

by Paul Hess

## Another Path Toward Flight

The origin and evolution of avian flight have been contentious topics for more than a century. In one camp are the arboreal, or “trees-down”, theorists, who assert that flight most likely arose in proto-avians which over evolutionary time climbed up, glided down, and eventually flapped expansive forelimbs to increase their aerial range. On the other side are the cursorial, or “ground-up”, proponents who argue that flight more probably originated in fast-running bipedal dinosaurs which began leaping to escape predators and to capture prey. Crosscurrents of aerodynamics, biomechanics, physiology, morphology, ecology, behavior, and phylogenetic ancestry have filled a vast literature with fascinating speculations. In two articles in 2003, Kenneth P. Dial proposed a third alternative to the intractably polarized arboreal-cursorial debate. He called this possible path toward flight “wing-assisted incline running” (*Science* 299:402–404), and he based the hypothesis not upon what primitive proto-birds might have done but upon what present-day birds actually do.

Dial looked particularly at galliform birds (quail, grouse, and relatives), which hatch fully feathered and which leave their ground nests almost immediately. From the day of hatching, these precocial chicks routinely use their well-developed legs to run up slopes as steep as 45 degrees. Using Chukar chicks as his experimental subjects, he demonstrated how they can run up even steeper slopes by vigorously beating their incipiently winged forelimbs. As their growing wings provide increasing thrust, the young Chukars can accomplish vertical ascents by the age of 20 days, and mature birds can combine flapping and running to scale even overhanging slopes. Dial’s key interpretation arose from the young Chukars’ steadily improving wing performance. He suggested that the ontogenetic development of wing-assisted incline running in today’s juvenile galliform birds offers a plausible scenario for the path of evolutionary development that feathered dinosaurs could have taken toward aerial flight.

In a second article (*Auk* 120:941–952) Dial revisited the subject from a holistic perspective

In the arid West, family groups of Chukars are often seen ambling about rock outcroppings. To get around in these steep places, the birds use a combination of flapping and running—a strategy that early proto-birds may have used in their evolution of fully powered flight. *Kern County, California; September 2003. © Bob Steele.*

that went broadly beyond the traditional aerodynamic and phylogenetic approaches. He used a multiple comparison of five variables associated with locomotion and life-history traits in present-day birds: hindlimb vs. forelimb dominance, precocial vs. altricial development, large vs. small body size, simple ground nests vs. complex elevated nests, and flight capability from none to high-performance. When he simultaneously correlated the variables, a general trend from basal to derived avian groups emerged. Dial emphasized that the trend should not be interpreted as a phylogeny, and at various stages his groupings correspond with or differ from the two most prominent higher-order phylogenies currently in use in North America—the American Ornithologists’ Union “checklist order” and the contrasting “Monroe and Sibley” sequence. Low on his trend line was a cluster of birds that are primarily terrestrial with dominant hindlimbs, that are relatively large compared to their avian relatives, that hatch precocial young from ground nests, and that offer no more than rudimentary to moderate forms of parental care. He described the cluster as a basal group of avian families, which includes the galliform birds that he had suggested in the previous article as plausible candidates for the origin of flight. Dial suggested that further analyses combining the behavior, life-history, ecology, and ontogeny of extant birds could illuminate corresponding aspects of long-extinct proto-birds—and perhaps shed more light on their ancient evolutionary path from the ground to the air.

## Kelp Gulls in Spotlight

The Fall 1997 cover of *ABA / National Audubon Field Notes* featured a stunning photograph of a Kelp Gull with a caption that was both timely and prophetic: “[T]he presence





This adult Kelp Gull is one of several discovered in the interior U.S. in recent years. Points to note include the extremely dark mantle, the strong gonydeal angle, the dull yellow legs, and the red orbital ring. Jackson Lake, Morgan County, Colorado; 18 September 2003. © Bill Schmoker.

of Kelp Gulls in North America adds to the potential challenge and excitement for gull-watchers.” That promise was fulfilled threefold in 2003. Records committees in Indiana and Maryland voted to add the species officially to their state lists, while an apparent Kelp Gull discovered in Colorado awaits that state committee’s review.

Indiana’s visitor, the first in North America away from Louisiana and Texas, was observed at Hammond on the southern shore of Lake Michigan on 19–20 October 1996. After extensive study of documentations, photographs, references, and correspondence with experts, the Indiana Bird Records Committee took two rounds of voting to accept it as a Kelp Gull that showed no sign of hybridization with Herring Gull (important because the two species have hybridized in Louisiana). With one dissenting vote, the committee also accepted it as a wild vagrant. The dissenter questioned its origin because Kelp Gull is considered a strictly coastal species throughout its range, even in the Louisiana and Texas breeding colonies, and he believed that it would not likely have appeared in Indiana without human assistance. All of the members agreed with a report by the Maryland / District of Columbia Records Committee that accounted for all known captives in the United States and Canada. The committee’s report, published in February 2004 in the *Indiana Audubon Society Quarterly* (82:2–18), commented: “There was some serendipity involved with this record because well-known ornithologist and birder Jon Dunn happened to be birding with Kenneth Brock and others when they happened upon this gull. No one in the group, other than Dunn, had previous experience with the species, and it may have been passed off as something other than a Kelp Gull, or might not have drawn

an immediate heightened attention, without Dunn’s presence.”

No such serendipity favored Maryland’s record. When first reported in January 1998 along the Patuxent River at Sandgates, the gull was thought possibly to be a Lesser Black-backed. It was identified as a Kelp Gull by Ottavio Janni, Rob Hilton, and Lisa Shannon only after it reappeared in 1999. This bird has evidently preferred its locality much more than did the one in Indiana, because it is still delighting gull fanciers six years later. In 1999 Marshall Iliff, mid-Atlantic regional editor for *North American Birds*, explained the likely reason why the bird lingered (53:154): “It proved to be extremely loyal to the small dock behind the Sea Breeze restaurant where the owners and employees became phenomenal hosts ... for the bird, which received a *gratis* daily meal of oysters on the half-shell.” The Maryland / District of Columbia committee tackled the record

with impressively exhaustive research, including all of the following: an analysis of DNA from a molted feather to determine its subspecies (regrettably inconclusive); the investigation of possible captive origin (which was ruled out because all known captives in the United States and Canada were accounted for); review of Kelp Gulls’ seasonal movements, breeding cycle, and range expansion; and consideration of the possible influence of El Niño in patterns of vagrancy. You can read the instructive report on the committee’s website <[www.mdbirds.org/mddcrc/pdf/kegudec.pdf](http://www.mdbirds.org/mddcrc/pdf/kegudec.pdf)>.

The excitement in Colorado began on 17 September 2003 when a larid initially thought to be a Lesser Black-backed Gull, but with a few features that didn’t seem to fit, was found at Jackson Lake in Larimer County. Its possible identity as a far more exciting species arose within a day when Christopher L. Wood [the *Birding* Photo Quiz editor] suggested on the CoBirds e-mail list that photographs showed it to be “at least reminiscent of Kelp Gull”. Other observers soon agreed. The gull spent at least two months at several lakes in Colorado’s north-central region, giving many birders an opportunity to seek it—not always an easy matter as it moved from place to place.

Kelp Gull was added to the ABA list in 2001 (*Birding* 33:568–572), based on a 1998 record in the Chandeleur Islands, Louisiana. The ABA Checklist Committee noted that problems of identification, the question of hybridization, and the matter of origin would be involved in evaluating any individual record. As the Indiana and Maryland committees’ deliberations proved, we should be prepared to wait years before a Kelp Gull record is analyzed thoroughly enough for acceptance.

## Clock Ticks for Sagelands

The future of North America's sagebrush habitat and the birds that depend on it was crystallized in a stark question by Steven T. Knick and six coauthors in 2003. Are sagelands and the possibility of saving them "teetering on the edge or [is it] too late"? Those bleak alternatives opened a report by the Cooper Ornithological Society's Committee for Conservation of Sagebrush Ecosystems (*Condor* 105:611–634). The review rang with a doomsday urgency and concluded with a call for swift and massive action to counter what the committee called a "disastrous scenario" in which the consequences of continued threats to sagelands "either will require long and expensive recovery or are largely irreversible."

Not surprisingly in a western landscape, virtually all of the threats were found to involve human activity. The authors listed a variety of destructive activities, but they blamed livestock grazing for the most widespread impact. Land managers have used prescribed fires, herbicides, slashing, bulldozing, plowing, and other mechanical methods to remove sagebrush from large areas and have reseeded the ground with non-native grasses to provide forage for cattle. Immense tracts once dominated by sagebrush have been converted to agricultural fields. Disturbance of the land has promoted invasions of unwanted alien plants such as cheatgrass, which alter the natural fire regime by fueling larger, more intense, and more frequent wildfires that multiply the destruction of sagebrush. The report estimated that up to 60 percent of the continent's sagebrush steppe now has either invasive plant species in the understory or has been planted with non-native annual grasses. Urbanization, roads, and utility lines have fragmented sagelands, and millions of acres are destined for oil, gas, or geothermal energy production. The direction in which demands for conservation must be aimed is clear, in the authors' view, because more than 70 percent of all remaining sagebrush habitat in the United States is publicly owned and administered by the U.S. Bureau of Land Management.

The report lists 18 bird species that are wholly or partly associated with sagebrush ecosystems. The most sagebrush-dependent among them are Greater Sage-Grouse, Gunnison Sage-Grouse, Sage Thrasher, Brewer's Sparrow, and Sage Sparrow. Others on the list that use sagelands to various degrees are Swainson's Hawk, Ferruginous Hawk, Prairie Fal-



To the undiscerning eye, the vast sagebrush landscapes of the Interior West can appear uniform and uninteresting. Yet the habitat is critical to a number of species, such as this sagebrush-obligate Sage Thrasher. Sagelands throughout the western U.S. are imperiled by various human uses, and management action is urgently needed. *Mono County, California; June 2003. © Brian E. Small.*

con, "Columbian" Sharp-tailed Grouse, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Gray Flycatcher, Loggerhead Shrike, Green-tailed Towhee, Vesper Sparrow, Lark Sparrow, and Black-throated Sparrow. For many of the species in sagebrush ecosystems, it is not known how habitat fragmentation influences productivity, density of breeding adults, size of home range, or probability of predation or of Brown-headed Cowbird parasitism. The first step toward effective land management is to improve our knowledge of bird and habitat relationships, the authors said. Their checklist of critical research includes such utterly fundamental requirements as adequate monitoring of the birds' populations.

Knick and his coauthors reported that conservation and restoration of sagelands are now high priorities of federal natural-resource agencies, but they cautioned that a two-part challenge remains: first, to convince the American public of the intrinsic value of sagebrush ecosystems and their unique biodiversity; and, second, to assure a firm commitment by federal and state agencies to provide the resources needed for effective conservation. A website sponsored by the U.S. Geological Survey <[sagemap.wr.usgs.gov](http://sagemap.wr.usgs.gov)> offers a lively introduction to sagebrush ecosystems and research. The site's extensive coverage shows that at least some of the crucial government agencies are aware of the crisis and are beginning to address it.

## Great-tailed Grackle Range

Pummeled by news of birds' hardships caused by human disturbance, it may be easy to overlook one North American species, the Great-tailed Grackle, whose vast current range expansion is aided by human activities. In 1880 the Great-tailed Grackle's breeding range in the United States—in fact, the northernmost portion of its entire tropical and subtropical range—was confined to approximately 64,000 square kilometers in southern Texas. By 2000 its U.S. range encompassed 3.5 million square kilometers in 19 states as far north and west as Minnesota, Montana, and Oregon. Geographic patterns and timing of the expansion were described by Walter Wehtje in 2003 (*Journal of Biogeography* 30:1593–1607) based on published reports, museum specimens, and old egg collections, as well as personal field surveys he made in parts of four western states.

There has been an enormous range extension toward the north and the west but almost no movement toward the east. Northward, an advance through Texas began around 1900, slowly reached Oklahoma in 1958, then progressed rapidly through Kansas, Missouri, Nebraska, and Iowa, finally reaching South Dakota in 1998 and Minnesota in 2000—a total distance of nearly 1,700 kilometers in a century. The movement has slowed recently, indicating that the species may be approaching the northern limit of its environmental tolerance. Westward, the breeding range reached New Mexico in 1913 and Arizona in 1936 (though an adult Great-tailed Grackle × Red-winged Blackbird hybrid had been collected there in 1928), and breeding was suspected in California in 1968. Subsequent advances through California on three fronts, east of the Sierra Nevada, in the Central Valley, and along the Pacific Coast, extended the range north more than halfway through the state. Northwestward, breeding began in Colorado and Nevada in the 1970s, Utah in 1980, and Wyoming in 1998. Two small disjunct breeding populations were established in Oregon in 1994 and Idaho in 1998, and Montana had a single breeding record in 1996. Wehtje said expansion into the Northwest may be accelerating. Eastward, in contrast, the advance has been slight. The first breeding record for Louisiana was not until 1958, for Arkansas not until 1976, and by 2000

the range still extended no more than halfway across either state. The eastern range limit coincides approximately with the 93rd meridian from Louisiana to Minnesota, as if a longitudinal wall were stopping the species from moving farther. Wandering is often followed quickly by breeding. With data from 19 states, Wehtje calculated an average of 5.8 years between a state's first sight report and first breeding confirmation. Vagrants have appeared at long distances beyond the species' recent breeding limits northwest to Washington and British Columbia; north to Saskatchewan and western Ontario; east to Illinois, Indiana, Mississippi, and Tennessee; and in the Great Lakes region in Michigan, New York, Ohio, and southern Ontario, and Wisconsin. Remarkable as well is an expanding winter range. Many Great-tailed Grackles migrate south in fall, but increasing numbers are wintering regularly to Colorado and Nebraska, and individuals have been seen as far north as Washington, Idaho, and South Dakota since the mid-1990s. Wehtje suggested that an important resource for their winter survival is the ready availability of grain in the large feedlots that have proliferated in places such as Kansas, Oklahoma, and Texas.

He further suggested that a willingness to associate with humans affords the species many opportunities for expansion. During field studies in Arizona, California, Nevada, and



The Great-tailed Grackle (adult male with Cheeto shown here) is one of dozens of bird species that have benefited from the development of the western U.S. Great-tailed Grackles expanded their range greatly during the twentieth century, especially because of the rise of agriculture and urbanization throughout the West. *Kern County, California; February 2004. © Bob Steele.*

Utah, Wehtje found the great majority of nests in or near areas of human activity. Breeding grackles were especially common in towns, city parks, restaurant parking lots, and campgrounds. Association with humans is by no means new behavior by the Great-tailed Grackle, Wehtje said. He cited sixteenth-century historical accounts linking it closely to Aztec communities in Mexico. Five hundred years later, the species finds modern society similarly rewarding.