

WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

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Centre Information

Title of WOA Collaborating Centre	USGS National Wildlife Health Center and the Canadian Wildlife Health Cooperative
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Name of the writer:	Jonathan Sleeman

TOR1 AND 2: SERVICES PROVIDED

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOA

Wildlife	
Title of activity	Scope
	In calendar year 2022, NWHC tested samples collected from 419 wild-bird carcasses for presence of avian influenza virus (AIV) as

Disease Surveillance: Avian Influenza	part of its avian mortality surveillance program in the United States. Tested carcasses were received from 38 U.S. states. Samples from 185 of the carcasses tested positive for the AIV matrix gene, 161 of the samples tested positive for H5- or H7- subtypes of AIV, and 158 samples tested positive for highly pathogenic AIV H5N1 clade 2.3.4.4b.
Wildlife	
Title of activity	Scope
Disease Surveillance: Newcastle Disease	In calendar year 2022, NWHC tested samples collected from 38 wild-bird carcasses for presence of avian paramyxovirus-1, including Newcastle Disease Virus (NDV), as part of its avian mortality surveillance program in the United States. Tested carcasses were received from 10 U.S. states, and samples from 2 of the carcasses tested positive for the NDV matrix gene.
Wildlife	
Title of activity	Scope
Disease Surveillance: RHDV2	In calendar year 2022, NWHC tested samples collected from 51 wild lagomorphs for presence of rabbit hemorrhagic disease virus type 2 (RHDV2). Either whole carcasses (18) or tissues (33) originating from 12 states were submitted to NWHC for testing. Samples from 20 lagomorphs tested positive for RHDV2.
Wildlife	
Title of activity	Scope
Disease Surveillance: WNS	<p>The USGS National Wildlife Health Center (NWHC) continued to assist federal, state, and tribal partners with nationwide coordination efforts during the 2021/2022 season for the white-nose syndrome (WNS) fungus using a designed surveillance approach, based on a dynamic diffusion model that identifies high risk areas where <i>Pseudogymnoascus destructans</i> (Pd) is predicted to spread annually in western and southern United States. NWHC evaluated samples from 2,295 bats and 1,710 environmental samples between 1 November 2021 and 31 October 2022 collected by a combination of model-guided and opportunistic surveillance. These samples represented 21 species of bats from more than 200 locations in 20 states.</p> <p>Overall, NWHC identified Pd range expansion in 15 new counties in six states. This included the first reported detection of the Pd fungus on bats in Idaho and Colorado, where bats showed no clinical signs of disease, and ongoing WNS disease progression on bats from multiple counties in Montana, South Dakota, and Wyoming. Evidence of Pd range expansion now extends to the Rocky Mountains, although WNS has yet to be confirmed west of the Rockies with the exception of Washington state where the disease was initially discovered in Spring 2016 and is slowly continuing to spread in the Pacific Northwest region. Sixteen years after the Pd fungus was first recognized in New York, it has now been definitively detected in</p>

all but 8 states (Alaska, Arizona, California, Florida, Hawaii, Nevada, Oregon, and Utah). Despite its continued westward expansion into areas with higher bat diversity, North American bat species confirmed with the white-nose syndrome disease so far remains stable at 12 over the past three seasons. Additionally, NWHC supported ongoing Pd surveillance by partners in Mexico by providing sampling kits and sample analyses for a fifth consecutive year. To date, Pd has not been detected in samples (457 bats representing 8 species; 117 environmental samples) from 19 hibernacula in 10 northern and central Mexican states surveyed through the 2020/2021 season. Receipt of the 2021/2022 season Mexico surveillance samples for analysis are pending.

Wildlife

Title of activity	Scope
Disease Surveillance: Batrachochytrium salamandrivorans	<p>The NWHC screens all diagnostic submissions for B. salamandrivorans. In 2022, NWHC is a lead participant in the Student Network for Amphibian Pathogen Surveillance (SNAPS). SNAPS was initiated by the USGS Amphibian Research and Monitoring Initiative and the North American Bsal Task Force with the dual purpose of enhancing early detection of Bsal and of providing hands-on field experience and environmental education for a diverse array of students. Participating instructors use SNAPS learning modules to engage students in rigorous field sampling for Bsal and Bd. In 2022, 29 U.S. institutions participated with support from USGS and NWHC, including 260 students that collected 482 samples (no Bsal was detected). SNAPS is also a regional collaboration with SNAPS Canada supported the Canadian Wildlife Health Cooperative and Environment Canada and SNAPS Mexico starting this year.</p>

Wildlife

Title of activity	Scope
General Disease Surveillance	<p>Both the CWHC and NWHC conduct necropsies of wild animal submissions to ascertain cause of death, and detect reportable diseases, and diseases of scientific interest.</p>

Wildlife

Title of activity	Scope
Targeted Surveillance	<p>The CWHC conducts targeted surveillance for diseases of interest such as avian influenza, white nose syndrome, rabies, chronic wasting disease, and SARS-CoV-2, etc.</p>

TOR3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main focus area for which you were designated

Proposal title	Scope/Content	Applicable area
Wildlife Disease Case Definitions	The CWHC and NWHC are jointly developing wildlife disease case definitions for use by diagnostic laboratories to standardize diagnostic reporting. A template plus 5 diseases (Avian Botulism, Electrocutation, Snake Fungal Disease, Stony Coral Tissue Loss Disease, and West Nile Virus) are in the USGS publication process with plans for additional 25 disease definitions added in the next few years.	Wildlife health and biodiversity

4. Did your Collaborating Centre maintain a network with other WOAHC Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Canadian Wildlife Health Cooperative (CWHC)	Canada	Americas	the NWHC and CWHC are a consortium Collaborating Centre
Thailand National Wildlife Health Center, Mahidol University	Bangkok, Thailand	Asia and Pasific	We have been executing a formal Twinning Project between the two institutions.

TOR4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOAHC Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

TOR6: EXPERT CONSULTANTS

6. Did your Collaborating Centre place expert consultants at the disposal of WOAHC?

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

Yes

The CWHC engaged in the wildlife disease reporting tool redesign that WOAHA is currently exploring. All members will benefit from an improved wildlife disease reporting tool that is easy to use.

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOAHA, to personnel from WOAHA Members?

Yes

a) Technical visit :

b) Seminars : 200

c) Hands-on training courses: 200

d) Internships (>1 month) :

TYPE OF TECHNICAL TRAINING PROVIDED (A, B, C OR D)	CONTENT	COUNTRY OF ORIGIN OF THE EXPERT(S) PROVIDED WITH TRAINING	NO. PARTICIPANTS FROM THE CORRESPONDING COUNTRY
B	Workshop on General Surveillance for Wildlife Diseases and Outbreak Investigation (Conducted in fulfillment of the Twinning Project)	Thailand	60
C	Train the Trainers Workshop on General Surveillance for Wildlife Diseases and Outbreak Investigation (Conducted in fulfillment of the Twinning Project)	Thailand	40
B	Meeting for Policy-driven Wildlife Disease Surveillance in Thailand: A Collaborative Wildlife Health Network (Conducted in fulfillment of the Twinning Project)	Thailand	20
B	2nd Thailand Wildlife Health Information Management Virtual Workshop	Thailand	60
C	Workshop for WOAHA National Focal Points for Wildlife	Africa Region	50

TOR8: SCIENTIFIC MEETINGS

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on

behalf of WOAHP?

TOR9: DATA AND INFORMATION DISSEMINATION

10. Publication and dissemination of any information within the remit of the mandate given by WOAHP that may be useful to Members of WOAHP

a) Articles published in peer-reviewed journals:

NWHC Publications for 2022

- Aguilar-Setién, A., Aréchiga-Ceballos, N., Balsamo, G.A., Behrman, A.J., Frank, H.K., Fujimoto, G.R., Gilman Duane, E., Hudson Iii, T.W., Jones, S.M., Ochoa Carrera, L.A., Powell, G.L., Smith, C.A., Triantis Van Sickle, J., Vleck, S.E., 2022. Biosafety practices when working with bats: A guide to field research considerations. *Applied Biosafety* 27, 169-190. 10.1089/apb.2022.0019
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- Brunson, S., Gaos, A., Kelly, I., van Houtan, K., Swimmer, Y., Hargrove, S., Balazs, G.H., Work, T.M., Jones, T.T., 2022. Three decades of stranding data reveal insights into endangered hawksbill sea turtles in Hawai'i. *Endangered Species Research* 47, 109-118. 10.3354/esr01167
- Cárdenas-Canales, E.M., Stockmaier, S., Cronin, E., Rocke, T.E., Osorio, J.E., Carter, G.G., 2022. Social effects of rabies infection in male vampire bats (*Desmodus rotundus*). *Biology Letters* 18. 10.1098/rsbl.2022.0298
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- Case, N.T., Berman, J., Blehert, D.S., Cramer, R.A., Cuomo, C.A., Currie, C.R., Ene, I.V., Fisher, M.C., Fritz-Laylin, L.K., Gerstein, A.C., Glass, N.L., Gow, N.A.R., Gurr, S.J., Hittinger, C.T., Hohl, T.M., Iliev, I.D., James, T.Y., Jin, H., Klein, B.S., Kronstad, J.W., Lorch, J.M., McGovern, V., Mitchell, A.P., Segre, J.A., Shapiro, R.S., Sheppard, D.C., Sil, A., Stajich, J.E., Stukenbrock, E.E., Taylor, J.W., Thompson, D., Wright, G.D., Heitman, J., Cowen, L.E., 2022. The future of fungi: Threats and opportunities. *G3 Genes, Genomes, Genetics* 12. 10.1093/g3journal/jkac224
- Cook, J.D., Campbell Grant, E.H., Coleman, J.T.H., Sleeman, J.M., Runge, M.C., 2022. Evaluating the risk of SARS-CoV-2 transmission to bats in the context of wildlife research, rehabilitation, and control. *Wildlife Society Bulletin* 46. 10.1002/wsb.1262
- Deng, K., Uhlig, S., Goodman, L.B., Ip, H.S., Killiam, M.L., Nemser, S., Ulaszek, J., Kiener, S., Kmet, M., Frost, K., Hettwer, K., Colson, B., Nichani, K., Schlierf, A., Tkachenko, A., Oyinloye, M.M., Scott, A., Reddy, R., Tyson, G.H., 2022. Second round of an interlaboratory comparison of SARS-CoV2 molecular detection assays used by 45 veterinary diagnostic laboratories in the United States. *Journal of Veterinary Diagnostic Investigation* 34, 825-834. 10.1177/10406387221115702
- Drew, M.L., Sleeman, J.M., 2022. Management of diseases in free-ranging wildlife populations. *Fowler's zoo and wild animal medicine current therapy, volume 10*, 47-53.
- Frick, W.F., Johnson, E.R., Cheng, T.L., Lankton, J.S., Warne, R., Dallas, J., Parise, K.L., Foster, J.T., Boyles, J.G., McGuire, L.P., 2022. Experimental inoculation trial to determine the effects of temperature and humidity on White-nose Syndrome in hibernating bats. *Scientific Reports* 12. 10.1038/s41598-022-04965-x
- Fu, Y., M'ikanatha, N.M., Lorch, J.M., Blehert, D.S., Berlowski-Zier, B.M., Whitehouse, C.A., Li, S., Deng, X., Smith, J.C., Shariat, N.W., Nawrocki, E.M., Dudley, E.G., 2022. *Salmonella enterica* serovar Typhimurium from wild birds in the United States represent distinct lineages defined by bird type. *Applied and Environmental Microbiology* 88. 10.1128/aem.01979-21
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- Groner, M., Hershberger, P., Fradkin, S.C., Conway, C.M., Hawthorn, A.M.A.C., Purcell, M.K., 2022. Evaluating the effect of nuclear inclusion X (NIX) infections on Pacific razor clam populations. *Diseases of Aquatic Organisms* 151, 1-9. 10.3354/dao03685
- Grunwald, N.J., Brown, C.E., Ip, H.S., Chang, J.H., 2022. Genetic processes facilitating pathogen emergence. *Tactical sciences for biosecurity in animal and plant systems*, 32-53. 10.4018/978-1-7998-7935-0.ch002
- Herbst, A.J., Wohlgemuth, S., Yang, J.-F., Castle, A., Moreno, D.M., Otero, A., Aiken, J.M., Westaway, D., McKenzie, D.I., 2022. Susceptibility of beavers to chronic wasting disease. *Biology* 11. 10.3390/biology11050667
- Hill, N.J., Bishop, M.A., Trovao, N.S., Ineson, K., Schaefer, A., Puryear, W.B., Zhou, K., Foss, A., Clark, D., McKenzie, K., Gass, J.D., Jr.,

- Borkenhagen, L., Hall, J.S., Runstadler, J.A., 2022. Ecological divergence of wild birds drives avian influenza spillover and global spread. *PLoS Pathogens* 18. 10.1371/journal.ppat.1010062
- Hofmeister, E.K., Ruhs, E.C., Fortini, L., Hopkins, M.C., Jones, L.C., Lafferty, K.D., Sleeman, J.M., LeDee, O.E., 2022. Future directions to manage wildlife health in a changing climate. *EcoHealth* 19, 329-334. 10.1007/s10393-022-01604-9
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b) International conferences:

c) National conferences:

d) Other (Provide website address or link to appropriate information):

The NWHC disseminates information on current and historical wildlife disease outbreaks in the USA via the online database, WHISPers (<https://whispers.usgs.gov/home>).

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

12. Additional comments regarding your report: