by Paul Hess

Christmas Counting in the High Arctic

A high-arctic Christmas Bird Count made its debut on 5 January 2007, centered at the hamlet of Arctic Bay, Nunavut—73° 02' latitude on the north coast of Baffin Island. Coincidentally, the number of participants exactly equaled the number of species: Clare Kines and Common Raven. He was not surprised by his 87 ravens, because no Christmas Bird Count (CBC) north of 70° has ever listed anything but ravens. In fact, two high-arctic counts have had no birds at all.

Kines almost doubled his total of species, and he recalls the near-miss on his blog <kiggavik.typepad.com/the_house_other_arctic_mu/2007/01/arctic_bays_fir.html>: "As was expected, ravens were the only species seen, although I came tantalizingly close to adding one more species. I had found some ptarmigan tracks...and went for a hike to try and find them, alas to no avail." (They were likely Rock Ptarmigan, he says, but possibly were Willow Ptarmigan.)

CBCs north of 70° are an on-and-off tradition. Only Prudhoe Bay, Alaska, at 70° 19' has been conducted more than once. In twenty counts from December 1987 to December 2006, Prudhoe Bay has tallied from 3 to 129 ravens.

The one-year CBCs were:

- Resolute, Nunavut, the northernmost ever at 74° 43'. Three observers found no birds on 18 December 1977. According to Chip Weseloh's regional summary of counts in northwestern Canada, an Inuit resident "mentioned that he and other friends have previously sighted ptarmigan (species unknown) during this time of year" (*American Birds* 32:424). Far from the required CBC precision, but fine fodder for wishful thinking. The Resolute folks tried again in December 1978, saw no birds, and this time did not submit a formal report to the National Audubon Society.
- Nanisivik, Nunavut, at 73° 02', adjacent to Arctic Bay. Five observers tallied 33 ravens on 16 December 1978.
- Pond Inlet, Nunavut, at 72° 41'. Three observers found 65 ravens on 17 December 1978.
- North Star Island, Alaska, 70° 14', about 50 miles east of Prudhoe Bay. Two observers saw no birds on 21 December 1981 (although 5 ravens were spotted during count week).

Geoffrey S. LeBaron, Audubon's CBC director, emphasized in 2007 (*American Birds* 60:6) that such zero-species counts are "by no means a failure—recording the absence of birds is as important as recording their presence. The key is to get out and look each season." One-species counts are equally important, LeBaron says (personal communication): "As our planet undergoes human-perturbed climate change, it is the arctic regions that suffer first, and most drastically. Species on the edge have nowhere to go when

This is moonlit Arctic Bay, Nunavut, at 3:28 in the afternoon of 31 January 2007, about a week before the sun would return for the first time since November—and where, on 5 January, the only Christmas Bird Count species was Common Raven. © *Clare Kines.*

the edge is gone. Christmas Bird Counts in the high arctic can serve as an early-warning system of climate-change effects on birds and the entire natural world, and my hat is off to all who do high-arctic counts."

High-arctic observers' hats or hoods aren't off, of course, although Kines's count-day temperatures from –11 to –9 °F (–24 to –23 °C) were relatively mild for that sunless time of the year. His CBC circle is dominated by tundra, fjords, frozen ocean, and a community of about 600, all of which Kines loves deeply as "really one of the magical places in world." The place, his life, and his warm personality come to life delightfully on his blog.

Kines would welcome anyone wishing to help him double the Arctic Bay species total. Flying in and out in the winter isn't a problem, he says. The problem is the expense—$3,800 to $5,000 from Ottawa—although the prospect might be enticing to affluent adventurers. Think of discovering a ptarmigan in the flesh, not just its footprints. Think of setting an all-time CBC record of two species north of 70°.

"Winged Warbler" Hybridization

Hybrids of Blue-winged and Golden-winged Warblers are recognizable by mixtures of the two ancestral forms' plumage characters. Correct? Not necessarily. A bird of hybrid ancestry may look perfectly typical of either species. In fact, in a recent study in Canada, almost one-third of birds with pure Golden-winged plumage showed combinations of both species' genes.

Rachel Vallender, Raleigh J. Robertson, Vicki L. Friesen, and Irby J. Lovette report the remarkably high proportion in 2007 after research at a location where inconsistencies between plumage and genes are not only frequent but highly complex (*Molecular Ecology* 16:2017–2029). The site, near Elgin, Ontario, is a former Golden-winged Warbler stronghold where Blue-winged Warblers and obvious hybrids began to appear only in recent years. Now the population is a "hybrid swarm" in which hybrids not only mate with hybrids but also regularly backcross with pure parental types. Such current interbreeding behavior as well as mixing of genes by repeated backcrossing in the past (introgression) can produce birds whose plumage shows no evidence of hybridization.

The primary goal of the study was to find nuclear DNA markers that are more informative about an individual bird's ancestry than are those based on matrilineally-inherited mitochondrial DNA (mtDNA). The authors tested three kinds of nuclear markers: microsatellites, introns, and amplified fragment length polymorphisms (AFLPs). The first two did not distinguish between Golden-winged and Blue-winged because the taxa are extremely closely related. AFLP analysis, though showing only weak distinctions, not only proved useful but also produced unexpected results.

A **Golden-winged Warbler** that appears to be pure by its plumage is not necessarily so. Twenty-three percent of morphologically "good" Golden-winged Warblers recently sampled in Ontario had Blue-winged ancestry, according to their nuclear DNA. *Galveston, Texas; April 2006. © Brian E. Small.*

Among 48 birds with Golden-winged plumage and corresponding Golden-winged mtDNA, the nuclear DNA assigned only 37 to Golden-winged ancestry. The surprise is that 11 (23 percent) were assigned with greater probability to Blue-winged ancestry or, at least, with equal probability of descent from either species. Thus, considerable introgression has occurred without being apparent to the eye.

Meanwhile, phenotypically recognizable hybrids' numbers have increased swiftly at Elgin. When intensive sampling began there in 2001, typical "Brewster's," typical "Lawrence's," and individuals with slightly introgressed plumage were 12 percent of the local population. The proportion rose to 33 percent in 2003 and 27 percent in 2004. That happened even though breeding by Blue-winged Warblers was not confirmed until 2005. Vallender suspects that most of these hybrids and introgressed birds are arriving from elsewhere as the two warblers' breeding ranges shift northeastward, although some may be produced by local interbreeding (personal communication).

Vallender and her colleagues discuss their findings' implications for conservation because the fast-declining Golden-winged Warbler is on everyone's high-priority list to protect. Yet, the geographic range of hidden introgression with Blue-winged is unknown. The number of "pure" populations may be smaller than is suggested by field surveys based on plumage. Without advanced genetic sampling, no

one can know how "pure" an apparent Golden-winged population is. In the authors' view, perhaps the best approach at present is to focus on conserving populations most isolated from Blue-winged Warblers and, thus, least likely to share Blue-winged genes.

Leo Shapiro, who has studied the two species and their hybrids in West Virginia, reviews the history of Golden-winged and Blue-winged research in *Birding*, May/June 2005, pp. 278–286 <americanbirding.org/pubs/birding/archives/2005.html>. He emphasizes the difficulties, and urges further studies of the warblers' ecology, behavior, and genetics such as the Vallender team's work. Shapiro also shares their conservation concern: "With the worrisome decline of the Golden-winged in recent decades, we can only hope that these research efforts yield answers quickly, before it is too late."

Florida's Endangered Grasshopper Sparrow

Lacking the historical interest and biological fame of the Everglades, the dry prairie of south-central Florida does not attract wide public attention. Yet it is a unique—and vanishing—ecosystem. There is an ornithological parallel to the two ecosystems: Lacking the hook-billed magnificence of the endangered Everglade Snail Kite (*plumbeus* subspecies), a short-tailed, flat-headed, very shy, hard-to-see little sparrow of the prairie arouses scant interest within the wider birding world. Yet the endangered Florida Grasshopper Sparrow (*floridanus* subspecies) is also unique—and vanishing.

Due largely to research by Michael F. Delany and colleagues during the early 1980s, *floridanus* was listed as Endangered by the U.S. Fish & Wildlife Service in 1986. Two decades later, he and a subsequent generation of colleagues are still trying to save it from extinction. A report by Delany and five coauthors in 2007 updates the grim trend of the sparrow's recent distribution, abundance, and habitat availability (*Southeastern Naturalist* 6:15–26). They fear that fewer than 1,000 birds exist.

As of 2004, only seven tiny breeding aggregations were known in total at Three Lakes Wildlife Management Area in Osceola County, Kissimmee Prairie Preserve in Okeechobee County, Avon Park Air Force Range in Highlands and Polk Counties, and a private ranch in Okeechobee County. Only Three Lakes and Kissimmee Prairie Preserve State Park had more than 50 breeding pairs. A decrease is particularly discouraging at Avon Park, where systematic point count surveys found 108 singing males in 1998 but only 6 in 2004. The crash persists there: Only 7 singing males were counted in 2006, and one of the range's three subpopulations was gone, Delany says (personal communication).

Florida's endangered Grasshopper Sparrow subspecies strongly prefers this dry prairie environment of open expanses dominated by grasses, saw palmetto, and low shrubs—a habitat that is decreasing swiftly. *Avon Park Force Range, Highlands County, Florida. © Michael F. Delany, Florida Fish & Wildlife Commission.*

The main problem is loss of the sparrow's highly preferred habitat. Not just any piece of prairie will do: *floridanus* requires very large, open treeless sites with low grasses, small patches of saw palmetto or other small shrubs for nesting, and areas of bare ground for scurrying from patch to patch. This precisely-structured natural environment has been steadily converted to ranching and agriculture. Based on digital land-cover information, aerial surveys, ground inspections, and contacts with land owners and managers, Delany's team estimated that 44,933 hectares of suitable habitat remain—a 30-percent decrease in the past decade.

The authors are not optimistic. Both the low total population of *floridanus* and the fragmented habitat are limiting factors, and currently protected areas may not be large enough to promote recovery. At an ecological conference in 2004, Bill Pranty and James W. Tucker Jr. spoke bluntly about extreme measures needed—foremost, public acquisition of privately-owned fragments of dry prairie, whether or not they currently support sparrows (*Proceedings of the Florida Dry Prairie Conference* <archbold-station.org/abs/publicationsPDF/PrantyTucker-2006-FDPC-sparrowecology.pdf>). Further, Pranty and Tucker recommend attempting to restore pastures to prairie, using controlled fire to preserve the low stature of grass, and possibly translocating sparrows to unoccupied sites.

Delany, a Florida Fish & Wildlife Conservation Commission biologist, participated in efforts to save the doomed Dusky Seaside Sparrow, and by now he has studied the Grasshopper Sparrow for nearly thirty years. What moti-

vates his intense and abiding interest? "Basic information is badly needed, and the idea of learning it firsthand is appealing. Also, it's so cryptic that it's really a challenge to work with," he says (personal communication). Above all, he hopes to help spare it from the Dusky's fate.

Nuthatches Understand Chickadees' Language

Black-capped Chickadees' vocalizations are more sophisticated than a casual human listener might realize. The familiar *chick-a-dee* call repertoire, for example, conveys an amazing variety of information. In 1985, Jack P. Hailman, Millicent S. Ficken, and Robert W. Ficken documented 362 different *chick-a-dee* call types, analyzed their structure and context, and concluded that the whole communication system of this species is similar in some respects to human language (*Semiotica* 56:191–224). Hailman and M. S. Ficken reviewed that research and other studies of chickadee vocalizations in 1996 (pp. 136–159 in: D. E. Kroodsma and E. H. Miller, eds., *Ecology and Evolution of Acoustic Communication in Birds*, Cornell University Press).

Warning of a predator's presence is one vital purpose of these calls. M. S. Ficken and Steve R. Witkin pointed out in 1977 that the *chick-a-dee* vocalizations instigate mobbing of a perched raptor (*Auk* 94:156–157). They found the calls to be quite effective, but they could scarcely have realized how precise the alarms are.

Recent research shows that by varying their calls, chickadees actually describe an avian predator's size and, thus, tell their companions how much danger the predator represents. A smaller, faster predator is a greater threat than is a larger, slower one. Reporting the chickadees' ability in 2005, Christopher N. Templeton, Erick Greene, and Kate Davis refer to the vocabulary—which also includes a high *seet* to warn of flying predators—as "one of the most subtle and sophisticated signaling systems yet discovered" (*Science* 308:1934–1937). The authors experimentally confronted chickadees in an aviary with 13 species of perched raptors ranging in size from Northern Pygmy-Owl to Great Horned Owl. The chickadees reacted to relatively small, fast, and more maneuverable predators with more and longer calls, which also had characteristics reflecting greater agitation. Further, the calls aroused more intense and persistent mobbing of high-threat predators by other chickadees in the captive group.

As birders know, chickadees form the nucleus of multispecies flocks, and, conversely, other species seem to be attracted to flocks of chickadees. These other songbirds sometimes join chickadees in harassing predators. At least ten other species participate in mobbing when they hear chickadees' alarm calls, according to experiments reported by Christine Hurd in 1996 (*Behavioral Ecology and Sociobiology* 38:287–292). Templeton and Greene document a remarkable example of this interspecific communication in 2007 (*Proceedings of the National Academy of Sciences* 104:5479–5482). They demonstrate that Red-breasted Nuthatches not only can recognize the general import of Black-capped Chickadees' warnings but also can understand fine details of the chickadees' language.

Black-capped Chickadees are sophisticated sentinels. They warn companions not only of a predator's presence but also of how dangerous the predator may be. A recent study shows that Red-breasted Nuthatches can understand the chickadees' language. *Aitken County, Minnesota; January 2005. © Brian E. Small.*

This time the authors experimented with a pair of nuthatches in the wild. Speakers hidden at the base of a tree played small-predator and large-predator call types in the nuthatches' presence. The test was whether the nuthatches could distinguish the two different *chick-a-dee* alarms denoting high-threat and low-threat predators. Indeed, the nuthatches responded in chickadee-like fashion. They showed much stronger mobbing behavior to playback of the small-predator warnings. In particular, they were more likely to fly to the tree with the small-predator warning, they moved closer to the speaker, they spent much longer in mobbing behavior, and they more often showed wing-flicking activity indicating agitation.

Thus, nuthatches evidently understand the exact meaning of each call. Templeton and Greene doubt that the nuthatches' comprehension simply arises from any similarities with their own calls, because nuthatches' alarm calls differ fundamentally from those of chickadees. Rather, the authors speculate that Red-breasted Nuthatches translate the foreign language by "eavesdropping" on the chickadees and learning which call corresponds to which degree of danger.