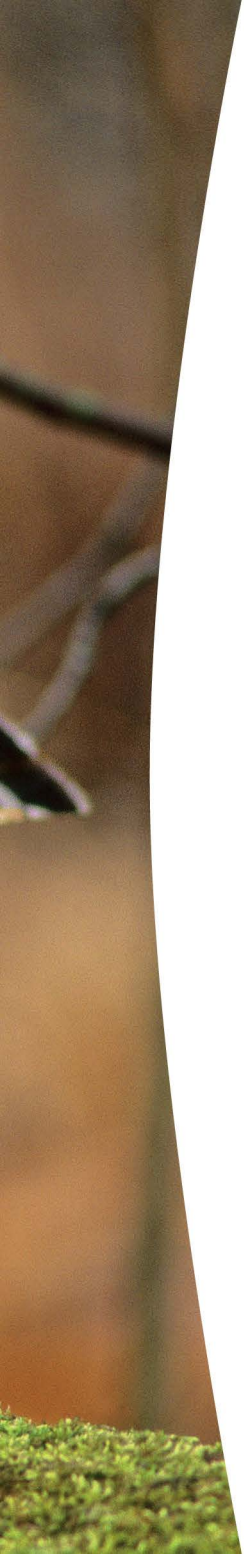


By Michael Furtman

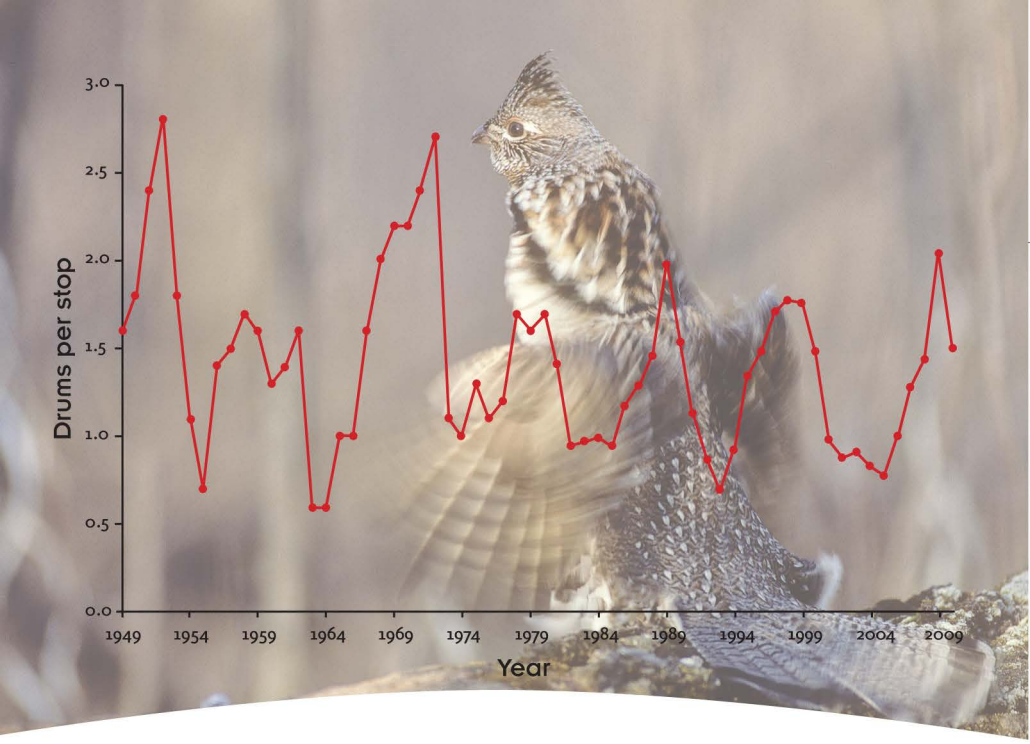
Ups and Downs in the Grouse Woods

The ruffed grouse population cycle works in mysterious ways, sometimes defying the best attempts of wildlife biologists to understand it.

My grouse trail runs for miles on public lands through rolling hills, south of the St. Louis River, west of Duluth. Come mid-September, when ruffed grouse hunting season opens, I walk the length of this trail beneath a golden aspen canopy. I've followed this path for so many years that four dogs have come and three have gone. All flushed their first grouse there. Two made their last.

For decades, my first day's hunt along the trail has been my indicator of the current status of the ruffed grouse cycle. A good day of shooting, a good season would follow. Few shots, and it was going to be a long, dry season.

RUFFED GROUSE BY BILL MARCHEL



Over the years, success has varied wildly—ups and downs in the grouse woods.

While all animal populations fluctuate, only those that rise and fall in large amounts and with regularity are considered cyclical. Grouse numbers rise and fall in a 10-year cycle that remains somewhat of a mystery. Wildlife managers simply call it the "grouse cycle."

"As wildlife managers, we just accept the grouse cycle as a given," said Mike Larson, Department of Natural Resources research scientist and grouse biologist in Grand Rapids. "The historical data show the cycle very clearly, and whatever the reasons for it, there is little that people could do to influence it anyway. Consequently, our job is really to manage the habitat.

"Providing quality habitat means there will be more ruffed grouse than there would otherwise be, no matter where we are in the cycle." According to Larson, quality habitat for grouse contains many components, but, in general, it is a forest of mixed species, predominately aspen with stands of various ages.

Inevitable Cycle. Many factors influence grouse populations. But even under the best of situations, the ruffed grouse is not a long-lived bird. Few survive to 3 years of age, according to research conducted by the late Gordon Gullion, head of the Forest Wildlife Project at the University of Minnesota's Cloquet Forestry Center. Of 1,000 eggs laid in spring, only about 250 ruffed grouse will survive to their first autumn, 120 to their first spring, about 50 to a second spring, and fewer than 20 will still be alive the third spring. Mortality comes in many forms—disease,

Cycle within a cycle: *The ruffed grouse population shows peaks and valleys about every 10 years, with "super peaks" every 20 years. But a super peak only lasts for one year, while the lower peaks can last two to three years.*

DRUMMING MALE RUFFED GROUSE BY BILL MARCHEL

accidents, weather-related stress, and predation. Predation ranks highest, though it is frequently difficult to separate it from the other factors. A ruffed grouse weakened by cold or disease might have died regardless of whether it had been caught by a fox or goshawk.

While losses occur every year, ruffed grouse populations, as well as those of snowshoe hares, rise and fall in a cycle of about 10 years and are synchronous. The ruffed grouse cycle appears to be largely unrelated to food availability or variation in reproduction due to weather.

Evidence suggests there is a cycle to the cycle: a pattern that shows every other peak is higher than the intervening one. And there are differences in the cycle depending upon location. In Minnesota the cycle is most noticeable in the prime grouse range in the northeast. The cycle is more subtle in the northwestern tallgrass aspen parklands, the central hardwoods region, and the southeastern blufflands.

"Where habitat isn't as good, the cycle is not as apparent," says Larson. "In the periphery of their range, you can see minor peaks and valleys, but not every 10 years, and the peaks and valleys aren't as dramatic."

Unravel the Mystery. Several studies have tried to unravel the mystery of the grouse cycle. University of Wisconsin researcher Lloyd Keith's classic *Wildlife's Ten-Year Cycle*, published in 1963 and based on his work in Alberta, chronicled not only the periodic fluctuations of ruffed grouse, but also those of snowshoe hares, red fox, lynx, and prairie grouse. He found that these fluctuations are frequently related to each other and usually are synchronous among species within areas. He also noted that this cycle seems to be limited primarily to northern forests and adjacent prairie.

Keith's research offers the following explanation for the ruffed grouse cycle: Snowshoe hares, which can breed several times in one year, increase in number. Lynx, red fox, goshawks, and great horned owls prey upon the abundant hares and produce numerous offspring. Despite the success of the predators, reproduction by the hares outpaces that of the predators. Eventually, hares are so numerous that they deplete their food sources and then die off rapidly.

During this boom in hares and predators, ruffed grouse increase because the hares buffer them against predation. But when hare populations crash, the abundant predators must find another food source, such as ruffed grouse. Unlike the snowshoe hare population, the grouse population cannot reproduce fast enough to sustain its numbers while being targeted by abundant predators. Ruffed grouse numbers slowly decline, followed by a drop in the predator population. Because this cycle takes years, the woody brush that provides food for the snowshoe hare rebounds, snowshoe hare numbers climb, and the cycle repeats.

However, because ruffed grouse populations are also cyclical south of the snowshoe hare's main range, some researchers looked for additional factors. In 1982 Donald Rusch of the Wisconsin Cooperative Wildlife Research Unit studied winter ruffed grouse mortality in Wisconsin. He found predation rates on ruffed grouse climbed when large in-

fluxes of raptors—primarily goshawks—migrated south into the northern United States during a decline in hares in their Canadian home range.

Increased winter predation by migrating raptors was further documented by David Lauten of the University of Wisconsin-Madison. For his master's thesis, he radio-tagged large numbers of grouse and noted significant mortality in winters when numerous northern raptors migrated into the area. He confirmed the influx of raptors by using data from monitoring sites such as Hawk Ridge in Duluth and the Audubon Christmas bird counts.

These winter studies in Wisconsin show that the 10-year cycle far to the north has impacts on more southerly grouse cycles. As the hare population subsides to the north, the grouse populations are driven down by the subsequent increased predation. Then some predators move south for the winter and prey on grouse there.

Still Puzzling. But predation might not be the only factor in the cycle. Throughout most of their range, ruffed grouse depend on aspen buds for winter food. In the 1990s, Gullion documented that ruffed grouse refused to eat aspen buds in some winters because the buds had a resinous coating that inhibited digestion. Gullion speculated that in years when an outbreak of tent caterpillars stressed trees, aspens protected themselves by creating less palatable buds. Ruffed grouse switched to less abundant or nutritious foods such as birch buds, perhaps lowering grouse survival. If the trees exhibit this self-defense mechanism for more than just one winter, then a cycle could be triggered.

RUFFED GROUSE CHICK BY BILL MARCHEL

A 2008 study by a team of researchers from the University of Minnesota and the Ruffed Grouse Society analyzed all of the research from Wisconsin, Minnesota, and elsewhere. The team looked at 27 years of data from the Ruffed Grouse Society's annual hunt in Grand Rapids (during which biological data, such as age, sex, and health, is gathered from the harvested birds). The team also reviewed DNR annual spring drumming counts, which monitor grouse populations. The team examined forest tent caterpillar outbreak information, raptor migration and irruption data from Hawk Ridge and other monitoring sites, and weather data to further seek answers to the grouse cycle.

The researchers concluded that the predation theory isn't sufficient to explain the grouse cycle. They found no direct correlation between influxes of migrating raptors and the cycle in Minnesota. However, they concluded predation plays a supporting role and is influenced by winter weather. Years with abundant snow and cold weather favored grouse. But in years with poor snow cover, predation may increase because grouse can't roost beneath the snow and must roost in trees. Without the warmth of snow roosts, they also must feed more often. In both cases, they are more visible and more vulnerable to predation.

"These studies are the best summaries about what is officially known about the ruffed grouse cycle," said Larson. "But the fact is, we aren't able to really explain very much except that the cycle is real.

"People are always inquiring about how wet, cool springs might affect nesting success. The cyclical pattern holds true despite the fact that spring weather fluctuates. You can have the best spring weather imaginable, but if we're on the downward side of the cycle, populations are still going to go down."

In other words, ideal weather might mean a larger population overall, both at the peak and at the valley, but the cycle will occur regardless of weather.

Current Cycle. In the region surrounding the Great Lakes, the cycle is generally at its low point in mid-decade and at its high point in years at the end and beginning of the decade. The cycle is remarkably synchronous across this range. The most recent low began in 2001 and bottomed out in 2004. As it turns out, 2009 was likely the most recent peak. Larson said that drumming counts in 2010 were 27 percent lower than in 2009, so the cycle might be heading down.

Grouse hunting harvest rates follow the same cycle. In 2009, hunters harvested an average of 0.64 birds per day, compared with 0.4 birds at the bottom of a typical cycle. Total harvest in Minnesota can be five times larger during peak years than at the valley. However, Larson said, the 2009 harvest did not show a dramatic increase because fewer hunters went afield—roughly 85,000 hunters compared with 140,000 at the last peak in 1998.

Looking to This Fall. What will this fall bring to the grouse woods?

"Some peaks in the cycle last for a few years," said Larson, "but some peaks only last for one. It would have been a lot to expect 2010 to equal 2009."

Yes, it would have. That's the nature of the grouse cycle. But come fall—peak or valley, good year or poor—there'll still be a trail to walk through rolling hills and a dog eager to parse the forest's scents.