In this issue:

1. The Natural History of Eastern Equine Encephalitis Virus in Florida
   Jonathan F. Day, PhD

4. One Health in Action: Reducing Feral Swine Damage and Disease
   Sarah Bevins, PhD and Alan Franklin, PhD

7. An Analysis of the Linkages between Public Health & Ecosystem Integrity, part 3 of 6
   Steven A. Ososky, DVM and Anila Jacob, MD, MPH

10. Graduate-level Certificate in One Health Training at the University of Florida
    Marissa A. Valentine-King, MPH, RN

11. One Health Innovation Fellowships for Zoonotic Disease Research in Mongolia
    Salah Uddin Khan, DVM

13. ProMED Quarterly Update - Camels, bird flu, and Ebola
    Jack Woodall, PhD

17. Advancements in One Health

19. Upcoming Events

20. Publications in One Health

22. References
The EEEV has never posed a significant human health threat to Florida residents or visitors. Between 1955 and 2013, 80 human EEEV cases were reported in 35 Florida counties. There have never been more than five human cases reported during a single transmission season in Florida and rarely is more than one human case reported from a county during a single year. Despite the availability of an efficacious equine vaccine against EEEV, positive horses are frequently reported in Florida. From 1982 through 2013, a total of 2,197 (mean of 69/year) EEEV positive horses were reported in the state. More than 150 EEEV positive horses were reported in Florida during 1982, 1991, 2003, and 2005. These recent (2003 and 2005) epizootics indicate that the Florida EEEV transmission cycle is still vigorously maintained and poses a continued threat to humans and equines in the state. As housing, industrial, and agricultural development encroaches into habitats that currently support the efficient maintenance and amplification of EEEV, the threat of focal human epidemic transmission as well as the risk of continued widespread equine epizootics caused by EEEV remains a significant public health concern.

One Health in Action: Reducing Feral Swine Damage and Disease
Sarah Bevins, PhD and Alan Franklin, PhD

One Health is a philosophical approach to human, livestock, and wildlife disease that encompasses multiple disciplines, including the medical, veterinary and ecological sciences. As One Health becomes more widely embraced, examples of its practice can be found in government-sponsored programs. Recently, the U.S. Department of Agriculture announced a new Feral Swine Management Program that will be administered and implemented by the Animal Plant Health Inspection Service (APHIS) and will embody the tenets of One Health.
As an invasive species, feral swine (Sus scrofa) are a classic example of a species that can profoundly influence ecological communities and ecosystems. They alter environments through a suite of well-known traits: rooting behaviors that alter soil properties and disturb plant communities; a generalist diet that can encompass seeds, crops, and animals; a rapid reproduction rate that can result in explosive population growth; and an adaptable biology that allows them to thrive in a range of habitats and climates. Along with these more familiar traits of an aggressive invasive species, feral swine can also reservoir and transmit a host of pathogens, and because of this, pathogen monitoring and research will be an integral part of the Feral Swine Management Program. Feral swine have expanded their range from 17 to 39 states in the U.S. in the last 30 years, and a One Health approach is needed to manage the agricultural and human health implications of a rapidly expanding invasive species.

The primary problems associated with pathogens transmitted by feral swine are twofold. First, many of the pathogens are zoonotic and therefore represent a human health risk. People have been infected with multiple strains of Brucella, Hepatitis E, Trichinella spiralis, and leptospirosis from feral swine. In addition, swine are a mixing vessel for influenza viruses that allow different strains to recombine. Many of these recombinant strains have resulted in human pandemics. This threat is heightened because feral swine have unfettered contact with wild water birds which are the natural reservoirs for influenza viruses. Viral transmission among feral swine and water birds presents a potential for increased emergence of novel strains of influenza that could affect both agricultural and human health. Second, because feral swine and domestic swine are the same species, pathogens in feral swine pose a risk to the domestic swine industry. Swine brucellosis and pseudorabies are examples of pathogens that have essentially been eradicated in the U.S. domestic swine industry, but both still currently circulate in feral swine populations throughout the U.S. Pseudorabies can also be transmitted to other domestic animal and wildlife species, where it can cause substantial morbidity and mortality.

Another threat posed by feral swine is the introduction and spread of foreign animal diseases (FADs) in the U.S. These pathogens are not currently found in this country, but if pathogens which are infectious to swine are accidentally or intentionally introduced, feral swine could act as an unmonitored reservoir and create an enormous risk of exposure and infection to commercial herds. Classical swine fever is an example of an FAD that, if introduced to the U.S. domestic swine industry, could cause severe economic losses because of trade restrictions and loss of stock.
The APHIS Feral Swine Damage Management Program will be the first nationally-led effort to reduce the expansion of this invasive species and to limit damage and pathogen transmission associated with feral swine. This program will focus on removing feral swine from multiple regions, including areas where there are isolated pockets of feral swine that can be eliminated, areas along the margins of feral swine distribution to stem population expansion, and areas with long-standing feral swine populations that could benefit from limiting population growth.

The eradication effort by USDA APHIS will establish procedures for disease monitoring. This effort will include developing new vaccination methods and conducting research and economic analyses to improve control practices, in addition to physically removing feral swine from the U.S. Multiple branches of USDA APHIS will be involved in this effort, including Wildlife Services, Veterinary Services, and International Services. Wildlife Services, with expertise in wildlife management and ecology, will provide the actual operative eradication programs and will also conduct research and pathogen monitoring through the National Wildlife Research Center (NWRC). Wildlife biologists, ecologists, geneticists, veterinarians, microbiologists, quantitative modelers, and economists will collaborate to efficiently meet the goals of the eradication effort. Veterinary Services will spearhead the diagnostic efforts for pathogens of concern, especially those of paramount concern for agricultural health. Samples from feral swine will be screened for five primary pathogens that threaten human and domestic animal health, including porcine reproductive and respiratory syndrome (PRRS), Brucella spp., pseudorabies, influenza A viruses, and classical swine fever. In addition to the five pathogens that will be monitored by the Feral Swine Management Program, data will continue to be collected on other pathogens as well, including leptospirosis, Trichinella spiralis, and Toxoplasma gondii. These samples will build upon an existing feral swine pathogen dataset that has been compiled by the NWRC National Wildlife Disease Program over the last seven years.

Disease issues associated with feral swine, because of their connection to zoonotic and domestic animal infections, require a One Health approach. This national effort proposes to eliminate feral swine from two states every 3-5 years and will attempt to stabilize feral swine damage across the U.S. within 10 years. Achieving this lofty goal will require a multi-disciplinary effort that includes expertise from the separate disciplines that define One Health.