

TV Tower Kills in Eastern North Carolina

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Discovery of a large bird kill at the WECT TV tower in Bladen County, N.C., in the fall of 1970 led us to study TV tower mortality in southeastern North Carolina during the fall migrations of 1971 and 1972. Autumn passages of birds across the coastal plain of North Carolina are little known, and TV tower mortality offers a significantly large sample of nocturnal migrants. Our results add to the knowledge of bird migration in southeastern North Carolina and to the information accumulating on mortality of nocturnal migrants at tall man-made structures throughout the United States.

STUDY AREAS

The WECT tower is located off NC 53, 5 miles SE of White Lake in Bladen County, N.C., and about 42 miles inland from the Atlantic coast. The WWAY tower is located off NC 87, 3 miles N of Boiling Spring Lakes in Brunswick County, N.C., and about 10 miles from the coast. We were unable to check the towers each day, but did visit them after the passage of each cold front and after most cloudy nights regardless of frontal activity. In 1971 the towers were first visited on 23 September. The presence of badly decomposed birds along with freshly killed birds indicated that we missed at least one early kill. In 1972 visits began in early August, and no kills were missed. Visits continued until mid-November both years.

The WECT tower stands 1994 feet above the ground. It is the tallest TV tower in the eastern United States. The 27 guy wires are attached at nine levels. Nine wires extend S, nine WNW, and nine NE. The longest guy wires are 2700 feet and reach the ground 1400 feet from the tower base.

The WWAY tower stands 1188 feet above ground. Its 27 guy wires are attached at seven levels. Nine extend S, nine NE, and nine NW. The longest guy wires are 1550 feet and reach the ground 800 feet from the tower base.

Both towers are lighted according to FCC regulations with a combination of flashing and nonflashing red lights. A small control building is located about 25 feet from the base of each tower, and a small dirt parking lot is in front of each control building. Most of the area around the towers is open weed-covered sand. All guy wire lanes are approximately 20 feet wide, and were vegetated with grass and low weeds at the time of the study. Beyond the open ground immediately surrounding the towers were young pine plantations and shrub bogs.

RESULTS AND DISCUSSION

The WECT tower was completed in January 1969, and employees indicated that a sizable number of birds were killed during the fall of 1969. The WWAY tower was completed in October 1964. We were unable to obtain any information on bird mortality at this tower prior to the initiation of the study. Our results and comments from tower employees indicate that large kills occur annually during September and October at the WECT tower under certain weather conditions. Large kills appear to occur much less frequently at the WWAY tower.

Our study of tower mortality was begun after we found an estimated 1000 birds at WECT on 30 October 1970 (Table 1). Apparently, the birds were killed on several different dates. The towers were not checked further in 1970, but we conducted a regular program in the fall of 1971 and again in the fall of 1972. During these 2 years birds were found on 42 occasions. We recorded a total of 3070 individuals of 84 species. The 1970 kill included four birds not found in 1971 or 1972, bringing the total to 88 species.

During the fall of 1971, large kills were typically associated with low ceilings and northerly winds. These conditions existed during and after the passage of cold fronts. Low ceilings associated with cold fronts were present during all major kills in the fall of 1971 except the one on 3-4 and 4-5 October at WWAY. According to TV station employees the bulk of this kill occurred the night of 3-4 October, 3 days after the passage of Hurricane

Ginger. Prior to passage of the storm, the Wilmington area had experienced strong northerly winds for several days. Apparently these winds concentrated migrant land birds along the coast. After the storm passed, a large flight of these birds moved south along the coast before low ceilings associated with the storm had dissipated. These birds moved on the first night after the winds had shifted back to the northerly quadrant. It was under these conditions that a major kill occurred at WWAY on 3-4 and 4-5 October. Nearly 1000 birds were picked up on the morning of 5 October. On the same date we found 111 birds at WECT, all very fresh.

In the fall of 1972, cold fronts usually passed quickly through our vicinity, resulting in generally unsuitable conditions for major kills. Only two kills (both at WECT) numbered over 50 birds. The difference in these 2 years is reflected best by the 387 individuals found during the fall of 1972, compared to 2683 found the previous fall.

Major problems were the loss of individuals in dense vegetation or to predators. No attempts were made to document predation, but numerous piles of feathers and disjointed wings and legs pointed to heavy predation at both towers, particularly WECT. Ants were the main problem in warm weather. As cooler weather began to decrease ant activity, losses to other predators became more apparent. Crows (*Corvus* sp.), Great Horned Owls (*Bubo virginianus*), House Cats (*Felis domesticus*), and Gray Foxes (*Urocyon cinereo-argenteus*) were seen at or near WECT. Evidence indicated that most of the vertebrate predation was caused by these species. Only crows were seen at WWAY.

Loss of birds in dense vegetation was very heavy at both towers. Birds that did not fall directly below the guy wires or in the immediate vicinity of the tower bases were not found. Even those falling in the open areas often were overlooked in the patches of weeds. The great height of WECT and its many long guy wires undoubtedly resulted in birds falling over a wide area during some kills. It is impossible to estimate how many were lost, but the figure was undoubtedly substantial.

Typically the heaviest warbler mortality, excluding the Yellow-rumped Warbler, occurred in late September and early October. Heavy Yellow-rumped Warbler and sparrow mortality occurred in mid to late October. This relates well to the known migratory patterns for these two groups. The Common Yellowthroat (588) was the most numerous and frequent bird represented in the kills. The Black-throated Blue Warbler (289), Ovenbird (268), Yellow-rumped Warbler (218), Gray Catbird (164), Red-eyed Vireo (149), American Redstart (141), and Black-and-white Warbler (115) had the next highest 2-year individual counts. All these species, except the Yellow-rumped Warbler, were represented in large numbers in the kill at WWAY on 3-4 and 4-5 October 1971. The Black-throated Blue Warbler was considered to be an uncommon fall transient in this area. The large numbers of these other species were to be expected.

Most unexpected was the discovery of Seaside Sparrows at WECT. We found 4 in 1970, 11 in 1971, and 2 in 1972. These occurrences indicate that Seaside Sparrows migrate regularly over inland portions of southeastern North Carolina.

Most species were found within the normal period for expected migratory passage in this area. Unusually early or late occurrences are discussed in the species accounts.

ANNOTATED CHECKLIST

Following is an annotated checklist of all avian species found during this study. Dates are those of pick-up. Generally, the birds were killed 12 to 36 hours before recovery. A notable exception was the large kill of 367 birds found at WECT on 29 October 1971, apparently the product of several nights' accumulation between 24 and 29 October. When four or fewer records for a species are given, the date(s) of recovery are listed, followed in parenthesis by the location and number of birds found. Where there are more than four records for a species, the records have been summarized. Each month was divided into approximately three equal periods (from the first to the tenth, from the eleventh to the twentieth, and from the twenty-first to the end of the month). Total individuals for each species found during each of these periods are entered in order in parenthesis after each month of occurrence. This is followed by the total number of individuals of a species found during the 1971 and 1972 fall periods, and the fall totals for each tower in paren-

TABLE 1. *Birds recovered on 30 October 1970 at WECT TV tower**.

Species	Number	Species	Number
Common Flicker (Yellow-shafted)	2	Northern Waterthrush	1
Yellow-bellied Sapsucker	3	Common Yellowthroat	30
Brown Creeper	2	Yellow-breasted Chat	5
House Wren	5	American Redstart	10
Winter Wren	5	Eastern Meadowlark	5
Long-billed Marsh Wren	4	Red-winged Blackbird	2
Gray Catbird	9	Rusty Blackbird	1
Brown Thrasher	1	Blue Grosbeak	2
American Robin	1	Indigo Bunting	1
Hermit Thrush	6	Rufous-sided Towhee	8
Golden-crowned Kinglet	6	Savannah Sparrow	26
Ruby-crowned Kinglet	3	Grasshopper Sparrow	3
Yellow-throated Vireo	1	Henslow's Sparrow	4
Red-eyed Vireo	1	Seaside Sparrow	4
Black-and-white Warbler	1	Chipping Sparrow	1
Northern Parula	1	Field Sparrow	4
Yellow-rumped Warbler (Myrtle)	68	White-throated Sparrow	9
Pine Warbler	1	Swamp Sparrow	33
Palm Warbler	3	Song Sparrow	15
Ovenbird	3		

*An estimated 1000 birds were killed. Due to inclement weather only the above were identified and counted. Birds were killed on several dates prior to discovery.

thesis. Spring records and data from Table 1 (30 October 1970) are not included in the totals, but references to these are given for several species. Annotations are made where warranted.

All occurrences were compared with the extensive 11-year study conducted by H.L. Stoddard and R.A. Norris in Leon County, Florida, between 1955 and 1966; the 8-year continuation of that study (1966-1973) by R.L. Crawford; and with the unpublished bibliography of nocturnal mortality compiled in 1967 by William Buskirk. Individual reference to these two reports will not be cited, unless specific comparisons are made. Very little information has been published on the land birds of the southeastern coastal plain. Comments on abundance in this area are based on the authors' experience.

PIED-BILLED GREBE: 6 September 1972 (WWAY-1) and 17 October 1971 (WECT-1).

GREAT BLUE HERON: 19 October 1971 (WECT-1). No other instance of a Great Blue Heron hitting a tower was found in the literature.

BLACK-CROWNED NIGHT HERON: 20 October 1971 (WECT-1). No other instance of a Black-crowned Night Heron hitting a tower was found. Records for this species are uncommon away from the immediate coast.

CLAPPER RAIL: 23 September 1971 (WECT-1). This species is generally considered to be confined to salt and brackish marshes in coastal areas. Its occurrence approximately 42 miles inland was not expected. A Clapper Rail found at a Raleigh, North Carolina TV tower on 28 September 1965 (Browne and Post 1972) and one found on 11 September 1969 at a tower in Orange County, Florida (Taylor and Anderson 1973) were the only other tower kill records located.

VIRGINIA RAIL: 24 September 1971 (WECT-1). Records for this species inland in North Carolina are scarce.

SORA: 6 September 1972 (WECT-1), 23 September 1971 (WECT-3), 24 September 1971 (WECT-2), 2 October 1971 (WECT-1).

- YELLOW-BILLED CUCKOO: 23 September 1971 (WECT-1).
- COMMON FLICKER: 5 October 1971 (WWAY-1), 17 October 1971 (WWAY-1), 19 October 1972 (WECT-1). This species has been of infrequent occurrence in tower kills elsewhere in the southeastern United States.
- YELLOW-BELLIED SAPSUCKER: October (2-9-3). Total 14 (WECT-13, WWAY-1).
- GREAT CRESTED FLYCATCHER: 24 September 1971 (WECT-1). This species has rarely been found in autumn tower kills.
- EASTERN PHOEBE: 19 October 1971 (WECT-1). This species has rarely been found in tower kills.
- ACADIAN FLYCATCHER: 5 October 1971 (WWAY-2). A well decomposed bird was picked up on 29 October 1971 at WECT. A tentative identification placed the bird in this species.
- TRAILL'S FLYCATCHER: 23 September 1971 (WECT-1). There are apparently no previous fall records of this species complex from southeastern North Carolina.
- TREE SWALLOW: 23 September 1971 (WECT-1). This individual was well decomposed. This diurnal migrant has seldom been reported in tower kills.
- BROWN CREEPER: Two on 30 October 1970 at WECT (Table 1). Brown Creepers have been of infrequent occurrence in tower kills in the southeastern United States.
- HOUSE WREN: September (0-0-3), October (11-24-7), November (1-0-0). Total 46 (WECT-36, WWAY-10).
- WINTER WREN: October (0-6-3). Total 9 (WECT).
- LONG-BILLED MARSH WREN: September (0-0-13), October (5-11-0). Total 29 (WECT-22, WWAY-7). The fall migration of this species is generally along the coast. Occurrences inland are less frequent. Single birds found on 14 April and 22 May 1972 at WECT were the only spring records.
- SHORT-BILLED MARSH WREN: 5 October 1971 (WWAY-5) and 19 October 1972 (WECT-1, WWAY-1). See comment on preceding species concerning migratory routes.
- GRAY CATBIRD: September (0-0-18), October (57-84-5). Total 164 (WECT-122, WWAY-42). A single well decomposed bird was found on 5 March 1972 at WECT.
- BROWN THRASHER: September (0-0-5), October (1-0-1). Total 7 (WECT).
- AMERICAN ROBIN: 29 October 1971 (WECT-1) and 8 December 1972 (WECT-1). Also one at WECT on 30 October 1970 (Table 1).
- WOOD THRUSH: September (0-0-3), October (11-2-0). Total 16 (WECT-15, WWAY-1).
- HERMIT THRUSH: October (0-15-28). Total 43 (WECT-42, WWAY-1).
- SWAINSON'S THRUSH: September (0-0-2), October (12-6-1). Total 21 (WECT-17, WWAY-4). A single bird found on 29 October 1971 at WECT was late for this species.
- GRAY-CHEEKED THRUSH: September (0-0-2), October (12-5-2). Total 21 (WECT-13, WWAY-8). Generally this species is considered to be less common than the Swainson's Thrush in North Carolina. Thus, the occurrence of identical numbers of these two species was surprising. The two birds found at WECT on 29 October 1971 were late.
- VEERY: September (4-0-33), October (6-0-0). Total 43 (WECT-37, WWAY-6). The majority of these birds (31) was found on 23 September 1971 at WECT.
- GOLDEN-CROWNED KINGLET: October (0-29-53), November (1-0-0). Total 83 (WECT). Ruby-crowned Kinglets are generally considered to be more abundant than Golden-crowned Kinglets in eastern North Carolina. Therefore, the larger numbers of this species were surprising.
- RUBY-CROWNED KINGLET: October (3-12-52), November (5-0-0). Total 72 (WECT-

- 68, WWAY-4). See account of preceding species. A single well decomposed bird was found on 5 March 1972 at WECT.
- KINGLET SP.:** October (0-4-13), November (0-1-0). Total 18 (WECT). These birds were partially eaten and/or decomposed to the point that species identification was impossible.
- WHITE-EYED VIREO:** September (0-0-2), October (3-2-0). Total 7 (WECT-6, WWAY-1). Numbers of this species were lower than expected. In a study in northwestern Florida, 469 were found over an 18-year period (Stoddard and Norris 1967, Crawford 1974). A single bird was found on 14 April 1972 at WECT.
- YELLOW-THROATED VIREO:** One bird at WECT on 30 October 1970 (Table 1). This individual was well decomposed when found.
- SOLITARY VIREO:** 19 October 1972 (WECT-1), 26 October 1972 (WECT-3), 29 October 1971 (WECT-1).
- RED-EYED VIREO:** September (0-0-48), October (74-26-1). Total 149 (WECT-78, WWAY-71). Seventy were found at WWAY on 5 October 1971. A single bird found on 29 October 1971 at WECT was late.
- BLACK-AND-WHITE WARBLER:** September (0-0-32), October (71-9-3). Total 115 (WECT-52, WWAY-63). All 63 of the birds found at WWAY were picked up on 5 October 1971.
- SWAINSON'S WARBLER:** 19 October 1971 (WWAY-1). This bird was quite late. The latest date in a similar study in northwestern Florida was 20 October (Crawford 1974).
- WORM-EATING WARBLER:** 6 September 1972 (WECT-1), 24 September 1971 (WECT-2), 2 October 1971 (WECT-1), 5 October 1971 (WWAY-2). Occurrence of this species in eastern North Carolina in the fall is poorly documented.
- GOLDEN-WINGED WARBLER:** 23 September 1971 (WECT-1). This species has rarely been found in eastern North Carolina during fall migration.
- BLUE-WINGED WARBLER:** 24 September 1971 (WECT-1). This species is also a rare transient in eastern North Carolina.
- TENNESSEE WARBLER:** 5 October 1971 (WWAY-1). Fall records for this species in southeastern North Carolina are rare.
- NASHVILLE WARBLER:** 24 September 1971 (WECT-1). This transient is also considered to be rare in southeastern North Carolina during fall migration.
- NORTHERN PARULA:** September (0-0-10), October (4-8-6), December (0-1-0). Total 29 (WECT-26), WWAY-3). Numbers of this species, which is a common summer resident and transient in eastern North Carolina, were lower than expected. A single well decomposed bird picked up on 20 December 1971 at WECT probably was killed in late November or early December, quite late for the species.
- YELLOW WARBLER:** 23 September 1971 (WECT-3), 5 October 1971 (WWAY-5).
- MAGNOLIA WARBLER:** September (0-0-4), October (15-3-0). Total 22 (WECT-9, WWAY-13). The 13 birds found at WWAY were picked up on 5 October 1971.
- CAPE MAY WARBLER:** September (0-0-8), October (26-6-13). Total 53 (WECT-29, WWAY-24). This transient species is found occasionally along the coast of southeastern North Carolina during the fall migration. The 13 birds found in late October [26 October 1972 (WECT-2), 29 October 1971 (WECT-10), 30 October 1971 (WECT-1)] indicate that the migration of this species continues later into the fall than expected.
- BLACK-THROATED BLUE WARBLER:** September (0-0-24), October (216-38-11). Total 289 (WECT-85, WWAY-204). This species is generally considered to be an uncommon fall transient along the southeastern coast of North Carolina, thus the 203 birds found in Brunswick County at the WWAY tower on 5 October 1971 represent an

unusual record. The 11 birds killed in late October [26 October 1972 (WECT-2), 29 October 1971 (WECT-7), 30 October 1971 (WECT-2)] indicate that this species may occur regularly later in the fall than generally realized. Both subspecies (*Dendroica caerulescens caerulescens* and *D.c. cairnsi*) were found in the kills.

- YELLOW-RUMPED WARBLER:** October (0-57-155), November (0-1-1), December (1-3-0). Total 218 (WECT-210, WWAY-8). We found 125 at WECT on 29 October 1971. The only band recovery during the study was made by a tower employee at the WECT tower in late October 1970. He found a stunned Yellow-rumped Warbler that had been banded on 11 October 1970 near Elton, New York. The bird recovered and was released. The exact date of recovery could not be recalled.
- BLACK-THROATED GREEN WARBLER:** 19 October 1972 (WECT-1), 29 October 1971 (WECT-1). The bird found on 29 October 1971 was late.
- BLACKBURNIAN WARBLER:** 5 October 1971 (WECT-1, WWAY-3). This species is very uncommon along the coast of southeastern North Carolina during fall migration.
- YELLOW-THROATED WARBLER:** 23 September 1971 (WECT-1). Most individuals of this early migrating species probably had passed southward before our study began.
- CHESTNUT-SIDED WARBLER:** 24 September 1971 (WECT-1) and 5 October 1971 (WWAY-3). This species is uncommon along the coast during fall migration.
- BAY-BREASTED WARBLER:** 24 September 1971 (WECT-1) and 17 October 1971 (WECT-1). Few records of this species exist from southeastern North Carolina.
- BLACKPOLL WARBLER:** September (0-0-3), October (3-3-15). Total 24 (WECT-21, WWAY-3). Buskirk (1967) in his summary lists no fall kills from North Carolina. Stoddard and Norris (1967) and Crawford (1974) in their 18-year study had only two birds killed in fall in northwestern Florida, and Taylor (1973) found 10 individuals in a 4-year study in central Florida.
- PINE WARBLER:** October (2-5-4). Total 11. (WECT-9, WWAY-2).
- PRAIRIE WARBLER:** 6 August 1972 (WECT-1), 24 September 1971 (WECT-2), 5 October 1971 (WWAY-3). We were surprised to find so few individuals of a species that is a common transient and summer resident throughout eastern North Carolina.
- PALM WARBLER:** October (73-10-4). Total 87. (WECT-16, WWAY-71). We picked up 68 at WWAY on 5 October 1971.
- OVENBIRD:** September (0-0-54), October (192-16-6). Total 268 (WECT-109, WWAY-159). This species is a relatively common fall transient in eastern North Carolina. Of the 268 individuals killed, 159 were picked up on 5 October 1971 at WWAY. Six birds at WECT on 29 October 1971 were late. It was very surprising to find only one bird during the fall of 1972.
- NORTHERN WATERTHRUSH:** 23 September 1971 (WECT-10), 24 September 1971 (WECT-2), 5 October 1971 (WWAY-7). This species begins its migration early, and the bulk of its numbers probably had passed prior to the onset of field work.
- KENTUCKY WARBLER:** 23 September 1971 (WECT-1) and 5 October 1971 (WWAY-1). This secretive species is seldom found along the southeastern coast of North Carolina during fall migration.
- CONNECTICUT WARBLER:** 5 October 1971 (WWAY-1). This species is rare in southeastern North Carolina during fall migration.
- COMMON YELLOWTHROAT:** September (0-0-203), October (188-142-24), November (1-0-0). Total 558 (WECT-386, WWAY-172). This was the most abundant and regular species in the tower kills, comprising 18.2% of the specimens.
- YELLOW-BREASTED CHAT:** 23 September 1971 (WECT-2), 24 September 1971 (WECT-3), 5 October 1971 (WWAY-4). Five were found at WECT on 30 October 1970 (Table 1).

- HOODED WARBLER: August (1-0-0), September (0-0-2), October (2-2-0). A freshly killed bird found on 17 October 1971 at WECT was late. Considering that this is a common transient and summer resident in eastern North Carolina, few birds were killed. A single spring record was one bird found on 14 April 1972 at WECT.
- AMERICAN REDSTART: September (2-0-58), October (71-9-1). Total 141 (WECT-84, WWAY-57). The bird found on 31 October 1971 at WECT was quite late. We picked up 56 at WWAY on 5 October 1971.
- BOBOLINK: September (1-0-21), October (3-0-0). Total 25 (WECT-23, WWAY-2).
- EASTERN MEADOWLARK: 18 October 1971 (WECT-1), 19 October 1972 (WECT-1), 29 October 1971 (WECT-1). Five were found at WECT on 30 October 1970 (Table 1).
- RED-WINGED BLACKBIRD: 17 October 1971 (WECT-2), 18 October 1971 (WECT-3), 29 October 1971 (WECT-2). Two were found at WECT on 30 October 1970 (Table 1).
- NORTHERN ORIOLE: 21 September 1972 (WECT-1), 23 September 1971 (WECT-1), 24 September 1971 (WECT-3), 5 October 1971 (WWAY-1).
- RUSTY BLACKBIRD: One was found at WECT on 30 October 1970 (Table 1).
- SCARLET Tanager: 5 October 1971 (WWAY-2). This species is rarely seen along the southeastern coast of North Carolina during fall migration.
- SUMMER Tanager: 23 September 1971 (WECT-1). This species is a common summer resident and transient in eastern North Carolina. Its early migration may have resulted in most birds passing prior to the onset of field work. The single bird found was well decomposed.
- CARDINAL: 19 October 1971 (WECT-1). The Cardinal is an abundant resident species throughout eastern North Carolina. The magnitude of its fall migration is generally unknown.
- ROSE-BREASTED GROSBEAK: 23 September 1971 (WECT-1), 5 October 1971 (WECT-1). This species is generally considered an uncommon fall transient in eastern North Carolina.
- BLUE GROSBEAK: Two were found at WECT on 30 October 1970 (Table 1). This species is a relatively common summer resident in the farmlands of eastern North Carolina. Although the birds found on 30 October probably were killed several days earlier, the record is still somewhat late.
- INDIGO BUNTING: September (0-0-1), October (4-12-2). Total 19 (WECT-15, WWAY-4). Two birds found on 29 October 1971 at WECT were late.
- DICKCISEL: 23 September 1971 (WECT-1) and 5 October 1971 (WWAY-1). Records of this western species in eastern North Carolina are sporadic, usually occurring in spring or winter.
- RUFOUS-SIDED TOWHEE: October (0-7-3). Total 10 (WECT-9, WWAY-1).
- SAVANNAH SPARROW: September (0-0-2), October (1-22-13), November (0-1-0), December (1-1-0). Total 41 (WECT-40, WWAY-1).
- GRASSHOPPER SPARROW: September (0-0-1), October (1-3-2). Total 7 (WECT-6, WWAY-1). The status of this sparrow in southeastern North Carolina is generally unknown. It appears to be very uncommon during fall migration. Three additional Grasshopper Sparrows were found on 30 October 1970 at WECT (Table 1).
- HENSLow'S SPARROW: 28 November 1971 (WECT-1). Four were found dead at WECT on 30 October 1970 (Table 1). In addition to the dead birds, two live and apparently uninjured Henslow's Sparrows were seen at WECT on 19 October 1972. The status of this species in southeastern North Carolina is poorly understood, but it is generally considered a very uncommon and localized winter resident.
- SHARP-TAILED SPARROW: October (1-5-2). Total 8 (WECT-7, WWAY-1). Since this species is very rare in inland North Carolina, it was surprising to find it in our

- study. Stoddard and Norris (1967) and Crawford (1974), in an 18-year study of a tower in northwestern Florida, listed 9 fall fatalities, all in early to mid-October.
- SEASIDE SPARROW: October (0-13-2). Total 15 (WECT-12, WWAY-3). Four were found dead at WECT on 30 October 1970 (Table 1). A single individual with slightly impaired flight was seen at WECT on 19 October 1971. The only published record of a Seaside Sparrow hitting an obstruction at night is one found dead at a Raleigh, N.C., TV tower on 5 November 1968 (Post and Browne 1971). This also represents the only known inland occurrence for North Carolina. The presence of the Seaside Sparrow for three consecutive years at WECT strongly suggests an inland migratory pathway.
- DARK-EYED JUNCO: 8 December 1972 (WECT-1). This species has been infrequent in tower kills in the southeastern United States.
- CHIPPING SPARROW: 29 October 1971 (WECT-1). One was found at WECT on 30 October 1970 (Table 1).
- FIELD SPARROW: 29 October 1971 (WECT-2). Also four were found at WECT on 30 October 1970 (Table 1).
- WHITE-THROATED SPARROW: October (0-6-3). Total 9 (WECT).
- FOX SPARROW: 20 December 1971 (WECT-1). This bird was well decomposed when found. This is a late fall migrant in southeastern North Carolina, which accounts for its scarcity in the kills.
- SWAMP SPARROW: October (0-49-32). Total 81 (WECT-80, WWAY-1). This is one of the most common sparrows in southeastern North Carolina during the winter and migrations and was the most common sparrow in the kills.
- SONG SPARROW: October (0-10-9). Total 19 (WECT).

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SUMMARY

Discovery of a major kill in October 1970 led to regular checks of two TV towers in southeastern North Carolina during the fall migrations of 1971 and 1972. The WECT TV tower is near White Lake in Bladen County and the WWAY TV tower is near Boiling Spring Lakes in Brunswick County. Several large kills occurred in 1971, and 2,683 individuals of 83 species were found. Only 387 individuals of 45 species were found during the fall of 1972. Weather conditions favorable for large kills were prevalent during the fall of 1971, but were infrequent during the fall of 1972.

Several unusual species for southeastern North Carolina were found. The 203 Black-throated Blue Warblers found at WWAY on 5 October 1971 were very surprising. Of special interest was the occurrence of small numbers of Seaside Sparrows 42 miles inland at WECT during three consecutive fall migrations (1970-1972). A Clapper Rail and several Sharp-tailed Sparrows also were found at WECT.

LITERATURE CITED

- Browne, M.M., and W. Post. 1972. Black Rails hit a television tower at Raleigh, North Carolina. *Wilson Bulletin* 84:491-492.
- Buskirk, W. 1967. A preliminary bibliography on mortality of nocturnal migrants. Unpub.
- Crawford, R.L. 1974. Bird casualties at a Leon County, Florida TV tower: October 1966-September 1973. *Tall Timbers Research Station Bulletin* No. 18.
- Post, W., and M.M. Browne. 1971. Seaside Sparrow hits a TV tower near Raleigh, North Carolina. *Wilson Bulletin* 83:102-103.
- Stoddard, H.L., and R.A. Norris. 1967. Bird casualties at a Leon County, Florida TV tower: an eleven-year study. *Tall Timbers Research Station Bulletin* No. 8.
- Taylor, W.K., and B.H. Anderson. 1973. Nocturnal migrants killed at a central Florida TV tower; autumns 1969-1971. *Wilson Bulletin* 85:42-51.
- Taylor, W.K. 1973. Black-throated Blue and Cape May Warblers killed in central Florida. *Bird-Banding* 44:258-266.

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