Bird Observer

VOLUME 45, NUMBER 3 JUNE 2017

HOT BIRDS

On February 22, David Pritchard filed an eBird report with photos of what he identified as a Barred Owl from a swamp in a remote area east of Williamsburg. But raptor-watcher Brian Rusnica looked at David's photos several days later and realized that they actually showed a **Great Gray Owl**! Possibly the first one documented in the state since 1996, it unfortunately was never relocated after its identification. David took the picture on the left.

A wave of **Summer Tanagers** passed through at the end of April and beginning of May, with a male in Cummaquid occurring simultaneously with a female at Mount Auburn, then what appeared to be a different bird in the Boston Public Garden a few days later, while another was found out west in the Berkshires! Jeff Offerman took the photo on the right.

Alan Kneidel and Nathaniel Marchessault found a Mew Gull of the European subspecies, the "Common Gull", at Race Point on April 15. Will Sweet arrived a couple of hours later and photographed what he thought to be the same bird, but after posting his to eBird, his bird turned out to be the Asian subspecies, "**Kamchatka Gull**" from the same beach on the same morning! The European bird may have been the same one photographed there by Blair Nikula in March. Will took the photo on the left.

Nate Dubrow photographed a Brown Pelican at Crane's Beach on May 6; it was seen from Annisquam a few hours later, and presumably the same bird was spotted passing Point of Pines two days after that, and over Winthrop Beach, heading toward Boston Harbor, an additional three days later. Nate took the photo on the right.

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Cover: Yellow Warbler by John Sill ©Massachusetts Audubon Society. Courtesy of the Museum of American Bird Art.

Bird Observer

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Birding Farnham-Connolly Memorial Park, Canton

Jim Sweeney

Farnham-Connolly Memorial Park is located in the town of Canton, Massachusetts, and opened to the public in July 2014. At the former site of the Canton Airport, the 338-acre park is part of the much larger Neponset River Reservation managed by the Massachusetts Department of Conservation and Recreation (DCR).

The park is named for Lieutenant Arthur E. Farnham and Sergeant Thomas M. Connolly. Both men worked at the Canton Airport, where they became friends while employed as aircraft mechanics. Subsequently, Farnham and Connolly served in World War II, were shot down over Serbia, and eventually airlifted to a safe location after participating in a historic mission together.

The Canton Airport opened in 1931, but closed in 1954 due to flooding and maintenance issues. The airport was situated in the flood plain for the Neponset River and the area is still prone to occasional flooding today. The Metropolitan District Commission (MDC) acquired the land in 1996 and after years of construction, restoration, and mitigation activities, the park appeared on the landscape as a new birding site.

The park has few trails, but all of them provide access to a variety of natural communities including alluvial red maple swamp, mixed oak forest, shallow emergent marsh, and shrub swamp. White pine, quaking aspen, and gray birch are commonly encountered on the trails in the upland portions of the park; red maple, silky dogwood, highbush blueberry, and speckled alder are found in the wetland areas.

In late summer and early fall, some of the trails contain ragweed, smartweed, and foxtail grasses. The weedy conditions attract migrant sparrows and other species that prefer seeds as a food source during migration.

Historically, Least Bitterns were found nesting in the Neponset River Reservation. Although the last breeding record is from 1990, this species could still be present—but as yet undetected—in the cattail marshes found within the park.

While the park can produce interesting bird sightings in all seasons, the focus of this article is the spring and fall migration periods. Because the park is bordered to the west, north, and east by developed sections of the towns of Norwood and Canton, the area has the concentrating effect of a migrant trap. Furthermore, the nearby Neponset River, with its conspicuous north and south orientation, may be a guiding topographical feature utilized by spring and fall migrants.

Please note that the Norwood Airport has air traffic that passes directly over the park. It is best to bird the park before 10:00 am when fewer planes are flying overhead

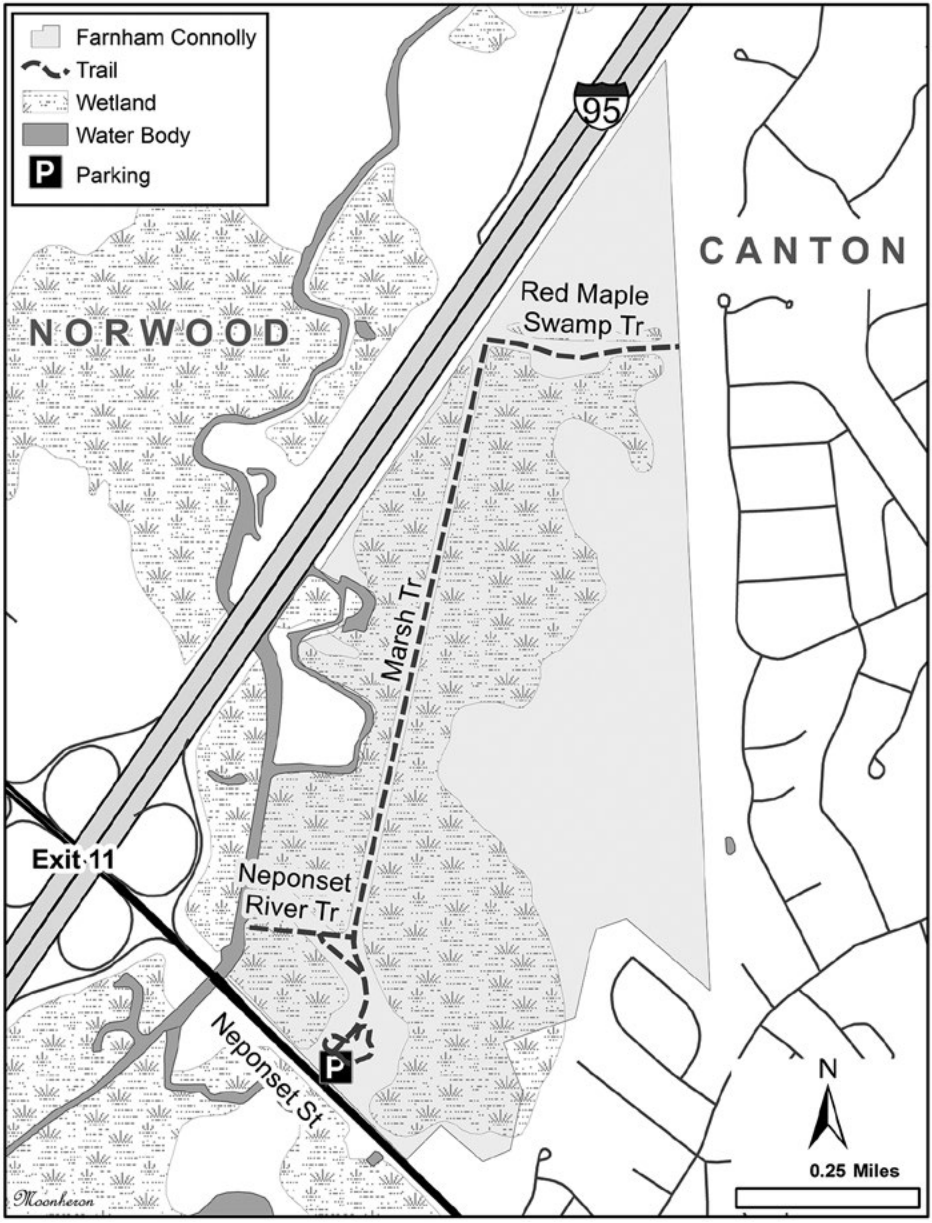
Farnham Connolly
Trail
Wetland
Water Body
Parking
95
CANTON
NORWOOD
Red Maple
Swamp Tr
Marsh Tr
Exit 11
Neponset
River Tr
Neponset St
P
N
0.25 Miles
Moonheron

Fig. 1. Great Lawn. Photograph by Marsha Salett.

and likely to interfere with the detection of chip notes and other avian vocalizations. Traffic from Interstate 95 (I–95) can also be a source of noise pollution, so an early morning visit is strongly recommended. Be prepared to spend two to three hours at the park during the spring and fall migrations. Most of the trails can be covered thoroughly in just a few hours. Farnham-Connolly Memorial Park is located close to I–95 and is convenient to access for anyone with a desire for pre-work birding or a respite from commuter traffic.

How to Get to Farnham-Connolly Memorial Park

Take I–95 south from the junction of Interstates 95 and 93 for about three miles to Exit 11A-Neponset Street toward Canton. If you are coming from southeastern Massachusetts or Rhode Island on I–95 north, you will also take Exit 11A, but be aware that there is no Exit 10 driving northbound. Travel east on Neponset Street for 0.2 miles and then take a left into the parking area. The traffic on Neponset Street can be challenging during the morning commute, so please exercise caution when entering or exiting the park.

The Great Lawn and Constructed Wetlands Area

The best place to start birding the park is the trail that borders the area that the park signage denotes as the "great lawn," situated directly north of the parking lot (Figure 1). To access the trail, walk to the northwest corner of the parking lot and take a right. The trail parallels the northern border of the parking lot and leads to several observation platforms overlooking the constructed marshes.

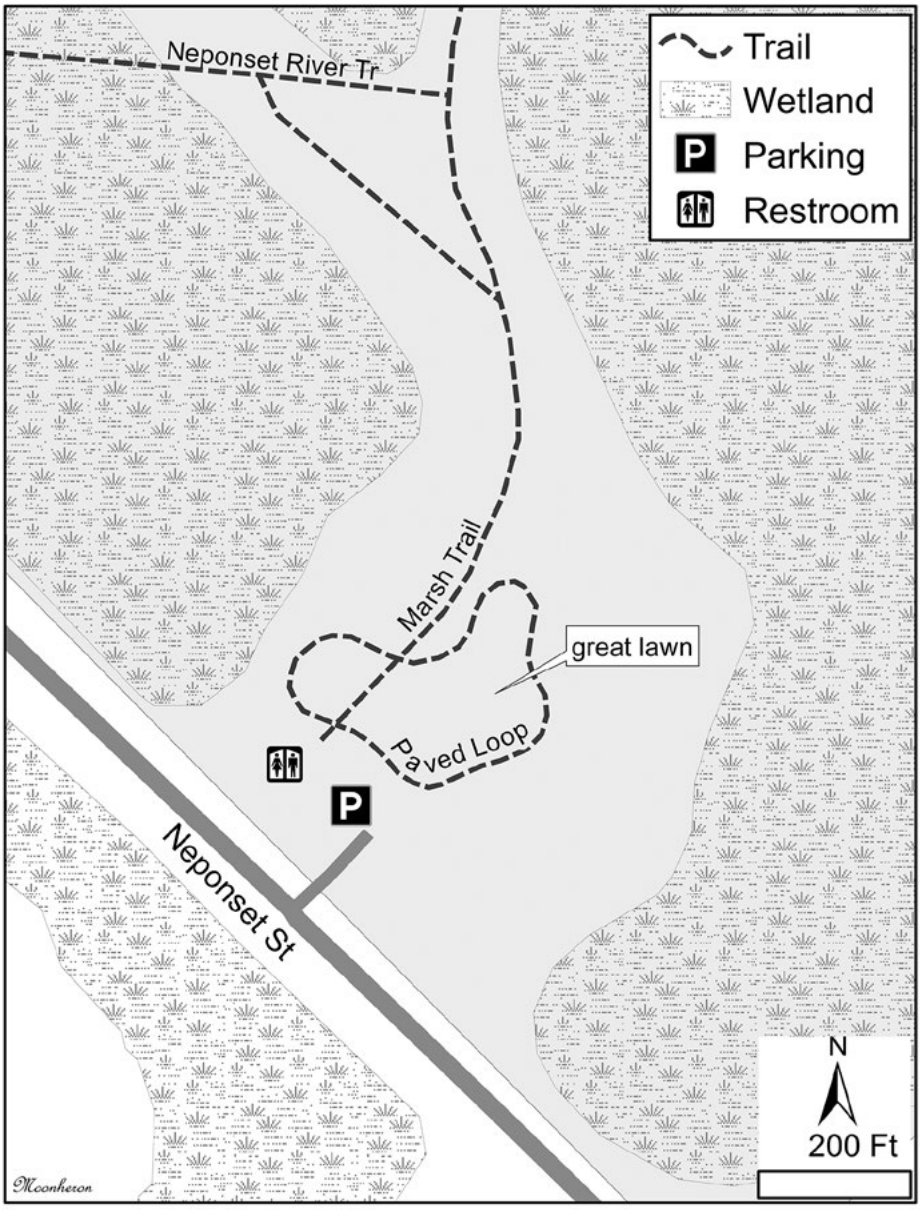
Neponset River Tr
Trail
Wetland
Parking
Restroom
Marsh Trail
great lawn
Paved Loop
Neponset St
N
200 Ft
Moonheron

Fig. 2. Constructed wetland attracts Tree and Barn swallows. Photograph by Marsha Salett.

During the fall migration, check the weeds and shrubs growing at the edge of the trail for Eastern Phoebes, Eastern Bluebirds, Palm and Nashville warblers, and Song and Chipping sparrows. Listen for Swamp Sparrows chipping from the cattails nearby and Common Ravens uttering their guttural *croaks* in the distance. Continue on the trail as it loops around the grassy knoll that affords a decent view of the constructed marsh below (Figure 2). This area has been a productive spot for watching migrating raptors such as Cooper's and Sharp-shinned hawks. In late September and early October, the manicured areas may host good numbers of Savannah Sparrows. Be sure to listen for Bobolinks flying over this area during the morning flight. Follow the paved path as it loops back toward the parking area and connects with the unpaved main trail.

Directly across the trail is an area bordered by a stone wall and identified on park signage as the "ceremonial lawn." It is worth exploring this area in the fall since there are usually foxtail grasses and other weeds growing around the perimeter of the walls. Check for sparrows in the weeds, but be sure to take a look at the deciduous trees growing just to the west of this location since the crowns are illuminated shortly after sunrise. These trees are a good place to look for Northern Flickers, Blue-gray Gnatcatchers, and Blue-headed and Warbling vireos after the passage of a cold front. Being at this spot at first light may provide the opportunity to witness American Robins exiting a roost site somewhere in the southwest corner of the park.

After birding the ceremonial lawn area, return to the main trail and continue north and beyond the great lawn area on the right. In the fall, Chipping and Song sparrows

Gray Catbird. Photograph by the author..

are typically encountered in this area; a Dickcissel made an appearance here in 2015. In addition, the weedy edges on the north side of the great lawn can be a good place to look for migrant sparrows. Vesper Sparrows are possible in spring and fall and the species has been observed at the park as recently as 2016. Continue north on the main trail and look for Tree Swallow nest boxes on either side of the path. Several pairs of Tree Swallows nest here and can be observed investigating the nest boxes in early April. The cattail marsh and wet areas in the vicinity are a good place to look for Spotted and Solitary sandpipers in early May. It is likely that at least one pair of Spotted Sandpipers breeds in this area, so a careful scan of the open areas between the trail and the marsh is definitely warranted. Other noteworthy species that may be observed here in spring include Barn Swallows, Blue-winged Warblers, Field Sparrows, and Purple Finches.

Neponset River Trails

About twenty yards north of the great lawn area, look for a trail on the left just before a stand of quaking aspen trees. Follow this trail west from the main park trail toward the Neponset River. The trail is not long and ends at the river, but a stroll along this route during the spring migration may yield sightings of Ruby-crowned Kinglets, Warbling Vireos, Rose-breasted Grosbeaks, and a variety of warblers. Rusty Blackbirds may be observed in this location from late March through early April. After reaching the end of the trail at the banks of the Neponset River, retrace your steps until you reach a fork in the trail. Taking either trail at the fork will lead back to the main trail and may produce sightings of Carolina and House wrens, Hairy Woodpeckers, Blue-gray Gnatcatchers, Gray Catbirds, Cedar Waxwings, Black-and-white and Yellow-rumped warblers, and American Goldfinches in the spring and fall seasons.

The Marsh Trail

Returning to the main trail, walk north and look for the large circular cement structure on the left. Directly ahead is the marsh trail, approximately one mile long, on what appears to be a former railroad bed. The trail is straight and, in several places, has breaks in the trees that afford great views of the large cattail marsh to the east. Continue north on this trail and look for Dark-eyed Juncos and White-throated Sparrows in the fall. Connecticut Warblers were observed along the first half-mile of the trail in September 2016. The rank weeds growing below the red maples and speckled alders lining the trail are perfect for this elusive species and certainly warrant a close look in mid to late September. Listening for the distinctive dry *chimp* call is usually key for detecting the presence of this large, but secretive, warbler.

While walking north on the trail, look for the openings in the vegetation for views of the marsh. The habitat here looks good for a variety of marsh birds, so be sure to

spend some time scanning the wetlands whenever there is an unobstructed view. The sparsely vegetated areas along the trail can also be good for migrants like House Wrens, Eastern Phoebes, Yellow-rumped Warblers, Northern Waterthrushes, and Savannah Sparrows during the spring and fall migrations. Swamp Sparrows abound in the marsh in these seasons, but are more frequently heard than seen.

House Wren. Photograph by the author.

The Red Maple Swamp Trail

The main trail ends at Interstate 95, but there is an approximately quarter-mile trail to the right that traverses red maple swamp habitat. The trail ends at a fence with a warning about the presence of commuter rail tracks just beyond it. Red-bellied Woodpeckers, Blue-gray Gnatcatchers, Northern Waterthrushes, and Black-and-white Warblers may be present along this trail and at the entrance to the swamp. This area is not as productive in the fall, but Carolina Wrens and migrating White-throated Sparrows may be found in the dense understory.

Birding the Park in Other Seasons

Farnham-Connolly Memorial Park has a variety of species that are likely breeders and can be found in the summer months. Green Herons, Willow Flycatchers, Eastern Kingbirds, Black-billed Cuckoos, and Indigo Buntings all have been observed in the months of June and July. In late summer, presumed family groups of Song Sparrows congregate in the weedy areas surrounding the great lawn area. This area may also produce postbreeding dispersed species that have not been observed elsewhere in the park as migrants or breeders, so anyone with a penchant for patch birding may add a few new species to the growing tally.

Because the park has only been open to the public since 2014, there is ample room for ornithological exploration and discovery at a site that is less than a 45-minute drive (on a good day) from the metro Boston area. As mentioned earlier, the park is a great place to go birding if one has limited time or needs a break from the hectic pace of Interstate 95.

To learn more about the park, please visit the following site, which served as a primary source for this article: http://www.mass.gov/eea/docs/dcr/stewardship/rmp/bh/section-5-neponset-river-reservation.pdf

Jim Sweeney *has been birding since 1980. He is the compiler for the Taunton/Middleboro CBC, a past vice president of the South Shore Bird Club, a member of Bird Observer's Board of Directors, and a trip leader for various conservation organizations in Massachusetts. In addition to birding, he has a passion for dragonflies and damselflies, collecting rare natural history books, and exploring the natural history of local patches.*

Dorothy R. Arvidson: 1920-2017

Robert H. Stymeist

Dorothy Arvidson with Herman D'Entremont at Mount Auburn Cemetery, May 2003. Courtesy of Eva Casey.

The staff of Bird Observer is saddened by the death of Dorothy Arvidson, who passed away at the age of 96 on April 9, 2017, in Texas. Dorothy joined the *Bird Observer* editorial staff in 1978 and served as editor of the magazine from 1983–1991. Dorothy presided over many changes in *Bird Observer* that enhanced the journal. Under her editorship, *Bird Observer* introduced a new look; after 15 years of the same cover design of a pair of Hudsonian Godwits, we initiated a new cover protocol that featured a different bird each issue.

Dorothy was an avid collector of bird art. She traveled to Wisconsin several times to attend the annual Birds in Art exhibit at the Leigh Yawkey Woodson Art Museum in Wausau, where she met several of the artists whose work graced many of our covers. Since the first cover of a Great Horned Owl by Scott Hecker in February 1987, we have had 180 different illustrations of birds from many different artists.

Dorothy maintained a high standard of editing and quality. One of her classic contributions to *Bird Observer* was her article "On Records of Birds," published in Volume 12, Number 1 in February 1984. Although digital photography now makes documentation of bird identification easier, this article is still a standard for reviewing the aspects of writing a rare bird report. The article details the history of record keeping of birds in Massachusetts, the certain minimal data required of a report, and a list of difficult species that can be confusing.

Dorothy loved to travel, was a friend to many, and was an enthusiastic field companion. She will be missed.

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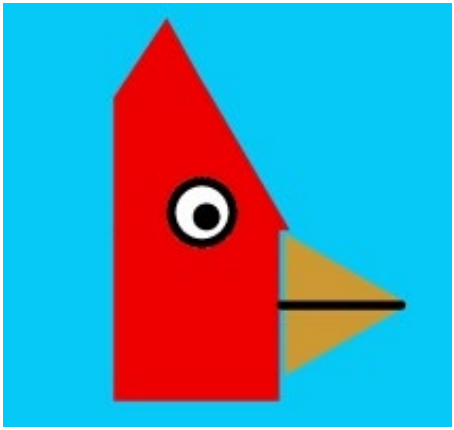
A Weekly Radio Show about Birds, Birding, and Conservation



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The Complex Relationship Between Birds and Gypsy Moths

Jennifer Forman Orth and Matt Pelikan

Habitat with dead canopy trees, the Woods Preserve (Nature Conservancy), West Tisbury, MA. Photograph by Matt Pelikan.

For many of us in the world of pest management, the invasive insect known as the gypsy moth (*Lymantria dispar*) had fallen off the radar in recent years, after having caused massive tree deaths in the 1980s and then going quiet. But since 2015, the gypsy moth has come back in a big way. In this article, we take a look at what impact this outbreak could have on birds, and how birds can impact gypsy moth populations in return.

Gypsy Moths: The Problem

Most Massachusetts residents are aware of the impact that gypsy moth caterpillars have had in our state over the past few years. If people were not familiar with the name gypsy moth, they surely knew those "big black caterpillars." In 2015 and 2016, a large part of the state was subject to defoliation by this pest, including portions of Barnstable, Plymouth, and Bristol Counties, the eastern parts of Hampden and Hampshire Counties, southern Middlesex and Worcester Counties, and the northernmost part of Essex County (Figure 1). The gypsy moth is not new to our state—it was first

introduced to North America in Somerville, Massachusetts, more than 120 years ago. However, for a couple of decades until the recent outbreak, we had been in a sort of uneasy détente with the pest. This period of calm was made possible by the flourishing of a fungus, *Entomophaga maimaiga*, starting in 1989 (Hajek 1996). *E. maimaiga*, known as an "entomopathogenic" fungus because it causes disease in insects, was one of many biological controls released in an effort to combat gypsy moth. It infects gypsy moths at the caterpillar stage, killing the caterpillars late in their life cycle. While this fungus won't ever be able to eradicate gypsy moths, until recently it kept most infestations in check.

That all changed in early spring of 2015, when parts of the state began to experience drought conditions. By June 2015, the entire state was at a level of Abnormally Dry (D0) or higher according to the U.S. Drought Monitor's Drought Intensity Scale, with more than half the state at a Moderately Dry level (D1), including Barnstable County and many of the adjacent towns and cities in Bristol and Plymouth County. Like many fungi, *E. maimaiga* needs moisture and humidity for its spores to germinate. Dry conditions meant the fungus couldn't thrive, which was a boon for gypsy moth populations. Thousands upon thousands of caterpillars ate their way through the summer, pupated, and by July 2015 had emerged in large numbers as adult moths. These moths went on to produce huge numbers of egg masses that overwintered into 2016.

While there was some drought relief in the winter and spring of 2016, drought conditions returned later that spring throughout much of the state. By July and August 2016, several counties were experiencing Severe Drought (D2) or even Extreme Drought (D3) levels (National Drought Mitigation Center, 2016). The high number of egg masses combined with drought conditions that prevented the fungus from proliferating meant that an even bigger gypsy moth year was on deck. Indeed, aerial surveys by the Massachusetts Department of Conservation and Recreation (DCR) indicated that more than 350,000 acres in the state were defoliated by gypsy moth caterpillars in the summer of 2016 (Massachusetts DCR 2016), a 300,000-acre increase over 2015 and the biggest defoliation in decades (Figure 1).

The 2016 gypsy moth outbreak garnered a lot of attention. When the caterpillars reach their final instars, their large size and black, spiky appearance makes them quite noticeable. At outbreak levels, the caterpillars can frequently be seen migrating to nearby food sources by the hundreds. Defoliations are usually hyper-localized; even in heavily infested areas, one homeowner might see all of his broadleaf trees stripped of foliage, while the yard across the street has minimal tree damage. When the caterpillars pupated and adult moths emerged in July, the initial daytime flight of the males was so massive that it made the evening news (Hager 2016). These recent repeated defoliations have raised questions about possible impacts on the environment, including bird populations. In this article, we look more closely at the complex relationship between birds and gypsy moths. In particular, we examine how gypsy moths might influence the abundance of Massachusetts birds, what the impact on birds might be after repeated defoliations caused by gypsy moth outbreaks, and what impact birds may have on this introduced forest pest.

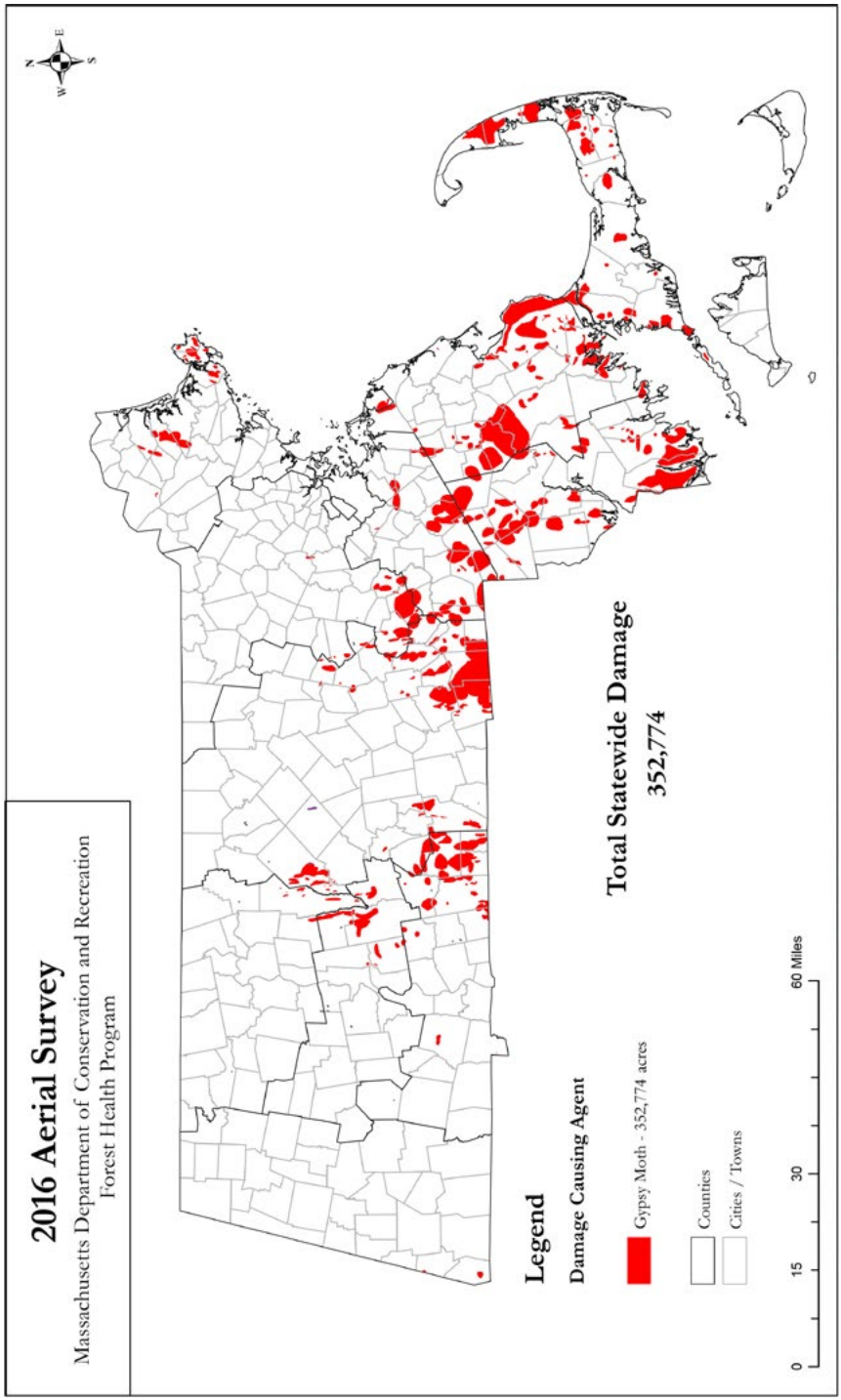

Fig. 1. 2016 Aerial Survey showing areas damaged by Gypsy Moths.

Gypsy Moth Outbreaks: Direct Impacts

The most obvious direct impact of a major gypsy moth infestation is the defoliation of trees and shrubs. Before we can delve into the effect defoliation can have on birds, we must first understand what it means for plants. Gypsy moth caterpillars will consume the leaves of more than 500 types of trees, shrubs, and vines, including broadleaf and coniferous species. Their preferred targets are oak, birch, poplar, willow, alder, basswood, and apple. They have also been observed eating maple, sassafras, hornbeam, elm, cherry, hickory, and many other common components of hardwood forests in Massachusetts. Older caterpillars (later instars) have been observed eating coniferous species such as pine, spruce, and hemlock, likely because all of their preferred food sources had already been consumed (McManus et al. 1979). As a result, in outbreak years, there are few woody plants in Massachusetts forests whose leaves won't become gypsy moth caterpillar food.

A single defoliation, even if complete, is unlikely to kill a large, mature tree or shrub. A broadleaf tree, e.g., an oak or a maple, will typically respond to defoliation by putting out a new set of leaves within a few weeks. However, repeated defoliations over the course of several growing seasons can lead to dead branches and eventually dead trees, particularly when environmental conditions are already stressful, such as during a drought. Full defoliations of seedlings and small saplings can lead to plant death much more quickly.

In the eastern part of the state, gypsy moth damage has been occurring after another introduced species, winter moth (*Operophtera brumata*), has already caused significant defoliation to broadleaf trees such as maple, oak, and elm (Elkinton and Boettner 2016). Since winter moth caterpillars feed from April to early May, trees and shrubs are often just putting out a new set of leaves when gypsy moth caterpillars begin feeding in May and June. That means that the same plants could end up trying to put out a total of three sets of leaves each season. This kind of resource expenditure jeopardizes future growth and the ability of the tree or shrub to survive. Gypsy moth caterpillars that hatch in a part of the state where winter moth has already defoliated the majority of broadleaf trees will also move on to less preferred host trees, such as pine and spruce. Defoliation of these conifers can have more severe and immediate consequences, since conifers do not put out a new set of leaves each year, and producing new needles is an extremely costly use of the tree's resources.

Gypsy Moth Defoliation: Impacts on Birds

What impact might the defoliation caused by gypsy moths have on birds? The first most obvious point is that defoliation removes shelter, reducing the number of suitable nesting sites for ground- and tree-nesting birds, including many of our songbirds. Defoliation also potentially reveals nesting sites to predators and may cause nesting birds to abandon their nests. Unfortunately, peak defoliation during a gypsy moth infestation occurs in July, which typically coincides with critical points in the nesting season for local birds (Thurber et al. 1994). Nest exposure when young birds are readying to fledge means they become visible to predators at a time when they are in some respects most vulnerable.

Late-instar female gypsy moth caterpillar. Photograph by Jennifer Forman Orth.

In addition, exposure of the forest floor to sunlight following defoliation of the upper canopy and the shrub layer, typical of a severe gypsy moth outbreak, can lead to indirect impacts on forest fauna. The lack of foliage means less shade, causing the forest floor to experience higher daytime temperatures and a lack of humidity that ground-nesting birds may find inhospitable (Smith and Lautenschlager 1981). The opening up of the shrub layer may also encourage predators to move into the area if they perceive prey is accessible (Smith and Lautenschlager 1981). Birds that forage in the leaves of live trees and shrubs may also encounter a lack of foraging sites and could experience food shortages later in the season because little food is left to support native caterpillars.

All of these factors imply that, in the short term, the forest environment can become inhospitable for breeding birds following a gypsy moth outbreak. Various studies have attempted to measure this impact. Smith and Lautenschlager (1981) noted that in infested areas where refoliation does occur, the birds and mammals will flee but will return to the area within two to three months. In an experiment done with artificial nests (Thurber, McClain, and Whitmore 1994), nest predation was higher in defoliated sites, and predation was also more frequent for ground nests than for nests placed more than one meter off the ground. Gypsy moth infestations are also associated with decreases in bird species associated with closed canopy forests (Gale, DeCecco, McClain, Marshall, and Cooper 2001), which makes sense because defoliation dramatically alters the makeup of the canopy.

Over several years, repeated defoliation of the upper canopy of the forest can lead to tree death. But these dead trees may be beneficial for some bird species. For example, Eastern Towhee is a ground- and shrub-nesting species that forages in the forest understory and thrives in early successional habitat. Bell and Whitmore (1997) found that populations of Eastern Towhee increased following a gypsy moth outbreak, because the defoliation opened up the canopy, and the sunlight exposure led to the creation of a denser shrub layer. Thurber, McClain, and Whitmore (1994) noted that the growth of the shrub understory following defoliation of the upper canopy should bring

in additional birds, but that this increase in bird numbers would also attract mammalian predators, suggesting that the net impact on birds might be neutral. These authors also predicted that birds nesting in the mid to upper canopy, such as Scarlet Tanager, Eastern Wood-Pewee, and Wood Thrush, would experience increased predation following defoliation. However, Bell and Whitmore (2000) found that for shrub and sub-canopy nesters, e.g., Indigo Bunting and Wood Thrush, the creation of additional shrub habitat offset any negative impacts due to predation.

Snags—standing deadwood—resulting from tree death can also become nesting locations for some species. Showalter and Whitmore (2002) found that overall abundance of cavity-nesting birds increased for the first five years following a gypsy moth outbreak, though that abundance then decreased over the following six years. In that study, primary cavity nesters such as Red-bellied Woodpecker, Pileated Woodpecker, and Northern Flicker were found to have a positive association with snags, as did secondary cavity nesters such as Black-capped Chickadee, and these species were found to take advantage of new nesting habitat created by snags immediately following an outbreak. However, populations of other primary cavity nesters, including Downy Woodpecker, Hairy Woodpecker, Tufted Titmouse, and White-breasted Nuthatch, did not increase when the number of snags increased, leading the authors to surmise that other factors suppress their populations.

There has also been some discussion if creation of snags following several years of defoliation might negatively impact ground-nesting birds by leading to increased nest predation or parasitization by birds that use the snags as perches to spot prey. However, research has not demonstrated a significant impact, with one study showing no increase in raptor predation or nest parasitization (Bell and Whitmore 1997), and a separate study showing that the creation of larger snags did not lead to an increase in nest parasitization by cowbirds (Bell and Whitmore 2000). In both studies, the authors suggested that the buildup of the shrub canopy following defoliation of the upper canopy limited opportunities for predation and parasitization by concealing any nests that were present.

Gypsy Moths as a Food Source

Gypsy moths start out their lives inside light brown egg masses that are laid by the female moths, mainly on tree trunks and branches but sometimes on outdoor furniture and other structures. The egg masses are a combination of eggs and hairs from the body of the female moth. The caterpillars hatch from the eggs in early to mid-May, and at their earliest life stages—the first few instars—can be found hiding on the undersides of mostly intact leaves. During this time, the hairs covering the caterpillars are smaller and thinner than the robust bristles found on later instars, when the caterpillars are larger and closer to pupation. The caterpillars pupate in late June or early July, forming dark brownish-red pupal cases that can often be found in clusters on tree trunks, fences, or the sides of buildings. The adult moths emerge from the pupal cases after about two weeks. The male moths are grey, and it is these males that you will see in flight during big outbreak years, or attracted to lights at night. The females are white and much larger than males, and though they have wings, they cannot fly. Instead, they usually

flutter around the area where they emerged from their pupae, until a male arrives to mate.

Birds have varying interests in gypsy moths as a food source, depending on the bird species in question and the life stage of the insect. Table 1 includes a list of 41 Massachusetts bird species documented as having eaten one or more life stages of the gypsy moth. Only five species have been documented eating egg masses, presumably because the masses are covered with hairs from the body of the female, rendering them distasteful or difficult to eat (Leonard 1981). Nonetheless, Forbush and Fernald (1896) noted that Black-capped Chickadees and House Sparrows eat the eggs, and White-breasted Nuthatches have been observed picking at the egg masses to get at other insects underneath. In contrast, in areas of Europe where gypsy moth is native, several bird species are known to eat the egg masses, as reported by Campbell (1981). As with the egg masses, the pupae are seldom eaten by birds in the eastern United States, though Hairy Woodpeckers, Eastern Wood-Pewees, cuckoos, vireos, and other species have been observed doing so (Smith 1985).

Most observations about the consumption of gypsy moths by birds come from the caterpillar life stage (larvae). The majority of this information comes from gut studies done by Forbush and Fernald (1896). During outbreak years, they found that significant percentages of the gut content of several bird species consisted of gypsy moth caterpillars. However, not many bird species have adapted to eat hairy caterpillars such as those of the gypsy moth. A study done by Whelan, Holmes, and Smith (1989) found that North American bird species generally prefer nonhairy caterpillars, and if offered both gypsy moth caterpillars and a nonhairy species in a feeding experiment, they will preferentially choose the nonhairy species. That study also found that birds were more willing to accept earlier gypsy moth instars, likely because the hairs were less distasteful or obtrusive to the birds. Leonard (1981) also noted that many more bird species will consume early instar gypsy moth larvae. In contrast, Smith and Lautenschlager (1981) investigated the gut contents of 17 different bird species and found that the majority contained mainly late-instar larvae, even though sampling was done in both June and July. It is difficult to know, though, if Smith's results reflect a preference that birds have for mature gypsy moth caterpillars or a shortage of preferable food.

Notable among our woodland birds as predators of gypsy moth caterpillars are the cuckoos. Yellow-billed and Black-billed cuckoos are caterpillar specialists, eating both hairy and spiny caterpillars. They can eat these caterpillars specifically because they have evolved the fascinating ability to regrow their stomach linings. Once the cuckoo's stomach lining is completely clogged with hairs and spines from the caterpillars it has digested, the bird regurgitates the used stomach lining in a pellet form, removing all the spines and hairs along with it (Forbush 1907, cited in Bent 1940). Both cuckoo species, along with grackles and Red-winged Blackbirds, are attracted to gypsy moth infestations and will enter new territory once the caterpillars reach outbreak levels (Leonard 1981). Once these birds arrive, they consume large numbers of the caterpillars. Other opportunistic species known to be attracted to gypsy moth caterpillar infestations include crows, Chipping Sparrows, starlings, and cowbirds (Smith and

Black-billed Cuckoos are caterpillar specialists. Photograph ©Shawn P. Carey.

Lautenschlager 1981), though Smith (1985) noted that the Chipping Sparrows he captured had no gypsy moth caterpillars in their guts. There is also a second suite of birds that, rather than arriving only when outbreak levels are high, instead eat gypsy moth caterpillars as a regular part of their diet, presumably helping to keep the pests at low levels until an outbreak occurs. This group includes Black-capped Chickadee, Blue Jay, Eastern Towhee, Baltimore Oriole, and Gray Catbird (Smith and Lautenschlager 1981), all of which are relatively common species that forage in a wide variety of habitats and often produce at least two broods per season.

A few bird species have also been documented eating adult gypsy moths. Blue Jays, for example, have been observed vigorously feeding on adult male moths during outbreak years. Specifically, Blue Jays on Cape Cod were seen congregating on tree trunks and lower branches right after sunrise, targeting the resting area of the moths. As the day went on and the moths left the tree trunks to hide in nearby shrub foliage, the Blue Jays were observed foraging in the shrubs, pulling the male moths from the undersides of leaves, even flying repeatedly straight into the shrubs, flapping their wings in order to scare up and dislodge the hiding moths (Odell 1977 cited in Smith and Lautenschlager 1981). Other bird species that feed on adult gypsy moths include Indigo Bunting, Ovenbird, Common Yellowthroat, and Eastern Phoebe. Nonetheless, the adult moths are not known to be a significant part of the diet of any bird species.

Direct Impacts of Gypsy Moth Infestations on Birds

It makes sense that the caterpillar life stage of gypsy moth is the most important to birds, because caterpillars are active when birds are nesting, and fledglings are frequently fed caterpillars for their high protein content (Smith and Lautenschlager

Family Common Name	Scientific Name	Life Stages of Gypsy Moth Consumed
Cuculidae		
Yellow-billed Cuckoo	*Coccyzus americanus*	L, P
Black-billed Cuckoo	*Coccyzus erythropthalmus*	L, P
Picidae		
Downy Woodpecker	*Picoides pubescens*	E, L
Hairy Woodpecker	*Picoides villosus*	L, P
Northern Flicker	*Colaptes auratus*	L
Tyrannidae		
Eastern Wood-Pewee	*Contopus virens*	L, P, A
Least Flycatcher	*Empidonax minimus*	L, A
Eastern Phoebe	*Sayornis phoebe*	P, A
Great Crested Flycatcher	*Myiarchus crinitus*	P, A
Eastern Kingbird	*Tyrannus tyrannus*	P, A
Vireonidae		
White-eyed Vireo	*Vireo griseus*	L
Yellow-throated Vireo	*Vireo flavifrons*	L, P, A
Red-eyed Vireo	*Vireo olivaceus*	L, P, A
Corvidae		
Blue Jay	*Cyanocitta cristata*	E, L, P, A
American Crow	*Corvus brachyrhynchos*	L, P, A
Paridae		
Black-capped Chickadee	*Poecile atricapillus*	E, L, P, A
Sittidae		
White-breasted Nuthatch	*Sitta carolinensis*	E
Troglodytidae		
House Wren	*Troglodytes aedon*	L
Turdidae		
Eastern Bluebird	*Sialia sialis*	L, P, A
Wood Thrush	*Hylocichla mustelina*	L
American Robin	*Turdus migratorius*	L, P, A
Mimidae		
Gray Catbird	*Dumetella carolinensis*	L, P, A
Brown Thrasher	*Toxostoma rufum*	L, P, A
Sturnidae		
European Starling	*Sturnus vulgaris*	L
Passeridae		
House Sparrow	*Passer domesticus*	E, L, P, A

Parulidae		
Ovenbird	*Seiurus aurocapilla*	L, A
Black-and-white Warbler	*Mniotilta varia*	L, A
Common Yellowthroat	*Geothlypis trichas*	L, A
American Redstart	*Setophaga ruticilla*	L, A
Yellow Warbler	*Setophaga petechia*	L, P, A
Chestnut-sided Warbler	*Setophaga pensylvanica*	L, A
Black-throated Green Warbler	*Setophaga virens*	L, A
Emberizidae		
Eastern Towhee	*Pipilo erythrophthalmus*	L, P, A
Chipping Sparrow	*Spizella passerina*	L, A
Cardinalidae		
Scarlet Tanager	*Piranga olivacea*	L, P, A
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	L
Indigo Bunting	*Passerina cyanea*	A
Icteridae		
Red-winged Blackbird	*Agelaius phoeniceus*	L
Common Grackle	*Quiscalus quiscula*	L
Brown-headed Cowbird	*Molothrus ater*	L
Baltimore Oriole	*Icterus galbula*	L, P, A

Legend: E = eggs, L = Larvae, P = Pupae, A= Adults

Table 1. Massachusetts bird species that are known to eat gypsy moths. Sources: Forbush and Fernald (1896), McManus et al. (1979), Smith and Lautenschlager (1981).

1981). Gale, DeCecco, McClain, Marshall, and Cooper (2001) found that short-term impacts of a gypsy moth caterpillar influx on bird abundance were numerous. For example, Black- and Yellow-billed cuckoos, noted caterpillar specialists, increased in local abundance two years before the gypsy moth hit outbreak levels and then were gone as soon as the outbreak abated. Indigo Buntings had a similar increase right before an outbreak but took about five years to get back down to typical population levels.

In contrast to years where gypsy moths are present but not at outbreak levels, or are rising in numbers but in extremely limited geographical areas, years of extensive infestation can result in food pulses being injected into the forest ecosystem. One study looked at the impact of these repeated pulses on bird abundance over three decades in Connecticut, Pennsylvania, and Virginia, and found an overall increase in populations of all woodpecker species over time, suggesting that the woodpeckers have learned to take advantage of outbreak years (Koenig, Walters, and Liebhold 2011). Research has found few other long-term trends, because the impacts of the moths are too variable. Koenig's study also found that, over shorter time periods, Red-headed Woodpecker and Northern Flicker numbers increased during the breeding season in outbreak years,

Gypsy Moths, Myles Standish Park. Photograph by Jennifer Forman Orth.

whereas Downy Woodpecker populations decreased. Though some bird species tie their breeding cycle to times when caterpillars are most abundant (Hinks et al. 2015), we have no evidence that such synchronization occurs specifically with gypsy moth outbreaks, perhaps because these outbreaks generally occur several years apart and last for only one to three years. Taken together, these studies suggest either that short-term trends are not good predictors of long-term bird populations, or that the long-term woodpecker success found by Koenig was related to factors other than gypsy moth outbreaks. Gale DeCecco, McClain, Marshall, and Cooper (2001) concluded that impacts of gypsy moth on birds will always be short-term, provided that there is little tree mortality.

Bird Impacts on Gypsy Moths

Much of the older research on birds and gypsy moths has focused on if birds could reduce populations of this pest, thus alleviating an outbreak. Campbell (1977, in Campbell 1981) found that excluding birds and small mammals from experimental plots had a stronger impact on gypsy moth populations than excluding mammals alone. Smith and Lautenschlager (1981) also noted that migrating warblers sometimes pass through forests when gypsy moth caterpillars are young and could make a dent in populations in areas where they stop to rest.

Gypsy moth caterpillars are generalists, feeding on many different plants. The "enemy-free space cascade hypothesis" suggests that, unlike host-specific caterpillars,

caterpillars that use many host plants will in turn have a variety of predators feeding on them, and that this predator pressure from birds will create a strong trophic cascade down the food chain that leads to a significant decrease in herbivory (Singer et al. 2014). However, once an outbreak occurs, predation by birds and other predators has been found to be insufficient to affect gypsy moth populations (Smith and Lautenschlager 1981). As much as defoliation impacts the forest in the short term, the cyclical nature of gypsy moth outbreaks, in combination with the fact that gypsy moths are important food sources for only a few predators (Smith 1985), means that the overall effect of birds on gypsy moths is limited.

That conclusion has not, however, kept some from suggesting natural "solutions" involving birds as a way of combating the gypsy moth problem. In Eurasia, nesting boxes are frequently placed in outbreak areas to encourage cavity-nesting birds to settle in the area, with the hope that the birds will consume caterpillars (Leonard 1981, Smith and Lautenschlager 1981). Leonard (1981) also recommends retaining brush in the forest understory as a way to promote populations of ground- and shrub-nesting species. Others have suggested that foresters should plant and encourage tree species that would provide the most habitat and shelter for bird species known to eat gypsy moth (Smith and Lautenschlager 1981). Unfortunately, because current research indicates that birds do not control gypsy moth populations in outbreak years, it is unlikely that such strategies will lead to control of gypsy moth outbreaks. Perhaps that is because there is already enough food available for birds to thrive without consuming gypsy moths, or because so few bird species actually prefer the caterpillars of gypsy moths if other more palatable caterpillars are available.

Gypsy Moth in Massachusetts: What Does the Future Hold?

There are now parts of Cape Cod, Bristol, Plymouth, and Worcester Counties that have experienced at least two consecutive years of high gypsy moth infestations and severe tree defoliation. The volume of egg masses on the trees in outbreak areas indicate that 2016 was once again a very successful reproductive year for gypsy moth. The Massachusetts DCR is currently predicting a third year of significant defoliations in 2017. Even though early spring storms in 2017 have alleviated drought conditions across most of Massachusetts, the two preceding years of dry conditions mean that there will likely not be enough *Entomophaga maimaiga* spores around this summer to truly knock down gypsy moth caterpillar populations (Massachusetts DCR 2017).

What would another year of defoliation mean for the future of forests in Massachusetts? As discussed above, long-term impacts of gypsy moth infestations on forest ecology are typically limited because the outbreaks do not last longer than one to three years, thus restricting the number of tree deaths and allowing bird populations to quickly recover or to decline following any bumps in abundance. But some parts of the state are now heading into what could be their third or even fourth year of high gypsy moth levels. If drought conditions return in the summer of 2017 or in subsequent years, the repeated defoliations and associated tree deaths that occur could lead to this pest setting back the process of succession in some forests (Bell and Whitmore 1997). The drought itself will only compound the problem, because lack of water can hasten

Adult male gypsy moth. Photograph by Jennifer Forman Orth.

death in a tree or shrub already damaged by defoliation or disease. Under such stresses, hardwood forest ecosystems may be altered, as selective pressure will favor species that gypsy moth does not like to eat (Twery 1991). These species would include trees such as ash, butternut, walnut, dogwood, tulip poplar, and catalpa, as well as shrubs such as American holly, mountain laurel, and rhododendron (McManus et al. 1979). Drought-resistant plants may also gain a competitive advantage.

It is difficult to predict how bird populations may be affected in the areas of Massachusetts most impacted by gypsy moth. Will the pine barrens in southeastern Massachusetts be reduced to nothing but low, scrubby shrubs, grasses, and herbs, with the canopy hospitable only to cavity-nesting birds that can take advantage of all the snags? Will the repeated exposure of the floors of oak and hickory forests to sunlight, combined with the death of nearby trees, create opportunities for invasive shrubs and small trees such as buckthorn, burning bush, barberry, and shrub honeysuckle? If so, there might be increased habitat for ground- and shrub-nesting bird species. On the

other hand, forests might be unable to regenerate a closed canopy, with the open habitat remaining inhospitable to Scarlet Tanager, Eastern Wood-Pewee, and the warbler species that nest high in trees.

This review has examined the complicated relationship that has developed in Massachusetts among birds, the woodlands they inhabit, and the gypsy moth, an introduced pest that has festered in our state for over a century. Moth outbreaks, especially in the presence of other stresses such as drought, can substantially alter forest structure, and therefore avian habitat, in the shortterm and may also potentially have some impact over longer periods of time. Some bird species will benefit from these alterations, and others will lose out. The fact that these interactions are happening within the context of a changing climate adds further complexity, as does the potential introduction of other forest pests, pathogens, and invasive plants. With a large and skilled birding community and a long history of documented research into the state's avian populations, Massachusetts is well positioned to support future studies to examine this issue from a wider perspective, with the hope that we can identify issues that put birds at risk and work toward alleviating them.

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The History, Birds, Research, and Conservation Efforts on Seal Island National Wildlife Refuge

Keenan Yakola

Keenan handles an Atlantic Puffin that has just received both a Field Readable and USGS Bird Banding Laboratory band before it was weighed, measured, and released. This individual can now be identified and monitored in the field by biologists. Photograph by Isabel Brofsky.

*[A note from the author: Although Seal Island National Wildlife Refuge (SINWR) is often visited by field biologists and interns with the U.S. Fish and Wildlife Service and Audubon's Project Puffin, the island remains **closed** to the public year-round due to concerns for breeding birds in the summer, pupping gray seals in the winter, and most importantly year-round safety concerns due to unexploded ordinance left over from target bombing in the 1940s–1960s. However, the island may be circumnavigated by boat via tours available throughout the summer through John Drury, Old Quarry Ocean Adventures, or the Isle au Haut Boat Services.]*

A Three-Hour Tour

Seal Island National Wildlife Refuge (SINWR) lies at the outer edge of Penobscot Bay, about 20 miles from Rockland, Maine and six miles from the closest civilization on Matinicus Island. Getting out to this seabird haven is no easy task. Interns, volunteers, and biologists with the National Audubon Seabird Restoration Program, also known as *Project Puffin*, must first board the Rockland-Vinalhaven ferry for an

Seal Island's rocky cliffs and pools attract nesting seabirds and migratory songbirds. All photographs by the author unless otherwise indicated.

hour-long journey. When the boat reaches the quiet, small harbor in Vinalhaven, John Drury—son of the late ornithologist Bill Drury—greets you with his boat, fittingly named the *Skua*. After departing the harbor, John weaves the *Skua* through the small rocky islands that scatter the eastern coast of Vinalhaven Island. Many of them, including Little Roberts Island, are inhabited by gulls and cormorants and give you a sneak peak of what is to come.

As John dodges the lobster buoys that sprinkle the ocean, he points out the birds, geology, cetaceans, and anything related to the local natural history. His passion for the ocean and all its inhabitants brightens up even the roughest crossings of the bay. As you putt closer to SINWR, you start to notice small rafts of alcids on the water and terns hovering over the surface hunting for their next meal. Once the island is in sight, the sheer number of birds becomes obvious. Thousands of terns swirl above the colony on the northwestern point and hundreds of puffins loaf on the rocky boulder berm that surrounds the island. I will never forget the feeling when I first stepped onto SINWR for the first time in 2014. It was breathtaking and it left me speechless. I quickly realized that I would be living in a place still ruled by birds. The five biologists living on the island would be the minority species, a rare phenomenon in today's world.

The living quarters on SINWR are modest. Each person on the island gets his own tent platform and tarp, which becomes his new home anywhere from two weeks to the entire field season of four months. A small 12-foot by 12-foot cabin is centrally located

A bird blind in the tern colony of Seal Island NWR where puffineers conduct studies on chick diet and read band numbers throughout the nesting season.

between the platforms as is a composting outhouse toilet. There is no running water on the island and dishes are washed by hand with rainwater or seawater. Inside the cabin, there is storage for research equipment, a small table for dining, a desk for data entry and management, a marine radio for emergencies and communication between islands, and a small kitchen area with a two-burner propane camp stove. A bath is usually just a swim in the frigid Atlantic but once you get out you can enjoy a seat next to the campfire. Life is simple on the island. It seems like it always has been, and I think this wildness will continue to attract future generations of biologists who learn from the seasoned souls continuing their generous efforts to conserve seabirds and teach others.

The History of SINWR

During the eighteenth and nineteenth centuries, humans exploited seabird colonies along the coast of Maine for the trade of feathers, eggs, and meat. By the early 1800s, the populations of many seabirds, including the Atlantic Puffin, plummeted and puffins occupied only two islands in the Gulf of Maine, nearby Matinicus Rock and Machias Seal Island at the mouth of the Bay of Fundy. Sadly, Matinicus Rock was hit so hard that only a single pair of puffins survived into the twentieth century.

After the extirpation of its diverse seabird colony, SINWR was home to a small fishing camp and today some descendants of its inhabitants still fish the rich waters surrounding the island. However, the island was closed to all activities from the

An Atlantic Puffin returns to its burrow with a bill load of hake. This photo was part of a greater feeding study to track the diet of puffin chicks from season to season.

1940s to 1960s when the U.S. Navy used it as a bombing range. Unfortunately the impacts are still seen on the island and it remains closed to the public due to concerns over unexploded ordinance. Once the bombing ceased, Seal Island's ownership was transferred to the Department of the Interior but it wasn't until the U.S. Fish and Wildlife Service and Project Puffin took over management of the island that seabirds began to return.

In an effort to reestablish Atlantic puffin populations, between 1984 and 1989 one thousand 10- to12-day-old puffin chicks were transplanted from Great Island in Newfoundland to artificial sod burrows where they were handfed and raised by biologists living on the island. The hope was that these puffins would return not to their natal colony in Newfoundland, but by becoming familiar with the sights and sounds of their new home on SINWR, would return to breed here instead upon maturation. To encourage the transplanted puffins as well as other roving Gulf of Maine puffins to nest on the shores of the island, Project Puffin's Dr. Steve Kress used social attraction methods such as decoys and mirrors, which were strategically placed at locations that could be viewed by puffins at sea. This made the island appear like a thriving puffin colony. It wasn't until 1992—eight years after the first translocations—that puffins first began to breed on SINWR. Similar social attraction techniques also were used to attract Common and Arctic terns, which began to nest on the island in 1989. Since these attraction methods were implemented, the diversity and numbers of nesting seabirds have continued to increase.

Alcids	
Black Guillemot	~ 600+
Atlantic Puffin	~ 510
Razorbill	~ 35
Terns and Gulls	
Common Tern	~ 1200
Arctic Tern	~ 900
Herring Gull	~ 400
Great Black-backed Gull	~ 50
Cormorants	
Double-crested Cormorant	~ 25
Great Cormorant	~ 17
Tubenoses	
Leach's Storm-petrel	~ 700

Table 1. A list of the breeding sea bird species and the estimated number of breeding pairs.

Breeding Birds on Seal Island NWR

During the summer, SINWR hosts a diverse suite of nesting seabirds (Table 1). Although research on the island focuses on three alcids—Atlantic Puffins, Razorbills, and Black Guillemots—in addition to Common and Arctic terns, many other birds also nest on the island. In fact, 17 pairs of Great Cormorants—nearly half of all the known pairs breeding in the United States—nest on SINWR. In 2016, all 42 pairs that were confirmed breeding in the United States nested on four islands in the Penobscot Bay Region. This small population in Maine has rightly earned a threatened status from the state. SINWR's Great Cormorants consistently have been the most productive colony of Great Cormorants in Maine primarily due to efforts of the resident interns to deter Bald Eagle predation, which has been problematic at other nesting colonies.

A more common species breeding on SINWR is the Leach's Storm-Petrel whose charming purr calls often lull you to sleep. The last census of Leach's Storm-Petrel on SINWR was in the 1990s when approximately 700 pairs were estimated to be nesting on the island. Other species such as Double-crested Cormorants, Common Eiders, and Herring and Great Black-backed gulls are monitored through an annual census conducted visually from either land or boat, or by surveying a subset of the island that is easily accessible by foot. Other species that are not intensively monitored but breed on the island include Spotted Sandpipers, Common Yellowthroats, Savannah and Song sparrows, and in some years Yellow Warblers and American Black Duck.

Interns head out to the tern colony to conduct productivity checks. They will band and monitor chicks from hatching until fledging to study annual growth and survival.

A Day in the Life of a Puffineer

Biologists, interns, and volunteers working for Project Puffin are affectionately referred to as *puffineers*. Being a puffineer is no easy task and often involves countless hours in bird blinds, crawling in and out of rocky burrows, and meticulous data collection. For more than two decades, puffineers have been getting up at 6:00 am to set up spotting scopes and clipboards at the same designated location to count the number of alcids, gulls, cormorants, and eiders that are visible in the water or on land. This is appropriately called the "morning bird count." After the morning bird count, we record the weather conditions including: sea surface temperature, ambient air temperature, wind speed, visibility, cloud cover, and sea surface conditions, all of which are all recorded three times a day.

After the morning data collection is completed and everyone has had a hearty breakfast, we typically head out to the tern colony for our productivity checks. Since terns first started nesting on SINWR, puffineers have followed a subset of Common and Arctic tern nests to determine their productivity—the number of chicks fledged per nest—and to assess chick growth metrics through banding and measuring. At the beginning of the field season when terns begin to lay eggs, each nest receives a unique identification number and the number of eggs in each nest is recorded daily. Once hatching begins, chicks receive a unique nine-digit band issued by the USGS Bird

The rocky boulder berms that surround the island are home to nesting Atlantic Puffins, Black Guillemots, and Razorbills. The bird blind is strategically placed to observe alcids nesting behaviors.

Banding Laboratory so that they can be identified. Every other day, basic morphometric data, including wing chord and mass, are collected to track growth rates during the nesting season from hatching until fledging. Similar studies also are conducted on Atlantic Puffins, Razorbills, and Black Guillemots. However, checking their nests is much more difficult because they nest among granite boulders that border the edge of the island.

After checking the nests and chicks, we often move into bird blinds for the next three hours. During these stints, we conduct a variety of activities. Before many of the chicks hatch, most of our attention is focused on reading the bands of the adult birds through spotting scopes. We use these data to monitor nest site and mate fidelity as well as longevity.

Once the tern and puffin chicks begin to hatch we conduct feeding studies. A subset of nests that are close to bird blinds are monitored from the day the first chick hatches to the day all the chicks have fledged. Using binoculars, we observe each nest for a total of 12 hours per week through multiple three-hour long blind stints. When a feeding is delivered to a chick, the observer records the time, the species of the prey item, the size of the prey item, the individual chick receiving the prey item, and the parent that delivered the prey item. This information is valuable because it allows researchers to follow the diets of seabird species through time and provides valuable

information to those managing fish populations.

An Arctic Tern delivers a large sand lance to its young chick.

In addition to productivity checks and blind stints, there are a myriad of other activities that are completed only once a week or during a small window of the season. For example, each year we conduct an annual census of nearly all the breeding species. For some species, such as terns, puffineers carefully walk transects across the nesting colony and count the number of nests and eggs. For other species, we use visual counting methods from land or by boat. Visual observations are particularly useful for species such as puffins that do not nest in the open or for species such as Great Cormorants that nest in an area that is inaccessible without severe disturbance. Other research tasks include keeping a daily bird list, conducting shorebird surveys during migration, and conducting dawn to dusk feeding rate studies on puffins to calculate the average number of feedings a chick gets daily. Needless to say, there is always something to keep a puffineer busy.

Birding on SINWR

Although I have birded in Kenya and Tanzania, the Peruvian Amazon and Andes, Mexico, and across the United States, SINWR is one of the most unusual places I ever have been birding. Because SINWR lies at the outer edge of Penobscot Bay, in spring and fall when migrating birds get blown out to sea with a westerly wind, the first land they come across in their efforts to return to the mainland are the islands smattering the coast of Maine. SINWR is unique in that it lies farther out to sea than other nearby islands and its narrow snakelike shape, which runs essentially south to north for about one mile, is particularly attractive to migrating songbirds.

Spring Migration

Spring migration on SINWR is rewarding. Unlike the mainland, the lack of trees provides migrating songbirds with few places to land comfortably. Instead, they use the steep rocky cliffs, crevices, and brackish pond edges as their hunting grounds to fuel up on insects for the next leg of their migration. The first migrants to arrive on the island during the first week of May are Palm and Yellow-rumped warblers, Chipping, White-throated, and Swamp sparrows, and Hermit Thrushes. In addition, the first week of May is often the only time during the entire field season when lingering wintering

A Blackburnian Warbler stops on the lichen-covered rocks of Seal Island NWR.

species such as Iceland Gull, Harlequin Duck, and Purple Sandpiper can be seen. By the end of the first week of May, the breeding terns begin to arrive. Often during their first week on the island they are heard and seen courting and flying high overhead for about an hour after dawn before departing far beyond the horizon to the east, only to return the following morning.

During the second and third weeks of May, a strong push of warblers comes through the island. Blackburnian Warblers are a favorite as their stunning black and orange plumage contrast with the granite rock boulders. In the past two years alone, I have seen 25 species of warbler on Seal Island. I think my favorite part of spring migration is that you get amazingly good views of nearly every bird. Whether they are canopy-dwelling species like the Blackburnian Warbler, a skulky species such as the Mourning Warbler, or a boreal breeding species such as the Cape May, Tennessee or Bay-breasted warbler, all are forced to forage in the open, allowing for ample time to respectfully study and appreciate.

I have noticed that many species of migrants find a way to fill a unique foraging niche on the island. For example, Black-and-White Warblers, Red-breasted Nuthatches, and Downy Woodpeckers use the steep lichen-covered boulder cliffs and the cabin, as a substitute for trees. Flycatchers often find an elevated boulder to sally for insects over grassy fields or gullies. Northern Waterthrushes bob their way along the edges of brackish pools, thrushes use the open muddy flats and rocky caverns, and warblers jump from rock to rock, often leaping and flitting straight up to catch an insect out of the air. And of course, Merlin and Peregrine Falcons are almost always waiting atop the highest perches for a songbird to make the wrong move.

A Blackpoll Warbler perches on a granite boulder. They are one of the most common migrants on Seal Island NWR and one of my favorites.

Another fascinating phenomenon that I have had the fortune to witness is fallout. Large groups of birds will often land on the island around 9:00 or 10:00 am. This fallout is likely due to the effect of birds returning west after being pushed out over the ocean with overnight westerly winds. The most notable fallout was early in May 2016 when more than 200 White-throated Sparrows covered the grassy area surrounding our cabin.

Shorebirds and Fall Migration

Early in July, shorebirds mark the beginning of the fall migration. Ruddy Turnstones and Short-billed Dowitchers pick their way through the rockweed at low tide and roost among the flocks of terns at high tide. Greater and Lesser yellowlegs frequent the many brackish ponds. Whimbrels march through the expansive fields on the southern end of the island. Semipalmated Plovers and Sanderlings feed on the large flat expanses of algae-covered granite exposed at low tide. Least and Semipalmated sandpipers are a common sight through July and August and if you are lucky, a more unusual peep may be among them. On several occasions, I have observed Stilt Sandpipers, some still in breeding plumage, among the flocks of yellowlegs. More than once, I have flushed dowitchers feeding in the muddy trail in route to my tent. During a blind stint one may look out to sea and observe migrating flocks of shorebirds. My most exciting shorebird observation from a bird blind was a small group of Hudsonian Godwits in high breeding plumage flying low over the open ocean in early July 2015. Early migrating species and postbreeding dispersal bring new songbirds to the islands, including Yellow Warblers and *Empidonax* flycatchers. Intriguingly, the past two seasons I have observed significantly more flycatchers in fall than in spring and the exact opposite phenomenon with warblers, but I don't know if this is a regular pattern.

The lone resident Red-billed Tropicbird flies through the tern colony.

It is not uncommon to come across western vagrants such as Yellow-headed Blackbird, Lark or Clay-colored sparrows, or even a Dickcissel.

By the end of August and into the beginning of September, a surge of young Baird's Sandpipers comes through. They frequent the rocky flat sections of the island devoid of any vegetation and sprinkled with brackish, algae filled pools. Additionally, raptors start moving south and often stop on SINWR for a quick snack. The most common species are Merlin and Peregrine Falcon, but seeing a Sharp-shinned Hawk is not out of the question. The past two seasons I have also enjoyed a nice push of Northern Gannets that often gracefully glide across the island in the evening likely trying to catch some of the only remaining thermals of the day. Unfortunately, puffineers are usually off the island by the beginning or middle of September. I have no doubt that given the opportunity to remain on the island through the entirety of the fall migration, we could observe even more species.

Rarities

One of the most exciting parts about being a field biologist—and birder—with Project Puffin is that you never know what, when, and if a rare bird will show up on one of the islands. I can't count the number of times that I was walking to my tent, the outhouse, or a bird blind and came across an unusual bird. All seven of the islands managed by Project Puffin have a long history of rarities including Sooty and Bridled terns, Yellow-nosed Albatross, Curlew Sandpiper, Eurasian Jackdaw, Prothonotary Warbler, Plumbeous Vireo, Black-necked Stilt, and Fork-tailed Flycatcher, just to name few. Since 2005, a Red-billed Tropicbird has spent time on SINWR and Matinicus Rock and has become famous in the birding community. It was first seen on SINWR on July 12, 2005, with an additional sighting the following day on Machias Seal

Island at the mouth of the Bay of Fundy. In subsequent years, the bird became quite faithful to Matinicus Rock, but in 2009 it moved back to SINWR where it has since been spending its summers under a large boulder when it isn't trying to fit in with the unwelcoming Common and Arctic terns.

Although most years are not highlighted by mega-rarities, I have been particularly lucky to observe 189 bird species on SINWR in just the past two seasons. During the summer of 2015, rarities included unusual spring records of Forster's Tern, American Golden-Plover, and Orange-crowned Warbler, a small group of Bohemian Waxwings, Yellow-headed Blackbird, Lark Sparrow, Clay-colored Sparrows and a young Yellow-crowned Night-heron.

The summer of 2016 was especially fruitful, highlighted by a young King Eider, Hooded Warbler, Olive-sided Flycatcher, Royal Tern, White-winged Dove, high numbers of Cory's Shearwaters, and the island's first Upland Sandpiper record. And what a thrill it was to see two new state records for Maine. The first was an Ancient Murrelet that John Drury pointed out to me. What a rush it was to see this Pacific alcid among Razorbills! Just when I thought the summer couldn't get any better, I found a Great Knot mixed in with some Ruddy Turnstones after a morning thunderstorm blew past the island. This bird represents one of only a handful of records for the lower 48 states and is the first for the Atlantic Coast!

I like to point out to birders that what we often consider to be common species on the mainland can sometimes be big-time rarities for the islands. For example, in the summer of 2016, a Turkey Vulture soaring over the island was a huge surprise and had never been recorded on SINWR. In addition, in 2015 a House Sparrow spent several days around the outhouse, which was one of only a handful of times this species has been recorded on the island. One species that I have dreamed about seeing on the island is a Tufted Titmouse, of all things. It is a common feeder bird for many, but to see one fly over open water is a totally different story. Many raptor species, especially buteos, are incredibly rare on the island, presumably due to the lack of thermals over the cool waters of Penobscot Bay. Perhaps my favorite part of birding on the island is that you gain a true appreciation for all birds both common and rare. Over the course of the summer you might only see one House Wren and maybe only a handful of Dark-eyed Juncos. After not seeing a common species regularly for weeks or months on end, seeing just one individual on the island can bring an excitement and unrealized appreciation for that species.

The Future of Seabirds in the Gulf of Maine

It is no surprise that seabirds in the Gulf of Maine are under significant pressure due to warming sea surface temperatures and rapidly changing environmental conditions caused by climate change and anthropogenic impacts (Mills et al. 2013). Over the past decade, Steve Kress, the director of Project Puffin, has noted significant changes in the diet and condition of Atlantic Puffin chicks. Some prey species such as the Atlantic Herring have declined in the diet while others such as haddock, redfish, and butterfish have increased (Kress et al. 2016). In the summer of 2012, large butterfish were common. Chicks often cannot swallow these fish due to their wide, deep-bodied

shape, which left many chicks starving. Fortunately, butterfish are not typically a major prey species in chick diet but, if warming sea surface trends continue, it may facilitate a northward shift of their current southerly distribution (Kress et al. 2016).

Kress (2016) also has noted an annual decrease in the growth rate of puffin chicks at nearby Matinicus Rock. These declines are attributed to the annually increasing trends in sea surface temperatures and declining overall primary productivity in the Gulf of Maine (Kress, 2016). To effectively manage seabird populations in this dynamic world, we must gain a better understanding of how climate change and warming sea surface temperatures are interacting with seabird diet in addition to chick growth and survival at local levels.

Using data collected over the past 25 years by Project Puffin and all its dedicated puffineers, I will be investigating these questions through the completion of my master's thesis as a fellow with the Northeast Climate Science Center at the University of Massachusetts Amherst. I will focus primarily on the Common, Arctic, and Roseate terns, using this long-term data set to quantify how prey composition has changed in chick diets in relation to observed changes in the environment and how these changes may ultimately impact chick growth and survival. In addition to my own research, there are several other students, biologists, and volunteers throughout New England who are researching the best ways to help these seabird populations thrive for decades to come.

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Additional Online Links

Keenan's Photos: https://www.flickr.com/photos/scolopax/
Project Puffin: http://projectpuffin.audubon.org/
Maine Coastal Island NWR: https://www.fws.gov/refuge/maine_coastal_islands/
Northeast Climate Science Center: https://necsc.umass.edu/

Keenan Yakola *is a fellow with the Northeast Climate Science Center, a master's candidate in the Department of Environmental Conservation at the University of Massachusetts Amherst, and during the summer months, the Supervisor of Seal Island National Wildlife Refuge with Project Puffin. Keenan is also a native of Cape Cod, Massachusetts; some of his first experiences with birds included working with Mass Audubon's Wellfleet Bay Wildlife Sanctuary, the Cape Cod National Seashore, and local bird bander Susan Finnegan. He has also spent time working with birds in the Peruvian Amazon and Andes, Kenya and Tanzania, as well as several other locations across the United States.*

PHOTO ESSAY

Birds of Seal Island

A stunning Bay-breasted Warbler is one of the many boreal breeding species that often take refuge on Seal Island NWR during adverse weather conditions.

Ovenbirds often strut around the open rock faces of the island like chickens picking up insects in a yard.

An Atlantic Puffin comes in for a landing with a bill full of fish for a young chick waiting in its rocky boulder burrow.

A Clay-colored Sparrow spent several days in 2015 sallying for insects from a rocky perch along one of the brackish pools on the island.

MUSINGS FROM THE BLIND BIRDER

Lists

Martha Steele

New Year's Day can mean many things to many people but to birders, it is the day on which you begin anew with your annual lists. It follows all the activity of the Christmas Bird Count blitz and the month of December where you try, often futilely, to add just a few more species to the year's list. But on January 1, when you notch your first Rock Pigeon, House Sparrow, or European Starling, you actually experience a few nanoseconds of glee over seeing even these species for the first time in the year. Racking up 50 or more species here in Massachusetts on the first day of the year gets that adrenaline going for the promise of the coming year.

Birding is of course full of friendly competitions for who sees the most bird species in any given geographic area. The advent of eBird has many birders checking daily to see what birds are being reported that can be added to the year's list. Sometimes, we can get a little too serious about listing—never forget to enjoy the bird's beauty and habitat— but the quest to find as many species as possible can be fun and satisfying. That quest can also give a sense of purpose to any given day, particularly during down times of birding, such as chasing after that Bald Eagle you need for your year list on an otherwise miserable and silent late winter day.

Bob and I pay most attention to a number of lists. For Massachusetts, we keep a state list as well as county lists. Each year, we try to see as many birds as possible in Orleans County in Vermont, where our property is, and we attempt to do what we can for the two other counties in the Northeast Kingdom, Essex and Caledonia counties. We also feed off each other's excitement when a new bird shows up on our Vermont property, such as the Olive-sided Flycatcher that stopped by briefly during one spring migration and announced itself by singing from atop a tree outside our kitchen window. We have so far recorded 112 species on our property. I always look forward to sitting on our Vermont deck in early summer, sipping our morning mugs of coffee, while Bob checks to see if there are any eBird alerts about a species seen in our area that we still need for the year. If there is, our morning's plans are solidified in that instant.

For those birders who undertake big year efforts, where they try to find as many species as possible in a single year for the region of interest, most would likely say that in the process, their birding skills improved, sometimes greatly. With the intensity and frequency of birding required to amass a notable year list, often with the assistance of expert local guides from whom you can learn, increasing your birding skills can be a by-product of such efforts. I certainly had to marvel at Noah Strycker's recent achievement of recording over 6,000 species in one year as he traversed the world, writing a blog along the way. Whatever one thinks of such efforts, they do raise awareness about birds and related conservation measures.

In truth, preparing and entering lists takes some discipline and time, and so cannot be dismissed as frivolous scorekeeping. How many times have I sat in the car while Bob meticulously tries to count the hundreds of waterfowl in the water, taking notes on his totals before he forgets them? Or the times that he counts the Snow Buntings that alight on the ground for only seconds before swirling off in a huge flock to the air for yet a few more seconds and then alighting again elsewhere? We might sit there for 10 or 15 minutes trying to come up with the best possible estimate we can, and we take those estimates seriously.

Compiling lists after each foray into the field obviously is a major source of data for researchers monitoring population trends and other aspects of the bird's ecology. We can take heart not only in having fun but also in knowing that we are, in some small way, contributing to the vast data being collected by amateur birders worldwide.

The life list by geographic region is also a valued part of birding. And why not? Any bird that would be a new addition to your life list is cause for dropping whatever you are doing and going for it. While nonbirders think this is a bit crazy and perhaps overzealous, it is all part of the fun, competition, and goal-oriented nature of birding. Maintaining lists is a purpose in and of itself and a means of recording not only the birds we see but also the experiences surrounding the birds, as well as memories of those we may have seen the birds with. So, when Bob looks at the Red-footed Falcon in his Massachusetts life list, it conjures not just the magnificent bird, but the frenzy of leaving the Museum of Comparative Zoology in Cambridge in midafternoon with Jeremiah Trimble to catch a ferry to Martha's Vineyard where they met Vern Laux for the mad dash to the airport to spot and confirm the first North American record of this species. For me, my life Boreal Chickadee brings to mind an afternoon with my friend, Jane Connet, high above the tree line in the White Mountains of New Hampshire. Jane and I were sitting on a rock eating lunch when a beautiful Boreal Chickadee landed in a small shrub about a yard away. Even though I had never seen this bird, I knew right away what it was. It sat there for a few seconds, all of us staring at one another before it took off. I am sure that every birder has multiple stories similar to this and that these stories bring smiles and laughter with their recollections.

So, lists are not just records of what we see; they are also reminders of the memories about the people and circumstances surrounding the sightings that we so meticulously record after each day of birding. They give structure to our daily lives and always represent goals which we strive to achieve. The next time you go up to your attic and pull out one of those shoe boxes with hand-written field cards marked with checks next to the birds you saw that day, or browse your old eBird records, think about the memories associated with that card or record. More likely than not, it will bring a broad smile to your face.

***Martha Steele**, a former editor of* Bird Observer*, has been progressively losing vision due to retinitis pigmentosa and is legally blind. Thanks to a cochlear implant, she is now learning to identify birds from their songs and calls. Martha lives with her husband, Bob Stymeist, in Arlington. Martha can be reached at <marthajs@verizon.net>.*

GLEANINGS

Lessons from the Labyrinth

David M. Larson

When I tell students that getting rid of excess heat is a strong driver of avian anatomy, they are often surprised. If they are wearing a down jacket during the conversation, they should not be taken aback, since they are relying on the insulation value of feathers to keep warm. Birds have high metabolic rates, generate a lot of heat, and are efficiently insulated by their feather coverings. So, in order to get rid of excess heat, birds need to rely on evaporative cooling during respiration and convection and conduction through unfeathered body parts, especially their feet and bill. Heat loss through these parts is enhanced by high blood flow to these regions.

The great divergence in the external anatomy of bird bills has been recognized since Darwin as a result of selection due to environmental factors; some variation is related to feeding behavior, some to thermoregulatory needs, and doubtless some to both factors (e.g., toucans). While surface area of bills—as a radiator—is commonly correlated with ambient temperatures, not as much attention has been paid to the heat-exchange mechanisms of the internal anatomy of the bill.

In the avian and mammalian sinuses, respiratory chonchae are complex and convoluted passages that amplify the surface area available for regulation of heat and moisture by countercurrent exchange. During inhalation, the chonchae help to raise the temperature and humidity of incoming air to match internal conditions, and during exhalation, to recapture heat and humidity. Avian chonchae occur in symmetrical pairs, often rostral, middle, and in some species, caudal. Associated with chonchae are rich vascular beds, facilitating thermoregulation throughout the body.

Danner, et al. (2017) set out to test the hypothesis that the internal respiratory chonchae would be more extensive in birds adapted to warmer climates. They studied two subspecies of Song Sparrow (*Melospiza melodia*) that live in different habitats. *Melospiza m. melodia* inhabits wide swaths of the eastern United States in relatively moist environments. *Melospiza m. atlantica* is restricted to dry, sandy, dune areas along the coast between New Jersey and North Carolina. The authors used CT (Computed Tomography) scans of liquid-preserved specimens of the two subspecies to determine the extent and complexity of chonchae. In addition, dried specimens were analyzed by radiography for nasal cavity size—as a proxy for choncha size—and by caliper for bill length, width, and depth. Measurements on these dried specimens confirmed that *atlantica* has a larger bill with greater surface area than does *melodia*, suggesting greater heat-radiation capability.

CT scans indicated that Song Sparrows have rostral and middle chonchae and lack caudal structures. The rostral choncha consists of a central plate with side ridges that interdigitate with ridges that arise from the nasal septum and the lateral wall of the nasal cavity. The middle choncha consists of a scroll-shaped structure that is simpler

than the rostral choncha. Inspired air travels through the rostral choncha to the middle choncha and then to the pharynx and trachea.

As hypothesized, surface area of chonchae was significantly higher in *atlantica* than in *melodia.* Considered separately, rostral and middle chonchae areas were both larger in *atlantica*. The maximum complexity did not differ between subspecies, though the site maximum complexity was more distal in *atlantica*. So the anatomic differences between the subspecies in bill size and chonchae development are consistent with climatic selection pressures on chonchae development. It stands to reason that in a drier climate, a larger area for water recovery during exhalation would have a selective advantage due to improved water economy. And it is possible that the more distal maximal complexity in *atlantica* leads to more efficient water collection, due to lower temperatures in the distal part of the bill. It might seem that more efficient water collection on exhalation would imply more heat retention, which would be less advantageous in the hot dry conditions in the dunes. However, heat recapture seems to be greatest at low ambient temperatures, suggesting that larger chonchae would not be as advantageous in warmer climes.

Bill and chonchae size are closely correlated and probably evolve in tandem. It is likely that the time of maximal temperature stress and selection pressure for the *atlantica* subspecies is in the hot, dry summer rather than the temperate winter. Hence, large chonchae and bill sizes provide adaptive advantages. In *melodia*, the cold winters are likely the stressors rather than the hot, humid summers. Therefore smaller bills would favor less heat loss in the winter. Larger chonchae would do the same, but they may be constrained by the need for smaller bill size.

Although this project has elucidated a connection between anatomic features and habitats, with a logical evolutionary basis, it is unclear if these findings are generally applicable to other widespread species of birds, or even to other New World sparrows. Song Sparrows seem to have especially complex chonchae compared to other passerines studied. Additionally, it would be interesting to see if the anatomic differences between the two subspecies demonstrated in this paper are consistent with physiological measurements of expired gases.

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FIELD NOTES

Nesting Mourning Doves Tolerate Human Presence

William E. Davis, Jr.

Fig. 1. Mourning Dove nesting on a crowded shelf. All photographs by the author.

On June 11, 2016, I was invited by my neighbors across the street to view and photograph an unusual nest of Mourning Doves (*Zenaida macroura*) on their open porch. The nest was located on the top of a cabinet, at about eye level, approximately six feet from their side door (Figure 1). The two eggs hatched on June 14th and by the 20th the young birds were seen in the nest next to an adult (Figure 2). The shelf had been rearranged with the canisters removed while the adult was off the nest. By the 23rd, the young were fully feathered (Figure 3) and they fledged on the 26th (Figure 4).

The nesting of Mourning Doves near or on man-made structures is not unusual. Although Mourning Doves typically nest in edge habitat in shrubs, trees, or on the ground, they have been reported nesting in eve troughs, rose arbors, light poles, and functioning traffic signal lights, as well as atop a steel I-beam supporting a house and in a variety of discarded cars and car parts (Sayre and Silvy 1993, Davis 2014). John Kricher supplied me with a photograph taken several years ago of a Mourning Dove pair nesting on the student's desk in a dorm room at Wheaton College in Norton, Massachusetts (Figure 5). The student had to leave the window open all the time so that the birds could fly in and out.

What I found interesting in my neighbor's nesting pair of Mourning Doves was their tolerance of human disturbance and presence. The homeowners, Robert and Janice Giannetti, frequently spent hours sitting on their porch less than eight feet from the nest and persons walking up to their side door would pass within two feet of the nest. At one point, Janice put her hand within six inches of the sitting adult dove but it did not flush and its only response was to slightly raise some of its back feathers. Once while I was

Fig. 2. Mourning Dove with its two young.

Fig. 3. The young birds are feathering out.

Fig. 4. One fledgling moments after flying from the nest for the first time.

Fig. 5. Mourning Doves nesting in a dorm room at Wheaton College, Massachusetts. Photograph courtesy of John Kricher.

photographing the nest, there were four adult humans present, talking and walking around. This instance of tolerance for human intrusion is not unique. An early study of Mourning Dove nesting found that about one sixth of nesting Mourning Doves stayed on their nests until touched or nearly so before flying (Nice 1923). Clearly, Mourning Doves are genetically driven to remain on the nest while incubating and brooding.

Mourning Doves have a suite of adaptations that promote multiple brooding and saving energy during reproduction. These adaptations include the building of minimal nest structures, reuse of old nests including those of other species, rapid nestling growth, and early fledging (Mirarchi and Baskett 1994). In her study of mourning Doves, Nice (1922) reported that about 15% of Mourning Dove nests were re-used nests of a variety of species including robins, mockingbirds, House Sparrows, Common Grackles, and Mourning Doves.

Mourning Dove nests are so flimsy that you can sometimes see the eggs through the bottom of the nest. Man-made structures are often sturdy and protected, thus supplying structural support and protection for flimsy nests. It seems possible that tolerance for human disturbance contributes to the frequency of use of man-made structures for nesting and may be a prerequisite for doing so. I speculate that if the tolerance of human disturbance when incubating or brooding indeed has a genetic component, then during storms when flimsy nests in trees are at risk, the use of secure man-made structures and its concomitant tolerance of human disturbance may be characteristics selected for. There are many bird species that have adapted to the use of man-made structures for nesting—the Chimney Swift (*Chaetura pelagica*) is perhaps the most obvious. Perhaps the Mourning Dove is evolving in that direction.

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Ted wishes to thank John Kricher for his helpful comments on the manuscript and Janice and Robert Giannetti for bringing attention to this nesting pair of Mourning Doves.

Great Gray Owl

Nathan Dubrow

Great Gray Owl lands on Marsha Richelli's head. Photograph by the author..

On March 11, 2017, I traveled to Newport, New Hampshire, in search of the Great Gray Owl that had been hanging around for some time. After a two-hour drive, I arrived at its "usual" spot to see if there were any cars parked, a sign of its presence, but came up empty. I was at a brief loss until an eBird Sullivan County Rare Bird Alert email arrived on my phone. The email stated that the owl was only a few minutes away on the opposite side of the local airfield. I headed over to the spot and saw only a few cars parked at the entrance to an old dead-end road. I parked and got ready to step into the frigid 3° F outside. I grabbed all my gear and proceeded over to where a small number of birders and photographers were standing. Lo and behold, the Great Gray was sitting in a tree not far from the observers. I set up my scope and found a place with a good vantage point.

For about three hours, the owl didn't do very much, except to occasionally stretch its wings and obtain a good scratch. Eventually, the owl took a short flight and landed on the nearby telephone wire. It then plunged to the ground in an attempt to catch something, but unfortunately for all of us, it was just out of view, so we didn't see if it was successful or not. The Great Gray flew around a few times and settled down on the edge of the field. Everyone watched and took photographs from a respectful distance,

and the owl didn't seem bothered by our presence. After standing in the well-below freezing weather for over five hours, we were finally getting some action.

Most of the people watching were in a single group as the owl briefly sat in a white pine about fifty yards away, except for one woman, Marsha Richelli, standing by herself in the middle of the field, watching from afar. The owl took off from its prominent branch to begin its evening hunt and glided down to the center of the field where a lone perch appeared to stand. The last thing anyone could have expected was for the owl to choose to perch on a human being, but to the owl, she looked like a perfect place to sit and hunt from, with access to the field around her. She became the center of attention for a good fifteen seconds as the Great Gray stood on her head and looked around. Amazingly, she stood still and was very calm as the huge owl gently put down. The owl soon realized that its perch was alive and took off to find an inanimate spot to hunt from. As it left the site, I decided I had observed this wonder for long enough and started my journey home. That day, I earned an awesome lifer and created an incredible memory!

Of note: as a boreal species, Great Gray Owls are fairly unaccustomed to humans and have little experience with us. In addition to Great Grays not having a natural fear of us, this bird was also identified as a first-year individual by the pale tips to its primaries. This may indicate that it is an inexperienced bird, and therefore didn't think much of us when we were in its area. This bird, to my knowledge, has never been baited at this site, so there should be no reason to believe that it had been coerced or manipulated into landing on this woman's head. This experience was all pure luck, and I felt very appreciative to be in the right spot at the right time.

ALBINO BLACK VULTURE BY KEN SCHOPP

ABOUT BOOKS

An Exquisite Ancient Menagerie

Mark Lynch

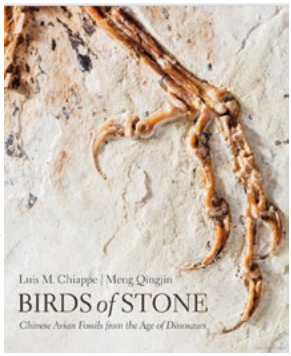
> ***Birds of Stone: Chinese Avian Fossils from the Age of Dinosaurs***. Luis M. Chiappe and Meng Qingjin. 2016. Baltimore, Maryland: Johns Hopkins University Press
>
> "China's newly discovered ancient menagerie has transformed our understanding of the kinds of birds that lived during the Mesozoic." (p. 8)

The Beneski Museum of Natural History at Amherst College hosts a large collection of fossils and geological specimens, many collected in the Connecticut River Valley. Among the displays is a unique "rock book." Edward Hitchcock, geologist and paleontologist at the college, split a book-sized fossil-bearing rock specimen into its horizontal layers. He then bound the layers together so that a viewer could actually turn the heavy rock pages and proceed through time to read the geological history of the minerals like a book. He called these pages his "stony library."

In China, north of Beijing, there is a veritable Library of Alexandria written on thousands of layers of rock. Three regions converge here: western Liaoning Province, northeastern Hebei Province, and the eastern Inner Mongolia Autonomous Region. There are a number of deposits of beautiful fine-grained shales that have dramatically changed our understanding of the evolution of birds.

> Numerous fossils of Mesozoic birds have been unearthed from sites around the world, but nowhere in such abundance, diversity, or superb state of preservation as in northeastern China during the past three decades. Thousands of exquisite fossils have been collected there. This remarkable fossil aviary, together with the well-preserved remains of many other animals and plants, is known as the Jehol Biota, a historic reference to the name of the ancient region that centuries ago was the seat of the powerful Khitan Empire. (p. 5–6)

During the Mesozoic Era (~252–66 million years ago) this area had numerous lakes and wetlands. It was also the location of several active volcanoes, which occasionally erupted as volcanoes will do. Sometimes an eruption would cause a pyroclastic flow, a rapidly moving deadly cloud of gas, ash, and debris that would devastate life in the area and lead to mass mortality. Many birds instantly fell dead into the lakes and were quickly covered by ash. These occurrences explain the abundance of detailed fossils from this region of China. Some unearthed slabs of shale contain multiple fossils of the same species of birds. The shales are so fine that many fossils are accompanied by a perfect mirror-image fossil when the rock is split. Photographs of these shale outcroppings look like tall piles of densely stacked books waiting to be pulled out and read. It is a fossil-a-palooza.



Today there are dozens of quarries in the area, and since the 1980s paleontologists have uncovered thousands of fossils. The detail captured in these fossils is breathtaking, and that is what is celebrated in *Birds of Stone* by Luis M. Chiappe and Meng Qingjin. Luis M. Chiappe is the vice president for research and collections at the Natural History Museum of Los Angeles County, where he directs the museum's Dinosaur Institute. He is also an adjunct professor at the University of Southern California and one of the great "explainers" of the science of paleontology. Meng Qingjin is the Director of the Beijing Museum of Natural History and vice chairman of the Chinese Association of Natural Science Museums and the Beijing Zoological Society. He is almost always "in the field" and is one of the giants of Chinese paleontology.

Birds of Stone is a large format, sumptuous book filled with full color photographs of the fossils of the Mesozoic birds of the Jehol Biota. The high quality of the photographs is due to the efforts of Maureen Walsh and Stephanie Abramowicz, who spent weeks in China preparing and photographing the fossils. Many of the photographs are full page, with a number of two-page spreads. The accompanying text by the authors is thorough and fascinating. This text introduces the reader to many unique aspects of these ancient birds and what we can learn from the fossils. It is nothing less than an introductory course in Mesozoic ornithology and contemporary paleontology. Many of the birds found in the Jehol Biota are enantiornithines. Other species are ornithuromorphs, a more primitive group. The enantiornithines were an abundant and diverse group of Mesozoic birds. Thousands of fossils of these birds, more than 30 species, have been found in the Jehol Biota deposits. These Chinese enantiornithines ranged in size from that of a crow to something closer to a Western Sandpiper. Unlike modern birds, many enantiornithines had teeth, which gave some species quite a fierce look. The variety of dentition found in the fossils shown in *Birds of Stone* indicate that some species ate fruit, others caught fish or crushed seeds, and some probably probed in the mud for invertebrates.

Enantiornithines had clawed fingers on each wing, and like modern birds, they had alulas, the small group of feathers found at the bend of the wing that aid in flight. It used to be thought that enantiornithines could not fly well, but the evidence of the Jehol Biota fossils, as well as fossils unearthed elsewhere, indicates that some enantiornithines did achieve aerial competence, although their flight style may have been unlike that of modern birds. Some species may have flown, while others may simply have launched themselves from branch to branch. The feet of some species show that they could grasp a branch and perch; they even had a long hind toe like some modern birds. No fossil eggs of birds have been found from Jehol, and only one fossil embryo has been uncovered so far. Based on anatomical differences of adults, it has been theorized that some species laid small clutches of large eggs while other species laid large clutches of small eggs. You might be wondering if these birds sang. Because a syrinx is not present in any of these species, the vocalizations would not have been as complex as those of a warbler or thrush, but they likely made some kind of call like

most non-songbirds do today. Overall, enantiornithines look more like modern birds than *Archaeopteryx lithographica*, but with a number of key differences.

The detailed pictures of feathers in some of the fossils (p. 21 and many other pages) certainly look like the feathers of modern birds at first glance, but again, there are some differences. There are many fossils in the Jehol of the primitive *Confuciusornis sanctus*. This large bird had a strong, massive toothless beak and likely ate tough seeds and fruit. *Confuciusornis sanctus* probably did not fly much but spent most of its life on the ground. What is most striking about this bird are the two, very long tail feathers that will remind you of a Fork-tailed Flycatcher or some species of motmot. But these feathers are not attached to a pygostyle, that fleshy and bony area at the end of the body sometimes colloquially known as the "Pope's nose." Furthermore, the shaft that runs the length of these long feathers looks more like a belt than a shaft. The feathers of many of these birds lack a shaft. Since fossils of some adult *Confuciusornis sanctus* have been found without these unique tail feathers, it has been suggested that this may be one of the earliest known examples of sexual dimorphism in birds.

Some of the fossils in the photographs in *Birds of Stone* are so detailed that they show the microstructure of the birds' bones and allow us to age the specimens. As to the coloration of these species, paleontologists are now looking at the distribution of minute melanosome capsules in the fossils to indicate what areas of the body were darker than others. It is amazing what a wealth of information is contained in every shale slab.

Of course, life other than birds is also preserved in the Jehol Biota, and several examples are shown in *Birds of Stone*. Fossils from this area include plants, numerous frogs, fish, salamanders, and turtles. There are a number of fossils of mouse-sized mammals. There are also fossils of invertebrates, including many wonderfully preserved mayfly nymphs (*Ephemeropsis trisetalis*).

Birds of Stone is an eye-opening introduction to an actual Lost World of birds. The last third of this book is a thorough account of the early evolution of birds beyond those found in the Jehol. This includes the evolution of feathers in non-avian dinosaurs. What this book does not have is any artist's paintings of what the living birds may have looked like. The visual focus is always on the actual fossils themselves and what they show us. The one exception is a simple painting of the *Changyuraptor yangi*, the "largest flying non-avian dinosaur" (p. 246), which because of its heavily feathered legs, looks like it "flew" with four wings. Imagine what that would look like in flight. *Birds of Stone* is a visual feast and one of the most beautiful books published on fossils, written by two experts in the field. In this book we are witness to another chapter in the evolution of the birds we are familiar with today.

> Like no other fossils, the spectacular avifauna from the Jehol Biota has brightened our understanding of the lives of a thriving diversity of ancient birds, which study has transformed our knowledge about some of the earliest relatives of present day birds and has greatly clarified key aspects of the evolution of these remarkable animals. (p. 188)

Marj the Magnificent: A Tribute and Thank You to Marj Rines

Wayne R. Petersen

Marj Rines. Photograph courtesy of Mass Audubon.

Many readers are probably unaware that Marj Rines, much-valued and long-time Bird Sightings Editor for *Bird Observer*, has decided to step down in this capacity following more than 25 years of skillful and valued service to the journal. Birders in Massachusetts and beyond know Marj as a discerning and dedicated field observer, especially in her favorite birding patches in Arlington, Lexington, and Woburn. Others no doubt think of her as the long-standing webmaster of her former website, *Massbird.org*. Then there are the local birders who acknowledge her as the founder of the popular Menotomy Bird Club, or as the helpful voice on the other end of Mass Audubon's wildlife information line. And there will be some of us who will forever

respectfully recall her ever-meticulous role as Secretary of the Massachusetts Avian Record Committee (MARC) from 2000–2009. Ultimately, however, Marj's greatest achievement, and arguably among her most valued accomplishments, has been in the arena of bird recordkeeping.

Since its inception, *Bird Observer* has been committed to publishing significant bird records for Massachusetts. Before this, however, and going back to the 1930s, significant bird records in the Commonwealth were archived in a modest, stapled publication called the *Bulletin of New England Bird Life* and produced by the New England Museum of Natural History. By 1945, the publication was expanded and called the *Records of New England Birds,* which the Massachusetts Audubon Society hosted from 1945 to 1968 until financial challenges made it no longer feasible to publish the *Records of New England Birds*. In 1973, the newly created magazine *Bird Observer of Eastern Massachusetts* took on this responsibility.

Through the years, a number of *Bird Observer* field records editors assisted Mass Audubon's Ruth P. Emery with the task of compiling bird records until 1989, when failing health made it impossible for Ruth to continue. In 1990, Marj Rines assumed an active role as bird record arbitrator and archivist for *Bird Observer* (as it was called by then). Shortly after taking on the responsibility of compiling and overseeing the validity of the journal's printed field reports, Marj, who was considerably computer savvy, created a searchable, digital database for Massachusetts bird records that ultimately was to prove of immense value to editors, authors, and anyone quickly needing a local compendium of bird reports by date, locality, or observer. This contribution alone, to say nothing of her continual monthly sifting and sorting of statewide bird reports, made Marj Rines a practically indispensable resource for nearly three decades of bird recordkeeping for Massachusetts.

With this historical glimpse of bird recordkeeping in Massachusetts in mind, the Board of Directors and staff of *Bird Observer*, as well as the entire New England birding community, wish to salute Marj's many contributions to Massachusetts ornithology, which include popularizing and helping raise birding in the Commonwealth to a new level. Good luck in whatever comes next Marj, but whatever you do, don't stop birding!

Bird Observer would like to thank recently-retired members of the Board of Directors Elizabeth (Liz) Clark, Paul Fitzgerald, Carolyn Marsh, John Marsh, and Fay Vale for their support and many contributions to the journal and the organization.

BIRD SIGHTINGS

January-February 2017

Seth Kellogg, Marjorie W. Rines, and Robert H. Stymeist

Both January and February were warmer than usual with near normal rainfall and normal snow amounts. A warm front arrived in New England on January 11, setting record-high temperatures across the state. Temperatures in Boston reached 61˚, tying previous records set in 1913 and 1975, and Worcester's high of 57˚ surpassed 55˚ in 1980. In Boston the temperature averaged 35˚ for January, 6.6˚ above normal. Rainfall totaled 3.9 inches in Boston during January, and snowfall totaled 8.9 inches. Most of the snow came on a nor'easter January 6–7. It dumped seven inches in Boston, but hit the south shore hard with 14–19 inches and 9–11 inches on Cape Ann, where gusts were reported at 65 mph in Rockport.

February was a mixed bag, from frequent snow to record warm temperatures. The temperature averaged 37˚, five degrees above normal. The high of 73˚ on February 24 set a new record for the month of February, and Worcester also experienced an all-time high of 68˚ that day. Rainfall for the month totaled 3.22 inches. Snow turned to rain on February 7–8 bringing hazardous conditions that caused multiple road accidents. A blizzard on February 9 dumped as much as 18 inches of snow in some areas. Nantucket reported winds out of the northeast at 68 mph, and a burst of 55 mph was reported from the Blue Hills in Milton.

R. Stymeist

Waterfowl through Alcids

It was another great month for geese, with reports of several rarities. The **Pink-footed Goose** that spent most of the previous reporting period in northeast Essex County lingered through January and February. There was an exceptional number of reports of **Ross's Goose**. The individual originally found on Plum Island at the end of December along with a **Ross's X Snow Goose** hybrid, continued in nearby Ipswich through January 6. It was followed by reports of single birds from Saugus (Essex County), Longmeadow (Hampden County), Northbridge (Worcester County), and Concord (Middlesex County). It is impossible to determine how many individuals were involved since only one date overlapped, but given the distance between the different reports, it is likely that multiple birds were involved. Good numbers of **Cackling Geese** were reported; as usual most were in the western part of the state.

The **Tufted Duck** that lingered in Essex County through the end of 2016 was not reported, but the Nantucket bird discovered on December 31 stayed through February, and another bird was reported from New Bedford and nearby Lakeville. Impressive numbers of **Barrow's Goldeneye** were seen throughout the state. **Pacific Loons** were sighted from Nantucket, Rockport, and Provincetown.

Shearwaters are rarely reported in winter, but regular sea watchers at Andrews Point in Rockport and Race Point in Provincetown were lucky to see a few. Rick Heil has been sea watching at Andrews Point for many years but tallied his first January records for both Great and Sooty shearwaters. A regular sea watcher at Race Point, Peter Flood, reported a single Sooty Shearwater on January 1 and two Manx Shearwaters on January 15.

A **Yellow Rail** on the Nantucket Christmas Bird Count was exceptional as was a **Purple Gallinule** found dead in South Truro. The only **Sandhill Cranes** reported during this period were two in East Bridgewater, possibly the breeding pair from nearby Burrage Pond.

A **Mew Gull** is always an exciting find, but the one discovered in Nahant on February 25 was banded. It turned out to have been banded as a chick in Iceland on June 23, 2013.

The late January storm brought conditions ideal for viewing sea birds at coastal locations. Nathan Dubrow and Miles Brengle took advantage of school cancellation on January 24 to go to Andrew's Point in Rockport, where they reported a good Dovekie flight with 29 individuals. On January 25 Blair Nikula spent the morning at First Encounter Beach in Eastham and reported:

> highlights (from 6:50 11:20 a.m.) included 3 very late jaegers (2 Pomarine and one unidentified), 58 Dovekies (some at almost point-blank range), 10 Thick-billed Murres (plus an additional 15 unidentified murres, most of which appeared to be Thick-billeds), 22 puffins, and 330 kittiwakes. . . The diversity of alcids that has been around for the past week or so is quite amazing - I can't recall anything quite like it before. To have a shot at seeing all six Atlantic alcids in a day is quite a treat.

Sadly, the storm that was exciting for birders was tough on a number of alcids that were forced onto land, in particular Dovekies. Wild Care on Cape Cod reported 35 Dovekies brought in for rehabilitation, the highest number they had ever received. More than half died, but they were able to release 14 on January 26. A single living individual was photographed inland in Lincoln on January 24 but was not seen again, likely the victim of exhaustion.

M. Rines

Pink-footed Goose			
thr	Ipswich	1	v.o.
Greater White-fronted Goose			
1/1-1/29	Essex County	3	v.o.
1/2-2/28	CRV	1	v.o.
1/17-2/7	Harwich	1	S. Finnegan + v.o.
1/28-2/28	Topsfield	1	M. McCarthy + v.o.
Snow Goose			
1/1	Longmeadow	2	M. Moore
1/14	Danvers	2	P. Fee
1/14, 2/26	Saugus	5, 4	S. Zendeh#
1/30	Topsfield	2	M. Watson
Ross's Goose			
1/1-6	Ipswich	1	v.o.
1/14	Saugus	1 ph	S. Zendeh#
1/18	Longmeadow	1 ph	D. Holmes
2/23-24	Northbridge	1 ph	Kittredge + v.o.
2/24	Concord	1 ph	J. Keyes#
Ross's Goose x Snow Goose			
1/1-6	Ipswich	1	v.o.
Brant			
1/16	Fairhaven	401	M. Lynch#
1/22	Quincy	98	P. Peterson
1/22	Fairhaven	78	R. Stymeist#
1/23	S. Boston	100	J. Battenfeld
2/3	Nahant	100	L. Pivacek
2/25	Duxbury B.	300	R. Bowes
Cackling Goose			
1/2	Ipswich	1	J. Smith#
1/4	Southwick	1	D. Holmes
1/5	N. Dighton	1	J. Eckerson
1/16	Agawam	4	A. Griffiths
1/30	Turners Falls	1	J. Smith
2/18	Northampton	2	G. LeBaron
2/24	Amherst	3	K. Yakola
Mute Swan			
1/1	Westboro	55	M. Lynch#
1/22	Acushnet	45	R. Stymeist#
1/28	Acoaxet	52	G. d'Entremont
Wood Duck			
1/6	Boston	13	R. Stymeist#
1/10	Jamaica Plain	34	P. Peterson
2/23	GMNWR	9	K. Dia#
2/27	Sheffield	11	M. Lynch#
Gadwall			
1/2	Newbypt H.	50	G. d'Entremont#
1/12	P.I.	23	R. Heil
1/21	Sandwich	16	G. d'Entremont#
1/22	Fairhaven	39	R. Stymeist#
1/27	Quincy	11	P. Peterson
1/28	Wareham	15	M. Lynch#
2/2	Marlboro	6	G. Perkins
American Wigeon			
1/2	Newbypt H.	4	P. + F. Vale
1/16	Acushnet	4	M. Lynch#
1/21	Sandwich	35	G. d'Entremont#
1/22	Fairhaven	65	R. Stymeist#
1/31	Northboro	2	T. Spahr
2/5	Acoaxet	70	M. Lynch#
Eurasian Wigeon			
1/1-2/19	Sandwich	1	R. Doherty#
American Black Duck			
1/12	P.I.	1630	R. Heil
2/5	Acoaxet	462	M. Lynch#
Blue-winged Teal			
2/4	N. Truro	1	P. Flood
Mallard			
1/4	Topsfield	100	P. + F. Vale
1/13	Ipswich	140	J. Berry
1/28	Acushnet R.	260	M. Lynch#
2/8	Waltham	245	R. Stymeist
Northern Shoveler			
1/3, 26	E. Boston	1, 2	P. Peterson
1/6-30	Marstons Mills	2	M. Keleher ,v.o.
1/22	Nantucket	2	S. Santino#
2/21	Salisbury	5	J. Berry#
2/23	Southwick	7	S. Kellogg
2/24	P.I.	2	N. Landry
Northern Pintail			
1/2	Marlboro	13	G. Perkins
1/13	P.I.	66	T. Wetmore
1/28	Acoaxet	21	G. d'Entremont
2/2	Westport	20	J. Hoye#
2/20	Sudbury	6	K. Dia
2/22	Lakeville	4	S. Miller#
Green-winged Teal			
1/29	Saugus	4	S. Zendeh#
2/1, 27	Sheffield	2, 14	Ward, Lynch

Green-winged Teal (continued)			
2/21	Salisbury	32	J. Berry#
2/25	GMNWR	33	J. Forbes
2/27	P.I.	150	T. Wetmore
Eurasian Green-winged Teal			
2/10-15	Nantucket	1	T. Pastuszak
Canvasback			
1/1-15	Cambr. (F.P.)	1	v.o.
1/21	Harwich	1 m	G. d'Entremont#
Redhead			
thr	Waltham	1	v.o.
1/16-2/19	Falmouth	1	J. Davis, J. Pratt
1/21	Nantucket	30	S. Santino#
1/29	Chilmark	7	R. Culbert
Ring-necked Duck			
1/8	Agawam	18	S. Motyl
1/21, 2/23	Waltham	155, 120	J. Forbes
1/28	Randolph	36	P. Peterson
2/23	Southwick	55	S. Kellogg
2/26	New Salem	60	B. Lafley
2/27	Sheffield	70	M. Lynch#
Tufted Duck			
thr	Nantucket	1	v.o.
1/1-22	New Bedford	1	MacKinnon + v.o.
2/19-24	Lakeville	1	J. Sweeney + v.o.
Greater Scaup			
1/2	Cambr. (F.P.)	18	A. Gurka
1/15	New Bedford	200	G. d'Entremont
1/15	Wachusett Res.	14	T. Pirro
1/16	Fairhaven	328	M. Lynch#
1/28	Marion	238	M. Lynch#
2/4	Falmouth	450	G. d'Entremont
2/8	Boston (Deer I.)	15	S. Zendeh
Lesser Scaup			
1/2	Cambr. (F.P.)	4	A. Gurka
1/14	Plymouth	25	G. d'Entremont#
1/28	Acushnet R.	10	M. Lynch#
2/22	Lakeville	20	S. Miller#
2/25	Gloucester	18	M. Lynch#
2/28	Wakefield	9	L. Ireland
King Eider			
thr	Rockport	7 max	v.o.
1/14, 29	P'town (R.P.)	1, 1	Petersen, Trimble
1/25-2/25	Gloucester	1	v.o.
Common Eider			
1/20	Ipswich (C.B.)	550	J. Berry
1/28	Bourne	600	M. Lynch#
2/8	Boston (Deer I.)	750	S. Zendeh
2/25	Gloucester	277	M. Lynch#
Harlequin Duck			
thr	Rockport	71 max	v.o.
1/20	Duxbury B.	3	R. Bowes
1/24	Cohasset	1	M. Iliff
2/5	Westport	3	M. Lynch#
2/5	Hull	9	SSBC (Fitzgerald)
Surf Scoter			
1/4	Cambr. (F.P.)	1	B. Miller
1/16	Fairhaven	39	M. Lynch#
1/28	Marion	580	M. Lynch#
White-winged Scoter			
1/2	Wellfleet	14000	V. Zollo
1/16	Fairhaven	32	M. Lynch#
1/20	Ipswich (C.B.)	200	J. Berry
1/28	Scusset B.	15	M. Lynch#
Black Scoter			
1/2	Wellfleet	14000	V. Zollo
1/8	Nahant	8	L. Pivacek
1/23	Rockport (A.P.)	288	R. Heil
2/20	P.I.	35	R. Doherty
Long-tailed Duck			
1/1	Nantucket	7850	B. Lagasse#
1/6	Quabbin Pk	2	L. Therrien
1/16	Fairhaven	45	M. Lynch#
1/23	Rockport (A.P.)	57	R. Heil
2/8	Boston (Deer I.)	15	S. Zendeh
2/28	P.I.	80	T. Wetmore
Bufflehead			
1/1	Nantucket	1200	I. Davies#
1/16	Fairhaven	324	M. Lynch#
1/28	Acushnet R.	130	M. Lynch#
2/4	Falmouth	203	G. d'Entremont
2/25	Rockport	117	M. Lynch#
Common Goldeneye			
1/13	Agawam	35	S. Kellogg
1/16	Fairhaven	377	M. Lynch#
1/22	S. Quabbin	92	L. Therrien
1/28	Acoaxet	60	G. d'Entremont
2/20	Westport	83	M. Lynch#
2/21	Newbypt	25	J. Berry#
Barrow's Goldeneye			
thr	Boston (Deer I.)	1	v.o.
1/1-16	Fairhaven	1	M. Sovay
1/1-2/11	Dighton	1	J. Ekerson
1/4, 15	Agawam	1	L. Richardson
1/5	Orleans	2	J. Hoye#
1/14	Gloucester	1	P. + F. Vale
1/16	Cohasset	1	V. Zollo
1/22	Northfield	1	E. Huston
1/31	Halifax	2	J. Sweeney
2/5	Hull	2	S. Williams
2/14	Scituate	2	K. Rawdon
2/19	Lakeville	1	J. Sweeney#
Common X Barrow's Goldeneye			
1/2	Boston (Deer I.)	1	J. Layman
2/19	Winthrop	1	J. Forbes
Hooded Merganser			
1/5	Waltham	38	P. + F. Vale
1/7	Quabog IBA	81	M. Lynch#
1/10	Medford	125	M. Rines
1/16	Acushnet	61	M. Lynch#
1/22	S. Quabbin	77	L. Therrien
2/23	Southwick	45	S. Kellogg
Common Merganser			
1/10	Medford	125	M. Rines
1/14	Plymouth	105	G. d'Entremont#
1/22	S. Quabbin	322	L. Therrien
1/28	Randolph	100	P. Peterson
2/27	Sheffield	150	M. Lynch#
Red-breasted Merganser			
1/2	P.I.	125	T. Wetmore
1/3	Pittsfield (Onota)	2	T. Collins
1/16	Fairhaven	125	M. Lynch#
1/20	Quabbin Pk	1	L. Therrien
2/4	Wachusett Res.	2	T. Pirro
2/15	Waltham	1	J. Forbes
2/25	Gloucester	122	M. Lynch#
Common Goldeneye x Hooded			
1/14	Pembroke	1	L. Schibley
Ruddy Duck			
1/4	Quabbin Pk	1	L. Therrien
1/4	Cambr. (F.P.)	13	B. Miller
1/8	Medford	11	M. Rines
1/10	Medford	2	P. Roberts
1/14	Jamaica Plain	5	C. Cook#
1/22	Acushnet	2	R. Stymeist#
2/4	Jamaica Plain	2	T. Bradford
2/20	Ludlow	1	S. Motyl
Ruffed Grouse			
1/21	Quabog IBA	2	M. Lynch#
2/17	Westport	1	R. Couse
2/28	Freetown	2	L. Abbey
Wild Turkey			
1/15	Westford	43	S. Selesky
1/22	P.I.	10	P. + F. Vale
1/31	Mt.A	25	R. Stymeist
2/2	S. Quabbin	30	M. Lynch#

Wild Turkey (continued)
2/25 Ipswich 14 J. & N. Berry
Red-throated Loon
1/2 Nantucket 1550 I. Davies#
1/2 P.I. 20 T. Wetmore
1/18 Rockport (A.P.) 30 R. Heil
1/26 Lincoln 1 N. Levey
1/28 Scusset B. 11 M. Lynch#
2/7 Woburn (HP) 1 D. Williams#
2/16 Everett 3 N. Dorian
Pacific Loon
1/2 Nantucket 1 L. Seitz#
1/13, 2/19 Rockport (A.P.) 1 Bertrand, Smith
1/14-2/28 P'town (R.P.) 1-2 B. Nikula#
Common Loon
1/2 Wachusett Res. 8 N. Paulson
1/20 Ipswich (C.B.) 35 J. Berry
1/28 Scusset B. 38 M. Lynch#
2/5 Hull 17 SSBC (Fitzgerald)
2/8 P.I. 35 MAS (D. Moon)
2/17 Quabbin Pk 3 L. Therrien
Pied-billed Grebe
1/1 Medford 1 M. Rines
1/15 Somerville 1 J. Forbes
1/28 Lynn 1 P. + F. Vale
2/5 Orange 1 D. Small
2/25 Turners Falls 1 J. Coleman
Horned Grebe
1/12 Cambr. (F.P.) 1 J. Connelly
1/16 Fairhaven 3 M. Lynch#
1/25 Wakefield 1 D. McGillicuddy
1/30, 2/23 P.I. 8, 7 T. Wetmore
2/25 Rockport 7 M. Lynch#
Red-necked Grebe
1/2, 2/18 P.I. 6, 5 T. Wetmore
1/14 Quabbin Pk 1 L. Therrien
1/23 Rockport (A.P.) 8 R. Heil
2/2 Wachusett Res. 1 B. Robo
Great Shearwater
1/3 Rockport (A.P.) 1 R. Heil
Sooty Shearwater
1/1 P'town (R.P.) 1 P. Flood#
1/23 Rockport (A.P.) 1 R. Heil
Manx Shearwater
1/12 P'town (R.P.) 2 P. Flood#
Northern Gannet
1/13, 2/5 P.I. 12, 10 T. Wetmore
1/14 P'town (R.P.) 75 B. Nikula
1/23 Rockport (A.P.) 206 R. Heil
Double-crested Cormorant
1/4 Cambr. (F.P.) 2 B. Miller
1/4 Jamaica Plain 2 T. Bradford
1/22 Wellfleet 2 B. Nikula
Great Cormorant
1/3 Waltham 1 J. Forbes
1/14 Gloucester 10 P. + F. Vale
1/16 Rockport 11 J. Berry#
2/20 Westport 12 M. Lynch#
2/27 Medford 1 R. LaFontaine#
American Bittern
1/11 Eastham (F.H.) 2 K. Yakola
1/13 Barnstable 1 P. Trimble
2/18 Orleans 1 K. Yakola#
Great Egret
2/18 Orleans 1 K. Yakola
Black Vulture
1/15 Easthampton 2 L. Halasz
1/22 Westport 8 R. Stymeist#
1/23 Sheffield 68 J. Pierce
2/1 Blackstone 17 S. Miller#
2/20 Northboro 3 B. Abbott
2/25 Northbridge 1 T. Pirro
2/25 Egremont 32 B. Harris#
Turkey Vulture
1/19 Westport 12 J. Hoye#
1/22 Blackstone 23 G. Gove#
2/19 Quabog R. 12 M. Lynch#
2/27 Ware 17 M. Lynch#
2/27 Sheffield 10 M. Lynch#
2/28 Ipswich 4 J. Berry
Osprey
1/2 Mashpee 1 J. Ghadban
1/2 Wellfleet 1 CBC
2/26 Amesbury 1 K. Elwell
Bald Eagle
1/1 Wachusett Res. 3 M. Lynch#
1/7 Medford 5 v.o.
1/29 Newbypt 3 MAS (P. Roberts)
2/2 S. Quabbin 5 M. Lynch#
2/17 Manchester 3 S. Hedman
Northern Harrier
1/13 Wayland 2 B. Harris
1/14, 2/19 Saugus 2, 2 S. Zendeh#
1/22 Bolton Flats 2 M. Lynch#
1/29 P.I. 12 T. Wetmore
2/5 Concord (NAC) 2 S. Perkins
2/26 Cumb. Farms 4 G. d'Entremont#
Sharp-shinned Hawk
thr Reports of indiv. from 14 locations
Cooper's Hawk
1/2 Marshfield 2 G. d'Entremont#
Northern Goshawk
1/2 Marlboro 1 T. Spahr
1/31 Goshen 1 N. Houlihan
Red-shouldered Hawk
thr Reports of indiv. from 12 locations
Red-tailed Hawk
1/22 Saugus 6 S. Zendeh#
1/22 Bolton Flats 7 M. Lynch#
1/26 Quabog IBA 6 M. Lynch#
Rough-legged Hawk
thr Reports of indiv. from 16 locations
thr P.I. 2-3 v.o.
thr Cumb. Farms 2-3 v.o.
Golden Eagle
2/2 New Salem 1 M. Lynch#
Virginia Rail
2/4 IRWS 2 M. Iliff
Yellow Rail
1/1 Nantucket 1 CBC
Virginia Rail
1/2 N. Truro 7 P. Flood#
2/4 IRWS 2 M. Iliff + v.o.
Sora
2/23-2/25 WBWS 1 C. Franklin#
Purple Gallinule
1/29 S. Truro 1 dead P. Erickson
Common Gallinule
1/21 Nantucket 1 S. Kardell
American Coot
1/5 Westboro 3 S. Miller
1/12 Woburn (HP) 15 M. Rines
1/21 Harwich 4 G. d'Entremont#
2/4 Jamaica Plain 9 T. Bradford
2/22 Woburn (HP) 14 S. Hedman#
Sandhill Crane
2/25 E. Bridgewater 2 G. d'Entremont
Black-bellied Plover
1/1 Nantucket 11 P. Trimble#
1/19 Westport 2 J. Hoye#
Semipalmated Plover
1/25 P.I. 1 T. Wetmore
1/28 Plymouth 2 J. Forbes
Killdeer
2/24 Ipswich 7 J. Berry#
2/24 N. Dighton 4 A. Eckerson

Killdeer (continued)			
2/25	Middleton	4	J. Keeley
2/25	P.I.	6	T. Wetmore
Western Willet			
1/16, 2/18	Barnstable H.	1	J. Trimble#
Ruddy Turnstone			
1/26	Revere B.	3	P. Peterson
Sanderling			
1/26	Revere B.	10	P. Peterson
1/29	P'town (R.P.)	420	B. Nikula#
2/4	Nahant	38	R. Stymeist#
2/24	P.I.	125	J. Smith
Purple Sandpiper			
1/4	P.I.	7	MAS (D. Moon)
1/16	Fairhaven	4	M. Lynch#
1/17	S. Boston	4	P. Peterson
1/26	Gloucester (B.R.)	60	G. Dysart
1/26	Revere B.	6	P. Peterson
Dunlin			
1/12	P.I.	395	R. Heil
1/20	Duxbury B.	1500	R. Bowes
1/29	P'town (R.P.)	300	B. Nikula#
2/3	Ipswich (C.B.)	57	J. Berry
2/5	Westport	35	M. Lynch#
Wilson's Snipe			
1/12	Newbypt H.	1	K. Elwell
2/6	Cumb. Farms	1	P. Peterson
American Woodcock			
2/8	Dighton	3	A. Eckerson
2/24	Milton	7	P. Peterson
2/25	Burlington	10	M. Rines
2/26	W. Roxbury (MP)	3	J. Battenfeld
2/27	N. Reading	6	A. Bean
Black-legged Kittiwake			
1/1	Nantucket	2100	I. Davies#
1/19	P'town (R.P.)	700	B. Nikula
1/23	Rockport (A.P.)	340	R. Heil
1/25	Eastham (F.E.)	330	B. Nikula#
Bonaparte's Gull			
1/4	Newbypt H.	2	P. + F. Vale
1/29	P'town (R.P.)	74	J. Trimble#
Black-headed Gull			
1/2	Hyannis	1	R. Debenham
1/22, 29	Wellfleet	1	B. Nikula
1/29	P'town (R.P.)	1	P. Flood#
Little Gull			
1/29	P'town (R.P.)	1(1w)	P.Flood#
Mew Gull			
2/25-28	Nahant	1 b ph	Quigley + v.o.
Iceland Gull			
1/1	Nantucket	52	J. Trimble
1/18	Wilmington	3	S. Sullivan
1/19	Boston (Deer I.)	7	P. Peterson
1/19	Westboro	3	S. Williams
1/21	P'town (R.P.)	50	B. Nikula#
2/18	Turners Falls	6	T. Pirro
2/19	Winthrop	5	J. Forbes
Lesser Black-backed Gull			
thr	Turners Falls	1-2	v.o.
1/1	Nantucket	104	I. Davies#
1/18	Cohasset	5	D. Peacock
2/11	Worcester	1	M. Lynch#
2/23	Wachusett Res.	1	M. Lynch#
Glaucous Gull			
1/thr	Westboro	1	v.o.
1/6, 2/4	Turners Falls	1	v.o.
1/14	P'town (R.P.)	1	B. Nikula
1/19	Wilmington	1	S. Sullivan
1/22, 2/22	Lunenburg	2, 1	T. Pirro, D. Small
Pomarine Jaeger			
1/1	P'town (R.P.)	1	P. Flood#
1/18	Rockport (A.P.)	1	R. Heil
1/25	Eastham (F.E.)	2	B. Nikula#
Jaeger species			
1/25	Eastham (F.E.)	1	B. Nikula#
Dovekie			
1/18	Rockport (A.P.)	21	R. Heil
1/21	P'town	18	B. Nikula#
1/24	Lincoln	1	W. Cunningham
1/24	Rockport (A.P.)	29	M. Brengle
1/25	Eastham (F.E.)	58	B. Nikula#
1/29	P'town (R.P.)	77	J. Trimble#
Common Murre			
1/3, 23	Rockport (A.P.)	89, 39	R. Heil
1/28	Scusset B.	4	M. Lynch#
1/29	P'town (R.P.)	142	J. Trimble#
2/3	Ipswich (C.B.)	1 dead	J. Berry
2/9	Rockport (A.P.)	4	N. Dubrow#
Thick-billed Murre			
1/3, 18	Rockport (A.P.)	3, 22	R. Heil
1/22	Salisbury	1 dead	A. Lin-Moore
1/24	Rockport (A.P.)	9	M. Brengle
1/25	Eastham (F.E.)	10	B. Nikula#
1/29	P'town (R.P.)	46	J. Trimble#
Murre species			
1/25	Eastham (F.E.)	15	B. Nikula#
Razorbill			
1/10, 2/23	P.I.	40, 30	T. Wetmore
1/14, 2/18	Boston (Deer I.)	3, 5	Mesick, Dalton
1/14, 29	P'town (R.P.)	300, 3400	v.o.
1/16, 2/20	Cohasset	2, 4	V. Zollo
1/18, 23	Rockport (A.P.)	245, 89	R. Heil
1/20	Duxbury B.	3	R. Bowes
1/28	Scusset B.	80	M. Lynch#
Black Guillemot			
1/14	P'town (R.P.)	1	B. Nikula
1/21	Boston H.	3	M. Beyly
1/23	Rockport (A.P.)	15	R. Heil
2/11	Gloucester (B.R.)	3	L. Waters
Atlantic Puffin			
1/3, 23	Rockport (A.P.)	2, 2	R. Heil
1/14, 21	P'town (R.P.)	1, 2	B. Nikula
1/22	Gloucester	1	S. Sullivan#
1/23	Rockport (A.P.)	2	R. Heil
1/25	Eastham (F.E.)	22	B. Nikula#
Large alcid species			
1/14, 26	P'town	2100, 1950	B. Nikula
1/25	Eastham (F.E.)	260	B. Nikula
1/26	N. Truro	1100	B. Nikula

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Doves through Finches

The two **White-winged Doves,** first noted on December 11, continued throughout the period at the Fenway Victory Gardens in Boston. Long-eared Owls were noted from five locations; this species may be more common but often goes unnoticed as it roosts in dense vegetation. Short-eared Owls were found in four areas with as many as five individuals noted from Bear Creek in Saugus.

Tim Spahr and Sean Williams had an amazing night of owling in the Desert Natural Area in Marlboro. The object was to record Northern Saw-whet Owls using playback calls. They estimated an impressive 41 Saw-Whets and five Barred Owls. Other good numbers of Saw-whets were noted in Lincoln and Concord. Another owl initially identified as a Saw-whet turned out to be a **Boreal Owl;** it was found at the Ipswich River Audubon Sanctuary during the Super Bowl of Birding. This was the first sighting report of a Boreal Owl in Massachusetts since October 2000 in Boston. A **Rufous Hummingbird**, first noted in November 2016, continued at a feeder in Falmouth through the end of this period.

Boreal Chickadee, a very irregular migrant to our area, was reported from Peru in western Massachusetts. It remained for most of the period to the delight of many observers. This was the first report since December 2010. Other unusual birds in Berkshire County included a **Bohemian Waxwing** in Dalton and a **Harris's Sparrow,** which spent most of January at a feeder, also in Dalton. A **Sedge Wren,** first discovered on October 29 at Fort Hill in Eastham, continued through January 26. Rounding out the unusual were two reports of **Painted Buntings** at feeders on Nantucket and East Orleans.

The continued mild weather into January and February certainly benefitted several lingering passerines such as Ruby-crowned Kinglets, Gray Catbirds, Eastern Towhees, and Chipping and Lincoln sparrows. An Ovenbird, first noted on December 10 at Horn Pond in Woburn, was able to survive through several snowstorms at a feeder set in the woods. Other unusual birds for the period included a Northern Waterthrush in Wellfleet, a Lark Sparrow in Eastham, and a Grasshopper Sparrow in Barnstable. There were reports of **Audubon's Yellow-rumped Warbler** in North Truro and Orleans. Winter finch reports were few and far between with the exception of Red Crossbills that were noted in good numbers in Salisbury–Plum Island and in Royalston.

R. Stymeist

White-winged Dove
thr Boston (Fens) 2 v.o.
Eastern Screech-Owl
1/1 Marshfield 6 G. d'Entremont#
Great Horned Owl
1/1 Belmont 3 R. Stymeist#
1/15 Bolton Flats 5 M. Lynch#
1/17 P.I. 4 T. Wetmore
Snowy Owl
thr P.I. 1 v.o.
1/1 Nantucket 5 H. Young#
1/17 Westport 1 L. Abbey
1/19 P'town (R.P.) 1 B. Nikula
1/25 Duxbury B. 1 R. Bowes
1/29 Burlington 1 ph fide J. Keeley
2/5 Boston (Logan) 2 P. + F. Vale
2/22 Edgartown 2 L. Johnson#
Barred Owl
1/1 Ware R. IBA 2 M. Lynch#
2/14 Ipswich 2 J. Berry
Long-eared Owl
1/1 Nantucket 1 P. Trimble
1/1-21 Shutesbury 1 B. Emily
1/2 Concord 1 ph CBC (E. Nielsen)
1/8-17 P.I. 1 S. Selesky + v.o.
1/14-20 Belchertown 1 L. Therrien
Short-eared Owl
thr P.I. 1 v.o.
1/14, 2/26 Saugus 5, 5 S. Zendeh#
1/21 Barnstable 1 E. Lipton
1/29 Cumb. Farms 4 K. Rawdon#
Boreal Owl
1/28 IRWS 1 ph v.o.
Northern Saw-whet Owl
1/1 Ware R. IBA 3 M. Lynch#
1/2 Lincoln 5 N. Levey
1/2 Concord 6 C. Winstanley
1/17 P.I. 2 T. Wetmore
1/19 Sudbury 2 J. Hoye#
2/6 Marlboro 41 T. Spahr
Rufous Hummingbird
thr Falmouth 1 M. Mann
American Kestrel
1/1, 2/19 Saugus 4, 3 S. Zendeh#
Merlin
thr Reports of indiv. from 15 locations
1/15 P.I. 2 D. Larson#
Peregrine Falcon
1/16 P.I. 2 N. Landry
2/1 Boston 2 R. Stymeist

Peregrine Falcon (continued)

2/5	Hull	2	SSBC (Fitzgerald)
2/10	Cambridge	2	R. Stymeist
2/19	Saugus	2	S. Zendeh

Red-headed Woodpecker

thr	Belchertown	1	v.o.
thr	Northampton	1	v.o.
1/2	Quabog IBA	1	M. Lynch#
2/14-28	Ipswich	1	J. Berry + v.o.

Red-bellied Woodpecker

1/1	Marshfield	10	G. d'Entremont#
1/10	Ipswich	5	J. Berry
1/12	GMNWR	7	K. Dia#
1/22	Bolton Flats	8	M. Lynch#

Yellow-bellied Sapsucker

thr	Mt.A.	1-4	v.o.
1/9	Boston (A.A.)	1	G. Denton
1/29	Nantucket	1	G. Andrews
2/18	Milford	1	B. Parette
2/19	Winchester	2	R. LaFontaine#
2/19	Vineyard Haven	1	P. Uhlendorf
2/25	Worcester	1	D. Gleason

Northern Flicker

1/21	Eastham (F. H.)	7	G. d'Entremont#
1/22	Bolton Flats	5	M. Lynch#

Pileated Woodpecker

1/10	Ipswich	2	J. Berry
2/19	S. Quabbin	3	M. Lynch#
2/19	Milton	2	R. Mussey
2/25	Hamilton	2	J. Berry

Eastern Phoebe

thr	Barnstable	1	S. Matheney, v.o.
1/14	Nantucket	1	S. Kardell

Northern Shrike

thr	Reports of indiv. from 15 locations		
1/2	Concord	2	CBC (S. Perkins)
2/22	P.I.	2	S. Pierce

Fish Crow

1/4	Worcester	21	J. Lawson
1/14	W. Roxbury (MP)	1	P. Peterson
1/28	Plymouth	30	J. Forbes
2/1	Blackstone	40	S. Miller#
2/26	Fairhaven	8	SSBC (GdE)
2/27	Dorchester	19	P. Peterson

Common Raven

1/2	Wellfleet	2	M. Faherty#
1/4	Ipswich	2	P. + F. Vale
1/8	Peru	2	M. Lynch#
1/16	Natick	2	J. Benson
1/21	Waltham	2	J. Forbes
2/27	Sheffield	2	M. Lynch#

Horned Lark

1/1, 2/19	Saugus	150, 150	S. Zendeh#
1/2	Newbury	200	P. + F. Vale
1/3, 2/18	Acton	140, 75	Stymeist, Forbes
1/4	Ipswich	150	J. Berry#
1/26	Quabog IBA	150	M. Lynch#
2/6	Cumb. Farms	50	P. Peterson
2/11	Hadley	400	S. Surner
2/14	Gloucester (B.R.)	40	L. Ferraresso#
2/18	Sutton	40	R. Brady

Tree Swallow

1/29	Chilmark	1	R. Culbert
2/27	Yarmouth	1	E. Hoopes
2/25	GMNWR	4	J. Forbes#
2/25	Cumb. Farms	4	J. Offermann
2/27	Framingham	1	C. Ewer

Boreal Chickadee

1/2-2/28	Peru	1	R. Guthrie

Red-breasted Nuthatch

1/7	Ware R. IBA	4	M. Lynch#
1/8	Peru	4	M. Lynch#
1/14	Mt.A.	3	Friends of Mt.A.
1/22	Boston (A.A.)	4	P. Peterson
2/15	P.I.	15	T. Wetmore
2/17	Hamilton	3	J. Berry

Brown Creeper

1/12	GMNWR	2	K. Dia
1/14	Mt.A.	2	Friends of Mt.A.
2/2	IRWS	2	J. Nelson
2/24	Milton	7	P. Peterson
2/25	Hamilton	3	J. Berry

Carolina Wren

1/16	Acushnet	5	M. Lynch#
1/22	Fairhaven	5	R. Stymeist#
2/4	Falmouth	11	G. d'Entremont

Winter Wren

1/1	Medford	3	M. Rines#
2/19	Newton	3	P. Gilmore

Sedge Wren

1/1-26	Eastham (F.H.)	1	v.o.

Marsh Wren

1/11	Marshfield	1	D. Peacock
1/13	Wayland	1	B. Harris
1/26	GMNWR	2	J. Stoner#
2/23	N. Truro	1	S. Broker

Golden-crowned Kinglet

1/22	Boston (A.A.)	4	P. Peterson
1/22	P.I.	3	A. Bean
1/22	Worc. (BMB)	5	J. Liller#
2/1	Waltham	4	J. Forbes
2/15	Ipswich	3	P. Peterson

Ruby-crowned Kinglet

thr	Reports of indiv. from 16 locations		
1/2	Cambr. (Danehy)	2	K. Hartel
1/22	Fairhaven	2	R. Stymeist#

Eastern Bluebird

1/15	Andover	9	J. Berry#
1/22	Bolton Flats	15	M. Lynch#
1/22	DFWS	19	P. Sowizral
1/25	Quabog IBA	16	M. Lynch#
2/6	Cumb. Farms	8	P. Peterson
2/24	Ipswich	9	J. Berry#

Hermit Thrush

1/1	Marshfield	2	G. d'Entremont#
2/5	Acoaxet	2	M. Lynch#

Gray Catbird

1/1	Southwick	1	T. Carter
2/2	Westport	1	J. Hoye#
2/4	Falmouth	3	G. d'Entremont
2/18	Gloucester	1	B. Harris
2/18	Rockport	1	B. Harris

American Pipit

1/2	Truro	3	M. Faherty
1/11	Waltham	3	C. Martone
1/14	Saugus	2	S. Zendeh#
1/28	Gloucester (E.P.)	3	N. Dubrow
2/11	Woburn (HP)	1	R. Hodson
2/19	Saugus	1	S. Zendeh
2/24	Northboro	1	T. Spahr

Bohemian Waxwing

2/18	Dalton	1	J. Pierce

Cedar Waxwing

1/2	Old Furnace	30	M. Lynch#
1/14	Bedford	40	J. Forbes
1/29	Athol	42	G. d'Entremont#
1/29	Ipswich	57	J. Berry
2/4	Falmouth	35	G. d'Entremont
2/11	Wachusett Res.	40	M. Lynch#

Lapland Longspur

1/5	Egremont	1	R. Wendell
1/6	Montague	1	J. Rose
1/7	Northampton	1	L. Therrien
1/7	Acton	3	J. Layman
1/10	P.I.	2	T. Wetmore
1/15	Newbury	5	M. Brengle

Lapland Longspur (continued)			
2/10	Gloucester	2	P. Peterson
2/11	Hadley	2	S. Surner
Snow Bunting			
thr	Acton	77 max	v.o.
thr	P.I.	55 max	v.o.
1/8	Ipswich (C.B.)	110	J. Berry
1/8	S. Boston	20	E. del Solar
1/16	Wachusett Res.	20	R. Quimby
1/26	P'town	70	B. Nikula
2/13	Deerfield	100	E. Huston
2/16	Lincoln	50	D. Brownrigg
2/19	Gloucester	45	S. Hedman
Ovenbird			
thr	Woburn (HP)	1	v.o.
Northern Waterthrush			
1/2	Wellfleet	1 ph	V. Zollo
Orange-crowned Warbler			
1/1	Nantucket	1	L. Seitz
1/1-5	Arlington	1	K. Hartel
1/2	Nahant	1	L. Pivacek
1/3	Revere	1	P. Peterson
1/10-29	Roslindale	1	D. Sullivan
2/8	Woburn (HP)	1	B. Lee
2/22	Boston (A.A.)	2	C. Hartshorn
Common Yellowthroat			
1/thr	Rockport	1	B. Harris
1/13-16	Barnstable	1	P. Trimble#
1/14	W. Roxbury (MP)	1	P. Peterson
1/16	Braintree	1	V. Zollo
2/5	Acoaxet	1	M. Lynch#
Palm Warbler			
1/1	Nantucket	2	P. Trimble
1/11-31	Plymouth	1	L. Meeks
Pine Warbler			
1/1	Salisbury	1	S. Glynn
1/2	Salem	1	D. Ely
1/2	Arlington	2	K. Hartel
2/10	Newton	1	J. Sender
2/11	Concord	1	W. Martens
Yellow-rumped Warbler			
1/12	P.I.	4	R. Heil
1/12	Longmeadow	2	M. Moore
1/22	Fairhaven	20	R. Stymeist#
2/3	Ipswich (C.B.)	14	J. Berry
2/4	Falmouth	5	G. d'Entremont
2/5	Acoaxet	4	M. Lynch#
Audubon's Warbler			
2/4-9	N. Truro	1	D. Spang
2/18	Orleans	1	K. Yakola
Yellow-breasted Chat			
thr	Nahant	1	v.o.
1/4	Barnstable	1	S. Matheney
1/22	S. Dartmouth	1	R. Stymeist#
1/29	Westport	1	E. Nielsen
2/4	Nahant	1	R. Stymeist#
2/4	Falmouth	2	G. d'Entremont
Eastern Towhee			
1/15	S. Hamilton	1	P. + F. Vale
1/22	S. Dartmouth	2	R. Stymeist#
1/28	Acoaxet	1	G. d'Entremont
2/4	Falmouth	2	G. d'Entremont
2/14	Sharon	1	M. Walters
2/19	Dedham	1	C. Ullrich
American Tree Sparrow			
1/2	Salisbury	86	G. d'Entremont#
1/2	Hardwick	20	M. Lynch#
1/10	P.I.	48	T. Wetmore
Chipping Sparrow			
1/4	Wayland	1	A. McCarthy#
1/26	Orleans	4	M. Faherty
1/31	Mt.A	1	R. Stymeist
2/17	W. Peabody	1	A. Bean
2/22	Westwood	1	E. Nielsen
Field Sparrow			
1/21	Lancaster	2	B. Robo
1/22	S. Dartmouth	5	R. Stymeist#
1/23	Canton	2	M. Iliff
2/5	Wachusett Res.	2	K. Bourinot
2/24	Lancaster	2	B. Robo
Vesper Sparrow			
thr	Barnstable	1-2	v.o.
2/15	Sheffield	2	J. Pierce
2/21	Cumb. Farms	1	S. Martin
Lark Sparrow			
1/1-4	Eastham (F.H.)	1	v.o.
Savannah Sparrow			
1/5	Concord (NAC)	1	B. Lee
1/6	Acton	1	G. Dupont
1/10	P.I.	1	T. Wetmore
1/14	Saugus	9	S. Zendeh#
1/26	Lincoln	1	K. Dia#
2/14	Hadley	2	M. Lynch#
Ipswich Sparrow			
1/8	Ipswich (C.B.)	2	J. Berry
1/16	Salisbury	1	T. Purcell
1/20	Duxbury B.	1	R. Bowes
Grasshopper Sparrow			
1/5	Barnstable	1	P. Trimble
Fox Sparrow			
thr	Woburn (HP)	1	v.o.
2/10	Nantucket	3	T. Pastuszak
2/20	Concord	2	W. Martens
Lincoln's Sparrow			
1/9-2/28	Essex	1	P. Brown
Swamp Sparrow			
1/14	Boston (Fens)	2	C. Cook#
1/19	GMNWR	6	J. Stoner#
1/22	Quincy	3	P. Peterson
2/8	Northboro	3	S. Miller#
Harris's Sparrow			
1/1-25	Dalton	1	G. Hurley
White-crowned Sparrow			
1/16	Acushnet	1	M. Lynch#
1/21	Concord	1	J. Keyes
Painted Bunting			
1/1-22	Nantucket	1 f	v.o.
2/5-20	E. Orleans	1 m	L. Schibley#
Dickcissel			
1/1	Nantucket	1	P. Trimble#
2/19	Nantucket	1	S. Kardell
Red-winged Blackbird			
1/4	Ipswich	200	J. Berry#
1/22	Bolton Flats	403	M. Lynch#
1/22	Saugus	200	S. Zendeh#
2/22	Cumb. Farms	120	S. Miller#
2/25	GMNWR	200	J. Forbes
Eastern Meadowlark			
1/9	Essex	8	P. Brown
1/15	Plymouth	4	R. Timberlake
1/15	Cumb. Farms	9	L. Schibley
1/16	Weymouth	1	V. Zollo
1/22	Saugus	2	S. Zendeh#
2/18	DWWS	4	V. Zollo
2/26	S. Dart. (A.Pd)	12	E. Nielsen
Rusty Blackbird			
1/14	Northboro	8	J. Bourget
1/19	N. Plymouth	9	L. Schibley
1/19	Cohasset	12	S. Avery
2/1	W. Barnstable	10	P. Trimble
2/10	Wayland	50	A. McCarthy#
2/20	Woburn (HP)	22	B. Lee
2/25	Lynnfield	10	L. Ireland
Common Grackle			
1/4	Ipswich	100	J. Berry#
1/22	Bolton Flats	300	M. Lynch#

Common Grackle (continued)			
2/25	Gloucester	115	M. Lynch#
2/25	GMNWR	200	J. Forbes#
2/26	Grafton	200	J. Liller
Brown-headed Cowbird			
1/22	Westport	80	R. Stymeist#
1/22	Bolton Flats	20	M. Lynch#
2/12	Wayland	20	A. McCarthy#
2/22	Cumb. Farms	20	S. Miller#
2/25	GMNWR	50	J. Forbes#
Baltimore Oriole			
1/thr	E. Harwich	1	J. Hensler
1/26	Orleans	1	M. Faherty
1/27	Yarmouth	1	J. Dwelly
Purple Finch			
1/1	Medway	1	J. Alberta
2/2	IRWS	2	J. Nelson
2/9	Norfolk	1	N. Crosby
Red Crossbill			
1/1, 2/8	Salisbury	18, 21	v.o.
1/2-24	P.I.	17 max	v.o.
1/4	Royalston	40	C. Winstanley
1/5	Tolland	6	D. Holmes
2/25	Montague	5	S. Eaton
Common Redpoll			
thr	P.I.	1-4	v.o.
1/2	N. Truro	3	P. Flood#
1/20	Newton	1	P. Gilmore
1/29	Gloucester	1	J. Standley
2/12	Woburn	1	M. Rines
Pine Siskin			
1/2	Wellfleet	5	V. Zollo
Evening Grosbeak			
1/5	Windsor	10	J. Pierce
1/16-2/5	Hardwick	4	A. Barnes
1/22	New Marlboro	20	G. Hurley
2/21	Ipswich	2	S. Riley#

RUBY-THROATED HUMMINGBIRD BY RICHARD JOHNSON

ABBREVIATIONS FOR BIRD SIGHTINGS

Locations

Location-#	MAS Breeding Bird Atlas Block
A.A.	Arnold Arboretum, Boston
ABC	Allen Bird Club
A.P.	Andrews Point, Rockport
A.Pd	Allens Pond, S. Dartmouth
B.	Beach
Barre F.D.	Barre Falls Dam
B.H.I.	Boston Harbor Islands
B.I.	Belle Isle, E. Boston
B.R.	Bass Rocks, Gloucester
BBC	Brookline Bird Club
BMB	Broad Meadow Brook, Worcester
BNC	Boston Nature Center, Mattapan
C.B.	Crane Beach, Ipswich
CGB	Coast Guard Beach, Eastham
C.P.	Crooked Pond, Boxford
Cambr.	Cambridge
CCBC	Cape Cod Bird Club
CRV	Cape Cod Regional Vocation-Technical HS
Corp. B.	Corporation Beach, Dennis
Cumb. Farms	Cumberland Farms, Middleboro
DM	Dunback Meadow
DFWS	Drumlin Farm Wildlife Sanctuary
DWMA	Delaney WMA, Stow, Bolton, Harvard
DWWS	Daniel Webster WS
E.P.	Eastern Point, Gloucester
F.E.	First Encounter Beach, Eastham
F.H.	Fort Hill, Eastham
F.P.	Fresh Pond, Cambridge
F.Pk	Franklin Park, Boston
G40	Gate 40, Quabbin Res.
GMNWR	Great Meadows NWR
H.	Harbor
H.P.	Halibut Point, Rockport
HP	Horn Pond, Woburn
HRWMA	High Ridge WMA, Gardner
I.	Island
IRWS	Ipswich River WS
L.	Ledge
MAS	Mass Audubon
MP	Millennium Park, W. Roxbury
M.V.	Martha's Vineyard
MBWMA	Martin Burns WMA, Newbury
MI	Morris Island
MNWS	Marblehead Neck WS
MSSF	Myles Standish State Forest, Plymouth
Mt.A.	Mount Auburn Cemetery, Cambr.
NAC	Nine Acre Corner, Concord
Newbypt	Newburyport
ONWR	Oxbow National Wildlife Refuge
PG	Public Garden, Boston
P.I.	Plum Island
Pd	Pond
POP	Point of Pines, Revere
PR	Pinnacle Rock, Malden
P'town	Provincetown
Pont.	Pontoosuc Lake, Lanesboro
R.P.	Race Point, Provincetown
Res.	Reservoir
RKG	Rose Kennedy Greenway, Boston
S.B.	South Beach, Chatham
S.N.	Sandy Neck, Barnstable
SRV	Sudbury River Valley
SSBC	South Shore Bird Club
TASL	Take A Second Look, Boston Harbor Census
WBWS	Wellfleet Bay WS
WE	World's End, Hingham
WMWS	Wachusett Meadow WS
Wompatuck SP	Hingham, Cohasset, Scituate, Norwell
Worc.	Worcester

Other Abbreviations

ad	adult
b	banded
br	breeding
dk	dark (morph)
f	female
fide	on the authority of
fl	fledgling
imm	immature
juv	juvenile
lt	light (morph)
m	male
max	maximum
migr	migrating
n	nesting
ph	photographed
pl	plumage
pr	pair
S	summer (1S = 1st summer)
v.o.	various observers
W	winter (2W = second winter)
yg	young
#	additional observers

HOW TO CONTRIBUTE BIRD SIGHTINGS TO *BIRD OBSERVER*

Sightings for any given month must be reported in writing by the eighth of the following month, and may be submitted by postal mail or email. Send written reports to Bird Sightings, Robert H. Stymeist, 36 Lewis Avenue, Arlington MA 02474-3206. Include name and phone number of observer, common name of species, date of sighting, location, number of birds, other observer(s), and information on age, sex, and morph (where relevant). For instructions on email submission, visit: <http://www.birdobserver.org/Contact-Us/Submit-Sightings>.

Species on the Review List of the Massachusetts Avian Records Committee, as well as species unusual as to place, time, or known nesting status in Massachusetts, should be reported promptly to the Massachusetts Avian Records Committee, c/o Sean Williams, 18 Parkman Street, Westborough MA 01581, or by email to seanbirder@gmail.com.

Mass Audubon Birders Survey

Mass Audubon invites birders to take a brief survey designed to help us collect information on:

- The different types of birding activities they engage in.
- Their familiarity with environmental issues affecting local and global bird populations.
- Their understanding of the impacts associated with these conservation issues.
- Their familiarity and engagement with conservation actions that can help mediate these impacts.

Here is the link for taking the survey:
https://www.surveymonkey.com/r/ZHCD3HX

What we learn from the survey responses, collected throughout spring and summer of 2017, will help us develop educational materials that build on birders familiarity with conservation issues, and that are relevant to birders current levels of engagement with certain conservation actions. By taking this survey, you will help us to develop materials that will be effective and applicable to fellow birders.

Lucy Gertz
Statewide Education Projects Manager
Education Department
Massachusetts Audubon Society
208 South Great Road Lincoln, MA 01773
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Email lgertz@massaudubon.org

ABOUT THE COVER

Yellow Warbler

For many people, the Yellow Warbler (*Setophaga petechia*), with its late April arrival, is a harbinger of spring. Aptly named, the male in breeding plumage is bright yellow, with greenish-yellow upperparts, and heavy red streaks below. The dark eyes and bill are prominent in the all-yellow head. Females are duller and the red streaking is either reduced or lacking. Winter-plumaged birds are duller colored. Immatures resemble drab females, with the immature females appearing nearly gray.

Yellow Warbler taxonomy is complex and somewhat controversial, with 33 recognized subspecies that are divided into three groups: the Yellow Warbler, or *aestiva* group; the Golden Warbler, or *petechia* group; and the Mangrove Warbler, or *erithachorides* group. All three groups bear the names of what were originally described as separate species. The *aestiva* group is divided into six subspecies, the other two into 16 and 11 subspecies respectively. The northern limit of the *aestiva* group's breeding range extends from the Aleutian Islands and most of Alaska through northern Canada to the shrubby edges of the tundra, then dips south of Hudson Bay and east to southern Labrador and all of Newfoundland. The range extends south to northern Georgia and west through Oklahoma to California—comprising about half of the United States—and extends south along the west coast to Baja California, and from Arizona to southern Mexico. *Aestiva* birds are migratory. This group winters from southern Baja and western Mexico south through Central America and in South America east of the Andes south to Bolivia. They spend the winter in scrubby wooded habitats, and frequently in mangroves. In Massachusetts, the Yellow Warbler is a widespread common migrant and breeder. Yellow Warblers arrive in late April and depart from late July to early August.

The other groups of Yellow Warblers are sedentary. The Golden Warbler group ranges from southern Florida through the West Indies and the Caribbean south to Venezuela; males have a chestnut-colored patch on the crown. The Mangrove Warbler group ranges from Baja California south through Central America and in South America in the west through central Peru; males have a chestnut-colored head. The Yellow Warbler is certainly one of the most diverse warbler species, but with DNA studies now available it would not be a surprise if ultimately it once again gets split into two or more species.

Yellow Warblers are usually monogamous, but sometimes also may be polygynous. They tend to be site faithful when breeding, and may mate with the same partners in successive years. Males sing from perches in shrubs or trees. The song is a series of short units that have been described mnemonically, as *sweet, sweet, sweet, sweeter than sweet*. Males deliver two basic patterns of song: one pattern is used for male-female communications, including mate attraction. The other pattern is for male-male communication, for example in territorial advertisement. A number of behaviors are involved in establishing a territory and attracting a mate. A male may fly in a circular pattern toward another warbler at its territorial boundary, may glide with wings

and tail spread, or fly slowly with exaggerated wing beats holding its head up over its back. Chases are frequent and sometimes end in fights. A stationary display involves a spread tail and lifted wings.

In our area, Yellow Warblers prefer to nest in wet thickets, especially thickets containing willows, and their habitat includes most disturbed successional habitats. The nest is a deep cup built by the female in a fork in a shrub or tree. It is constructed of bark and grasses and covered in fine gray fibers. The clutch is variable but usually consists of three to five eggs that can vary in color: grayish white to pale green or blue and spotted and blotched with brown or olive around the large end of the egg. Only the female develops a brood patch and she alone incubates the eggs for the 10 to 12 days until hatching. The altricial chicks are helpless upon hatching, and are covered with natal down and their eyes are closed. The female does the all brooding for the eight to ten days until fledging. The female may give a distraction display if the nest is approached. Both parents feed the young, which may remain with the parents as long as three weeks after fledging.

Yellow Warblers feed upon a wide variety of insects and insect larvae. They primarily forage by gleaning leaves, but also hawk flying insects and snatch prey from leaves by hovering. They occasionally eat fruit.

Yellow Warbler nest predators include snakes, mammals such as squirrels, weasels, and raccoons, and birds such as crows and jays. In some areas, they suffer from cowbird nest parasitism. However, if cowbirds lay eggs early in the nesting cycle, Yellow Warblers may cover the clutch and start afresh, producing a multi-tiered nest effect. One nest had six tiers and 11 cowbird eggs! They also may desert their nest and presumably rebuild elsewhere.

As a primarily long-distance nocturnal migrant, many are killed in collisions with buildings or towers. Habitat alteration, including cattle grazing, is a problem, but the Breeding Bird Survey data indicate that their overall population is stable, even though there are different regional trends. For example, there has been a decline in the Pacific rain forest area, and increases in southern New England and the Great Lakes area. Thus it appears that with its vast breeding area, this delightful little warbler is reasonably secure.

William E. Davis, Jr.

ABOUT THE COVER ARTIST

John Sill

John Sill is a freelance wildlife artist living in the mountains of North Carolina. He was the illustrator for the Bird Identification Calendar for Mass Audubon for many years. His work has appeared in Birds In Art at the Leigh-Yawkey Woodson Art Museum, Wausau, Wisconsin, and in Art of the Animal Kingdom at the Bennington Center for the Arts in Vermont. He continues to illustrate the "About" and "About Habitats" series of natural history books for children written by his wife Cathryn.

AT A GLANCE

April 2017

WAYNE R. PETERSEN

This issue's mystery bird is a gull, a representative of a family about which some birders feel that all species are "mystery species." While there is no question that the family Laridae is complex and often challenging where matters of field identification are concerned, larids also provide a spectrum of research opportunities in the fields of evolution, genetics, speciation, and taxonomy, as well as provide identification challenges to field birders.

A cursory look at the mystery bird reveals a hefty gull with a stout bill, a full-chested look, relatively long, pink legs (visible in the online version), and an overall pale or frosty appearance. This bird is clearly a large gull, not one of the smaller species such as Bonaparte's Gull. Also of note is the seemingly anomalous presence of dark (blackish or brownish) primaries and what appears to be a dusky tail band visible below the bird's left wing. Finally, the gull has a neat black tip to an otherwise pale bill. This combination of characters represents an example of the type of conundrum hinted at in the opening paragraph.

So, what are the issues and what are the options surrounding the identification of the mystery gull? First, the frosty appearance, robust size, head shape, and dark-tipped bill pattern of the mystery gull suggest the possibility that it could be a Glaucous Gull, except that it clearly has dark primaries and a seemingly dark tail band. Glaucous Gulls are classic white-winged gulls that typically have immaculately white primaries. Likewise, most Iceland Gulls occurring in Massachusetts and elsewhere on the northeastern coast of North America have pale or white wing tips, or else have at least some gray spotting or charcoal coloration in the primaries. However, there seems to be

little question about the degree of darkness on the wing tips of the pictured gull. Where does this leave us?

The reader is now confronted with a classic mystery gull. Given the features at hand, there are two likely options. The bird might be abnormally frosty due to a genetic condition, or else it might be a hybrid. If the gull is a hybrid, the most likely possibility is a Glaucous x Herring cross. Such hybrids are fairly regular in areas where Glaucous Gulls and Herring Gulls coexist in Canada and elsewhere; when they hybridize, they are sometimes called Nelson's Gulls, a name at one time applied to such hybrids occurring in the Bering Sea, which were then thought to be a distinct species. If the bird were expressing a genetic anomaly, it would most likely show either a form of leucism or schizochromism that would somehow give the bird an abnormally pale appearance to its body plumage, yet not affect the bill or wing tip coloration. Given these choices, hybridism is the more likely possibility, in which case the mystery gull is likely a cross between a Glaucous Gull and a Herring Gull. Regardless of its identity, such individuals are always interesting, even if they can't always be definitively identified.

The author photographed this gull at Eastern Point, Gloucester, on February 7, 2009.

Wayne R. Petersen

KING EIDER BY SANDY SELESKY

AT A GLANCE

WAYNE R. PETERSEN

Can you identify the birds in this photograph?
Identification will be discussed in next issue's AT A GLANCE.

MORE HOT BIRDS

At least two and possibly four or more **White-faced Ibis** spent the latter half of April into early May in a large flock of Glossy Ibis in Essex County. Reports came in from at least three locations in Ipswich plus one from Wenham Lake. Nathan Dubrow took the photo on the right.

A one-day wonder, a male **Painted Bunting** appeared at a feeder in Huntington. The homeowner welcomed birders but the bird was less accommodating, never seen again after the first day. Surprisingly, given Hampshire County's very few prior records of this species (maybe only one?), this is the second record for the town of Huntington: another male spent roughly the last week of November and first week of December in 2006 here as well! Lois Richardson took the photo on the left.

BIRD OBSERVER (USPS 369-850)
P.O. BOX 236
ARLINGTON, MA 02476-0003

PERIODICALS POSTAGE PAID AT BOSTON, MA

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