

One Health as an Approach for Integrated Health Management in the National Park Service

Margaret A. Wild, Wildlife Management and Health Program Leader, Biological Resource Management Division, National Park Service, 1201 Oak Ridge Dr., Suite 200, Fort Collins, CO 80525; margaret_wild@nps.gov

Charles Higgins, Director, Office of Public Health, National Park Service, 1201 Eye St. NW, Washington, DC 20005 charles_higgins@partner.nps.gov

Wildlife diseases can be an important component of naturally functioning systems; however, more recently, human impacts on disease-causing organisms, their animal hosts, and the environment in which they exist, have led to emergence of diseases that are a significant concern to wildlife management in the National Park System. Traditionally, wildlife diseases have been managed in individual species or populations by melding information from veterinary medicine with wildlife biology. This approach certainly has merit in protecting valued wildlife resources, but in some cases a more expansive view may be warranted to protect health of other species as well.

The concept of One Health is an emerging integrated approach to health management. Multiple definitions of One Health have been proposed. Two of the most relevant to this discussion are as follows:

- The collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, and our environment, and
- Cooperation between human and veterinary medicine and other scientific professionals to combat diseases that are shared between people and other animals (zoonotic diseases) to promote health of all species and the environment.

The concept of One Health is not new. The theory was promoted by William Osler and Rudolf Virchow in the 1800s and revived by Calvin Schwabe in the 1960s. And at the start of the 21st century it was the wildlife community, with leadership that included the Wildlife Conservation Society, which was a driving force in resurgence of One Health. Now many human and animal medicine organizations, including the American Medical Association and the American Veterinary Medical Association, have endorsed, and are promoting, the concept as a strategic change needed in health care transformation.

One Health is predicated on the fact that people, domestic animals, and wildlife share the same planet, the same ecosystems, and many of the same health threats. One Health includes more than infectious diseases, for example, water and air quality, health consequences of toxins, and effects of climate change on nutrition. However, the remainder of this discussion will focus on infectious disease as a template for application of One Health. Indeed, emerging infectious diseases have been a driver in the revitalization of One Health. At least 60% of human infectious disease agents can be acquired from other animal species and in the last 30 years, 75% of the emerging human pathogens have been zoonotic (originating in other animals), including West Nile virus, avian influenza, and Lyme disease.

Health care stewards of animals, humans, and the environment face unprecedented challenges associated with emerging pathogens, loss of biodiversity, climate change, and explosive human population growth resulting in habitat loss and increased wildlife/human interactions. Human activities reduce, modify, and degrade wildlife habitats in ways that can encourage disease emergence. Further, humans assist in the movement of pathogens around the globe, and locally domestic animal or human diseases can spillover to wildlife. Of course, wildlife are often victims of these occurrences, but often becomes viewed as the “source” or “vector” of diseases when diseases become established in wildlife populations and then threaten domestic or human health.

The National Park Service (NPS) brings humans and wildlife into proximity in natural areas. This proximity could result in negative interactions, or alternatively could provide a unique opportunity for the application of One Health-coupled systems approach to health management.

The NPS currently supports both veterinary and human medical expertise that function independently, but also perform collateral duties to *de facto* perform in a One Health approach. The NPS Biological Resource Management Division Wildlife Management and Health Program addresses servicewide wildlife health issues while the NPS Office of Public Health is charged with protection of visitor health.

The NPS Wildlife Management and Health Program is located in the Natural Resources Stewardship and Science (NRSS) Directorate. This program provides professional veterinary and wildlife management support to parks, regions, and the NPS directorate on policy and technical aspects of wildlife management, including wildlife diseases and their management, preventive health actions, and animal welfare issues. One Wildlife Health Team (including a veterinarian, biologist, and technicians) is available for disease investigation, response, and consultation with NPS units.

The NPS Office of Public Health is headquartered in the Visitor and Resource Protection (VRP) directorate, and has field staff located across the national park system. This program is charged by NPS Management Policies with identifying public health issues and disease transmission potential in the parks, and assisting park management and staff to reduce or eliminate these hazards. The Office of Public Health has a Medical Epidemiologist who coordinates disease detection and response, and leads a field staff of 10 regional consultants from various disciplines, who conduct on-site evaluations and consultations at NPS park units.

Using current funding and personnel, the Service is building a framework on which a broader, more formal One Health approach could be implemented. NPS is piloting joint disease surveillance projects, and a disease response team, as demonstration projects of the effectiveness of a One Health approach. The Service is networking with other agencies and organizations as demonstrated, for example, through membership on the national One Health Joint Steering Committee.

The NPS One Health approach contains five key focus areas: unified disease surveillance, interdisciplinary response, combined research agenda, consensus guidance, and inter-agency coordination.

Unified disease surveillance (detection). The two programs (Wildlife Management

and Health and Office of Public Health) are working to develop, and ultimately combine, human and wildlife disease detection efforts and systems. Both programs have pilot efforts in place to detect disease transmission and outbreaks (or in wildlife, large unexplained animal die-offs). The strengths of these two systems can relatively easily be combined, improving detection capabilities, enhancing response, and increasing reporting efficiency for NPS park units (one stop shopping).

Interdisciplinary response. The two programs have recently formed a joint response team through collateral duties of a physician, a wildlife veterinarian, and a public health consultant. The team will serve as the initial Washington, D.C., office responders, and enhance park capacity to address an adverse health event involving humans and/or wildlife. The team has four objectives:

1. Facilitate rapid investigation of potential adverse human and/or wildlife health events.
2. Establish and streamline communication and response protocols, both within the NPS, and with external partners.
3. Enhance NPS capacity to respond to adverse health events and to develop interventions for disease control and prevention that are in agreement with NPS mission and policies.
4. Foster relationships between the NPS, state and local health departments, and state and federal health, agriculture, and wildlife agencies.

Additionally, efforts such as “Get the Lead Out!” while not strictly One Health projects, are excellent examples of multidisciplinary collaboration forged to improve the health of humans, wildlife, and the environment. Such examples show the importance of biologists and managers in implementing One Health.

Combined research agenda. Projects designed to explore and better define disease transmission issues within the NPS system, both wildlife and human, can be carried out using a One Health paradigm. This approach is not only an efficient use of resources but has the added advantage of providing a holistic understanding of disease transmission cycles, stresses on wildlife from human activities, and resource management issues. Further, understanding public perception of disease risk can help development of effective communication messages and intervention strategies. The NPS is just beginning to implement research to address some of these topics.

Consensus guidance. A One Health approach can provide NPS unit managers and staff with holistic, ecologically-based science guidance that they can use when making decisions about wildlife and visitor protection. Potential conflicts between management actions taken to protect wildlife and visitors can be avoided through a unified understanding of interaction of wildlife health, human health, and their environments. Examples of collaboration to reach consensus guidance have included development of a reference manual section on safe work practices for employees handling wildlife, guidance on meat donation from areas affected by chronic wasting disease, planning documents for highly pathogenic avian influenza, and recommendations on response to plague and rabies.

National interagency coordination. The NPS is a member of the national One Health

Joint Steering Committee which includes other human, domestic animal, wildlife, and environmental health agencies and organizations working toward implementation of a national One Health Commission. NPS employees also serve as leaders of One Health in their professional organizations and interagency planning efforts.

One Health is a concept whose time has come. NPS units will continue to hear more about One Health from both the Wildlife Management and Health Program, and the Office of Public Health. We encourage parks to explore local applications of the One Health approach, and to contact our staff as consultation or assistance is needed. Complementing ongoing individual discipline work with the synergy gained from a multidisciplinary One Health approach has the potential to take our efforts in environmental conservation and health to exciting new levels.