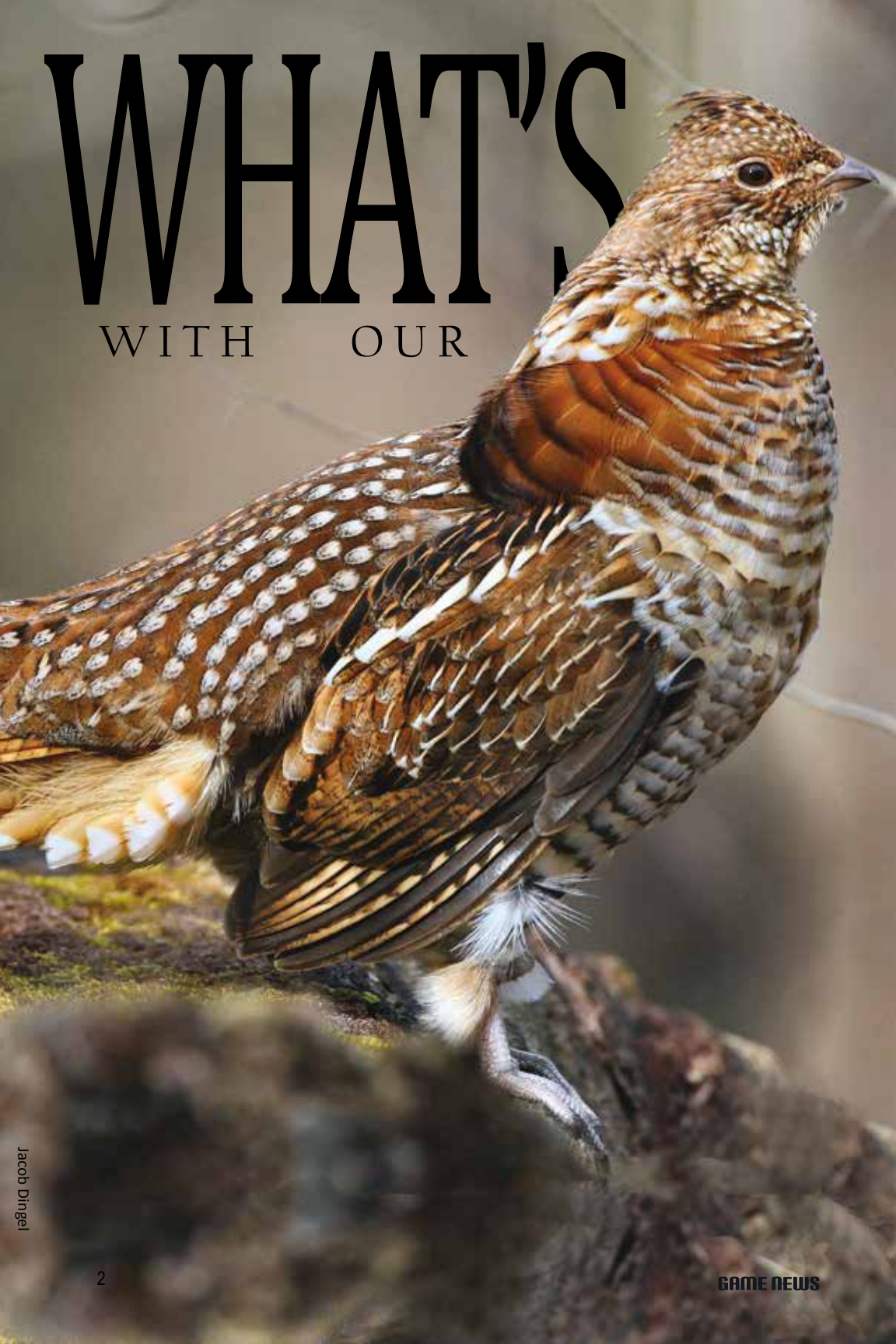
WHAT'S

WITH OUR



Jacob Dingel

WRONG RUFFED GROUSE?

By Lisa Williams
Game Commission Game Birds Biologist

I COULD HEAR THE CONCERN in the caller's voice.

"Are you the new grouse biologist?" he asked in 2011. "I'd like to report something from my grouse-hunting experience. I really hope I'm the only one seeing this . . . but grouse have disappeared from the areas I hunt in Sullivan County."

Unfortunately, this gentleman was not alone in his concern. Not at all. His worried voice joined a chorus of hunters responding by phone, e-mail or handwritten letter. Their reports all indicated grouse numbers had taken a dramatic turn for the worse in the early 2000s.

As the new Game Commission grouse biologist, I listened closely and took careful notes. Then I wondered. Pennsylvania still had plenty of grouse. It still was a grouse-hunting destination. Could our state bird really be in the kind of trouble that had longtime hunters so concerned?

While hunters listen to their gut, scientists follow a rigorous process – the scientific method – to answer complex questions. Readers might remember the method's steps from high school: 1.) Identify a question; 2.) Gather information; 3.) Develop a hypothesis; 4.) Test the hypothesis; 5.) Analyze the results; 6.) Identify conclusions and implications, and 7.) Communicate the findings.

Hunters had completed the first step by identifying the question: "What's happening to our grouse?" Clearly, if I wanted to provide an answer, it was time to view our ruffed grouse through the lens of the scientific method.

VERIFIED DECLINE

I first looked at the facts. Did the population numbers reflect what hunters observed? Each year, hundreds of cooperating grouse hunters keep diaries for the Game Commission, recording from each hunt the date, county, hours hunted, and grouse flushed and bagged. So my first stop in untangling the missing grouse mystery was to look at changes in cooperator flushes per hour.

Sure enough, grouse populations exhibited a steep decline in the early 2000s. Grouse are notorious for having boom-and-bust population cycles, with sharp declines occurring periodically. So the population bust of 2001 to 2004 was not necessarily alarming in its own right.

WEST NILE VIRUS' DEADLY IMPACTS

Author Lisa Williams, above, and agency biologist Tom Keller, upper right, visit a Somerset County grouse nest as part of the effort to better understand the effects of West Nile virus on grouse. The nest was found by agency Food & Cover Corps foreman Bob Turner.

The troubling part was that no population boom followed.

Looking at the data, it was clear the hunters I heard from were not isolated observers. The loss of grouse they reported was echoed by the experiences of hundreds of grouse hunters across the Commonwealth.

Population trends within the state's six regions showed the same pattern. The decline grouse hunters observed was real and had occurred statewide.

It was time to look for explanations.

DISEASE DRIVEN?

I drew up a list of plausible explanations for the grouse decline to see if they fit the facts, or could be eliminated.

A number of factors can work against grouse: the maturing of forests; increasing predator numbers; severe weather events.

Most factors, like habitat loss and predator pressure, tend to occur over a long time. Others, like severe weather, have fairly localized impacts.

Whatever caused the abrupt grouse loss from 2000 to 2004 was dramatic, fast-acting, and occurred statewide.

A rapid decline such as this has all the hallmarks of disease.

Ongoing disease impacts also might explain why grouse numbers had not rebounded much since 2004.

West Nile virus (WNV) first occurred in Pennsylvania in 2000, and by 2002, it was found in every county.

Carried by mosquitoes, the virus can be fatal to humans, and it caused large-scale mortality in crows and blue jays in the early 2000s. In western states, WNV has caused extremely high mortality in sage grouse.

But no studies had been published on WNV and ruffed grouse. We would have to get our own answers.

TESTING FOR WEST NILE

Justin Brown, the Game Commission's wildlife pathologist, assured me an experimental study could be done.

But it would be difficult.

The study would require a laboratory with a high level of biosecurity clearance, and personnel with WNV experience.

Fortunately, Justin knew a top-notch WNV researcher with access to the type of lab needed.

Richard Bowen, director of the lab at Colorado State University, agreed to host the study and also donated all facility and personnel costs. But a new problem arose quickly: We would need ruffed grouse that had never been exposed to WNV.

That meant we needed grouse that had never been bitten by a mosquito.

Phone calls to known grouse propagators revealed only one facility – Grouse Park Waterfowl in Idaho – could provide such highly protected grouse. The facility's owner, Dan Snyder, was willing to accommodate our request for grouse, but his birds already were vaccinated against WNV.

Then, somewhat literally, a new plan was hatched.

If we could find wild grouse eggs, we could ship them to Grouse Park. Chicks could then be hatched and raised in a quarantined environment.

At 4 to 6 weeks of age, we would transport them by air to the Colorado lab. Researchers would then give the chicks WNV by inoculating them directly with the virus. From that simple study, we could answer three critical questions: Does WNV kill ruffed grouse? What percent of birds with WNV die of the disease? What percent recover?

To be clear, this plan was crazy and seemed to have little chance of success.

Walking into the woods on any particular day, with the intention of finding a grouse nest, is a fool's errand. And without nests, our plan would fail.

The best chance of success would be to enlist many searchers. I drafted "Grouse Nests Wanted" posters and sent them in April and May to organizations with members active in the springtime woods – the National Wild Turkey Federation, Trout Unlimited, Pennsylvania Audubon, mushroom clubs, hiking clubs and local birding clubs.

I enlisted Game Commission foresters, Food and Cover Corps personnel, biologists and conservation officers, as well as Department of Conservation and Natural Resources' foresters.

Ruffed Grouse Society members eagerly signed up to assist, as did experienced bird-dog handlers.

I was humbled and overwhelmed by the outpouring of support. By my best count, more than 3,000 people were ready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to help search. My goal was to have 20 live chicks for the study.

To achieve that, I wanted to collect at least twice that many eggs since cross-country shipping was bound to kill some embryos.

Two nests – one in Erie County, and the other in Cambria County – were found before hens began incubating. These eggs were shipped UPS, with careful attention to padding!

An additional four nests – one each in Potter, Lycoming, Centre and Somerset counties – were located after hens began incubating.

TRAVELING TRAVAILS

Eggs collected after incubation had to be kept warm from the moment they were collected until they hatched in Idaho.

The only way to do this was to drive warm eggs cross-country with an incubator onboard.

Once again, I put out a plea for assistance, and once again folks rushed to help.

Debbie and Tim Flanigan, of Nature Exposure wildlife photography, donated their time to drive the eggs west, and the Ruffed Grouse Society offered to reimburse their gas expenses.

The Flanigans' cross-country drive is a story in itself. If you ever want to know the condition of our nation's highways, drive cross-country with a batch of fragile, irreplaceable grouse eggs.

Snyder met them in Missouri and completed the transport to Grouse Park.

Getting the hatched chicks to the laboratory six weeks later presented more hurdles. High temperatures during transport week made it unlikely chicks would survive the trip.

We had only a three-day window for the lab to receive the birds. We could not wait for temperatures to drop.

In the 11th hour, Snyder began the 12-hour drive. He had put so much effort into raising those chicks that he was not about to leave their fate to an overheated cargo hold. Personnel from the lab drove north and met him in Laramie, Wyo., to retrieve the chicks. It was just one more example of the passion of everyone involved in this study.

Upon the chicks' safe arrival, our lab partners sprang into action. Nicole Nemeth, a respected WNV researcher, flew to Colorado from her Guelph University office in Ontario to oversee the study. Nicole donated all of her time on the project, and Woodcock Limited covered her travel costs.

In all, 18 chicks were involved in the WNV-challenge study: 10 were inoculated with WNV; five were given a WNV vaccine and then inoculated with WNV to see if the vaccine worked; three were housed with the others as a contact-

control group to see if the virus would pass directly from bird-to-bird without the presence of mosquitoes.

Blood was drawn daily to look for WNV presence and levels of WNV antibodies.

ANALYZING THE RESULTS

None of the vaccinated birds and none of the contact-control birds sickened.

But within eight days, four of the 10 birds inoculated with the virus were extremely ill. The other six birds survived to the end of the two-week project.

All were autopsied to see if WNV had affected them.

Four of these survivors had severe lesions that damaged their hearts, brains and other vital organs. In total, eight of the 10 birds had organ damage severe enough to make their long-term survival in the wild uncertain.

After many months and many miles, our critical questions had been answered: WNV clearly kills ruffed grouse; and as many as 80 percent of ruffed grouse exposed to WNV are killed outright or might have reduced survival.

HUNTERS HELP

We answered our questions using standard wildlife-disease protocols in a laboratory setting. But we also wanted to understand WNV impacts on wild grouse.

In autumn of 2015, I mailed more than 600 specialized "blood kits" to our grouse cooperators and Ruffed Grouse Society members to gather WNV information from hunter-harvested grouse.

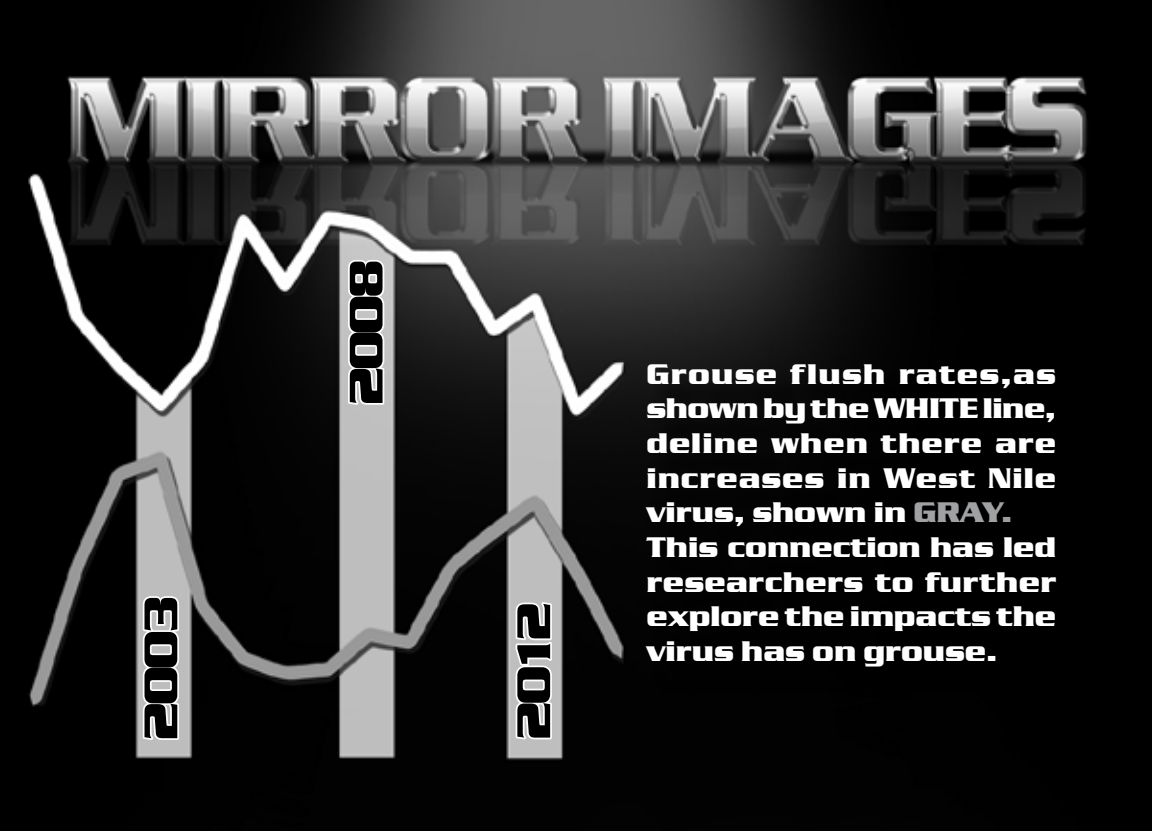
Each kit included instructions and a filter-paper strip to be soaked in the fresh blood of a harvested bird.

Once again, grouse hunters demonstrated their passion. It is amazing to me that hunters were willing to call in their dogs, halt their hunts, and collect fresh blood samples!

In all, 204 filter strips were returned by hunters from 31 counties. We found that 13 percent of harvested grouse were positive for WNV antibodies.

This represents both good and bad news: Our wild grouse are being impacted

Nicole Nemeth pauses before inoculating a grouse chick at Colorado State University.



by WNV, but at least some are surviving.

What does this new information mean for the future of grouse and grouse hunting?

At this time, the answers are not clear.

Since the initial invasion of WNV into Pennsylvania, the disease has fluctuated in prevalence, with "hot" WNV years occurring from 2002 to 2005, and again from 2010 to 2012.

A review of our Grouse Cooperator data shows fewer grouse were flushed in years where WNV prevalence was highest. In fact, the data sets are near mirror images. So the link between WNV and the rise and fall of grouse populations remains a strong one.

HOPE FOR THE FUTURE

There is hope, however. In years when WNV prevalence is low, grouse numbers can recover fairly quickly.

We see this robust recovery in our northwest and northcentral counties where high-quality grouse habitat is fairly abundant and well-dispersed across the landscape.

In the northeast region and across the three southern regions, though, grouse numbers remain low with only anemic upticks when WNV recedes.

Lack of a population recovery in four of six regions is likely due to limited young-forest habitat on the landscape.

Scattered, isolated grouse populations are vulnerable. Vaccinating or treating sick grouse is not feasible, nor is controlling mosquitoes in grouse habitat.

Creating abundant, high-quality habitat is the most important safeguard we can provide to our state bird.

Is it possible to indirectly boost grouse populations by reducing harvest?

The Game Commission is closely

examining this option. The bedrock assumption of sustainable wildlife harvest is that hunters remove only "surplus" animals from a population.

With WNV on the landscape, are surviving birds still a surplus portion of the population? Does grouse hunting matter?

The number of grouse hunters dropped 78 percent between 2000 and 2014, and hunter success has never been very high with ruffed grouse.

The vast majority of grouse hunters bag just one bird per year.

With hunter numbers and harvests already relatively low, will further reducing hunting mortality have any true impact on populations?

This is not easily answered with a hard-to-study species like ruffed grouse.

In the 2016-17 season, we will repeat blood sampling from hunter-harvested birds to increase our sample and our confidence in the data. We also will work with population modelers to shed more light on WNV's impact on grouse populations.

We will present this information at several meetings where grouse biologists from across the country can review the data and discuss appropriate management options. WNV had spread throughout the United States by 2005, so this virus might be an unrecognized factor in grouse declines in other states.

Finally, we will keep Pennsylvania grouse hunters and our partners apprised of new information.

This research was made possible only by the passion of our grouse hunters and our many partners who donated their time and talents. It is this passion that drives us to gather the information we need to make management decisions necessary to sustain our ruffed grouse.

BECOME A COOPERATOR

Several hundred hunters help the Game Commission manage grouse by keeping a log of their daily hunting activities.

This survey, conducted since the mid-1960s, helps track grouse status and hunter success.

Participating hunters record number of flushes and hours hunted.

To participate, download forms from the Ruffed Grouse page in the Hunting Section at www.pgc.pa.gov, or write or call the Game Commission's Bureau of Wildlife Management, 717-787-5529.

After your first year as a cooperator, you will be added to the Grouse Hunter Cooperator list and receive through the mail the *From the Coverts* newsletter, which is loaded with information about the previous year's grouse harvest and grouse population status.

In addition, you'll receive flush-report cards and a postage-paid envelope for sending in your forms.

Cover Painting by Dana Bellis

Sitting stoically on a log within a dense, green understory soon to change colors, Pennsylvania's state bird, the ruffed grouse, long has faced varied challenges to its survival. Maturing forests provide less cover for grouse, limiting their ability to flourish. Harsh winters and wet springs affect recruitment of young. Now, West Nile virus, which has been shown to kill ruffed grouse, presents yet another obstacle our grouse must overcome.