by Paul Hess

Starlings Aid Flight Studies

When most of us see European Starlings, we don't watch for long. They are, after all, just starlings—"trash birds", in a lister's lexicon. In contrast, when John P. Swaddle and Rowan Lockwood watch starlings, they see wonderfully cooperative subjects for studying avian aerodynamics. Research on bird flight has accelerated in recent decades, covering theoretical, mechanical, physiological, behavioral, ecological, and ultimately adaptive aspects of wing design, function, and performance. Thanks to starlings, Swaddle's and Lockwood's analyses of wing morphology have been a notable part of that research. In a collaboration reported in 2003 (*Ibis* 145:457–464), they examined the role of wingtip shape in flight performance. They asked in particular how outerwing pointedness vs. roundedness and convexity vs. concavity are related to a starling's level flapping-flight speed, maneuverability, and takeoff ability.

Experimentally observing starlings' flight in an aviary, the authors found equally interesting negative and positive results. Outer-wing shape had no significant association with level flapping-flight speed, maneuverabililty (measured by flight through an "obstacle course"), or speed of flight at takeoff. But one significant correlation did emerge: Starlings with more-rounded wings took off from the ground at a steeper angle than did those with more-pointed wings. The results were similar for individual starlings whose wings were rounder after molt than they had been before molt: When the same bird's wingtips became more rounded, it took off at a steeper angle than before. Swaddle and Lockwood noted that, in addition to wingtip shape, unknown physiological or behavioral factors might have influenced the takeoff angle. Nevertheless, they emphasized that no matter how the relationship could best be explained, many studies have shown that an ability to take off at a steep rather than a gradual angle of ascent can improve birds' chances of escaping from predators. Swaddle and Lockwood themselves had reported in 1998 that small passerines with relatively rounded wings had a lower risk of predation by Eurasian Sparrowhawks (*Journal of Avian Biology* 29:172–176). The starling has been central to other studies by Swaddle, Lockwood, and various collaborators investigating effects of flight-feather molt and wing asymmetry on flight performance.

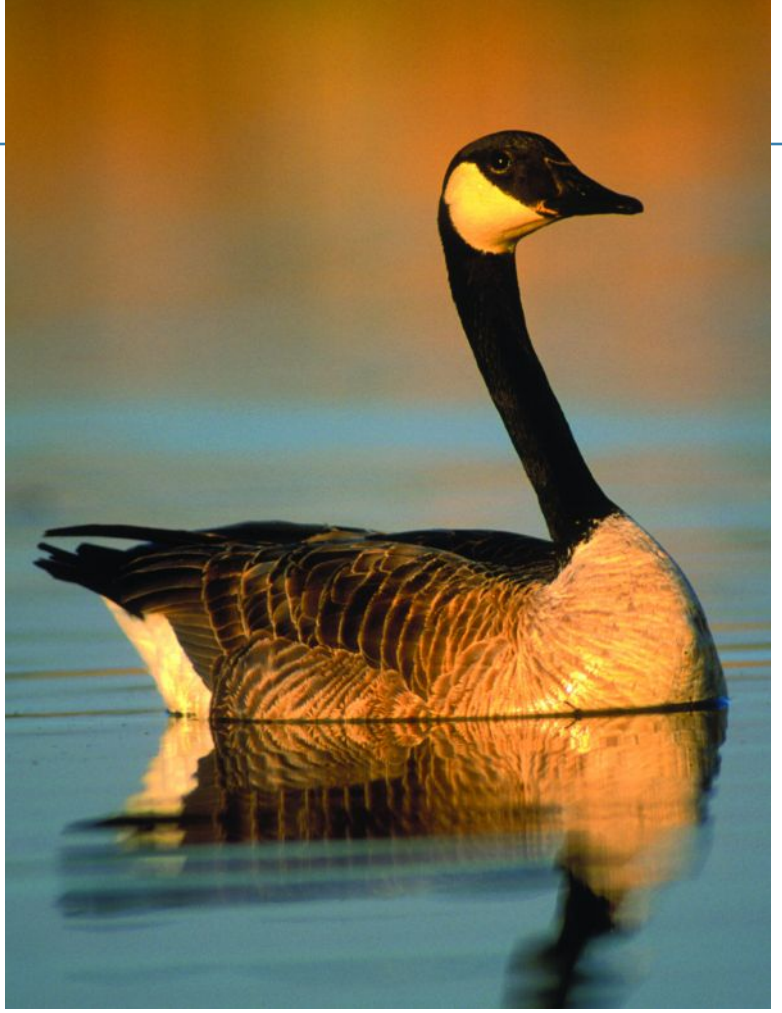
Perhaps, then, the species may deserve more respect than it usually receives in North America, where birders view it as a tiresomely abundant alien, where bird lovers in general resent it as a usurper of native birds' nesting cavities, and where residents near its immense winter roosts are driven mad. There have been prominent exceptions to that contempt. For example, the eminent Massachusetts ornithologist Edward Howe Forbush saluted the starling as a "trim and handsome bird". And on the species' native continent, there was Mozart. He bought a starling as a pet in 1784 and wrote down his reaction upon hearing it sing: "*Das war schön!*" ("That was beautiful!") Eventually, it learned to mimic, though slightly offkey, one of the principal themes in its owner's Piano Concerto No. 17 in G major. Trash bird?

Research on the European Starling has quantified how wing morphology characters such as pointedness/roundedness and convexity/concavity can have direct consequences for flight speed, in-flight maneuverability, and takeoff ability—and ultimate consequences for adaptive behaviors such as escape from predators. *Phoenix, Arizona; March 2004.* © *Jim Burns.*

Canada Goose Variations

A phrase in Frank Bellrose's *Ducks, Geese & Swans of North America* 28 years ago marked him as a master of understatement. The classification of Canada Goose subspecies, he said, "leaves much to be desired." Three decades of quarrelsome taxonomy later, Bellrose's comment would rate hearty approval from ornithologists, birders, and wildlife managers, along with hunters who might fear shooting an endangered subspecies.

Varieties of the Canada Goose have been defined in many ways. Although 11 nominal subspecies across the continent have been discussed in most of the recent waterfowl literature, there has certainly been no consensus. For example, as few as four races were described in Arthur Cleveland Bent's *Life Histories of North American Wild Fowl* (1925) and an incredible 83 were proposed in Harold C. Hanson's *The Giant Canada Goose* (1997). Some wildlife experts have avoided using subspecies names altogether, instead calling groups by their migra-



The Canada Goose is a highly variable species, and multiple subspecies (*moffitti* ["Western"] shown here) have long been recognized. A recent study by K.T. Scribner and colleagues focuses in particular on a major division between the "large" vs. "small" races, and reinforces current thinking that the Canada Goose consists of at least two separate species. *Springbank, Alberta; April 2002. © Wayne Lynch.*

tion corridors or wintering areas, such as the "Mississippi Valley" or "Western Prairie" populations. In the context of field identification, David Sibley grouped the races into "six recognizable populations" in *The Sibley Guide to Birds*. In the seventh edition of the *Check-list of North American Birds* (1998), the American Ornithologists' Union did not list subspecies but noted an increasingly accepted taxonomic view that the large-bodied and the small-bodied groups probably represent at least two separate species. For example, George Sangster and colleagues, writing in *Dutch Birding* (20:22–32) in 1998, note that the Dutch Committee for Systematics (CSNA) has recognized two species of what is called Canada Goose in North America.

A molecular genetic study reported by Kim T. Scribner and five colleagues in 2003 (*Auk* 120:889–907) provided new evidence that could support the two-species concept. The authors analyzed variations in gene patterns among 11 separate breeding populations within seven nominal subspecies that nest in western North America, from arctic Alaska south to Washington. The populations include four large races, Lesser (*parvipes*), Dusky (*occidentalis*), Vancouver (*fulva*), and Western (*moffitti*), and three small races, Taverner's (*taverneri*), Cackling (*minima*), and Aleutian (*leucopareia*). The small Richardson's Goose, *hutchinsii*, which breeds in arctic Canada and migrates primarily in the Central Flyway, was not part of the study. Using nuclear microsatellite and mitochondrial DNA (mtDNA) markers as independent measures of genetic relationships, the team found that the large Pacific Flyway forms were highly diverged from the small forms in "a fundamental evolutionary split" and represent separate monophyletic groups. However, populations and subspecies examined within the large-bodied and small-bodied groups did not have distinct mtDNA, which indicates that gene flow is ongoing—although at different rates—among the currently recognized subspecies.

The researchers produced detailed phylogeographic "gene trees", which depict patterns of genetic variation in terms of geographic distribution among the western subspecies and breeding populations. Their findings have broad implications for Canada Goose conservation and management. Multiple subspecies form mixed groups on the wintering grounds, where hunting pressure is intense. For wildlife management purposes, assignment of Canada Geese to subspecies is based on morphological characters, but (as birders will attest) distinctions cannot always be made because definitive traits for all populations and subspecies are unknown. Detailed genetic data can offer much more accuracy in estimating the proportions of different subspecies and breeding areas represented in the hunting harvest. The authors of this study, along with other collaborators, are using genetic markers in novel ways and are developing new methods of morphological analysis to improve assignment of individual birds to particular breeding populations. An ability to distinguish Canada Goose populations on micro-geographic scales is a critical first step toward conserving the species' diversity.

House Cats As Predators

Cats. To many readers of *Birding*, that is an inflammatory word. Cats have been estimated in various publications to kill millions, tens of millions, even hundreds of millions of birds in the United States each year. In one of the most widely cited studies in the last decade (available at <www.wnrmag.com/stories/1996/dec96/cats.htm>), John S. Coleman and Stanley A. Temple offered "best

The "conventional wisdom" is that free-roaming feral cats do the lion's share of harm to populations of small land birds in North America. But an investigation by C.A. Lepczyk and colleagues shows that pet "house cats" are responsible for serious depredations, too. *Victoria, Minnesota; August 2003. © Stan Tekiela.*

guesses", depending on disparate assumptions about predation rates, that free-roaming rural cats were killing from 7.8 million to 219 million birds annually in Wisconsin alone. Those totals might reasonably be extrapolated to billions of birds being killed nationwide each year. An investigation reported in 2003 by Christopher A. Lepczyk, Angela G. Mertig, and Jianguo Liu (*Biological Conservation* 115:191–201) had a different focus: pet "house cats" that were allowed access to the outdoors not only in rural areas but also in suburban and urban settings. The study was limited to predation during the breeding season, defined as April through August, and the authors sought to relate patterns of predation to demographics of the cats' owners.

The data were based on a mail survey of 1,654 private landowners along three U.S. Fish and Wildlife Breeding Bird Survey (BBS) routes in southeastern Michigan, totaling 75 miles (120 km). The authors asked 11 questions including the number of cats allowed outdoors, how many birds the cats' owners saw them bring in, whether the birds' species were known, how many bird feeders if any were on the property, plus demographics such as an owner's age, sex, and educational level. Among 968 questionnaires returned, 253 respondents (26 percent) reported owning a total of 656 cats that were allowed outdoors.

The statistical path of the pets' predation rates led to some large numbers. Averaged across all 253 cat owners, whether or not they reported birds killed, the mean rate was 15 birds caught per cat during the five-month period. Averaged across 118 of those owners who reported kills, the mean was 31 birds. The sum of the individual cats' predations was 3,680 birds killed during the breeding season—a total that the authors felt underestimated true numbers for reasons involving attitudes of those who did or did not reply to the questionnaire. To calculate broad landscape-level projections as Coleman and Temple did, Lepczyk and his colleagues used a range of assumptions about the overall number of cats along the three BBS routes (including pets owned by non-respondents to the survey), the possible number of cats that were predatory, the density of the predatory cats, and the total number of birds killed under different estimation procedures. The authors projected a range of 800 to 3,100 predatory outdoor cats, which were perhaps killing between 16,000 and 47,000 birds during the breeding season on property abutting the 75 miles of routes.

Of the birds reported as caught, respondents identified 77 individuals to the following 17 species: Mourning Dove, Ruby-throated Hummingbird, Blue Jay, Barn Swallow, Black-capped Chickadee, Tufted Titmouse, Eastern Bluebird, American Robin, European Starling, Song Sparrow, Dark-eyed Junco, Northern Cardinal, Common Grackle, Purple Finch, House Finch, American Goldfinch, and House Sparrow. An additional 63 birds were called swallow, nuthatch, wren, sparrow, blackbird, and finch. Not surprisingly, many of those species typically feed on the ground or in low brush, but three hummingbirds were a surprise—agile felines indeed.

The study analyzed relationships of predation rates to landscape types, cat owners' bird-feeding practices, and the owners' demographics. Few of the expected correlations were found. For example, mean predation rates did not differ significantly among the rural, the suburban, and the urban landscapes. Use of bird feeders made no difference; mean rates of capture were similar for properties with and without feeders. Age and level of education were unrelated to whether the owners allowed their cats to go outdoors. The authors considered the absence of those last relationships "somewhat troubling". They had predicted that because the campaign urging people to keep pet cats indoors is relatively recent, it would more likely influence younger owners. They also had predicted that cat owners with more education would be more likely to hear and heed the campaign's message. Lepczyk and his coauthors concluded that

the results show a continuing and urgent need to educate cat owners and conservation policy makers about the negative impacts of cats outdoors.

Hummingbird Travelers

A bit of Rufous Hummingbird history will demonstrate the value of the website <www.trochilids.com>. In 1983, the sixth edition of the American Ornithologists' Union *Checklist* described this species as wintering along the Gulf coast "in small numbers" and as appearing no more than casually eastward across the Great Lakes region and along the Atlantic coast (casual meaning "two or a few records, not enough to constitute regular occurrence"). How obsolete that reference has become only two decades later! From July 2003 through February 2004, east of their breeding range and their formerly typical migration path, 1,191 Rufous-type hummingbirds were reported in 661 gardens in 426 towns in 285 counties or parishes in 30 states plus Washington, D.C., and Ontario. Where can such detailed totals be found so easily? The answer: on trochilids.com, where those numbers were available by 11 March 2004.

The website, named for the hummingbird family Trochilidae, was created and is maintained as a labor of considerable love by Stacy Jon Peterson of Idaho. With beautiful graphic immediacy, it depicts a twin panorama of regular post-breeding range expansion and increasingly widespread vagrancy by eight species: Ruby-throated, Black-chinned, Anna's, Costa's, Calliope, Broad-tailed, Rufous-type (birds identified as Rufous and those listed only as Rufous/Allen's), and Allen's Hummingbirds. The site also records the infrequent occurrences of seven "Southwestern Specialties" and Mexican species away from their usual breeding areas: Green Violet-ear, Green-breasted Mango, and Broad-billed, Buff-bellied, Violet-crowned, Blue-throated, and Magnificent Hummingbirds. Peterson updates the site throughout the season, listing individual birds' locations and dates and summarizing them on separate maps for each species. He compiles the reports from state birding listservers and rare bird alerts, and he relies heavily on volunteers who bring sightings to his attention. His efforts and those of his growing number of reporters are paying off. For the 2003–2004 post-breeding and winter periods, the site includes more than 1,400 records of extralimital and/or out-of-season hummers.

Describing the 2002–2003 winter in *North American Birds* (57:166), Stephen J. Dinsmore and Joe Fontaine commented that overwintering Rufous and Ruby-throated Hummingbirds have become almost not worthy of mention in regional reports covering many parts of the Southeast. The stunning 1,100-plus Rufous-type hummers listed on trochilids.com from the fall and winter of 2003–2004 show why that is the case: More than 700 of them were in Alabama, Florida, Georgia, Louisiana, and Mississippi. Meanwhile, the geographic extent of regular vagrancy seems to be expanding as well. Writing further about the 2002–2003 season, Dinsmore and Fontaine noted Massachusetts's first Calliope Hummingbird and said, "Every winter, no matter what the weather, records of hummingbirds out of range in the East appear to increase and to creep ever northward." That is also an apt characterization of the 2003–2004 fall and winter, judging by some of the exciting extralimital records mapped on the website: Green Violet-ear in Colorado, North Carolina, and West Virginia; Black-chinned as distant as Washington, D.C.; Anna's as far east as Colorado and Texas; Costa's in Alaska, Colorado, and Minnesota; Calliope in Pennsylvania; Broad-tailed east to Florida; and Allen's in New Jersey. Trochilids.com is worth visiting often to study the fluid patterns of various species' distribution—or simply to marvel at whatever far-wandering rarities show up next.

Reports of wintering hummingbirds—such as this adult male Rufous in Connecticut—in the eastern U.S. have increased dramatically in recent years, in part because of increased observer effort, but also apparently because of real range shifts by multiple species. The size and scope of the phenomenon are laid out in exacting quantitative detail at <www.trochilids.com>. *New Haven County, Connecticut; November 2003. © Jim Zipp.*