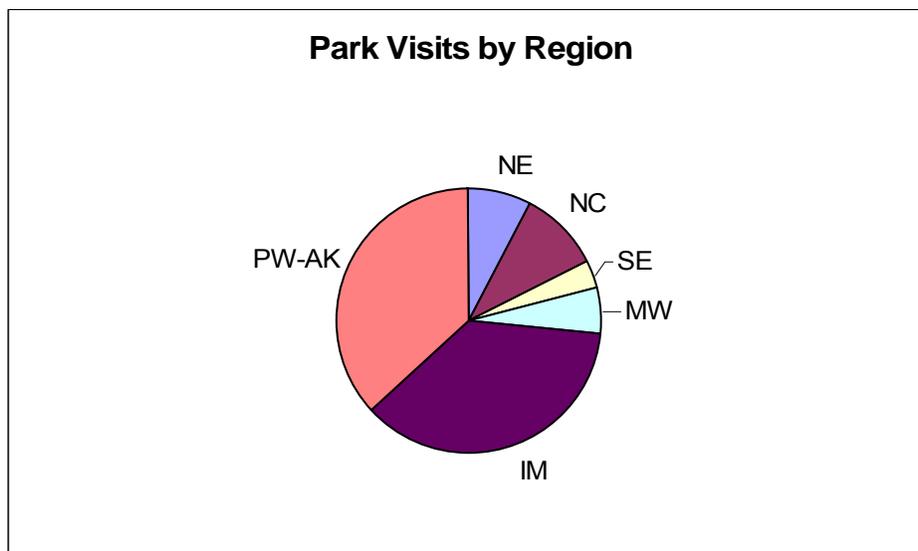
*(Note 1: For purposes of efficiency, work in both the AK and PW regions is shared between three individuals and so these two regions are listed together in the following chart. It is planned that future data collection methods will allow separating out this information for statistical purposes.)*

*(Note 2: The SE position was open much of the year, resulting in artificially low numbers of outputs for that region. Because a patchwork of people assisted in conducting essential work to fill that gap, data that does exist and is reflected in this table, may be incomplete.)*

Region	NE	NC	SE	MW	IM	PW-AK
Park Visits	23	29	10	16	106	108
Training Courses Conducted	0	2	0	4	4	11
FS Critical Violations	34	66	19	5	192	69
FS Non Critical Violations	61	88	20	7	119	99
FS Total Violations	95	0	39	12	311	168
FS Satisfactory Ratings	39	40	21	10	219	136
FS Marginal Ratings	2	1	0	0	19	1
FS Unsatisfactory Ratings	0	3	0	0	2	2
Food Safety Evaluations	41	44	21	10	240	139
Water System Surveys	76	24	38	105	142	159
Waste Water System Surveys	58	23	5	153	188	137

The vast majority of food concession operations evaluated in 2005 received an overall rating of Satisfactory (98%). This reflects the high quality of many of our operators within the NPS system. Unlike in a community outside of the parks, operators can only conduct business within NPS under a contract with the agency. This has a very real effect over time of helping to weed out those who have a low interest in compliance with food safety issues. To some extent the number of Satisfactory ratings is artificially inflated due to the limited nature of the scale in the current system used to determine these ratings. The Public Health Program hopes to work with the Concessions Program this coming fiscal year to develop, test and implement a new ratings system. There is a need for a broader scale that more accurately conveys the relative control that each operation has over critical food safety issues and process and better indicates if that control is increasing or decreasing over time.

On-site evaluations and consultations are based on Directors Order 83 and the requirements contained within it. These are also driven by several factors including park size, amount of infrastructure such as number and complexity of drinking water and waste water systems, how long visitors are likely to remain, etc. Some variables, such as park size, affect the potential for visitors to be exposed to a disease agent and if that exposure will result in an outcome that we can detect. Other variables including number and nature of water supplies, create the potential for risk and elevate the need for on-site evaluation for preventative purposes. Regional consultants use DO 83, the variables listed above, as well as others such as how well past issues have been resolved, to prioritize the travel and what subject areas to spend time with. These variations are reflected in the relative differences seen in the charts below that list activity by region.



**In Depth**      Disease Transmission and Outbreaks

**GRCA**

On 8/26/05, Grand Canyon National Park (GRCA) was alerted to a river trip operated by a river rafting concession with passengers experiencing symptoms of gastrointestinal illness (GI). One of the cases and her husband were evacuated by the park from Phantom Ranch (she had a pre-existing heart condition) and was transported to Flagstaff Medical Center where she was treated for severe dehydration.

The GRCA River Sub-District Ranger notified the PHP on 8/26/05 of illnesses associated with this river trip. Further reports of GI illness were received from this same company on 8/31. During the preliminary interviews, other companies in the Kanab, UT/Fredonia, AZ area were found to have trips with passengers and crew who had experienced GI illness in a similar timeframe.



During August 19 and September 12, 2005, 95 commercial river trips launched from Lee's Ferry with 13 trips experiencing multiple individuals with GI illness (attack rate=14%). The 13 trips were spread amongst 5 companies.

On these thirteen trips there were 353 people, 250 people have been interviewed (70%). Of those 250, 122 have reported illness (trip participant attack rate=49%). Fourteen additional individuals were reported by the river companies as having illness (total ill individuals =136).

Epidemiologic and laboratory evidence indicates that norovirus was the causative agent of this outbreak.

The leading cause of viral gastroenteritis in the United States is the noroviruses (NoV), members of the family Caliciviridae. It is estimated that 50% of all foodborne outbreaks of gastroenteritis (23 million cases) are attributable to NoV. The incubation period (time between exposure and symptoms) is usually 24 to 48 hours (range: 10 – 72 hours), symptoms usually include nausea, vomiting, diarrhea and abdominal cramps, and duration is short, around one to two days. This agent is very infectious, requiring a dose as low as 10 to 100 virus particles, and can be transmitted in a variety of ways including food, water, fomites (inanimate objects), as well as person-to-person through close contact.

The initial cases in this outbreak appear to have been initiated by an ill employee in a meat processing plant. The employee had been ill on the weekend and returned to work on Monday August 15, 2005. He then proceeded to slice and package ready to eat meat for five different river rafting companies. The slicing involved the use of bare hands with meat on a manually operated slicer. It is possible that this employee was infected with norovirus and at the time he sliced the lunchmeat for the river rafting company orders, he was still shedding virus. Inadequate hand washing combined with the bare hand contact of the lunch meat may have contaminated the product with norovirus. No other contributing factors were identified by this investigation.

## **BRCA**

In the last week of June (2005), alert staff at BRCA noticed an increase in Gastrointestinal illness (GI) among employees of one of the park concessions. The NPS Public Health Program (PHP) was notified of this issue on June 30th. On July 1, 2005 a conference was conducted between Park Management, PHP personnel, and concession management. A decision was reached that a public health response was warranted.

On July 2, 2005 CAPT John Collins, Regional Public Health Consultant and LTJG Adam Kramer, Public Health Consultant responded to BRCA.

Private interviews were conducted with employees of concession A that self-reported an illness during June or July 2005. Concession B was also identified as having ill employees. A group interview was held with those employees.



The results of the interviews indicate that there may have been two different illnesses occurring simultaneously. One illness was minor, causing some GI distress but quickly resolving. The other illness is longer lasting and symptomatic of Norovirus. There does

not appear to be a single incident that preceded the illnesses, indicating that the illness was most likely spread from person to person perhaps with the aid of fomites (inanimate objects).

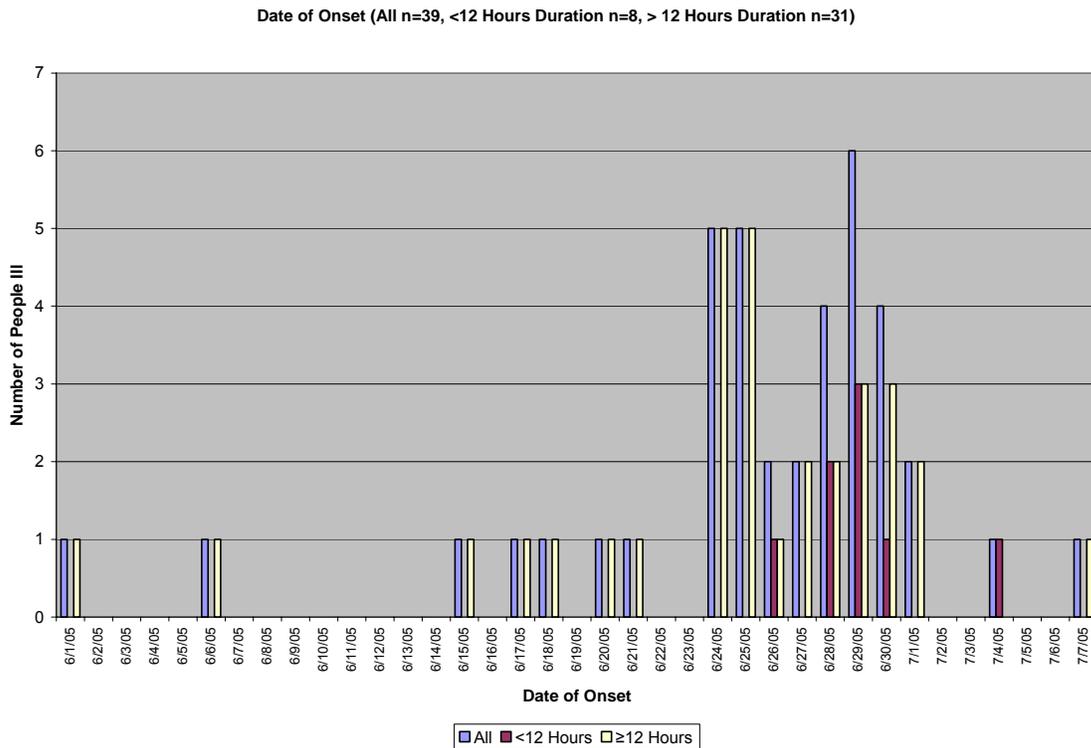
The employee dining room was identified as a common location where employees from both concession A and B eat.

Concession A practices connected with ill employees, may have been encouraging employees to return to work while they were still ill. During the interviews a number of employees including food service workers indicated that they were still working even while they were symptomatic.

The interview data indicates that a large number of food service workers were ill, even with this high number the illness does not appear to be foodborne. We identified only 3 ill visitors and it is likely that foodborne transmission would have produced a higher incidence among visitors.

Identifying this outbreak early, enabling interventions by both NPS and the concession, may have limited the scale and scope of this disease transmission event.

The causative agent(s) remain unidentified and, as previously mentioned, it is possible that there were two different illnesses occurring. The illnesses that lasted longer have symptoms and durations consistent with Norovirus.



## GRCA

During April 2005, there were four hiking groups who traveled from the South Bass Trail to the Boucher Trail via the Tonto trail within Grand Canyon National Park and developed diarrhea after drinking water from natural reservoirs within the canyon.

Based upon the epidemiology of the illness (people who had treated water with a disinfectant as well as those who had not treated their water were ill), indicates a non-microbial source of infection.

The high attack rate, with various methods of water treatment being used, the short duration of the illness, the lack of other symptoms, the description of the water as having a bitter taste, and the localization of the illness around water from one drainage, indicates that the suspect agent was a chemical intoxication most likely due to a high mineral content in the water.

Laboratory findings indicate a high magnesium content that could have a laxative effect. It is the common ingredient in some laxatives as either Magnesium Sulfate or Magnesium Hydroxide.

Other minerals found in this water commonly form a salt with Sulfate. Sulfate has been shown to have a laxative effect with concentrations ranging from 250-1,000 mg/L.



**In Depth** Significant Public Health Issues or Consultations

**Chronic Wasting Disease**

Chronic wasting disease belongs to a group of diseases known as transmissible spongiform encephalopathies (TSE's), which includes scrapie, bovine spongiform encephalopathy (BSE), and Cruetzfeldt-Jakob disease (CJD). TSE's cause distinctive lesions in the brain and consistently result in death.



Current research consensus indicates that the health risk for human's that consume elk and deer infected with CWD if any, is extremely low. Based on analysis of existing epidemiologic and laboratory studies, there is currently no established link between CWD and similar human TSE diseases. However, current literature reviewed by the PHP and subject area experts agree that there is still more to be learned and that many questions remain unanswered about the transmissibility of CWD to humans.

A related animal disease, bovine spongiform encephalopathy (BSE), has been causally linked to the human form of that disease known as variant Creutzfeldt-Jakob disease (vCJD). This has raised new concerns about the possibility of CWD crossing the species barrier and infecting humans that consume meat from infected elk and deer (1). While current evidence indicates that the differences between BSE/vCJD and CWD are significant, there is still ongoing research to establish whether CWD can cross the human species barrier. Given the early state of our knowledge about this issue, many subject area researchers and public health authorities believe that it is wise to take some basic precautions to protect human health when eating meat from deer or elk that come from areas known to have CWD.

Given this background, the Biological Resources Management Division (BRMD) submitted a request to the PHP for the development of guidance regarding the human consumption of elk and deer meat gathered from Parks in areas where chronic wasting

disease (CWD) is known to occur. Several parks are facing decisions on what options to use if they decide to use lethal culling techniques to manage their cervid herds. Using the meat for human consumption is one of the alternatives being considered by Parks.

The PHP researched this topic, consulted with subject area experts, federal health agencies and federal food safety agencies, and produced a guidance documents to assist parks in planning for the possible human use of any meat that might result from the lethal culling of cervids.

### **Back-Country Health Outcomes**

Outdoor organizations have questioned the standard advice given hikers and campers about the need for universal filtering and disinfection of drinking water in the back-country to prevent illness. In response to this issue, the PHP is partnering with the Centers for Disease Control and Prevention (CDC) and in FY05 designed a back-country health outcomes study to be conducted at YELL in FY06. The purpose of this study is to begin to capture information about health outcomes from use of the back-country areas at YELL and any specific risk factors that led to illness.

Information from this study will be used to improve personal protection advice that NPS provides to visitors.

### **Water and Waste Water Systems**

One outcome of the routine, on-site evaluations and consultations that the PHP provides park units on their drinking water and waste water systems, is the elevation in priority for repair and / or construction projects. Multiple systems in FY05 received funding as a result of PHP findings. This effort and the resulting application of additional resources is a major preventative outcome, reducing NPS liability, protecting visitors, and improving relationships between NPS and various regulatory agencies.

### **Other Examples of Public Health Consultations in FY05**

- NE Assisted ACAD with assessments of beach water quality issues
- MW Helped HOSP to evaluate and deal with potential bacterial and radiological hazards
- IM Provided consultation for MEVE and CURE on visitor and employee protection measures related to plague epizootics in wildlife
- PW Provided 3<sup>rd</sup> party sanitary surveys required under the Safe Drinking Water Act resulting in a significant monetary savings for AK park units