



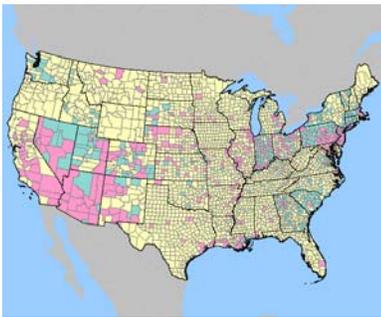
## Public Health Update

Friday, October 26, 2004

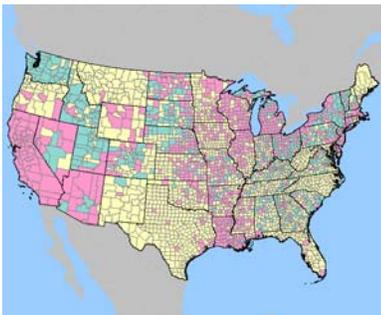
### West Nile Virus Activity Summary



Areas in pink on the map below report mosquitoes testing positive for WNV.



Areas indicated in pink on the map below report birds testing positive for WNV.



### Disposing of Human Waste in the Backcountry

The basic NPS policies for food, water, and waste sanitation are stated in Directors Order 83, the backcountry accepted public

health practices are outlined in DO- 83, Reference Manual (RM) 83 B and H. you can find this at our web site ([http://www.nps.gov/public\\_health](http://www.nps.gov/public_health)).

The RM 83B identifies the regulations and directs Park managers to "...reduce the risk of waterborne diseases and provide safe wastewater disposal by ensuring wastewater systems are properly operated, maintained, monitored, and deficiencies promptly corrected." The regulations cited are (1) the Clean Water Act, as amended (33 U.S.C. 1251 et seq.); (2) The Primacy Agency requirements; or (3) this NPS wastewater policy, whichever is most stringent." The RM 83 also identifies systems that are suitable for backcountry operations. Suitable systems include "flush toilets; composting toilets; barrel toilets; evaporator toilets; incinerator toilets and pit privies." However, the use of pit privies is typically not recommended and is a temporary option at best. Some park policy allows for the use of "cat holes" because there are no other means available to dispose of human waste.

There is also guidance on adequate sanitation facilities for remote activities such as river rafting, horseback riding, backcountry biking, backpacking and similar activities. In accordance with RM-83, Reference H "in environmentally sensitive areas such as river corridors, human feces and other solid waste shall be transported to an approved offsite disposal facility unless fixed facilities which conform to all applicable rules and regulations are available onsite. Urine may be disposed onsite unless prohibited by law. However, all waste shall be disposed of in a manner consistent with park policy and all applicable health and environmental regulations." Some Parks may allow individual visitors to deposit urine at least 100 feet away from the riverbanks or allow for deposition in the main river current.

#### A Summary of Various Alternatives Typically Used Within NPS

##### Cat Holes

The person typically digs a hole at least 6" deep (15 centimeters) and at least 100 feet (30 meters) away from water for fecal waste disposal. Decomposition of fecal matter is

increased if it is mixed with the soil. Toilet paper is slow to decompose and may be dug up by animals therefore some

backcountry operations require users to collect toilet paper in a separate container and haul it out for disposal in a public wastewater system or vault toilet. This is a typical alternative for lightly used trails and is common in Denali. Source - Denali National Park and Preserve, Backcountry Camping Guide

##### Pit Privy



Pit privies are buildings (wood, logs or native rock construction); built over either earthen or concrete lined holes at least 5 feet deep that allow the feces to collect under the opening in the seat. The privy has a ventilation system, self-closing doors and insect screens. As was mentioned earlier this method of collection and disposal is the least favorable structured alternative. Once the pit is full, the contents are covered with at least 2 feet of native topsoil or removed, placed in container(s) and hauled out to an approved wastewater treatment plant.

Another type of privy is called a drum privy. This consists of a toilet seat and building structure placed over a removable drum or small fiberglass vault. The drum

or vault is replaced when it is full and the full container is removed from site by helicopter or ATV. These containers can serve approximately 150 - 200 visitors before being emptied.

#### Carry out

There are basically 3 types of containers. There are bag containers, simple containers, and complex containers. Plastic bags require a collection container. At Mt. Rainier National Park plastic "blue bagged" waste is collected from backcountry hikers and collected in specially labeled 55-gallon drums. The blue-bagged wastes are incinerated at a facility in Morton, Washington. The bagged waste was historically fed into the NPS operated wastewater treatment plant and macerated (Muffin Monster). The problem with this process is sometimes the contents of the bags when compressed popped like a balloon and emptied on the operators. Disposal options for bagged waste is difficult and costly. Landfills and most treatment plants do not take it so most bagged waste is incinerated. There are bagged waste systems such as the "wag



bag" that absorb all the liquid much like a diaper and can be landfilled. The key to land application is there must not be any free flowing liquid. However these are not used in the NPS.

Simple containers include pickle pails (5-gallon buckets with tight fitting lids) rocket boxes (20-mm ammo cans), 55 gallon drums, brief relief, and clean mountain cans. The pickle pails and rocket boxes are common devices seen on the river trips.

Grand Canyon river guides use the pickle pails and rocket boxes. Once the containers are full the contents are dumped into a centrally located septic tank system during or at the end of the river trip. The septic tanks are then pumped via a septic tank hauler and delivered to a wastewater treatment plant.



The 55-gallon drums are typically removed as stated earlier via helicopter or ATV. Mount Rainier typically produces 65 of the 55-gallon drum waste. These are transported to the City of Tacoma sewage treatment facility and dumped into their system. Other parks use similar systems like a romtec backcountry toilet or other helicopter friendly devices. The concerns with using helicopters to transport waste are; expensive, noise pollution, spills, accidents, weight restricted (limits the size of container) and the load can be unstable.

Clean mountain cans were developed in Denali National Park by ranger Roger Robinson and was featured in a 2002 article in Alaska Magazine. Prior to the implementation of the Clean Mountain Can (CMC) human waste was collected in a bagged lining of a bucket. When the bag was full it was tied, removed from the bucket and thrown into a crevasse. Now all climbers on and around Denali (about 2,000 per year) are required by the NP to use the CMC. The CMC is a plastic container with a ventilation system and a foam ring (disposable). A group normally takes 2-weeks for a summit attempt and carries a sufficient number of cans along. The cans are used and when full cached for collection on the return down the mountain via a sled. The CMC is once on the mountain and decided to develop a system to collect the waste for transportation off of the mountain.

Complex containers are commercial units that can be emptied and cleaned at trailer dump stations. These devices are equipped with fittings that allow them to be drained and rinsed with standard trailer dump station equipment such as the Jon-E-Partner with lid. *Source Remote Waste Management*, Brenda Land, National Forest Service 1995.

Note that in OSTRANDER SKI HUT in Yosemite at the request of the National Park Service. During the 1999-2000 winter season, the hut's septic system was closed and guests began using metal storage cans that allowed removal of all waste at the end

of the year. The "Jon-ny Partner" system that was chosen seems to be a success.

#### Composting Toilets

Compost toilets use an aerobic process in a digester tank to decompose the human waste into compost. Properly treated final composted material has no offensive odor or texture. Compost toilets currently in use include several commercially manufactured digester tanks, site fabricated digester tanks, and combination holding tank/batch composters. If the operation and maintenance schedule is followed, and the system was sited properly, a composting toilet depending on usage may last 10 years before cleaning is necessary.

The NPS public health program has adopted a flow chart to assist parks to decide if a composting toilet is the correct application. This is due to the simple yet routine and complex systems (bacteria/oxygen/nitrogen/carbon) of a composting toilet. Typically a bin of wood shavings (Carbon source) is located near by and the user is asked to pour one cup of wood shavings into the reactor after each use. For complete composting to occur it requires proper time, moisture, oxygen, temperature, pH, a proper carbon to nitrogen ratio, and routine maintenance. The requirements are a moisture content of 45% to 75%, oxygen via stirring or mixing every 100-500 uses, a temperature range of 20°C - 55°C (68° - 131°F), pH range of 5.5 - 7.5 and a carbon to nitrogen ratio of 20 - 25 parts carbon to 1 part nitrogen.



(source 1) *Liquid Waste Composting*. J. C. Patterson and J. R. Short, NPS for EPA Project Officer P.G. Bowker, EPA-78-D-X0298, 1979; 2) *The Composting Alternative - Waste Disposal in Remote Locations*. J. F. Ely and E. L. Spencer, Research Dept. Appalachian Mountain Club; 3) *Composting Toilet Systems, Planning Design & Maintenance*. U.S. Forest Service Technology and Development Program, July 1995).

Problems with composting may include: visitor overuse (units are limited to a maximum load per day); Insufficient resources to properly maintain (compost pile requires constant manipulation); and Improper site selection (specific environmental conditions required for composting),

Material that fails to compost must be treated as raw sewage. Composting process requires specific climatic conditions (temperature, humidity, etc), some are confined spaces and therefore the entry program required for working in compost compartment. These systems are used in several parks with high to moderate success.

#### Dehydrating Toilets

The purpose of the dehydrating toilets is to separate the liquid from the solid portion. As discussed earlier the reduction in weight will reduce maintenance cost substantially. The maintenance costs are due primarily to how often the site is visited (some take 1-2 days of travel each way) and waste transportation (helicopter costs). Therefore the dehydration process not only reduces the frequency but also reduces the cost in energy. Dried sludge has very little offensive odors and may be transported by pack animal, ATV, or helicopter. *Source (Remote management waste disposal, Michael E. Jensen (RAMWAD Study, NPS).* The options include commercial basket type, site modified commercial basket type, dehydrating/composting units, and self constructed units. Rocky Mountain NP and Mount Rainier NP developed site constructed dehydrating units that worked better than the commercially available units. Mount Rainier uses the dehydrating unit at the 10,000-foot level located in Camp Muir. Waste is deposited into the unit and the liquid portion drains into a drainfield. The low moisture content of the high altitude air and sunshine may reduce the contents in the toilet 75% by volume. At the end of the visitor season the solid material is *shoveled* into 55-gallon drums and removed by helicopter.

The material is then hauled to a wastewater treatment plant for final processing. In 2003 the Park experimented with a "D - Vap" system to eliminate the need for the drainfield. Results of this study are still pending. *Septic tank and drainfield systems*

Centrally located septic tanks along shorelines of lakes and rivers where outfitters and boaters can dispose of the

collected sewage for treatment in septic tanks with drainfields. The park service will operate a barge that pumps the sewage from the septic tank on a routine basis and hauls the sludge to a wastewater treatment facility. Ross Lake resort located in North Cascades and sites in Lake Roosevelt National Recreational Site use these systems.

#### Wastewater treatment plants

These may not seem like a remote site solution, however there are places such as Phantom Ranch in the Grand Canyon and Glacier Bay Alaska that require advanced treatment. Phantom ranch is located at the bottom of the Grand Canyon approximately 14 miles from the North Kaibab Trailhead.

Glacier Bay Alaska has an activated wastewater treatment plant that discharges filtered effluent into the bay. The solids are de-watered, bagged, and incinerated. The ash is then deposited in the landfill.

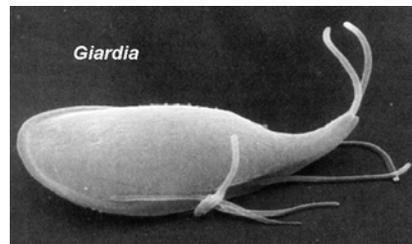
#### Small Water System Case Study

Bag Filter issues at Rocky Mountain National Park FY 2004



This past summer the State Health Department required that Rocky Mountain National Park begin sampling the filtered water at their small surface water bag filter and cartridge filter installations. The microscopic particulate analysis (MPA) tests showed that giardia and cryptosporidium cysts were passing the 1 micron Strainrite bag filters at the Alpine visitor center system and the required 3 log removal was not being achieved. Upon receipt of the test results an immediate boil water notice was posted, and the state health department was notified.

It was initially suspected that the bags had not been installed correctly. After ensuring proper installation and changing the filter canisters to the bag filter company's specifications, an MPA test still stilled showed organisms present.



The regional public health officer is now working with Rocky Mountain National Park and the state health department to modify the filtration to achieve satisfactory removal of giardia and cryptosporidium. Micro filtration has been considered and a new jumbo cartridge filter in series with the existing bag filters. The jumbo cartridge has been recommended by the state health department. It is a Harmsco HUR 40 HP capable of flows up to 50 gpm. The filter canister can be fitted with a 0.35 micron filter cartridge. The state health department is also requesting that ultraviolet light disinfection be installed. Chlorination will be maintained for proper residuals. The goal is to have the new treatment system installed before the next operating season.

The required post filtration testing is pointing out problems with previously approved filtration. The state is finding other bag filter installations in the state have similar problems. We expect that other water systems in the National Park Service will experience similar problems. We recommend that small surface water systems using bag filtration conduct a post filtration MPA test to determine efficiency.

By: CAPT John Collins  
NPS Regional Public Health Consultant  
Denver

#### THE PLAN REVIEW PROCESS IN FOOD SERVICE FACILITY CONSTRUCTION AND RENOVATION

The National Park Service has hundreds of food service facilities operated under concessions contracts across the extensive system of parks. The facilities range in both size and age: from simple snack bars to full service restaurants with high production kitchens. Many are historic structures that predate the creation of parks while others have been built within the past few years. As visitation increases and parks attempt to provide adequate services to visitors there will be a continued

need to remodel, renovate, and build food service facilities. When these projects are planned it is critical to seek consultation from the Public Health Program (PHP) through a Regional Public Health Consultant (PHC) or park Environmental Health Officer (EH). Four parks have an EHO. For contacts see the directory at the end of this newsletter.

The Plan Review Process (PRP) consists of an evaluation of the proposed project in terms of public health, with a focus on ensuring that the menu matches the capacity of the facility: including adequate equipment and storage, appropriate materials for food service operations that are easily cleanable, sufficient protection from pests and weather, as well as suitable hand wash facilities and restrooms.



This process is completed in partnership with the park, concessionaire, architects, kitchen facility designers, and construction contractors. When implemented, the PRP assists parks and concession operators complete renovation and construction projects without delays or costly retrofits. This process also serves to protect public health by insuring that the design of the facility adds to the overall goal of producing food in a controlled and safe manner. There are many examples of projects that were completed without the benefit of plan review by the Public Health Program that required additional work once the contract was completed in order to bring facilities to a level that was protective of public health.

The NPS PHP is available to provide consultation to parks and concessions operators in the renovation and construction of park food service facilities.

It is suggested that parks contact their PHC or park EHO as early in the project planning as possible in order to fully implement recommendations that will serve to protect public health and meet the requirements of the most recent edition of the USPHS/FDA Food Code. If you have a

project in the works or planned for the near future we would greatly appreciate the opportunity to review the design.

By: LCDR Jason Thomas  
Deputy Director, Public Health Program  
WASO

## Many Thanks!

The NPS Public Health Program is a consultative service. Personnel associated with this activity do not have line authority over park superintendents, park employees, or concessions. So... we depend entirely on working with and through others.

Over the course of a year, we depend on the dedication and generosity of countless NPS staff to provide us with information, help us to make our recommendations real, and support our work in a thousand ways.

Many and sincere thanks to the superintendents that make us welcome and wade through our reports, to the park employees that keep an eye out for public health issues and help us to collect data, and to the regions / parks that provide office space and support.

We've achieved a great deal this year but only with a LOT of help!!

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In Partnership for nearly 100 years, the National Park Service and the United States Public Health Service have worked together to protect the health of visitors in Americas Parks!

