



One Health



NPS/THEODORE ROOSEVELT NATIONAL PARK

One Health in the National Park Service

By Dr. Danielle Buttke

Did you know that foxes are good for your health? More and more studies are showing that biodiversity and healthy ecosystems can actually protect both us and wildlife from a variety of diseases. For example, in ecosystems with native predators and the full complement of native species, researchers have found fewer mice with hantavirus and fewer ticks with Lyme disease, thereby reducing human disease risk in these areas too.

One Health is the recognition that human, animal, and environmental health are all interlinked. Many of the diseases we encounter in NPS units highlight this interdependence: hantavirus, Lyme, plague, and many others. One Health encourages physicians, veterinarians, and scientists to work together across disciplines and jurisdictions to improve the health of all species by building on our common needs.

One Health is not new to NPS—our mission to protect and preserve our resources requires that we practice ecologically-based public health. The Wildlife Health Branch and Office of Public Health have recently taken strides to promote One Health both professionally and service-wide by formalizing a One Health Network and One Health Coordinator position.

By formalizing a One Health Network of public health, wildlife health, and environmental health experts, we are able to more quickly respond to incidents in parks with consensus

guidance and recommendations that take all factors—human, environmental, and animal—into consideration. The end results are well-rounded, science-based resources ranging from visitor education and interpretation materials to remote diagnostic testing to on-ground epidemiologic investigation and resource support (see side bar). The NPS One Health Network: protecting and promoting the health of all species and the parks that we share. How can One Health help your park?

NPS AREAS OF ONE HEALTH PRACTICE:

Unified Disease Surveillance

Combined human and wildlife surveillance systems are being piloted to better detect outbreaks and disease clusters.

Interdisciplinary Response

A disease outbreak investigation team (DOIT) consisting of a medical epidemiologist, a wildlife veterinarian, veterinary epidemiologist, and a public health consultant is available to provide immediate technical expertise and assistance to all park units on disease outbreaks and health threats.

Integrated Messaging

With over 280 million visitors annually, national parks offer a unique opportunity to

interpret One Health to the public. The One Health Network is working to develop integrated programs and messages that communicate the interconnectedness of the health of all species.

Combined Research Agenda

The One Health Network will explore better ways to study disease transmission issues using a One Health paradigm. This approach not only is an efficient use of resources but

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Water systems can require several hours of preparation before they are ready for the season.

Water System Start-up: ensuring a safe season of operation

By LCDR Kurt Kesteloot

As many of you know, water systems require more than the flick of a switch before visitors can safely drink from them. Systems require inspection to assure that the weather conditions or varied usage have not caused new or amplified existing problems to park water systems. Seasonally operated pump houses and buildings need inspection for rodents and safe proper removal of rodents and/or feces before reuse. Seasonal or active pump houses should never be used for storage. If the building did serve as temporary storage, move materials before reactivating the system.

Before allowing visitors access to water systems, systems should be properly disinfected and tested. When entering for the first time that season, leave the door open to dissipate potentially hazardous gasses. Disinfection should include NSF approved chlorine, ozone, or other disinfection means approved by your regional public health consultant. Chlorine residuals in the system should stabilize to levels greater than 0.2 mg/L and up to a maximum of 4.0 mg/L before use.

Water samples should be collected and analyzed for bacteria (total coliforms and fecal coliforms). Operators should also inspect the remainder of the recently pressurized water system. Additional areas to inspect include and are not limited to: water storage tanks, water distribution lines, water well or water source, other water treatment processes, and system records.

It is important to initiate the inspection, startup, testing, and post inspection process a couple weeks before park operations demand use of the water system(s). If a system(s) requires repairs after it is online and a potential point of contamination to the system develops during the repair process, repeat disinfection and bacteriological testing will be necessary. If you or your operators have questions on starting up their water systems, please contact your regional public health consultant for additional information.

For additional information, please refer to the following link: http://www.nps.gov/public_health/eh/dw.htm.

Water System Start-up Checklist Ensure safe workplace.

- Review all system manuals and job-hazard-analyses prior to activities.
- Follow lock-out and tag-out procedures for electrical service to pumping system during start-up and operational periods.
- Resupply chemicals following MSDS requirements and store properly on-site.

Prevent damage to system.

- Operate all valves in the system for proper operation and orientation.
- Read gauges, meters and panels upon system start-up to ensure correct settings.
- Inspect all exposed plumbing joints, taps, fixtures for leaks or incorrect orientation.
- Inspect reservoir/tanks and lines for leaks or damage. Check pressure tanks for waterlogging or pressure issues.
- Inspect connection of chemical injection pumps.
- Check that electrical components are properly grounded.
- Check that doors, fencing and locks are working properly.
- Inspect housing of facilities for rodent or insect infestation.

Prevent contamination of water.

- Flush and disinfect lines and reservoir/tanks. For assistance with calculating the appropriate amount of disinfection, please consult your local public health officer or consultant.
- Assure disinfectant residuals are at least 0.2 mg/L and less than 4 mg/L (for chlorine), perform bacteriological tests, and report results to the public health consultant, state, and others as required.
- Test reservoir level controls and automatic systems.
- Test backflow prevention devices. Ensure all vacuum breakers are in place.
- Replace defective screens and seals around pipe and reservoir/tank openings.

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Rodent Exclusion & Management

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- Inspect well protection area (100 feet) for any contamination sources.
- Inspect well cap and vent for any openings allowing debris, precipitation or animals access.
- Check secondary containment around backup power system or fuel containers.

Communicate system status to stakeholders

- Notify concessioners, visitors, partners, park staff and regional public health consultant at least one week prior to system start-up.
- Complete necessary, state-required system restart notification forms.
- Place water analysis test orders as needed.
- Record initial meter readings and any other tracked data.
- Start-up each system with ample time to allow for bacteria test results and above areas to be addressed before the system is in service.

Reference: http://www.epa.state.oh.us/portals/28/documents/pws/seasonal_checklist.pdf

By CDR Matthew Weinburke

This spring, many of our national parks will be opening seasonally closed buildings and structures that have been shut down for the winter. Before opening these buildings, be sure you understand the risks that potential rodent infestations create, and what you can do to keep yourself and visitors safe. The hantavirus outbreak, that occurred at Yosemite National Park is a reminder of the potential hazards faced when humans and rodents cohabitate. Check the Public Health website http://www.nps.gov/public_health/di/di.htm or Integrated Pest Management website <http://www1.nrintra.nps.gov/brmd/ipm/rodent.cfm> for information on some of these diseases.

The control of rodents in buildings is not complicated, but involves more than simply setting out a few mouse-traps. To be effective, rodent control must be done in a professional man-

ner, and should be handled as a cooperative project between site occupants, pest management professionals, and site management and maintenance staff. Rodent control in and around buildings remains the primary strategy in preventing hantavirus infection. The National Park Service uses an integrated pest management (IPM) approach to dealing with pest problems. IPM uses a variety of pest management techniques that focuses on pest prevention, pest reduction, and the elimination of conditions that lead to pest infestations.

A successful rodent control strategy typically includes four elements: surveillance, sanitation measures, building construction and rodent proofing; and if necessary, population control.

Surveillance (inspection and monitoring): A measure of the magnitude of the pest problem and its environmental causes. Rodent infestation can be determined by direct observation of animals, their nests, feces, gnaw marks, or snap trap success. Consult a NPS Integrated Pest Management (IPM) Coordinator for assistance with

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Harmful Algal Blooms Increasing

Chances are, you have seen or smelled a harmful algal bloom, or HAB, before. They come in a variety of colors— greens, turquoise, or red— and can impact fresh and marine waters in unpleasant and dangerous ways. Harmful algal blooms are an excess growth of aquatic algae and are caused by an increase in water temperature and excess nutrients from lawn fertilizers, municipal wastes and agricultural run-off. Unfortunately, as climate change and land use change increase, HABs are occurring more often and with greater intensity. Already this year, Lake Erie is experiencing one of the most significant HABs in recent decades, and a record number of Florida manatees have been killed by red tide along the Florida coast. Harmful algal blooms have occurred in several NPS units, with effects ranging from fish kills, to wildlife die-offs, to deaths in visitors' dogs and upper respiratory illness in humans. If a HAB should occur in your park, it is important to warn both visitors and employees about the potential health risks. The NPS One Health Network and Water Resources Division are working together to create guidance and resources for education and response to HABs in NPS units. For more information, contact Danielle Buttke, DVM, PhD, MPH, One Health Coordinator, at: Danielle_Buttke@nps.gov.



Left: Photo courtesy of Minnesota Pollution Control Agency.

Above: Photo Courtesy of the California Department of Public Health.

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rodent infestations; they have a variety of tools that can help you manage these problems.

Interventions (sanitation, rodent exclusion of structures, and managing infestations): Actions taken to prevent, reduce, or eliminate rodent infestations and their destructive effects. First, conduct a thorough inspection of the exterior and interior of a building. Inspections identify potential areas of rodent entry and provide information about rodent species present, key shelter areas, locations where animals obtain food and water, and conditions that favor infestations. The key to a successful IPM program is the elimination of the causes of infestation (i.e., food, water, and harborage). The following are critical elements in preventing rodents from entering buildings and other structures:

- Effective exclusion.** The most successful and long-lasting form of ro-



dent control in structures is exclusion, or “building them out”. If a pencil can fit in the hole, so can a mouse.

- Good sanitation practices that eliminate food, water, and shelter for rodents.** Good sanitation removes water, food, and shelter resources required by rodents, and limits the number of animals that can live in an area.

- Continual removal of rodents.** Rodents mature quickly, and produce large numbers of young. Place snap traps where rodents are present. Many rodent control programs fail, because they do not use enough traps.

- Regular checking for new rodent activity.** Regular documented re-inspection (monitoring) is important to determine if previous con-

trol efforts are effective, newly-created entry points exist, and if the number of animals present has changed.

- Cooperation among people.** Rodent management must always be a team effort among building occupants, maintenance workers, and area managers. All persons must be committed and understand program requirements.

- Assigning responsibilities.** Each team member must be aware of rodent-control activities that need to occur, and their own roles and responsibilities. Establish this information in writing with completion dates.

- Evaluation:** Regular follow-up is necessary to determine whether treatments are successful and what should be done next. Evaluation is one of the most critical components of an IPM plan.

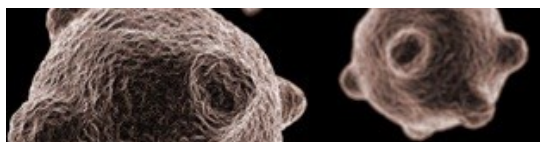
Knowledge is the key. Below are some excellent resources that will help you and guide you to a successful awareness and management of rodent issues and concerns:

Norovirus: an unwelcome visitor

By LCDR Adam Kramer

Norovirus is estimated to cause 23 million cases of acute gastroenteritis in the United States annually. Over the past years, the NPS Office of Public Health (OPH) has seen disease transmission associated with tour buses, river rafting trips, and individuals that have a high amount of visitor contact. Symptoms of infection include sudden onset of diarrhea and projectile vomiting that starts 12-24 hours after exposure to the virus and lasts for 24-48 hours. It has been described as the perfect human pathogen, “These viruses possess essentially all of the attributes of an ideal infectious agent: highly contagious, rapidly and prolifically shed, constantly evolving, evoking limited immunity, and only moderately virulent, allowing most of those infected to fully recover, thereby maintaining a large susceptible pool of hosts (Hall, 2012).” With this evolutionary process, new strains appear on average every 2-3 years and tend to lead to increased illness activity. In March 2012, a new strain appeared in Australia, and it has quickly become the predominant strain circulating in the U.S.

Regardless of the specific strain, noroviruses are primarily passed through an inhalational route (inhaling virions from someone actively vomiting) or ingestion (either through contaminated food or water or by touching a surface that had been contaminated and transferring the virions to your mouth). In order to limit the spread of illness, the first step is identifying when illness is occurring (by using such techniques as Ranger Radar – an informal system of noting that something is wrong), then acting to stop the spread of the illness (Guidelines for preventing the spread of illness are available at: http://www.nps.gov/public_health/info/factsheets/fs_noro_r&c.htm)



NPS, Integrated Pest Management website: <http://www1.nrintra.nps.gov/brmd/ipm/rodent.cfm>

NPS, Public Health Program: http://www.nps.gov/public_health/zed/hanta/hanta_worker_pro.htm

CDC, Preventing and Managing Rodent Infestations: http://www.cdc.gov/rodents/prevent_infestations/

CDC, Hantavirus Pulmonary Syndrome: <http://www.cdc.gov/hantavirus/hps/index.html>

Left: Photo courtesy of SaniGuard.

Above: Photo courtesy of Danielle Buttke

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also has the added advantage of providing a holistic understanding of disease transmission cycles, stresses on wildlife from human activities, and resource management issues.

Management Tools

Our goal is to use the One Health concept to provide NPS unit managers and staff with holistic, ecologically-based science guidance that can be used when making decisions about wildlife and visitor protection. Potential conflicts between management action taken to protect wildlife and visitors can be minimized through a unified understanding of the interaction of animal health, human health, and the environment.

One Health Promotion

A growing body of evidence suggests that human health is linked to the health of our natural world. The One Health Network seeks to develop a strategy to guide how parks and partners can best contribute to the health of our nation while promoting the health of all species and the planet we share.

INTRODUCING THE ONE HEALTH COORDINATOR

Greetings from sunny Colorado! I am very excited to have joined the NPS as the One Health Coordinator and look forward to working with you on any of your wildlife, human, or environmental health needs! My goals are to provide rapid assistance in disease response and communications (whether it is to the public, media, or internally), develop ready-made guidance and materials for parks on public health issues, and promote One Health through research, education, and messaging. Before joining NPS, I worked as an Epidemic Intelligence Service Officer at the CDC. I earned my Doctorate of Veterinary Medicine and PhD in comparative biomedical sciences from Cornell University and a Masters in Public Health from Johns Hopkins University. I grew up on a South Dakota dairy farm and enjoy hiking, biking, and anything to do with animals.

-Danielle Buttke



New and Improved Service-Wide Wildlife Veterinary Diagnostics for the NPS!

By Dr. John Bryan

The National Park Service Wildlife Health Branch Veterinary Diagnostic Service (WHB VDS) has service-wide guidance to assist NPS units in meeting their veterinary diagnostic needs; whether investigating individual cases of wildlife mortality and/or disease, disease surveillance, and/or consultation regarding general aspects of wildlife disease. And the new website (*coming soon*: <http://nrintratest/brmd/wildlifehealth/vds/index.cfm>) is intended to serve as a new, very user-friendly tool to help NPS units achieve their wildlife diagnostic goals, address questions regarding the WHB VDS, make submissions, and provide just how the WHB VDS can best be of service to your NPS unit. For more information, all are encouraged to contact the WHB VDS directly: 970-267-2161 (Lead Technician); 970-267-2176 (Service Coordinator); NPSDiagnostics@nps.gov

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