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## Bulletin No. 43: Birds of the Connecticut College Arboretum: Eighty Years of Change

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BIRDS OF THE  
CONNECTICUT COLLEGE  
ARBORETUM:  
*Eighty Years of Change*



# CONNECTICUT COLLEGE

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*Cover Photo—Hooded Mergansers are common winter residents in the shallow estuary waters around Mamacoke Island and in Smith Cove. They also occur on the Arboretum Pond when the water is not iced over in winter. Photo by Bob MacDonnell.*

BIRDS OF THE  
CONNECTICUT COLLEGE  
ARBORETUM:  
Eighty Years *of* Change

*Robert Askins*

The Connecticut College Arboretum  
BULLETIN 43  
March 2018

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This is the 43rd volume of a series of bulletins published by the Connecticut College Arboretum, formerly named the Connecticut Arboretum. Bulletins 1-30 were published as Connecticut Arboretum Bulletins.

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# FOREWORD

One of the most distinctive aspects of the Connecticut College Arboretum has been our focus on the importance of long-term ecological research. Detailed studies of natural vegetation and bird communities began shortly after the establishment of the Bolleswood Natural Area in 1952. Since that time teams of faculty and students have documented the changes in these natural communities, and have shared the information generated from their studies in both technical and popular publications. The Arboretum Bulletin series has often served as a vehicle for disseminating Connecticut College original research to the general public, and the present edition is an excellent example of how to make scientific information accessible to a broad audience.

The Arboretum map that is located in the center of this bulletin is the most accurate version we have ever produced. Generated in the College's Geographic Information Systems Lab, it details the wetlands, watercourses, topography, trails and stone walls with great clarity. This map was customized for this publication, and other digital and printable versions are available on the Arboretum website.

Glenn Dreyer

*Charles & Sarah P. Becker '27 Arboretum Director*

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# ACKNOWLEDGMENTS

We would not have a detailed record of changes in bird populations in the Arboretum during the past six decades if it weren't for the foresight of professors William Niering and Richard Goodwin, who initiated long-term monitoring of ecosystems in the Bolleswood Natural Area, and Barbara Rice Kashanski, who recommended that the original vegetation surveys should be supplemented with a standardized census of breeding birds. Subsequent research on bird populations in the Bolleswood and at other sites in the Arboretum was only possible because of the efforts of many students and volunteers. Our understanding of the abundance and distribution of birds throughout the year is also based on records by numerous local birders and Connecticut College students and staff who submitted their records to me or to e-Bird. The draft of this bulletin benefitted greatly from editorial recommendations by Glenn Dreyer and Corrie Folsom-O'Keefe. Christine Donovan helped to design and improve the chart showing the seasonal occurrence of different species of birds and Maggie Redfern and Beverly Chomiak created the attractive and detailed Arboretum map for this publication. Bob MacDonnell generously permitted us to use his stunning photographs of numerous bird species that are discussed in the text. Susan Lindberg, provided the elegant graphic design of this booklet. A grant from the Important Bird Areas Small Grants Matching Program of Audubon Connecticut provided support for preparation and printing of this bulletin.

# INTRODUCTION

The status of birds in the Connecticut College Arboretum was analyzed in two previous Arboretum Bulletins (Goodwin and Grandjouan, 1958; Askins 1990). Like this bulletin, the earlier bird bulletins included summaries of research results and a chart showing the relative abundance of each species at different times of year. It is sobering to compare these bulletins and realize how much bird populations have changed during the past few decades. These changes occurred despite the fact that Arboretum properties are carefully protected and managed to preserve natural diversity. Some bird species have declined sharply or disappeared entirely, while other species have increased. Each successive chart includes new species as additional rare species are eventually recorded. More surprisingly, however, some new species have become regular and even common residents in the Arboretum. The detailed studies of the ecology of birds in the Arboretum provide exceptional insights about why some of these dramatic changes in bird populations occurred, and they are the main reason that the Bolleswood Natural Area of the Arboretum has been recognized as an Important Bird Area by Audubon Connecticut.

The first sections of this bulletin briefly summarize the results of research projects on birds, providing a more accessible and readable account than previous accounts in scientific journals. I cite the scientific papers, however, for readers who are interested in details about methods and results. I include a brief summary of changes in waterfowl populations on the Thames River, but a more comprehensive description of these changes can be found in a recent Connecticut College Arboretum Bulletin on the Mamacoke Conservation Area.

The final sections of this bulletin will be especially interesting to amateur birders. I've included a site guide for birding in the Arboretum at different times of the year, and a checklist of all species recorded in the Arboretum. The checklist indicates the likelihood of finding each species during different seasons.

# BIRD STUDIES IN THE ARBORETUM

Natural areas have been preserved at Connecticut College since the college was founded in 1911, when Anna Hempstead Branch donated a grove of ancient hemlocks to the new women's college (Goodwin, 1981). She stipulated that this grove, called the Bolleswood, should be, "a park for the use and engagement of said college and their friends". The Bolleswood became a central feature of the Connecticut College Arboretum, which was officially established in 1931. Eight-millimeter films made by George Avery, the first director of the Arboretum, show students in elegant fur coats walking along a trail bordered by giant hemlocks during a botany field trip in the 1930s. The trees grew above a deep ravine with spectacular ledges and a seasonal stream.

There is no doubt that the Bolleswood and other parts of the Arboretum were visited by both amateur naturalists and professional biologists frequently during the early years of the college. A search of the student newspapers and the alumni magazines revealed that an ornithology club consisting of faculty, students and members of the local community

was active from the fall of 1935 until at least 1945. The club sponsored field trips and lectures, including a slide show presented by the famous ornithologist Arthur A. Allen, who described his pioneering work on recording bird songs. A field trip to the Arboretum was announced for May 1944, but there was no follow-up article describing which birds were seen on this or other field trips. Articles in the student newspaper and the alumni magazine also allude to an ornithology class that was part of the curriculum in the 1940s. Despite this ornithological activity, I could find virtually no written accounts of birds in the Arboretum or the adjacent campus before 1953. The only published article reporting earlier observations of birds in this



Mature eastern hemlocks growing at the edge of the ravine in the Bolleswood. This photograph was taken around 1920.



LEFT Northern Bobwhites were common near campus in the 1930s when much of the campus and the surrounding properties were covered with open fields. Subsequently this species disappeared not only from the Arboretum, but apparently has been extirpated from Connecticut. This photograph was taken by Bob MacDonnell in Florida.

BELOW Aerial view of Connecticut College in 1934 showing the open landscape not only on campus, but also in the areas between the campus and river. The landscape was dominated by pastures and cropland, with only small patches of woods.



area was written by Robert Fulton Logan, a Professor of Art and an active member of the ornithology club, about his discovery of an Eastern Meadowlark nest in 1937 (Logan, 1958). This nest was located on campus in a grassy field near the present site of the Williams School. He considered it unusual only because a Northern Bobwhite had laid two eggs in the nest. Bobwhites are known to occasionally lay eggs in the nests of pheasants and domestic chickens (Brennan et al., 2014), so this behavior isn't totally unexpected. From a modern ecological perspective, however, the notable feature of Logan's account is that there was enough open grassland at Connecticut College to support breeding populations of both meadowlarks and bobwhites. Neither species nests anywhere near the campus today. This natural history note reflects a very different landscape from the manicured campus and heavily forested Arboretum that dominates the college landscape today.

I have searched for any reports of birds heard and seen in the Bolleswood on a June or July morning before the 1938 Hurricane, which blew down nearly all of the ancient hemlocks. This pre-hurricane perspective would help us understand changes in the forest bird community as the forest recovered from the storm. Similarly, a list of birds from this area from the breeding season during the early 1940s would provide a perspective on how bird populations were directly affected by the hurricane. Unfortunately, however, no such field notes have surfaced in a departmental file cabinet or in the college archives.

The historical perspective on birds of the Bolleswood shifts from essentially no information before 1953 to a remarkably detailed record on population changes for each bird species after 1953. This dramatic change resulted from the designation of the Bolleswood Natural Area as a site for long-term ecological research. The initial goal was to monitor changes in vegetation in this forested segment of the Arboretum to determine how the forest changed over time. Standardized plant surveys were initiated along four permanently marked transect lines in 1952. The next year Barbara Rice Kashanski ('54), an undergraduate student who was an experienced birder, proposed that the long-term research project should also include a study of changes in bird populations. She convinced Richard Goodwin and William Niering, the botanists who initiated the plant surveys, to start a census of breeding birds. They adopted a standard census method (the Breeding Bird Census protocol) developed by the National Audubon Society in the late 1940s for use at sites throughout the United States and Canada. This involved mapping the position of individual birds identified by sight or by their songs during a series of visits to determine the location of breeding territories for each species. Since then, breeding bird censuses have been repeated regularly in the Bolleswood Natural Area using the same methods as in 1953, and vegetation surveys have been repeated every ten years. The Bolleswood Natural Area is one of the few sites in North America where both forest vegetation and bird populations have been monitored systematically for such a long

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Barbara Rice Kashanski (Class of 1954) participating in a vegetation survey in the early 1950s at about the time that she recommended a long-term bird census in the Bolleswood study area.

period of time. These studies provided many insights about how forests change over time, and the results have been described in numerous papers in scientific journals.

Fleur Grandjouan ('59) was another undergraduate student in the 1950s who was an active birder. She did not participate in the summer Breeding Bird Census (perhaps because she returned home to France during the summer break), but she searched for birds in and around Connecticut College during the academic years between 1955 and 1957. She and Richard Goodwin compiled a chart showing seasonal occurrence of different species of birds in the Connecticut College Arboretum and campus (Goodwin and Grandjouan, 1958). The chart is similar to the one published in this bulletin, and it includes footnotes with details on some of the bird records. Although the information was derived primarily from the 1953 and 1955 bird censuses and field observations by Fleur Grandjouan, the authors were also able to draw on information from ornithology classes and from other observers, including some observations from before 1953. For example, there are several records of Grasshopper Sparrows from 1936 to 1941, a single Northern Mockingbird record (1940), and a single record of Pileated Woodpecker (1935). The Grasshopper Sparrows were recorded in May and it is unclear whether they were migrants or breeding birds. Breeding populations of this species would later disappear from the region as large open fields became less common, and there are no recent records from the Arboretum. In contrast, Northern



Pileated Woodpeckers were not recorded during the first four decades of the Bolleswood bird census, but they now occur regularly in the Bolleswood Natural Area, Bolles Road and Mamacoke areas of the Arboretum. They may have moved into the area as the forest matured, resulting in numerous large dead trees and branches that provide feeding and nesting sites. Photo by Bob MacDonnell.

Mockingbirds would become regular residents of the Arboretum. Pileated Woodpeckers were not recorded for many years after the large hemlocks blew down, but they are now regular permanent residents. The 1935 record suggests that these large woodpeckers may have occurred in the Bolleswood before the 1938 hurricane killed most of the large trees.

The breeding bird censuses continued in the Bolleswood Natural Area in the 1960s and 1970s. The observers changed over the years, but William Niering and Richard Goodwin continued to coordinate the census, ensuring that the same methods were used by different observers (most of whom were students when they participated in the censuses). Robert Dewire and Stephan Syz, both of whom worked at the Thames Science Center, made particularly important contributions by completing censuses in more than one year and writing detailed analyses of census results in *Audubon Field Notes* (Dewire, 1967; Syz, 1972). Gregory Butcher ('77) completed the 1976 census and later coauthored an influential scientific paper on population declines in forest birds in the Bolleswood Natural Area between 1953 and 1976 (Butcher et al., 1981).

When I arrived at Connecticut College in 1981, I immediately recognized the

importance of continuing the Bolleswood bird census. During the first few years, Margaret (Philbrick) Jones ('85), who was a botany major at Connecticut College at the time, helped me. She excelled at plant identification but initially she knew relatively little about birds. Because our census was in deep woods with dense vegetation and a high tree canopy, we primarily detected birds from their songs and calls, and there were many species that she learned to identify by their voice but had never seen. Even if she had a good view of a species such as Ovenbird, she had to wait for it to sing to identify it. She soon became proficient in identifying birds by both sight and sound, however.

Censuses were completed every year between 1982 and 1997, providing a detailed picture of year-to-year variation in bird populations. From 1997 to 2016 the censuses were typically repeated every other year, with some longer gaps when I was deeply involved with other field projects. Although undergraduate students often participated in these censuses, better continuity was ensured because highly experienced birders participated over a span of many years. Margaret Jones continued with the censuses after she graduated, and later Wendy Dreyer and Diane Hitchcock ('75) regularly agreed to meet at sunrise to count birds in the Arboretum for a couple of hours on ten mornings in early summer. All three are expert at identifying birds by ear and have excellent hearing, a factor that became increasingly important as my own hearing declined and I couldn't hear some of the species with high-frequency songs. In addition, the participation of students who were 19 or 20 years old ensured that the decline of Black-and-white Warblers reflected an actual population decline rather than a decline in the observer's ability to hear them singing.

Bird populations in the Bolleswood Natural Area had changed sufficiently by 1985 to warrant a new analysis and a new publication (Askins and Philbrick, 1987). The most recent update on the census was published in a 2016 scientific paper co-authored by Mary Buchanan ('14), Botany Professor Chad Jones and me (Buchanan et al. 2016). Mary Buchanan participated in the census with Diane Hitchcock and me in 2012 and 2014, and Diane Hitchcock completed the 2016 census with help from two students, Jack Beltz ('18) and Ariane Buckenmeyer ('19).

Students and volunteers who participated in the bird population study have gone on to make major contributions in conservation and research. Barbara Kashanski became an influential conservationist in southeastern Connecticut, working with Richard Goodwin to preserve the Eight Mile River watershed. Fleur Grandjouan became a leading conservationist in Kenya. Robert Dewire and Margaret Jones both became leaders in environmental education and conservation in southeastern Connecticut. Gregory Butcher is the Director of Bird Conservation for National Audubon Society, and Stephan Syz co-founded the Vermont River Conservancy. Mary Buchanan worked on conservation planning for Highstead, a regional conservation organization, and is now enrolled in the doctoral program in geography at the University of Connecticut.

Although the Bolleswood census has been the most important bird study, bird research has also been completed in other parts of the Arboretum. A second Breeding Bird Census site was originally an open field adjacent to the heavily wooded section of the Bolleswood Natural Area. We have been able to track bird populations at this site as it changed from open field to low thicket to young forest. More recently we have monitored populations and nest success of birds in two restored meadows, and studied the use of these meadows by migratory birds in the fall and spring. In addition, faculty and students have analyzed population changes and feeding behavior of winter-resident waterfowl on the Thames River.



Stone walls and pastures north of Connecticut College campus circa 1911.

## DECLINE OF OPEN COUNTRY BIRDS WITH THE SPREAD OF WOODLANDS

On September 25, 1915, Irene Nye was a new faculty member who traveled to campus in time to welcome Connecticut College's first class of students. She arrived at the New London train station and hired a carriage with "two sedate horses under the direction of an old cabman" to take her up the hill to the new campus (Nye, 1943: 26-27). Professor Nye lived temporarily in one of the dormitories (Blackstone) because her own rooms were still under construction, and she took the trolley along Mohegan Avenue to downtown New London for dinner. In her book about the history of Connecticut College, she describes the campus during the first year as "almost a treeless place" (Nye, 1943: 23). Early photographs of the campus confirm this; large expanses of pastures and abandoned fields extend down to the Thames River. Even the future Arboretum, despite the majestic stand of hemlocks, was predominately covered in active or abandoned farmland at that time. This was not only true of the areas east of Mohegan Avenue along the Thames River and along Bolles Road north of Gallows Lane, but also in areas adjacent to the Bolleswood hemlock grove. The future plant collection area was virtually treeless. Early records of Northern Bobwhites, Eastern Meadowlarks, Grasshopper Sparrows and other open-country bird species on campus are consistent with this landscape of pasture and old fields. Aerial photographs from the 1930s show that woodland was limited to small woodlots that were usually in areas too rough and steep for farming. It's likely that few woodland bird species lived anywhere near the campus except in the Bolleswood.

Over the next few decades the pastures and fields were progressively abandoned as farming declined (Goodwin, 1991). Houses were built along Mohegan Avenue and Old Norwich Road, but most of the land was left untended, slowly transitioning from grassy fallow field to shrubby old field to tall thicket and then young forest. The farms that were abandoned earliest are now mature forests with closed tree canopies. Embedded

in the expanse of young forests are occasional old trees, including giant, wide-spreading “wolf trees” that originally grew in isolation along stone walls in open fields, where they provided shade for farm workers and livestock. There are also small groves of ancient trees in steep rocky areas. These were once woodlots surrounded by pasture. Similar change occurred throughout Connecticut and most other parts of southern New England.

As the land changed from open fields with islands of trees to expanses of woodland with occasional openings, bird populations changed in a predictable way. Field birds were replaced by thicket birds, which were in turn replaced by birds that live in young forests. Usually ornithologists describe these changes by comparing sites where farming was



LEFT Field Sparrows were frequent in the summer in the old field study area in the 1950s and 1960s, but this species and other shrub/scrub specialists declined and disappeared as the fields were replaced by woodland. Field Sparrows are frequent in the restored meadows along Benham Avenue during fall migration and winter, but there are no recent breeding season records. Photo by Bob MacDonnell.

BELOW Students completing a vegetation transect in old field section of Bolleswood study area in 1954.





This meadow restoration project was planted by seed in the area north of Benham Avenue in 2006 to expand the availability of early successional habitat.

abandoned at different times in the past. The results of the bird census in an abandoned field at the western edge of the Arboretum, however, provide an unusual opportunity to understand the sequence of changes on a single plot of land over a period of more than 60 years. In the 1950s, this census site was a typical old field with a mixture of open areas dominated by goldenrod and grass, with scattered patches of shrubs (Niering and Goodwin, 1962). Not surprisingly, the typical bird species at this site were associated with grassland (such as Ring-necked Pheasant and Song Sparrow) or low, shrubby vegetation (White-eyed Vireo, Brown Thrasher, Blue-winged Warbler, Chestnut-sided Warbler, Prairie Warbler and Field Sparrow) (Butcher et al., 1981). Most of these species declined and disappeared by 1964 as young forest replaced the open habitats. The census plot now supports typical woodland birds such as Eastern Wood-Pewee and Wood Thrush. Surprisingly, however, a large patch of low thicket remained in the southwestern corner of the census plot, adjacent to a powerline corridor (Fike and Niering, 1999). In this area, Oriental bittersweet, which is an introduced species, formed a thick mat of woody vines that prevented most trees and shrubs from becoming established. Small numbers of White-eyed Vireos, Blue-winged Warblers and Chestnut-sided Warblers continued to have breeding territories in this area long after 1964, and single males of the first two species were still found in the largest remaining patch of low, vine-covered, shrubby vegetation in recent summers.

White-eyed Vireos and Blue-winged Warblers have probably been able to persist in small patches of low vegetation in the old-field census site because it abuts a powerline corridor where the vegetation is managed to favor a dense layer of native shrubs (Niering and Goodwin, 1974). This shrubby corridor supports species such as White-eyed Vireo and Blue-winged Warbler that are thicket specialists as well as more generalized shrub-layer birds such as Common Yellowthroat and Eastern

Towhee. The utility company selectively removes young trees that could grow tall enough to reach electrical lines, allowing shrubs to spread and persist. This powerline through the Arboretum was one of the original demonstration plots used to test the effectiveness of this approach to vegetation management in the 1950s. The original goal was to reduce the need for broadcast herbicide spraying, but another benefit has been the creation of diverse shrub vegetation favored by many bird species. As shrublands throughout the Northeast have grown up into forests, powerline corridors managed with selective tree removal have become one of the main nesting areas for birds that require low, woody vegetation.



Orchard Orioles are summer residents in restored meadows north of Benham Avenue. They build their nests in large trees that are scattered across the upper meadow. Baltimore Orioles, which have more brilliant orange plumage than this male Orchard Oriole, nest in the same fields. Photo by Bob MacDonnell.

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The decline of grassy and shrubby open habitats throughout the northeastern U.S. led to severe declines in bird species that require open habitats. To some extent this can be considered a “return to normal” for a region that has been heavily forested for most of the time following the last glacial period. Some species completely disappeared from large parts of their former geographical ranges, however, indicating that the homogeneous young forest of the current landscape lacks sufficient habitat diversity. The processes that created forest openings in the pre-agricultural forests – wildfires, massive spring floods on river floodplains, and beaver activity — are now too infrequent to provide sufficient habitat for shrubland and grassland birds. Increasingly conservationists have decided that a small proportion of the landscape must be managed as open habitat to support these species either by continual management of open areas or by forest harvesting to create temporary openings.

As part of this effort, 12 acres of former fields and pastures near Bolles Road and Benham Avenue have been restored to meadow to provide habitat for a diversity of native species including grasses, wildflowers, pollinating insects and open-country birds. The Arboretum does not have large enough expanses of grassland to support the more specialized grassland bird species such as Upland Sandpiper and Grasshopper Sparrow, so our target was to manage for species that can persist in relatively small grasslands with scattered trees. Some meadows were restored by removing most of the invading trees and shrubs and then mowing annually to maintain grassland



Mary Buchanan ('14), Clara Chaisson ('12) and Robert Askins (l-r) conducting a survey in the meadows adjacent to Bolles Road in 2012.

vegetation. One area north of Benham Avenue was a thicket of trees and young shrubs, so it required more massive work (Jones et al., 2013). In 2004 the woody plants were cut down and hauled away. The ground was then raked and a mix of native grasses and wildflowers was planted in summer 2006. Large oaks were left standing in this field to create the sort of savanna habitat favored by some species of birds.

These efforts have been successful. Both Baltimore Orioles and Orchard orioles continued to nest in the meadows after restoration, and Eastern Bluebirds and Indigo Buntings — neither of which had previously been recording as breeding birds at these sites — established breeding territories. Pairs of bluebirds attempted to nest in the Benham Avenue meadows, but they were consistently driven out of the nest boxes by House Sparrows. Bluebirds have nested successfully in the Bolles Road meadow, however, which apparently is far enough away from residential areas to protect them from House Sparrows even though the nearest houses are only about a fifth of a mile away through the forest. Other open-country species with breeding territories in these meadows include Eastern Kingbird, Blue-winged Warbler and Song Sparrow. Although the meadows are a small proportion of the Arboretum, they have substantially enhanced its natural diversity.

# CONTINUAL CHANGES IN BIRD POPULATIONS OF THE BOLLESWOOD FOREST

In September 1938, Irene Nye wrote a letter about the hurricane that hit the New London area unexpectedly on the opening day of classes at Connecticut College (Nye, 1943: 79-81). After her last class ended at 3:00, she was working in her office. She vividly described her experience during the storm:

“It was raining, there was a wind, but I took it to be only an ordinary storm until I heard that the flag pole was down. I looked out. The tall brick smoke stack at the heating plant toppled slowly over. The windows in Fanning [Hall] were already almost opaque, plastered with mud and leaves. The water was beating into the building on the south, east and north. It was getting dark, all lights and telephones were off. I looked from the basement toward New London Hall. The greenhouse was a wreck. The rising walls of the new auditorium to the south of us fell in a heap.”

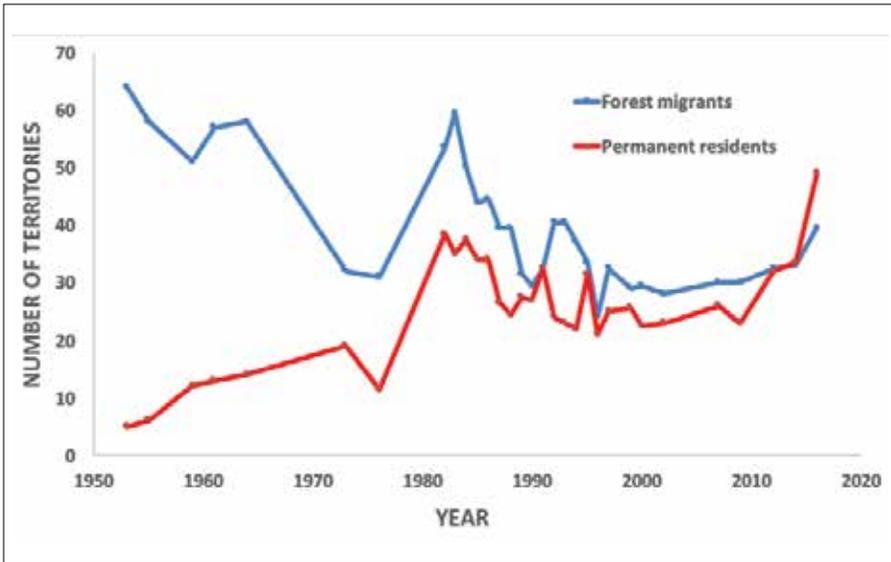
Struggling to reach her house, Nye was “blown down, rose again, only to be caught up like a leaf by the next gust”. In assessing the impact of the storm, she particularly emphasized the loss of trees and ivy vines on the campus, and wrote that “the loss of most of the large hemlocks in Bolleswood is what we especially mourn”. Only three of the 130 large hemlocks were still alive a year after the storm. Examination of growth rings showed that the downed trees were 150 to 200 years old (Avery et al., 1940).

When the Bolleswood bird census was initiated in 1953, the forest was still recovering from the 1938 hurricane. Hurricanes of this magnitude are infrequent in coastal Connecticut, but they have a lasting impact on forest ecosystems. Fifteen

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Remains of eastern hemlock grove in Bolleswood following the 1938 hurricane. Most of the standing trees subsequently died because of the effects of the storm.



Overall population changes for all species of forest migrants (forest specialists that migrate to the tropics for the winter) and all species of permanent residents (non-migratory birds that spend the winter in Connecticut) in the Bolleswood Natural Area. The species that constitute each of these groups are listed in Table 1 of Buchanan et al. (2016). The total abundance for each group was determined from the number of breeding territories for each species in the group during each year for 31 breeding bird censuses completed between 1953 and 2016.

years after the storm, the forest was still open in the areas where large hemlocks once grew: “The general aspect of the forest is that of scattered large oaks, showing severe storm damage, interspersed within a matrix of younger hemlock, black birch and oak ranging up to 6-8 in. dbh [6 to 8-inch diameter trunks]” (Niering and Goodwin, 1962).

Plants that survive best in forest openings, such as gray birch, sassafras, alders, raspberries, and blueberries, were frequent in this disturbed forest. Over the next few decades, young trees slowly grew and filled in the gaps left by fallen hemlocks. The plants that thrive in forest openings declined and the shrub layer became less dense.

A logical prediction in 1953 would have been that the Bolleswood would slowly become a better habitat for birds associated with mature forest. Surprisingly, however, the number of forest birds declined steeply in the 1960s and 1970s. The abundance of this group of birds increased again during the 1980s, and then began a slow decline until the early 2000s. Clearly the population changes in the Bolleswood were too complex to explain in terms of the forest growing older as it recovered from hurricane damage. Our recent analysis of changes in bird populations between 1953 and 2012 indicate that a complex interplay between four major factors have resulted in these changes. These factors are briefly explained below, but a more complete analysis can be found in a recent scientific paper (Buchanan et al., 2016).

1. Forest fragmentation — Most of the declining species of forest birds are long-distance migrants, so they may have declined because of destruction of rainforests, coastal mangroves, tropical dry forests, and other tropical habitats where they spend the winter. Many of these species have not declined in more extensive forests such as

Connecticut state forests, however (Askins et al, 1987). Throughout eastern North America, they have primarily declined in small patches of forest that have been cut off from other forested areas. The Bolleswood Natural Area was protected, but the forest cover in the region surrounding this Natural Area has changed continually. Most of the woodland south of the census site was destroyed in the 1960s with the construction of a massive highway interchange and associated shopping centers and apartment complexes. This was a period of steep decline in migratory forest birds in the study area. By the 1980s, however, young forests had grown up in numerous abandoned pastures and abandoned farm fields in the large section of the Arboretum immediately north of the Bolleswood Natural Area. Many species of migratory forest birds increased during this period. This pattern fit nicely with predictions of how



forest fragmentation affects specialized forest birds (Askins and Philbrick 1987), but the subsequent population trends indicated that other factors were at play. After 1987 the abundance of forest migrants declined even as new woodland grew up and as the level of forest fragmentation around the study site declined.

2. Hemlock decline — By the late 1980s only a single ancient hemlock that had survived the hurricane was still alive, but vigorous young hemlocks were beginning to create a new hemlock grove. Three bird species that typically nest in shady hemlock ravines, the Acadian Flycatcher, Hermit Thrush, and Black-throated Green Warbler, established breeding territories in the census study area beginning in the late 1980s and early 1990s. In 1987, however, an introduced

Black-throated Green Warblers often nest in mature hemlock forests in Connecticut. In the 1990s they occurred during the breeding season in mature hemlocks along the Bolleswood ravine but disappeared after most of the hemlocks were killed by hemlock woolly adelgid. They still occur in the Arboretum during spring and fall migration, however. Photo by Bob MacDonnell.

insect, hemlock woolly adelgid, arrived in the Arboretum. Adelgids are sap-feeders that typically kill eastern hemlock trees, and by 2002 most of the hemlock trees were dead (Small et al., 2005). Not surprisingly, the three bird species associated with hemlocks subsequently disappeared.

3. Forest maturation and the change in forest structure — Many species of birds depend on particular vertical layers of the forest, such as the ground layer of ferns and wildflowers, the understory of woody shrubs and tree saplings, and the canopy of taller trees. As the trees became larger in the Bolleswood between 1952 and 1972, they produced more shade, leading to a sparser shrub layer. It's therefore not surprising that Hooded Warbler and Canada Warbler, both of which are associated with a dense understory, declined. After 1987, however, adelgids began to kill many hemlocks, resulting in openings in the forest canopy and a denser shrub layer. Despite this, Hooded Warbler continued to decline and it eventually disappeared. Other

shrub-layer species such as Gray Catbird and Eastern Towhee also declined. Evidently the post-adelgid shrub layer was not as suitable as the original post-hurricane shrub layer. Two factors that would be important for the shrub layer in many other Connecticut forests, the impact of browsing by dense deer populations and the effect of invasive introduced shrubs, are probably not important in the Bolleswood study area. Deer densities are low because the study area is protected by a tall deer fence, and invasive species such as Japanese barberry are not a major component of the vegetation in the study area



Hooded Warblers were once common breeding birds in the Bolleswood Natural Area. They have not been recorded during the summer since 2009. They may have declined because of changes in the density and composition of the forest understory. Photo by Bob MacDonnell.

#### 4. Changes in the species composition of trees and shrubs — Research of forest bird populations usually

focuses on changes in the overall structure of forest vegetation – the density of different vertical layers of vegetation and the number and spacing of forest openings – rather than changes in the relative abundance of the plant species that make up the forest. Several recent studies have shown that plant species composition may be important for birds, however. Some types of trees and shrubs are frequently used as feeding sites by forest birds because they have a higher density of caterpillars or other prey. Some of the changes in bird populations in the Bolleswood may be due to substantial shifts in the relative abundance of woody plant species. Many of the plants that are known to be important for some species of birds, such as gray birch, yellow birch, maple-leaved viburnum, cherries, blueberries and alders, have declined since the vegetation study was initiated in 1952. Perhaps some forest specialists and shrub-layer species have declined since the 1990s despite a reduction in forest fragmentation and an increase in understory density because of the loss of important plant species (Buchanan et al., 2016). This explanation needs to be tested with more focused studies of the feeding behavior of particular species of birds, however.

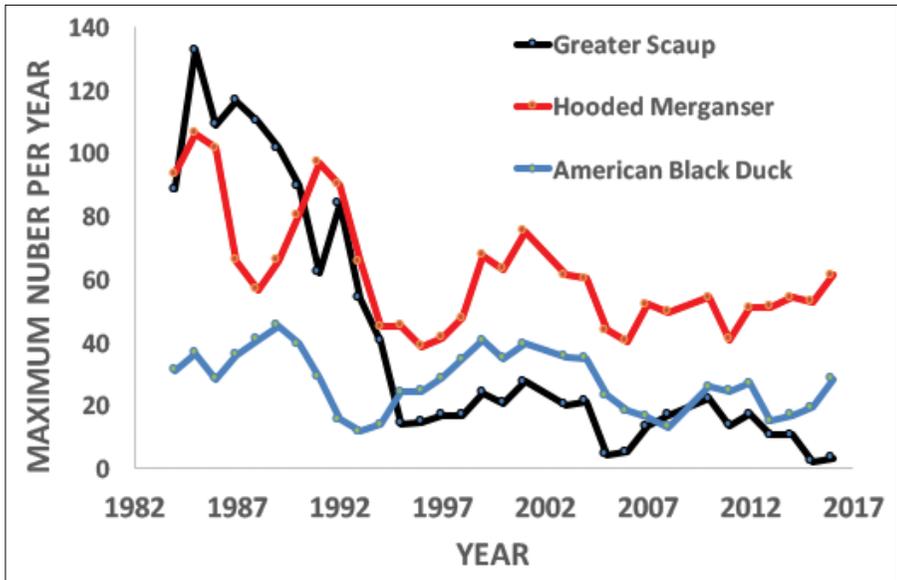
The most distinct overall trends in bird populations in the Bolleswood Natural Area during the past six decades were a decline in the total abundance of forest migrants (forest specialists that spend the winter in the tropics) and an increase in the total abundance of permanent residents. Interestingly, in 2016 there was an increase in the abundance of forest migrants to a level not recorded since the early 1990s. This was partly due to six territories defended by Blue-gray Gnatcatchers, a species that has recently expanded northward into Connecticut. No more than a single gnatcatcher territory had been recorded in previous years. Ovenbird numbers were also higher than in recent years. Only future censuses will reveal whether this is a temporary fluctuation or the beginning of a trend.

# WATERBIRDS ON THE THAMES RIVER

In contrast to the situation with forest birds, there are no detailed records of the abundance of waterbirds in the Arboretum before the 1980s. The best source of information from before 1981 is the first Arboretum Bulletin on birds (Goodwin and Grandjouan, 1958), which includes an annotated list of all bird species recorded in the Arboretum. The only waterfowl species listed in this bulletin as common and regular on the Thames River during the winter were Mallard, American Black Duck, Greater Scaup and Common Merganser. Notably, some species that would later become common winter residents such as Mute Swan, Canvasback and Hooded Merganser are listed as infrequent. The now-common and regular Hooded Merganser was listed as both infrequent and irregular.

When I first visited the coves north and south of Mamacoke Island during the winter of 1981-1982, I was impressed by the abundance and diversity of winter-resident ducks, particularly during cold periods in late December and January. Extended periods of subfreezing weather cause lakes, ponds and reservoirs throughout the region to freeze over, driving ducks toward the open water on large rivers and along the coast. Smith Cove and other relatively shallow, tidal coves near Mamacoke Island provide a refuge where both diving and surface-feeding ducks can still feed during these cold periods. Flocks of more than 500 Canvasbacks regularly occurred, along with dozens of Hooded Mergansers in small, scattered groups (Askins, 1990). Large Canvasback flocks often

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Changes in the maximum number of waterfowl recording during winters between 1982-1983 and 2016-2017. Because numbers vary from year to year with weather (particularly with ice conditions on freshwater lakes and on the Thames River), the graph is based on three-year running averages. For example, the values for 1984 are the averages for the maximum number for each species for the winters of 82-83, 83-84 and 84-85. The decline in scaups between 1982 and 2017 reflects a region-wide decline in the population of this species.

contained numerous Greater Scaups and a few Redheads. Mallards, American Black Ducks and other dabbling ducks fed in shallow water along the river shore, and Gadwalls and American Wigeons were regular winter-residents during the 1980s. Mute Swans, which had shown exponential population growth in coastal Connecticut since the 1950s, concentrated in the coves north of Mamacoke in winter flocks of more than 100 birds even when the weather wasn't particularly cold. Clearly the diversity and abundance of waterfowl had increased substantially since the 1950s.

After 1990 there were further changes in waterfowl numbers. In particular, Greater Scaups and Canvasbacks declined substantially. Small flocks of scaups (often including Lesser Scaup as well as the regionally more common Greater Scaup) now occur only sporadically in the coves near Mamacoke Island during winter. Canvasbacks are absent except during exceptionally long periods of low temperature, and they have not been recorded during some recent winters. The annual midwinter aerial survey of Connecticut waterfowl indicates that both Greater Scaups and Canvasbacks have shown substantial declines throughout the state, so the pattern on the Thames River reflects this more widespread regional change. Some of the other common species of the 1980s are still present in good numbers, however. Hooded Merganser and American Black Duck numbers fluctuated during the past 25 years, but showed a relatively small overall decline. Mallards showed little overall change in abundance, but the once-regular American Wigeon is now rare.

A recent Arboretum Bulletin describes population changes in waterfowl species in the Mamacoke Island and Smith Cove area in much greater detail, and also summarizes the results of several studies of the ecology of waterfowl on the Thames River (Dreyer et al., 2016). This area has been designated as an Important Bird Area by Audubon Connecticut because of the large flocks of winter-resident waterfowl and the breeding populations of species that require open habitats in the restored meadows near Benham Avenue.

## ARRIVAL OF NEW SPECIES OF BIRDS

An experienced naturalist who reviews the list of regular nesting birds in the Arboretum for the 1940s and 1950s will probably be impressed primarily by the large number of species that are now absent (Goodwin and Grandjouan, 1958). Most of these are species that depend on open meadows, thickets or forest openings, such as Ruffed Grouse, Northern Bobwhite, Ring-necked Pheasant, American Kestrel, Eastern Whip-Poor-Will, Horned Lark, Brown Thrasher, Yellow-breasted Chat, Eastern Meadowlark and Grasshopper Sparrow. These species declined as their habitats changed into closed-canopy woodland. However, a closer consideration of the list also reveals a large number of species that are now regular and even common residents that were absent or rare in the 1950s.

Some of the new or more-abundant species are associated with larger areas of mature forest in the Arboretum. For example, the increase in Pileated Woodpeckers and Worm-eating Warblers would be expected as the forests grew older and expanded. Most of the added species, however, are not associated with mature forests, but have expanded their geographical ranges northward into Connecticut during the past few decades. These species were originally considered to be southern birds, and some (such as cardinals and mockingbirds) were emblematic of the American South. They have expanded northward as the winters became milder, aided in some cases by the proliferation of birdfeeders and introduced shrubs such as multiflora rose that produce fruit that provides a winter food source. In the 1958 list, Northern Mockingbird and Northern Cardinal were described as regular but infrequent. The populations of these species were still in the process of expanding into southeastern Connecticut in the 1940s and 1950s. Many other species were not listed at all or are represented by a single record. They spread into southeastern Connecticut in the 1960s (Tufted Titmouse), 1970s (Red-bellied Woodpecker and Blue-gray Gnatcatcher) or 1980s (Black Vulture). The Carolina Wren has shown sporadic expansions into New England since 1900, but it often declines precipitously after severe winters. It became a much more regular and abundant resident after the 1980s. All of these species are now regular (and in some cases abundant) permanent or summer residents.

In addition to these previously southern species, four other species have been added as regular residents in the Arboretum. House Finches, which are native to western North America, were introduced to Long Island in the 1940s and spread to the New London area by the early 1960s (Zeranski and Baptist, 1990). Wild Turkeys were originally native to Connecticut but disappeared by the early 1800s because of intense hunting (Zeranski and Baptist, 1990). They only returned after wild birds from New York State were released in northwestern Connecticut in 1975. These reproduced quickly and were supplemented with additional releases. Turkeys soon spread to most parts of Connecticut (Clark, 1994), first arriving in the Arboretum in the mid 1990s. Another new resident species, the Fish Crow, was previously restricted to areas within a few miles of the coast (Clark, 1994). Fish Crows have moved farther inland, however, and are now a common breeding bird on the Connecticut College campus. Perhaps the most surprising addition to the Arboretum list is Common Raven, which was associated with remote wilderness areas in New England as recently as the 1990s.



ABOVE Worm-eating Warblers have increased in the Bolleswood Natural Area since the 1990s and it is now a regular summer resident in the forest interior. Photo by Bob MacDonnell.

RIGHT Red-bellied Woodpecker and several other historically southern species have expanded their ranges northward into Connecticut during the past few decades. Red-bellied Woodpeckers are now common residents in the woodlands of the Arboretum. Photo by Bob MacDonnell.



Bevier (1994) describes ravens as restricted to hills and mountains in northwestern Connecticut, where they nested on rock ledges in remote areas with restricted public access. Ravens now nest on rock ledges and buildings in much more heavily populated areas of New London County, and are regular visitors to the Arboretum and college campus. In contrast to many of the new species that expanded their ranges northward into Connecticut, ravens moved southward from Canada, but they are probably recolonizing areas where they had disappeared after European settlement (Bevier, 1994).



American Black Ducks are regular winter residents in shallow coves on the Thames River. They also occur on the Arboretum Pond when it is not covered with ice. Photo by Bob MacDonnell.

## SEASONAL GUIDE TO BIRDS IN THE ARBORETUM

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December to February — Midwinter is the best time to search for birds on the Thames River. A diversity of ducks, loons, grebes and gulls occur in the coves north and south of Mamacoke Island. During long periods of subfreezing temperatures, waterbirds concentrate in the remaining open water. The rocky point at the northern end of Mamacoke Island is a particularly good vantage point for viewing Northern Mamacoke Cove and the mouth of Smith Cove. Be careful, however — the rocks are often covered with ice and may be treacherous. Another good observation point is from the eastern end of Scotch Cap Road in Waterford. The interior of Smith Cove, west of the railroad bridge, can also be productive if it isn't completely frozen.

Hooded Mergansers are numerous and there are often small numbers of Common Goldeneyes, Buffleheads, Greater and Lesser scaups, Red-breasted Mergansers, and other diving ducks. Red-breasted Mergansers are usually in deeper water along with occasional Common and Red-throated loons. Mute Swans, Mallards and American Black Ducks concentrate in shallow water along the shores, and are regularly joined by Gadwalls, American Coots and Pied-billed Grebes.

Hundreds of gulls gather in Smith Cove during the winter, often standing on the ice in the interior of Smith Cove or on the boat slips at the northern end of the cove. The vast majority are Herring Gulls, with a lesser number of Great Black-backed and Ring-billed gulls. In recent winters rare gull species have joined these flocks. The most regular have been immature Iceland Gulls, which are creamy white and so stand out among hundreds of larger, grayer Herring Gulls. Lesser Black-backed Gulls, Glaucous

Gulls and adult Iceland Gulls also occasionally occur in these flocks. All of these gulls may take off suddenly if a Bald Eagle soars over the cove.

Although at Mamacoke Island the Thames River is brackish and tidal, many of the species that occur regularly in Long Island Sound at the mouth of the river (which is only about six miles away) are surprisingly rare. There are only a few observations of Brant, White-winged Scoters, Black Scoters, and Long-tailed Ducks from the Mamacoke area. Surprisingly, both Harlequin Duck and Razorbill have been seen there, however, so it is worth searching for unusual coastal waterbirds here in the winter.

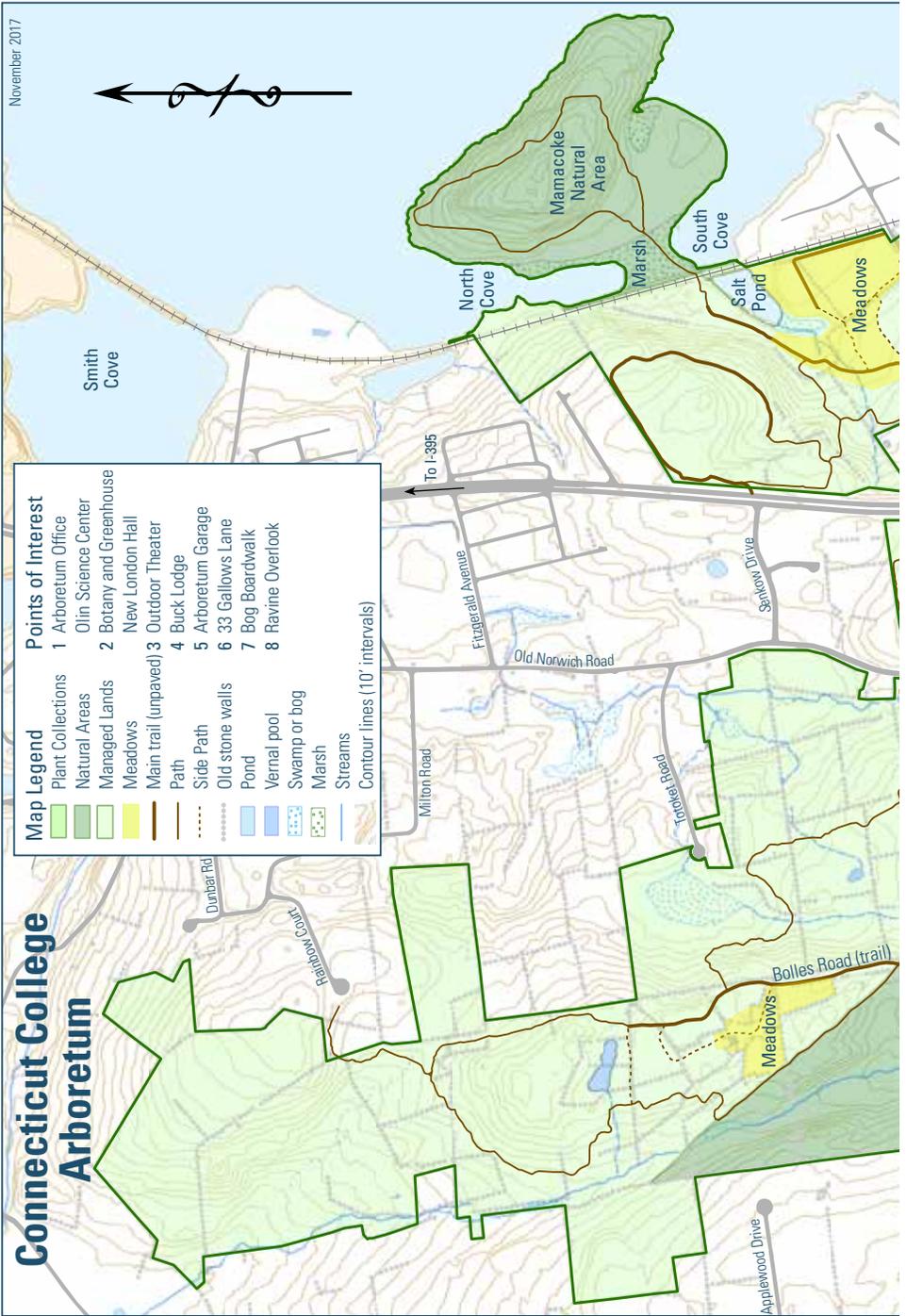
The woodlands in the Arboretum are generally quiet in midwinter, perhaps because many of the birds are drawn into surrounding residential areas by bird feeders. With patience one can find roving bands of chickadees, titmice and nuthatches that may include Golden-crowned Kinglets, Brown Creepers and Downy Woodpeckers. Hermit Thrushes and Winter Wrens occasionally occur in the forest understory. Flocks of White-throated Sparrows and Dark-eyed Juncos are frequent along forest edges and in the plant collection area.

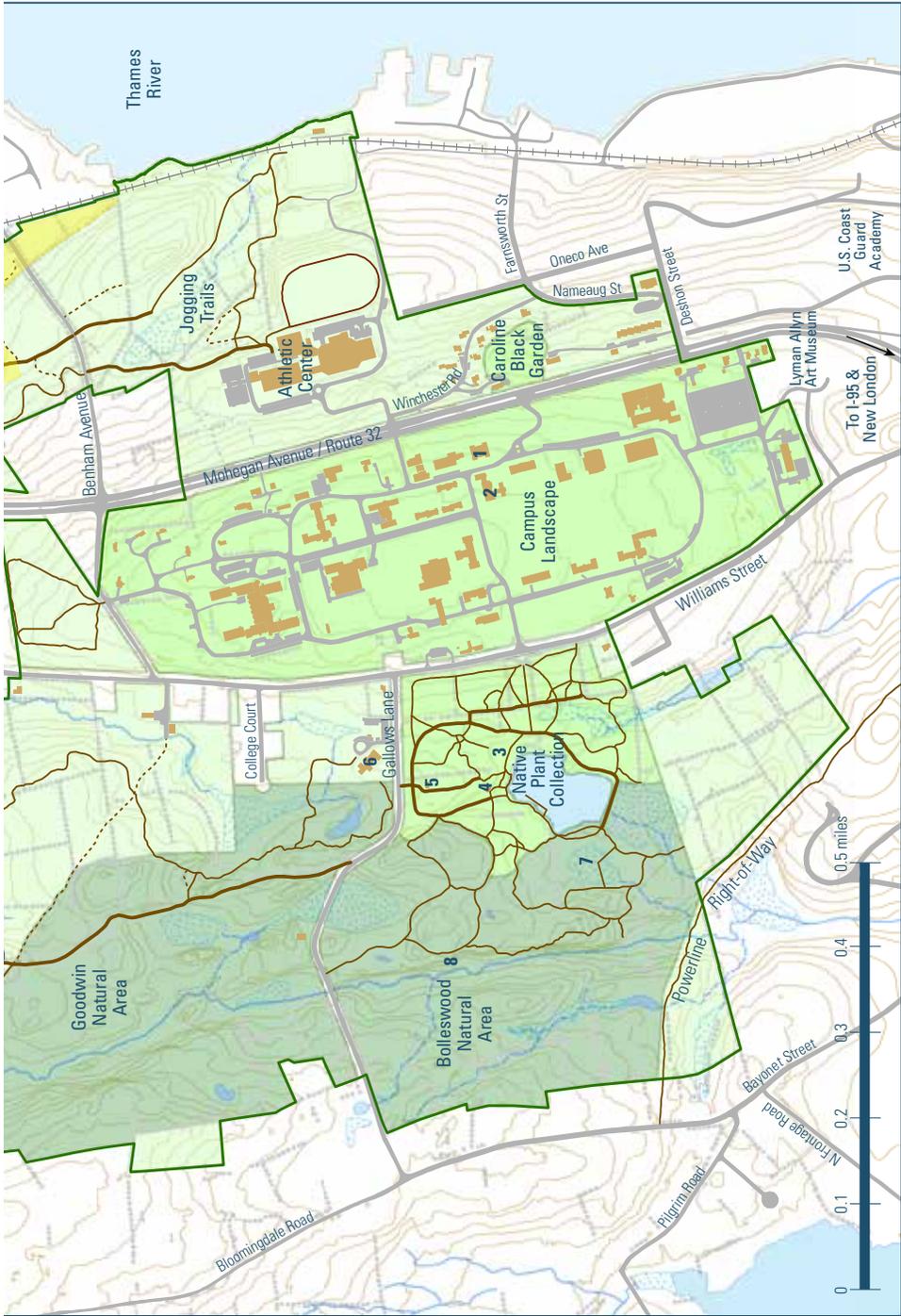
March and early April — Migratory birds begin returning in March, so the diversity of species slowly builds during the early spring. One of the first indications of spring is the dramatic aerial display of woodcocks in the restored meadows north of Benham Avenue. Depending



TOP Since 2003 Iceland Gulls have occurred regularly in winter among the large groups of gulls that congregate at the mouth and upper end of Smith Cove. Most of the Iceland Gulls are creamy white immatures similar to the one in this photograph, but adults also occasionally appear. Photo by Bob MacDonnell.

BOTTOM Great Horned Owls are often heard near Gallows Lane and in the woods on the mainland opposite Mamacoke Island. This nest was in the pine grove north of Buck Lodge. Photo by Bob MacDonnell.





on when it becomes warm, they may start displaying at dusk any time between late February and mid-March.

Great Horned and Barred owls nest during the winter, and they defend their nesting territories by calling. Beginning in December or early January, Great Horned Owls call frequently at night near Gallows Lane and in the Avery Tract north of Benham Avenue. Barred Owls also call near Gallows Lane during the winter, but their peak period of calling is in February and March when Great Horned Owls have become quieter as they tend to eggs and young.

Late April and May — On clear nights with southerly winds, large waves of migratory songbirds move north. Migrants who end up over New London or Waterford at dawn search for green areas such as the Arboretum where they can find food, water and safe places to rest. Large numbers of warblers and other migrants can sometimes be observed in the plant collections area and around the Arboretum Pond at this time of year. Also, in the early morning watch for Wood Ducks and Solitary Sandpipers on the pond, and for mixed flocks of Tree, Barn and Northern Rough-winged swallows feeding on flying insects over the pond surface. Another good place to see migratory songbirds is the trail through the restored meadows north of Benham Avenue. Look for foraging warblers along the woodland edge bordering the meadows.

June to early July — To see (or, more likely, hear) woodland birds, it is best to take an early morning walk in the Bolleswood Natural Area west of the Arboretum Pond or along Bolles Road, which runs north from Gallows Lane. Although Hooded Warblers and some other woodland bird species have disappeared from these areas, there is still an impressive diversity of breeding woodland birds, including Red-shouldered Hawks, Pileated Woodpeckers, Eastern Wood-Pewees, Great Crested Flycatchers, Blue-gray Gnatcatchers, Wood Thrushes, Veeries, Red-eyed Vireos, Black-and-white Warblers, Ovenbirds, and Scarlet Tanagers. Search the more park-like areas around the Arboretum Pond for Eastern Kingbirds and Warbling Vireos.

A different set of breeding birds can be seen in the restored meadows near Benham Avenue and about half way down Bolles Road. Here one may see Common Yellowthroats, Blue-winged Warblers, Baltimore and Orchard orioles, Indigo Buntings, American Goldfinches and Song Sparrows. Eastern Bluebirds have nested successfully in the bluebird boxes in Bolles Road Meadow.

July and August — Songbirds become increasingly difficult to find as they stop singing in late summer. The trail from the Benham Avenue parking area to Mamacoke Island can be productive, however. Great Egrets, Great Blue Herons and Green Herons may be foraging along the edge of the salt marsh at Mamacoke Island. Watch for Black-crowned Night-Herons at the tidal pond west of the railroad tracks; they forage along the shore at dawn and dusk, and may be roosting in the trees along the shore during mid-day. Ospreys occasionally hunt for fish over the coves adjacent to the island. Watch for occasional shorebirds (which are most often Spotted Sandpipers) along the muddy banks at low tide, but the mudflats are not extensive enough to attract large numbers of migrating sandpipers and plovers.

Late August and September — By late August migratory songbirds are already heading south to their wintering areas. After clear nights with winds out of the northwest, one may find mixed flocks with several species of migrating warblers as well as gnatcatchers, kinglets, and vireos. They often accompany local permanent residents such as chickadees,



Swamp Sparrows are often the most abundant species in mixed species flocks of sparrows that stop to feed during fall migration in the restored meadows along Benham Avenue. Photo by Bob MacDonnell.

titmice and nuthatches. The forest edge near the trail through the restored meadows north of Benham Avenue is a good place to search for these flocks.

October — An impressive variety of migrating sparrows occur in the restored meadows north and south of Benham Avenue in October. During the peak of the sparrow migration one may see six or seven species of sparrows (including juncos) during a morning stroll through the meadows. Surprisingly, the most abundant species is often Swamp Sparrow, which is associated with marshes and other wetlands during the breeding season but occurs in these upland meadows during migration. Chipping Sparrows, Field Sparrows, Song Sparrows, White-throated Sparrows and Dark-eyed Juncos are also common, and one occasionally finds Lincoln's, Savannah and White-crowned sparrows as well as Indigo Buntings moving with the flocks of more common species. American Tree Sparrows arrive toward the end of October as the mixed species flocks become smaller.

November — This is a relatively slow time for finding birds in the Arboretum. Most of the summer residents have left and fewer migratory birds are moving through the region on their way south. Many of the winter residents have not yet returned, however. A good option at this time of year is to walk along the trail from Benham Avenue through the restored meadows to Mamacoke Island. American Black Ducks and a few Hooded Mergansers may have returned to the coves near Mamacoke Island. They frequently occur on the tidal pond on the west side of the railroad embankment. In the early morning one can often see these ducks in beautiful light. Great Blue Herons and Belted Kingfishers may also be in the tidal pond or the Mamacoke coves. Be careful crossing the railroad tracks, which are active.

# ANNOTATED CHECKLIST OF BIRDS OF THE CONNECTICUT COLLEGE ARBORETUM

The chart on the following pages lists all species that have been recorded in the Connecticut College Arboretum, including the college campus and the adjacent Thames River from the U.S. Coast Guard Academy in New London to Smith Cove in Waterford. Seasonal occurrence and relative abundance are indicated for each species. Species that have not been recorded as permanent or summer residents in the Arboretum since 1990 have no seasonal information but are described in a footnote. Relative abundance is based on my own field notes and the observations of many other observers, including Mark Braunstein, Hunter Brawley, Glenn and Wendy Dreyer, Daniel Kluza, Thomas Ford, Eugene and Anita TeHennepe and Manuel Lizzaralde. I also included observations of students who participated in the research projects on bird populations described in the research section of this bulletin. Another important source was bird reports submitted to eBird (ebird.org) since 1992 for the following “hotspots”: Connecticut College Arboretum (which primarily refers to the plant collections area, the Arboretum Pond, and the adjacent Bolleswood Natural Area), Mamacoke Island, Mamacoke Island and Arboretum fields, and Smith Cove. The last three hotspots overlap broadly. Relative abundance is indicated in the chart by the thickness of the bar. These bars indicate the likelihood of seeing or hearing a species during a visit at a particular time of the year, so they reflect both detectability and the density of individual birds of that species. Thus, an inconspicuous species such as Brown Creeper may actually be more abundant than the chart suggests, while a highly conspicuous species such as Mute Swan may be detected on nearly every visit and thus will be shown as relatively common even when the total number of individuals is relatively low.

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Arrival and departure times for migratory birds are based on the same field notes and eBird summaries as the abundance estimates, but I also depended heavily on the record of seasonal occurrence for New London County on eBird. The New London eBird graph I used in 2017 was based on more than 20,000 daily checklists, so it provided a much more precise record of migration timing for the region around the Connecticut College Arboretum than do records from the Arboretum.

Habitats are listed for all species. The habitat categories for a particular species are listed in approximate order of the likelihood of finding them in particular habitats. These categories are important if you are searching for a species. For example, if the only habitat listed for a common species is estuaries, then you are only likely to see it if you search at sites along the Thames River. Likewise, meadow specialists are only likely to occur in the restored meadows near Benham Avenue and on Bolles Road.

A species is listed as nesting if there is direct evidence such as discovery of an active nest or a family group included fledglings. Most species that regularly occur through the summer are listed as nesting, but there are a few summer residents for which I could find no direct evidence of nesting activity. Most of these are species such as Pileated Woodpecker and Warbling Vireo that began to occur regularly in the Arboretum relatively recently.

I used the standard English common names listed in the Checklist of North and Middle American Birds, Seventh Edition including supplements up to the 57th Supplement (American Ornithological Society, 2016; (<http://checklist.aou.org>)). The

scientific names associated with these common names can be found in the most recent version of the checklist (<http://checklist.aou.org/taxa/>). Officially recognized common names are capitalized (e.g., Downy Woodpecker and Northern Bobwhite) while more general English names that typically include a group of related species are not (e.g., woodpeckers and gulls). A more accessible and readable version of the complete list of species for North America north of the Mexican border can be found at the American Birding Association website (<http://listing.aba.org/aba-checklist/>).

The birds are listed in the phylogenetic order used in the most recent version of the American Ornithological Society Checklist. This is likely to cause some confusion soon after this bulletin is published because of recent changes in the sequence of different bird families on the checklist. Consequently, the sequence of bird families that birders have learned from using field guides will not match the order used in this annotated list. I adopted the change because future editions of field guides are likely to use the revised sequence of families and species.

The relative abundance of regularly occurring species is indicated for particular periods of the year by the relative thickness of horizontal bars. For species that have only been recorded a few times, the week within a particular month that it was observed is indicated by the location of either an X (if seen before 1989 when the last bulletin on Arboretum birds was completed) or O (if seen after 1989). The following symbols are used in the chart:

	<b>Abundant (More than 90% of visits)</b>
	<b>Common (50 – 90% of visits)</b>
	<b>Frequent (25 – 50% of visits)</b>
	<b>Infrequent (5 – 25% of visits)</b>
<b>O</b>	<b>Rare (single observation since Jan. 1, 1989)</b>
<b>X</b>	<b>Rare (single observation before 1989)</b>
<b>N</b>	<b>Summer resident known to nest in the Arboretum</b>
<b>[N]</b>	<b>Recorded nesting in past but no longer a summer resident</b>

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#### HABITAT CATEGORIES:

E — estuary (Thames River Estuary including coves near Mamacoke Island)

P — freshwater pond (Arboretum Pond)

B — red maple swamps and bogs

F — mature hardwood or mixed hardwood-coniferous forest

C — coniferous forest

S — shrub/scrub and thicket

M — meadow and savanna (grassland with scattered trees)

PL — park-like areas (campus and plant collections)

FO — flying over entire Arboretum area



Species	Nesting Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Common Goldeneye														
Hooded Merganser	E,P							o						
Common Merganser	E													
Red-breasted Merganser	E													
Ruddy Duck	E													
Northern Bobwhite	[N]													[1]
Ring-necked Pheasant	[N]													[2]
Ruffed Grouse	[N]													[3]
Wild Turkey	N													[4]
Pied-billed Grebe	E,P													[5]
Horned Grebe	E	oo	x	xx									x	
Red-necked Grebe	E					xx							o	
Rock Pigeon	PL													
Mourning Dove	N													
Yellow-billed Cuckoo	S													
Black-billed Cuckoo	S							o						
Common Nighthawk	PL													
Chuck-will's-widow	F							o						
Eastern Whip-poor-will	[N]									o				[6]
Chimney Swift	N													
Ruby-throated Hummingbird	N													
Sora	P										x			
American Coot	E													
American Oystercatcher	E							o						[7]
Black-bellied Plover	E								x					



Species	Nesting Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Snowy Egret	E				x									
Little Blue Heron	E								o					
Green Heron	N				x									
Black-crowned Night Heron	E											x		
Black Vulture	FO													
Turkey Vulture	FO													
Osprey	E,P													
Bald Eagle	E							o						
Northern Harrier	E					xt			ok	x		x		
Sharp-shinned Hawk	F,M													
Cooper's Hawk	N													
Northern Goshawk	F											x		
Red-shouldered Hawk	F													
Broad-winged Hawk	F													
Red-tailed Hawk	N													
Rough-legged Hawk	M									x				
Eastern Screech-owl	M,S	o		o	o				o					
Great Horned Owl	F,C													
Barred Owl	F													
Long-eared Owl	C												o	
Northern Saw-whet Owl	M,F								o				o	o
Belted Kingfisher	E,P													
Red-bellied Woodpecker	F,PL													
Yellow-bellied Sapsucker	PL,F													
Downy Woodpecker	F,S,M													



Species	Nesting	Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Tree Swallow	N	P, M													
N. Rough-winged Swallow	N	P													
Bank Swallow		P													
Cliff Swallow		P					o								
Barn Swallow	N	P, E, M													
Black-capped Chickadee	N	F, PL													
Tufted Titmouse	N	F, PL													
Red-breasted Nuthatch		C													
White-breasted Nuthatch	N	F, PL													
Brown Creeper		F, PL					oo								
House Wren	N	S, PL													
Winter Wren		F													
Carolina Wren	N	PL, F													
Blue-gray Gnatcatcher	N	F													
Golden-crowned Kinglet		C, F, PL													
Ruby-crowned Kinglet		C, F, PL													
Eastern Bluebird	N	M													
Veery	N	F													
Gray-cheeked Thrush		F													
Swainson's Thrush		F													
Hermit Thrush		C, F					o	ooo							
Wood Thrush	N	F													
American Robin	N	PL, S, F													
Gray Catbird	N	S, F													
Brown Thrasher	[N]	S	oo	oox											[13]

Species	Nesting Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Northern Mockingbird	N													[14]
European Starling	N													
Cedar Waxwing	N													
House Sparrow	N													
Pine Grosbeak	PL	xx	xx											
House Finch	PL, M													
Purple Finch	PL		x			x			o				o	
Red Crossbill	PL, C		x											
White-winged Crossbill	PL, C		x											
Common Redpoll	M		x			x							o	
Pine Siskin	C, PL													
American Goldfinch	M, S, F													
Evening Grosbeak	PL												o	
Snow Bunting	PL	o												
Overbird	F													
Worm-eating Warbler	F													
Louisiana Waterthrush	F													
Northern Waterthrush	F, P													
Golden-winged Warbler	S					x	x							
Blue-winged Warbler	S													
Black-and-white Warbler	F													
Tennessee Warbler	PL													
Orange-crowned Warbler	M, PL									oo				
Nashville Warbler	S, PL													
Connecticut Warbler	F, PL									o				

Species	Nesting Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Mourning Warbler														
Kentucky Warbler	PL													
Common Yellowthroat	N													
Hooded Warbler	[N]													[15]
American Redstart	N													
Cape May Warbler	F,PL													
Cerulean Warbler	F,PL													
Northern Parula	F,PL													
Magnolia Warbler	F,PL													
Bay-breasted Warbler	F,PL													
Blackburnian Warbler	F,PL													
Yellow Warbler	PL,B													
Chestnut-sided Warbler	[N]													[16]
Blackpoll Warbler	F,PL													
Black-throated Blue Warbler	F,PL													
Palm Warbler	PL,M													
Pine Warbler	C,PL													
Yellow-rumped Warbler	PL,F,M													
Yellow-throated Warbler	PL													
Prairie Warbler	[N]													[17]
Black-throated Green Warbler	[N]													[18]
Canada Warbler	[N]													
Wilson's Warbler	F,PL													
Yellow-breasted Chat	[N]													[19]
Eastern Towhee	N													

Species	Nesting	Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
American Tree Sparrow		M													
Chipping Sparrow	N	PL,M													
Field Sparrow	[N]	M						o							[20]
Vesper Sparrow		M										x			
Savannah Sparrow		M													
Grasshopper Sparrow		M													[21]
Saltmarsh Sparrow		E		x											
Seaside Sparrow		E									x				
Fox Sparrow		M,PL													
Song Sparrow	N	M,S,PL													
Lincoln's Sparrow		M													
Swamp Sparrow		M						o						o	
White-throated Sparrow		PL,M													
White-crowned Sparrow		M						o							
Dark-eyed Junco		PL,M,F													
Summer Tanager		PL							o						
Scarlet Tanager		F													
Northern Cardinal	N	F													
Rose-breasted Grosbeak	N	PL,S													
Blue Grosbeak		F													
Blue Grosbeak		PL												o	
Indigo Bunting	N	M,S													
Dickcissel	[N]	PL,M													[22]
Bobolink		M													xxx
Red-winged Blackbird	N	P,E													[23]
Eastern Meadowlark	[N]	M												x	[24]

Species	Nesting	Habitat	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Rusty Blackbird		PL			°							° °			
Common Grackle	N	PL,P													[23]
Brown-headed Cowbird	N	PL,S,F													[23]
Orchard Oriole	N	M													
Baltimore Oriole	N	M,PL													

# FOOTNOTES

See Goodwin and Grandjouan (1958) and Askins (1990) for details on observations before 1989.

- [1] No records since 1990. Bobwhites were previously common permanent residents in brushy areas.
- [2] No records since 1980. Pheasants were previously regular permanent residents in the Bolleswood old field census plot and along Bolles Road.
- [3] No records since 1990. Ruffed Grouse were previously infrequent permanent residents in the Bolleswood Natural Area and along Bolles Road.
- [4] Wild Turkeys were first reported by Wendy Dreyer on November 9, 1994. Robert Askins observed two females with at least four young on July 12, 1996. Subsequently turkeys became fairly common permanent residents throughout the Arboretum.
- [5] Spring records of Pied-billed Grebe (March and April) are primarily for the Arboretum Pond, while winter records are for the Thames River.
- [6] Eastern Whip-poor-wills were previously regular summer residents north of Gallows Lane near Bolles Road (Askins, 1990).
- [7] Eva Kovach reported 10-15 American Oystercatchers on the Thames Shipyard wreckage in the river near the Connecticut College Boathouse on May 11 – 14, 2015.
- [8] A Razorbill was photographed on the Thames River north of Mamacoke Island on March 12, 2017 by Anthony Vicciarelli (eBird).
- [9] Early May records of Common Loons are for migrating birds flying over the Arboretum heading north from the coast. Winter records are for the Thames River.
- [10] An American Bittern was reported on April 16, 2015 on eBird by Richard Chmielecki (eBird).
- [11] American Kestrels were previously a regular but infrequent winter resident (Askins, 1990).
- [12] Goodwin and Grandjouan (1958) describe Horned Larks as a regular if infrequent migrant and occasional breeding species. This species has not been recorded since 1980.
- [13] Peter Picone saw three Brown Thrashers in the remote thicket in the southwestern corner of the Bolleswood Natural Area on January 6, 2007.
- [14] Northern Mockingbirds occur regularly along the paved trail bordering the railroad tracks in the restored meadow north of Benham Avenue.
- [15] Hooded Warblers regularly occurred during the breeding season along the southern end of Bolles Road and in the Bolleswood Natural Area, where they were recorded nesting. The last year that a breeding territory was recorded in the Bolleswood was 1997, and they were last observed in summer on Bolles Road in 2009. This species may have declined because of changes in the density and plant species composition of the shrub layer, where they search for food and hide their nests. It would be worthwhile to search for them in the extensive areas of young forest north of Gallows Lane.
- [16] Chestnut-sided Warbler were summer residents in the old field census plot in the Bolleswood Natural Area until 2002, but disappeared from this and other scrub/shrub sites as they grew into young forest.
- [17] Prairie Warblers were summer residents in open areas along Bolles Road and along the powerline right-of-way south of the Bolleswood Natural Area until 1993.
- [18] Black-throated Green Warblers were summer residents in the hemlock stand on the eastern side of the Bolleswood ravine in 1992 and 1993, but they were not recorded during summer after most of the hemlocks were killed by hemlock woolly adelgid in the late 1990s.
- [19] Yellow-breasted Chats nested in shrubby thickets such as the Bolleswood old field in the 1950s and 1960s (Goodwin and Grandjouan, 1958, Butcher et al., 1981), but they have not been recorded as summer residents since 1964.
- [20] Field Sparrows formerly occurred in the Bolleswood old field and in the meadow north of Benham Avenue, but there are no recent records of breeding territories for this species.

- [21] Grasshopper Sparrows were recorded during late April and May between 1936 and 1941. These may have been migrants that were passing through the region, or they may have been breeding birds because the Arboretum and surroundings had extensive open grassy fields at that time. There are no recent records of this species.
- [22] Goodwin and Grandjouan (1958) reported a pair of Dickcissels nesting in the eaves of a house near the Connecticut College campus in 1951.
- [23] Common Grackle, Red-winged Blackbird and Brown-headed Cowbird are all relatively common residents throughout the winter in some parts of New London County, often occurring in enormous mixed flocks. They forage in open fields and occasionally descend on lawns and bird feeders in residential areas. Remarkably, however, there are no recent winter records for any of these species for the Connecticut College Arboretum. The annual Christmas Bird Count results for the past ten years show no records of these species in the Arboretum even though large numbers were recorded in other segments of the New London Christmas Count circle. The Arboretum may be too far from the cornfields and dairy herds that provide the grain that attracts these blackbird flocks. Winter records for any of these species would not be surprising, however, particularly at bird feeders in or near the Arboretum.
- [24] Eastern Meadowlarks nested in the Arboretum in the 1950s (Goodwin and Grandjouan, 1958), but there are no recent records during the breeding season.

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- No. 37. *Living Resources and Habitats of the Lower Connecticut River*. 76 pp. 2001. Focuses on the lower reaches of the Connecticut that is a major New England estuary and tidal river recognized as globally significant. Photographs and illustrations.
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*Connecticut Lakes* by Richard Canavan IV and Peter A. Siver. 299 pp. 1995. A study of the chemical and physical properties of fifty-six Connecticut lakes, presenting both current information and summaries of previous studies.

*Native and Naturalized Vascular Plants of Connecticut Checklist*. Glenn Dreyer, Chad Jones et al. 232 pp. 2014.

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## ABOUT THE AUTHOR

Robert Askins is the Katherine Blunt Professor of Biology at Connecticut College. He arrived at the college in 1981, and during his first year he became involved in the long-term breeding bird census in the Arboretum. Forest bird populations had declined in the Bolleswood Natural Area since the 1950s, and one possible cause was forest fragmentation caused by development around the Arboretum. To investigate this possibility, he and his students completed bird surveys in 46 forest patches of different sizes in the region of southeastern Connecticut around the Arboretum. As predicted, the larger forests had a consistently higher density and diversity of forest birds compared to the smaller, more isolated forest patches. He also investigated whether loss of winter habitat might have contributed to the decline of migratory birds that nest in eastern North America and spend the winter in the tropics. He and his colleagues studied habitat requirements of birds that spend the winter in Virgin Islands National Park. Later his interest in population trends in birds of the eastern forest region led to the realization that birds associated with open, early successional habitat have suffered severe declines, and that their plight had largely been overlooked by conservationists. This led to intensive studies of the distribution and habitat requirements of birds that are specialized in low, shrubby habitats, a type of habitat that has declined in New England as the forests became older. He has written numerous scientific papers and two books on these subjects. He teaches courses in ecology, animal behavior and conservation biology.





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