The Wildlife Health office: a service-based branch of NRPC

**WHY?** To break the cycle of short-term reactionary approaches to one disease emergency at a time and move towards a sustainable, prevention-minded approach to wildlife health.

**HOW?** Provide a stable, long-term, prepared, and pro-active resource capable of conducting critical work in wildlife health and disease surveillance, response and management.

**WHAT?** A network of wildlife health experts located across the country supporting Refuges, Wetland Management Districts, and other Service programs by: a) providing technical advice about wildlife disease issues, b) providing guidance on adapting management strategies to prevent wildlife diseases, c) identifying health surveillance needs, d) conducting research projects to determine best practices in disease prevention, and e) providing veterinary services for field activities.

**Philosophy**

Maintaining healthy animals and healthy populations through preventive medicine is far more efficient and cost effective than reacting to diseases once they become a problem. This requires actively focusing on the root causes (often anthropogenic) of wildlife health problems rather than applying bandages to the symptoms of disease.

"Wildlife disease control is a matter of doctoring the environment, not the animal."

-- Aldo Leopold, 1933
Achieving WHO tangible deliverables for FY2015

1. **Staffing actions:** Jenn Ballard successfully transitioned from Pathways Intern to full time Veterinary Medical Officer (VMO) stationed in Fort Collins, Colorado. The VMO position for the Alaska Region has not yet been filled; the position will be re-advertised shortly.

2. **Initiate development of an Institutional Animal Care and Use Committee (IACUC):** The writing committee, advisory committee, consulting reviewers, and Service reviewers have been identified for the IACUC development process. The implementation strategy, including course of action and timeline for standing up the IACUC, has been created and reviewed by the USDA APHIS Animal Care advisor. Two briefing papers (Animal welfare and IACUC) have been written, and a briefing will be presented at the Refuge leadership meeting October 2015 at Charles M Russell NWR. Briefings for the Science Applications AD and others will be arranged after October.

3. **Wildlife health training in collaboration with NCTC:** An NCTC Refuge Biology Webinar was presented on wildlife mortality event response as part of the quarterly webinar series. The Wildlife Health Awareness Training Course (an on-line presentation) is under development, with completion expected FY 2016. The Field and Laboratory Techniques week-long hands-on course scheduled for NCTC September 21-28, 2015 was cancelled by NCTC due to low enrollment.

4. **Wildlife disease projects:** For chronic wasting disease (CWD) we announced a request for proposals, selected and funded projects, and also coordinated sample diagnostics and reporting. Awards for Chronic Wasting Disease (CWD) work were made to Ouray, Upper Mississippi River, Stewart B. McKinney, Fort Niobrara, Medicine Lake and Bowdoin, Crescent Lake, Wichita Mountains, and the National Elk Refuge.

   On-the-ground and financial support for a selection of non-CWD associated field projects included: Eagle disease human health risk assessment for the National Eagle Repository, Wellfleet Bay virus epidemiology, harmful algal bloom surveillance, *Mycoplasma bovis*, dieldrin and food safety evaluation in bison, as well as mercury contamination in created wetlands.
Developments in the WHo areas of emphasis

Avian health: The introduction of highly pathogenic avian influenza from Asia to North America (HPAI H5N2) and its subsequent reassortment into H5N8 and H5N1 in December 2014 kick-started the Avian Influenza Interagency Steering Committee back into action. We monitored the spread and impacts of HPAI in wild and domestic birds across three flyways and made sure that leadership and field stations were kept abreast of the developing situation. An interagency team developed a suite of planning documents for surveillance. The role of Refuges in this field work will be purely supportive over the coming year since no additional funding has been provided for materials or personnel.

Harmful algal blooms: Increasing temperatures, combined with nutrient runoff, have resulted in blue-green algae growth in wetlands across the U.S. Some algal blooms produce toxins that threaten both animal and human health - in response, the WHo launched a Service-wide surveillance effort to identify areas with toxin production. We also provided samples in support of an Environmental Protection Agency (EPA) research effort to develop new detection methods and assess the effects of toxins on wildlife. Through partnerships with state wildlife and public health agencies, we increased awareness of the dangers of algal blooms in an effort to reduce risk to humans, wildlife and domestic animals.

Mortality event investigation assistance: Appendix A lists refuges experiencing wildlife mortality events that submitted carcasses or samples to one of our partner diagnostic labs for cause of death analysis. The wildlife health issues involved in these events included everything from man-made and biological toxins to bacteria, viruses and fungi. In addition to utilizing the services of the USGS National Wildlife Health Center and FWS Forensics Laboratory, the WHo has contracted with the Southeastern Cooperative Wildlife Disease Study (SCWDS), the Northeast Wildlife Disease Cooperative (NWDC), the Montana Veterinary Diagnostic Laboratory, Colorado State University and the California Animal Health and Food Safety Laboratory System (CAHFS) to provide diagnostic support for Service submissions. Many stations seek WHo assistance to discuss mortality events, determine whether carcass submission is warranted, find out how and where to send samples, as well as assist with interpretation of results.

One Health: The WHo is a very active part of the DOI One Health Group, providing technical advice, presentations, and policy reviews. Of note this year, the WHo took the lead in revising and distributing DOI personnel health and safety guidelines for handling wild birds, and also developed the group’s Google site for information sharing.
Developments in the WHo areas of emphasis (continued)

**Reptile and amphibian health:** The WHo teamed with the Branch of Aquatic Invasive Species, the Aquatic Animal Health Program, and Ecological Services to draft a proposed rule to list host species of the fungal pathogen Batrachochytrium salamandrivorans (Bsal) as injurious under the Lacy Act. The rule is currently under review.

The WHo participated in a USGS-hosted workshop in Fort Collins, Colorado in June 2015 to begin a coordinated, interagency effort to prepare for the potential introduction of Bsal into the United States. The meeting resulted in the formation of a National Bsal Task Force with associated committees, and WHo participation is ongoing.

The WHo continues to be an active participant in the Partners in Amphibian and Reptile Conservation (PARC) group, participating in the PARC Disease Task Team as well as the PARC Federal Agency Steering Committee.

**Ungulate health:** In addition to CWD-specific support, the WHo provided assistance for a variety of ungulate health issues, including developing live animal sampling methods for lipophilic toxins; parasitology investigations as an index to habitat use and wildlife health; dermatological investigations; minerals baselines in wild bison and elk; and developing a remotely delivered temporary external marker.

**Wildlife welfare** We are making steady progress in the development of a Service-wide Institutional Animal Care and Use Committee (IACUC). After research and information gathering from experts in the field, a plan for development and a timeline have been created. Two briefing statements have been written, one addressing Service policy in animal welfare, and the other regarding creation of a Service-wide IACUC. We met with the USDA APHIS Animal Care office to determine their requirements, and the Service has been issued a certificate number to use in registering the IACUC after October 1st.

*Blue-green algae at the shoreline of an impoundment.*
Wildlife Health office PRODUCTS

WILDLIFE HEALTH: email alerts. These email alerts cover current topics in wildlife health of immediate importance and interest to both regional leadership and field stations. The distribution list for the emails includes: Regional Refuge Biologists, Regional Refuge Supervisors, Regional I&M Coordinators, FWS Flyway Representatives, and previous Avian Health Program Regional Coordinators. Titles of email alerts sent out in FY2015 include: Harmful algal blooms, Banding season health and safety, Reminder of avian influenza safety guidelines, New CDC Laboratory Study Suggests U.S. H5 Bird Flu Viruses Currently Pose Low Risk to People, Avian influenza surveillance plans, Habitat management and biosecurity memo, NCTC on-line training course on wildlife health, Responding to requests to assist with avian influenza control activities. Regional outreach messages included anthrax awareness, bird feeders and trichomoniiasis, and a tularemia alert and associated Job Hazard Analysis.

Fact sheets, standard operating procedures, protocols, memos, job hazard analyses.

a. Introduction to the Wildlife Health office
b. Harmful Algal Blooms
c. Disinfection and disposal
d. Euthanasia techniques for large wild birds
e. Updated Employee Health and Safety Guidance for Avian Influenza Surveillance and Control Activities in Wild Bird Populations, 2014
f. Domestic animals on refuges – precautions
g. Key deer mortality investigation protocol
h. Morbidity mortality response kit contents
i. PPE - donning and doffing
j. Sample Packaging and Shipping
k. Stress and wildlife health
l. Avian Disease Memo for Banding Crews in Canada
m. Waterfowl Banding and human safety at Refuges and Wetland Management Districts Memo
n. Ungulate Necropsy and Basic Photography
o. Contact with rodents: Tularemia, Plague, and Hantavirus risks JHA
p. Ungulate Necropsy and Sampling JHA
Wildlife Health office PRODUCTS (continued)

**Disease Contingency Plans.** Savannah Coastal NWR Complex (complete); Florida Keys NWR Complex (complete); Alaska Avian Health Disease Contingency Plan (complete); North Florida NWR Complex (in progress), including Manatee Rescue Plan; Rainwater Basin WMD (in progress); Stillwater NWR Complex (in progress). Ungulate health language has also been provided for refuges developing Herd Management Plans (HMPs).

**Google sites.**
WHo  https://sites.google.com/a/fws.gov/fws-wildlife-health/
DOI One Health Group  https://sites.google.com/a/fws.gov/doi-one-health-group/

*Bison necropsy training at Rocky Mountain Arsenal NWR, Commerce City, Colorado*
Wildlife Health office SERVICES

**Training.** This year, several on-site training modules were presented: a) avian morbidity and mortality event response in Alaska; b) Key Deer necropsy, tissue collection, and shipment; c) bison necropsy, tissue collection and biosafety; d) elk necropsy, tissue collection and biosafety; e) CWD sample collection; f) bighorn sheep respiratory disease and health evaluation; and g) Northeast Wildlife Disease Cooperative regional training sessions on wildlife health in Massachusetts and New Jersey. Remote training opportunities were also developed such as: a webinar on outbreak response presented as part of the NCTC Refuge Biologist webinar series, and two online wildlife health awareness training courses called *Essentials of Disease in Wildlife* and *Applications in Wildlife Disease Response*. Additionally, the WHo Google site has also been greatly expanded to provide even more learning resources.

**Emergency response and management.** WHo team members respond to requests from the field for morbidity and mortality investigation assistance; they also coordinate with laboratories for diagnostics. (See Appendix A) This year, the WHo also provided support to the emergency management team in headquarters for ESF-11, Eagle Horizon Training, and HPAI personnel safety preparedness. In addition, WHo personnel have served as technical experts to the Tulane primate facility *Burkholderia* outbreak Incident Command and the Washington State and USDA Joint Command for HPAI introduction to North America.
Wildlife Health office SERVICES (continued)

Technical assistance
The WHo team provided technical assistance to a number of groups both within and outside the Service. Team members serve on several committees to provide wildlife health input: the Wildlife Disease Association (Member of Council), the Western Association of Fish and Wildlife Agencies (Wildlife Health Committee), Association of Fish and Wildlife Agencies (Fish and Wildlife Health Committee, Lead subcommittee, Fish and Wildlife Health Initiative working group), the US Animal Health Association (Committee on Wildlife Diseases, Committee on Transmissible Diseases of Poultry and other Avian Species, Committee on Foreign and Emerging Diseases), National Bsal Task Force (Technical Advisory Committee co-chair and Diagnostics Committee chair), International One Health Congress (session co-chair), the International Union for Conservation of Nature (IUCN) Bison Specialist Group, the DOI Bison Working Group Health Technical Committee, and the Hanalei Botulism Task Force. Team members review grant applications, such as the White Nose Syndrome proposals, and provide assistance with field protocols such as biopsy darting for Wrangell-Elias National Park and CWD sample collection for the Texas Animal Health Commission.

Policy input
- Assisting with revisions to the Service Manual Chapter Part 724 Migratory Bird Permits, FW 4 - Permits for Eagle Carcasses, Parts, and Feathers from the National Eagle Repository
- Part of the rule-writing team for *Batrachochytrium salamandrivorsans* (Bsal). The team is reviewing the available scientific information to propose an injurious species listing intended to prevent the introduction and spread of Bsal through the translocation of host amphibians.
- Beginning the process of defining Service animal welfare policy; this will eventually be codified by Service Manual Chapter Part 810 Animal Welfare FW 1 - Policy and Responsibilities and FW 2 Requirements.

Bison Conservation. Facilitator for a multi-regional team evaluating current Service bison management relative to increased public interest in bison as a wildlife species in need of conservation. The team is developing guidance for bison conservation management, including reducing stress during handling, health surveillance, donations and conservation genetics.
Wildlife Health office PROJECTS

Bald and Golden eagle health: a risk assessment for receiving tribes. This work pertains to the exposure of bald and golden eagles to toxins and pathogens in the environment prior to being processed by the National Eagle Repository. Health issues impacting bald and golden eagles have the potential to also negatively affect the health of Native Americans receiving eagle parts and remains. The project is a collaborative effort between the Wildlife Health office, the National Eagle Repository, and the Center for Environmental and Human Toxicology, College of Veterinary Medicine, at the University of Florida.

Wellfleet Bay virus. Die-offs of common eiders have been occurring annually on Cape Cod Massachusetts since at least 2006 and have affected thousands of birds. In 2010 a multi-agency investigation lead by the Service discovered a new virus named Wellfleet Bay virus (WFBV) and a variety of projects evolved to determine the epidemiology of the disease and understand more about the potential impacts of the virus on common eider populations. The last of these projects – satellite transmitter placement surgeries and mortality investigations for continued monitoring of eider movements to and from the Boston Harbor outer islands – is still in progress. Publications are being prepared for the completed projects that investigated the geographic extent of infections, possible WFBV transmission routes, and pathophysiology of the disease.

Ungulate health surveillance and diagnostics. We conducted serologic surveillance for a wide variety of diseases in Service bison and some elk herds, with no evidence of disease significant to any herd. We also conducted a respiratory health assessment for bighorn sheep as a baseline from which to evaluate future potential for transplantation to other states. We evaluated parasitism as an index to habitat condition and ungulate health in Service bison and some elk herds, with most herds showing dramatic reduction in parasitism with improved herd and habitat management in the past few years. We began expansion of the bison genetic health program to include a more sensitive test for cattle gene introgression, and we began development of a population management strategy based on mean kinship using microsatellites to estimate relatedness.
Wildlife Health office PROJECTS (continued)

*Mycoplasma bovis in bison research project.* Collaboration with USDA-ARS-NADC to provide paired deep nasal swab cultures and serum in support of their effort to better understand *M. bovis* as a significant cause of mortality in cattle and ranched bison. Although 3 species of *Mycoplasma* were newly identified in Service bison, none are thought to be pathogenic. Genetic material from these samples is also being used by the University of Alabama at Birmingham to advance the understanding of *Mycoplasma* in human health. We continue to conduct surveillance for disease-causing *Mycoplasma* in Service bison through active mortality surveillance.

*Collecting a nasal swab sample from a bison.*

**Chronic wasting disease (CWD)** request for proposals, distribution of funds, surveillance projects, and technical support.

**Evaluating the effects of bison population management on long-term genetic diversity:** In collaboration with researchers from the University of Wisconsin and the San Diego Zoo, we modeled the effects of 3 methods of population management on conservation of bison genetic diversity in FWS herds. Publications are in preparation.

**Methyl mercury contamination of created wetland habitats:** Kellys Slough NWR (Devil’s Lake Complex) in collaboration with ND Game and Fish, USGS Mercury Research Laboratory in Madison, WI; University of North Dakota, and Valley City State University.

**Batrachochytrium salamandrivorans (Bsal).** The multi-agency Bsal team is reviewing the available scientific information to propose an injurious species listing intended to prevent the introduction and spread of Bsal through the translocation of host amphibians from other countries.
### Appendix A. Stations taking part in wildlife health activities

<table>
<thead>
<tr>
<th>Refuges/WMDs submitting mortality cases to a diagnostic laboratory (NWHC, NWDC, SCWDS, CAHFS, FWS FL)*</th>
<th>No. of stations submitting</th>
<th>Region</th>
<th>Station names</th>
<th>Health issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 NWHC, 2 NWDC, 8 SCWDS, 2 CAHFS, 1 FWS FL</td>
<td>All regions</td>
<td>Alaska Maritime, Alligator River, Arrowwood, Bosque Del Apache, Buffalo Lake, Chase Lake, Crescent Lake, Fergus Falls, Horicon, Humboldt Bay, Kauai, Kodiak, Lacroek, Lost Trail, Long Lake, Lower Klamath, Medicine Lake, Mississippi Sandhill Crane, North Mississippi, Ouray, Rocky Mountain Arsenal, Sacramento, San Luis, Sevilleta, Sonny Bono Salton Sea, St. Vincent, Upper Mississippi River, Wheeler</td>
<td>Microcystins, anticoagulants, electrocution, lead, trauma, emaciation, salmonellosis, aspergillosis</td>
<td></td>
</tr>
</tbody>
</table>

| Refuges/WMDs requesting technical assistance from WHo | 2, 4, 6 | | Rainwater Basin, Laguna Atascosa, National Key Deer Refuge, Stillwater, Lower Suwannee, Bowdoin, National Bison Range, Kauai, San Fransisco Bay, Moosehorn, Necedah, Crystal River, CM Russell, Ouray NWR, Long Lake NWR, Rocky Mountain Arsenal, Upper Mississippi River Complex | Avian cholera, cattle fever ticks, key deer necropsy training, botulism, emaciation, animal welfare, WNV, salmonellosis, microcystins, CWD |

| Refuges/WMDs visited by WHo staff | 1, 2, 4, 5, 6, 8 | | Loxahatchhee, National Key Deer Refuge, Savannah Coastal Lower Suwannee and Cedar Keys, Crystal River, National Elk Refuge, Alligator River, Pocosin Lakes, Mattamuskeet, Pelican Island, Archie Carr, Chincoteague, Patuxent, Blackwater, Eastern Neck, E. B. Forsythe, Cape May, Stewart B. McKinney, Monomoy, Sevilleta, Bosque Del Apache, Rocky Mountain Arsenal, Sachuest Point, Hanalei, Kilauea Point, Laguna Atascosa, Rainwater Basin, Stillwater, National Bison Range, Ouray, Fallon | Necropsy training, DCP creation, botulism outbreaks, woodcock health surveillance |

| Refuges/WMDs assisting USDA APHIS Wildlife Services with highly pathogenic avian influenza surveillance | | | Trustom Pond, Lower Klamath, Tule Lake, Sacramento, Delevan, Colusa, Merced, Kern, Sonny Bono Salton Sea, Ouray, Fish Springs, Bear River, Benton Lake, Devils Lake WMD, Audubon, Forsyth, Great Swamp, Walkill, Minnesota Valley, Litchfield WMD, Cat Island, John Heinz, Monte Vista, Baca, Alamosa, Arapaho, Santeet, Ace Basin | Highly pathogenic avian influenza surveillance |

| Refuges receiving mortality response kits (funding provided by R4 Migratory Birds) | 52 | 4 | North Florida NWR Complex, Ding Darling, Florida Panther, Lower Suwannee, Loxahatchee, Merritt Island, National Key Deer Refuge, Okefenokee, Savannah Coastal, Piedmont, South Carolina Low Country Complex, Ace Basin, Waccamaw, Santee, Carolina Sandhills, Mattamuskeet, Alligator River, Mackay Island, Pocosin Lakes, Roanoke River, Caribbean Islands, Wheeler. Eufaula, Bon Secour, White River, Holla Bend, South Arkansas, Cache River, Bald Knob, Upper Ouachita, Tensas River, Southeast Louisiana complex, Southwest Louisiana complex, Lake Ophelia, Catahoula, Red River, Yazoo, Tallahatchie, St. Catherine Creek, Panther Swamp, Noxubee, Mississippi Sandhill Crane, Morgan Brake, Dahomey, Tennessee, Reelfoot, Hatchie, Clarks River | Morbidity and mortality response |

| Refuges receiving on-site training | 2 | 4, 6, 7 | National Key Deer Refuge, Rocky Mountain Arsenal, R7 Regional Office and Migratory Birds | Necropsy training and mortality response training |

Appendix B. Working with partners

1. Collaborations with state partners
   a. Alaska – Kimberly Beckman, avian health training for FWS and state staff, guidance on fat biopsy techniques
   b. North Carolina – Maria Palamar, advice regarding permit exception for collection of sick and dead birds by animal control officers
   c. Maryland – Cindy Driscoll, marine mammal health, Poplar Island avian disease investigations
   d. Florida – Mark Cunningham and Dan Wolf, funding support for investigation of virulent Newcastle Disease virus in resident double-crested cormorants, feral swine health on Lower Suwannee NWR
   e. Oregon – Collin Gillen DEA, requirements for controlled substances
   f. Nevada – Peregrine Wolff, collaborative disease response and notification arrangements between Nevada Department of Wildlife and Stillwater NWRC
   g. New York – Krysten Schuler, collaborations with NWDC and WDA conference planning
   h. Missouri – Kelly Straka, interactions on avian influenza media response, distribution of Missouri wildlife disease field guide to refuges in the state of Missouri
   i. Utah – Annette Roug, technical advice on avian baseline health surveillance studies
   j. Washington – Kristin Mansfield, funding support for mortality investigations, interactions on HPAI Joint Command and seabird mortality events
   k. Kentucky – Iga Stasiak, support for die-off of 100-200 waterfowl (snow geese and ducks) at a hunting preserve in Western KY
   l. Louisiana – Jim LaCour, Burkholderia incident command support
   m. Rhode Island – Jay Osenkowski, avian influenza surveillance guidance
   n. Idaho – Mark Drew, communications regarding falconer/rehabilitation facility regarding HPAI, outreach to other falconers, DEA regulations
   o. Pennsylvania – Justin Brown, animal welfare and avian capture techniques for waterfowl banding operations
   p. Texas – Susan Culp, ongoing discussions about the cattle fever tick quarantine of Laguna Atascosa NWR

2. Collaborations with federal partners
   a. USGS – National Wildlife Health Center, Patuxent Wildlife Research Center, Alaska Science Center, Environmental Health program
   b. CDC – avian influenza and human health strategies
   c. USDA – Wildlife Services, Veterinary Services, Animal Care
   d. National Park Service – animal welfare
   e. DOI level emergency management group – hantavirus after action report
Appendix C. Skills development

Training sessions attended by WHO staff:
  a) Wildlife capture training (Ballard and Jones)
  b) Firearms training (Ballard)
  c) Packaging and shipping of biological materials (Maheine)
  d) Large whale euthanasia techniques (Gibbs)
  e) Meeting the information requirements of the Animal Welfare Act (Gibbs)
  f) Refuge Academy (Gibbs)
  g) Incident Command System Training (Ballard)

Licensure: Jenn Ballard maintained veterinary licenses in Georgia and Arkansas and has started application processes for Colorado, Wyoming, and North Dakota.

Appendix D. Publications by WHO staff


