



BY SHERYL DE VORE

WILD CARDS

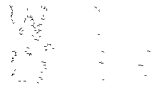
Birders can never quite anticipate what hand will be dealt from the deck of winter irruptions.

BY MID-JANUARY 1992, Michigan birders knew: One of the biggest invasions ever of Great Gray Owls was occurring in the upper peninsula.

These enigmatic birds of prey with their massive wingspan were perched everywhere in downtown Sault St. Marie—on buildings, billboards, even telephone poles. Area birders could stand in one spot and see eight at a time. A deer hunter counted 15 Great Grays along the ravines of a nearby island. During winter 1991-92, banders on the peninsula tagged 39 different Great Grays within a 50-mile radius.

Thousands of miles away in St. John's, Newfoundland, Purple Finches were descending by the dozens to feeders. Birders were thrilled to look out their backyard windows to see the raspberry-hued birds—which typically forage in conifers—gorging themselves on feeder seeds. Ian A. McLaren, *American Birds'* Regional Reports editor for the Atlantic Provinces Region, called the influx of the Purple Finches in 1991-92 a "truly massive invasion."

Winter irruptions, the irregular southerly or sometimes eastern, western,



or altitudinal emigrations of avian species, have long fascinated birders. Many indulge in predicting when the next invasion will occur.

And many wonder: What prompts north woods and taiga-dwelling Purple Finches, crossbills, and grosbeaks to leave their usual home range, embarking on atypical migrations to places like California, Illinois, or Mississippi? What brings wintering owls and other raptors from the tundra and boreal forests to spots as diverse as Ontario, Kentucky, and Washington State?

The common denominator among many irruptive species is that they are food specialists.

The simple answer is that the birds are searching for food. But other factors need to be considered, such as the impact of a population explosion of prey or predator, the availability of secondary food sources, and regional weather patterns, such as drought. Add up all these variables, and the reasons for invasions become more complex.

The common denominator among many irruptive species is that they are food specialists. Typically living and breeding in the tundra and coniferous forest, they feed exclusively or chiefly on one or a few kinds of food.



Common Redpoll

nance during the winter months.

Red Crossbills offer a dramatic example of how random events can force seed specialists to invade another area. Crossbills live and breed in coniferous forests. Their highly evolved beaks allow them to pry open cones that would defeat other foragers. While most

Snowy Owls, for example, mainly eat lemmings. Boreal Owls prey mostly on voles.

Redpolls eat alder seeds. Red-breasted Nuthatches prefer pine seeds, and Evening Grosbeaks have a penchant for maple seeds.

When each species' particular food becomes scarce, the birds must search elsewhere for suste-

nance during the winter months.



Northern Goshawk

songbirds feed insects to nestlings, Red Crossbills feed their young mostly seeds of pine and spruce. When the cone crops fails, the crossbills must move.

Both crossbill and conifer benefit from the symbiotic relationship. Crossbills instinctively breed in a plentiful seed season; in fact, a heavy cone crop has induced birds still in juvenile plumage to reproduce. And with more crossbills feeding, more seeds are likely to fall on the ground and develop into seedlings.

But the best reproductive strategy for trees also dictates that they produce seed crops of irregular bounty. After a bumper crop that yields thousands of seeds, a spruce may produce few cones for several seasons, slowly rebuilding its strength toward another burst of fecundity. Usually these cycles fall randomly enough from stand to stand that crossbills can find enough food within their normal range in the taiga; they don't need to search elsewhere.

Still, the laws of chance dictate that irregularly, but inevitably, there will be years with so many seeds that crossbills proliferate, followed by a season with almost no seed at all.

"Crossbills live in a boom or bust economy," says Curtis Adkisson, professor of biology at Virginia Polytechnic Institute and State University, who has studied the species for many years.

"Failure of cone crop, coinciding with large populations, will create an irruption." In such years, hungry crossbills descend into Michigan, Minnesota, New England, and other areas.

Hungry, but not really desperate, suggests Erica

PHOTOGRAPH PAGE 362 WAYNE LANKINEN PAGE 363 F. K. SCHLEICHER/VIREO PAGE 364 LEFT COLUMN TO RIGHT SAM FRIED W. BRENE/VIREO

Dunn, a surveys scientist for the Canadian Wildlife Service. Her studies indicate that irrupting finches rarely appear to be stressed.

“Crossbills and other finches can tell well ahead if there are not going to be any seeds,” says Dunn. “They are watching the seeds all the time, even when the seeds are green.”

Adkisson agrees: “These birds preparing for irruption are healthy birds, fattened up for flight.”

Some even suggest that irruptions may help serve long-term survival of a species. Sometimes crossbills move far south, even if taiga next door to its typical breeding grounds has ample food. By scattering southward, crossbills and other boreal finches may “extend and restock the (species’) range and promote gene flow in outlying populations,” wrote J. Baird in *Audubon Field Notes* in 1964.

Irruption may be an innate adaptation, says Adkisson. He further notes that “there is no real correlation between severity of winter weather and irruptions of boreal finches.”

These species feed on tops of trees, not on the ground where snow gathers, so snow will not hinder the birds’ ability to find food. During invasion years, however, they may search for food on the ground, either at feeders or where cones have fallen.

Irruption finches do not always move south. In the early 1960s, Red Crossbills flew thousands of miles east from British Columbia to Michigan’s upper peninsula. How did observers know that the birds were from the West?

“It is widely known that crossbills vary greatly in size,” says Adkisson, who is writing the Red Crossbill chapter for the *Birds of North America* life histories series. “Size affects what they eat; the smaller-billed species will eat spruce cones, the larger will eat pine, and the middle-sized might eat both. The finches invading Michigan had very small bills, as did the subspecies in British Columbia.”

“The [crossbills] kept moving until they found a locally abundant spruce cone crop,” says Adkisson. “What’s even more fascinating is that when they arrived in Michigan, they interrupted their molt and started breeding right away.”

Predicting finch invasions is done with some consistency in Sweden, where foresters keep a keen watch over cone crop production region-by-region, noting failures in specific areas. In North America, birders have little more luck predicting finch irruptions than meteorologists have in predicting hard winters. Birders only know an invasion is occurring when they actually start counting larger than normal numbers of certain species. It’s part of what makes winter invasion watch-



Red Crossbill

ing in North America so exciting.

So how are invasion predictions made? North American ornithologists typically average the numbers of years between invasions for a certain period to determine patterns.

For example, “Red-breasted Nuthatches and redpolls usually irrupt every two or three years, while Evening Grosbeaks invade areas every three or four years,” says Dunn. Pine Grosbeak invasions occur less frequently.

"They have more catholic tastes," says Adkisson. "Pine Grosbeaks, which breed in the inaccessible taiga near the tree line, will eat seeds, buds, and fruits. They're more adaptable."

No wonder, then, in the late 1960s a friend from Rockford, Illinois, called Adkisson, then in Iowa, exclaiming: "We've got Pine Grosbeaks! At least a dozen." The fact that Pine Grosbeak sightings are so rare in that area made the find doubly exciting, and has Illinois birders waiting and wondering each winter

'Pine Grosbeaks ... will eat seeds, buds, and fruits. They're more adaptable.'

if they will again see the northern species. Some birders in the East are waiting for another Evening Grosbeak invasion. Until the winter of 1889-90, Evening Grosbeaks were rarely, if ever, seen in the eastern United States, according to John K. Terres, author of the *Audubon Encyclopedia of North American Birds*. Then plantings of Box-elder, which Evening Grosbeaks prefer, seemed to attract the species eastward.

But birders in the eastern United States have wondered in recent years why the grosbeaks have apparently

disappeared. Dunn says one possible explanation is that the Evening Grosbeaks had a population boom in the late 1970s and early 1980s, when eastern boreal forests experienced a major spruce budworm outbreak.

The budworms provided copious food for grosbeaks, which likely reproduced extraordinarily well during those years. Coinciding

seed shortages during the winter months led many of the increased grosbeak population further south.

Eventually the insect outbreak ran its course, and grosbeak numbers declined to former levels. The reduced population might now find enough food in their normal range, even in winters with low seed abundance, making irruptions less common. Dunn

stresses that this scenario is mere speculation.

"Understanding and predicting Evening Grosbeak irruptions is not easy," she says.

The Snowy Owl rarely ventures below the tundra, but when it does, it can come in impressive numbers and advance astonishingly far south. A Kentuckian who chances upon a Snowy Owl perched like a great white beacon on a highway sign is bound to wonder what it is doing there. Fortunately for birders, predicting Snowy irruptions is less challenging than foreseeing finch invasions. Snowys are top-of-the-chain predators whose success is directly linked to the cyclical crash and boom of the lemming, its main prey.

"So intimately are the Snowy Owl migrations tied up with the lemming cycle that the migrations can be predicted if we have a knowledge of the status of the lemming," wrote Alfred O. Gross in "Cyclic Invasions of the Snowy Owl" published in *The Auk* (Vol. 64).

Gross showed that between 1886 and 1946, Snowy Owls staged invasions every three to five years in southern Canada, New England, and middlewestern states. Lemmings crash and boom every four years. Snowy Owls will actually lay more eggs in the midst of a lemming population boom, just as Red Crossbills reproduce more successfully during peak cone crop years. When lemming populations crash and Snowy Owl populations are high, major irruptions can occur.

Scientist Roland C. Clement predicted a Snowy Owl invasion the winter of 1945-46, because he had discovered that no mice and lemmings were found in any salmon or trout caught in 1945, although many had been found the year before. Clement also saw many dead lemmings on the tundra that year. His prediction was accurate. Snowy Owls invaded several regions south of the normal wintering range that season.

The four-year cycles do not necessarily constitute major invasions, since numbers of Snowy Owls may simply move to another area of the Arctic where lemmings are more plentiful. Some Snowy Owls, too, will feed on several different kinds of lemmings or hares as a secondary food source.

The big invasions occur when several lemming species and hares are scarce in several neighboring areas of the owls' typical range. During major invasions, the Snowy Owl may venture as far south as Kentucky. That same year, the northern regions might count more Snowy Owls in winter than they have had for years, perhaps decades.

Several eastern regions experienced one of the largest Snowy Owl invasions in their history during the winter of 1991-92. Illinois saw its second largest invasion;



Pine (foreground) and Evening grosbeaks



Great Gray Owl

Minnesota recorded its largest. Parts of Ontario and Michigan's upper peninsula also experienced large numbers of Snowy Owls that winter.

Bird bander David Evans of Minnesota noted that the birds, at times, appeared stressed and that they were found in some unusual places. He discovered one female Snowy Owl trapped in a 100-foot high chimney. Evans guessed that the owl was chasing a pigeon at dusk and inadvertently flew into the chimney.

In Illinois, three birders discovered a Snowy Owl

Was the great owl invasion of 1992 caused by the chance simultaneous disappearance of prey?

trapped in an old abandoned hotel in Waukegan near Lake Michigan. A passerby had noticed a large white bird flopping on the top floor of the building. The birders got gloves, net, and other gear, retrieved the bird late one night and released it back into the wild—but not before admiring its bold yellow eyes and dark flecking on white feathers.

That same winter brought Michigan birders even more delights. Not only did the upper peninsula have a Snowy Owl invasion, but large numbers of Great Gray

and Boreal owls and Northern Hawk-Owls arrived.

"Having an irruption of those three species at once is virtually unheard of," says Dave Evers of Whitefish Point Bird Observatory. "We normally band only one or two hawk-owls a year. We banded 21 that year."

Another owl that tends to be cyclical in its irruptions is the Boreal, which preys mainly on

voles during the winter in its Canadian range.

"We get huge peaks [and valleys]" of Boreal Owls, says Evers. "We can band 164 one year, and then band only one the next."

Great Gray Owl irruptions are rarer; these birds are "more opportunistic," preying on several different species, explains Evers.



Boreal Owl

Was the great owl invasion of 1992 happenstance, caused by the simultaneous disappearance of lemmings, voles, hares, and other prey? No one knows, yet. But synchronized irruptions of different seedeaters have been explored by Carl E. Bock, who discussed the apparent coinciding invasions of Common Redpolls and Pinyon Jays, based on Christmas Bird Count data, in an article in *The Auk* in 1982. He noted that the pattern of Pinyon Jay irruptions resembled that of the redpolls.

Bock agreed that it may have been just coincidence, but added that "if the relationship between jays and redpolls is real, and if it is due to fluctuations of their food supplies, the relationship suggests that geographic and interspecific synchrony among tree-seed crops may be much more widespread than previously suspected."

Humans may promote irruptions with their backyard feeders, suggests Erica Dunn, who for six years headed Project Feeder Watch for the Cornell Laboratory of Ornithology. A siskin species that was not normally found in New England, but which irrupts there periodically, seems now to be migrating back to the area each winter. The siskins apparently found an ample food source at feeders during irruption years and appear to be returning to those areas more regularly, even when food supplies in their winter range are not scarce.

While irruptive species are typically thought to be those from northern climates, such as siskins, owls, and crossbills, other species occasionally stage their own irruptions in North America. Adkisson recalls that while studying Blue Jays in Iowa in the late 1980s, the Midwest experienced one of its worst droughts. One



Northern Hawk-Owl

day in late September Adkisson looked to the sky and saw flocks of Blue Jays moving south.

"The air was full of Blue Jays," he recalls. "Tens of thousands of them. I had never seen so many Blue Jays in my life."

Rather than migrate, most Blue Jays stockpile acorns for the winter. That year the drought-stressed oaks of Iowa had produced few acorns, so the jays flew south, Adkisson concluded.

"With a regional climatic change, such as a disastrous drought, the rules regarding irruptions could be rewritten," says Adkisson.

Mountain birds and species that live in foothills—such as Clark's Nutcrackers, Steller's, Scrub, and Pinyon jays—will sometimes invade lowland areas.

"Food shortages in the mountains seem to provide the driving force," says Kenn Kaufman, associate editor of *American Birds* and author of *Advanced Birding*. "These montane invasions sometimes can be predicted to follow a series of dry summers in the mountain west; but their timing is very irregular."

Although bird watchers may rarely notice, the Black-capped Chickadee also irrupts every few years within its range. In the fall of 1968, a major Black-capped Chickadee flight occurred in Ontario and northern United States. Koni Sundquist banded 110 Black-capped Chickadees in her Duluth backyard. Seventy-three chickadees were also banded in a one-acre lot near St. Paul.

The chickadees presumably came from the north woods, where they depend mainly on the seeds of spruces, balsam fir, and hemlock, as well as paper and yellow birch, alder, and hophornbeam.

Scientists suggest that crop failures of many of these plant species over a wide area, at a time when the chickadee population was at a high, may have forced the species out of their normal range. Predicting another major chickadee irruption would prove very difficult. Who knows when crop failures of so many different species will occur over a wide area?

Whatever the cause, or combination of causes, for winter irruptions, science has certainly not uncovered them all. Take the example of the Northern Goshawk. It has been one of the most predictable of invading species, irrupting southward every ten years. The cause seemed clear.

"The snowshoe hare is its main prey," says Dave Evers. "Hares go through a ten-year population cycle which goshawks follow."

Data at Whitefish Point showed that goshawks irrupted the winter of 1982-83 and that numbers were fairly low for nine years after that. So it followed that a goshawk invasion was due there the winter of 1992-93.

It never happened.

"I'm guessing that the snowshoe hares fell off in northern Michigan, but the Ruffed Grouse population,



Pinyon Jay

which is at a high, provided a secondary food source to the goshawks," says Evers. "That could have dampened the goshawk's peak of irruption."

Evers remains optimistic: "I expect to see a big goshawk invasion this fall."

Perhaps Northern Goshawks are right now staging a major invasion into Michigan this fall. Birders are waiting, binoculars and scopes at the ready. And if the goshawks don't come?

Well, as Dunn says, "There's always next year." ♣

Sheryl De Vore is an environmental writer and chief editor of Meadowlark, the publication of the Illinois Ornithological Society.