The Changing Seasons: Foods for thought

MARSHALL J. ILIFF • 282 PERHAM STREET • WEST ROXBURY, MASSACHUSETTS 02132 • (EMAIL: MILIFF@AOL.COM)
DEREK LOVITCH • WILD BIRD CENTER OF YARMOUTH • 500 ROUTE ONE, SUITE 9 • YARMOUTH, MAINE 04096 • (EMAIL: YARMOUTHWBC@YAHOO.COM)

A testimonial to the effect of exotic fruit trees, this wayward Townsend's Solitaire took up residence at the home of Mark Anderson in Fairview Township, Erie County, Pennsylvania on 31 December 2006, remaining to feed on the fruit throughout the winter period (here 9 January 2007). The matter of invasive and exotic fruiting plants, and even exotic snails, is considered in some detail in the pages that follow. ***Photograph by Geoff Malosh.***

Weather

The title of the Changing Seasons column for last year's winter season (Brinkley 2006) lamented the "Winter that Wasn't." When we committed to writing this article in early January 2007, it looked as though we would simply be able to reaffirm the trends observed in that warm winter—but then came the cold weather! Much of the eastern two-thirds of the continent felt winter's grip from mid-January through early March, and some places, from Yukon to Colorado to Missouri, had heavy snow and ice to contend with. In the North, most fresh water had frozen by mid-February, with the predictable effects on grebes, waterfowl, and gulls. As often occurs, the Southwest showed an inverse pattern—cold and snowy (in montane areas) in the first part of the season, warmer in February—and the Pacific Northwest and Alaska also had most of their colder weather and storm energy pass through in the first half of the season.

In a radical departure from past Changing Seasons essays, we will refer the reader to the regional reports for longer discussions of the season's weather. We do this for three reasons: first, to reduce repetition in the journal overall; second, to emphasize that almost none of the bird records we consider below show obvious connections to meteorological phenomena, other than the general warming trend; and third, to make room for more discussions of trends rarely mentioned in this forum: exotic snails and plants and their effects on bird distribution. But first, we'll take a look at some of the trends in bird distribution that leapt out as we studied the regional reports.

Short-term phenomena?

Ted Floyd's Changing Seasons essay discussing the winter of 2004-2005 (Floyd 2005) considered, among other things, short-term trends in bird distribution—that set of birds that moved southward during that season in response to local conditions but that did not appear to form part of longer-term patterns. Floyd called them "Category S" birds. The poster children of such erratic irruptions are the winter finches and owls, grist for the mill of many a Changing Seasons essay. But this year was abysmal for irruptive species. With a few local exceptions, usually in areas where the species in question are regular winterers, the entire suite of northern irruptives—including Great Gray, Northern Hawk, and Boreal Owls, Red-breasted Nuthatch, Bohemian Waxwing, Pine Siskin,

Purple Finch, both crossbills, both redpolls, and Evening and Pine Grosbeaks—remained near their regular wintering ranges. We'll discuss below what few exceptions we found.

Snowy Owl • Numbers of this symbol of winter failed to impress anywhere east of the Rockies, but the Pacific Northwest had a modest flight (down from 100+ last winter), with at least 31 to Washington, four to Oregon, and one even to California, where the species is quite rare. This bird, in Solano County, became a local celebrity and was most easily seen by chartering local fishing boats! Aside from one in the previous winter, it had been almost three decades since California had recorded Snowy Owl.

Gray Jay • The fall Changing Seasons essay (Schmoker and Leukering 2007) noted an invasion of Gray Jays that took place in the upper Midwest and Prairie Provinces. By this season, Adam Byrne in the Western Great Lakes region reported that the "irruption petered out by December, leaving only a few strays in northwestern Minnesota." In the Prairie Provinces, Rudolf Koes and Peter Taylor noted that "Gray Jays continued their strong showing outside the boreal forest in southeastern Manitoba, but none was reported west of the Red River valley," with some birds staying through mid-March. North Dakota also had above-average numbers continuing through the winter, with at least 15 in Grand Forks County and three at Icelandic State Park. No Gray Jay movements were reported elsewhere, and we don't have the answers for why this species irrupted, but most passerines from the same region and habitat (e.g., Boreal Chickadee) didn't show similar signs, the notable (if minor) exception being American Three-toed Woodpecker, which appeared out of habitat or typical range around the Great Lakes in Ontario, Québec, Minnesota, and Michigan.

Bohemian Waxwing • The scene was certainly a unique one in eastern Newfoundland, where in December Bruce Mactavish described looking up through a pumpkin-colored rainstorm of waxwing droppings to a wheeling flock of 3000 Bohemians overhead; later in the winter, the maximum estimate had increased to 7500. Away from this northeasternmost province, the scene was more subdued, with a few flocks of tens in New Brunswick, Prince Edward Island, and Nova Scotia, whereas in Québec and New York they were "virtually absent." Pamela Hunt's prediction last winter (Hunt 2006) of a boom year in winter 2006-2007 in New England was not borne out; the winter instead saw the "lowest counts in a decade" of the species, with all reports coming from the region's northern reaches. There was no more evidence of a flight around the Great Lakes, where they were "very scarce" in Ontario, and Wisconsin saw its "poorest winter...in decades." The Great Plains, where the species is often rare, had a few birds visiting a single Nebraska locale, and the Great Basin had none, while Colorado had only one "notable" report. Even in the Yukon, numbers were down, which Cameron Eckert blamed on a May frost that affected the Mountain Ash berry crop. Other than Newfoundland, the only other northern areas that saw elevated numbers were Saskatchewan, where up to 4000 were in Saskatoon, and central and southeastern coastal Alaska. Thede Tobish attributed the late arrival of Bohemian groups to the lateness of the first appreciable snowfall; perhaps this was true in Canada as well.

White-winged Crossbill • Although this species occurred nowhere outside of its regular range, there was a large movement to certain areas of the Northeast. In New Brunswick, Brian Dalzell wrote that it was "abundant in north and central New Brunswick, with 500-1000 per day easily found in Madawaska, Restigouche, or Gloucester," the birds apparently attracted to a strong cone crop from White and Red Spruces and Balsam Fir. In Québec, Whitewingeds "remained abundant throughout the boreal and mixed forests; adults gathering nest material were reported in February, and a male was seen feeding 2 juveniles as early as 9 February." Large numbers also reached the boreal forests of central and eastern Maine, where the "largest flocks tended to be in the northern and western parts of the state." Almost none reached the southern coastal plain of Maine, and above-average numbers were not specifically noted from New Hampshire and Vermont, although the Adirondacks had "a moderate invasion." Crossbills are well known for their habit of occasionally breeding in midwinter, at least when food supplies are exceptionally high: this season, nesting behavior was noted at least in Maine, Vermont, Québec, Ontario, and Saskatchewan.

Redpolls • Although specifically noted as scarce or absent throughout the Northeast and west to Ontario, southerly Common Redpolls reached southwestern Ohio, Tennessee (two), Nebraska, and central Missouri. These birds were probably the fringes of a movement that brought "high numbers" to Saskatchewan and "good numbers" to the Dakotas, the only places that reported any real influx. The southernmost outlier was in northern Texas; there are few records of the species for the entire state. Hoary Redpoll, similarly noted as scarce (even in areas where regularly seen), was also represented by odd outliers this season, the most impressive of these being one in Story County, Iowa.

A necessary caveat in discussing trends of these northern irruptives: we tend to discuss "good years" and "bad years" from the point of view of our human population centers, which are largely urban. We have at best a very fragmentary sense of what goes on with these species in their core ranges. Often, the "best" years for the species themselves are those in which few or none move south of their normal range, which typically indicates good supplies of food in the north. Without observers in much of the Canadian taiga, we

A counting quiz

One of the most enjoyable aspects of reading through the regional reports is noticing the high counts of species that make one's jaw drop. Table 1 below shows just our personal favorites; if you want a challenge, cover up the right-hand column and try to guess the state—or country. Good luck!

Table 1. High counts of selected species, Winter 2006-2007.

Species	Count	Location
Mallard	28,700	DeSoto N.W.R., Nebraska
Canvasback	37,100	Lee County, Iowa
Lesser Scaup	11,400	Lake Barkley, Kentucky
Common Goldeneye	9235	Kentucky Lake, Kentucky
Ring-necked Pheasant	1107	Garrison Dam area, North Dakota
Sharp-tailed Grouse	498	Arrowwood N.W.R. area, North Dakota
Yellow-billed Loon,	7	Dungeness Bay, Washington
Manx Shearwater	261	Guadeloupe, Lesser Antilles
Northern Harrier	200	Lacassine N.W.R., Louisiana
Dovekie	9000	Pelagic waters off New York state
Military Macaw	200	Jaumave, Tamaulipas, Mexico
Eurasian Collared-Dove	929	Roswell area, New Mexico
Short-eared Owl	141	Grand Forks County, North Dakota
Common Raven	1377	Yellowknife area, Yukon Territory
American Dipper	53	Lower Little Susitna River, Alaska
Marsh Wren	400	Thornwell, Louisiana
American Robin	240,000	Lake Apopka, Florida
Worthen's Sparrow	56	Tanque de Emergencia, Coahuila, Mexico
Snow Bunting	10,000	Landglade, Wisconsin

can only speculate that this was a year with good food availability virtually across the continent in the north. But if the (presumed) good food availability this year translates to exceptionally high breeding success, a bumper crop of young might deplete whatever food supplies are available through the year. By the time you read this, attentive field observers in the north will already know the answer to this question.

"Zooties" and more

As with the winter finches, it is darn near impossible to write any Changing Seasons column without some comment on the real vagrant surprises—or "Category Z" birds (Floyd 2005). We'll limit the notes below to a summary of firsts for country, province, or state, birds sometimes characterized as "zooties." Among these are birds whose long-term expansions reached new territories; others are examples of birds previously overlooked, usually because they were only recently elevated to species level, or because interest in field identification of subspecies has grown in recent years. The summary of first state records below (many still pending official acceptance by the state records committee, of course) provides a good snapshot of vagrancy patterns around the country, including a few real shockers that should open our eyes to even more possibilities.

We were shocked to read, for instance, about an **Inca Dove** in Huntington, West Virginia 3-10 December; with a few exceptions (e g., Green Violet-ear), landlocked West Virginia does not lead the "East" in the discovery of western vagrants. The Inca Dove expansion has been a long-term phenomenon (Leukering and Gibbons 2005), but unlike the explosive dispersals of White-winged Dove and Eurasian Collared-Dove, Inca Dove had not reached the East—aside from a bird a month earlier in Maryland, 5-6 November. An Inca Dove noted 18 October–14 December in Hamblen County, Tennessee, that state's third, may also indicate an eastward turn in vagrancy. The species' eastward spread along the Gulf Coast may be a clue to this turn: in Louisiana, there were numerous indications that Inca Doves are no longer confined to the southwestern part of the state, while in Mississippi, 14 in Arcola 10 February were considered "amazing." Inca Dove's northern boundary in the Great Plains continues to move northward as well, and it is now regular locally across Oklahoma, with singles located this season as far north and west as Keith County, Nebraska and Morton County, Kansas. Although no signs of spread were noted beyond the two Colorado strongholds, Montana's first Inca Dove reached Terry 2 December (found dead two days later). There will almost certainly be more such records of "pioneers," successful or otherwise, in seasons to come.

On the East Coast, where birder coverage has been thorough for almost a century, it continues to astound that the pool of new species is not drying up. St. Pierre et Miquelon made the best progress in their overall list, with their first Golden-crowned Sparrow (a very rare vagrant anywhere in the East) and, remarkably, their long overdue first Barrow's Goldeneye. Maryland joined the Carolinas, Connecticut, Massachusetts, and Maine among East Coast states with a Tropical Kingbird record. Although Maine's record is from 1915, most other eastern records have been since 1990. Are these records explained by climate change—or because yellow-bellied kingbirds are checked much more carefully now than in the past? Given that the Maryland bird was identified as Ash-throated Flycatcher and then as a Western Kingbird before being nailed down, the latter explanation may be more plausible. New Jersey at last recorded Long-billed Murrelet, adding another eastern state to the list of states that have hosted vagrant Long-billeds; Florida, North Carolina, South Carolina, New York, Rhode Island, and Massachusetts also have records. A state-first Calliope Hummingbird was found in Connecticut, joining three others in Massachusetts November–January for a record total in New England. Both of these species have shown relatively recent (rather than long-term) patterns of dispersal.

Snow Geese are much less common in the New England region than in Atlantic states farther south (through North Carolina), and vagrant Ross's Geese are correspondingly much harder to find in the Northeast than in the Hudson-Delaware and Middle Atlantic regions (indeed, Todd Day notes that interest has "waned" in reporting this species, which is regular at Chincoteague National Wildlife Refuge in Virginia now). But Ross's Goose has been a very recent addition for Maine and Massachusetts—and one in Connecticut this winter will represent that state's very first. The East Coast's first came in 1971 at Pea Island National Wildlife Refuge, North Carolina, and records have increased almost exponentially since that winter. In the Palearctic, in Iceland and Greenland, populations of Pink-footed Goose have increased substantially in recent years, and, correspondingly, the tempo of vagrant records from the Northeast has accelerated: Pennsylvania, Connecticut, Québec, Newfoundland, and Massachusetts all have recent records, and older records in the East come from New York and Delaware. Rhode Island got into the game this year, when two state-first birds near Newport in January–February joined six other goose species, among them six Cacklings, a Barnacle, and four Greenland Greater White-fronteds.

In the 1990s, the prospect of multiple **Scott's Orioles** east of the Mississippi would have seemed preposterous. This season, both Kentucky and Pennsylvania had state firsts of this southwestern oriole, the former found in early February, the latter found 19 February The nearest record of the species comes from Georgia, where that state's first was documented 3-8 November 2002. Indiana's first Bullock's Oriole pales in comparison to its **Audubon's Oriole**, seen 24 January–15 February. Although Audubon's Oriole has been expanding slightly in Texas (note the Hill Country records in this season's report), it is essentially unknown as a vagrant and has not been recorded in the United States outside of Texas (other than a sight report from Ohio, 20 December 1995). Almost as remarkable, a state-first **Red-breasted Sapsucker** in Iowa joins the three in Texas as the only records from a state east of the Rocky Mountains. Could this species stray as far east as Louisiana and New York, as has Williamson's Sapsucker? West Virginia's first Inca Dove is discussed above, but its first **Virginia's Warbler** visiting a feeder in Harper's Ferry 10-15 February also represents one of the few eastern records before fall 2006, when singles were in Maine 28-30 September and Rhode Island 8 October; older eastern records come from New Jersey in October 1962, Labrador in September 1994, Nova Scotia in November 1994, and Maine in May 1998. Was this a boom year for the species in the East?

Several species showing long-term expansions crossed arbitrary political boundaries for the first time this season: Wisconsin's first Great-tailed Grackle finally turned up at Horicon Marsh, and a Eurasian Tree Sparrow snuck across the Iowa border to a Nebraska feeder. A Slaty-backed Gull (discussed below), first found in Iowa, also visited Nebraska this season. To the south, the Gulf Coast had two significant vagrants. First, a male **Common Eider** shot by a hunter in Nueces County, Texas 8 January is the first for Texas The Gulf Coast has no records of this species west of Florida but has a handful or more of the more northerly breeding King Eider Mlodinow (1999) discusses this and other discrepancies in eider vagrancy. Common Ei-

der has recently made inroads in the southern states, and on the West Coast, there have been recent firsts for Washington and California, both back in 2004. Perhaps more remarkable, a **Mangrove Cuckoo** (Figure 1) turned up along the Mississippi River in St. Bernard Parish, Louisiana 23-24 December. With about ten records of vagrants from Texas, falling primarily April–August (Lockwood and Freeman 2004), and few other records outside of their limited U.S. range, a Christmastime record from Louisiana would seem far-fetched, were it not for two Texas records from December.

West of the Rockies, the haul of firsts was somewhat lower but included some remarkable species. Gulls were at the forefront, with a Western Gull in Utah, Iceland Gull in New Mexico and Utah, and Lesser Black-backed Gull in Arizona (discussed below). A possible Gilded Flicker in southwestern Utah was surprising, considering that this species has been stable or declining in its northern and northwestern margins. Not without precedent, but still not expected anywhere away from Texas, a vocal **Couch's Kingbird** discovered feeding on dead honeybees in a western Arizona hamlet provided a remarkable first state record. Just two others had previously been identified west of Texas: one in New Mexico and one in Orange County, California, first found 31 December 1997. How many other Couch's have been passed over as Tropical Kingbirds? In Washington, a Whooper Swan at Snohomish was overdue, considering that California has had over a dozen records, and some of those birds have crossed into Oregon as well (McEneaney 2004). A **White-tailed Eagle** photographed at Kilauea, Hawaii Island (and seen eating a Laysan Albatross!) prompts the question: should West Coasters be watching for White-tailed Eagles too? Absolutely.

Figure 1. Although not entirely unprecedented in winter on the Texas Gulf Coast, this Mangrove Cuckoo in St. Bernard Parish 23-24 (here 24) December 2006 furnished the first record of the species for Louisiana. ***Photograph by Dave Patton.***

In Mexico, state lists have not traditionally been kept as passionately as in the United States, but there is increasing momentum in that direction, and students of bird distribution will be the beneficiaries, as the avian biogeography in Mexico is tracked more rigorously and accurately. The state lists for the Baja California Peninsula are being carefully tracked by the Regional Editors, with Erickson et al. (2001) as a framework. The northern state added the overdue Lesser Black-backed Gull, but the southern state (with a lower overall list) fared quite a bit better, documenting its first White-winged Scoter as well as its first Common Black-Hawk. But the zootie of zooties in Baja California Sur was one of the most remarkable of the winter season—a **Yellow-browed Warbler** found wintering in a bird-rich town at the peninsula's tip. With just three Alaska records and one sight record from Wisconsin, this Siberian bird was surely a shocker as a Mexican first. In Sonora, a Red-necked Grebe photographed at Puerto Peñasco this winter follows two previous December sight records from the same location (1996 and 2001). Some other Mexican highlights included an **Arizona Woodpecker** well east in Camino Real, Tamaulipas; this species has no known pattern of vagrancy within the United States, and a record so far outside the mapped range (see Howell and Webb 1995) may be more of a shocker than the Yellow-browed Warbler! Some other less surprising "firsts" included Red-shouldered Hawks in the Distrito Federal; descriptions of two Golden-cheeked Warblers and a heard-only Central American Pygmy-Owl, both first documented records for the Yucatan Peninsula subregion and for the state of Quintana Roo; and a first Vermilion Flycatcher for well-birded Cozumel Island, off the coast of that state. The Bahamas scored two new birds this season as well, its first well-documented (second reported) Bufflehead and its first-ever Eastern Bluebird, with its first Ross's Goose continuing from November. But the big news item in the Caribbean was the discovery of a **Brown Trembler** on Antigua; previous reports on that island had been poorly documented and so not given much credence.

While summarizing first state records in the East, we noted many of the more surprising vagrants from the southwestern states or Mexico were found: 1) at feeders, and 2) in late January through February. These attributes were true of a Townsend's Warbler in Massachusetts, Scott's Orioles in Pennsylvania and Tennessee, a Virginia's Warbler in West Virginia, and many others. Not surprisingly, these records coincided with the abrupt cold snap at that time, which almost certainly forced these non-hardy birds to the only consistent food sources: bird feeders. Birders who speculate on such things often debate detectability. For example, do western hummingbirds arrive in the East in August and September and tend to find feeders in late October and November, when it first turns cold? Or do they actually arrive in late October and November? The prevalent theory explaining the arrival of many southwestern vagrants

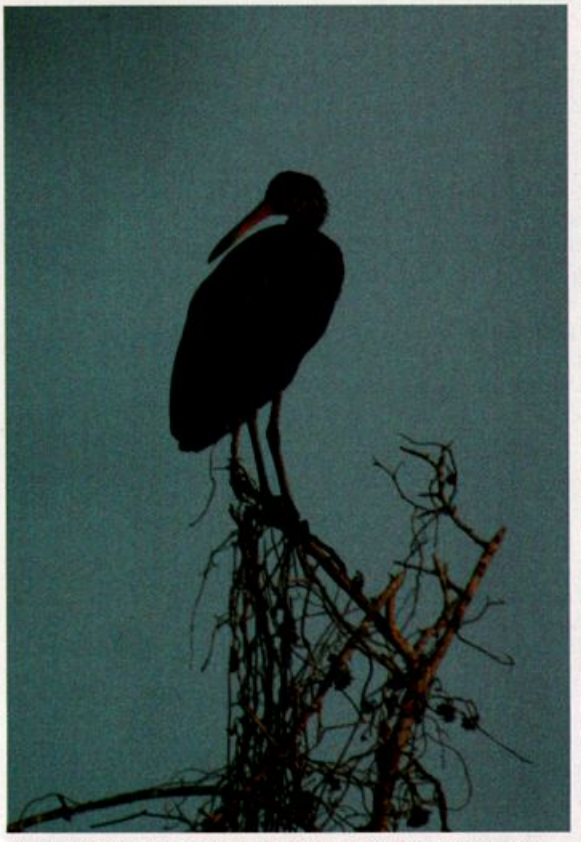

Figure 2. Like Snail Kites, Limpkins have been expanding their ranges in western Mexico in recent years. This bird was near Cruz de Loreto, Jalisco, Mexico 5 January 2007. *Photograph by Marshall J. Iliff.*

(including many hummingbirds, Cave Swallows, Ash-throated Flycatchers, etc.) has been that they reach the Northeast in warm-core sector winds that precede strong October–December cold fronts (Sullivan and Wood 2004). Heil (1981) tied late November–early December records of Lucy's Warbler and Black-chinned Hummingbird in New England to such a frontal passage during those weeks.

The pattern from this winter does not reject the hypothesis that many of the rarest western and southwestern vagrants arrived in the October–December period, when the strong cold fronts coincide with bird movements and migration. Too, autumn/early winter 2006 appears to have been an exceptionally good season for western vagrants in the East. With the mild climate across much of the Midwest and East in November, December, and into early January, survivorship for vagrant orioles and warblers wintering in woodlots must have been quite high—and the natural settings they inhabited kept them from being widely detected on Christmas Bird Counts, for instance. But when winter arrived with a vengeance in mid-January, we presume that those insectivores were suddenly between a rock and a cold place and were forced out of their previously insect-rich wintering grounds and sought out other food sources, finding hospitable feeders in places such as Jefferson County, West Virginia (Virginia's Warbler), Jefferson County, Indiana (Audubon's Oriole), and Cumberland County, Pennsylvania (Scott's Oriole). We know of no previous winter season with a comparable list of feeder vagrants across such a wide swath of the East and Northeast.

Of escargots and bird distribution

Iliff has been fortunate to conduct tours for the past three winters from a ranch at El Tuito, south of Puerto Vallarta, Jalisco, Mexico. In the six-year gap between Howell and Webb's 1995 *Birds of Mexico and Northern Central America* and the onset of *North American Birds* coverage of this area (in 2001), numerous changes in bird distribution took place, and two species—Limpkin and Snail Kite—illustrate perfectly how rapidly some tropical birds respond to changes in food resources. In January 2006, Iliff was surprised to flush a **Limpkin** from an irrigation ditch near Cruz de Loreto, Jalisco (Figure 2), and doubly stunned to see another at the mouth of the Río Ameca, north of Puerto Vallarta, a few days later. Brian Gibbons found more in the area the next month, including several in Cruz de Loreto and at Laguna de Quelele in adjacent Nayarit. In early 2007, at least 6 were at Cruz de Loreto, and Gibbons found one at a small pond in El Tuito. This season, Iliff was even more stunned to see a female-plumaged **Snail Kite** at Cruz de Loreto 7 January (Figure 3).

Howell and Webb (1995) show essentially the same range maps for both species: resident along the Gulf coast from Honduras and northern Guatemala north through the Yucatan Peninsula to central Veracruz, with a small lobe across the Isthmus of Tehuantepec to the Pacific Slope of Oaxaca for Snail Kite and a coastal sliver from southern Oaxaca to El Salvador for Limpkin. The recent history of Snail Kite in Panama is instructive. As of Wetmore's (1965) treatment of the country's avifauna, there had been but a single record. The species' status had changed little as of Ridgely and Gwynn's (1989) update on the country's avifauna: five sight records from the Canal Zone and the western province of Chiriquí, including "several pairs evidently breeding (one nest seen)" in 1973. Angehr (1999) detailed the dramatic next chapter. Although much of Panama was forested and devoid of extensive marsh systems during the nineteenth century, the successful completion of the Panama Canal in 1914 brought with it the creation of Gatún Lake, which now occupies 420 square kilometers in central Panama. Snail Kite remained essentially unknown from this area for 80 years, with its closest population centers in western Colombia and the Tempisque Basin of Costa Rica (350 and 650 km distant, respectively). Starting in the late 1980s, the apple snail *Pomacea lattrei* (per Cazzaniga [2002], *Pomacea* taxonomy is complex; *P. lattrei* may be a synonym of *P. flagellata*) was introduced from Guatemala in an attempt to control the invasive aquatic plant *Hydrilla verticillata*. The introduction was successful, and the snails spread throughout the lake within a few years and drastically reduced the *Hydrilla*. A native *Pomacea* snail had provided an unsuitable food source for Snail Kites, as it was a bottom dweller, but this new species, which fed on floating vegetation, proved much more accessible to Snail Kites, and their colonization of the area followed within just a few years. Kites were first observed at Barro Colorado Island in Gatún Lake in May or June 1994, with 14 present in February 1995, along with several nests under construction. Three months later, 37 kites were found at two sites at Barro Colorado, and numbers have since swollen such that up to 100 can be seen in this area on a single train trip across Gatún Lake. Angehr (1999) considers it possible that the species expanded to Barro Colorado after first colonizing another part of the lake, but whatever the vector, the kites quickly found and exploited the new food resource at Gatún Lake, colonizing within less than a decade. Females may breed at only 10 months of age (Angehr 1999), but even so, the extremely rapid colonization of this area is remarkable and suggests immigration. The Central America report comments twice on the species this winter. Fifty were counted at recently created wetlands site 8 kilometers west-northwest of Cañas, Guanacaste Province, Costa Rica, along a presumptive flight path for birds moving be-

tween the two major population centers at Palo Verde and Caño Negro: another example of Snail Kites colonizing a new area.

Returning to western Mexico, we find a similar tale. Both Limpkin and Snail Kite are now regular at the Manzanillo marshes of Colima, about 120 kilometers southeast of Cruz de Loreto. A single Limpkin there in November 1994 constituted the first record north and west of the area of regular occurrence in eastern Oaxaca, some 1000 km to the east-southeast (Howell 1994). Two there in March 1995 swelled to six in December 1995 and 20 in February 2001 (Howell 1994, 2004). By 2000, the species had also spread 270 km north-northwest to San Blas, Nayarit (Howell 2004), where it is now rather common. In Jalisco, Palomera-García (2006) reports records at a minimum of four locations in southern Jalisco from 1999, 2001, and 2005.

Although lagging a few years behind the Limpkin, Snail Kite's immigration in Mexico has been similar. Palomera-García (2006) reported a nesting pair at Manzanillo marshes as early as 1998, and Howell (2004) further reported records of three birds (including an adult male and a juvenile) from the Manzanillo marshes in February 2000, which had grown to five birds by February 2002. Howell (2004) further clarifies the nearest Pacific Slope record, mapped by Howell and Webb (1995): four (one adult male, three female/immatures) at Ometepec Junction, in eastern Guerrero, 18 April 1988, about 700 kilometers east-southeast of Manzanillo. Snail Kites were discovered at San Blas shortly after Manzanillo, being noted there from January 2000 on (Howell 2004). Palomera-García (2006) reports Jalisco's first Snail Kite report, a sight record from Laguna de Tule, Barra de Navidad, in December 2004; the one photographed at Cruz de Loreto could have been a wanderer, but the species does have the potential to colonize the irrigation canals and scattered marshes, as have the Limpkins in the area.

Limpkin and Snail Kite have remarkable dispersal abilities that are under-appreciated by birders. Limpkin has occurred north to North Carolina, Virginia, Maryland (twice), and Nova Scotia. Snail Kite has a less impressive pattern of vagrancy, but two have reached south Texas (22-26 July 1977; 17-29 May 1998; Lockwood and Freeman 2004), and one adult male was widely enjoyed in South Carolina during at least 14 May–June 2007; the bird dined extensively on crayfish. But vagrancy is one thing, while colonization is yet another, especially for a dietary specialist. The story of colonization of Snail Kites in Panama prompted us to look more carefully at the situation in western Mexico. It turns out there is a story here as well. *Pomacea flagellata*, the favored food of the kites and Limpkins in southeastern Mexico, had historically been restricted to Veracruz, Chiapas, and the Yucatan Peninsula. However, in 1990, this aquatic snail was discovered in Colima, and its range appears to have since spread to at least Laguna del Rosario, Jalisco, where Jalisco's first was recorded when a shell was recovered after the snail was eaten by a Limpkin (Palomera-García 2006). One might assume that the snail is established around San Blas as well, given the presence of Snail Kites and Limpkins there. Birders in western Mexico should be alert for the presence of *Pomacea* snails at other freshwater locations and likewise should be aware that Snail Kite and Limpkin may continue to expand their ranges. Furthermore, birders in Texas and on the Gulf coasts should be aware that a suitable food source, more so than dispersal ability or any other limitation, may be the limiting factor for those species there. Introduced *Pomacea*, which could have serious environmental repercussions should they spread, have been found in multiple counties from Houston to southern Texas (Howells 2005), which raises the possibility that Limpkin or Snail Kite could colonize southern Texas as well!

Figure 3. This female-plumaged Snail Kite was near Cruz de Loreto, Jalisco, Mexico 7 January 2007, the first to be photographically documented in Jalisco and one of very few records from that state. *Photograph by Marshall J. Iliff.*

Larophilic nirvana

Has the reader noted the steady increase in photographs of gulls in this journal over the past decade?

From the Pacific Northwest to Baja California, Utah to Arizona, Minnesota to eastern Mexico, and New Hampshire to Florida, this winter was a great one for gulls and those who watch them. Although Ross's and Black-tailed Gulls were conspicuously absent, two species stole the show: Lesser Black-backed and Slaty-backed Gulls. The Lesser Black-backed Gull invasion of the continent has a saga for well over 50 years. It was first reported in North America in 1934 (Edwards 1935) and first confirmed with a specimen from Assateague Island, Virginia/Maryland, in 1948 (Buckalew 1950). As recently as the late 1970s, it was still a red-letter bird along much of the East Coast. The pace quickened in the 1980s and by the 1990s, triple-digit counts were to be had at select East Coast sites (especially Bucks County, Pennsylvania). In some regions, the species has become so numerous as to escape enumeration, though Ricky Davis couldn't help but remark on high counts in the Southeast (e.g., 52 at Tybee Island, Georgia) this season, and Pennsylvanians bragged of their 315 counted at Peace Valley Park. (Anyone who doubts that the species is nesting in North America should visit the 200 largest Herring Gull colonies north of the Canadian border to prove the case. But this is a winter column, so no more talk of nesting birds.)

Lagging somewhat behind this boom on the East Coast has been a burgeoning number of midwestern and western records. Away from the immediate East Coast, the species drew comment from Florida, Indiana, Illinois…well pretty much every region south of Canada (the Western Great Lakes and Pacific Northwest being notable exceptions). Among several comments on the species in Texas were that El Paso County got its third, and in Colorado counts of five and four at a single location are already prompting yawns; Colorado got its first in 1977 and its second in 1988. In well-watched California, the state's first came in 1978, followed by five records 1985-1987; the next record in 1994 marked the beginning of annual occurrence for the species, with a total of 23 records by the end of 2003; by the end of 2005, another five had been found. But last winter, the dam broke, and the pattern in California reverberat-

ed throughout the West. At the Salton Sea alone, there were no fewer than nine (possibly more), with two elsewhere in the state for a record total of 11 birds. Baja California birders have been actively seeking the peninsula's first for several years now, and this year at least four were found: three in the Mexicali Valley and one within yards of the Baja California Sur state line. Even in gull-depauperate Arizona, a state first showed up near Palo Verde 10-16 December, while New Mexico got its second at Elephant Butte Lake 24 January–7 February. In Utah, three adults were scattered around the state 8 December–11 February, and two were in British Columbia. South of the border (and away from Baja), there were no other Pacific reports, but eight at a single location in Tamaulipas seemed impressive, and amazingly the species is now considered so commonplace on the Yucatan Peninsula that this season's reports were not detailed. Back on the Atlantic Coast, Christmas Bird Counters found 31 Lesser Black-backed Gulls on Grand Bahama Island 15 December.

So, two questions remain. How many years until Hawaii gets its first Lesser Black-backed (our guess is less than three), and where and when will the North American nesting grounds be found? The species likely has multiple colonies in Canada that have been creeping westward. Maybe this year was the year that the westernmost colony had a boom year of recruitment of new adults and new fledglings (a handful of birds west of the Plains states were first-year birds). Oops—did we say no more talk of nesting birds?

Although Slaty-backed Gull originates from the other side of Eurasia, the question puts itself: is Slaty-backed the new Lesser Black-backed? Consider its history in North America. The first Slaty-backed for the Lower 48 was a red-letter adult found in St. Louis, Missouri/Illinois, in December 1983, back when any dark-backed gull there was red-letter. Goetz, Rudder, and Snetsinger (1984) wrote an excellent paper detailing the identification of this outlandish vagrant, with special attention to wing pattern. They describe the known distribution at the time as "uncommon summer and rare fall visitor to western Alaska and Aleutians, rare on north coast [...] Additionally, it has become a fairly regular fall visitor as far east as Anchorage on the Pacific coast (T. G., Tobish, pers. comm.), although it had been unrecorded at Anchorage prior to 1979." Although recent summer counts of up to 30 at Nome seem high (*North American Birds* 60: 566), they are matched by counts of 39+ as far back as to 9 July 1984 (Kessel 1989). Even this year, nothing unusual seemed to be afoot in Alaska. Tobish comments: "the only Slaty-backed Gull away from the Bering Sea was a single that was considered a local returnee." Prior to the St. Louis bird, the only record south of Alaska was one at Clover Point, Victoria, British Columbia on 1 March 1974 (Roberson 1980); in the years since then, singles have appeared in such diverse locations as Iowa/Illinois (December 1988–February 1989), Brownsville, Texas (February 1992), Niagara, New York (November–December 1992), Mississippi (February 1993), Indiana (March 1993), Key West, Florida (September 2002), and Balmorhea Lake, Texas (December 2003). Reports of Slaty-backed-like gulls have been equally widespread. But surprisingly, in the intervening years, its abundance in Alaska has changed little.

The pattern south of Alaska has clearly changed. In January 2005, California got its overdue first at Half Moon Bay, San Mateo County, followed by two more at the same location in the next two months. The next winter, 13 more were reported, most of them at Half Moon Bay, and a 2001 photograph from Half Moon Bay surfaced and was accepted by the California Bird Records Committee. This winter there were "only" two at Half Moon Bay, but either due to increased awareness elsewhere (or, more probably, to a larger "invasion" throughout), seven others were found at four new locations from Monterey County all the way north to Humboldt County (with more to follow in the spring report). Could this widespread invasion be tied to the "amazing" 39+ Glaucous Gulls in northern California? Although recent Slaty-backeds have been restricted to the northern half of the state, California's chronological first was just accepted when a 5 February 1995 record of a second-winter in Ventura County was reevaluated and accepted by the California Bird Records Committee. A dark-backed adult gull in Hawaii may have been a Slaty-backed, a species with just a dozen state records. Mexico awaits its first, presuming that a "probable adult" reported 12 December from Playa Bagdad, Tamaulipas does not qualify as the country's first. To the north of California, Washington had just one this year, its eleventh (10 since 1994).

To the east, an adult photographed in western Iowa 17-21 December, the state's second, may have been the same bird that provided a potential first for adjacent Nebraska 21 December. In the western Great Lakes, Minnesota's second (the first was 21 July–14 August 2006; *North American Birds* 60: 530-531) was furnished by an adult in Dakota County; a fourth-winter in Washington County that moved to the Mississippi River provided a Pierce County, Wisconsin record too. Wisconsin had two other reports as well, but photographs showed that one of those was likely the same bird seen in Pierce County (further demonstrating the importance of securing good images of these birds!). New York had two, one at Niagara Falls 2-3 December, the other photographed at the Monticello Landfill, Sullivan County, 24 January–10 February. In southern New Hampshire, a remarkable landfill that had hosted New England's first Slaty-backed (found 23 December 2003) had another adult this winter 2-22 January; and, when Iliff, Jeremiah Trimble, and Bob Stymeist visited 18 January, they found a third-winter Slaty-backed! Finally, at our easternmost extreme, at least three different adults were at the gull mecca of St. John's, Newfoundland this winter, possibly the same as the two adults and one third-winter found there the previous winter (the only previous provincial records). Two decades after the second Lower 48 record, no fewer than *eleven* Slaty-backed Gulls were found. Can Iceland's/Europe's first be far behind? So if the occurrence of Slaty-backed Gull is not increasing in Alaska concurrent with its explosion elsewhere, what is going on? Have breeders colonized High Arctic areas east of Alaska? Are "reverse migrants" coming over the pole? Are seafaring birds shortcutting from Kamchatka to California? Or is Alaska vast enough, and the birds' transit time short enough, that an increase there has not been apparent?

And what of Vega Gull? This (relatively) distinctive form of Herring Gull (*Larus argentatus vegae*), split as a separate species by some authorities, outnumbers Slaty-backed Gull essentially throughout western Alaska, but it remains little known away from its "normal" range. In Alaska, records away from normal areas of occurrence on the Bering Sea and Aleutians are extremely scarce. To the south, there has been a rash of sightings, many with photographs but few with consensus, from the California coast and spottily east to at least Texas. This year, one at Renton 28 December was considered Washington's first, while the northern California editors cautioned: "as we gain an understanding of variation in the Herring Gull complex, it will be interesting to determine the status of this taxon in the Region." *Larus argentatus vegae* remains an identification

enigma. Most reports thus far have been of immatures; why are there not more adults? Not only is it a gull (and thus variable and hard to identify), but we are still quantifying, or rather speculating upon, the normal variation within *smithsonianus* Herring Gulls, especially those on the West Coast that seem more prone to show a tail band (Howell and King 1998, Howell and Dunn 2007). European Herring Gull (*Larus argentatus argentatus/argenteus*), which would seem a likely candidate to occur across much of the continent, may in fact be inseparable in subadult plumages from *vegae* (Howell and Dunn 2007). And what about the potential of hybridization between *smithsonianus* and Lesser Black-backeds? Could genetic analysis of apparent hybrids resolve some of the riddles we observe in the field? Would more color-banding of gulls at their colonies help? Well, if nothing else, North American gull-watchers will continue to have something to discuss on the Frontiers of Field Identification listserv for the next decade or two.

Ignoring all caveats about taxonomic uncertainties in the Thayer's–Kumlien's–Iceland complex, we note that "Iceland Gull" was reported in no fewer than ten states west of the Mississippi River this year. Although many of these will be subject to deliberation by state records committees, it seems apparent that some Iceland Gulls do occur as vagrants as far west as the Pacific. From East to West, notable reports this year included: Florida's eleventh at Perdido Landfill, Escambia County, the sixth and seventh for Alabama; a first-winter bird at Pace Point, Tennessee; "good numbers" in Wisconsin and two in Minnesota, two in Iowa; two in North Dakota; and a possible sixth state record for South Dakota. Farther west and south, Iceland Gulls get really newsworthy. In Texas, single first-winter birds at Houston and El Paso follow just a handful of previously accepted records. The El Paso bird shared its time across the border in New Mexico, furnishing that state's first, which was quickly followed by its second 100 kilometers to the northwest. Colorado had one or two as well, and Utah probably had that state's first. Along the Pacific Coast, three reported as Kumlien's in Alaska included two at Ketchikan in February and one in Cook Inlet; Alaska has had "a handful of documented" records, "mostly from autumn." And finally, two different birds were reported from northern California, a state where Iceland Gulls have a notoriously difficult time getting approved by the state records committee, although two recent records (of classic-looking Icelands) gained much easier acceptance than such birds did a decade ago. In a winter that seemed so good for the species south and west of its normal range, Ricky Davis noted that "white-winged gulls were practically absent" in the Southeast, with just one report of Iceland; white-winged gulls were generally scarce around the south of the Great Lakes and Pennsylvania as well. But this is not unusual in a warm winter. Most reports of strong numbers of white-winged gulls in the Midwest and East came in after the onset of cold weather in mid-January.

Other gull records that caught our eye included: third-winter Western Gulls in Utah (first state record) and Nevada; a Thayer's Gull well documented in Provincetown, Massachusetts, a state with inexplicably few records; a probable Great Black-backed Gull at Redwood Creek, Humboldt County; an odd-looking gull that resembled a Kelp Gull × Lesser Black-backed Gull cross at Playa Bagdad, Tamaulipas, Mexico (heaven knows what that was); and the Salton Sea's first Black-headed Gull. Always among the sexiest of winter gulls (and increasingly so as their habitat melts away), Ivory Gulls reached Anchorage, the Yukon, and the lower Hudson River of New York. The latter bird was an adult enjoyed by a large number of lucky birders who got there on the one day that its presence was known to birders. Two more were in eastern Newfoundland, where one brazen bird "came into a backyard kennel to pilfer dog food"—we've instructed our own dogs (Chula and Sasha) that if they share their food politely with any *Pagophila*, we'll make it worth their while in prime rib!

We can't help but conclude with a wet blanket. Gulls are gulls. This means that not only do we have to contend with a dizzying array of age-related plumage variation, we must also sort out an equally dizzying array of individual variation. And a glance at the 25 pages of hybrid gull photos in the superb new *Gulls of the Americas* (Howell and Dunn 2007) should hopefully inspire caution in even the cockiest larophile. Six of those photographs are of presumed Slaty-backed hybrids. An oft-cited paper by Gustafson and Peterjohn (1994) suggests that such hybrids are rare. The authors ascribe mantle shade as ranging from as dark as *graellsii* Lesser Black-backed to as pale as Vega Herring Gull. King and Carey (1999) offered a contrary opinion, pointing out that known hybrid pairings have been reported with Glaucous-winged and Vega Gulls, and that the wide variation in mantle color reported by Gustafson and Peterjohn (1994) is almost certainly due to this hybridization. In fact, the pale individual shown in Figures 6 and 7 of the Gustafson and Peterjohn (1994) article shows bleached wingtips and is almost certainly a hybrid with a paler-winged species such as Glaucous-winged or Glaucous. Similarly, the Ohio record has been questioned (e.g., Mlodinow and O'Brien 1996) and does not appear to us to be a pure Slaty-backed Gull. We point this out to stress that not all published information on Slaty-backed Gull seems to be correct and also to stress that hybrid Slaty-backeds are a distinct possibility. Given that Slaty-backed Gulls in eastern Siberia are the most geographically proximate to the United States, and given that those birds on the limit of their range may be the most likely to form hybrid pairings with another species (e.g., Glaucous-winged Gull), we should be especially cautious in assessing our out-of-range birds. Indeed, a Slaty-backed identified in Maryland 6-23 February 1999 had a wing with an odd pattern and a narrow white trailing edge; some have offered the opinion that it was in fact a hybrid, possibly with Vega Gull. Although it is now clear that Slaty-backed Gull can appear literally anywhere, state authorities should always consider the hybrid question first and assure that the bird is consistent with known identification criteria—birds with paler mantles than normal should not be promoted as Slaty-backeds. Much the same could be said for extralimital Lesser Black-backed Gulls, Iceland Gulls, Thayer's Gulls, Kelp Gulls, Great Black-backed Gulls, and a number of other species. Not only can hybrids with these species cause confusion, but sometimes hybrid combinations of two totally different species can end up resembling another (e.g., Kelp Gull × Herring Gull hybrids can resemble Lesser Black-backed Gulls; Dittman and Cardiff 2005). As more and more rare gulls are sought and found around the country, we would all do well to take a little extra time to ask of each one: Why aren't you a hybrid?

Paying ever closer attention

It is gratifying to see more and more regional reports discussing interesting bird records at levels other than that of species. Talk of *maxima* Canada Geese can be found from southern California to Rhode Island; *elegans* and *lineatus* (group) Red-shouldered Hawks were identified in Idaho and New Mexico, respectively; a Brown Pelican in inland Chiapas 21 January 2006 was identified as *californicus*, and Héctor Gómez de Silva commented on an unseasonable Gray Hawk in Durango that resembled *costaricensis* (Gray-lined Hawk), even though that taxon is known no farther

north than Costa Rica! A number of other surmountable frontiers remain open to North American birders: field-identifiable subspecies of Sandhill Cranes, White-winged Scoters, Common Eiders, Green Herons, and many others present challenges that birders have only begun to study. Authoritative identification papers on all of these groups remain to be written (from a North American perspective, at least), and the distributional limits of the taxa remain to be mapped in detail.

While it is gratifying to read so much in these pages about subspecies, it is just as frustrating to see instances where subspecies or subspecies groups are *not* reported: was the Niagara River Mew Gull not identified to subspecies? What about other Red-shouldered Hawks in Kansas, Nevada, and Mexico City? Are those who find out-of-range Willets not specifically noting the subspecies, even with great new identification sources available (O'Brien 2006, O'Brien et al. 2006)? Or are Regional Editors not adding a word (Western, or *inornata*) to clarify the identification? (Or is it already obvious that these pertain to Western Willet?) A disappointment to us as New Englanders was that *borealis* Common Eider received no mention in the New England report. One was found and superbly photographed by James Smith at Provincetown, Massachusetts 28 December 2006–4 January) 2007, and another followed at Gloucester 1 January 2007 (ph. D. Pavlik et al.). This subspecies has been known from specimens from Maine (A.O.U. 1957), Massachusetts (Chalif 1947, Veit and Petersen 1993), Connecticut (A.O.U. 1957), and New York (Levine 1998) but had not been identified by field birders south of Maine, where at least two recently have been found (D. Lovitch, pers. obs.; L. Bevier, pers. comm.) prior to this year. Are they regular in small numbers among flocks of *dresseri* Common Eiders in Massachusetts and south to Montauk, New York? Are southerly Common Eiders necessarily the more proximate *dresseri*, or might some *borealis* "overshoot," as do King Eiders (which breed much farther north than *borealis*)? We won't really start to understand its status until field birders start tackling this problem—one that some British birders have begun to investigate (Garner and Farrelly 2007). And by the way: Of what subspecies was the Texas Common Eider specimen?

The regional accounts are still reverberating from the Cackling Goose split in 2006. In just a few years, most East Coast states have learned that nominate Cackling Geese are regular migrants or winterers in small numbers. Yet after the split, in many states the species was immediately placed on the review list for the state records committees, which have been scrambling to identify the true temporal and spatial parameters of their occurrence. Had more birders been paying attention to, and documenting, these smaller geese prior to the split, our collective catch-up period would not have been so frantic. Are birders (like politicians) not learning from history and thus doomed to repeat it? On the other side of the coin, the good news from the Canada Goose split—and the hint of further action by the A.O.U. (Banks et al. 2004)—seems to be that some birders have been prompted to work out the subspecies within the two white-cheeked goose species. Baja California and Orange County, California both reported first solid records of Lesser Canada Geese (*B. c. parvipes*) this season, while the New England report mentioned the identification of several Giant Canada Geese (*B. c. maxima*) in Rhode Island and two more in the same Orange County flock. Although definitive identification and taxonomic articles for the subspecies within the white-cheeked goose complex have not been published (but stay tuned to this journal), it is good to see *North American Birds* contributors doing some of the legwork.

Invasive plants & our avian environment

In the Changing Seasons essay for last winter, Brinkley (2006) discussed possible explanations for changes in winter bird distributions. Specifically, the discussion followed some of the causes of the increasingly northerly occurrence of the so-called half-hardies and other birds "overwintering" north (or sometimes west, or upslope, etc.) of expected ranges. Brinkley cited a paper by Valiela and Bowen (2006), which analyzed Christmas Bird Count data from Cape Cod and concluded that the "local amelioration of winters, as well as global-scale warming, have been followed by clear shifts in the winter avifauna of Cape Cod, with southern species becoming more common and northern species less so." But other factors are surely involved in the shifting ranges of such birds as well; Brinkley (2006) mentions habitat modification (succession, destruction, or in some cases, creation), stochastic weather events, breeding success/failure, "reverse-migrant" phenomena, misoriented migrants, and observer effort. Most likely, surely, changes in bird distribution occur because of a combination of these factors, as well as others we have not even begun to consider Christmas Bird Counts, Breeding Bird Surveys, Project FeederWatch, eBird, and the many sightings found within the pages of this journal can give us a more refined understanding of where birds *are*—why they are found where they are is a far more challenging set of questions.

But to the maelstrom of weather, climate, and vagrancy, which occupies so much of our interpretive framework in birding, and nowhere more so than in *North American Birds*, we would add another factor worthy of consideration: the proliferation of non-native and invasive plants, especially those that produce large quantities of fruit eaten by birds The explosion of invasive plants is certainly having an impact in New England and most other places. In the Northeast, for instance, plants such as Oriental Bittersweet (*Celastrus orbiculatus*), various species of honeysuckle (*Lonicera* spp.), Russian Olive (*Eleaegnus angustifolia*), Multiflora Rose (*Rosa multiflora*), *Euonymus* spp., Porcelain-berry (*Ampelopsis brevipedunculata*), and others provide an abundant supply of foodstuffs when native foods are less readily available. They often grow in disturbed areas and produce fruit in larger quantities than many native species Meanwhile, climate change, development, disturbance, and even such factors as seed dispersal by frugivorous birds themselves continue to promote the spread and increase of a number of these plants.

It has long been understood that such plants could increase survivorship for some species—and "reverse migrant" and/or "lingering" birds are among those associated with invasive exotic plantings. Furthermore, these dense patches of foodstuff may increase our detection of said species by keeping them alive (long enough to be found), concentrate them in such locations that birders are learning to check, and perhaps because they tend to flourish in disturbed areas close to humans. No matter how the half-hardy gets there, once it finds the food, it can survive, and it can then be detected by the growing legions of birders Many have opined, too, that species such as Rufous Hummingbirds have changed their winter distribution in response to artificial food sources, including both feeders and plantings. Why would a winter-season frugivore (or nectarivore) fly to Central America if it doesn't have to—particularly in ever-warmer winters? California offers a number of examples: orioles wintering in *Eucalyptus* groves, coastal fields of fennel holding fall-migrant passerines, and Mediterranean grasses in the desert supporting grassland-nesting species that were probably much rarer prior to

invasion, such as Western Meadowlark. From coast to coast, examples of native birds exploiting non-native plants are many.

In Portland, Maine, in one of Lovitch's local patches called Dragon Field (an old municipal landfill), a Gray Catbird spent the winter of 2006-2007. Lovitch checks this site nearly weekly in the fall, and each time a catbird was present in one corner of the park. Due to the frequency of his visits, and the behavior (feeding within the same row of shrubs) of this bird, we are reasonably certain that this bird was present since at least mid-September, when most of our other catbirds had moved on. Thus this catbird may have remained from the summer breeding area (or close nearby) through the winter months. Between October and April, the bird fed on Staghorn Sumac (*Rhus hirta*), Multiflora Rose, Oriental Bittersweet, and "bush" honeysuckle—either Morrow's (*Lonicera morrowii*), Amur (*L. mackii*), Tatorian (*L. tatorica*), or Bell's (*L. X bella*), all rather difficult to distinguish. All except the sumac are invasive plants here. In early April, this catbird began to sing, well over a month before any other catbirds had arrived in Maine. When other catbirds had arrived, this bird was already on territory and likely therefore had the "home field" advantage. Of course, without having banded the bird, there's no way to confirm whether or not this was the bird that successfully bred here this summer. Is this Gray Catbird an example of a "pioneer" proposed by Brinkley (2006)? Although it was an extremely mild winter, it seems unlikely that this bird would have survived without the non-native plantings (or southward migration). A few kilometers away, in a park on the urban Portland peninsula, two other catbirds wintered, there feeding on Russian Olive, Oriental Bittersweet, bush honeysuckle, Multiflora Rose, crabapple (*Malus* spp.), Mountain Ash (*Pyrus americana*), and hawthorn (*Crataegus* sp.). Even without speculation on any long-term changes in a species' wintering range or migratory patterns, it seems clear that invasive plant food sources are playing a role in both survivorship and detection of half-hardies, whether they are early, late, lingering, or just plain lost. In the same season, birders in New Hampshire noted a Fork-tailed Flycatcher at Odiorne State Park feeding heavily on Oriental Bittersweet and buckthorn (*Rhamnus* sp.), while online discussions in Massachusetts debated the value of invasive plants and included considerations of what lingering half-hardies were observed eating them.

There is no question that our birds are eating invasive plants; and there is no question that birders are keenly interested in a number of these birds. One study (White 1989) suggests that passerines' use of exotic fruits in New England and the mid-Atlantic states has increased from 13% of fruit taxa recorded in frugivore stomachs in the period from 1881-1950 to 33% by the 1980s. Lafleur (2006) found American Robins and European Starlings were as likely to take Glossy Buckthorn (*Frangula rhamnus*) fruits as they were to take Highbush Blueberry (*Vaccinium corymbosum*), even though the buckthorn was unrecorded in robins' diets prior to 1950. Morrow's Honeysuckle was found to be one of the fruits most frequently consumed by American Robins and European Starlings 1988-1993, despite the fact that it was not recorded in pre-1950 diets of these species (Whitmer 1996).

So what were frugivores up to in winter 2006-2007? According to the regional reports, large numbers of American Robins and Cedar Waxwings irrupted into Florida and down into Mexico. In the Torreón area, in the state of Coahuila, Mexico, roadside mulberry (*Morus* sp.) plantings helped to sustain American Robins and Cedar Waxwings. Mountain Bluebirds and Varied Thrushes were on the move in the West, Midwest, south-central Canada, and elsewhere; the latter, when found out of range in winter, often appears in backyards or around ornamental plantings. Orioles, notably Baltimore Orioles in the East and in Southern California, continue to be found with increasing frequency during the winter season. In Alaska, Thede Tobish noted that Bohemian Waxwings once again wintered in "good numbers" in Anchorage, thanks to the planting of non-native fruiting species for landscaping. While two Gray Catbirds wintered in Berks County, Pennsylvania, surviving on Multiflora Rose, an Ash-throated Flycatcher in Saco, Maine was seen feeding on Multiflora Rose, Oriental Bittersweet, and apple (*Malus* sp.); Virginia's Ash-throated was found in a copse of sumac and blackberry (*Rubus* sp.). Clearly, even the little bit of anecdotal reporting on frugivory in these pages suggests that these fruits sustained birds through the winter, whether in extralimital or more normal settings.

This topic is a fascinating one—and one that has never had due consideration in this column. We will attempt to rectify that in the pages that follow. However, we should restrict the discussion here to *invasive* plants. Thousands of non-native, or "exotic," plants are planted in North America, with varying impacts on birds, but only a fraction of these plants will survive without gardener's care. A small fraction of garden plants move beyond the backyard. Of those, fewer will spread aggressively and become invasive. Generally, we refer to a plant species as "invasive" when it outcompetes native plant communities. Though there are many invasive plants that produce vast quantities of seeds for granivorous birds to eat—Japanese Knotweed (*Polygonum cuspidatum*), Spotted Knapweed (*Centaurea biebersteinii*), Purple Loosestrife (*Lythrum salicaria*), for instance—the seed biomass of these invasives does not appear to concentrate particular bird species in relatively small areas. By comparison, fruit is more easily studied and does appear to concentrate birds in such a way. For much of this discussion, we use the thickets of eastern Massachusetts as a case in point, mostly because the area is familiar to us. We posed two questions for ourselves. First: *Are invasive plants good for birding?* And second: *Are invasive plants good for birds?*

Are invasive plants good for birding?

It does seem that invasive plants have been good for birding in some locations. Let's consider eastern Massachusetts. In a highly urbanized environment, packed with people and traffic, many of the best landbirding opportunities are to be found in small remnants of green space, in dense thickets surrounded by the concrete jungle of Greater Boston. What little open space remains can be a magnet for birds—from the most common of migrants to the rarest of vagrants: concentrated first by factors such as weather and geography, birds gather in these remaining patches of habitat and eat whatever there is to be eaten. More often than not, these thickets contain non-native, invasive plants: Oriental Bittersweet, Muliflora Rose, various *Euonymus* species, Glossy Buckthorn, privet (*Ligustrum* spp.), Japanese Honeysuckle (*L. japonica*), and bush honeysuckle. Birds eat these fruits and survive long enough to be discovered by eastern Massachusetts' many dedicated birders. Christmas Bird Counts and November Big Days are much the more exciting for these birds. Birders search thickets of bittersweet in November for rarities such as Ash-throated Flycatchers and search fields overtaken by Multiflora Rose for lingering birds such as catbirds in midwinter. And we forget easily how exciting Northern Mockingbirds and Carolina Wrens were to New Englanders a few generations ago; mockingbirds have marched northward in step with Multiflora Rose (Stiles 1982), while the wrens

are now common in the thickets of eastern Massachusetts.

In almost any urbanized area of the East, one could find similar examples. Even in South Florida, where winter hardiness is not the issue it is in Boston, non-native fruit-bearing plants, both invasive and non-, have certainly increased birding opportunities. For better or for worse, however, some of these "new" birding opportunities include non-native birds. From Red-whiskered Bulbuls (Carleton and Owre 1975) to a variety of psittacids, many "new" species are part of today's birding in South Florida thanks to "new" species of fruiting plants now found in the region. In the West, Himalayan Blackberry (*R. armeniacus*) forms dense thickets in riparian areas of California's Central Valley, and these areas harbor many of the Orange-crowned Warblers that winter in these regions—and also most of the wintering vagrant warblers found here, along with Wrentits, *Zonotrichia* sparrows, Fox Sparrows, and Spotted Towhees. Based on these examples (and many others), it is clear that these non-native plants provide opportunities for birding that almost certainly would not be available with native plants.

Are invasive plants good for birds?

The much more difficult question is whether birds themselves benefit from the proliferation of invasives that bear consumable fruit. Fortunately, the question interests ornithologists, and several good studies have been conducted that merit mention. One study in central New Jersey (White and Stiles 1992) found that introduced species of fruits accounted for 0.4-14% of fruit biomass and 3-30% of the low-quality fruit biomass in birds' diets. In winter in such areas, introduced plant species can account for as much as 50% of the overall fruit biomass available to birds. Highly persistent, low-quality fruits, which mature late in the fall (after the passage of most migrants), now rival native species in fruit diets of many frugivorous birds in late fall and winter, based on analyses of stomach contents (White and Stiles 1992). Clearly, then, there are a lot of fruits out there being produced by invasive plants, and there are a lot of birds eating them.

One of the few relatively clear connections of a native bird being positively influenced by the introduction of a new food source is the well-known example of Northern Mockingbirds and Multiflora Rose (Stiles 1982). In this case, the rose appears to be the key factor in allowing pioneering Northern Mockingbirds to survive northern winters. Stiles (1982) showed that it would be unlikely for mockingbirds to maintain the positive energy balance needed for survival in the northern parts of its range without Multiflora Rose fruit. On the other hand, the secondary compounds that permit the persistence of Multiflora Rose fruits (Drummond 2005) may make these fruits unpalatable to other birds. Nevertheless, in the case of the mockingbird, this bird has proceeded northward much more rapidly than changes in mean monthly winter temperatures, and the proliferation of Multiflora Rose (which also provides good nesting habitats) seems to be the reason. However, Drummond (2005) postulates that increasing abundance of Multiflora Rose could dramatically disrupt the relationship between Cedar Waxwings and a specific *Viburnum* in Maine (Drummond identifies it as *V. opulus*, but we suspect *V. trilobum*, Highbush Cranberry, is the relevant species). There is at least the potential for negative impacts on the winter diet of waxwings and on the dispersal of this plant's seeds.

Valiela and Bowen (2006) found that the changes in the number of southern species in Cape Cod Christmas Counts—including some of our so-called "half-hardies" — seemed unrelated to changes in local habitats, since the increase also took place in aquatic species whose preferred habitats did not change materially in these areas. However, habitat changes at Cape Cod in the past 100 years or so clearly include the proliferation of invasive plants. If climate change, both local and global, is the primary factor in altering bird's ranges, then the question begs to be asked: Just how are the fruits provided by invasive plants? Looking beyond our field observations of birds eating invasive plants, we should carefully consider a number of other issues and influences in answering the question of whether or not invasive plants are indeed good for birds.

Selective foraging

While it may not be a conscious decision, we know birds "choose" what they want to/need to eat. Some species fine-tune their search image to a very specific range. "Choices" are likely made by sight (hence the bright color of many fruits) and not via other senses. This "selective foraging" has evolved over many thousands of years and can be very specific in some species. Neotropical hummingbirds that can only feed on one particular blossom are extreme examples; however, even seeming generalists such as Cedar Waxwings and American Robins are known to "pick and choose" their foodstuffs. "The food that birds eat over their lifetimes or even a single day is a complex result of numerous foraging decisions" (Wheelwright 1996). Color, secondary compounds, nutrition, seed size, and other variables can affect the fruit selection of frugivores (Jung 1992). How does the proliferation of invasive plants affect these decisions? Are "our" birds being fooled into eating something that they "shouldn't" be? In fact, a fair amount of research has been conducted on fruit preferences of frugivorous birds, at least in temperate regions. Cedar Waxwings and American Robins are frequent subjects for such research. Some studies suggest that Cedar Waxwings prefer fruits high in sugar and low in lipids, while American Robins—like other thrushes—prefer fruits rich in both (Witmer 1996, Yong and Moore 1997). Differences between foraging behavior and food choice can even vary between individuals and age groups of the same species (Jung 1992, Stevens 1985). In another study, Cedar Waxwings seemed to be more opportunistic, eating whatever was most abundant. In the laboratory setting, however, they prefer small, red berries (Brush 1990). Oriental Bittersweet and most honeysuckle species are abundant and are small and red. Cedar Waxwings certainly eat them. In fact, they are eating so much of one of these, that it is even changing their plumage! Morrow's Honeysuckle contains abundant rhodoxanthin (a carotenoid), which has been shown to be the cause of the aberrant orange color seen with increasing regularity in the tail tips of Cedar Waxwings in the Northeast, usually in juvenal plumages (Brush 1990). Is there a cost to this change? Although rarely seen in adults, could this recent—and relatively sudden (Brush 1990)—change affect the fitness of one of our favorite frugivores? Rodoxanthin from bush honeysuckle has also recently been implicated in aberrant plumages in Baltimore Orioles in Ontario and elsewhere, and across the East and Midwest, there have been reports of Yellow and Kentucky Warblers, Yellow-breasted Chats, basic-plumaged Scarlet Tanagers, and White-throated Sparrows in which a carotenoid, likely rhodoxanthin, has apparently changed yellow-pigmented feathers to orange. The potential evolutionary impacts of such changes, on mate attraction or physical fitness, are unknown (Flinn et al. 2007).

Several studies (e.g., Stevens 1985, McPherson 1987, Witmer 1996) have demonstrated that there is much variability in how birds select food. How does limiting the potential choices by reducing biodiversity affect the

overall diet of our frugivores? Lafleur (2006) found that European Starlings and American Robins actually preferred invasive fruits to native ones (especially Autumn Olive) in controlled experiments using three native and three invasive species of fruits. Other studies using other species of birds and plants have produced different results. In a study in Maine, frugivores preferentially consumed fruit from the invasive Tatorian Honeysuckle and the native Silky Dogwood (*Cornus amomum*) but did not discriminate between the invasive Multiflora Rose and a native viburnum during choice trials. In this case, these two native species had the higher caloric content, yet the energy density of these two natives did not correlate with fruit removal or fruit preferences (Drummond 2005).

The value of invasive plants

Even invasives such as the much-maligned "Common Reed" or Phragmites (*Phragmites australis*), which outcompete native wetland environments, can have some value for native birds. In New Jersey, for example, *Phragmites* wetlands provide nesting habitat for dozens of species, including a few State Threatened and Endangered Species for breeding, wintering, and migration stopover habitat (Kane 2000). Before they were destroyed by well-meaning state agencies, large stands of *Phragmites* on the Virginia coast hosted enormous roosts of Bobolinks—as many as 40,000 around Labor Day each autumn, along with hundreds of Eastern Kingbirds and, later in the season, countless Tree Swallows. Purple Loosestrife is another wetland invasive, but yes, it does feed Ruby-throated Hummingbirds and later in the fall, migrant sparrows (see Benoit 1999, Maddox 2005, Whitt 1999 for these and other examples). If "Phrag" and loosestrife have their benefits, other bird-food producing invasives probably also have some redeeming qualities. Any birder who has visited South Florida knows about Brazilian Pepper (*Schinus terebinthifolia*). Dense, impenetrable tracts of this invasive from South America produce large quantities of fruit. While dispersal of the seed seems to occur mostly via raccoons and opossums, bird species, particularly American Robins, also feed on this fruit and facilitate the dispersal of the seed. Many other native bird species feed on the fruit of Brazilian Pepper. However, significant ecological consequences have been detected. A Breeding Bird Survey in Everglades National Park showed a lower density of breeding species and individuals in Brazilian Pepper forests than native plant habitats. Furthermore, it has been suggested that wading bird rookeries in mangroves may be abandoned when surrounded by forest of pepper (Florida DEP). Brazilian Pepper produces a wealth of food for some species—but at clear cost to others.

Climate change, forest fragmentation, suburbanization, bird feeders, and other anthropogenic factors have also coincided with the period of expansion of certain bird species. Is it possible to eliminate these variables when discussing how closely tied these species might be to invasive plants? Unfortunately, we cannot. In eastern Massachusetts, wintering Hermit Thrushes, Gray Catbirds, and other half-hardies have certainly increased. All eat fruit, and all are observed eating the fruit of invasive species. However, Red-bellied Woodpeckers, Tufted Titmice, and Northern Cardinals, among others, have also increased considerably in the area. Is this because of the new abundance of fruit? That seems unlikely. Are the factors—such as suburbanization, bird feeders, and global climate change—that we often "credit" with facilitating their range expansion also the ultimate cause of the range expansion of frugivores as well? Northern Cardinals, for example, have been expanding northward since the 1800s—likely due to habitat changes, bird-feeding, and moderating winter temperatures, not primarily because of invasive plants. Climate change in particular seems difficult to rule out as the potential ultimate factor in allowing these species to spread northward. According to Merriam's (1894) "Laws of Temperature Control of the Distribution of Land Animals and Plants," animals and plants are restricted in northward distribution by the total quantity of heat during the season of growth and reproduction (the "life zone" model). Therefore, increasingly warm temperatures would not only spur more northward colonization by plants—both native and non—but by birds as well (see Valiela and Bowen 2006).

The nutritive value of exotic fruiting plants is a subject of much study, though there is still much to be learned. It is well known that Oriental Bittersweet and many other invasive plants' fruits are low in lipids (White and Stiles 1992), the building blocks for the fat deposits that birds need in order to migrate. If an isolated habitat in which a migrant has sought refuge contains only lipid-poor foods, would that then force a bird to consume vast quantities only to stay alive? Furthermore, caloric content (both sugars and lipids) is only one part of a fruit's nutritive value. Fruit selection is also based on nutrients and secondary compounds that the fruits contain (Witmer 1996). Many frugivores have specific digestive and physiological adaptations that allow them to process certain fruits more efficiently than others (Witmer 1996, Place and Stiles 1992). Yellow-rumped Warblers and Tree Swallows, for instance, are among a small group of birds in temperate North America that regularly eat waxy fruits. "Yellow-rumps" feed extensively on plants in the genus *Myrica* (Northern Bayberry, *M. pensylvanica*, and Wax Myrtle, *M. cerifera*) in autumn through early spring. In fact, the wintering range of Yellow-rumped Warblers coincides with the entire range of these *Myrica* species—hence the name "Myrtle Warbler." Other waxy fruits, such as Poision Ivy (*Toxicodendron radicans*) are also important, especially beyond the range of *Myrica*. Yellow-rumped Warblers possess several gastrointestinal traits that permit efficient saturated fat assimilation from the wax of these fruits. These persistent fruits provide an energy-rich resource that, thanks to their adaptations, allows Yellow-rumped Warblers and Tree Swallows to winter farther north than any of their relatives (Place and Stiles 1992). What happens when Oriental Bittersweet and Japanese Honeysuckle overwhelm a thicket of Northern Bayberry in eastern Massachusetts? *Myrica* species might be the only fruits that are available in large enough quantities and that provide a dense enough caloric supply for them to survive. Are we trading our wintering population of Yellow-rumped Warblers for the occasional overwintering Townsend's Warbler? In other words, are any of these "new" plentiful food sources the avian equivalent of a steady diet of Doritos? Sure, we could live on Doritos for a while, but the long-term costs are many (see below, on migration). For one thing, many of these plants have evolved to produce many fruits, which means less invested (energy, nutrients, etc.) in each fruit (N. Lafleur, pers. comm.). Furthermore, birders' detection of these birds in some cases is probably a function of the food source being so nutritionally poor that birds are forced to spend more time consuming these foods. Extensive feeding might also increase the chances of depredation, further diminishing the value of these plants to frugivores.

A case in point: Maine's first winter record of a Wood Thrush was discovered in January by Lovitch. It was seen feeding on invasive Multiflora Rose and native Beach (or Virginia) Rose (*Rosa virginiana*)—but it ignored invasive Rugosa Rose (*Rosa rugosa*) and native Staghorn Sumac. It would come to the edge, gulp a number of fruits, and then sneak off

into the deepest, darkest impenetrable thicket If the observer walked by during one of these "rest" periods, the bird would likely have gone undiscovered. One out of two species the bird was observed feeding on was invasive, but a full feeding selection study was not performed here. But what if the only food sources were nutritionally lacking? Would the bird have to feed more often—improving its chances of detection (and depredation)?

Invasive plants often thrive due to a lack of natural enemies—insects. Insects are a vital part of the diets of most birds, especially during the nesting season, when even frugivorous birds consume much insect matter. If invasive plants host fewer insects, do birds find less of the protein and nutrition necessary to sustain fitness and raise young? Are the birds observed eating Oriental Bittersweet in migration eating because that's all they can find—fewer native fruit sources, but also fewer bugs? About 120 species of insects are found feeding on Purple Loosestrife in Europe, but only 12 were found in a study in southern Manitoba (see <http://www.inhs.uiuc.edu/inhsreports/autumn-01/fnesting.html>). Non-native trees have also been found to support fewer species of insects than natives (Bessinger and Osborne 1982). While thickets in eastern Massachusetts harbor few insectivores in midwinter, many migrants—including some that are predominately frugivores—need some amount of insect matter to provide a balanced diet. Birds feeding on fruit are thought to gain energy more quickly than those feeding on insects (hence the reasoning used to explain the switch from insects to fruit by many passerines during migration), but the lack of insects on these plants would be even more problematic during breeding season (N. Lafleur, pers. comm.). That once again calls into question whether or not invasive plants are truly good for birds—at least in the long term.

Some fruits contain potentially toxic secondary compounds. A frugivore may only be able to consume a certain amount of a given fruit within a certain period of time to avoid accumulation of any single compound (Levey and Karasov 1989). What happens when the biodiversity is limited to the point that there are so few fruit options that a bird has must ingest toxic matter—or starve? "Persistent fruits" persist longer due to lower fat content, fewer nutrients, more secondary compounds (that make them less palatable to frugivores), and/or more resistance to damage by microbes and invertebrates (Reichard et al. 2001, Drummond 2005). These persistent fruits are often said to be of "low quality." Therefore, most frugivores "choose" high-quality fruits when they are available, turning only to the lower-quality, persistent fruits during winter, when other options are unavailable (White and Stiles 1992, Drummond 2005). Due to the prevalence of "low-quality" fruits in invasive plants, we are of the opinion that their overall, long-term value to native birds is low.

The impacts on movement and migration

It is impossible to argue that invasive plants don't compete with, and often outcompete, native plant species. In the case of the thickets of eastern Massachusetts, the various aforementioned species are seen outcompeting other native fruit-producing plants. The argument that "native fruit" doesn't last as long isn't entirely factual. It is true that many native species, such as viburnums and blueberries, don't last very long before being completely consumed by birds. In fact, many of these lipid and/or sugar-rich foods are devoured by migrants fueling up for the first (or next) leg of a journey. Birds need calorie-rich foodstuffs to pack on the layers of fat that they will need to burn during each extended leg of migration. The need to increase fat loads requires more foraging time and a longer stopover for refueling migrants (Yong and Moore 1997). A number of native fruit species ripen in late summer and early fall and become available, just before the onset of, or during the, southbound migration of many facultatively frugivorous birds (Baird 1980).

So what happens when a thicket of native viburnum is swallowed up by an explosion of Oriental Bittersweet? Low in fat—hence the winter-long persistence of the fruit—do some of these exotic food sources fail to provide the calories needed to produce the necessary fat reserves? What if the preponderance of invasive plants were reducing the amount of native, lipid-rich fruit (an oversimplification for sake of argument here; some invasive plants are high in lipids, some native fruits are not, of course) and essentially preventing a bird from migrating? Stopover ecology studies show us that birds work to gain sufficient weight before leaving. Fruit is a critical aspect of a migrant's diet, as it provides the calories needed to store fat for the energetic demands of migration (Parrish 1997). What if they can't pack on the pounds (well, grams)? A Gray Catbird landing one dawn in a thicket of invasives may not be able to leave, even if it wanted to. What if certain invasives were in fact causing birds to *stop* migrating? Call it a "Couch Potato Effect." Maybe the reverse-migrant Yellow-breasted Chat, lingering Gray Catbird, or pioneering Ruby-crowned Kinglet simply *cannot* leave? At the very least, low-quality food would likely decrease survival during migration. Yong and Moore (1997) write: "As stopover habitat is transformed or degraded, the cost of migration increases, and the likelihood of successful migration is jeopardized. High-quality stopover areas probably are especially critical before and after migrants cross ecological barriers." How do invasive plants affect the utility of such stopover locations, such as the thickets of eastern Massachusetts?

Biodiversity and the Big Picture

Bird communities of residential and urban areas contain higher densities of birds than outlying natural areas, according to Bessinger and Osborne (1982), whose study in Ohio found a 6:1 ratio of non-native to native trees and shrubs in an urban setting resulted in 1 3 times the amount of birds when compared to a nearby forest. Nearly half of these birds, however, were European Starlings and House Sparrows. In fact, the six most abundant species in urban sites composed 78% of the individuals and 83.5% of the avian biomass Meanwhile, the six most abundant species in wooded areas were found to account for only 45.8% of the individuals and 21% of the avian biomass. They concluded that "dominance by a few species that can rapidly colonize and reproduce in artificial habitats is characteristic of urban bird communities in North America." In fact, they found a 28% decline in species richness in urban areas. Yes, House Sparrow flocks act as wonderful magnets for wayward Dickcissels, but is such a tremendous increase in this invasive bird really good for birding? Is the reduction in bird biodiversity linked to the reduction in plant biodiversity as well?

Thinking back to our eastern Massachusetts example, we recall that many of these thickets are becoming frighteningly low on plant biodiversity. Ecology 101 teaches us that biodiversity is good. Biodiversity is in short supply in these thickets, and the addition of a vagrant here, a half-hardy there, and the colonization by one or two other bird species hardly seems to make up for virtual monocultures of foreign vegetation. This may be good for a few bird species—and for a few misguided individuals of other species. However, what is the ecological cost? What species no longer find valuable resources in these thickets? Are they able to adapt? If not, are they declining or just moving elsewhere?

In other words, what is the long-term impact on bird biodiversity—the very engine that moves the pastime of birding? Introduced species are a threat to overall biodiversity: one of the few facts we can ascertain in all of this thinking-out-loud. Therefore, we cannot consider the addition of one new food source to be either good or bad on its own right. We must consider the broader ramifications.

Invasive plants, whether they produce fruit or not, have replaced native species. Those replaced native species, whether in disturbed areas or not, have a role to play, a niche to fill, in the ecosystem. What niches are no longer filled now that the biodiversity of a specific habitat has been much reduced? What birds depended on food sources provided only by the now-absent native? How is the ecosystem affected? There is significant evidence that links invasive plants to a range of problems, from impeding the progress of forest succession to short-circuiting a healthy food chain. For instance, there are numerous examples of invasive plants that have altered communities of insects, which can exert a strong, negative effect on insectivores (Reichard et al. 2001); and invasive grasses are wreaking havoc on biodiversity from the Great Basin to the Southeast, limiting the diversity of native food sources for birds, while increasing the frequency and severity of fires (John Sterling, pers. comm.). Examples are nearly uncountable.

What would happen if the crop of Oriental Bittersweet, for example, were to fail one season for some unknown reason (although, with this plant, that does seem unlikely!)? Has this, or any other invasive species that we have discussed, become such a large percentage of the biomass that its failure would doom hundreds of birds? Would Gray Catbirds, for whatever reason (lingering, tardy, pioneer, etc.) in the thickets of eastern Massachusetts just drop dead one cold November day? That seems unlikely, but if the invasive plants are so important for birds, why wouldn't their failure be as catastrophic as their success has been considered at least partly beneficial?

For many of us who live and bird in semi-urban environments, we must confront some rather grim realities. Our last patches of birdable habitat may not be "good" for birds in the big picture, but they're some of the last nearby green spaces left that produce birds we can enjoy. We find it impossible to argue that a new parking lot is more valuable than the last stand of vegetation, no matter how non-native. The only port in a storm is better than no port at all. So when invasive plants are used as an excuse for further development in already developed areas—such as when developers are allowed to plow under more and more acres of the already drastically reduced Hackensack Meadowlands of New Jersey because its only *Phragmites*!—we lose more and more ground in our effort to preserve whatever we can for birds. In the case of the thickets of eastern Massachusetts, it seems impossible to argue that we should build another Dunkin' Donuts in the last undeveloped patch of habitat, just because it's "only buckthorn"! A more pressing, and problematic, question is whether we should replace the buckthorn with something native.

Earlier, we discussed the Gray Catbird that overwintered last year in Portland, Maine. Assuming that bird successfully fledged young, and there was a genetic or "learned" trait that caused this bird not to migrate, then it would, in theory, be possible to develop into its own population—especially in the light of climate change. Well, we can throw that hypothesis out the window in this case, as *Dumetella carolinensis dragonfieldensis* did not survive—no Gray Catbirds were seen at this area after early October of this year. But what if it had? The sumac, Multiflora Rose, and Oriental Bittersweet that it consumed would not be present when a wandering flock of Bohemian or Cedar Waxwings arrived. In early March in Maine, persistent fruits such as Staghorn Sumac and rose hips feed and fuel early returning facultative migrants, such as American Robins and Eastern Bluebirds. Therefore, there is a cost to other species associated with the fruit consumption by this catbird—a bird that is "not supposed" to be there.

There are surely many other costs, hypothetical and real, associated with invasive plants, some of them quite complex. Many of the invasive plants that provide fruits for birds are spread by birds—one of the reasons that they're so invasive. Simply put, birds spread fruit seeds faster and farther than do other vectors (Drummond 2005, Reichard et al. 2001). Larger quantities of fruit, higher germination rates, and widespread dispersal by birds all compound this issue. These plants become established in new areas, even new regions. A species that has become invasive in one region is significantly more likely to become invasive elsewhere, and dispersal by birds is one factor that can facilitate that (Herron et al., in ms.). Oriental Bittersweet, for example, does not usually become established in unbroken, mature forest. However, fragmentation and disturbance of this and other habitats allows these species to take root, survive, and sometimes flourish. At a local park in Yarmouth, Maine, Oriental Bittersweet has established itself on a sunny riverside slope (a natural "edge"). The tangle has progressed rapidly, engulfing tree after tree, steadily marching into the deeper woods. While Bayview Preserve is hardly an undisturbed old growth forest, it is home to mature woodland species such as Red-eyed Vireos and Ovenbirds. As the edge marches inward, so do such edge-loving and potentially problematic species such as Brown-headed Cowbirds. Opposite the river, the disturbed habitat of suburban yards hosts a number of invasive plants, such as bittersweet. If a local resident had controlled a patch of bittersweet there, would that seed have been available to be carried across the river in the droppings of a local robin? (Again, this is an oversimplification—the seeds are often carried much farther.) A little farther south, Oriental Bittersweet is overwhelming the native vegetation of a critically important nesting island. Tangles of bittersweet are encroaching onto the sandy beaches where colonies of Roseate Terns and Least Terns make their home. Meanwhile, bittersweet is crawling over the stunted canopy, rendering parts of the woods impenetrable and useless for the wading birds that breed here—including the northernmost breeding Glossy Ibis and Little Blue Herons on the East Coast. While vines are mostly edge species, invasive shrubs are often successful in secondary forest conditions, and some species of invasive trees have successfully penetrated mature forests (Herron et al., in ms.), so few habitats are truly safe from the potential impacts of invasive species.

And this may be the most pressing question we raise here: Does our tolerance of invasive plants in the few urbanized locations where they might seem "good for birding" contribute to the threat that invasive plants pose to biodiversity? The purpose of a plant spending its energy in making fleshy fruits is to attract birds to eat them in order to disperse their seeds far and wide, encouraging rapid range expansions (Lafleur 2006). We must then also consider the possibility that if our native birds are indeed "choosing" the invasive plants over native fruits, the native fleshy-fruited plants may be outcompeted for dispersal services (Lafleur 2006), further impacting biodiversity, and greatly impacting the potential food supplies offered by many native fruiting plants Moreover, large quantities of fruit are also feeding species that may themselves directly or indirectly impact native birds. European Starlings are invasive birds that will feed read-

ily on many species of invasive plants, especially Oriental Bittersweet. In fact, 84% of seeds collected from starling fecal samples were from this species (Lafleur 2006). Lafleur (2006) also demonstrated that the starling is likely to adopt a novel food more quickly than robins when no other choices are present, as is the case with many generalist foragers (Reichard 2001). European Starling populations could well be strengthened by the fruit of invasive plants as well, to the point that they further outcompete native secondary cavity nesters (see Renne et al. 2002, Bessinger and Osborne 1982). And what about Eastern Chipmunks and Red Squirrels? Both of these critters will feed on the nests and nestlings of birds, at least on occasion. Is the supplemental food provided by invasive plants augmenting their survival as well, which, come spring, will add more nest-predation pressures for native songbirds?

Let us not also forget the significant and well-documented economic cost of invasive plants. For example, $34 billion are lost or spent annually in the United States to control "noxious weeds"—and an estimated $137 billion against "non-indigenous plants, birds, reptiles, fish, arthropods, mollusks, and microbes" (Pimental et al. 2000). "Invasive species are the second leading cause—after habitat loss—of species being listed as endangered or threatened, and infest more than 100 million acres across the United States," according to Lori Williams of the National Invasive Species Council (<http://www.weedcenter.org/inv_plant_info/impacts.html>). Meanwhile, invasive plants infest an additional 700,000 hectares of wildlife habitat each year (Babbitt 1998), and many of the worst invasive plants are thought to be bird dispersed (Cronk and Fuller 1995). Invasive plants can also alter nutrient and even hydrologic cycles, and change the frequency and intensity of fires (Reichard et al. 2001). Worth a few more Gray Catbirds on New England Christmas counts?

Parting thoughts

Though we are not plant ecologists or avian nutritionists—and so often offer our thoughts in question form here—we do, like the readers of this journal, spend a fair amount of time birding, and in our lives, we've seen stark changes in the distribution of numerous species, both of birds and plants. We know that birds, sometimes in large numbers, move into a new area to take advantage of a food resource. It is hard to imagine that frugivores wouldn't expand their range and grow their populations in response to a "new" source of food. However, questions regarding the nutritional value of some of these species, the overwhelming of important native food sources, increases in potential nest predators or competitors, and so on should cause us to pause before suggesting that invasive plants are "good for birds." (The editor of this journal, in fact, admits to having planted Variegated Porcelainberry in his Virginia garden after witnessing a host of late-autumn vagrants foraging on the berries at Cape May, New Jersey. He has since, however, removed the invasive vine!) Furthermore, other variables, such as forest fragmentation, suburbanization and other development, and climate change certainly play a larger role in affecting the distribution of birds. How significant are these issues when compared to the addition of a non-native abundance of food? Would there be Carolina Wrens and Hermit Thrushes in the thickets of eastern Massachusetts nowadays, even without buckthorn, bittersweet, and their ilk? After all, there are Northern Cardinals, Red-bellied Woodpeckers, and Tufted Titmice here now.

We had hoped to offer strong conclusions on these and related questions. Unfortunately, hard facts have proved difficult to come by. Few studies have been conducted on the question of whether or not invasive plants are, in fact, good for birds. Rigorously quantified studies on the matter are scarce, as Reichard et al. (2001) emphasize. Christmas Bird Counts—with their numerous inherent and sometimes untestable variables—seem to furnish the only real, if indirect and incomplete, evidence to support the theory that invasive plants at the very least keep lingering half-hardies alive long enough to be discovered. However, for the most part, we are left to piece together anecdotes and other tidbits to draw conclusions. We will never return eastern Massachusetts to a "pristine" or "natural" (whatever that means) state. Does that mean we don't try? Do we resign ourselves to celebrating the questionable virtues of bittersweet?

There are several observations that bear repeating here. First, increasing urbanization will accelerate the proliferation of invasive plants, and continued introduction of new species by the horticultural trade will almost certainly compound the problem (Reichard et al. 2001). Climate change will continue to affect the changing ranges of both birds and plants. Invasive plants will continue to spread rapidly, even with control measures. So, at the very least, we should increase our awareness of these various relationships (Reichard et al. 2001) and document the associations we observe on our local patches. Absolute conclusions may be elusive—even more than usual in a column that invariably raises more questions than it answers. But a little food for thought, outside the usual fare of this essay, will perhaps bring us to think on these matters again, when next we see a frosty catbird in a New England bramble—or an Audubon's Oriole in an Indiana backyard.

Acknowledgments

Nancy Lafleur graciously provided helpful comments on an early draft of this article, and we are indebted to her for the assistance. We also thank Chris Martine for supplying a proof of his upcoming article, and Louis Bevier helped track down some obscure references for us. Scott B. Terrill, Robb Hamilton, and Dan S. Cooper provided some thoughts on exotic, invasive plants in California. For contributing other information, literature, or thoughts on this article, we'd like to thank Richard A. Erickson, Kimball L. Garrett, Brian P. Gibbons, Steven G. Mlodinow, John Sterling, and Linnea Hall of the Western foundation of Vertebrate Zoology. Jeannette Lovitch provided helpful comments on various drafts of this article.

Literature cited

American Ornithologists' Union [A.O.U.] 1957. *The American Ornithologists' Union Check-list of North American Birds*. Fifth edition. Port City Press, Baltimore, Maryland

Angehr, G. R. 1999. Rapid long-distance colonization of Lake Gatun, Panama, by Snail Kites. *Wilson Bulletin* 111: 265-268.

Babbitt, B. 1998. Statement by Secretary of the Interior on invasive alien species. *Proceedings, National Weed Syposium, BLM Weed Page*. April 8-10, 1998.

Baird, J. W. 1980. The selection and use of fruits by birds in an Eastern Forest. *Wilson Bulletin* 92: 63-73.

Banks, R. C., C. Cicero, J. L. Dunn, A. W. Kratter, P. C. Rasmussen, J. V. Remsen, J. D. Rising, and D. F. Stotz. 2004. Forty-fifth supplement to the *American Ornithologists' Union Check-list of North American Birds Auk* 121: 985-995.

Benoit, L. K., and R. A. Askins. 1999. Impact of the spread of *Phragmites* on the distribution of birds in Connecticut tidal marshes. *Wetlands* 19: 194-208.

Bessinger, S. R., and D. R. Osborne. 1982. Effects of urbanization on community organization. *Condor* 84: 75-83.

Brinkley, E. S. 2006. The Changing Seasons Winter That Wasn't. *North American Birds*

60: 184-193.

Brush, A. H. 1990. A possible source for rodoxanthin in some Cedar Waxwings tails. *Journal of Field Ornithology* 61: 355.

Buckalew, J. H. 1950. Records from the Del-Mar-Va peninsula. *Auk* 67: 250-252.

Carleton, A. R., and O. T. Owre. 1975. The Red-whiskered Bulbul in Florida: 1960-1971. *Auk* 92: 40-57.

Cazzaniga, N. J. 2002. Old species and new concepts in the taxonomy of *Pomacea* (Gastropoda: Ampullariidae). *Biocell* 26: 71-81.

Chalif, E. 1947. Northern Eider on Martha's Vineyard. *Auk* 64: 633.

Cronk, Q. C. B., and J. L. Fuller. 1995. *Plant invaders: the threat to natural ecosystems*. Chapman and Hall, London, United Kingdom.

Dittman, D. L., and S. W. Cardiff. 2005. Origins and identification of Kelp × Herring Gull hybrids. *Birding* 37: 266-276.

Drummond, B. A. 2005. The selection of native and invasive plants by frugivorous birds in Maine. *Northeastern Naturalist* 12: 33-44.

Florida Department of Environmental Protection Bureau of Invasive Plant Management. Undated. *Environmental Impact and Regional Difference of Invasive Plants in Florida*. Circular 10.

Edwards, J. L. 1935. The Lesser Black-backed Gull in New Jersey. *Auk* 52: 85.

Erickson, R. A., R. A. Hamilton, and S. N. G. Howell. 2001. New information on migration birds in northern and central portions of the Baja California Peninsula, including species new to Mexico, pp. 112-170 in: *Birds of the Baja California Peninsula: Status, Distribution, and Taxonomy* (R. A. Erickson and S. N. G. Howell, eds.). Monographs in Field Ornithology 3, American Birding Association, Colorado Springs, Colorado.

Flinn, T., J. Hudon, and D. Derbyshire. 2007. Tricks exotic shrubs do: When Baltimore Orioles stop being orange. *Birding* 39 (5): 62-68.

Floyd, T. 2005. The Changing Seasons: Seeing the forest for the trees. *North American Birds* 59: 222-226.

Ganley, S. 2003. *Checklist of birds from the Puerto Peñasco region, Sonora, Mexico*. Online: <http://members.cox.net/sganley/page8.html>.

Garner, M., and W. Farrelly. 2007. Rare forms worth finding: Eiders in Ireland. Online: <http://www.birdsireland.com/pages/site_pages/features/eider/eider.html>.

Goetz, R. E., W. M. Rudden, and P. B. Snetsinger. 1986. Slaty-backed Gull winters on the Mississippi River. *American Birds* 40: 207-216.

Gustafson, M.G., and B. G. Peterjohn. 1994. Adult Slaty-backed Gulls: variability in mantle color and comments on identification. *Birding* 26: 243-249.

Heil, R. S. 1981. An avian fallout and the first Massachusetts records for Black-chinned Hummingbird and Lucy's Warbler. *American Birds* 35: 139-141.

Heinl, S. C. 1997. New information on gulls in southeastern Alaska. *Western Birds* 28: 19-29.

Herron, P. M., C. T. Martine, A. M. Latimer, and S. A. Leicht. in ms. Invasive plants and their ecological strategies: prediction and explanation of woody plant invasion in New England.

Howell, S. N. G. 1994. Additional information on the birds of Colima and adjacent Jalisco, Mexico. *Euphonia* 3: 33-54.

——. 2004. Further observations of birds from Colima and adjacent Jalisco, Mexico. *Cotinga* 21: 38-43.

Howell, S. N. G., and J. L. Dunn. 2007. *Gulls of the Americas*. Houghton Mifflin, Boston.

Howell, S. N. G., and J. R. King. 1998. Tail pattern variation in first year Herring Gulls. *Western Birds* 29: 63-64.

Howell, S. N. G., and S. Webb. 1995. *A Guide to the Birds of Mexico and Northern Central America*. Oxford University Press, Oxford, United Kingdom.

Howells, R. G. 2005. Invasive applesnails in Texas: status of these harmful snails through spring 2005. Online: <http://www.cofc.edu/~fwgna/downloads/2.CAS2005bHandout.pdf>.

Hunt, P. 2006. The winter season: New England region. *North American Birds* 60: 204-207.

Kane, R. 2000. Phragmites use by birds in New Jersey. *Records of New Jersey Birds* 26: 122-124.

Kessel, B. 1989. *Birds of the Seward Peninsula, Alaska*. Fairbanks, University of Alaska Press.

King, J. R., and G. J. Carey. 1999. Slaty-backed Gull hybridization and variation in upperparts colour. *Birder's Journal* 8: 88-93.

LaFleur, N. 2006. The fruits of success: examining the contributions of avian seed dispersal to the spread of invasive, woody, fleshy-fruited plants. Ph.D. thesis. University of Connecticut, Storrs, Connecticut.

Schmoker, B. and T. Leukering. 2007. The Changing Seasons: Wheatears, flycatchers, and plovers. *North American Birds* 61: 18-27.

Leukering, T., and B. Gibbons. 2007. The Changing Seasons: xx. *North American Birds* 59: 386-394.

Levey, D. J., and W.H. Karasov. 1989. Digestive responses of temperate birds switched to fruit or insect diets. *Auk* 106: 675-686.

Levine, E. 1998. *Bull's Birds of New York State* Cornell University Press, Ithaca, New York

Maddox, J. D., and R.N. Wiedenmann. 2005 Nesting of birds in wetlands containing purple loosestrife (*Lythrum salicaria*) and cattail (*Typha* spp.). *Natural Areas Journal* 25 369-373.

McEneaney, T. 2004. A Whooper Swan (*Cygnus cygnus*) at Yellowstone National Park, Wyoming, with comments on North American reports of the species. *North American Birds* 58: 301-308.

McPherson, J. M. 1987. A field study of winter fruit preferences of Cedar Waxwings. *Condor* 89: 293-306.

Merriam, C. H. 1894. Laws of Temperature Control of the Distribution of Land Animals and Plants. *National Geographic Magazine* 6 229-238.

Mlodinow, S. G. 1999. Common and King Eider: Vagrancy patterns in western North America. *Birder's Journal* 8: 234-242.

Mlodinow, S. G., and M. O'Brien. 1996. *America's 100 Most Wanted Birds*. Falcon Publishing, Montana.

O'Brien, M. 2006. Subspecific identification of the Willet *Catoptrophorus semipalmatus Birding* 38: 40-47.

O'Brien, M., R. Crossley, and K. Karlson. 2006 *The Shorebird Guide*. Houghton Mifflin, Boston, Massachusetts.

Palomera-García, C., S. Contreras-Martínez, B Y. Cruz-Rivera, B. Villa Bonilla, and J. C Gómez-Llamas. 2006. Registros adicionales del Carrao (*Aramus guarauna*) en el Estado de Jalisco, México. *Huitzil* 7: 23-26.

Parrish, J. D. 1997. Patterns of frugivory and energetic condition in nearctic landbirds during autumn migration. *Condor* 99: 681-697.

Pimentel, D., L. Lach, R. Zuñiga, and D. Morrison. 2000. Environmental and Economic Costs of Non-Indigenous Species in the U S *Bioscience* 50: 53-65.

Place, A. R., and E.W. Stiles. 1992. Living off the wax of the land: bayberries and Yellow-rumped Warblers. *Auk* 109: 334-345.

Renne, I. J., W. C. Barrow, Jr., L. A. Johnson Randall, and W. C. Bridges, Jr. 2002. Generalized avian dispersal syndrome contributes to Chinese tallow tree (*Sapium sebiferum*, Euphorbiaceae) invasiveness. *Diversity and Distributions* 8: 285-295.

Renne, I. J., T. P. Spira, and W. C. Bridges, Jr 2001. Effects of habitat, burial, age and passage through birds on germination and establishment of Chinese tallow tree in coastal

South Carolina. *Journal of the Torrey Botanical Club* 128: 109-119.

Reichard, S.H, L. Chalker-Scott, and S. Buchanan. 2001. Interactions among nonnative plants and birds. Pp. 179-223 in: *Avian ecology in an urbanizing world*, J. Marzluff, R. Bownan, and R. Donnelly, eds. Klauer Academic Publishers, Norwell, Massachusetts.

Ridgely, R. S., and J. A. Gwynne, Jr. 1999. *A Guide to the Birds of Panama*. Second edition. Princeton University Press, Princeton, New Jersey.

Roberson, D. 1980. *Rare Birds of the West Coast*. Woodcock Publications, Pacific Grove, California.

Stevens, J. 1985. Foraging success of adult and juvenile starlings *Sturnus vulgaris*: a tentative explanation for the preference of juveniles for cherries. *Ibis* 127: 341-347.

Stiles, E. W. 1982. Expansion of Northern Mockingbird and Multiflora Rose in the northeastern United States and Canada. *American Birds* 36: 358-364.

Sullivan, B. L., and C. L. Wood. 2004. Changing Seasons: a plea for the common birds. *North American Birds* 59: 18-30.

Valiela, I., and J. L. Bowen. 2006. Shifts in winter distribution in birds: Effects of global warming and habitat change. *Ambio* 32: 477-480.

Veit, R. R., and W. R. Petersen. 1993. *Birds of Massachusetts*. Massachusetts Audubon Society, Lincoln, Massachusetts.

Wetmore, A. 1965. *The Birds of the Republic of Panama*: Part 1. Tinamidae (Timanous) to Rhynchopidae (Skimmers). Smithsonian Institution Press, Washington, D.C.

Wheelwright, N. T. 1986. The diet of American Robins: an analysis of U.S. Biological Survey Records. *Auk*: 103: 710-723.

Whitt, M. B., H. H. Prince, and R. R. Cox, Jr. 1999. Avian use of purple loosestrife dominated habitat relative to other vegetation types in a Lake Huron wetland complex. *Wilson Bulletin* 111: 105-114.

White, D. W., and E. W. Stiles. 1992. Bird dispersal of fruits of species introduced into eastern North America. *Canadian Journal of Botany* 70: 1689-1696.

Witmer, M. C. 1996. Annual diet of Cedar waxwings based in U.S. Biological Survey Records (1885-1950) compared to diet of American Robins: Contrasts in dietary patterns and natural history. *Auk* 113: 414-430.

Yong, W., and F. R. Moore. 1997. Spring stopover of intercontinental migratory thrushes along the north coast of the Gulf of Mexico. *Auk* 114: 263-278.