

# The Raven

JOURNAL OF THE VIRGINIA SOCIETY OF ORNITHOLOGY

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The Virginia Society of Ornithology, Inc. exists to encourage the systematic study of birds in Virginia, to stimulate interest in birds, and to assist the conservation of wildlife and other natural resources. All persons interested in those objectives are welcome as members. Present membership includes every level of interest, from professional scientific ornithologists to enthusiastic amateurs.

Activities undertaken by the Society include the following:

1. An annual meeting (usually in the spring), held in a different part of the state each year, featuring talks on ornithological subjects and field trips to nearby areas.
2. Other forays or field trips lasting a day or more and scheduled throughout the year so as to include all seasons and to cover the major physiographic regions of the state.
3. A journal, *The Raven*, published twice yearly, containing articles relevant to Virginia ornithology as well as news of the activities of the Society and its chapters.
4. A newsletter, the *VSO Newsletter*, published quarterly, containing current news items of interest to members and information about upcoming events and pertinent conservation issues.
5. A journal, *Virginia Birds: A Quarterly Journal of Ornithological Sightings in the Commonwealth*, published quarterly and contains records of bird sightings from the different regions of the Commonwealth.
6. Study projects (nesting studies, winter bird population surveys, etc.) aimed at making genuine contributions to ornithological knowledge.

In addition, some local chapters of the Society conduct their own programs of meetings, field trips and other projects.

Those wishing to participate in any of the above activities, or to cooperate in advancing the objectives of the Society, are cordially invited to join and should contact the Membership Secretary. Annual dues are \$20.00 for active members, \$35.00 for sustaining members, \$60.00 or more for contributing members, \$500.00 for life members, and \$25.00 for family members.

New manuscripts and queries about *The Raven* should be sent to Raven Editors John and Jennifer Styrsky: [ravensubmissions@lynchburg.edu](mailto:ravensubmissions@lynchburg.edu). Queries and comments about *Virginia Birds* should be directed to Evan Spears [e3spears@gmail.com](mailto:e3spears@gmail.com).

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## ERRATA

Due to unforeseen circumstances, the publication of *The Raven* by the Virginia Society of Ornithology has been erratic and there are now errors in the correspondence of publication year and volume number. As a result:

Volume 88 should have been published in 2017. Instead, this volume was published in 2017 and 2018.

Volume 89(1) should have been published in 2018. Instead, it was published in 2019 with the papers receiving a 2019 publication year.

Volume 89(2) was published on-line with a 2019 publication year instead of 2018.

The present edition of *The Raven* contains:

Volume 89(2), the on-line paper which is dated 2019

Volume 90, which should have been published in 2019 and will carry a 2019 publication date.

A future edition of *The Raven* will be published containing

Volume 91, which should have been published in 2020 and will carry a 2020 publication date.

Volume 92 will be published at the end of 2021 and carry the correct 2021 publication date.

## Purple Finch (*Haemorhous purpureus*) Migration at the Kiptopeke Hawkwatch, 2012-2019

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Purple Finches (*Haemorhous purpureus*) may be found on Virginia's coastal plain from approximately 30 September to 30 April, with an extreme date range of 10 September to 10 May (Rottenborn and Brinkley 2007). Purple Finches have been monitored during fall migration, by sight or flight call, by Coastal Virginia Wildlife Observatory at the Kiptopeke Hawkwatch, Kiptopeke State Park, Northampton County, since 1994, when the Observatory was established and began operating the hawkwatch. A full-time hawkwatcher conducts the hawkwatch daily from 1 September to 30 November each year and there are often volunteers as well to document all species at the site. Though Purple Finches are highly irregular in their migration patterns, due to food availability and breeding success, November is the month of the greatest concentration of Purple Finches at this site, and their numbers give some indication of the relative size of their seasonal movements. Hawkwatch sites are good for such long-term data collection on a daily basis, since they use the same location, season and protocols each year.

Prior to the establishment of the Observatory, the Kiptopeke Hawkwatch was conducted by volunteers from 1977 to 1994. Purple Finch data during this period are scarce, as the hawkwatch was not regularly conducted in November and eBird was not available. The authors are not aware of any significant documentation of Purple Finch flights during this period. Between 1994 and 2012, the daily high count at the site was 31 on 23 October 2005, and the season high count was 81 in 2004 (Sam Stuart unpub. Hawkwatch report). In 2012, the finch migration at Kiptopeke became particularly interesting and was monitored more closely than in the past when an unprecedented movement of finches occurred, particularly Red Crossbills (*Loxia curvirostra*), though White-winged Crossbills (*Loxia leucoptera*), House Finches (*Haemorhous mexicanus*), Purple Finches, Evening Grosbeaks (*Coccothraustes vespertinus*), Common Redpolls (*Acanthis flammea*), Pine Siskins (*Spinus pinus*) and American Goldfinches (*Spinus tristis*) also appeared in larger than normal numbers. A new hawkwatch season high count for Purple Finches (365) and the daily high count (80) were established at the site in 2012 (Kolbe and Brinkley 2013).

The Purple Finch total (498) throughout December and into early January 2013, as described by Kolbe and Brinkley (2013), was "the largest seasonal total ever for any part of the State's coastal plain."

In 2013, following the huge finch movement of the previous year, the flight was almost nonexistent. Only 10 Purple Finches were recorded at the site by hawkwatcher Katie Rittenhouse and other volunteers (Rittenhouse unpub. Hawkwatch report).

In 2014, hawkwatcher Katie Rittenhouse and the author were the main Purple Finch counters, recording 373 for the season, which was slightly higher than the 2012 season through November (Rittenhouse unpub. Hawkwatch report). The 2014 survey produced a new daily high count at the site of 86 on 23 Nov and also the third and fourth daily high counts of 59 (16 Nov) and 57 (3 Nov). The seven biggest days accounted for 82% of the total, similar to the 68% represented by the seven biggest days in 2012, indicating a strong, brief push of migrants. It seems likely that the 2014 Purple Finch seasonal movement was even larger than the then-record flight for 2012, when surveys continued into January, but the 2014 surveys ended on 30 November.

In 2015, hawkwatcher Eli Gross documented the Purple Finch flight for the site. He recorded 930 in November and eight in October, making the new season high count for the site by a huge margin. The three highest days, with totals of 248, 232 and 314 on 15 November, 16 November and 17 November respectively, each greatly exceeded the previous daily high count of 86 set in 2014 (Gross unpub. Hawkwatch report).

From 2016 through 2019, hawkwatcher Anna Stunkel again recorded Purple Finches, with results reported in Table 1. Little movement was noted in 2017, and in 2019 the season total dropped to only six, the lowest since regular counts began (Stunkel unpub. Hawkwatch reports).

For several years, an annual "Winter Finch Forecast" prepared in late summer by Ron Pittaway of Ontario Field

**Table 1. Daily High Counts and Seasonal Totals of Purple Finches at Kiptopeke Hawkwatch through 2019**

YEAR	Prior to 2012	2012	2013	2014	2015	2016	2017	2018	2019
<b>Daily High Count</b>	31 (23 Oct 2005)	80	6	86	314	14	5	13	2
<b>Season Total</b>	81 (2004)	365	10	373	938	113	10	144	6

Ornithologists made predictions for winter finch activity based on an examination of the food crops throughout Canada, which may influence movements south into the United States or in other directions to locate food. These forecasts have proven to be accurate with respect to Purple Finch abundance at Kiptopeke during the period 2012-2019. For example, in 2015, Pittaway (2015) predicted that “many should migrate south out of Ontario this fall because cone and deciduous tree seed crops are generally low,” while in 2019 Pittaway predicted that “many [Purple Finches] will remain” in Canada (Pittaway 2019).

The Observatory plans to continue to monitor Purple Finches annually at the Kiptopeke Hawkwatch in an ongoing effort to document the irregular pattern of migration movements there.

#### ACKNOWLEDGEMENTS

We would like to thank Kiptopeke State Park for hosting the hawkwatch.

#### LITERATURE CITED

- Kolbe, S. and Brinkley, E. S. 2013. The 2012-2013 irruption of finches (Fringillidae) as monitored at Kiptopeke State Park, Northampton County, Virginia. *The Raven* 84(1):32-46.
- Pittaway, R. 2015. Winter Finch Forecast 2015-2016. Accessed online at <http://www.jeaniron.ca/2015/forecast15.htm>
- Pittaway, R. 2019. Winter Finch Forecast 2019-2020. Accessed online at <http://www.jeaniron.ca/2019/wff19.htm>
- Rottenborn, S. C. and Brinkley, E. S., eds. 2007. *Virginia's Birdlife: an annotated checklist*, 4<sup>th</sup> edition. Virginia Society of Ornithology.

## Virginia Christmas Bird Counts: 2018-2019 Season

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Fifty-seven Christmas Bird Counts (CBCs) were conducted in Virginia during the 2018-2019 season. Six counts do not meet Audubon-sponsored count requirements but are included here (Bristol, Chesapeake Bay, Darlington Heights, Giles County, Highland County, and Peaks of Otter). The total number of species was 218, which is slightly above the five-year average of 214. The total number of individuals was 864,270, which is below the five-year average of 926,634.

A new count at Sandy River Reservoir was added in 2018. The center of the Sandy River Reservoir count circle is about one-half mile south of the eastern end of Gates-Bass Road. Evan Spears is compiling this count. The 20 participants observed a respectable 76 species for the first year.

There were several compiler changes: Andrew Baldelli took over for Paul Sikes at Back Bay, Mike Hayslett replaced Ed Haverlack at Clifton Forge, Nick Flanders is working with Elisa Flanders on Little Creek, Phil Silas took over for Robert Shipman at Manassas-Bull Run, Bert Harris replaced Sue Gavin for The Plains, and Tom Wieboldt took over for George Barlow at Big Flat Mountain.

No new species were added in Virginia this year, but there were a few record high counts for the state. A surprising number of somewhat unexpected warblers were found this year; many were new on individual counts but not for Virginia. Several species were new for individual counts, which are mentioned below. It was only the third year for the Northumberland-Lancaster count and the second year for the Rappahannock count so there were too many new species reported for these counts to enumerate here.

Summary details for individual species follow. The comprehensive table listing all fifty-seven counts with all of the species reported on each count plus the numbers for each species can be viewed by clicking on a link on the Christmas Bird Count page of the VSO website (<https://static1.squarespace.com/static/572d119340261d2ef97ef526/t/5cba09e77817f7e65163af68/1555696103275/VA+CBC+2018-2019+Table.pdf>). This table will no longer be printed in *The Raven*.

GEESE, SWANS & DUCKS: Only 19,185 Snow Geese were seen which is below the ten-year average of 26,931. The 8 Ross's Geese recorded were seen on two counts (7 Hopewell; 1 Wachapreague). Only 2,378 Brants were seen

in 2018; their numbers peaked in the 1970s and 1980s when more than 20,000 were sometimes counted. The number of Cackling Geese is down from last year's record high of 63 as only 28 were seen this year, 20 of those were on the Hopewell count alone. The 95,819 Canada Geese tallied are down a bit from the last couple of years and below the ten-year average of 103,753; the ten-year averages for Canada Geese have been around 100,000 since the mid-2000s.

A total of 34 Mute Swans were observed on seven counts (3 Chincoteague; 2 Williamsburg; 2 Northumberland-Lancaster; 14 Brooke; 4 The Plains; 6 Chancellorsville; 3 Rockingham); thankfully, this is down from the 75 seen last year. The 17 Trumpeter Swans seen on five counts (1 Mathews; 7 Central Loudon; 2 The Plains; 4 Calmes Neck; 3 Rappahannock) are a record high. The previous high count was 6 seen in 2010; the first Trumpeter Swans on a CBC in Virginia appeared in this century, in 2005. The 2,004 Tundra Swans reported is the lowest since 1,486 were seen in 1990.

The 478 Wood Ducks observed are about half of the 911 seen last year. The 4,202 Gadwalls are the lowest number seen since 3,409 were detected in 2010. The only Eurasian Wigeons recorded this year were the 3 seen on the Chincoteague count. The 1,658 American Wigeons logged are above the ten-year average of 1,563, but this ten-year average is half what it was in the late 1990s. American Black Duck numbers are the lowest reported in fifty years as only 3,177 were seen in 2018. The 11,179 Mallards tallied are down quite a bit from 18,017 spotted in 2017. The ten-year averages for Mallards have been fairly stable at around 16,500 since the mid-1990s; their current ten-year average is 16,332. The 10 Blue-winged Teals recorded are about the same as the 11 seen in 2017. The 1,260 Northern Shovelers observed in 2018 and the 1,399 seen in 2017 are each less than half the 2,911 seen in 2016. The 1,005 Northern Pintails reported is the lowest since they were completely missed in 2006. The 1,327 Green-winged Teals found are up from the 1,187 seen in 2017 but below the ten-year average of 2,293.

The 2,045 Canvasbacks documented are less than half the 4,339 seen in 2017. Their current ten-year average is 2,623; this has decreased steadily from ten-year averages that were over 10,000 at the beginning of this century. The last time their numbers were over 10,000 was 2007 with 10,118. On a brighter note, The Plains had a record high count of



94 Canvasbacks. The 206 Redheads logged is less than the 615 seen in 2017; their ten-year averages have remained between 200 to 300 for most of the past twenty years. Despite a local record high of 245 Ring-necked Ducks reported on the Bristol count, only 3,648 Ring-necked Ducks were seen statewide which is the second lowest number recorded in the past ten years. The 242 Greater Scaups seen throughout Virginia are the highest number in ten years; their ten-year average is only 58. The single Greater Scaup seen on the Buchanan count was a new species there. The 12,284 Lesser Scaups observed are less than the 16,279 seen last year, but not far below the ten-year average of 13,687. The lone King Eider was seen on the Back Bay count.

The 7 Common Eiders tallied are much better than none seen in 2017 and slightly above the ten-year average of 5. A total of 3 Harlequin Ducks were seen on two counts (2 Chesapeake Bay; 1 Little Creek). The 4,875 Surf Scoters reported are the highest number seen in ten years. The 16 White-winged Scoters observed are well below 51 seen in 2017. The ten-year averages for White-winged Scoters have decreased over the past thirty years from 411 in 1989 to only 67 in 2018. The 1,333 Black Scoters tallied are above the 825 seen in 2017 and close to their ten-year average of 1,363. The 259 Long-tailed Ducks found are the highest number since 310 were seen in 2010; the lone Long-tailed Duck recorded at Banister River was a new species for that count. The 9,016 Buffleheads reported are below the 13,029 seen in 2017. The ten-year averages for Bufflehead have been fairly stable around 9,000 to 10,000 for the past ten years; their current ten-year average is 10,020.

The 105 Common Goldeneyes tallied are close to the ten-year average of 119. The 2,957 Hooded Mergansers observed are less than the 5,196 seen last year. However, their numbers have climbed over the past fifty years from ten-year averages around 300 in the early 1970s to ten-year averages in the 3,000s over the past twenty years; their current ten-year average is 3,618. The 1,279 Common Mergansers tallied are below the 1,762 seen in 2017 but above the ten-year average of 937. The 2,911 Red-breasted Mergansers found are the highest number seen since 4,129 in 2011 and well above the ten-year average of 1,929. The 9,877 Ruddy Ducks reported are below the 12,452 seen in 2017 and below the ten-year average of 12,191.

**GAME BIRDS:** Northern Bobwhites continue to decline as only 32 were recorded this year on six counts (1 Nassawadox; 8 Williamsburg; 1 Hopewell; 4 Walkerton; 6 Washington's Birthplace; 12 Gordonsville) and are down from 56 seen in 2017. The 5 Ruffed Grouses seen on five counts (1 Rockingham; 1 Highland County; 1 Mount Rogers-White Top; 1 Blackford; 1 Breaks Interstate Park) are an improvement over just 3 documented in 2017. The 1,306 Wild Turkeys observed are the highest number since

2,271 were seen in 2013; the number of turkeys tallied had never exceeded 1,000 prior to 2013. The 18 turkeys found in Highland County were a new high count there.

**LOONS & GREBES:** The 7,887 Red-throated Loons seen are almost three times the 2,812 reported in 2017. The 518 Common Loons seen are close to the ten-year average of 557 for the species; Common Loon was a new species on two counts (1 Glade Springs; 1 Breaks Interstate Park). The 291 Pied-billed Grebes recorded are less than half of the 660 seen in 2017 and also less than half of the ten-year average of 601. This is the second lowest number of Pied-billed Grebes seen in the past thirty years since 184 were seen in 1990. The 901 Horned Grebes reported are the highest in over five years since 1,094 were seen in 2013. The 6 Red-necked Grebes observed are an improvement over none seen last year. No Western Grebes were seen in 2017, but Back Bay logged one this year.

**GANNETS, CORMORANTS & PELICANS:** The 1,589 Northern Gannets spotted are below not only the 5,071 reported in 2017 but also the ten-year average of 2,901. The 8,926 Double-crested Cormorants recorded are less than the 14,165 seen in 2017 and also less than the ten-year average of 12,948. The single Double-crested Cormorant seen at Breaks Interstate Park was a new species for that count. The 25 Great Cormorants recorded on two counts (6 Cape Charles; 19 Chesapeake Bay) are below the ten-year average of 39. The only American White Pelicans reported were the 3 seen on the Williamsburg count. The 297 Brown Pelicans observed are up from 109 seen in 2017, but below the ten-year average of 413.

**WADING BIRDS:** The only American Bitterns were the 2 seen on the Back Bay count. The 1,310 Great Blue Herons recorded are the lowest since 1,255 were seen in 2009. The 71 Great Egrets logged are the lowest in over thirty-five years, since 29 were seen in 1983. The 8 Snowy Egrets tallied are about the same as the 9 seen in 2017. The only Little Blue Heron was seen on the Back Bay count. The 20 Tricolored Herons reported are less than half the 51 seen in 2017. The 8 Black-crowned Night-Herons seen are the lowest in over 50 years since 7 were observed in 1961. The 392 White Ibises seen on two counts (11 Cape Charles; 381 Back Bay) are up from 80 seen in 2017.

**VULTURES & HAWKS:** The 6,347 Black Vultures found are a record high count. Their numbers have been steadily increasing over the past twenty years. In 1999 the ten-year average for Black Vultures was 2,261; today the ten-year average has more than doubled to 4,734. Three counts had a record number of Black Vultures (89 Blackford; 75 Chatham; 13 Mount Rogers-White Top) and the 2 Black Vultures in Wise County were a new species there. The 8,691 Turkey Vultures seen are up from 6,933 recorded in

2017 and above the ten-year average of 7,294. Two counts (131 Clifton Forge; 99 Giles County) had record highs for Turkey Vultures.

The 14 Ospreys reported are close to the ten-year average of 16. The Osprey seen at Brooke was a new species for that count. The 10 Golden Eagles tallied are nearly equal to the ten-year average of 11. The 219 Northern Harriers seen are below the ten-year average of 256; although three counts had record high numbers of harriers (22 The Plains; 7 Gordonsville; 2 Fincastle). In 2009, 230 Sharp-shinned Hawks were seen but their numbers have dropped nearly every year since to only 133 seen this year. The 216 Cooper's Hawks logged are close to the ten-year average of 217. Two counts saw record high numbers of Cooper's Hawks (5 Darlington Heights; 7 Warren). The 1,362 Bald Eagles reported are down from 1,443 seen in 2017, but above the ten-year average of 1,181. Six counts had record high numbers for Bald Eagles (18 Charlottesville; 2 Chatham; 39 Calmes Neck; 93 Shenandoah NP-Luray; 3 Giles County; 2 Mount Rogers-White Top). The 716 Red-shouldered Hawks seen are down from 821 in 2017, but slightly above the ten-year average of 693. Three counts had record high numbers of Red-shouldered Hawks this year (13 Warren; 9 Fincastle; 2 Mount Rogers-White Top). The 1,148 Red-tailed Hawks spotted are about the same as the 1,088 seen in 2017 but below the ten-year average of 1,233. The lone Rough-legged Hawk was seen on the Waynesboro count.

**RAILS, COOTS & CRANES:** All of the rail and coot numbers are declining. The 10 King Rails seen are below the ten-year average of 15. The 34 Clapper Rails recorded are below the 59 seen in 2017 and also considerably less than the ten-year average of 94. The 17 Virginia Rails observed are the same number seen in 2017 but below the ten-year average of 25. Only 2 Soras were seen this year on two counts (1 Little Creek; 1 Back Bay). The 323 American Coots found are less than a tenth of the 3,801 seen in 2017 and less than a twentieth of the ten-year average of 6,671. The lone Sandhill Crane this year was seen at Wachapreague.

**SHOREBIRDS:** The only American Avocets seen were the 112 at Nansemond River. This is an all-time high count for American Avocets for Virginia CBCs. The 440 American Oystercatchers reported are less than half of the 1,027 seen in 2017 and below the ten-year average of 701. The 930 Black-bellied Plovers tallied are less than the 1,027 seen in 2017 and also below the ten-year average of 1,326. The 6 Semipalmated Plovers seen on two counts (2 Nassawadox; 4 Cape Charles) are significantly less than the 51 seen in 2017 and also below the ten-year average of 27. The 344 Killdeers seen are about a sixth of the 1,951 seen in 2017 and well below the ten-year average of 1,411; the last time the number of Killdeer fell below 1,000 was when 860

were seen in 2003. Despite the low number of Killdeers seen in the state, a record high count of 10 was recorded in Chatham. The only Spotted Sandpiper was seen count week on the Mathews count.

The 216 Greater Yellowlegs observed are less than half the 440 seen in 2017 and below the ten-year average of 364. The 1,422 Willets detected are up from the 534 tallied in 2017 and also above the ten-year average of 825. The 42 Lesser Yellowlegs found are less than the 58 seen last year, but slightly above the ten-year average of 38. The 117 Marbled Godwits spotted are nearly double the 59 seen in 2017 but still below the ten-year average of 204. The 244 Ruddy Turnstones spotted are up from the 156 seen in 2017 and also above the ten-year average of 157. The 18 Red Knots seen on two counts (1 Wachapreague; 17 Cape Charles) are less than half the 42 seen in 2017 and below the ten-year average of 31. The 1,118 Sanderlings logged are up from 815 seen in 2017. The 13,782 Dunlins observed are well below the 19,576 seen last year and also below the ten-year average of 18,152.

Only 7 Purple Sandpipers were spotted on three counts (4 Cape Charles; 2 Chesapeake Bay; 1 Nansemond River); their numbers haven't been this low since only 4 were seen in 1992. This low number of Purple Sandpipers may be related to the construction on the Chesapeake Bay Bridge Tunnel (CBBT). In past years, most of the Purple Sandpipers were found on the Chesapeake Bay count which is conducted on some of tunnel islands. If so, this species' CBC numbers will continue to be affected by construction on the CBBT for several years. (The estimated completion date for the Parallel Thimble Shoals Tunnel Project is October 1, 2022.) The 47 Least Sandpipers recorded are more than double the 20 seen last year. The 668 Western Sandpipers seen are the highest since 1,182 were found in 2013. Short-billed Dowitcher numbers have declined since a high this decade of 397 in 2012; this year only 150 Short-billed Dowitchers were reported. The 83 Wilson's Snipes tallied are the lowest number seen in over fifty years since 78 were spotted in 1964. This is despite a record high count of 6 Wilson's Snipe seen at Mount Rogers-White Top. The 131 American Woodcocks observed are well below the ten-year average of 222; although record high numbers of American Woodcocks were seen on two counts (10 Darlington Heights; 2 The Plains).

**ALCIDS & GULLS:** The only Parasitic Jaegers were 3 recorded at Back Bay. The 104 Razorbills seen on three counts (1 Cape Charles; 1 Chesapeake Bay; 102 Back Bay) were a record high count for Virginia; the previous high count was 37 seen in 2012. The only Black-legged Kittiwake was spotted at Back Bay. The 4,622 Bonaparte's Gulls seen are the highest since 13,432 were observed in 2008 and

more than double the ten-year average of 1,984. The lone Black-headed Gull was seen at Hopewell, which was a new species for that count. The 5,418 Laughing Gulls seen are nearly double the ten-year average of 2,828. The 70,863 Ring-billed Gulls recorded are the highest since 92,423 were seen in 2008. This includes a record high count of 6,481 Ring-billed Gulls at Washington's Birthplace. But Herring Gull numbers are declining, the 8,391 Herring Gulls seen are the second lowest number recorded in sixty years. Ten-year averages for Herring Gull have dropped by over half from 23,811 for the ten-year period ending in 2008 to 9,890 ten years later for the ten-year period ending in 2018. The only Thayer's Gull was seen on the Chesapeake Bay count. A lone Iceland Gull was reported on the Nokesville CBC. The 275 Lesser Black-backed Gulls observed are up after only 79 were seen in 2017. The only Glaucous Gull was on the Nokesville CBC and was a new species for that count. The 1,508 Great Black-backed Gulls seen are the second lowest number recorded in fifty years. The ten-year average for Great Black-backed Gulls has declined by over half in the past twenty years; it was 4,913 in 1999 and is down to 2,021 in 2018.

**TERNs & SKIMMERS:** The 1,590 Forster's Terns logged are the highest since 2,147 were seen in 2001 and more than double the ten-year average of 622. The 4 Black Skimmers were seen on two counts (3 Little Creek; 1 Back Bay); this is an improvement over 2017 when none were seen.

**PIGEONS & DOVES:** The 12,102 Rock Pigeons are the highest number seen since 12,487 were documented in 2011. A record high count of 2 Rock Pigeons were seen at Peaks of Otter. That doesn't seem like it should be a high count but this count is only conducted above 1,500 feet in elevation within the count circle centered at the Peaks of Otter Visitor Center. There aren't very many Rock Pigeons to be found in the habitat above this elevation. The first Eurasian Collared-Dove appeared on the Cape Charles CBC in 2003; fifteen years later 44 were recorded in 2018 on four counts (2 Cape Charles; 16 Rockingham County; 22 Blacksburg; 4 Glade Spring). The 15,508 Mourning Doves seen are the highest since 15,877 were noted in 2012.

**OWLS:** The 24 Barn Owls are the most seen in nearly twenty-five years since 28 were reported in 1994. Barn Owl was a new species for two counts (1 Lake Anna; 1 Tazewell). The 148 Eastern Screech-Owls seen are the second lowest documented in forty-five years, the lowest for that period was 100 logged in 2009. However, the 6 screech-owls logged in Highland County set a record high there. The 119 Great Horned Owls recorded are down from 239 in 2017 but better than only 103 seen in 2016. The ten-year averages for Great Horned Owls have decreased somewhat over the past ten years from 174 in 2009 to 159 in 2018. Do you think

the number of Eastern Screech-Owls and Great Horned Owls are actually declining or are these numbers just due to fewer being detected? The 94 Barred Owls found are close to the ten-year average of 93. Darlington Heights set a record high count for Barred Owls with 3 this year. The only Long-eared Owl was seen at Northern Shenandoah Valley. The 8 Short-eared Owls observed on five counts (1 Washington's Birthplace; 2 The Plains; 2 Gordonsville, 1 Calms Neck; 2 Augusta County) are down from 27 seen in 2017.

**HUMMINGBIRD & KINGFISHER:** The only Ruby-throated Hummingbird was seen on the Cape Charles count. The 629 Belted Kingfishers observed are close to the ten-year average of 635.

**WOODPECKERS:** The 437 Red-headed Woodpeckers reported are up from 303 seen in 2017. The 3 Red-headed Woodpeckers seen in Chatham are a new high count there. The 3,973 Red-bellied Woodpeckers recorded are above the ten-year average of 3,650. Two counts had record high numbers of Red-bellied Woodpeckers (62 Gordonsville; 78 Washington's Birthplace). The 892 Yellow-bellied Sapsuckers logged are down from 1,327 in 2017 but are exactly equal to the twenty-year average. The 2,215 Downy Woodpeckers seen are the second lowest in twenty years. The 480 Hairy Woodpeckers seen are close to the ten-year average of 491. It is no surprise that the only Red-cockaded Woodpeckers tallied were the 2 at Dismal Swamp. Biologists continue to monitor the Red-Cockaded Woodpeckers transplanted there over the past five years or so in an effort to establish a second breeding colony in Virginia. The 2,961 Northern Flickers seen are slightly higher than the ten-year average of 2,771. The 1,007 Pileated Woodpeckers observed are close to the ten-year average of 1,040. Pileated Woodpecker numbers were up in Chatham where a record high of 6 were seen.

**FALCONS:** The 551 American Kestrels recorded are the highest number seen since 573 were found in 2012. The 40 Merlins seen are greater than the ten-year average of 32. The 3 Merlins seen at Washington's Birthplace are a new high count there. The 21 Peregrine Falcons logged are the second lowest in twenty years; the lowest for this period is 12 seen in 2009. Shenandoah NP-Luray set a new high count with 2 Peregrine Falcons.

**FLYCATCHERS:** The 262 Eastern Phoebe seen are less than the 478 recorded in 2017 and slightly below the ten-year average of 296. The only Ash-throated Flycatcher was seen on the Back Bay count.

**SHRIKES & VIREOS:** The 12 Loggerhead Shrikes seen are up from only 7 seen in 2017. But their numbers continue to decline as evidenced by their ten-year averages; the ten-year average for Loggerhead Shrikes was 115 in 1978, 67 in 1988, 41 in 1998, 15 in 2008 and now 11 in 2018. A glimmer

of good news for Loggerhead Shrikes is that one was found for the first time on the Highland County count. A single Northern Shrike was seen for the third year in a row at Manassas-Bull Run. The 3 White-eyed Vireos reported on three counts (1 Back Bay; 1 Dismal Swamp; 1 Hopewell) were better than in 2017 when none were observed. The 20 Blue-headed Vireos recorded are the second highest number ever seen; the record high count is 30 in 1992.

JAYS & CROWS: The 11,930 Blue Jays are up significantly from 7,595 in 2017 and well above the ten-year average of 8,919. Two counts had record highs for Blue Jays (74 Chatham; 136 Washington's Birthplace). The 15,665 American Crows logged are about half of the 30,104 seen in 2017. The 3,766 Fish Crows tallied are down from the 4,991 seen in 2017. The 374 Common Ravens seen are slightly higher than the ten-year average of 326. Contributing to that are the 4 Common Ravens that were a record high count at Gordonsville plus 2 Common Ravens that were a new species on the Walkerton count.

LARKS & SWALLOWS: The 595 Horned Larks seen are the second lowest in twenty years. The 143 Tree Swallows reported are less than the 1,099 seen in 2017 but Tree Swallow numbers fluctuate from year-to-year as evidenced by 344 seen in 2016 and 4,686 seen in 2015.

CHICKADEES & TITMOUSE: The 5,411 Carolina Chickadees tallied are the lowest number seen since 5,271 were logged in 2009. The 69 Black-capped Chickadees recorded are up from 50 seen in 2017. The 3,948 Tufted Titmice spotted are down from 5,332 seen in 2017; this is the lowest number observed in over thirty years, since 3,780 were seen in 1985.

NUTHATCHES & CREEPER: The 635 Red-breasted Nuthatches noted are the highest since 694 were seen in 2012. The 2,552 White-breasted Nuthatches reported are below the ten-year average of 2,713. Newport News had a record high of 32 White-breasted Nuthatches. The 359 Brown-headed Nuthatches observed are up from 286 seen in 2017. A record high count of 4 Brown-headed Nuthatches were found on the Bristol count. The 483 Brown Creepers detected are the second highest number recorded in twenty-five years, since 485 were seen in 1995.

WRENS: The 95 House Wrens seen are the highest in twenty years, since 112 were recorded in 1998. The 336 Winter Wrens observed are down from 477 seen in 2017 but their numbers have been fairly stable over the past twenty years according to their ten-year averages that range from about 350 to 390 for this period; the current ten-year average is 370. The 12 Sedge Wrens found are up one from 11 seen in 2017. But their numbers are declining; their ten-year average is a third of what it was thirty years ago (the ten-year average in 1998 was 47, in 2008 it was 30,

and in 2018 it is only 15). The 39 Marsh Wrens reported are up from 22 in 2017 and much better than the 4 seen at the beginning of this decade. The 6,106 Carolina Wrens tallied are up from numbers in the 4000s and 5000s for the past four years. Calmes Neck saw a record high count of 242 Carolina Wrens this year.

GNATCATCHER & KINGLETS: The 6 Blue-gray Gnatcatchers seen on three counts (1 Cape Charles; 4 Hopewell; 1 Walkerton) tie the highest number seen in the past twenty years. A Blue-gray Gnatcatcher was tallied for the first time on the Walkerton count. The 1,520 Golden-crowned Kinglets recorded are close to the ten-year average of 1,525. The 612 Ruby-crowned Kinglets reported are down from 1,250 seen in 2017. The 40 Ruby-crowned Kinglets seen at The Plains is a record high for that count.

THRUSHES: The 6,470 Eastern Bluebirds seen are the lowest number of bluebirds tallied in fifteen years; this is despite bluebirds being seen on all but one of the counts in Virginia. The only Townsend's Solitaire seen this year is a new species for the Back Bay count. The 642 Hermit Thrushes recorded are about half the 1,219 seen in 2017. The 20,191 American Robins observed are the lowest number since 13,599 were reported in 2006.

MOCKINGBIRDS, THRASHERS & STARLINGS: The 249 Gray Catbirds seen are above the ten-year average of 197. The 247 Brown Thrashers tallied are down from 302 recorded in 2017. The 2,861 Northern Mockingbirds observed are down from 3,195 seen in 2017. The 74,935 European Starlings seen are below the 100,569 reported in 2017. Starling numbers are declining; they peaked at 3,705,040 in 1974. Their ten-year averages were around a million each year from the mid-1970s into the early 1980s, but then began declining to ten-year averages of less than 100,000 each year since 2015; in 2018 their ten-year average is 91,375.

PIPITS, WAXWINGS & BUNTINGS: The 121 American Pipits recorded are the lowest number seen in fifty years. Their numbers fluctuate year-to-year but overall have been relatively stable, as the ten-year averages have circled around 1,200 since the mid-1980s; the current ten-year average is 1,123. The 5,036 Cedar Waxwings detected are less than half the 13,037 seen in 2017, but Cedar Waxwing numbers also vary from year-to-year. The 19 Snow Buntings tallied are exactly equal to their ten-year average.

WARBLERS: A surprising variety of warbler species were found this year. The 8 Black-and-white Warblers observed on six counts (1 Nassawadox; 2 Cape Charles; 1 Little Creek; 1 Nansemond River; 1 Newport News; 2 Hopewell) are a record high. The 38 Orange-crowned Warblers seen are down slightly from 45 reported in 2017; this includes the 4 Orange-crowned Warblers that were a record high for

Newport News. The only Nashville Warblers were the 2 seen on the Chincoteague count. This is the fifth time in the last ten years that Nashville Warblers were recorded (2011, 2013, 2016, 2017, & now 2018) plus they were seen during count week in 2009 and 2012. The 11 Common Yellowthroats reported are exactly equal to their ten-year average. The only Cape May Warbler seen was on the Central Loudon count where it was a new species. This is the third time in the past twenty years that a Cape May Warbler was recorded on a Virginia CBC (2000, 2016, & now 2018). A lone Northern Parula was seen at Cape Charles. This is the first Northern Parula found in the past ten years on a CBC in Virginia although one was seen during count week in Rockingham County in 2015. The only Blackpoll Warbler seen was at Back Bay and was a new species on that count; a blackpoll hasn't been recorded on a Christmas Bird Count in Virginia since 1972 on the Roanoke count. A lone Black-throated Blue Warbler was a new species for Augusta County. This is only the second Black-throated Blue Warbler sighting in the last thirty years on a Virginia CBC. The 85 Palm Warblers logged which include 2 western Palm Warblers are less than a fourth of the 385 seen in 2017, but that 385 last year was unusually high as it was the most seen in the previous twenty years. The 283 Pine Warblers detected are the second highest number seen in fifty years. The 5,250 Yellow-rumped Warblers tallied are the lowest number seen in fifty years and less than half the ten-year average of 11,474. The only Yellow-throated Warbler was seen in Williamsburg. Yellow-throated Warblers have been reported eight times in the last twenty years on Virginia CBCs plus a count week sighting one other time.

**SPARROWS:** The 9 Nelson's Sparrows found on two counts (3 Little Creek; 6 Newport News) are an improvement over just 5 seen in 2017. The 6 at Newport News were a record high count. The 8 Saltmarsh Sparrows discovered are also an improvement over last year when none were observed. The 6 Seaside Sparrows seen are also better than just 4 in 2017. Only 33 American Tree Sparrows were seen this year. American Tree Sparrow numbers are declining; their ten-year averages are less than a fourth what they were twenty years ago as the ten-year average was 239 in 1999 and is just 54 now in 2018. Range maps from 1939, 1980, 2000, and the present indicate that the winter range for American Tree Sparrows is receding northward. Nearly all of the state was included in the winter range map for the American Tree Sparrow in 1939; the presence of this species in winter in Virginia was explained as "not abundant, but a regular winter resident, uncommon southward" (Baumgartner 1939). Roughly three fourths of the state was part of this tree sparrow's winter range in 1980 (Peterson 1980). By 2000 about half of the state was still shown as part of this species' winter range (Sibley 2000). Now maybe one fifth of

the state just along the northern border is still part of their winter range (Sibley 2018). The 2,203 Chipping Sparrows logged are a record high count; two counts had local record highs for Chipping Sparrows (2 Calmes Neck; 4 Mount Rogers-White Top). The 3 Clay-colored Sparrows reported on two counts (2 Hopewell; 1 Fort Belvoir) are half of their record high of 6 set last year. The 1,744 Field Sparrows logged are above the ten-year average of 1,576 but their numbers have been declining since the early 1980s when around 4,000 were regularly seen. Despite this statewide decline, Washington's Birthplace had a record high count of 114 Field Sparrows. The 476 Fox Sparrows tallied are up from 367 seen in 2017 and also above the ten-year average of 407.

The 13,281 Dark-eyed Juncos recorded are below the 18,472 seen in 2017 and are the lowest number seen since the early 1970s. The 1,482 White-crowned Sparrows observed are up from 1,215 seen in 2017. The 23,032 White-throated Sparrows spotted are below the 25,405 seen in 2017 but above the ten-year average of 21,372. This includes the 942 White-throated Sparrows logged at Washington's Birthplace, which was a local record high count. The 7 Vesper Sparrows were seen on two counts (6 Cape Charles; 1 Sandy River Reservoir); this number is below the 22 observed in 2017 but exactly equal to the ten-year average. The 852 Savannah Sparrows seen include 21 Ipswich Savannah Sparrows; this number is down from 1,166 seen in 2017 and also below the ten-year average of 971. The 10,118 Song Sparrows found are slightly less than the 10,420 seen in 2017 but above the ten-year average of 9,015. The 15 Song Sparrows seen in Highland County and the 374 Song Sparrows seen at Calmes Neck were local record high counts. The 3 Lincoln's Sparrows tallied on two counts (1 Walkerton; 2 Fort Belvoir) are equal to not only the ten-year average but also the twenty-year average. The one seen at Walkerton was a new species for that count. The 1,464 Swamp Sparrows observed are slightly below the 1,524 seen in 2017 but close to the ten-year average of 1,493. The 1,152 Eastern Towhees logged are the highest number seen in nearly fifteen years since 1,242 were seen in 2005. Washington's Birthplace had a record high count of 72 Eastern Towhees.

**CARDINALS:** The 2 Western Tanagers were seen on two counts (1 Cape Charles; 1 Little Creek). The last time two Western Tanagers were recorded was 2013 although in 2016 and 2017 count week birds were seen in addition to a Western Tanager being recorded every year from 2011 to 2017 in Williamsburg (but not this year), so if we could include count week birds, two would have been tallied for the last three years. The 10,942 Northern Cardinals observed are slightly higher than the ten-year average of 10,325; the 32 cardinals seen in Highland County were a

new high there. The 2 Painted Buntings seen on two counts (1 Williamsburg; 1 Hopewell) are the same number as seen in 2017.

**BLACKBIRDS & ORIOLES:** The 35,539 Red-winged Blackbirds tallied are the lowest number seen since 34,947 were logged in 2013; this is despite 75 Red-winged Blackbirds in Chatham setting a local high count. Only 878 Eastern Meadowlarks were reported in 2018. The number of Eastern Meadowlarks is declining; their ten-year averages were over 4,000 from the mid-1970s into the mid-1980s, now in 2018 the ten-year average for Eastern Meadowlarks is about a fourth of that as it is only 1,268. The 381 Rusty Blackbirds found are about the same as the 390 seen in 2017. Only 16,038 Common Grackles were seen in 2018. Their numbers are decreasing dramatically. While no one expects to see their ten-year averages in the millions like they were from the late 1950s into the early 1970s, their ten-year averages were still six digits from the mid-1970s through 2013 when the ten-year average was 242,446. In 2014 the ten-year average dropped to 86,955. The ten-year average has continued to drop every year since; in 2018 the ten-year average for Common Grackles is only 44,408. It was a better year for Boat-tailed Grackles as 900 were observed, which is better than the 583 seen in 2017 and above the ten-year average of 654. The 3,780 Brown-headed Cowbirds spotted are slightly more than the 3,717 tallied in 2017; their numbers have been fairly stable as the ten-year averages have been around 4,500 for the past ten years including the 2018 ten-year average of 4,488. The 19 Baltimore Orioles seen are below the 22 seen in 2017 but above the ten-year average of 13. Their numbers have been unusually high for the past four years with an average of 20; the last time their numbers were high for a period of years was four years around 1980 when the average number seen was 24.

**FINCHES & ALLIES:** The 3,044 House Finches recorded are the lowest number seen since 2,827 in 2013. However, the 319 Purple Finches observed are the highest since 348 were seen in 2012. The 11 Red Crossbills were all seen on Big Flat Mountain plus a sighting during count week in Rockingham County; they hadn't been detected on a Virginia count since 3 were logged in 2013. The only Common Redpoll sighting was on the Mathews CBC; the last time one was seen on a count in Virginia was 2013 in Cape Charles. The 199 Pine Siskins reported are more than double the 91 seen in 2017. The 5,605 American Goldfinches found are the lowest number seen since 4,990 in 2011. The 6 Evening Grosbeaks were tallied on two counts (5 Mathews; 1 Chancellorsville) plus one was seen during count week in Rockingham County; this is the highest number recorded since 8 were seen in 2012. Only 3,080 House Sparrows were spotted in 2018. House Sparrow numbers are declining. In

the 1990s their numbers peaked when the ten-year averages were over 9,000 for most of the decade. Since then their ten-year averages have steadily declined and in 2018 their ten-year average is down to about a third of that at 3,072.

Filling Teta Kain's shoes as the new regional editor for the Virginia-Washington DC Christmas Bird Counts has been a difficult task. She masterfully did this job for almost thirty years. Luckily, Teta has been very willing and quick to answer my numerous questions this year. I am grateful for the patience of all of the local CBC compilers. Plus I am indebted to the three anonymous members of the vetting committee that Teta established who were willing to continue in this role and assisted me with some difficult decisions on rarities submitted this year.

#### LITERATURE CITED

- Baumgartner, A.M. (1939) Distribution of the American Tree Sparrow, *The Wilson Bulletin*, 51:137-149 (<https://sora.unm.edu/sites/default/files/journals/wilson/v051n03/p0137-p0149.pdf>)
- Peterson, R.T. 1980. *A Field Guide to the Birds East of the Rockies*
- Sibley, D.A. 2000. *The Sibley Guide to Birds*
- Sibley, D.A. 2018. *Sibley Birds*, 2<sup>nd</sup> Edition, Birds of North America (app)

## Mottled Duck *Anas fulfigula* on Craney Island, Portsmouth: Virginia's first record with notes on possible Mallard X Mottled Duck hybrids

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### Abstract

Virginia's first confirmed Mottled Duck *Anas fulfigula* was documented on Craney Island Dredge Material Area, Portsmouth during June and July 2018. Here we present this bird's plumage details, its initial and subsequent detections, the species' distribution and vagrancy, and the criteria applied to differentiate this individual from similar species and/or possible hybrids. We also discuss the coincidental occurrence of possible Mallard *A. platyrhynchos* X Mottled Duck hybrid(s) at the facility.

### Introduction

In this paper we present our observations and conclusions based on the plumage details and contingent considerations addressed for documentation of Virginia's first Mottled Duck *Anas fulfigula*. This account also presents observations of possible Mallard *A. platyrhynchos* X Mottled Duck hybrids. These ducks were recorded by the Coastal Virginia Wildlife Observatory's Waterbirds Team during June/July 2018 bird monitoring surveys conducted at Craney Island Dredged Materials Management Area (CIDMMA), a United States Army Corps of Engineers restricted access facility in Portsmouth, Virginia.

### Mottled Duck-Initial Detection and Confirmation

A duck exhibiting field marks consistent with Mottled Duck (Alderfer, 2006; Bielefeld et al., 2010) was identified from a photograph taken 14 June 2018 during a weekly bird monitoring survey of CIDMMA (Figure 1). The duck was among an *Anas* sp. flock of >100 roosting/preening individuals that included Mallards, American Black Ducks

*A. rubripes*, and Mallard X American Black Duck hybrids. Aggregation members exhibited a broad spectrum of plumages associated with molt stage and ages ranging from adults to downy chicks.

Post-survey, the photograph was forwarded to the team members present at the time it was taken for assessment of the duck's identity. Plumage characteristics evident in the photograph were: completely lemon-yellow bill with a black gape patch; unstreaked, buffy-pink cheeks and throat; small, brown cap; short, brown eyeline that extended just beyond the eye; and tan lower neck suffused

Figure 1. Mottled Duck photographed on Craney Island, Portsmouth 14 June 2018. Photo courtesy of Brian Taber



with pale brown streaking. The upper wing coverts had buffy centers, bordered by dark brown then buffy margins which produced a “mottled” look. The upper chest, flanks, belly and undertail were dark, mottled brown. The duck’s overall brown color was intermediate to that of the paler brown of molting and young Mallards and the “black” of the American Black Ducks, yet more consistent with the Mallard X American Black Duck hybrids present. Because Mallard X American Black Duck hybrids closely resemble Mottled Duck and Mallard X Mottled Duck hybrid was possible (Leukering and Mlodinow, 2012; Leukering and Pranty, 2015), the photograph was subsequently circulated among ornithologists known to have extensive experience with Mottled Duck/ Mallard X Mottled Duck hybrid identification. The result of that collective scrutiny was that the duck in the photograph was a pure Mottled Duck based on this succinct summary provided by Tony Luekering (pers. comm.):

- The areal extent of dark crown patch is relatively small
- Short, dark eyeline, leaving a large gap between end of eyeline and slightly darker nape
- Large and distinct black gape patch
- Entire lower part of face buffy and unstreaked
- Other features that rule out either MALL, ABDU or MALL x ABDU:
- Body plumage fairly dark
- Buffy internal markings on sides and scaps
- Tail dark (at least, not white), even in June, when worn

The team eliminated “Mexican” Mallard *A. p. diazi* from consideration based on the following assessment. Compared to Mottled Duck, that subspecies’ has a darker yellow bill that lacks a black gape patch, its crown and eyeline are darker, its face is grayer patterned and its neck is more streaked (Aldefer, 2006; Sibley, 2014).

### Subsequent Detections

A duck with field marks matching those of the putative 14 June Mottled Duck was detected at CIDMMA 22 June (Figure 2) 0.8 km s. of the location of the initial detection site and then again on 12 July (Figure 3) 3 km nw. of the 14 June location and 3.6 km nw. of the 22 June site. On each occasion the bird was photographed as its field marks were systematically assessed and simultaneously compared by all observers present to companion Mallards, American Black Ducks and Mallard X American Black Duck hybrids. The duck was not seen in flight during any of the three observations. For both the 14 June and 12 July encounters the Mottled Duck was among an *Anas* sp. group that had one distinctly “blond” plumaged individual, a color morph observed annually in summer at CIDMMA for many years. That bird, therefore, served as a marker for a closely associated flock that

Figure 2. Mottled Duck photographed on Craney Island, Portsmouth 22 June 2018. Photo courtesy of Bill Williams



Figure 3. Mottled Duck photographed on Craney Island, Portsmouth 12 July 2018. Photo courtesy of Bill Williams



moved about the facility complex throughout the season. We acknowledge that waterfowl routinely go undetected during molt. Nevertheless, the team’s years of experience at the facility suggested that each survey’s thoroughness of coverage devoted to documenting species diversity insured waterfowl observations in particular were maximized. The consensus, therefore, after the on-site and photographic evidence from each of the dates was synthesized, was that the same individual Mottled Duck was observed during all three encounters.

The Mottled Duck was not detected after the 12 July sighting despite extensive searches during weekly surveys thereafter.

### Provenance, Source Populations and Vagrancy

Provenance of rare, unusual and/or extralimital waterfowl must be evaluated to determine an individual bird’s status for acceptance into Virginia’s permanent ornithological record, especially for one that would constitute a first state record. Issues therewith include probable source populations, vagrancy, and potential for captive release/escape.



Mottled Ducks are native to peninsula Florida and coastal marshes along the Gulf of Mexico from Alabama west and south to Tampico, Mexico (Bielefeld et al., 2010). The two recognized subspecies (Palmer, 1976; Leukering and Pranty, 2015; Clements et al., 2018) include an endemic non-migratory Florida population *A. f. fulfigula* and an Alabama/Louisiana population *A. f. maculosa* known to disperse to the Mexican gulf coast (Palmer, 1976; Benson and Arnold, 2001; McCracken et al., 2001). Additional populations were established in Georgia and South Carolina during the mid-1970s into the mid-1980s through introductions of birds from both subspecies (Bielefeld et al., 2010; Ducks Unlimited, 2018).

Mottled Duck vagrancy is well documented (Robbins et al., 2010; eBird, 2018). The species has been recorded as far north as Kelly's Slough National Wildlife Refuge near Grand Forks, North Dakota (Marty et al., 2018; Lambeth, 2003; Riemer, 2003; Svingen, 2003) and as far west as Albany, Wyoming (Billerman and Saucier, 2006). Closer to Virginia, Mottled Ducks have been documented in North Carolina since 2005 (LeGrande et al., 2018), possibly individuals from the Georgia and South Carolina introduced populations (Bielefeld et al., 2010; Leukering and Pranty, 2015).

Prior to the June/July 2018 CIDMMA sightings, the northernmost Atlantic coast Mottled Duck report was from Lake Mattamuskeet, Hyde County, North Carolina 23 June 2014 (Winton, 2014). More recently three 2018 North Carolina eBird entries documented 2 near Surf City, Pender County 7 January (Cranston, 2018), 2 at Camp Pretty Pond Lake, Brunswick County 28 February (Massey, 2018a), and one near Carolina Beach, New Hanover County 6 April (Massey, 2018b). Also relevant was an eBird report of one near Bowling Green, Kentucky 31 Mar-7 Apr 2018 (Wulker, 2018).

#### Feral vs. Captive

The CIDMMA Mottled Duck was believed to be feral, that is, a wild, free ranging individual not from a captive collection. Close examination of Figure 1 shows the duck was unbanded, the hallux on both legs was unclipped, and there was no evidence of feather wear that would be indicative of recent captivity. The duck's behavior during both the 22 June and 12 July encounters was very alert and wary in the presence of our vehicle. It quickly and purposefully retreated to the most distant shoreline edge and/or into vegetative cover in the company of other waterfowl. Consultation with the Virginia Department of Game and Inland Fisheries (Gary Costanzo pers. comm.) indicated Mottled Duck is an unlikely candidate for inclusion in a captive waterfowl collection and that there was no known evidence of this species currently held in captivity.

Documentation for the Mottled Duck record was submitted to the Virginia Avian Records Committee (VARCOM) on 5

September 2018. The submission was formally accepted by VARCOM as a Category 1 record 27 March 2019. Category 1 is "any bird that has occurred in Virginia and has been accepted by VARCOM as a wild bird on the basis of an observation accompanied by a photograph, specimen, audio or video recording, or band (for bands, only in cases where proof of identification is extant and compelling)" (<https://www.virginiabirds.org/varcom/official-state-list>). This was Virginia's first accepted Mottled Duck record and became the state's 474th recognized species.

The occurrence of the Mottled Duck at CIDMMA was withheld from public announcement at the specific request of the Norfolk District Office of the U. S. Army Corps of Engineers.

#### Notes on the presence of possible Mallard X Mottled Duck hybrids

Mallard X Mottled Duck hybridization is "widespread" in Florida (Leukering and Pranty, 2015), with "hybridization rates ranging from 0% to 24%" (Williams et al., 2005). eBird reports chronicled sixteen Mallard X Mottled Duck hybrid entries north of Florida since 2005: one in Georgia, 13 in South Carolina and 2 in North Carolina. The latter, both from 2017, included single birds at Carteret-Pond, Professional Park Drive., Carteret County 14 January (Wall, 2017) and at Mason Inlet Waterfowl Management Area, New Hanover County 25 February (Cooper, 2017).

Two possible Mallard X Mottled Duck hybrids were documented at CIDMMA on three June/July 2018 dates. The first was identified from a photograph taken 14 June (Figure 4) of a duck that was among the diverse mixed species/hybrid assemblage that also included the Mottled Duck described above. This bird appeared similar to the Mottled Duck, although paler. Figure 4 shows this bird's unstreaked, buffy cheeks and throat, reduced eyeline and

Figure 4. Possible Mallard x Mottled Duck hybrid photographed on Craney Island, Portsmouth 14 June 2018. Photo courtesy of Brian Taber



cap and mottled plumage. However, the undertail was white, a characteristic consistent with a possible Mallard X Mottled Duck hybrid.

What was believed to be this same possible Mallard X Mottled Duck hybrid was photographed 19 July (Figure 5). Its characteristics matched those of the duck in Figure 4, and in this case, its pale yellow bill with a black gape patch was evident.

Figure 5. Possible Mallard x Mottled Duck hybrid photographed on Craney Island, Portsmouth 19 July 2018. *Photo courtesy of Brian Taber*



A second possible Mallard X Mottled Duck was found during the 22 June Mottled Duck sighting. This duck exhibited almost identical field marks to its nearby pure Mottled Duck companion. After lengthy observation it was apparent this second individual's outer rectrices had white tones, suggesting Mallard introgression. That was verified by a photo (Figure 6) taken at the time. The bill color and gape patch, extent of brown on the cap and

Figure 6. Probable Mallard x Mottled Duck hybrid photographed on Craney Island, Portsmouth 22 June 2018. *Photo courtesy of Bill Williams*



eyeline, clean, pale tan facial and neck color, flight feather patterning and almost dark undertail clearly distinguished that possible Mallard X Mottled Duck hybrid duck from the one photographed 14 June and 19 July (Figures 4 & 5).

#### **Coastal Virginia Waterbirds Team Members Present by Observation Dates:**

14 June-Lee Schuster, Alex Minarik, Brian Taber, Bill Williams  
22 June-Edward S. Brinkley, Alex Minarik, Lee Schuster, Bill Williams

12 July-Robert L. Ake, Andrew Hawkins, Bill Williams, David Youker

19 July-Lee Schuster, Brian Taber, Bill Williams, David Youker

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#### **LITERATURE CITED**

- Alderfer, J. 2006. Complete Birds of North America. National Geographic Society, Washington, D. C.
- Benson, K. L. P., and K. A. Arnold. 2001. The Texas Breeding Bird Atlas. Texas A&M University System, College Station and Corpus Christi, TX. <https://txtbba.tamu.edu> (12 July 2001).
- Bielefeld, R. R., M. G. Brasher, T. E. Moorman, and P. N. Gray. 2010. Mottled Duck (*Anas fulvigula*), version 2.0. *In: The Birds of North America* (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.81>
- Billerman, S. and J. Saucier. 2006. eBird Checklist: <https://ebird.org/ebird/view/checklist/S8191120>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018).
- Clements, J. F., T. S. Schulenberg, M. J. Iliff, D. Roberson, T. A. Fredericks, B. L. Sullivan, and C. L. Wood. 2018. The eBird/Clements checklist of birds of the world: v2018. Downloaded from <http://www.birds.cornell.edu/clementschecklist/download/>

- Cooper, S. 2017. eBird Checklist: <https://ebird.org/ebird/view/checklist/S34783228>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 18 November 2018).
- Cranston, L. 2018. eBird Checklist: <https://ebird.org/ebird/view/checklist/S44628971>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018).
- Ducks Unlimited website. 2018. <http://www.ducks.org/south-carolina/South-Carolina-Conservation-Projects/South-Carolina-Mottled-Duck-Research-Project-Background-Info> (Accessed 5 Aug 2018)
- eBird. 2018. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 5 August 2018).
- Lambeth, D. 2003. eBird Checklist: <https://ebird.org/ebird/view/checklist/S21438655>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018).
- LeGrande, H. et al. 2018. Birds of North Carolina: their Distribution and Abundance <http://ncbirds.carolinabirdclub.org/accounts.php> (Accessed: 3 November 2018)
- Leukering, T. and S. G. Mlodinow. 2012. The Mexican Duck in Colorado: identification and occurrence. *Colorado Birds* 46 (4): 296-307
- Leukering, T. and B. Pranty. 2015. Mottled Duck hybridization. eBird, Cornell Lab of Ornithology, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018)
- Marty, J. R., S.A. Collins, and J. M. Whitaker. 2018. Extralimital Records of Louisiana-Banded Mottled Ducks Recovered in North Dakota. *Southeastern Naturalist* 17(3): 51-55. <https://doi.org/10.1656/058.017.0318>
- Massey, G. 2018a. eBird Checklist: <https://ebird.org/ebird/view/checklist/S43267674>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018).
- Massey, G. 2018b. eBird Checklist: <https://ebird.org/ebird/view/checklist/S44304356>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018).
- McCracken, K.G., Johnson, W.P. & Sheldon, F.H. 2001. *Conservation Genetics* 2: 87. <https://doi.org/10.1023/A:1011858312115>
- Palmer, R. S. 1976. *Handbook of North American Birds: Volume 2 (Waterfowl-first part)*. Yale Univ. Press, New Haven and London. Pp. 314-320
- Riemer, D. 2003. eBird Checklist: <https://ebird.org/ebird/view/checklist/S5287865>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018)
- Robbins, M.B., P.McKenzie, and B. Jacobs. 2010. A review of Mottled Duck (*Anas fulvigula*) reports in the North American interior, with comments on historical records of dark *Anas* ducks. *North American Birds* 64: 518-522.
- Sibley, D. A. 2014. *The Sibley Guide to Birds: Second Edition*. Alfred A. Knopf. New York. 600 pgs.
- Svingen, P. 2003. eBird Checklist: <https://ebird.org/ebird/view/checklist/S2467881>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018)
- Wall, M. 2017. eBird Checklist: S33654955. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 16 November 2018)
- Williams, C. L., R. C. Brust, T. T. Fendley, G. R. Tiller, Jr. and O. E. Rhodes, Jr. 2005. A Comparison of Hybridization between Mottled Ducks (*Anas fulvigula*) and Mallards (*A. platyrhynchos*) in Florida and South Carolina using Microsatellite DNA Analysis. *Conservation Genetics* 6:445-453.
- Winton, S. 2014. eBird Checklist: <https://ebird.org/ebird/view/checklist/S18900902>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018)
- Wulker, B. 2018. eBird Checklist: <https://ebird.org/ebird/view/checklist/S44323797>. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: 6 August 2018)

## The Composition of Wintering Bird Communities in an Agricultural Landscape of the Northwestern Dominican Republic

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### ABSTRACT

Hispaniola, the second largest and most topographically complex island in the Antilles of the Caribbean, is home to a wide variety of habitats for resident birds as well as overwintering migrants from North America. Over three consecutive years, we conducted winter surveys in a remote agricultural region of the northwest Dominican Republic in Dajabon province. We monitored four survey plots, each representing a different habitat common to the study area, including a riparian broadleaf forest, a managed pine stand, a shade coffee plantation, and an abandoned field. We recorded 1,616 detections of 48 avian species, including 38 year-round residents and 10 wintering New World Warbler species (Parulidae). Migrants accounted for 23.6% of total detections. The species composition of the avian assemblages varied significantly across survey plots but not among years. The field plot consistently had lower abundance of birds, but not necessarily lower diversity than the three forested habitats. Shade coffee and field – generally more modified habitats – hosted relatively fewer migratory species than pine stand and riparian forest habitats. These surveys present important baseline data on the distribution and relative abundance of resident and wintering migrant birds in a poorly documented area of the island of Hispaniola.

**Keywords:** Neotropical migrants, Caribbean, Hispaniola, winter residents

### INTRODUCTION

The tropical and subtropical forests of the Caribbean islands provide important wintering grounds for numerous Neotropical migrant land birds native to Virginia and the eastern United States. An estimated 23 species consistently overwinter in the Greater Antilles and the Bahamas, including Yellow-bellied Sapsucker, Indigo Bunting, White-eyed Vireo, Bicknell's Thrush, Gray Catbird, and numerous New World warblers (Wunderle and Waide 1994, McFarland et al 2013). Many of these species can spend 6 months or more of the calendar year on their wintering grounds with the non-breeding period presenting a major life history stage in determining survival and fitness (Norris 2005, Norris and Marra 2007).

The islands of the Caribbean, while relatively small in land mass, offer a surprising diversity of topography and ecosystems. Perhaps nowhere is this better seen than on the island of Hispaniola. Hispaniola, which is divided politically into Haiti and the Dominican Republic, is the second largest island in the Caribbean and is home to the greatest diversity of vegetation communities in the region with nine life zones ranging from coastal mangroves and desert scrub to subalpine pine forests at elevations up to 3098 meters (Holdridge 1972, Wunderle and Waide 1994). The island is known to provide wintering grounds for migratory populations of 12 species of New World warblers (Latta et al 2010). Lowland and midland tropical wet

forests historically accounted for at least 60% of the island's land area but has been reduced to less than one third of its original cover by advancing settlements and agricultural practices (Dinerstein et al 1995). Most remaining wet forest habitat is distributed in the Dominican Republic, consisting of secondary forest that is heavily fragmented by pastures and cultivation or otherwise degraded (e.g., selective logging, grazed understory). While avian communities have been reasonably well catalogued in the nation's relatively few protected areas (Latta et al 2003, Rimmer et al 2003, Latta 2005), surveys in rural agricultural regions remain relatively rare.

In this paper, we present the findings of surveys conducted over three consecutive winter periods (2016-2018) in an agricultural landscape of the northwestern Dominican Republic in Dajabon province. Surveys were carried out on four plots representing the predominant habitats in the study area by a team of experienced birders with aim of (1) documenting diversity and relative abundance of resident and wintering migrant species in the landscape, (2) determining the extent to which wintering bird assemblages differ among habitats and between years, and (3) relating patterns of species distribution and abundance to their ecology and life history.

#### METHODS

**STUDY AREA:** This study was conducted over 3 consecutive winter seasons (December-January) in a small farming village known as *Los Cerezos*, approximately 10 km south of Loma de Cabrera in Dajabón province of the Dominican Republic. The site is located at approximately 700 m above sea level in the foothills of the northwestern end of the Cordillera Central. The native biome of the region is primarily broadleaf subtropical humid forest. Stands of the endemic creole pine (*Pinus occidentalis*), while more typical of higher elevation, also occur through a combination of intentional planting and natural propagation. As a result of historic forest loss during the colonial era and sustained agricultural practices in the time since, native habitats have largely been displaced and fragmented by settlements, grazing pastures, and a variety of cultivation practices (Hooghiemstra et al 2018).

With site access facilitated by local partners and permission from private land owners, we selected four plots of land to monitor over the three-year period. Sites ranged from 0.35-0.45 ha in area and were irregularly shaped according to the natural boundaries of the defined habitat and man-made fences. The riparian forest plot consisted of a relatively undisturbed patch of trees arranged as a vegetation buffer approximately 20 meters on either side of an ephemeral stream with an overstory of *Cecropia schreberiana*, *Ocotea* spp., *Zanthoxylum elephantiasis*, *Schefflera morotoni*, *Cupania americana* and *Mangifera* sp. as well as an understory of small trees (e.g., *Trichilia pallida*, *Allophylus crassinervus*) and shrubs (e.g., *Miconia* spp., *Piper* spp.). The pine stand plot was dominated by large > 40 year-old pines (*Pinus*

*occidentalis*) mixed with large *Schefflera morotononi* trees and an understory of mostly invasive grasses and shrubs (e.g., *Psidium guava*). The shade coffee plot had an overstory of large trees of various species such as *Schefflera morotoni*, *Guarea guidonia*, *Cupania americana*, *Cordia* sp., and *Ocotea leucoxylon*, and the understory was largely absent with mostly bare soil and light debris and leaf litter scattered between young coffee shrubs planted the year before the surveys initiated. The field plot consisted primarily of invasive grasses, abandoned bean plants, with the only woody vegetation being an isolated mango tree (*Mangifera* sp.) and live fence trees (*Gliricidia sepium*) bordering the plot.

**SURVEY METHODS:** Plots were surveyed during three consecutive winter periods (i.e., Dec-Jan) beginning in the winter of 2016/2017, with the exception of the pine stand site, which was added to the study in the second year. All surveys consisted of visits by different observers on three consecutive days in teams of 2-3 during each winter period. Year 1 surveys were conducted 12-14 Dec 2016. Year 2 surveys were conducted on 6-8 Jan 2018. Year 3 surveys were conducted 9-11 Dec 2018. Hereafter, these will be referred to as 2016, 2017, and 2018 for simplicity. Each plot visit consisted of approximately 2 hours of search effort between the hours 0830-1130. During each survey, we walked within the boundaries of each plot in non-standardized area searches using auditory and visual cues to identify and estimate the number birds. We relied on observer judgement to discard likely double-detections from surveys to estimate the minimum number of birds of each species simultaneously occupying the plot, based on the relative positions of individuals of the same species and whether they were detected simultaneously or likely to be the same individual.

**STATISTICAL ANALYSES:** All analyses were conducted in R 3.5.2 (R Development Core Team 2018) using the 'vegan' package and Microsoft Excel 2016. We first produced basic summaries of the survey data for general comparison among the survey areas. These data summaries included the total number of bird detections, the number of migratory and resident species, the total number of species (i.e., species richness), and Shannon diversity measures. Next, we further scrutinized the survey data from each winter period as: (1) The total number of detections of each species by survey day on each of the three visits during the three winter periods, and (2) estimates of the number of birds of each species occupying survey plots during each winter season based on the median value of abundance during each winter period. Thus, in the latter case, species that were only detected by one survey team were counted as present but were omitted from our analyses of cross-site and cross-year comparisons. We consider distinguishing between daily detections and "occupants" as a necessary step for avoiding pseudoreplication and minimizing the effects of transient visitors to the sites in favor of distinguishing those species that consistently depend on the habitat within the plots (i.e., territories, consistent foraging grounds).

To qualitatively analyze the similarity in species composition between the sites in each winter season, we used nonmetric multidimensional scaling (NMDS) to graphically represent communities in ordination space based on the Bray-Curtis Index (Clarke 1993). The performance of the ordination is evaluated by a measure of stress, which varies from 0 to 1, and where values between 0 and 0.20 are considered representative of the similarity between pairs of samples. We used permutational multivariate analysis of variance (PERMANOVA) to statistically test whether plot or year had a significant effect on the species composition of the survey plots.

Finally, we examined the patterns of species distribution among our study plots comparing resident and migratory species as well as on the basis of dietary guild. For the latter, we classified status based on the Elton Traits 1.0 database for foraging attributes of birds of the world (Wilman et al 2014). Given that nearly all birds consume substantial proportions of arthropod prey, we chose to consider any species with  $\geq 80\%$  of arthropods in the diet as “insectivorous”. Species were assigned as nectivores, frugivores, or granivores if the proportion of nectar, fruit, or seed respectively was  $\geq 30\%$ . As the only species found within plots that consistently consumes vertebrate prey, the American Kestrel was assigned as a carnivore.

## RESULTS

### Summary of Survey Results

Over the course of the three winter surveys we recorded 1,616 detections of 48 avian species, including 38 year-round residents and 10 wintering migrants. Of the resident species, 12 were endemic to Hispaniola and 2 were introduced or naturalized species. All 10 of the wintering migrants were New World Warblers (Parulidae). Migrants accounted for 23.6% of detections compared to 76.4% for residents. From the total survey list, 36 species were determined to be persistent occupants of one or more of the four survey plots (Table 1, see pages 24-25 for complete table).

### Habitat Patterns and Interannual Change in Bird Compositions

The number of birds occupying each survey plot ranged 20–62 and species richness ranged 14–22. While no plot consistently had greater numbers or diversity of birds, the field plot was consistently the most depauperate in terms of abundance (Table 2). Species composition varied

significantly among the four plots, but not by year (Table 3). Generally, field and riparian forest plots had distinct avian assemblages, while the pine stand and shade coffee farm were similar to one another (Figure 1).

Table 3: PERMANOVA testing effects of habitat plot, year, and their interaction on the variation of species composition. Habitat was found to be the only factor with significant differences among groups.

Factor	df	Sum of Squares	R <sup>2</sup>	F	P
Habitat	3	0.73877	0.55190	3.2616	0.002
Year	2	0.08311	0.06209	1.1008	0.366
Habitat*Year	3	0.29021	0.21680	1.2812	0.270
Residual	3	0.22651	0.16921		
Total	11	1.33860	1.00000		

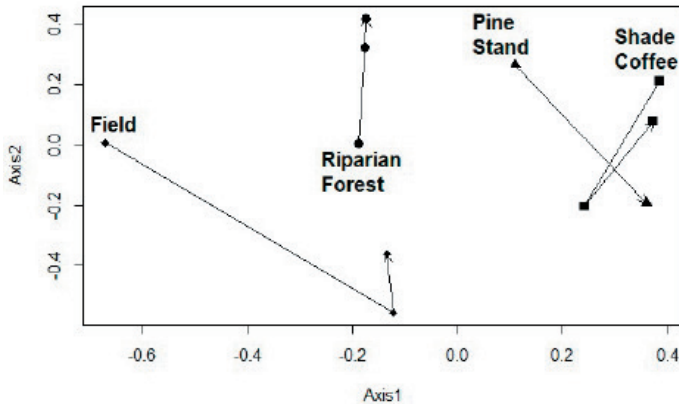
The most abundant resident species included Hispaniolan Woodpecker, Black-crowned Palm Tanager, and Narrow-billed Tody, which were seen in all four plots during all survey years (Table 1). Other habitat generalists included Palmchat, Hispaniolan Lizard Cuckoo, Broad-billed Tody, Antillean Euphonia, and Gray Kingbird. Several resident species were more restricted in their distribution among survey plots. For example, the only plot where Smooth-billed Ani recurrently occupied in each year’s survey was the field plot, while Red-legged Thrush and Hispaniolan Spindalis did not register a single detection in the field plot.

Of the wintering migrant warblers, the Black-throated Blue Warbler, American Redstart, Black-and-white Warbler, and Cape May Warbler were the most abundant (Table 1). These species were consistent occupants of all four survey plots with the exception of the Cape May Warbler which was only transient in the shade coffee plot. Other warblers showed apparent habitat preferences. For example, the Yellow-throated Warbler was almost exclusively found in the pine stand site and was a mainly transient visitor to pine trees on the fringes of the riparian forest plot. Similarly, the Common Yellowthroat was restricted to the field and pine stand sites, both of which had thick grassy or shrub cover at ground level. Other less common migratory species included Ovenbird, Palm Warbler, Prairie Warbler, and Northern Parula.

Table 2: Summary of abundance and diversity attributes of the four survey plots across three years.

Feature	Riparian Forest			Pine Stand			Shade Coffee			Field		
	'16	'17	'18	'16	'17	'18	'16	'17	'18	'16	'17	'18
# of Birds	44	54	35	NA	43	52	62	52	37	40	24	20
Resident Species	15	13	11	NA	11	16	11	15	12	12	11	10
Migratory Species	5	6	5	NA	7	6	3	3	3	7	4	5
Species Richness	20	19	16	NA	18	22	14	18	15	19	15	15
Shannon Diversity	2.88	2.71	2.53	NA	2.74	2.91	2.24	2.68	2.55	2.73	2.58	2.58

Figure 1: Nonmetric multidimensional scaling plot of the species composition of bird species at each site in successive years. Ordination Stress = 0.08198693. The pine stand and shade coffee plots had the most similar communities, while the communities in the riparian forest and field plots were consistently distinct from these and from one another.



**Habitat Associations by Dietary Guild**

The abundance of nectivorous birds (i.e., hummingbirds and bananaquits) was generally low across all study years with no consistent association with any particular survey plot. Granivorous birds (i.e., grassquits and doves) were also uncommon. While the Red-tailed Hawk was observed in the landscape (i.e., seen flying in the distance), American Kestrel was the only carnivorous species confirmed as an occupant in the pine stand plot.

Insectivorous birds and frugivorous birds consistently occupied all survey plots, with the former being the most abundant (Figure 2). However, frugivorous birds accounted for a substantial proportion of occupants in the shade coffee plot. This was particularly true in 2016, when approximately 50% of detections were of frugivorous species, most notably Red-legged Thrush and Hispaniolan Spindalis (Table 1).

**DISCUSSION**

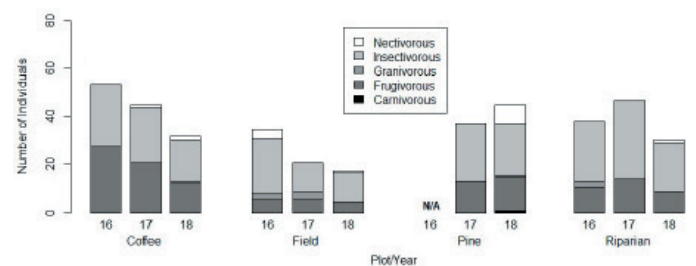
We found the avian assemblage in the study area was dominated by resident birds, with migrants representing 21% of all species and similarly 23.6% of all detections. The relative diversity and abundance of migratory species compared to resident species was considerably lower than other studies community-wide diversity in the Caribbean and Hispaniola. Regionally, migratory species have been estimated to account for 30-47% of species at a given site during the winter period (Arendt 1992, Wunderle and Waide 1993). Latta et al, (2003), for example, found that wintering warblers accounted for approximately 30% of both species richness and abundance across multiple habitats in an elevational gradient in the Sierra de Bahoruco region of the southeastern Dominican Republic. While the distance of islands from the North American continent may play a role in determining the number of overwintering migrant species in the Caribbean (Terborgh and Faaborg 1980, Wunderle and Waide 1993), previous

research has shown that overwintering communities can differ markedly among habitat types, evidencing the varying capacity of different habitats to support resident and migratory populations (Wunderle and Waide 1994).

As expected, the field plot consistently held the lowest abundance of birds when compared to the other three relatively forested habitats. However, this did not necessarily correspond to diversity measures. Most notably, the coffee farm had the lowest diversity and relative abundance of migratory warblers. This finding contrasts the prevailing view of shade coffee plantations as offering high quality habitat for migratory birds in disturbed landscapes (Perfecto et al 1996). Yet, the characteristics of the shade coffee plot surveyed offer some potential explanations. First of all, the coffee plants in the understory of the plot had not grown taller than 1 meter in height by the third year of the study and did not provide a meaningful perching or foraging substrate for most birds. Consequently, the coffee plot used for our study lacked the understory and midstory habitat structure that would be more typical of a mature shade coffee plantation. The diversity of foraging substrates is known to have a strong positive effect on the diversity of migrant warblers in other forested habitats of the Caribbean (Latta and Wunderle 1998). Two of the warbler species frequenting the shade coffee plot – American Redstart and Black-throated Blue Warbler – are known to aggressively defend canopy foraging space where insects are abundant in parts of their wintering territories to exclude both conspecifics and heterospecifics competitors (Marra 2000, Marra and Holmes 2001, Smith et al 2012). Such dynamics potentially explain the lower migrant diversity in the shade coffee survey plot.

While our study was mostly exploratory in nature and did not include rigorous replication of survey plots in the habitats of interest, several habitat use relationships emerged from the survey data. Most birds detected in our surveys showed generalist tendencies regarding habitat

Figure 2: The relative abundance of occupants of each plot across the three study years according to dietary guild. Insectivorous and frugivorous birds were pervasive in all habitats. Nectivorous birds were found to occupy all habitats, but their presence varied greatly and inconsistently among years. Granivorous birds were predominantly found in the field, and only one carnivorous species – the American Kestrel – was classified as an occupant in the pine stand in 2018.



use, although a substantial proportion of the total species could not be evaluated due to either low abundance or only transient use of the survey plots selected for this study. The only relatively clear case of specialization was seen with the Yellow-throated Warbler in its almost exclusive detection in pine trees. Indeed, this habitat preference has been well documented by prior studies (Lack and Lack 1972, Emlen 1977, Terborgh and Faaborg 1980, Wunderle and Waide 1993).

Overall, insectivorous species had the greatest relative abundance in all survey plots followed by frugivorous birds. A relative peak in the abundance of frugivorous birds in the shade coffee plot, particularly in 2016, was largely influenced by the availability of ripe fruits in this plot. In particular, there was high foraging activity of several species on ripe fruits of one large *Schefflera morototoni* tree, including Red-legged Thrush, Hispaniolan Spindalis, Black-crowned Palm Tanager, Palmchat, and Hispaniolan Woodpecker. Although we classified the Hispaniolan Woodpecker as insectivorous according to published information, field observations from other parts of the island have indicated that this species opportunistically feeds on a wide variety of fruits (Wunderle Jr and Latta, 1998, Schubert unpubl. data). Carlo et al, (2004) documented a similar tendency of frugivorous birds to feed on *S. morototoni* in shade coffee farms of Puerto Rico as well as several other plant species common to forests and shade canopies in our study area such as *Cecropia schreberiana*, *Guarea guidonia*, and *Miconia* spp. While some of the migratory birds encountered during our surveys, such as Black-throated Blue Warbler and Cape May Warbler are known to feed on fruits at their wintering sites (Latta et al 2003, Latta 2018), we did not observe any evidence of frugivory by warblers.

Overall, our surveys present important baseline data on the distribution and relative abundance of resident and wintering migrant birds in a poorly explored area of the island of Hispaniola.

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#### LITERATURE CITED

Arendt, W. J. 1992. Status of North American migrant landbirds in the Caribbean region: a summary. Pages 143–174 in J. M. Hagan and D. W. Johnston, editors. Ecology and conservation of neotropical migrant landbirds. Smithsonian Inst. Press, Washington, D. C.

Carlo, T. A., J. A. Collazo, and M. J. Groom. 2004. Influences of fruit diversity and abundance on bird use of two shaded coffee plantations. *Biotropica* 36:602–614.

Clarke, K. R. 1993. Non-parametric multivariate analyses of changes in community structure. *Austral Ecology* 18:117–143.

Dinerstein, E., D. M. Olson, D. J. Graham, A. L. Webster, S. A. Primm, M. P. Bookbinder, and G. Ledec. 1995. A conservation assessment of the terrestrial ecoregions of Latin America and the Caribbean. World Bank.

Emlen, J. T. 1977. Land bird communities of Grand Bahama Island: the structure and dynamics of an avifauna. *Ornithological Monographs*:iii–129.

Holdridge, L. 1972. Life zones in Haiti. *Carte Ecologie d’Haiti*, OAS, Haïti.

Hooghiemstra, H., T. Olijhoek, M. Hoogland, M. Prins, B. van Geel, T. Donders, W. Gosling, and C. Hofman. 2018. Columbus’ environmental impact in the New World: Land use change in the Yaque River valley, Dominican Republic. *The Holocene* 28:1818–1835.

Lack, D., and P. Lack. 1972. Wintering warblers in Jamaica. *Living Bird* 11:153.

Latta, S. C. 2005. Complementary areas for conserving avian diversity on Hispaniola. Pages 69–81 *Animal Conservation forum*. Cambridge University Press.

Latta, S. C. 2018. On the relationship among birds and *Trema micrantha* in montane forests of Hispaniola. *Novitates Caribaea*:1–13.

Latta, S. C., C. C. Rimmer, and K. P. McFarland. 2003. Winter bird communities in four habitats along an elevational gradient on Hispaniola. *The Condor* 105:179–197.

Latta, S. C., and J. M. Wunderle. 1998. The Assemblage of Birds Foraging in Native West Indian Pine (*Pinus occidentalis*) Forests of the Dominican Republic during the Nonbreeding Season 1. *Biotropica* 30:645–656.

Latta, S., C. Rimmer, A. Keith, J. Wiley, H. A. Raffaele, and K. McFarland. 2010. *Birds of the Dominican Republic and Haiti*. Princeton University Press.

Marra, P. P. 2000. The role of behavioral dominance in structuring patterns of habitat occupancy in a migrant bird during the nonbreeding season. *Behavioral Ecology* 11:299–308.

Marra, P. P., and R. T. Holmes. 2001. Consequences of dominance-mediated habitat segregation in American Redstarts during the nonbreeding season. *The Auk* 118:92–104.

McFarland, K. P., C. C. Rimmer, J. E. Goetz, Y. Aubry, J. M. Wunderle, A. Sutton, J. M. Townsend, A. L. Sosa, and A. Kirkconnell. 2013. A winter distribution model for Bicknell’s Thrush (*Catharus bicknelli*), a conservation tool for a threatened migratory songbird. *PloS one* 8:e53986.



Norris, D. R. 2005. Carry-over effects and habitat quality in migratory populations. *Oikos* 109:178–186.

Norris, D. R., and P. P. Marra. 2007. Seasonal interactions, habitat quality, and population dynamics in migratory birds. *The Condor* 109:535–547.

Perfecto, I., R. A. Rice, R. Greenberg, and M. E. Van der Voort. 1996. Shade coffee: a disappearing refuge for biodiversity: shade coffee plantations can contain as much biodiversity as forest habitats. *BioScience* 46:598–608.

Rimmer, C. C., J. Almonte, E. Garrido, D. A. Mejia, M. Milagros, and P. R. Wieczorek. 2003. Bird records in a montane forest fragment of western Sierra de Neiba, Dominican Republic. *Journal of Caribbean Ornithology* 16:55–60.

Smith, C. J., M. D. Johnson, B. R. Campos, and C. M. Bishop. 2012. Variation in aggression of Black-throated Blue Warblers wintering in Jamaica. *The Condor* 114:831–839.

Terborgh, J. W., and J. Faaborg. 1980. Saturation of bird communities in the West Indies. *The American Naturalist* 116:178–195.

Wilman, H., J. Belmaker, J. Simpson, C. de la Rosa, M. M. Rivadeneira, and W. Jetz. 2014. EltonTraits 1.0: Species-level foraging attributes of the world's birds and mammals. *Ecology* 95:2027–2027.

Wunderle, J. M., and S. C. Latta. 1998. Avian resource use in dominican shade coffee plantations. *The Wilson Bulletin* 110:271–281.

Wunderle, J. M., and R. B. Waide. 1993. Distribution of overwintering Nearctic migrants in the Bahamas and Greater Antilles. *The Condor* 95:904–933.

Wunderle, J. M., and R. B. Waide. 1994. Future prospects for Nearctic migrants wintering in Caribbean forests. *Bird Conservation International* 4:191–207.

Table 1: The estimated number of individuals of each avian species occupying the surveyed sites. Species are classified based on their status: resident (R), endemic (E), migratory (M), and introduced/naturalized (I/N). Diet guild categories are classified as insectivore (I), frugivore (F), nectivore (N), granivore (G), and carnivore (C). Data expressed as numbers represent the median count for a species that was present in at least two of the repeated surveys each winter. "X" indicates a species was present in a single survey but not persistently detected. The pine stand plot was surveyed in only two of the three years.

Bird Species	Status	Diet	Riparian Forest			Pine Stand			Shade Coffee			Field			Total
			'16	'17	'18	'16	'17	'18	'16	'17	'18	'16	'17	'18	
<b>Ardeidae</b>															
Great Egret	R	I	0	0	0	NA	0	0	0	0	0	X	0	0	X
Cattle Egret	R	I	X	1	0	NA	X	X	0	0	X	0	1	0	2
<b>Charadriidae</b>															
Killdeer	R	I	X	0	0	NA	0	0	0	0	0	0	0	0	X
<b>Columbidae</b>															
Scaly-naped Pigeon	R	F	X	2	X	NA	1	X	2	2	3	0	1	X	11
Plain Pigeon	R	F	0	0	X	NA	0	0	0	0	0	0	0	0	X
Common Ground-Dove	R	G	1	0	0	NA	0	X	0	0	0	0	0	0	1
Mourning Dove	R	G	0	X	0	NA	0	0	0	0	0	1	X	0	1
<b>Cuculidae</b>															
Smooth-billed Ani	R	I	4	0	X	NA	X	0	X	5	0	3	2	4	18
Hispaniolan Lizard-Cuckoo	E	I	3	4	2	NA	1	1	1	2	1	2	1	1	19
<b>Accipiteridae</b>															
Red-tailed Hawk	R	C	0	0	0	NA	0	X	0	0	0	0	0	0	X
<b>Falconidae</b>															
American Kestrel	R	C	X	0	X	NA	X	1	X	0	0	0	0	0	1
<b>Apodidae</b>															
White-collared Swift	R	I	0	X	0	NA	0	0	0	0	0	0	0	0	X
Antillean Palm-Swift	R	I	0	X	0	NA	0	X	X	0	0	0	0	0	X
<b>Trochilidae</b>															
Antillean Mango	R	N	0	X	1	NA	X	3	0	0	0	0	X	X	4
Hispaniolan Emerald	E	N	0	X	X	NA	X	0	X	0	0	2	X	0	2
Vervain Hummingbird	R	N	0	X	0	NA	X	4	0	0	0	X	0	0	4
<b>Todidae</b>															
Narrow-billed Tody	E	I	2	5	5	NA	2	3	5	5	5	1	1	1	35
Broad-billed Tody	E	I	2	2	1	NA	X	1	2	X	0	1	1	1	11
<b>Picidae</b>															
Hispaniolan Woodpecker	E	I	5	4	3	NA	6	6	14	7	6	1	3	1	56
Antillean Piculet	E	I	0	X	X	NA	X	1	0	2	X	0	0	0	3
<b>Tyrannidae</b>															
Hispaniolan Pewee	E	I	1	1	1	NA	X	0	0	0	X	1	0	X	4
Stolid Flycatcher	R	I	X	X	X	NA	0	X	0	0	0	0	0	0	X
Loggerhead Kingbird	R	I	2	1	1	NA	1	2	1	X	1	X	X	0	9
Gray Kingbird	R	F	2	1	0	NA	1	2	1	2	2	0	0	1	12



## Status and Distribution of Cliff Swallows in Coastal Virginia: An Update

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### ABSTRACT

We surveyed bridges ( $n = 83$ ) for Cliff Swallow colonies throughout the Coastal Plain of Virginia to update a comparable survey conducted in 1995. Bridges were systematically surveyed by piloting a boat section by section and counting occupied nests. We located 11 breeding sites supporting 3,052 Cliff Swallow nests. The size of colonies ranged from 8 to 1,051 nests. The Coastal Plain population has increased dramatically since 12 pairs were found in 1979 with an average doubling time of 4.8 years over the 38-year period. The population has increased 6.7 fold since the benchmark survey of 1995. The James River continues to be the center of breeding within the physiographic region supporting 7 of the 11 colonies and 2,430 pairs (79.6% of total). Growth of the Virginia population is part of the ongoing range expansion along the Atlantic Slope from New York through Georgia. Breeding continues to be confined to the inner (western) portion of the physiographic region over low-saline waters where insect production is high.

### INTRODUCTION

The Cliff Swallow (*Hirundo pyrrhonota*) population has experienced a dramatic ebb and flow throughout eastern North America since the time of European colonization. Historically associated with the cliff faces and open meadows of western mountains, Cliff Swallows expanded their breeding range throughout eastern states during the early 1800s as land was cleared and houses, barns and bridges were constructed (e.g., DeKay 1844, Baird 1845, Merriam 1877). By the mid-1800s the breeding range extended through the Coastal Plain and to the Atlantic Ocean (Gross 1942). However, by 1900 the population was in decline presumably due to the usurpation of nest structures by House Sparrows (*Passer domesticus*) and the increased practice of painting barns that made it more difficult for pairs to attach their mud nests to vertical structures (Simpson 1914, Forbush 1927, Bagg and Eliot 1937). By the early 1900s, Bailey (1913) indicates that the population in Virginia had been diminished and was declining.

A second range expansion began within the Atlantic Coastal Plain during the second half of the 1900s (Brown and Brown 1995) as birds began to colonize newly constructed concrete bridges. First modern Coastal Plain breeding records include 1977 in South Carolina (Potter et al. 1980), 1981 in Maryland (Patterson 1981) and 1993 in Delaware (Ednie 1994). In Virginia, the first modern breeding record within the physiographic region was in 1979 when 12 nests were discovered on the Benjamin Harrison Bridge by Fred Scott (Scott 1979). In 1991, the Cliff Swallow was recommended for the status of "special concern" in Virginia due to the small population size and perceived loss of nest sites (Ridd and Hale 1991).

During the breeding season of 1995, 110 bridges were surveyed for breeding Cliff Swallows throughout the Coastal Plain of Virginia (Watts et al. 1996). The survey located six colonies and a total population size of 454 pairs. Between the initial discovery in 1979 and the 1995 survey the population demonstrated exponential growth with an average doubling time of 3.1 years. In 2005 the Benjamin Harrison Bridge site was found to have 899 active nests, a 300% increase in the ten-year period since the 1995 survey (Williams et al. 2006). The purpose of this paper is to update information on the status and distribution of breeding Cliff Swallows within the Coastal Plain of Virginia.

### METHODS

**STUDY AREA.** This study included the Coastal Plain of Virginia from the Atlantic Ocean to the fall line including the lower Chesapeake Bay and the lower Delmarva Peninsula. The fall line is an erosional scarp where the metamorphic rocks of the Piedmont meet the sedimentary rocks of the Coastal Plain. The geologic formations along this boundary frequently determine the landward extent of tidal influence. Because this boundary required portage of goods from tidal to nontidal waters it became a common site along tributaries for the development of trading settlements and later major cities (e.g., Richmond, Fredericksburg, Washington, D.C., Baltimore). The Coastal Plain supports an extensive network of tidal rivers that penetrate virtually the entire land surface.

Both the development of the land and the modern transport of goods have required the construction of hundreds of automobile and railroad bridges. Bridges have become concentrated along the fall line and outer coast, reflecting the distribution of major population centers. Bridges represent one of the primary nesting substrates that have allowed for the eastward range expansion of Cliff Swallows (Brown and Brown 1995).

**BRIDGES SURVEYED.** We surveyed prominent bridges ( $n = 83$ ) within the Coastal Plain including both automobile ( $n = 69$ ) and railroad ( $n = 14$ ) bridges. These bridges represent most of the bridges surveyed for Cliff Swallows in 1995 ( $n = 110$ ) (Watts et al. 1996). Bridges were selected for inclusion based on their prominence within the landscape. All bridges that cross the main channel of primary Chesapeake Bay tributaries (i.e. James River, York River, Rappahannock River) somewhere between their mouth and the fall line were included. Bridges that cross the main channels of minor tributaries of the Chesapeake Bay (e.g., Elizabeth River, Nansemond River, Chickahominy River, Appomattox River, Piankatank River, Great Wicomico River) were also included. Prominent bridges that cross some inlets of the outer coast (e.g., Lynnhaven Inlet, Little Creek, Rudy Inlet) were included. Finally, selected bridges that cross prominent creeks flowing into the major tributaries (e.g., Cat Point Creek, Occoquan Creek, Neabsco Creek) were included. We believe that the set of bridges selected represents the most likely sites of Cliff Swallow colonization within the physiographic region.

**SURVEY PROTOCOL.** We searched bridges for evidence of breeding Cliff Swallows by piloting a boat along the bridge span. Upon detection of either Cliff Swallows or their nests, we systematically searched the bridge to determine colony status and size. For this study, colony refers to a breeding group of two or more nests though we did not detect breeding sites with less than eight pairs in 2017. We surveyed occupied bridges section by section from below. We counted all nests that were occupied, had fresh mud or that were actively under construction. Old nests that were broken or that had obvious cobwebs over the entrance were not counted. Colonies with a large portion of nests under construction we revisited to record peak numbers.

**DATA ANALYSIS.** We expressed population growth rate using the average time (in years) required for the population to double in size ( $t_{\text{double}}$ ), the intrinsic rate of increase ( $r$ ), and the average annual percent increase over the study period. Average doubling time was calculated using the growth equation  $N_t = N_0 e^{rt}$  where  $N_t$  is the population size in 2017,  $N_0$  is the population size in 1979,  $e$  is the base of the natural logarithm,  $r$  is the intrinsic rate of increase, and  $t$  is the time interval between population estimates (Vandermeer and Goldberg 2003). With this configuration,  $t_{\text{double}} = \ln(2)/r$ . Average annual percent increase was calculated as  $(N_{t+1} - N_t) / N_t \times 100$ .

## RESULTS

We located 11 breeding sites supporting 3,052 active nests of Cliff Swallows (Table 1). The Coastal Plain population has

increased considerably since 12 pairs were found in 1979 with an average doubling time of 4.8 years over the 38-year period. The population has increased 6.7 fold since the benchmark survey of 1995. Seven of the sites documented in 2017 have been colonized since the survey conducted in 1995. Of the 6 colonies documented in 1995, 4 were still active. All of these colonies have increased since that time with increases ranging between 3.6 and 6.8 fold. Two of the colonies located in 1995 were abandoned. These abandoned colonies were located on a bridge on a tributary of the Rappahannock River that supported 2 nests and a pump house on Little Creek Reservoir that supported 4 nests. The size of colonies surveyed in 2017 ranged from 8 to 1,051 nests.

Table 1. Breeding sites and the number of Cliff Swallow nests found within the Coastal Plain of Virginia during the 1995 and 2017 breeding seasons.

Site	1995	2017
Rt. 156, James River	292	1,051
I-295, Appomattox River	73	504
Rt. 10, Appomattox River	48	316
I-295, James River	35	166
Little Creek Reservoir	4	0
Rt. 17, Mount Landing Creek	2	0
Route 301, Rappahannock River	0	346
Route 629, Mattaponi River	0	224
Route 895, James River	0	192
Concrete Dock, James River	0	105
I-95, James River	0	96
Route 360, Mattaponi River	0	44
Route 33, Mattaponi River	0	8
<b>Total</b>	<b>454</b>	<b>3,052</b>

The James River continues to be the center of breeding for Cliff Swallows nesting within the Coastal Plain. Seven of the 11 colonies supporting 2,430 pairs (79.6% of total) were documented within the James River Watershed between Hopewell and Richmond (including the Appomattox). Colonies were also located on bridges along the Pamunkey (1 colony) and Mattaponi (2 colonies) rivers within the York River Watershed. A single colony was located on the Rappahannock River.

With one exception colonies were located on bridges with concrete support beams and roadbeds. The single exception was a concrete loading dock with structures very similar to the bridges. The distribution of nests along bridge spans was highest near shorelines, presumably allowing birds to access sources of mud on the river's edge. Nests were typically attached to corners where two concrete slabs come together. We found 36 nests (<2%) collectively within two colonies that were affixed to steel structures.

## DISCUSSION

The Cliff Swallow population within the Coastal Plain of Virginia has exhibited ongoing exponential growth since the discovery of breeding near Hopewell in 1979. Although it was true that breeding distribution was very limited throughout the 1980s, the suggestion that the species should receive a status of "special concern" in the state did not consider the broader, regional context. Growth of the Virginia population is part of the ongoing range expansion along the Atlantic Slope from New York through Georgia (Patterson 1981, Ednie 1994, Dowell 1996, Beaton 2010).

Recent colonization of the Coastal Plain has been within the inner (western) portion of the physiographic region within low-saline waters. Reaches within the lower salinity zones near the fall line produce large concentrations of flying insects (Watts, pers. obs.). It is possible that breeding will ultimately be confined to these waters due to prey availability or that colonization has not had time to extend east into the outer Coastal Plain. Continued monitoring of range expansion will help to resolve these questions over time.

The apparent importance of concrete bridges to the range expansion into the Coastal Plain of Virginia is consistent with patterns documented within other states (e.g., Dowell 1996, Medler 2008, Beaton 2010). Four of the bridges that were found to support colonies were recently (after 1990) constructed including the I-895 Bridge across the James River and the Route 33 Bridge across the Mataponi River. Based on this pattern, we would expect that other new bridges within the inner Coastal Plain such as the Route 33 Bridge across the Pamunkey or the Route 5 Bridge across the Chickahominy may also be colonized. Use of the steel substrate for nest attachment is a new development since 1995. Although this currently accounts for Less than 2% of the overall population, the development may lead to colonization of other bridge types. Additional, systematic surveys in the future may help to resolve some of the questions relating to factors important for range and substrate constraints.

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## LITERATURE CITED

Bailey, H. H. 1913. *The birds of Virginia*. J. P. Bell Company, Lynchburg, VA.

Baird, S. F. 1845. Catalogue of birds found in the neighborhood of Carlisle, Cumberland County, Pennsylvania. *Literary Record and Journal of the Linnaean Association of Pennsylvania College* 1:249-257.

Bagg, A. C. and S. A. Eliot. 1937. *The birds of the Connecticut River Valley*. The Hampshire Bookshop, Northampton,

Massachusetts.

Beaton, G. 2010. Cliff Swallow. In *The breeding bird atlas of Georgia*, eds. T. M. Schneider, G. Beaton, T. S. Keyes and N. A. Klaus. University of Georgia Press, Athens, Georgia.

Brown, C. R. and M. B. Brown. 1995. Cliff Swallow (*Hirundo pyrrhonota*). In *The Birds of North America*, No. 149 (A. Poole and F. Gill, eds.), the Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington D. C.

DeKay, J. E. 1844. *Zoology of New York, or the New-York Fauna: Birds*. Carroll and Cook, printers to the Assembly. New York, NY.

Dowell, B. A. 1996. Cliff Swallow. In *Atlas of breeding birds of Maryland and the District of Columbia*, eds. C. S. Robbins and E. A. T. Blom. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Ednie, A. P. 1994. Delaware's first successful nesting of Cliff Swallow. *Delmarva Ornithologist* 26:3-4.

Forbush, E. H. 1927. *Birds of Massachusetts and other New England states: Volume 2*. Massachusetts Department of Agriculture, Norwood Press, Norwood, Massachusetts.

Gross, A. O. 1942. Northern Cliff Swallow. In *Life histories of North American flycatchers, larks, swallows, and their allies*, ed. A. C. Bent, U.S. National Museum Bulletin, no. 179. Washington, D. C.

Medler, M. D. 2008. Cliff Swallow. In *The second atlas of breeding birds in New York state*, eds. D. J. McGowan and K. Corwin. Cornell University Press, Ithaca, New York.

Merriam, C. H. 1877. A review of the birds of Connecticut with remarks on their habits. *Transactions of the Connecticut Academy*. Volume 4. New Haven, CT.

Patterson, R. M. 1981. Range expansion of Cliff Swallow into Maryland Coastal Plain. *Maryland Birdlife* 37:43-44.

Potter, E. F., J. F. Parnell and R. P. Teulings. 1980. *Birds of the Carolinas*. The University of North Carolina Press, Chapel Hill, North Carolina.

Ridd, S. and A. M. Hale. 1991. Cliff Swallow. In *Virginia's endangered and threatened species* (K. Terwilliger, ed.), McDonald and Woodward, Blacksburg.

Scott, F. R. 1979. Middle Atlantic Coast Region. *American Birds* 33 (5): 758-760.

Simpson, R. B. 1914. Cliff Swallow and sparrow. *Oologist* 31:40.

Vendermeer, J. H. and D. E. Goldberg. 2003. *Population Ecology: First Principles*. Princeton University Press, Princeton, NJ.

Watts, B., M. A. Byrd and M. Watts. 1996. Status and distribution of Cliff Swallows in coastal Virginia. *Raven* 67: 21-24.

Williams, B., B. D. Watts, and M. A. Byrd. 2006. A census of a Cliff Swallow colony on the Benjamin Harrison Bridge. *The Raven*, 77:35-40.

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