

New York State Wildlife Health Program

Annual Report 2019-2020



**Promoting the health and sustainability of wildlife
populations through integration of wildlife ecology
and veterinary medicine**

Administrative Summary	3
Health & Disease Surveillance	4
Emerging & Significant Disease Issues	6
CWD Prevention & Update	10
Training and Teaching	12
Quarterly Updates	14
Science Communication & Outreach	16
Research	18
Policy Support	20
Wildlife Health Team	23
Annual Work Plan Review	24
Publications, Presentations & Grants	26



ADMINISTRATIVE SUMMARY

The New York State Cooperative Wildlife Health Program (WHP) is a partnership between the New York State Department of Environmental Conservation (NYSDEC) and Cornell University's College of Veterinary Medicine Wildlife Health Lab (CWHL) that works to safeguard the long-term health of wildlife in New York. Initiated in 2011, the program is responsible for monitoring wildlife disease and toxin impacts on species statewide, staff training and support, policy input, and research. Our activities are reported by the state fiscal year (April 1, 2019 - March 31, 2020).

This report covers the case submissions from January 1 - December 31, 2019. During that time, the program processed 1386 cases, including 948 necropsies at our three necropsy laboratories: DEC Wildlife Health Unit at Delmar, CWHL at the Animal Health Diagnostic Center in Ithaca, and Cornell Duck Research Lab on Long Island. This represented a slight increase over 2018, which has shown a consistent upward trajectory as the program has become established. The diversity of species submitted and distribution of cases across the state demonstrates widespread coverage of surveillance activities.

New Leadership & Training

With the promotion of Kevin Hynes to Wildlife Health Program Leader, the DEC Wildlife Health Team met at Cornell in September 2019 to discuss the New York State Wildlife Health Program. This multi-day meeting was the basis for developing a third strategic plan (2021-2026). This plan emphasizes improvements in disease surveillance, targeted staff training and support, and the development of research-based solutions. A program review was conducted in [2019](#) and areas identified for concerted effort incorporated better inclusion with the Division of Law Enforcement and contacts with indigenous tribes. We have added strength in the [forensic skill set](#) from professional training our staff has received and additional pathology training for DEC at Cornell.

Major Staff Updates

Some staffing changes included the addition of Dr. Rachel Abbott, a wildlife veterinarian, who joined the CWHL from the USGS-National Wildlife Health Center. She has considerable experience working on vaccination efforts for black-footed ferrets against plague and white-nose syndrome in bats. Lauren Miller joined the Delmar team as a Fish and Wildlife technician. We also engaged the expertise of Dr. Jarra Jagne to assist with operations at the DEC Game Farm following an [outbreak of avian cholera](#). Dr. María Forzán, wildlife pathologist, left the CWHL for a position at the new veterinary college at Long Island University.

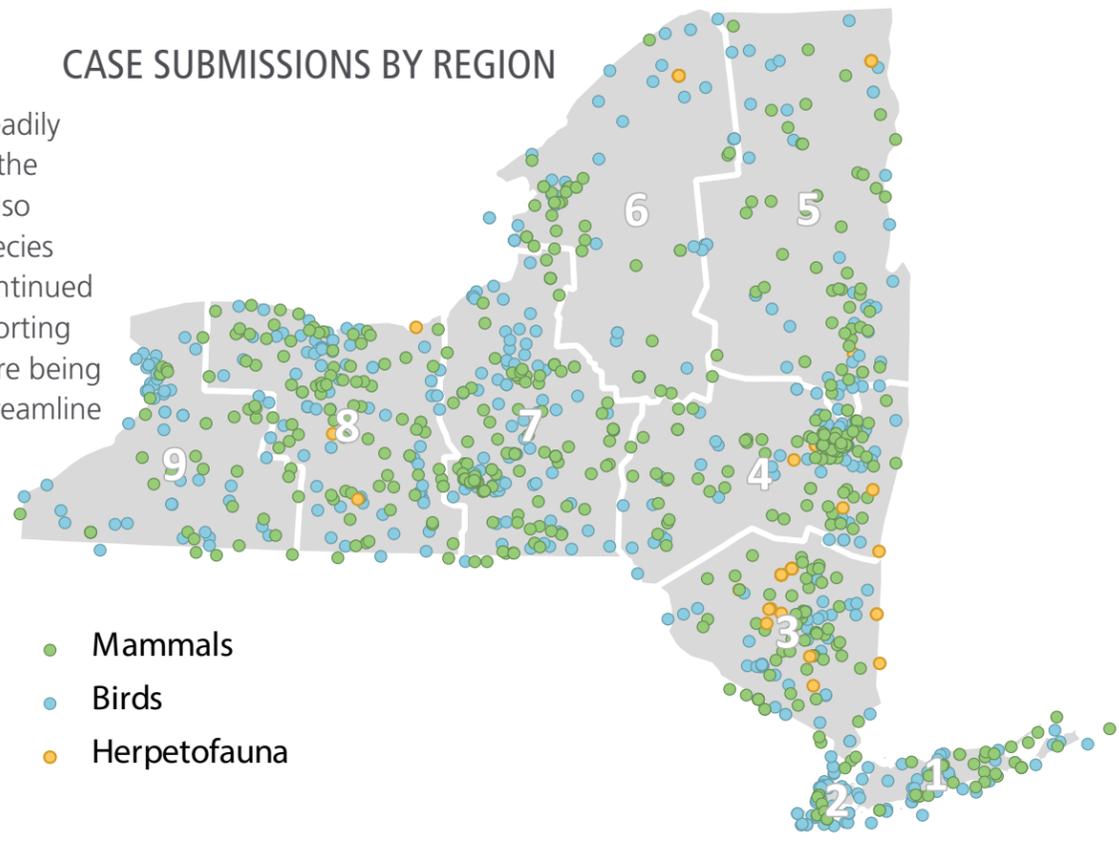
COVID-19

Although this report summarizes activities before the start of the COVID-19 pandemic, it would be remiss to not mention the importance of wildlife health in light of global events and we were heartened to know that the good work and effort spent developing this program and rapport within the agency were valuable in responding to this crisis.

HEALTH AND DISEASE SURVEILLANCE

Case submissions have steadily increased each year since the program's start. There is also a notable expansion in species diversity in cases. With continued improvements in data reporting and analysis, more tools are being created. Our hope is to streamline and inform disease surveillance efforts.

CASE SUBMISSIONS BY REGION



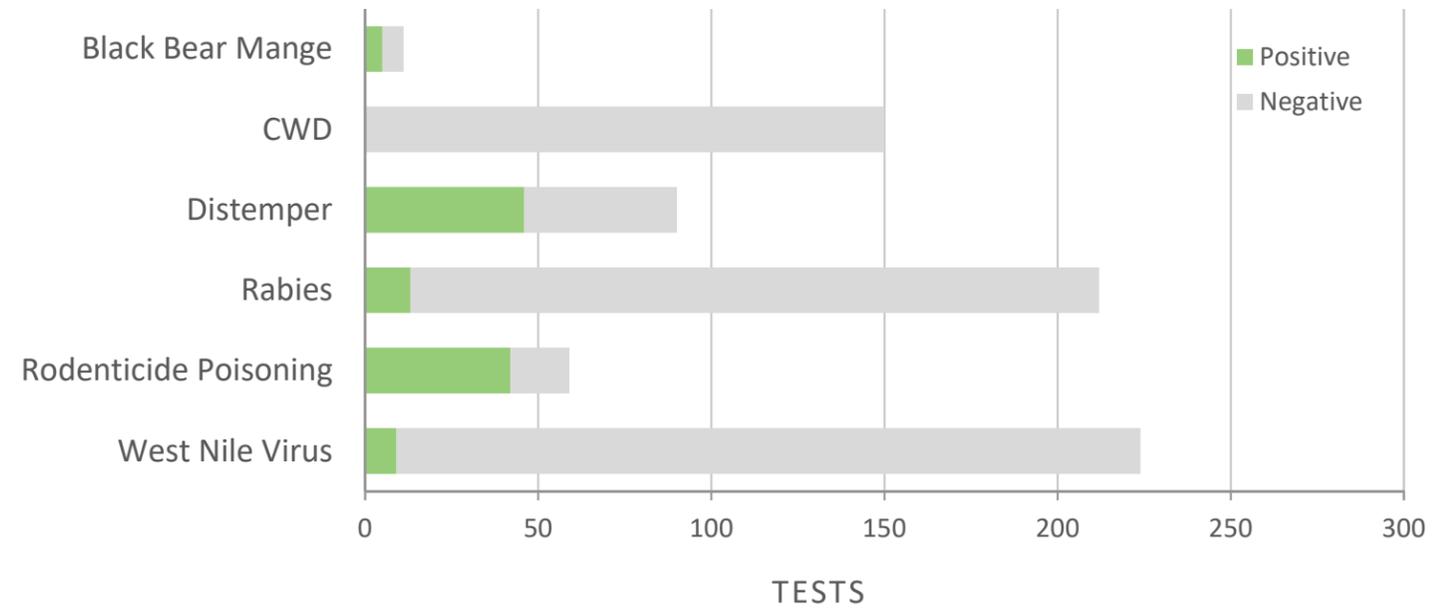
- Mammals
- Birds
- Herpetofauna

948 necropsies performed

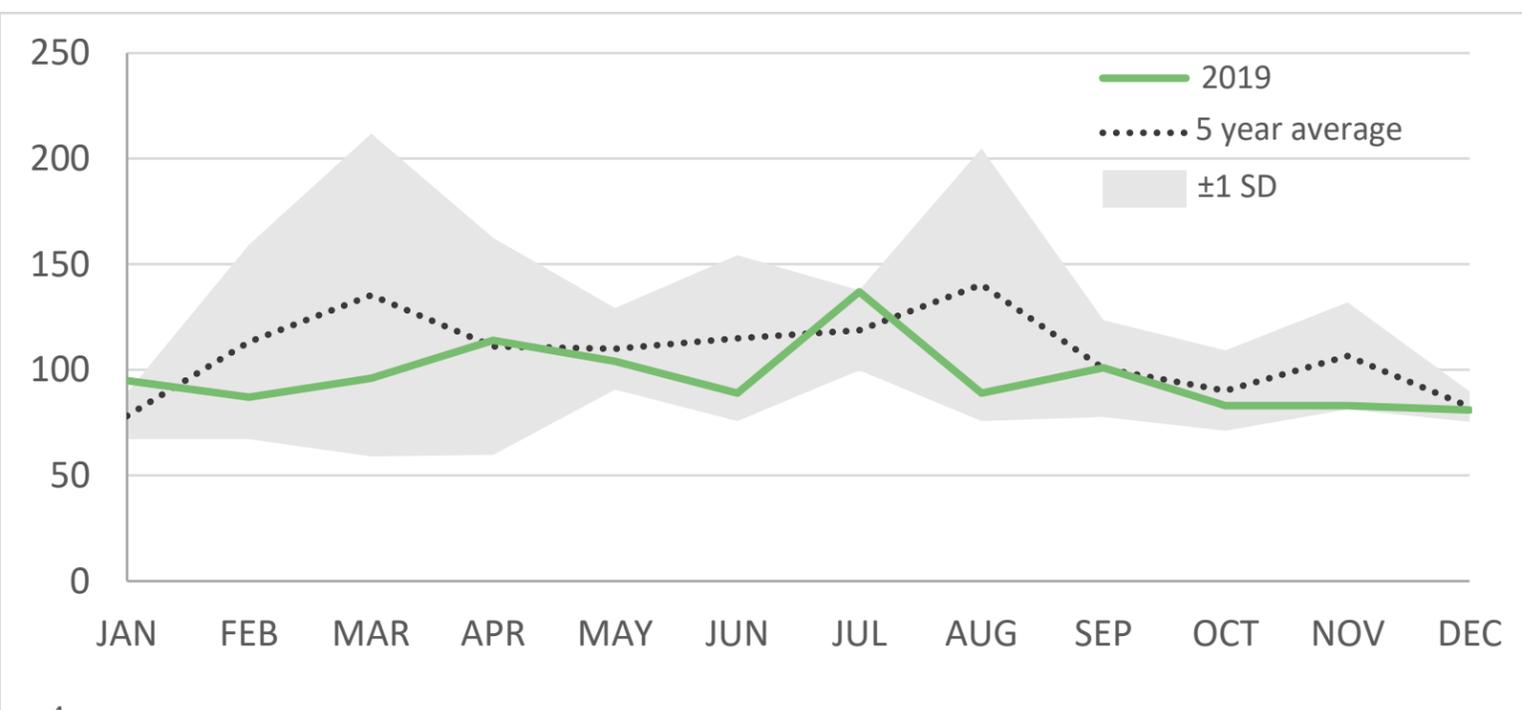
1386 animals examined
57 forensic examinations

619 birds **69** species
651 mammals **36** species
108 herpetofauna **17** species

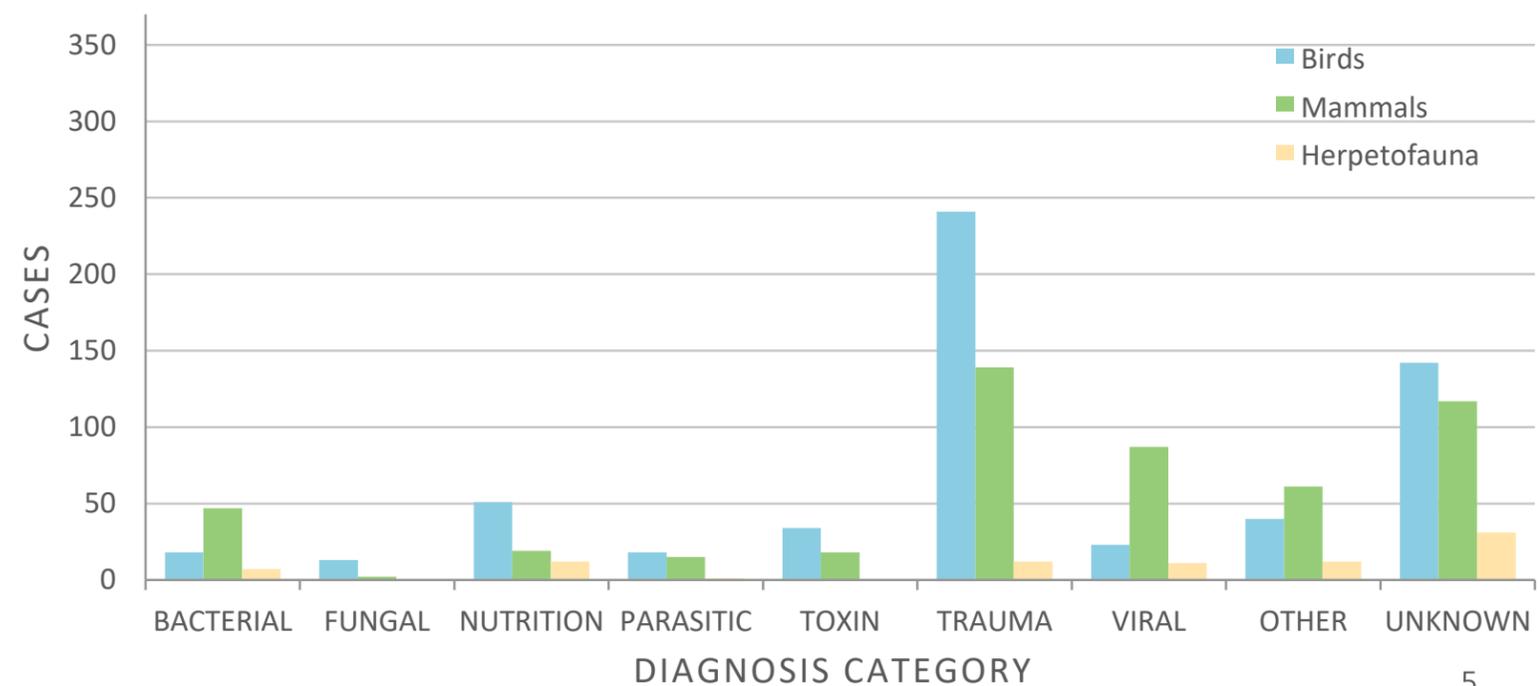
TARGETED DISEASE SURVEILLANCE



MONTHLY CASELOAD



DIAGNOSED CAUSE OF DEATH



EMERGING AND SIGNIFICANT DISEASE ISSUES

Eastern Equine Encephalitis

Eastern Equine Encephalitis (EEE) is a virus that is spread by mosquitoes. It is carried by many species of native songbirds, and sometimes will cause serious neurologic illness in the rare cases of people and horses that become infected. It typically shows up in mid to late summer in this area of the northeast. In 2019, EEE was more active and widespread than previous years.

In September 2019, a Cooper's hawk was found in a road in Schuyler County and brought to the Janet L. Swanson Wildlife Hospital for treatment. The raptor was very weak and dull with no obvious injuries. Radiographs were normal. Blood work was not concerning but showed a few hemoparasites. Tests for West Nile virus were negative and the bird died overnight. Additional testing revealed the bird was infected with EEE. This finding was unexpected since very few EEE cases have been seen in NYS wildlife.



Ranavirus Tadpole Mortality

In May, June, and July 2019, larval amphibians were found dead or dying in a vernal pool on New York City Department of Environmental Protection (NYCDEP) property near the Ashokan Reservoir in Ulster County. DEC Region 3 staff collected 10 wood frog tadpoles in May, as well as four spring peeper tadpoles and four unidentified Ambystoma larvae in July, to submit for necropsy and diagnostic testing. All specimens tested negative for chytrid fungus.



Ranavirus was detected by PCR in the wood frog samples, but not in the other species submitted. Case history (species, lifestage, and seasonality), as well as gross necropsy lesions (hemorrhages on tail and ventral surfaces, swollen eyes and mouth parts) also were indicative of ranavirosis. To meet the case definition, lesions must be confirmed histologically, but the submitted specimens were unsuitable for this evaluation, and therefore the diagnosis is left as "probable."



Porcupine Adenovirus Cases

Adenoviruses often affect the respiratory system of infected animals and tend to be specific for certain types of animals. In 2015 and 2017, two young male porcupines were brought to the Janet L. Swanson Wildlife Hospital at Cornell for treatment of respiratory symptoms. Both had nasal and ocular discharge, inflammation of their eyes, and increased breathing efforts. X-rays revealed severe pneumonia in one of the porcupines. Diagnostic workups revealed bacterial infections. After intensive antibiotic treatment and supportive care, both porcupines recovered and were released back into the wild. However, additional analysis of nasal swabs revealed underlying infection with an adenovirus in both porcupines.

Using genetic sequencing techniques, the adenovirus was identified as skunk adenovirus (SkAdV-1), also known as pygmy marmoset adenovirus. In addition to infecting a marmoset and a skunk, this virus has also been identified in hedgehogs. These porcupines were the first time the virus has been isolated from rodents, indicating that SkAdV-1 may have a propensity for transmission across mammalian species that are not closely related, and therefore may have implications for other wildlife species.

MASS MORTALITY IN CROWS

Throughout January and February of 2020, upwards of 1000 American crows (*Corvus brachyrhynchos*) were reported dead in Middletown, Orange County. DEC Region 3 staff collected approximately 100 of the birds and submitted them for examination to the Wildlife Health Program. The specimens were dispersed to the Wildlife Health Unit, Cornell Wildlife Health Lab, and Cornell University Duck Lab for evaluation.

Gross necropsies were largely unremarkable, except for lung congestion present in the majority of the animals examined. A representative sample of birds were tested for West Nile virus, reovirus, and Eastern Equine Encephalitis virus via PCR, and all were negative. Bacteriology

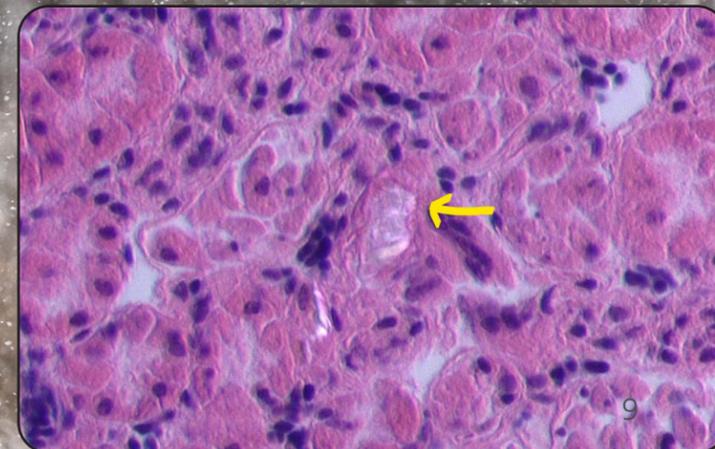
yielded the occasional organism such as *E. coli*, but results were overall insignificant. Toxicology for rodenticides, avicides, pesticides, and other potential poisons also did not reveal cause of death.

However, histology on the tissues showed oxalate crystals in the kidneys of some birds, which can be indicative of ethylene glycol toxicity (among other differentials). There had been a spill reported at the same address as the staging area for the crow roost at approximately the same time as the mortality event, so the case was turned over to DEC Division of Law Enforcement to pursue since ethylene glycol was implicated.



Above right:
Crow being prepped for necropsy

Bottom:
Histopathology image of crow kidneys showing crystals



CHRONIC WASTING DISEASE PREVENTION & UPDATE

US Congress Talking About CWD

Dr. Krysten Schuler, wildlife disease ecologist with the New York State Wildlife Health Program, testified before the U.S. House Natural Resource Committee – Oversight Subcommittee on June 25, 2019. The topic was chronic wasting disease (CWD), a serious threat to deer and elk populations. CWD has been detected in 26 states thus far. Once CWD becomes established in a population, it is nearly impossible to eradicate. Therefore, it is critical to follow the “precautionary principle” when dealing with CWD and take preventative action in the face of uncertainty. There are currently several bills in Congress related to CWD.

NYDAMS & Captive Cervids

As part of the NYS Interagency Risk Minimization Plan, DEC and the Dept. of Agriculture and Markets have been conducting joint inspections of white-tailed deer held at captive cervid facilities. Both agencies are responsible for licensing these operations. Increased cooperation and data sharing has been beneficial in prevention of CWD in NYS. An electronic form on the CWHL website allows DEC staff to record inspection information and search by facilities in their region.

Dr. Schuler in the House chamber before testifying on the importance of CWD prevention.

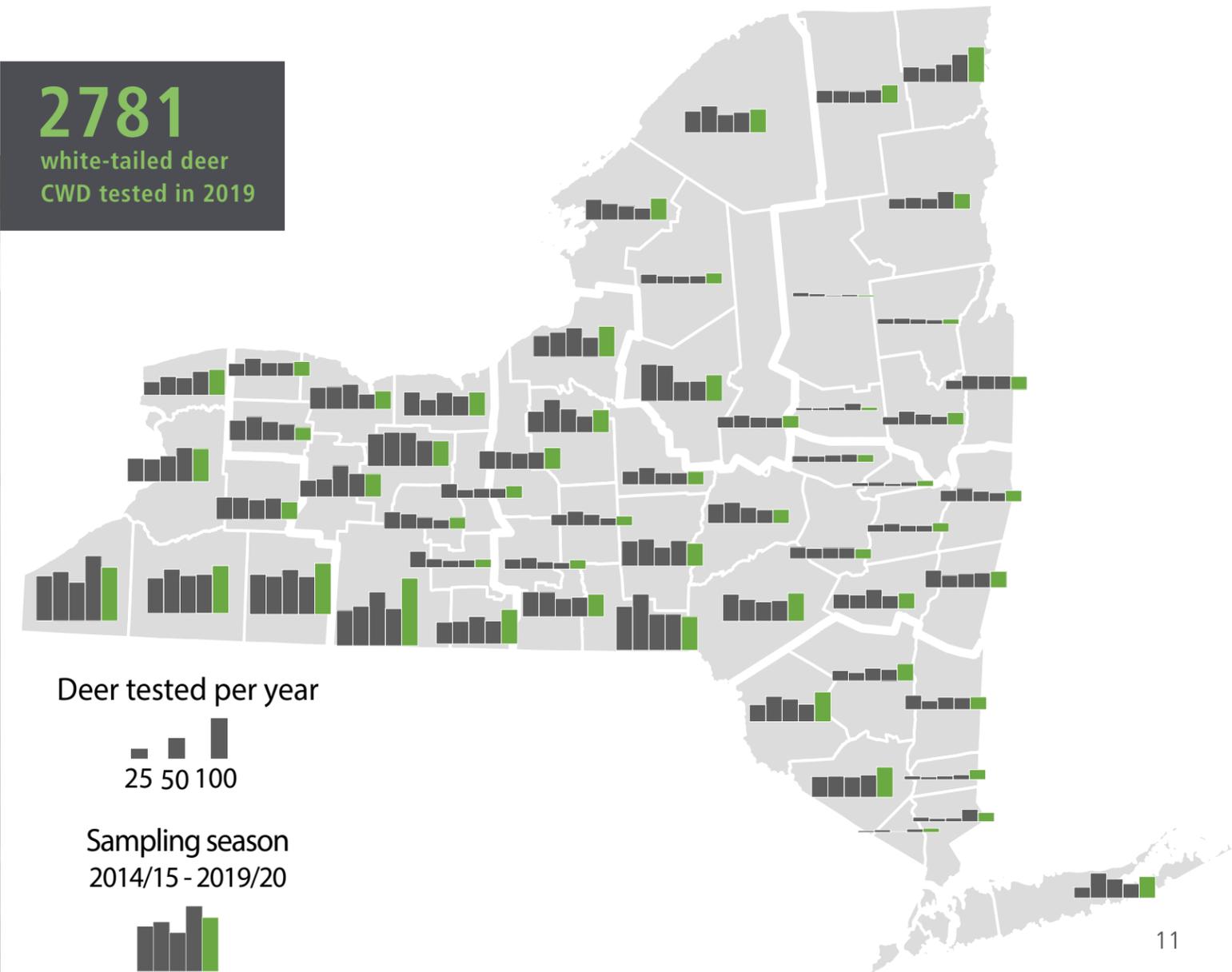


Left: Captive cervid testing kit, prepared to send out to facilities upon request by any NYDAMS field veterinarian

Below: Deer tested for CWD per year from 2014-2019



2781
white-tailed deer
CWD tested in 2019



Hands-On and Onsite Training

Research Scientist Ashley Ableman visited the Animal Health Diagnostic Center at Cornell in April 2019 and spent a week in the Anatomic Pathology department. Observing and participating in the intensive pathology teaching program at the College of Veterinary Medicine, Ashley was able to experience the hands-on diagnostic training vet students receive in necropsy.

Research Aide, Melissa Fadden, visited the University of Florida for a conference on Animal Crime Scenes in March, 2020. Melissa received firsthand experience mapping out a crime scene, using forensic equipment such as ground-penetrating radar, and practiced appropriate procedures and evidence collection methods that would stand up in criminal court.

Melissa also spent two days onsite at the Wildlife Health Unit in Delmar in August 2019 to observe the similarities and differences between their processes and those at Cornell. She received instruction in taking diagnostic radiographs, sodium rhodizonate lead testing for recovered bullet fragments, and cementum age determination in furbearing species.

USGS Climate Change Meeting

In January 2020, the U.S. Geological Survey hosted a multi-agency group to discuss issues related to climate change and wildlife health. This workgroup in Madison, WI identified key issues that will impact wildlife populations from climatic impacts. Following this meeting, a symposium was organized by The Wildlife Society's Wildlife Disease Working Group for their annual conference held virtually in September 2020.

Forensic Training

Ashley Ableman and Melissa Fadden both completed online graduate certificates in Wildlife Forensic Sciences and Conservation through the University of Florida, a 9-credit program that requires coursework in Wildlife Law, Policy, & Ethics, Forensic Science in Conservation Biology, and Wildlife Crime Scene Processing. This rigorous program gave them background information on contemporary illegal wildlife activities and the legislation that surrounds them, as well as skills to handle and interpret evidence in criminal wildlife cases.

eDNA Update and Field Training

CWHL PhD trainee Alyssa Wetterau presented a webinar to DEC biologists with updates on the progress of research into eDNA detection methods for monitoring both the viral pathogen Ranavirus and the occupancy status of herpetofauna of conservation concern identified by the DEC herp health team. She provided training in eDNA collection methods for biologists, discussed the growth of a "Herp DNA library" to aid in eDNA test development and validation, and presented results from three new eDNA tests made possible by this library and eDNA sample contributions from DEC biologists.



The Long Tailed Salamander (*Eurycea longicauda*) is one of the species targeted with eDNA testing. Photo by Brian Gratwicke. Attribution 2.0 Generic (CC BY 2.0)

Necropsy Wet Lab and Lecture

At SUNY-Environmental Science and Forestry, Krysten Schuler gave a guest lecture in Dr. Jacqui Frair's undergraduate wildlife management class on the topic of wildlife health. Afterwards, there was a wet lab where students were given the opportunity to conduct a necropsy on a variety of avian species, which introduced them to anatomy and sample collection.

Right:
SUNY-ESF student performing a necropsy during avian wet lab



Dr. Schuler discussing wildlife health and the importance of necropsy as a diagnostic tool in disease surveillance

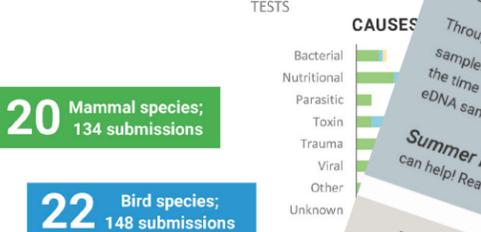
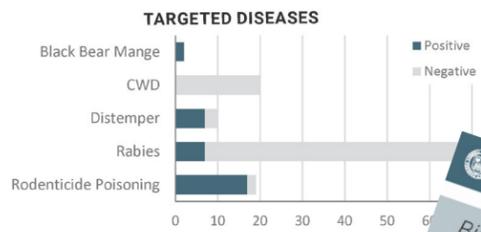
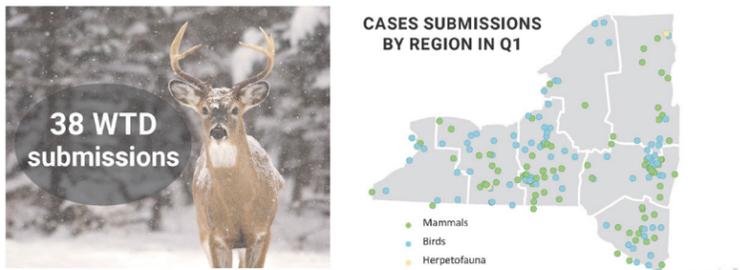
QUARTERLY UPDATES

Keeping Everyone Informed

With new quarterly reports, the DEC and public have current information on wildlife health available. With this information, you can follow what the WHP is working on and what biologists should keep an eye out for when in the field.

New York State Wildlife Health Program (WHP)

WHP QUARTERLY REPORT Q1 - 2019 (JANUARY-MARCH)



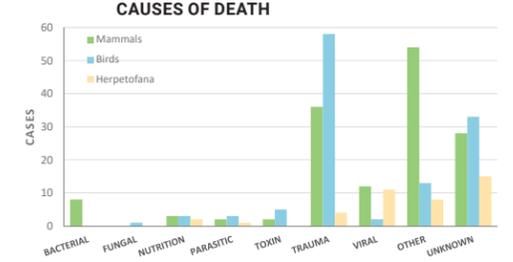
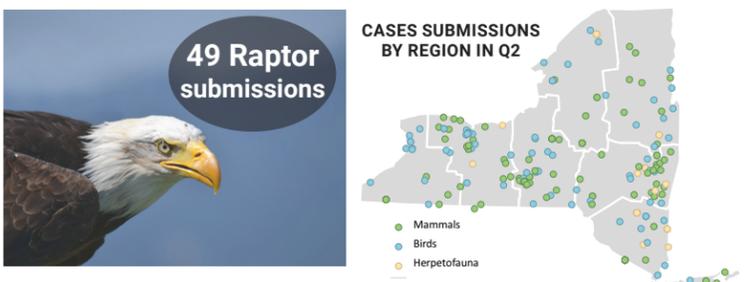
20 Mammal species; 134 submissions

22 Bird species; 148 submissions

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New York State Wildlife Health Program (WHP)

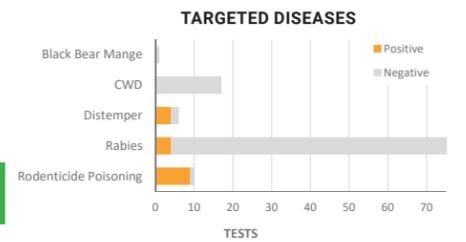
WHP QUARTERLY REPORT Q2 - 2019 (APRIL-JUNE)



95 Rabies tests 4 Positive

38 Bird species; 118 submissions

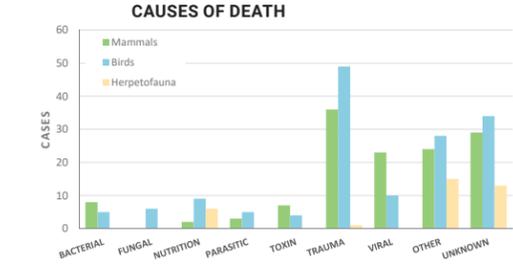
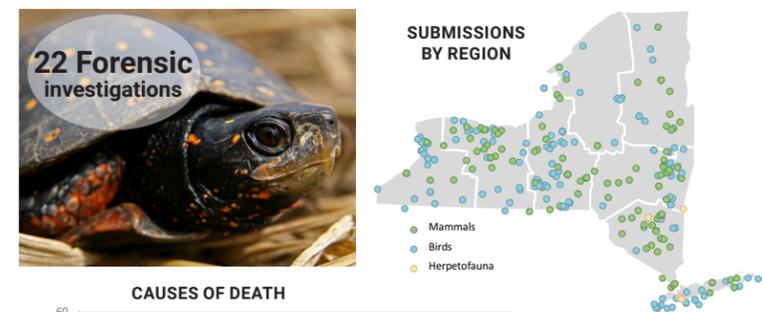
28 Mammal species; 145 submissions



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New York State Wildlife Health Program (WHP)

WHP QUARTERLY REPORT Q3 - 2019 (JULY-SEPTEMBER)



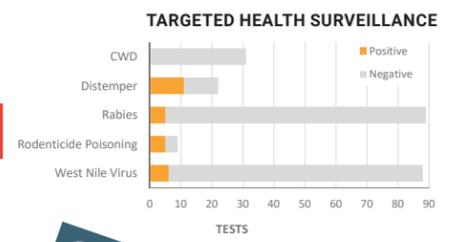
320 Total submissions

89 Rabies tests 5 Positive

40 Bird species 150 submissions

11 Herp species 38 submissions

31 Mammal species 132 submissions



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Bio Shout-Out!
Throughout the year the WHP has ongoing research projects and active disease surveillance & we need samples to do all that. We want to send out a big **THANK YOU** to all the biologists out there taking the time to collect valuable samples & send them our way! From coyote & deer samples to hellbender & eDNA samples - all efforts essential to safeguarding & improving wildlife health in NYS!

Summer is approaching! Looking for some student help in the field? We've got connections & we can help! Reach out to cwhl@cornell.edu for available students looking for field work & NYSDEC experience!

Program happenings in the field and in the lab

- Test development
 - Rodenticide coagulation test development in progress
 - Baal PCR in review
 - eDNA validation testing ramping up
- Fishers
 - Collaboration with SUNY ESF on reproductive study & future pregnancy testing
 - Furbearer Team and biologists sampling of livers for rodenticide research
- Wildlife Rehabilitation Online Database
 - In beta testing, available soon!

Under the scope...
Barred Owl (*Aves - Strigiformes, Strix varia*)
January through March resulted in a string of barred owl submissions (22 cases) - 45% were starved/emaciated and 14% showed high loads of *acanthocephalids* (thorny-headed worms) in the intestine, determined incidental but still under review.

Keeping you in the loop!

- Interested in getting the "WHP Weekly Case Reports?" Email us at cwhl@cornell.edu to get registered & keep up to date on all WHP cases! Access to the case reporting system is available to all DEC BOW staff.
- Check out the latest WHP disease watch alerts, Wildlife 411, or Lab news impacting wildlife health at cwhl.vet.cornell.edu.

Promoting the health and sustainability of wildlife populations through integration of wildlife ecology and veterinary medicine

Students & Field work!
Summer field work is a great time to educate the next generation of wildlife professionals on what really happens in the field - invaluable experiences to be had.

A BIG Thank You to all those that invited students to tag along to get that experience this summer! From goose banding to timber rattlesnake tracking, getting to see (and do) field work with experienced DEC staff is key to expanding student horizons!

Program happenings in the field and in the lab

- Trip to Capitol Hill
 - Dr. Krysten Schuler **testified** on Chronic Wasting Disease and the importance of prevention and response.
- Wildlife Health Program Survey
 - We want to THANK YOU for taking the time to give us your feedback!
- Available Apps for Wildlife Conservation
 - StablePOPd** - Stable Population Dynamics
 - StallPOPd** - Halting Population Growth
 - IsoPOPd** - Understanding Growth Rates
 - EaglePOPd** - Bald Eagle Population Dynamics

Under the scope...
(*Lithobates sylvaticus* and *Chelydra serpentina*)
Ranavirus (Frog Virus-3) outbreaks are most common in the spring and summer, resulting in high mortality. April thru June resulted in a run (10 cases) of ranavirus in wood frogs. The result that caused the most interest was a **suspect** case in a common snapping turtle, not previously reported affected until January of this year in Canada in [Diseases of Aquatic Organisms](http://DiseasesofAquaticOrganisms).

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Bald eagles and lead
We saw 25 bald eagle submissions in Q3 with 14 deaths caused by trauma and four by electrocution. Of the 25 submissions, 11 tested **positive for lead**. Lead poisoning remains a significant threat for bald eagle population health. With ongoing research on lead toxicosis and its impact on the population, we have produced a software app specifically for bald eagle population recovery, life history and population scale impacts of lead toxicosis. Check out EaglePOPd and get the facts on lead's impact.

Program happenings in the field and in the lab

- New head of Wildlife Health Program named
Kevin Hynes took over as new head of the WHP in September!
- Anticoagulant test development
Dr. Beth Bunting is working with the Cornell Coagulation Lab on new testing for rodenticide poisoning.
- Optimizing CWD Surveillance
Drs. Schuler, Hanley, and Nick Hollingshead are getting started with a multistate project to improve chronic wasting disease surveillance efficiency and effectiveness by combining cutting-edge modeling with state agency needs.

Under the scope...
Where's all the WNV?
We all know that WNV prevalence can vary greatly year-to-year, but this year was a definite anomaly with the lowest number of positive results since we began tracking WNV in 2013 - only **6** positive cases!

Predicting WNV?
We are working with epidemiologists at Cornell University to understand the connections between weather, climate change factors, vector population dynamics, and disease transmission cycles to improve our ability to predict WNV outbreaks.

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SCIENCE COMMUNICATION AND OUTREACH

Social Media at The Wildlife Society Meeting

At the 2019 NYS Chapter of The Wildlife Society meeting in Syracuse, Jennifer Peaslee and Krysten Schuler presented a poster on *Using Social Media as a Mechanism to Inform the Public on Wildlife Health and Human Impact*. This poster presented data on the power of social media to boost presence online and attract followers, along with tips on how wildlife organizations can begin using social media.

Using Social Media as a Mechanism to Inform the Public on Wildlife Health & Human Impact
 Jennifer L. Peaslee, jlp342@cornell.edu; Krysten Schuler PhD, ks833@cornell.edu; Department of Population Medicine and Diagnostic Sciences, Cornell Wildlife Health Lab, Animal Health Diagnostic Center, College of Veterinary Medicine, Cornell University

What can you do with Social media? Almost anything!
 Social media is changing the way people view and engage with the world. By embracing it, you can educate about wildlife health, conservation, or even human impact. **At the Cornell Wildlife Health Lab our main topics are:** research updates, wildlife disease alerts, personal protection tips, and human-wildlife interactions

What do you want? Their attention!
 Grab the audience's attention with a fantastic image or video. Field photos can be hit or miss – think about some professional photo services like Shutterstock or BigStock.

Which one will grab your audience's attention?
 When picking images, think about whether your field photo of an adult bald eagle (below left) would get more views than this image of a juvenile bald eagle in flight by Shutterstock.

Be Visually Stimulating!

Generate "buzz"

From Field Work to Lab Work – Real life gets noticed, just choose wisely!

Left: Will this field pic draw them in? Maybe not – all that snow, what will catch the eye?

Above: Will this lab photo draw users to your research page? Maybe – that smile is pretty fabulous!

Our website visits increased by 84% after a popular tweet

Easy Tips to start your Social media experience!

- Start small – one account at a time
- Great photos grab users attention
- Get permission to use the image
- Start a conversation
- Engage your whole team
- #Hashtag use – try to diversify

Pick your audience

The power of a good, short video clip

Instead of "Slow Down and Save a Turtle," try a 15 second video of a snapping turtle in nesting season as a PSA!

Table of Website Metrics:

Sessions	Users	Pageviews	Pages / Session	Avg. Session Duration	Bounce Rate
49 094	43 191	62 859	1.28	00:53	76.48%

The CWHL published over **50** articles in 2019, including news reports, disease alerts, Lab Bites, wildlife 411s, and newsletter emails. Our social media accounts have been an essential tool in expanding our public outreach and education efforts. By tracking website visits following targeted postings, we can see the link between social media posts and website traffic. In 2019 our Twitter program grew from 107 to almost 400 followers and Instagram increased from 281 to over 600 followers. Both of these outlets continue growing and have proven to be important factors in our public outreach efforts.



COVID-19 PSA's

Working with the Cornell University Master's in Public Health program, the CWHL put out a number of tweets and Instagram posts to inform the public on the importance of social distancing and sheltering in place, washing your hands, and flattening the curve during the COVID pandemic.

Cornell Wildlife Health Lab
 @Cornell_CWHL

Social distancing is tough, but if this prairie dog can do it, so can you! **#Asymptomatic** spread is real & you can help protect yourself & your community from **#COVID19** by playing it safe; isolate, watch some trash TV, dig into the science, stay connected!
bit.ly/2wmbDvq



5:36 PM · Mar 19, 2020 · Twitter Web App

cornell_cwhl

55 likes
 cornell_cwhl The simplest precautionary measure to take against the spread of #covid19 is to wash those paws of yours! Do it often, do it as soon as you arrive home, do it even... more
 View 1 comment
 March 20, 2020

Outreach Networking at Cornell

With thousands of Cornell alumni on campus for the annual 2019 Reunion event, WHP staff joined the Janet L. Swanson Wildlife Hospital with a display of educational materials including skulls from unique and interesting cases and updates on research involving wildlife in New York.

Left: Melissa Fadden discussing the Wildlife Health Program, disease surveillance, and ongoing research at Cornell Reunion 2019.



Modeling Parasitic Disease and Population Declines in the New York Moose Population

Recent moose abundance estimates in New York project a population at significantly lower density than populations in neighboring states. To investigate potential causes for these observed dynamics, we initiated a multi-institutional project, in collaboration with NYSDEC and SUNY ESF, investigating parasitic disease, namely brain worm (*Parelaphostrongylus tenuis*) and liver fluke (*Fasciola hepatica*), as a cause of observed moose population dynamics in the Adirondack Park of New York.

We hypothesized that mortalities of young adults by lethal parasites have influenced population dynamics of moose in the Adirondacks. We incorporated moose necropsy data and demographic characteristics of the life cycle of cow and bull moose into a population matrix model to determine whether mortalities from the aforementioned lethal parasites have impacted the annual survival of moose.

Specifically, we modeled theoretical populations that exist in the absence of these parasites by returning resultant mortalities back into the population in the year of the individual's death to determine whether parasitic disease has decreased population recruitment. Based on the analysis, parasitic disease, particularly brain worm, has significantly decreased annual survival of juvenile bull moose, which may impact *in situ* population recruitment. We expect to submit a manuscript for publication early next year.



SOP4CWD Project Start Up

Surveillance Optimization Project for Chronic Wasting Disease ("SOP4CWD")

In 2019, the CWHL embarked on an ambitious regional approach for state and provincial wildlife agencies to conduct surveillance for CWD, which requires considerable logistic and financial resources. The goal is to have a standardized system for data collection and model-informed output for wildlife managers to most efficiently and effectively test white-tailed deer across the eastern U.S.

Initial support was provided by DEC and grant funding through the Michigan Department of Natural Resources to develop these products, and additional states have joined the project. Currently, 14 state and provincial wildlife agencies are participating with collaboration involving scientific researchers from three academic institutions (plus CWHL) and two federal government agencies. By bringing together modelers with state agency biologists, veterinarians, and administrators, we identified 10 different components of the project that will inform and improve surveillance efforts.

Phase 1 of the project is focused on the development of a cooperative regional data sharing network and the modeling of data across jurisdictional boundaries.

Phase 2 will create an online "Dashboard" to display modeling results in a user-friendly online fashion.

Phase 3 will develop a "Data Warehouse" to store and share state data among researchers and agencies.

Phase 4 will automate analyses through the development of a "Computational Pipeline".

The project commenced in summer 2019 and will continue through summer 2022. We are coordinating with other complementary efforts lead by other researchers and organizations, such as the CWD Alliance, so as to streamline efforts around CWD surveillance, management, communication, and reporting.



POLICY SUPPORT

The NYS WHP provides support on any wildlife health topic, not just limited to disease outbreaks. We routinely review research permit requests, management plans and project proposals to see where we can assist staff in working safely with wildlife, and reduce any potential health impact on species.

Wildlife Health Team Meetings

The Wildlife Health Team assists the program with regional communications and work planning. Health program staff routinely attend other specialty team meetings to keep informed about field projects and provide disease and research updates.

Members of the Wildlife Health Program attended team meetings on:

- Strategic Planning 2022-2026
- Spring/Fall HERP
- Spring/Fall Bird and Mammal Diversity
- Migratory Game Bird
- Bird Banding Workshops
- Mute Swans
- Hunter Education
- Land Management and Habitat Conservation
- NYS TWS meeting in Syracuse

CWHL students learning bird handling at a DEC Canada goose round-up



2019 NYSDEC Bureau Of Wildlife



Satisfaction Survey with the Wildlife Health Program (WHP)

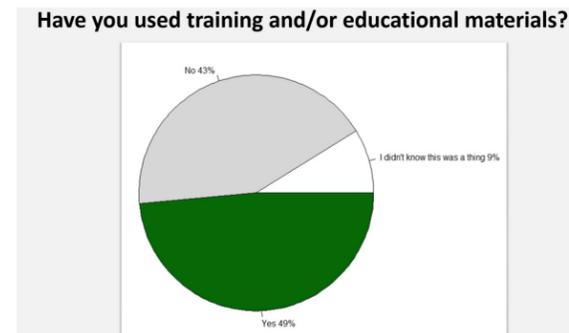
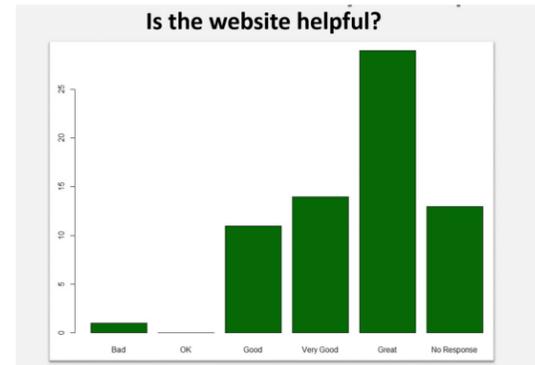
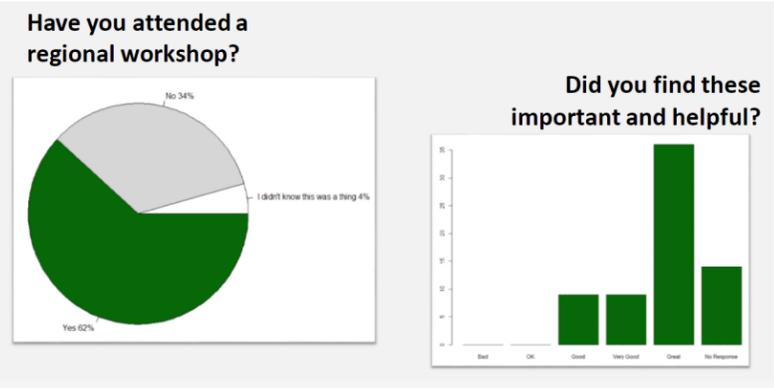
Questions formulated by **Krysten Schuler**
 Survey constructed by **Jennifer Peaslee**
 Disseminated to BOW by **Kevin Hynes**
 Summarized by **Brenda Hanley**

The majority of the respondents stated that they viewed the WHP favorably. Most respondents gave high marks to WHP services, such as the online submission forms and turn-around time of cases, the availability of WHP staff for consultation, case reports, weekly updates, training materials, and the special topic workshops. The survey further provided suggestions for improvement in communications, such as the follow-up of case diagnoses, even when an animal in question has been found to be negative for the suspected disease.

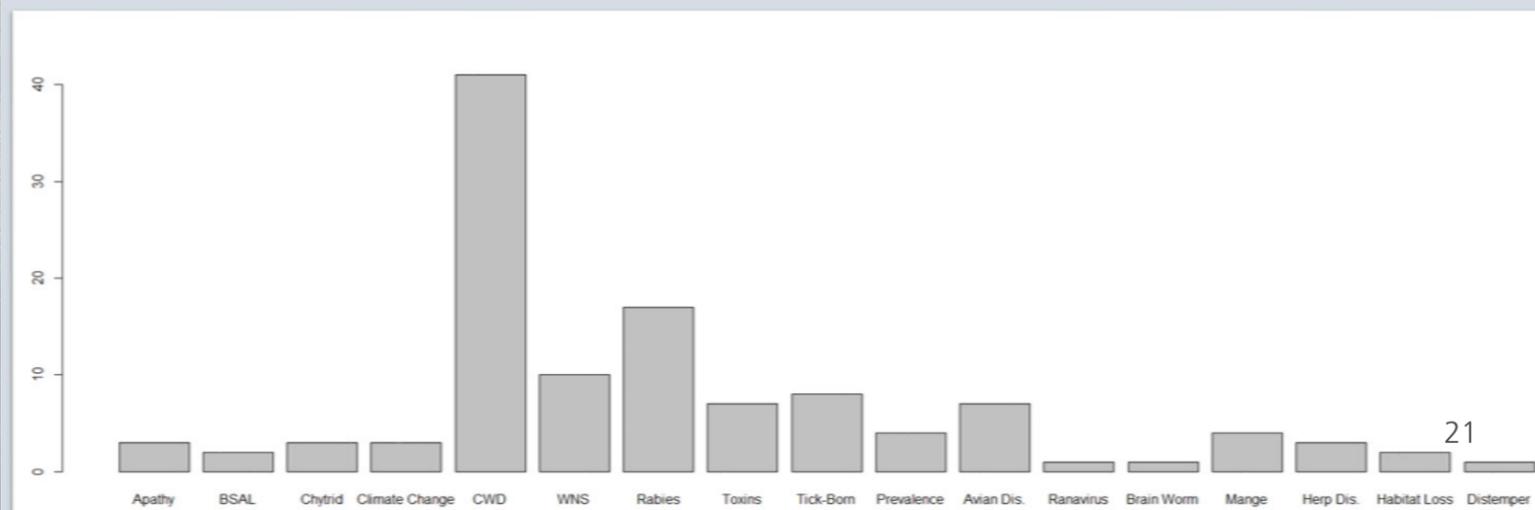
Survey results depicting regional workshop importance and effectiveness, training, website and what wildlife health issues are concerning in NYS

Wildlife Health Program Survey

The WHP survey was created to gather feedback on the program from the regional and central office DEC staff to identify areas of success and those in need of improvement. The survey was returned by 68 respondents representing all regions and all levels of experience in DEC.



What is the most significant wildlife health issue facing NYS?



Avian Cholera (*Pasteurella multocida*) Outbreak at Reynolds Game Farm

In April 2019, the DEC Reynolds game farm experienced higher than normal mortality in a Chinese ring-necked pheasant flock of 3,000. Representative specimens were sent in for necropsy at the AHDC. Gross, histological and bacteriological results indicated a final diagnosis of *Pasteurella multocida*, a bacteria that causes avian cholera. On-site investigations revealed the presence of a high population of rodents on the farm. Rodents are carriers of *P. multocida* and aid in transmission of the disease.

Within a week, the flock was down to 2,400 (20% mortality). We treated the flock with a tetracycline product and assessed antibiotic sensitivity. Biosecurity measures (i.e., rodent control, collecting carcasses, and cleaning and disinfecting feeders and waterers) were put in place to stop the disease from spreading. A Manchurian pheasant breeder flock was close to the affected flock.

The affected flock was depopulated by DEC in cooperation with New York State Agriculture & Markets and the USDA office in Albany. Depopulation of 2,100 birds was carried out almost five weeks after the first case. Birds were composted with the assistance of Cornell's Mortality Management program.



Jarra Jagne, DVM, is an international expert in poultry health and served as a subject matter expert in this outbreak. As a result, Dr. Jagne joined the NYS Wildlife Health Program as a consultant to provide veterinary services to DEC Reynolds Farm, which will include four routine site visits a year, support for quality assurance, and coverage for outbreaks.

In 2020, another outbreak of avian cholera occurred at the farm because birds were placed in the same pen that had the outbreak last year despite mitigation measures (i.e., the use of lime on the grounds as a disinfectant and a resting period of 9 months). We were ready this year with quick diagnostic results and a treatment regime, but again the decision was made to depopulate. In addition, we also diagnosed *E.coli* in chicks and gapeworm in adult birds. Both infections were treated quickly and successfully. Due to COVID-19 restrictions, routine site visits were not possible, but we did work on a hatchery sanitation monitoring program to detect bacterial concentration in hatchery incubators, hatchers, and the area around the machines.

Above:
Flock of pheasants infected with *Pasteurella multocida*

Left:
Racks of pheasant eggs prepared for incubation



The scope of the wildlife health team encompasses all wildlife health related issues involving Bureau of Wildlife programs and responsibilities.

The Wildlife Health Program incorporates the One Health concept, which fosters collaboration among multiple disciplines involving health of humans, domestic animals, and ecosystems. Other specialists from the academic community, Departments of Health and Agriculture & Markets, and federal agencies may participate or provide information as needed.

Joint Team Meetings Hosted at Cornell

Cornell Wildlife Health Lab hosted a joint meeting of the Bird and Mammal Diversity Team and the Herp Team for a three-day session. This included break outs specific to each group on project updates/future plans and associated funding, as well as topics shared between the two, such as updates from Central office, and discussion on proposed species listing changes.

Joint Bird and Mammal Diversity Team and Herp Team Meeting Cornell University

March 3rd – 5th, 2020

HERP Team - items green, BMD Team - items orange, Both - joint meeting items blue

Tuesday, March 3rd

- 12:30 pm Arrive and introductions
- 12:40 pm Discussion of herp team project plans:
 - Money spent
 - Funds needed for additional work
 - Money swap
 - Wood turtle CSWG
 - Spotted/Wood/Box turtle amendment?
- 4:30 pm Adjourn

Wednesday, March 4th

- 8:30 am eDNA (Alyssa)
- 9:15 am Hellbender project (Beth)
- 10:00 am Break
- 10:15 am Other herp topics:
 - snake fungal disease discussion
 - review proposed herp listing changes if needed
 - co-chair situation
 - etc.
- 10:00 am Arrive, introductions, and update team list
- 10:15 am Species updates and plans for upcoming field work
 - marsh birds
 - grassland birds
 - colonial waterbirds
 - winter raptors
 - etc.
- 12:30 pm Lunch
- 1:00 pm Julie Hart BBA training and discussion (We assume Herp Team members are also interested)
- 3:00 pm Animal Health Diagnostic Center lab tour/Comparative anatomy lab with a pathologist (2 groups)
- 4:00 pm Break
- 4:10 pm Albany updates and introduce discussion on species listing (Dan and Joe)
- 5:30 pm Adjourn

Thursday, March 5th

- 8:00 am Wildlife population dynamics and planning for reintroductions (Brenda)
- 8:45 am Why wildlife health is important (Krysten)
- 9:15 am Continued discussion, including species listing discussions, review to-do items
- 8:45 am Species listing discussions
- 10:15 am Break
- 10:30 am Project review and wind/solar update and discussion, including updates on recent rulings
- 11:30 am Raptor monitoring (Bald eagle, Peregrine, forest raptors), other raptor topics?
- 12:30 pm Adjourn (if not sooner)/Lunch
- 1:00 pm NLEB, mammal project, NEC, E. whip poor will analysis and monitoring
- 3:00 pm Review to-do items
- 3:15 pm Adjourn

WILDLIFE HEALTH TEAM MARCH 2019-CURRENT

DEC Personnel

Region 1	Leslie Lupo
Region 2	Sandy Chan
Region 3	Giovanni Pambianchi
Region 4	Karl Parker
Region 5	Tim Watson
Region 6	Joe Lydon
Region 7	Tom Bell
Region 8	Jenny Landry
Region 9	Ryan Rockefeller

WHP Personnel

WHU	Kevin Hynes
Cornell	Krysten Schuler
Cornell	Beth Bunting
BMT Liaison Central Office	Kevin Hynes
DLE Liason	Major Matthew Revenaugh
BMT Liaison (Regional)	Sandy Chan

ANNUAL WORK PLAN FY 2019-2020 REVIEW

Administrative

Annual Wildlife Health program report	Completed
Biannual wildlife health program review (Central Office or Cornell)	Completed
Wildlife Resources Center (WRC) infrastructure, equipment management and maintenance	Completed
WRC incinerator operation, lab maintenance, facility maintenance and grounds	Completed
Administration: budgeting, fiscal, personnel, T&A, LATS, FMIS	Completed

Policy Support

Summary and analysis of SLU data for wildlife disease risk assessment (captive cervids, taxi/processors, NWCO, Game Birds, Shooting Preserves reports)	In progress
Wildlife rehabilitation web-based data management and reporting system	In progress
Converting SLU to electronic reporting system for select licenses (NWCO, Game Bird)	In progress
Wildlife rehabilitation procedures evaluation	In progress
Participate in wildlife health related meetings IRC, CWD, BOW, Wildlife Health and other meetings	Completed
Providing scientific/medical wildlife health consultation (public, staff, One Health partners, regulatory, research projects, SLU licenses, etc.)	Completed
Wildlife health and wildlife rehabilitators listserv maintenance	Completed

Health and Disease Surveillance

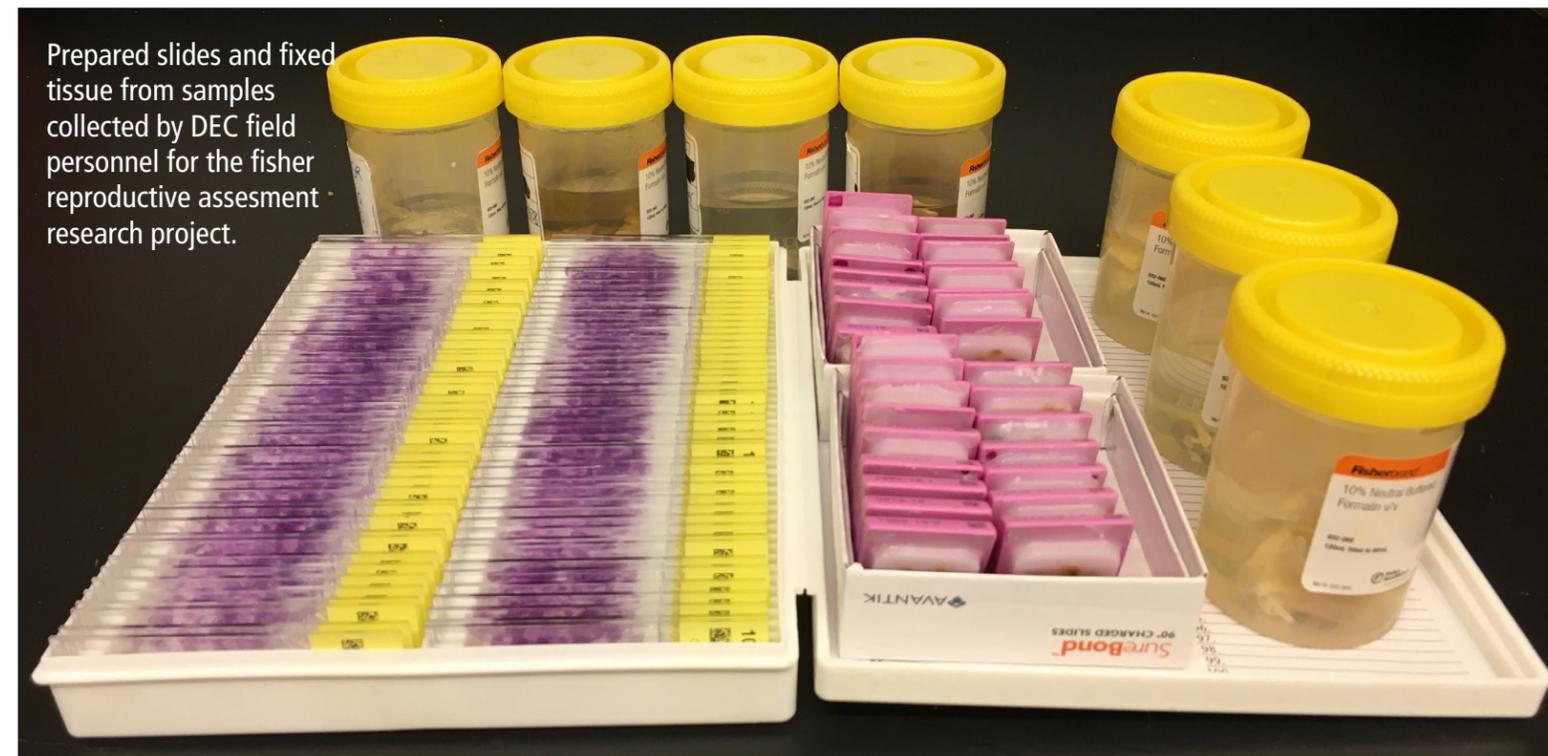
Migrating to new CWHC case database (WHIP)	Completed
Annual CWD surveillance (sample collection, Taxidermy Partnership Program, reporting)	Completed
Chemical Immobilization Protocol	Completed
Wildlife rehabilitation 2012-2014 evaluation (publication)	Nearing completion
Case management and reporting: Wildlife necropsies (>1000/yr)	Completed
Participate with Northeast Wildlife Disease Cooperative as a partner	Completed

Disease Prevention and Response

Update CWD Surveillance Plan	In progress
Implement CWD Risk Minimization Plan action items	Completed
Summary and analysis of SLU data for wildlife disease risk assessment (NWCO, Game Bird reports)	In progress
Moose population health assessment (publication)	Nearing completion

Training, Teaching and Outreach

Summary and analysis of SLU data for wildlife disease risk assessment (captive cervids, taxi/processors, NWCO, Game Birds, Shooting Preserves reports)	On hold
Wildlife rehabilitation web-based data management and reporting system	Completed
Converting SLU to electronic reporting system for select licenses (NWCO, Game Bird)	Completed
Wildlife rehabilitation procedures evaluation	Completed
Participate in wildlife health related meetings IRC, CWD, BOW, Wildlife Health and other meetings	Completed
Providing scientific/medical wildlife health consultation (public, staff, One Health partners, regulatory, research projects, SLU licenses, etc.)	Completed
Wildlife health and wildlife rehabilitators listserv maintenance	Completed
Forensic services for DLE	Completed



Prepared slides and fixed tissue from samples collected by DEC field personnel for the fisher reproductive assessment research project.

Research

Fisher project - reproductive assessment	In progress
Fisher project - rodenticide testing	In progress
Bobcat cytauxzoon study	Nearing completion
Development of eDNA tools for amphibian and virus detection (yr 5)	In progress
Complete tissue archive system	Completed
Bear mange statewide surveillance (publication)	Nearing completion
<i>P. tenuis</i> study (publication)	Nearing completion

PUBLICATIONS, PRESENTATIONS AND GRANTS

Publications

Abbott, R.C., Saindon L., Falendysz, E.A., Greenberg, L., Orciari, L., Satheshkumar, P.S., Roche, T.E. 2020. Rabies outbreak in captive big brown bats (*Eptesicus fuscus*) used in a white-nose syndrome vaccine trial. *Journal of Wildlife Diseases* 56:197-202.

Ableman, A., K. Hynes, K. Schuler, and A. Martin. 2019. Partnering with taxidermists for improved chronic wasting disease surveillance. *Animals* 9(1113) DOI:10.3390/ani9121113

Hanley, B., Dhondt, A., Dennis, B., and Schuler, K. 2019. Using time series data to assess recent population dynamics of Bald Eagles in the Northeast United States. *Ecosphere*, 10.1002/ecs2.2963.

Hanley, B., Connelly, P., and Dennis, B. 2019. Another look at the eigenvalues of wildlife population matrix models. *PeerJ*, 7:e8018 <https://doi.org/10.7717/peerj.8018>

Shields, T., Currylow, A., **Hanley, B.**, Boland, S., Boarman, W., and Vaughn, M. 2019. Novel management tools for subsidized avian predators: a case study in the conservation of a threatened species. *Ecosphere*, (10):e02895. 10.1002/ecs2.2895

Hanley, B., Bunting, E., and Schuler, K. 2019. How can we augment the few that remain? Using stable population dynamics to aid reintroduction planning for an iteroparous species. *PeerJ*, 7:e6873

Hanley, B., Dennis, B. 2019. Analytical expressions for the eigenvalues, demographic quantities, and extinction criteria arising from a three-stage wildlife population matrix. *Natural Resource Modeling*, 32:2.

Balik, S., **Bunting, E.M.**, E. Dubovi, R. Renshaw, S. Childs-Sanford. Detection of an adenovirus in two North American porcupines (*Erethizon dorsatum*) with respiratory disease. *Journal of Zoo and Wildlife Medicine*. December 2019 Online

Forzán, M., R. Renshaw, E. Bunting, E. Buckles, J. Okoniewski, K. Hynes, R. Melendez, A. Ableman, M. Laverack, M. Fadden, A. Dastjerdi, K. Schuler, and E. Dubovi. 2019. Novel orthoreovirus associated with epizootic necrotizing enteritis and splenic necrosis in American crows, *Corvus brachyrhynchos*. *Journal of Wildlife Diseases* 55(4):812-822. DOI:10.7589/2019-01-015.

Needle, D., V. Burnell, **M. Forzán**, E. Dubovi, **K. Schuler**, C. Bernier, **N. Hollingshead**, J. Ellis, B. Stevens, P. Tate, E. Anis, and R. Wilkes. 2019. Infection of eight mesocarnivores in New Hampshire and Vermont with a divergent clade of canine distemper in 2016-2017. *Journal of Wildlife Diseases*. DOI: 10.1177/1040638719847510.

Presentations

Schuler, K., N. Hollingshead, S. Heerkens, J. Kelly, **K. Hynes**, C. Yoest, **J. Hurst**, D. Smith, E. Collins, R. Applegate, **E. Bunting**, D. Grove, and **P. Martin**. "Weighted Risk-Based Surveillance for Chronic Wasting Disease: A Tale of Two States." Joint Conference of The Wildlife Society & American Fisheries Society, Reno, NV. 2019

Schuler, K., K. Hynes, S. Tabor, N. Dean, N. Schoch, E. Dubovi, E. Behling-Kelly, and **J. Hurst**. "New York's Adirondack moose population health metrics." North American Moose Conference, Sugarloaf, ME. 2019

Kretzler, H., W. Siemer, T.B. Lauber, K. McComas, M. Verant, **K. Schuler**, and **C. Herzog**. "Predictors of Bat Conservation Intentions: Implications for Communicators." Pathways: Human Dimensions of Wildlife. Fort Collins, CO. 2019

Hanley, B. "The population scale impacts of Pb toxicosis in Bald Eagle in the NE, US and in NY, US." New York State Department of Environmental Conservation (NYSDEC) Meeting. Virtual. 2020

Hanley, B. "The population dynamics of Bobcats in New York." Furbearer team meeting at the New York State Department of Environmental Conservation (NYSDEC). Virtual. 2020

Hanley, B. "The population scale impacts of Pb toxicosis in Bald Eagle." The Ecological Society of America (ESA) national conference. Virtual. 2020

Hanley, B. "Combinatorial optimization algorithm for estimating parameters of Bald Eagles." Herpetology and Bird & Mammal Diversity Working Group at the New York State Department of Environmental Conservation, Ithaca, NY. 2020

Hanley, B. "How do we augment the few that remain?" Herpetology and Bird & Mammal Diversity Working Group at the New York State Department of Environmental Conservation, Ithaca, NY. 2020

Hanley, B. "Novel management tools for subsidized avian predators and a case study in the conservation of a threatened species." Bird Damage Management Conference. Salt Lake City, UT. 2020

Hanley, B. "Combinatorial optimization algorithm for a population matrix model." 60-min. webinar to faculty at the State University of NY. 2020

Hanley, B. "Wildlife Health Program Satisfaction Survey." New York State Wildlife Health Program meeting. Cornell University, Ithaca, NY. 2020

Hynes, K., Ableman, A. "Wildlife Health Unit tour and wildlife necropsy demonstration." SUNY Cobleskill Animal Pathology class. October 2019

Hynes, K. "Wildlife diseases in NY, CWD, and proper PPE use." ECO Training Academy, Pulaski. October 2019

Hynes, K. "Introduction to joint NYSDEC/Cornell Wildlife Health Program and Epidemiology of Chronic Wasting Disease." Special Session for Veterinarians 39th Annual NYS Wildlife Rehabilitation Council Seminar, Troy. November 2019.

Hynes K. Featured in "NYSDEC On the Front Lines" Staff Profile. NYSDEC Website. <https://www.dec.ny.gov/press/119168.html> and <https://www.youtube.com/watch?v=o5ECFLG2Ewl> November 2019.

Hynes, K, Ableman, A. "Epidemiology of rabies and wildlife decapitation technique." Nassau County Health Department Staff. January 2020.

Hynes, K. "Wildlife Disease, Wildlife handling, PPE, animal welfare, and field euthanasia techniques." NYSDEC Animal Response Team. January 2020.

Hynes, K. "NYSDEC Wildlife Health Program and Epidemiology of CWD." Albany Pine Bush Preserve Science Lecture Series. February 2020.

Kaganer, A. W. Ranavirus and Herpetofauna Host Environmental DNA: 2020 project updates. New York State Department of Environmental Conservation Webinar. Mar 2020.

Kaganer, A. W., R. J. Ossiboff, N. I. Keith, **E. M. Bunting**, and B. Gratwicke. "Efficacy and Impacts of *Batrachochytrium dendrobatidis* vaccination on Eastern Hellbender Salamanders (*Cryptobranchus alleganiensis alleganiensis*)." Arizona State Amphibian Pathogens Meeting. Tempe, AZ. Nov. 2019;

Kaganer, A. W., **E. M. Bunting**, and M. P. Hare. "Cutting-edge Approaches for Viral Pathogen Surveillance and Genetic Analysis in North American Vernal Pools". American Fisheries Society & The Wildlife Society Joint Annual Conference. Ecology and Conservation of Herptiles II. Reno, NV. Oct. 2019

Posters

Bunting, E., M. Fadden*, M. Hanson, N. Hollingshead, K. Schuler, W. Siemer, **P. Martin**. "Wildlife Rehabilitator Data as an Additional Herpetological Health and Monitoring Information Source." Northeast Partners in Amphibian and Reptile Conservation. Galloway, NJ. July 2019

Peaslee, J.* and K. Schuler. "Using Social Media as a Mechanism to Inform the Public on Wildlife Health and Human Impact." The New York Chapter of The Wildlife Society. Fayetteville, NY. February 2020.

Grants

Bunting, E. New York State Department of Environmental Conservation Wildlife Health Program, Reynolds Game Farm. Veterinary Services. \$10,000, 1 year.

Childs-Sanford, S., Espinheira, F., Radcliffe, R., **Bunting, E.** and Huson, H. Post Release Survival Success of One Eyed Great Horned Owls. Sarah K. deCoizart Perpetual Charitable Trust. \$60,000. 1 year.

Schuler, K., D. Williams, S. Christensen, A. Belsare, W.D. Walter, D. Walsh, C. Jennelle, and **B. Hanley**. 2020. SOP4CWD Dashboard: A Web Application for Disease Visualization and Data-Driven Decisions. Multistate Conservation Grant Program. \$244,946, 1 yr. *In review*.

Schuler, K., D. Williams, S. Christensen, A. Belsare, W.D. Walter, D. Walsh, C. Jennelle, and **B. Hanley**. 2020. Surveillance Optimization Project for Chronic Wasting Disease: Streamlining a Web Application for Disease Visualization and Data-Driven Decisions. Michigan Department of Natural Resources and Michigan State University Wildlife Disease Initiative. \$243,285, 3 yrs.

Christensen, S., **K. Schuler**, N. Pinizzotto, and D. Ortega. 2020. CWD Show and Tell: Gauging Hunters' Willingness to Adopt Management Practices. Michigan Department of Natural Resources and Michigan State University Wildlife Disease Initiative. \$70,833. 1 yr.

Walsh, D., S. Christensen, J. Cook, T. Harms, T. Hefley, C. Jennelle, J. Marten, J. Mawdsley, E. Michel, D. O'Brien, **K. Schuler**, D. Storm, W. D. Walter. 2020. Pulling on the Same End of the Rope: Developing a Regional CWD Adaptive Management Framework. Michigan Department of Natural Resources and Michigan State University Wildlife Disease Initiative. \$114,381. 2 yrs.

Schuler, K. 2020. Modeling Risk of Infection for Individually Harvested Deer & Estimating Prevalence When Sampling is Limited. Tennessee Wildlife Resource Agency. \$22,504; 1 yr.

Walter, W.D. and **K. Schuler**. 2020. Linking Genetics to Movements of White-Tailed Deer to Assist Surveillance for Chronic Wasting Disease. U.S. Geological Survey, \$199,256, 2 yrs.

Software Applications

Hanley, B., Dhondt, A., and **Schuler, K.** 2020. BandingPOPd. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/1n7f-xs53>

Hanley, B., Dhondt, A., **Bunting, E.**, Pokras, M., **Hynes, K.**, **Forzán, M.**, and **Schuler, K.** 2019. ClosedDensiPOPd Web Interactive. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/n2x8-6p10>

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Hanley, B., Dhondt, A., **Bunting, E.**, Pokras, M., **Hynes, K.**, **Forzán, M.**, and **Schuler, K.** 2019. ClosedCounterPOPd Web Interactive. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/q4t7-1y54>

Hanley, B., Dhondt, A., **Bunting, E.**, Pokras, M., **Hynes, K.**, **Forzán, M.**, and **Schuler, K.** 2019. DensiPOPd Web Interactive. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/6yb8-5c25>

Hanley, B., Dhondt, A., **Bunting, E.**, Pokras, M., **Hynes, K.**, **Forzán, M.**, and **Schuler, K.** 2019. CounterPOPd Web Interactive. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/0v1k-wq39>

Hanley, B., Dhondt, A. A., Dennis, B. and **Schuler, K.** 2019. EaglePOPd Web Interactive. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/q4m1-se95>

Hanley, B., Dennis, B., Kramer, D., and **Schuler, K.** 2019. OptiPOPd. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/a416-v747>

Hanley, B., Connelly, P., and Dennis, B. 2019. IsoPOPd. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/bcmg-7w08>.

Hanley, B., Connelly, P., and Dennis, B. 2019. IsoPOPdAnnualEagle. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/0qcp-6f27>.

Shields, T. Currylow, A., **Hanley, B.**, Boland, S., Boarman, W. and Vaughn, M. 2019. StallPOPd. Cornell University Library eCommons Repository. <https://doi.org/10.7298/sk2e-0c38>.

Hanley, B., Bunting, E., and Schuler, K. 2019. StaPOPd Web Interactive Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/d9hg-wa84>.



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