

THIRTY-SEVENTH BREEDING-BIRD CENSUS

*Edited by Willet T. Van Velzen**

The recent upswing in the number of censuses conducted, that peaked last year at 99, this year soared over the hundred mark and came to rest at 125. Reports were received from 31 states or provinces, with top honors for the highest number of plots studied going to California with 18, followed by North Dakota with 13, and Connecticut, Ontario and West Virginia with 9 each. This brings the all-time total number of individual plots studied to 812; over 100 new plots since 1971! California, now with 46 different plots studied, edged Maryland out of fifth place, and is led by Ontario (49), North Dakota (50), Ohio (56) and, far in the lead, by West Virginia (96). It was a pleasure to see Louisiana rise to the call and submit her first 3 censuses, leaving Nevada as the only continental state never to have submitted a census. Surely, there is someone out there. . .

Several points about this year's reports were particularly gratifying. One being the high number of new studies that provided a thorough habitat analysis, using a method such as that presented by James and Shugart (*AFN* 24 727-36, 1970). This alone demonstrates the willingness of our census takers to contribute deeply of their time and effort. Also, of the total of 47 new plots studied this year, some were in habitat types not previously reported upon, especially those in the western states. Even though some of these studies appear to be relatively unproductive in the number and variety of birds, the habitat studied represents types which cover wide expanses of many parts of the continent and it is of high interest to have such areas sampled. One cannot urge strongly enough that bird students select new plots in the wide array of habitat types yet unsampled. It is really stimulating to see reports such as Census 101, conducted as part of a baseline wildlife inventory prior to prototype development of oil shale processing and Census 103, part of an environmental monitoring program in

conjunction with a nuclear power site. With today's emphasis upon environmental impact studies, it is hoped that many more Audubon Censuses will originate from or provide data to such studies.

Many of the new plots, such as Censuses 38, 39, and 40, have been carefully selected for uniformity by being set up within extensive tracts of similar habitat. These should stand as fine examples for anyone preparing to set up a study plot.

Any attempt to analyze the data represented in the many censuses submitted immediately brings to light one important point—seldom do any two census takers follow the same procedures in setting up their plots or conducting their counts. And even though the final data is expressed in the same units of measurement in the end, one cannot but wonder how comparable the data really are. A careful review of the following censuses will show many that are hardly more than strip censuses; many are set up on plots much smaller than the recommended minimum size; some received far less than the approved time coverage; and others included so much edge (in some cases deliberately done so by the observer!) that real territories are hardly measurable; etc., etc., etc. Perhaps this hodge-podge results from our failure to carefully outline exactly what the requirements must be. More than likely, however, it reflects the interpretation of the "word" by the many, no two of whom think alike. It is apparent (or so it seems) that many points in the instructions are simply ignored, perhaps because they do not suit the observer. This situation brings us back to the questions I raised last year concerning the value of these censuses. It is unlikely that the rapid growth of a program, as occurred this year, would happen if a hard-nosed line of requirements were adhered to.

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The problem, of course, is amplified when one attempts to establish guidelines for such censuses. This was readily shown this past year when I wrote some of the more active census takers regarding their opinions on various points. Little agreement could even be met on such a major point as how big a plot should be—the difference was as much as 500% between competent observers! So, perhaps as with many other endeavors, we better measure observers' ability, rather than the subjects they study.

Most observers, however, seemed to agree that care should be taken to remove as much edge effect bias as possible. Plots should thus be set up so that they are surrounded by enough similar habitat to remove edge effect. It is

realized that this would present difficulties for many observers since the habitat selected often is present in blocks too small to allow for such a margin. Yet observers certainly should strive to set up their plots accordingly, and not attempt to deliberately include edge, as some quite apparently have done, in order to increase their list of breeding species.

Well, be it as it may, this year's Breeding-bird Census represents the largest contribution yet of time, effort and interest we have ever received for this project. This we both appreciate and applaud. We hope that the following data may be useful now, and in the future, and that those who have suggestions and recommendations to improve the program will send them along for consideration.

LIST OF CENSUSES

Eastern — Deciduous Forest

1. Second-growth Hardwood Forest	Connecticut	19. Woodland Swamp ..	North Carolina
2. Suburban Wildlife Sanctuary – Mixed Habitat	Connecticut	20. Mountain Ravine Mixed Forest	Georgia
3. Upland Beech – Maple Forest	Connecticut	21. Red Oak – Sugar Maple Forest	Ontario
4. Mixed Hardwood Forest	Pennsylvania	22. Wooded City Ravine	Ontario
5. Cut-over Mature Hardwoods	West Virginia	23. Wooded City Ravine	Ontario
6. Oak – Beech – Hickory Forest	West Virginia	24. Mixed Hardwood Forest	Michigan
7. Oak – Beech – Magnolia Forest	West Virginia	25. Oak – Maple Forest and Edge	Illinois
8. Oak – Hickory Forest	West Virginia	26. Brush with Early Deciduous Forest ..	Indiana
9. Tulip-tree – Beech – Hickory Forest	West Virginia	27. Mixed Deciduous Forest	Indiana
10. Upland Black Cherry Forest	West Virginia	28. Old Growth Beech – Tulip-tree – Black Gum Forest	Indiana
11. Young Northern Hardwood Forest ..	West Virginia	29. Second-growth Hardwoods	Ohio
12. Hickory – Oak – Ash Floodplain Forest ..	Maryland	30. Mixed Deciduous Forest – Strip Mine	Tennessee
13. Mature Deciduous Floodplain Forest ..	Maryland	31. Ridge and Valley Hardwood Forest	Tennessee
14. Mixed Hardwood Forest	Maryland	32. Upland Mixed Deciduous Forest with Strip Mines	Tennessee
15. Upland Tulip-tree – Maple – Oak Forest ..	Maryland	33. Loess Bluff Forest	Louisiana
16. Mixed Upland Habitat	District of Columbia	34. Mature Bottomland Hardwood Forest	Louisiana
17. Upland Oak – Hickory Forest	Virginia		
18. Upland Mixed Forest	North Carolina		
		Eastern – Coniferous – Deciduous (Mixed)	
		35. Balsam Fir – Birch Forest	Minnesota
		36. Deciduous – Coniferous Second Growth	

Northwoods				
37 Mixed Upland Forest and Edge	Vermont	61 Dry Juniper – Cottonwood Savannah		Ontario
38-40. Pitch Pine – Scrub Oak Forest (I, II, III)	Vermont	62 Burned Jack Pine Ridge		Minnesota
41 Climax Hemlock – White Pine Forest with Transition Hardwoods	Massachusetts	63 Disturbed Oak – Hickory Forest, etc.		Ohio
42 Deciduous Forest with Pond and Brook	Connecticut	64 Mixed Deciduous – Pine and Pasture-land		Mississippi
43 Upland Pine – Oak Forest	New Jersey	Central — Prairie		
44 Central Hardwood Forest with Scattered Pine	New Jersey	65 Kentucky Blue Grass Prairie		North Dakota
45 Coastal Mixed Pine – Oak Forest	District of Columbia	66-73. Mixed Prairie (I-VIII)		North Dakota
46 Southern Mixed Hardwood Forest ..	North Carolina	74. Shortgrass Prairie ..		Colorado
Eastern — Coniferous		Central — Mixed Habitats		
47 Upland Scotch Pine Plantation	Georgia	75. Mixed Prairie Park ..		Nebraska
48 Tamarack – White Cedar Slough	New York	76. Mixed Habitat – Disturbed Bottomland ..		Oklahoma
49 White Pine – White Cedar Forest	Ontario	Western — Deciduous		
50 Fir – Spruce Swamp	Ontario	77. Broad-leaf Evergreen Forest		California
51 Young Spruce Forest	West Virginia	78. Deciduous Oak Woodland		California
52 Slash Pine Plantation	West Virginia	79. Disturbed Floodplain Woodland		California
	Louisiana	80. Floodplain Riparian Forest		California
Eastern — Mixed Habitats		81. Oak – California-bay – Buckeye – Mixed Forest		California
53. Mixed Forest, Old Field and Home-site	Vermont	82. Riparian Oak Woodland		California
54. Rural Stream Border	Vermont	83. Floodplain Cottonwood Forest		Colorado
55 Arboretum: Coniferous Parkland	Massachusetts	84. Floodplain Cottonwood Forest		Colorado
56 Arboretum: Deciduous Parkland ...	Massachusetts	Western — Coniferous – Deciduous (Mixed)		
57 Mixed Upland Habitat and Swamp	Connecticut	85. California-bay – Bishop Pine – Mixed Forest		California
58 Oak – Hemlock Forest and Semi-open Fields and Shrubland	Connecticut	86. Lodgepole Pine Forest with Aspen ..		Colorado
59. Upland Brushy Pasture	Connecticut	87. Ponderosa Pine – Scrub Oak – Mountain Mahogany Woodland		Colorado
60 Dry Cottonwood Sand Dune	Ontario	Western — Coniferous		
		88. Bishop Pine Forest		California
		89. Bishop Pine Forest		California
		90. Disturbed Bishop Pine Forest		California

91. Logged Douglas-fir – Re-seeded with Monterey Pine		Fresh Water Wetlands	
92. Mature Douglas-fir Forest	California	109. Open Sphagnum Bog	New Brunswick
93. Disturbed Douglas-fir – Lodgepole Pine Forest	California	110. Shrubby Swamp and Sedge Hummocks ..	Connecticut
94. Ponderosa Pine Forest	Montana	111. Sedge – Rush Swale	Ontario
Western — Mixed Habitats	Colorado	112. Cat-tail Marsh	Illinois
95. Scattered Mixed Coniferous Forest ..		Fields and Cultivated Areas	
96. Clearcut in Douglas-fir Forest	Oregon	113. Blue Grass – Milkweed Grassland	Ontario
97. Coastal Scrub	California	114. Abandoned Field	New York
98-99. Disturbed Coastal Scrub (A-B)	California	115. Partially Abandoned Hayfields and Pastures	Connecticut
100. Disturbed Riparian Stream Border	California	116. Abandoned Field	Maryland
101. Northern Desert Shrub	California	117. Cultivated Field and Landing Strip	North Carolina
102. Conifer – Brush – Grass Plains – Foot-hills Ecotone	Utah	Unclassified Late Censuses	
103. Cottonwood River-bottom – Pasture ...	Colorado	118. Mature (1949, 1950) Eight-row Belt	North Dakota
Northern — Deciduous	Colorado	119. Mature (1945) Nine-row Belt	North Dakota
104. Mature Birch and Poplar Forest	Saskatchewan	120. Mature (1949) Six-row Belt	North Dakota
105. Young Aspen Forest	Saskatchewan	121. Mature (1949, 1953) Six-row Belt	North Dakota
Northern — Coniferous		122. Horse Farm and Second-growth Edge	Vermont
106. White Cedar – Balsam Fir Swamp Forest ..	New Brunswick	123. Cat-tail Marsh with Willow Edge	California
107. Balsam Fir Forest ..	Saskatchewan	124. Oak Forest, Pastures and Thickets	Connecticut
108. Black Spruce Stand with Alder Swales ..	Saskatchewan	125. Mixed Deciduous Forest	North Carolina



Census 95. Scattered mixed conifer forest in subalpine meadows and spruce bogs. Photo/ Ken Jones.

1. SECOND-GROWTH HARDWOOD FOREST. — **Location:** Connecticut; Litchfield Co., White Memorial Foundation, Morris; 41°42'26"N, 73°12'22"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965; 7 intermittent years. **Size:** 25 acres (roughly rectangular). **Description of Plot:** See AFN 19:590-591, 1965. **Coverage:** June 2, 5-6, 10-11, 16, 19, 22, 24; July 5, 7-8, 12, 14-15, 17, 19. Hours varied from 0445 to 2200 and totaled 23 hours. **Census:** (territorial males followed in parentheses by males per square kilometer and males per 100 acres): Ovenbird, 7.5 (74, 30); Veery, 7 (69, 28); Red-eyed Vireo, 7 (69, 28), Am. Redstart, 7 (69, 28); Rufous-sided Towhee, 4.5 (44, 18); Brown Creeper, 3.5 (35, 14); Black-capped Chickadee, 3 (30, 12); House Wren, 3 (30, 12); Gray Catbird, 3 (30, 12); Chestnut-sided Warbler, 3 (30, 12); Com. Yellowthroat, 3 (30, 12); Am. Robin, 2.5; Brown-headed Cowbird, 2.5; Downy Woodpecker, 2; E. Wood Pewee, 2; Blue Jay, 2; Blue-winged Warbler, 2; Canada Warbler, 2; Scarlet Tanager, 2; Com. (Yellow-shafted) Flicker, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; E. Phoebe, 1; Com. Crow, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Black-and-white Warbler, 1; Cerulean Warbler, 1; N. (Baltimore) Oriole, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Song Sparrow, 1; Cedar Waxwing, 0.5; Am. Goldfinch, 0.5; Great Horned Owl, +; Barred Owl, +; Pileated Woodpecker, +; Red-breasted Nuthatch, +; Blackburnian Warbler, +; Cardinal, +; Purple Finch, +; Chipping Sparrow, +. **Total:** 43 species; 83.5 territorial males (825/km², 334 per 100 acres). **Visitors:** (average number of individuals per 100 acres): Com. Grackle, 6; Red-winged Blackbird, 3; Red-tailed Hawk, +; Broad-winged Hawk, +; Chimney Swift, +; Barn Swallow, +; Starling, +. **Remarks:** This census showed no changes of measurable significance in either species or number of individuals that could not be compensated for in the adjacent woods, except in the following two cases. Broad-winged Hawks, which bred on or near the area in 1965, 1966, and 1968, continued a steep decline first noted as significant in 1971. For the first time they were absent from the census, and were distinctly uncommon locally. The Cerulean Warbler, locally a rare visitor and evidently an extremely sporadic breeder (it bred in Canton, Conn., last year) was a very strong singer and stably located, but there was no indication that it had a mate. It disappeared after the second week of June. — ANDREW MAGEE, 34 Hobson Street, Springfield, Mass. 01109, sponsored by the Litchfield Hills Audubon Society, Litchfield, Conn.

2. SUBURBAN WILDLIFE SANCTUARY-MIXED HABITAT. — **Location:** Connecticut; Mid-Fairfield County Youth Museum, Westport; 41°8'N, 73°22'W, Norwalk North, Conn. — N.Y. Quadrangle USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 20.2 ha = 50 acres (boundary very irregular owing to attaining property in small parcels). **Description of Plot:** See AB 25:1010-1011, 1971. **Coverage:** May 17, 19, 21, 24-25, 30; June 1, 3, 6-7, 9, 14. All trips between 0515 and 0900. Total man-hours: 18. **Census:** House Wren, 9 (44, 18); Blue Jay, 5 (25, 10); Red-winged Blackbird, 5

(25, 10), Gray Catbird, 4 (20, 8), Com. (Yellow-shafted) Flicker, 3 (15, 6); Great Crested Flycatcher, 3 (15, 6), Tufted Titmouse, 3 (15, 6); Brown Thrasher, 3 (15, 6), Am. Robin, 3 (15, 6); Veery, 3 (15, 6); Blue-winged Warbler, 3 (15, 6); N. (Baltimore) Oriole, 3 (15, 6), Rufous-sided Towhee, 3 (15, 6); Field Sparrow, 3 (15, 6); Ring-necked Pheasant, 2; Mourning Dove, 2; Starling, 2; Rose-breasted Grosbeak, 2; Song Sparrow, 2, Wood Duck, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; E. Kingbird, 1; E. Wood Pewee, 1; Tree Swallow, 1; Black-capped Chickadee, 1; Brown Creeper, 1; Wood Thrush, 1; House Sparrow, 1; Cardinal, 1. **Total:** 30 species; 74 territorial males (366/km², 148 per 100 acres). **Visitors:** Pileated Woodpecker, Com. Crow, White-breasted Nuthatch, E. Bluebird, Red-eyed Vireo, Black-and-white Warbler, Ovenbird, Com. Yellowthroat, Am. Redstart, Scarlet Tanager **Remarks:** Nests located were: 9 House Wrens, 1 Tree Swallow, 1 House Sparrow, and 1 Wood Duck all in bird houses, 1 flicker, 1 Blue Jay, 1 Black-capped Chickadee, 1 Brown Creeper, 1 robin, 2 Starlings, and 1 Field Sparrow. The same number of species were recorded on the sanctuary this year as in 1972 (30), but different birds were involved. Absent this year were bluebird, mallard, phoebe, crow and yellowthroat, while birds new this year were Wood Duck, Hairy Woodpecker, E. Kingbird, Tree Swallow, and Brown Creeper. The kingbird, Tree Swallow and Brown Creeper all nested for the first time since the censuses started. The total of 74 territorial males was a slight increase over 1972 (69) but was still down from the 91 males recorded in 1971. Bluebirds did not nest this year, their attempt to use a box failed when House Sparrows drove them out. They remained in the area, so it is hoped nesting will take place next year. The only sizeable increase in a species over 1972 was the Blue-winged Warbler that went from 1 to 3. Sizeable drops were noted in the Downy Woodpecker (3 pairs in 1972 to 1 pair) and the towhee (6 pairs in 1972 to 3 pairs). The nesting season was wet, but the fierce storm of June 1972 was not equalled and there was not any severe weather that would have affected nesters. What was noticed was the earliness with which nesting began. Whether the mild winter and early spring were the cause or not, many birds were nesting in April and migrants such as orioles, which arrive here in early May, had young out of the nest before the end of June — ROBERT C. DEWIRE, Nature Center For Environmental Studies, Westport, Conn. 06880.

3. UPLAND BEECH-MAPLE FOREST. — **Location:** Connecticut; Fairfield Co., Greenwich, in NW part of town and N portion of 280-acre Audubon Center, Glenville Quadrangle, USGS. **Continuity:** Established 1961; 4 intermittent years. **Size:** 8.09 ha = 20 acres (rectangular, surveyed). **Description of Plot:** See AB 25:970-971, 1971. **Weather:** 1951-1971 averages are shown in parenthesis. Average temperatures: May, 56°F (58.2°); June, 69.8° (67.4°); July, 73.5° (72.2°). Precipitation (inches): May, 5.95 (3.47); June, 6.04 (2.95), July, 7.29 (3.61). It was a wet nesting season with 22 days during May and 19 in June in which some rain fell. Weather information from the weather station at the Stamford Museum 6.5 miles to the east. **Coverage:** May

6, 12, 26, June 5, 8-9, 11-13, 15, 19, 23, July 4, 7, 9. All trips between 0540 and 1945 hours. Total man-hours: 26. **Census:** Worm-eating Warbler, 4 (49, 20); Ovenbird, 4 (49, 20); Blue Jay, 3 (37, 15); Black-and-white Warbler, 2.5; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Black-capped Chickadee, 2; Wood Thrush, 2; Scarlet Tanager, 2; Rufous-sided Towhee, 2; Tufted Titmouse, 1.5; White-breasted Nuthatch, 1.5; Veery, 1.5; Com. (Yellow-shafted) Flicker, 1; Hairy Woodpecker, 1; Red-eyed Vireo, 1; Canada Warbler, 1; N. (Baltimore) Oriole, 1; Brown-headed Cowbird, 1 (female); Rose-breasted Grosbeak, 1, Am. Robin, 0.5; Com. Yellowthroat, 0.5; Ruffed Grouse, +; Yellow-billed Cuckoo, +; Pileated Woodpecker, +; Brown Creeper, +; Gray Catbird, +; Cardinal, +. **Total:** 28 species; 38 territorial males or females ($469/\text{km}^2$, 190 per 100 acres). **Visitors:** Black-billed Cuckoo, Great Horned Owl, E. Phoebe, E. Wood Pewee, Com. Crow, House Wren, Brown Thrasher, Starling, Louisiana Waterthrush, Am. Redstart, Red-winged Blackbird, Com. Grackle, Song Sparrow. **Remarks:** Immature birds being fed by adults included 1 flicker, 2 Downy Woodpeckers, 1 creeper and 2 orioles. There was a net decline of 4.5 from the previous year consisting mainly of the following: Ovenbird -3; towhee -2; and Ruffed Grouse, Winter Wren and robin -1 each. The main increases were Great Crested Flycatcher, Worm-eating Warbler and Scarlet Tanager, +1 each. There has been a decline of nesting birds for the past two years with the Ovenbird and Rufous-sided Towhee showing the greatest drops. Both of these seasons have had above average rainfall and also the lack of an Elm Span Worm infestation. Striped Skunk, E. Chipmunk, E. Gray Squirrel, E. Cottontail and White-tailed Deer were seen. Thanks to Bob Boone, Wm. Bolton Cook and Paul C. Spofford for assisting.

— GARY E. PALMER, Greenwich Audubon Society, 109 Greenwich Ave., Greenwich, Conn. 06830.

4. MIXED HARDWOOD FOREST. — **Location:** Pennsylvania; Montgomery Co., Limerick Township, 2.5 miles SE of Pottstown near the intersection of Keene and Longview Rds; $40^\circ 13' \text{N}$, $75^\circ 35' \text{W}$, Phoenixville Quadrangle, USGS. **Continuity:** New. **Size:** 6.31 ha = 15.6 acres (irregular, but roughly 2470 x 250 ft, measured in half-acre blocks with steel tape and compass). **Description of Plot:** Composed of several adjacent stands. Dominant canopy trees include White Ash (*Fraxinus americana*), Tulip-tree (*Liriodendron tulipifera*), Red Maple (*Acer rubrum*), Chestnut Oak (*Quercus prinus*), and Am. Elm (*Ulmus americana*). Flowering Dogwood (*Cornus florida*) and Spicebush (*Lindera benzoin*) are common in the understory. The ground cover is primarily Pale Touch-Me-Not (*Impatiens pallida*) or Enchanter's Nightshade (*Circaea quadrangularis*). A quantitative survey of the vegetation based on 22 0.0405 ha (0.1 acre) circular quadrats gave the following results: Trees 9-cm dbh and over $510/\text{ha}$ (206/acre); total basal area $24.1 \text{ m}^2/\text{ha}$ ($101.5 \text{ ft}^2/\text{acre}$). Species comprising 90% of the total number of trees are listed below followed by number per hectare, relative density (%), relative dominance

(%), and frequency (%), respectively. White Ash, 14, 28.2, 31, 77; Red Maple, 53, 10.4, 4, 50; Tulip-tree, 43, 8.4, 12, 27; Am. Elm, 29, 5.7, 4, 41; Chestnut Oak, 27, 5.3, 12, 32; Slippery Elm (*U. rubra*), 27, 5.3, 4, 32; Sugar Maple (*A. saccharum*), 23, 4.4, 2, 18; Black Walnut (*Juglans nigra*), 21, 4.2, 4, 36; Flowering Dogwood, 20, 4.0, 1, 46; Beech (*Fagus grandifolia*), 19, 3.7, 3, 22; Bitternut Hickory (*Carya cordiformis*), 16, 3.1, 3, 32; Black Cherry (*Prunus serotina*), 15, 2.9, 2, 32; Boxelder (*Acer negundo*), 15, 2.9, 2, 23; White Oak (*Q. alba*), 11, 2.0, 5, 14; Red Oak (*Q. rubra*), 11, 2.0, 3, 32; dead trees, 55, 9.7, 6, 86. Trees by diameter size class followed by number per hectare, relative density (%), basal area (m^2/ha), relative dominance (%): A (9-15 cm) 247, 43.7, 2.9, 11; B (15-21 cm) 112, 19.9, 2.9, 11, C (21-30 cm) 103, 18.3, 5.3, 21; D (30-48 cm) 88, 15.5, 10.6, 41; E (48-69 cm) 13, 2.4, 3.2, 13; F (69-93 cm) 1, 0.2, 0.7, 2.6. Woody stems between 1.5-cm and 9-cm dbh are estimated at $2093/\text{ha} = 847/\text{acre}$; ground cover 72%; canopy cover 87%; average canopy height 13.7 m = 45 ft. Plant names are from M. L. Fernald, 1950, *Gray's Manual of Botany*, 8th Ed. **Edge:** Bordered on three sides by similar forest and on the fourth by a road and fields. **Topography:** A small stream, Possum Hollow Run, flows through the middle of the plot. The plot consists of a narrow floodplain and 3-15% slopes on both sides. **Elevation:** 200 ft. **Weather:** Normal for the area. **Coverage:** May 31; June 6, 8, 12, 14, 21, 26-27, July 2-3. All trips between 0500 and 1000 hours. Total man-hours: 12, plus about 50 for plot layout and plant survey. **Census:** Cardinal, 6 (95, 38); Wood Thrush, 5 (79, 32); Tufted Titmouse, 3 (48, 19); Gray Catbird, 3 (48, 19); Rufous-sided Towhee, 3 (48, 19); House Wren 2.5; Carolina Wren, 2; Ovenbird, 2; Great Crested Flycatcher, 1.5; Indigo Bunting, 1.5; Ring-necked Pheasant, 1; Com. (Yellow-shafted) Flicker, 1, E. Wood Pewee, 1; Carolina Chickadee, 1; Kentucky Warbler, 1; Song Sparrow, 1; N. (Baltimore) Oriole, 1; Com. Yellowthroat, 0.5; Downy Woodpecker, +; Blue Jay, +. **Total:** 20 species; 37 territorial males ($586/\text{km}^2$, 237 per 100 acres). **Visitors:** Broad-winged Hawk, Yellow-billed Cuckoo, Rose-breasted Grosbeak, Am Goldfinch. **Remarks:** One House Wren nest with young was located. This census was completed as part of a study describing the terrestrial ecology in the vicinity of the proposed Limerick Generating Station by Ichthyological Associates, Inc. — ROBERT W BLYE, JR. *Ichthyological Associates, RD#1, Frick's Lock Road, Pottstown, Pa. 19464.*

5. CUT-OVER MATURE HARDWOODS. — **Location:** West Virginia, Pocahontas Co., about 5 miles NE of Durbin; centerline starts at $38^\circ 35' 50'' \text{N}$, $79^\circ 45' 40'' \text{W}$, Durbin quadrangle, USGS, and extends NW. **Continuity:** Established 1948; 5 intermittent years. (Formerly called Mature Deciduous Forest) **Size:** 6.1 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally) **Description of Plot:** See AFN 22:660, 1968. A northern hardwood forest, selectively cut in 1955 but now almost completely canopied over at height 50 to 85 ft **Elevation:** 4000 ft. **Weather:** Light fog in the mornings, clear days, warmer than normal for month. **Coverage:**

June 9-14, 8 trips 0530-0645 hours, 2 trips 0900-1030 hours, 4 trips 1900-2030 hours. Total party-hours: 20. **Census:** Red-eyed Vireo, 6 (99, 40); Black-throated Green Warbler, 4 (66, 27); Veery, 3 (49, 20); Wood Thrush, 2; Black-throated Blue Warbler, 2; Ovenbird, 2, Dark-eyed (Slate-colored) Junco, 2; Yellow-bellied Sapsucker, 1; Chestnut-sided Warbler, 1; Mourning Warbler, 1; Rufous-sided Towhee, 1; Hairy Woodpecker, +; Brown-headed Cowbird, +; Scarlet Tanager, +. **Total:** 14 species; 25 territorial males (412/km², 167 per 100 acres). **Visitors:** Black-billed Cuckoo, E. Wood Pewee, White-breasted Nuthatch, Am. Robin, Rose-breasted Grosbeak. **Remarks:** One nest located—Yellow-bellied Sapsucker, contents not examined. The succession to a closed canopy has induced changes in some bird species from 1968—notably Chestnut-sided Warbler—a 9 to 1 decrease. The only opening remaining in the canopy is an area approximating the size produced when one or two large trees are removed. This is the location of the Chestnut-sided and Mourning Warblers. — WILLIAM H. SMITH (compiler), Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.

6. OAK-BEECH-HICKORY FOREST. — **Location:** West Virginia, Lincoln Co., Big Ugly State Public Hunting Area, 12 miles W of Madison. The centerline starts at 38°04'50"N, 82°01'56"W, Big Creek Quadrangle, USGS, and extends NE. **Continuity:** New. **Size:** 6.1 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** Dominant in the canopy are oak (*Quercus* sp.), Am. Beech (*Fagus grandifolia*) and hickory (*Carya* sp.). The understory is thick, seldom over 10 ft tall, and is mostly seedlings of the canopy trees, Mountain Laurel (*Kalmia latifolia*), Azalea (*Rhododendron nudiflorum* and *R. calendulaceum*), and Mapleleaf Viburnum (*Viburnum acerifolium*). Christmas Fern (*Polystichum acrostichoides*) is the most prominent ground cover plant. A quantitative survey shows: Trees 3-inches dia. and over, based on six circular samples, 215/acre; total basal area 75 7ft²/acre. Species comprising 90% of the total number of trees: White Oak (*Q. alba*), 43, 20, 18, 83, Chestnut Oak (*Q. prinus*), 28, 13, 9, 67; Black Oak (*Q. velutina*), 23, 11, 12, 67; Red Oak (*Q. rubra*), 17, 8, 17, 67; Shellbark Hickory (*C. ovata*), 23, 11, 5, 83; Pignut Hickory (*C. glabra*), 10, 5, 4, 83; Red Maple (*Acer rubrum*), 22, 10, 4, 67; Black Birch (*Betula lenta*), 13, 6, 4, 50; Cucumber-tree (*Magnolia acuminata*), 10, 5, 9, 67; Am. Beech, 7, 3, 14, 50. Trees by diameter size class: A (3-6 in.) 145, 67, 14, 5, 19; B (6-9 in.) 25, 12, 7.5, 10; C (9-15 in.) 32, 15, 25, 4, 33; D (15-21 in.) 10, 5, 18, 24; E (21-27 in.) 3, 1, 10, 7, 14. Shrub stems per acre 73,600; ground cover 42%; canopy cover 60%; average canopy height 55 ft (range 40-75). The hillside was timbered about 1940 leaving the large Beech to dominate the area far out of proportion to their number. **Edge:** The forest continues in all directions. **Topography:** Very steep hillside. The centerline follows a jeep trail which rises from elevation 940 to 1020 ft then continues about level. The hillside slopes from 30 to 35 degrees. **Weather:** Warm, with rain

most of the time except during census hours. **Coverage:** May 26-28. Ten trips between dawn and 0900, two in the late morning and two in the late evening. Total party-hours: 13. **Census:** Red-eyed Vireo, 6 (99, 40), Worm-eating Warbler, 5 (82, 33); Cerulean Warbler, 4 (66, 27); Black-and-white Warbler, 3 (49, 20); Yellow-billed Cuckoo, 2; Blue-gray Gnatcatcher, 2; Ovenbird, 2; Kentucky Warbler, 2; Hooded Warbler, 2; Tufted Titmouse, 1; White-eyed Vireo, 1; Yellow-throated Vireo, 1; Black-throated Green Warbler, 1; Blackburnian Warbler, 1; Yellow-throated Warbler, 1; Scarlet Tanager, 1; Summer Tanager, 1; Indigo Bunting, 1, Rufous-sided Towhee, 1; Whip-poor-will, +; Great Crested Flycatcher, +; Carolina Chickadee, +, Brown-headed Cowbird, +. **Total:** 23 species; 38 territorial males (626/km², 253 per 100 acres). **Visitors:** Black-billed Cuckoo, Ruby-throated Hummingbird, Blue Jay, Wood Thrush, Prairie Warbler, Cardinal, Am. Goldfinch. **Remarks:** Nests of the Red-eyed and Yellow-throated Vireos were found. Quantitative habitat description by Kenneth Anderson and George Koch. — VIRGINIA B. OLSEN and GEORGE HURLEY, Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.

7. OAK-BEECH-MAGNOLIA FOREST. — **Location:** West Virginia; Lincoln Co., Big Ugly Public Hunting Area, 12.5 miles W of Madison. The centerline starts at 38°04'51"N, 82°02'22"W, and extends northeast; Big Creek Quadrangle, USGS. **Continuity:** New. **Size:** 6.1 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The dominant canopy trees are oak (*Quercus* sp.), Am. Beech (*Fagus grandifolia*), and Cucumber-tree (*Magnolia acuminata*). *Magnolia tripetala* and *fraseri* are also present. About one quarter acre is kept cleared at the site of a gas well. Many such wells and clearings are distributed throughout the area, hence its inclusion in a study plot. Most prominent in the understory are Flame Azalea (*Rhododendron calendulaceum*), Spicebush (*Lindera benzoin*), Maple-leaved Viburnum (*Viburnum acerifolium*), and saplings of the canopy trees. The ground cover is primarily Christmas Fern (*Polystichum acrostichoides*), Broad Beech Fern (*Dryopteris hexagonoptera*), *Trillium* sp., and Pussy's-toes (*Antennaria plantaginifolia*). A quantitative vegetation shows: Trees 3-inches diameter and over, based on six circular samples, 242/acre; total basal area 89.8 ft²/acre. Species comprising 90% of the total number of trees: White Oak (*Q. alba*), 63, 26, 29, 83; Black Oak (*Q. velutina*), 10, 4, 3, 33; Tulip-tree (*Liriodendron tulipifera*), 22, 9.7, 67; Pignut Hickory (*Carya glabra*), 20, 8, 8, 33; Shellbark Hickory (*C. ovata*), 15, 6, 2, 83; Cucumber-tree, 17, 7, 11, 83; Am. Beech, 13, 6, 21, 50, Linden (*Tilia americana*), 13, 6, 6, 33; Sourwood (*Oxydendron arboreum*), 13, 6, 3, 33; Flowering Dogwood (*Cornus florida*), 12, 5, 2, 67; Black Birch (*Betula lenta*), 12, 5, 2, 67; dead trees, 7, 3, 1, 33. Trees by diameter size class: A (3-6 in.) 139, 57, 13.9, 15; B (6-9 in.) 60, 25, 17.5, 20; C (9-15 in.) 28, 12, 22.7, 25; D (15-21 in.) 8, 3, 15, 17; E (21-27 in.) 7, 3, 20.7, 23. Shrub stems/acre 45,100; ground cover 48%; canopy cover 79%; average canopy height 68 ft (range 50-84). Plant

names from Strausbaugh and Core, *Flora of West Virginia*. **Edge:** Forest continues on all sides. **Topography:** Northwest hillside with 35 degree slope. Elevation approximately 800 ft. **Weather:** Cloudy with frequent rain, temperature 60-72 F. **Coverage:** May 26-28; ten trips between 0545 and 0850 and four in the late evening. Total party-hours: 12.5. **Census:** Red-eyed Vireo, 8 (132, 53); Acadian Flycatcher, 6 (99, 40); Worm-eating Warbler, 6 (99, 40); Cerulean Warbler, 6 (99, 40); Black-and-white Warbler, 5 (82, 33); Ovenbird, 5 (82, 33); Am. Redstart, 5 (82, 33); Blue-gray Gnatcatcher, 3 (49, 20); Indigo Bunting, 3 (49, 20); Black-throated Green Warbler, 2.5; N. Parula, 2; Kentucky Warbler, 2; Ruby-throated Hummingbird, 1; Tufted Titmouse, 1; Yellow-throated Vireo, 1; Louisiana Waterthrush, 1; Hooded Warbler, 1; Scarlet Tanager, 1; Summer Tanager, 1; Turkey Vulture, +; Red-tailed Hawk, +; Barred Owl, +; Whip-poor-will, +; Pileated Woodpecker, +; Hairy Woodpecker, +; E. Wood Pewee, +; Blue Jay, +; Com. Crow, +; Carolina Chickadee, +; Wood Thrush, +. **Total:** 30 species; 60.5 territorial males (997/km², 403 per 100 acres). **Visitors:** Green Heron, Bobwhite, Yellow-billed Cuckoo, Black-billed Cuckoo, Rufous-sided Towhee. **Remarks:** Nests were found for Black-throated Green Warbler and Indigo Bunting. It is felt that the wet weather caused less activity among the hawks and owls of the region, so that their evaluation was more difficult. The Tufted Titmice were apparently already hatched and moving throughout the plot. The study was made as a part of the continuing quantitative analysis of West Virginia birds by the Brooks Bird Club. — **GEORGE and LAURA KOCH, MARK and BETTY GATEWOOD, MAXINE KIFF, JANICE MUSSER and GLEN PHILLIPS (compiler), Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.**

8. OAK-HICKORY FOREST. — **Location:** West Virginia; Kanawha Co., South Charleston, 2 miles SE of intersection of Kanawha Forest Drive and State Route 214; 38°19'8"N, 81°41'42"W, Charleston, West Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.07 ha = 15.0 acres (rectangular, 110 x 660 yards, measured). **Description of Plot:** See AFN 26:946-947, 1972. **Weather:** Generally clear and cool (50°) following showers in the night. On only one trip was it overcast with light rain. **Coverage:** May 14-15, 26-29; June 1-3, 5, 9, 17. All trips between 0625 and 0915, except one between 1630 and 1800. Total man-hours: 17. **Census:** White-eyed Vireo, 4 (66, 27); Red-eyed Vireo, 4 (66, 27); Ovenbird, 4 (66, 27); Hooded Warbler, 4 (66, 27); Acadian Flycatcher, 3 (49, 20); Tufted Titmouse, 3 (49, 20); Wood Thrush, 3 (49, 20); Cardinal, 2.5; E. Wood Pewee, 2; Black-and-white Warbler, 2; Am. Redstart, 2; Rufous-sided Towhee, 2; Carolina Wren, 1.5; Kentucky Warbler, 1.5; Scarlet Tanager, 1.5; Carolina Chickadee, 1; Blue-gray Gnatcatcher, 1; Yellow-throated Vireo, 1; Worm-eating Warbler, 1; Indigo Bunting, 1; Downy Woodpecker, 0.5; Red-bellied Woodpecker, 0.5; White-breasted Nuthatch, 0.5; Com. (Yellow-shafted) Flicker, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Great Crested Flycatcher, +; Blue Jay, +; Com. Crow, +; Yellow-throated Warbler,

+; Louisiana Waterthrush, +; Brown-headed Cowbird, +. **Total:** 32 species; 46.5 territorial males (766/km², 310 per 100 acres). **Visitors:** Yellow-billed Cuckoo, Ruby-throated Hummingbird, E. Phoebe, Gray Catbird, E. Bluebird, Cedar Waxwing, N. Parula, Summer Tanager, Am. Goldfinch, Field Sparrow, Song Sparrow. **Remarks:** No physical changes occurred on the area or in its vicinity during the year and there were no significant changes in the population. Apparent differences may be attributed to the mild, snowless winter followed by a warm, wet spring. This weather pattern resulted in an early abundant growth of heavy foliage. Permanent residents like Tufted Titmouse, Carolina Chickadee, and Downy Woodpecker, and such early spring arrivals as Louisiana Waterthrush, began nesting early, and many broods were out of the nest by the third week of May, making it difficult to tie them closely to the plot. One Cardinal nest under construction was found. White-eyed Vireos, Worm-eating and Kentucky Warblers were observed carrying food. Three or four Box Turtles were seen along the path. Special thanks to George Koch for his assistance with the evaluation of the species. — **CONSTANCE R. KATHOLI (compiler), Brooks Bird Club, 930 Woodland Avenue, South Charleston, W. Va. 25303**

9. TULIP-TREE-BEECH-HICKORY FOREST. — **Location:** West Virginia; Lincoln Co., Big Ugly State Public Hunting Area, 14 miles W of Madison. The centerline starts at 38°05'28"N, 82°03'37"W, Big Creek Quadrangle, USGS, and extends NW. **Continuity:** New. **Size:** 6.1 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The dominant canopy trees are Tulip-tree (*Liriodendron tulipifera*) and Am. Beech (*Fagus grandifolia*). Most prominent in the understory are Spicebush (*Lindera benzoin*), Wild Hydrangea (*Hydrangea arborescens*), and seedlings of the canopy trees. The ground cover is primarily Poison Ivy (*Rhus radicans*) (not included in the woody stem count), Golden Ragwort (*Senecio aureus*), and Black Cohosh (*Cimicifuga racemosa*). A quantitative vegetation survey shows: Trees 3-inches diameter and over, based on six circular samples, 328/acre; total basal area 127.6 ft²/acre. Species comprising 90% of the total number of trees: Tulip-tree, 78, 24, 29, 100; hickory (*Carya sp.*), 47, 14, 10, 67; Am. Beech, 30, 10, 15, 50; dead trees, 24, 7, 3, 83; Flowering Dogwood (*Cornus florida*), 22, 6, 2, 50; Cucumber-tree (*Magnolia acuminata*), 20, 6, 6, 83; Black Gum (*Nyssa sylvatica*), 16, 5, 1, 67; White Oak (*Quercus alba*), 12, 4, 6, 83; Red Oak (*Q. rubra*), 10, 3, 4, 67; Basswood (*Tilia americana*), 12, 4, 10, 67; Black Birch (*Betula lenta*), 8, 3, 1, 50; White Ash (*Fraxinus americana*), 8, 3, 2, 50; Sassafras (*Sassafras albidum*), 8, 3, 1, 50; Hemlock (*Tsuga canadensis*), 5, 2, 5, 33; Black Walnut (*Juglans nigra*), 5, 2, 2, 33; Sugar Maple (*Acer saccharum*), 3, 1, 1, 17. Trees by diameter size class: A (3-6 in.) 162, 49, 16.2, 13; B (6-9 in.) 87, 27, 26.2, 21; C (9-15 in.) 67, 20, 56, 43; D (15-21 in.) 7, 2, 12, 9; E (21-27 in.) 3, 1, 10.3, 8; F (27-33 in.) 2, 1, 8.2, 6 Shrub stems/acre 36,200; ground cover 66%; canopy cover 74%; average canopy height 80 ft (range 50-105) **Edge:** The forest continues in all directions **Topography:** Very steep perpendicular to centerline

The centerline follows a jeep trail along the left side of a ravine from elevation 800 to 1000 ft. The ravine is about 50 ft deep at the start with sides sloping about 45 degrees. The depth decreases to only a few feet at the upper end while the slope decreases to about 20 degrees, the average slope of the remainder of the plot. **Weather:** Cloudy skies and daily rain that stopped during the morning hours. Mild temperatures and very little wind made the weather ideal for making the study. **Coverage:** May 26-29; ten trips between daylight and 0830, two in the late morning and two in the late evening. Total party-hours: 12. **Census:** Acadian Flycatcher, 10 (165, 67); Red-eyed Vireo, 8 (132, 53); Cerulean Warbler, 5 (82, 33); Am. Redstart, 5 (82, 33); Blue-gray Gnatcatcher, 3 (49, 20); Worm-eating Warbler, 3 (49, 20); Ovenbird, 3 (49, 20); Hooded Warbler, 2.5; Tufted Titmouse, 2; Black-throated Green Warbler, 2; Black-and-white Warbler, 1.5; Summer Tanager, 1.5; Carolina Chickadee, 1; White-breasted Nuthatch, 1; N. Parula, 1; Louisiana Waterthrush, 1; Kentucky Warbler, 1; Rufous-sided Towhee, 1; Yellow-billed Cuckoo, 0.5; Scarlet Tanager, 0.5; Cardinal, 0.5; Black-billed Cuckoo, +; Pileated Woodpecker, +; Red-bellied Woodpecker, +; Downy Woodpecker, +; Wood Thrush, +; Brown-headed Cowbird, +; Indigo Bunting, +. **Total:** 28 species; 54 territorial males ($890/\text{km}^2$, 360 per 100 acres). **Visitors:** Great Crested Flycatcher, Com. Crow, Am. Goldfinch. **Remarks:** Very remote, heavily wooded. We could see no reason for the low Wood Thrush population. Populations of other species of this habitat seemed to be normal or above. — KENNETH ANDERSON, WILLIAM SMITH, NEVADA LAITSCH, BETSY EATON, GEORGE KOCH (compiler), *Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

10. UPLAND BLACK CHERRY FOREST. — **Location:** West Virginia; Pocahontas Co., 6.5 miles NE of Durbin. The centerline follows a seeded and seldom used forest access road along the top of a ridge, a spur of Burner Mountain, that extends SE between Five Mile Hollow and Bearwall Run; $38^\circ 36' 10''\text{N}$, $79^\circ 43' 29''\text{W}$; Thornwood Quadrangle, USGS. **Continuity:** Established 1968; 2 intermittent years. **Size:** 6.07 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** See *AFN* 22:661-662, 1968. **Weather:** Warmer and drier than normal. **Coverage:** June 13-16; nine trips, six between daylight and 0730 plus three from 1900 to 2030. Total party-hours about 15. **Census:** Red-eyed Vireo, 5 (82, 33); Black-throated Green Warbler, 5 (82, 33); Veery, 3.5 (58, 23); Chestnut-sided Warbler, 3 (49, 20); Solitary Vireo, 2; Magnolia Warbler, 2; Black-throated Blue Warbler, 2; Wood Thrush, 1.5; Dark-eyed (Slate-colored) Junco, 1.5; Mourning Warbler, 1; Yellow-bellied Sapsucker, +; E. Wood Pewee, +; Am. Robin, +; Ovenbird, +; Scarlet Tanager, +; Rufous-sided Towhee, +. **Total:** 16 species; 26.5 territorial males ($437/\text{km}^2$, 177 per 100 acres). **Visitors:** Barred Owl, Com. Raven, Pileated Woodpecker, Black-capped Chickadee, Brown Creeper, White-breasted Nuthatch, Brown-headed Cowbird. **Remarks:** A comparison of the present census with that taken in 1968 seems to indicate fewer numbers of the same species

present this year than 5 years ago except Red-eyed Vireos and Black-throated Green Warblers, which were about the same. — KYLE BUSH, E. E. HUTTON, JR., E. R. CHANDLER (compiler), assisted on several trips by Mary Ford, J. Murphy and William Smith, *Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

11. YOUNG NORTHERN HARDWOOD FOREST.

— **Location:** West Virginia; Randolph Co., in Monongahela National Forest on the crest of a spur of Shaver's Mountain near the head of Glade Run, about 1.5 miles N of Gaudineer Knob. **Continuity:** Established 1948; 5 intermittent years. (Also called Young Deciduous Forest.) **Size:** 6.07 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** See *AFN* 22:660-661, 1968. **Topography:** The ridge slopes from east to west toward Cheat River at an elevation of 4100-4200 ft. **Weather:** Unseasonably warm and dry for the area. **Coverage:** June 9-12; 13 trips between 0540 and 0730. About 10 party-hours. **Census:** Red-eyed Vireo, 7 (115, 47); Black-throated Green Warbler, 4 (66, 27); Ovenbird, 3 (49, 20); Am. Robin, 2; Solitary Vireo, 2; Dark-eyed (Slate-colored) Junco, 2; Com (Yellow-shafted) Flicker, 0.5; Black-capped Chickadee, 0.5; Red-breasted Nuthatch, 0.5; Red-shouldered Hawk, +; Blue Jay, +; Wood Thrush, +; Hermit Thrush, +; Swainson's Thrush, +; Brown-headed Cowbird, +. **Total:** 15 species; 21.5 territorial males ($354/\text{km}^2$, 143 per 100 acres). **Visitors:** Black-throated Blue Warbler, Red Crossbill. **Remarks:** The population was first recorded by Aldrich and Stewart in 1947. The Brooks Bird Club has studied and recorded on the plot in 1948, 1953, 1958, 1968, and 1973, tracing the bird population from that of a thicket to a young forest. Little change is evident from 1968 to 1973, being reflected mostly in the ascendancy of Red-eyed Vireos to dominant species. Although it was the opinion of most members that bird populations were down in this part of West Virginia this year, this plot retained its relatively stable population figure. — GREG and ANN EDDY, MARTIN and CAROL RUDY, ORPHA RICHARDSON, HOWARD HEIMERDINGER, ROBERT LIGHTBURN, GERALD McGREW, KIT PRICE and GLEN PHILLIPS (compiler), *Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

12. HICKORY-OAK-ASH FLOODPLAIN FOREST.

— **Location:** Maryland; Howard Co., Middle Patuxent River due W of the Hobbits Glen Golf Course, Columbia; $39^\circ 13' 10''\text{N}$, $76^\circ 54' 45''\text{W}$, Clarksville Quadrangle, USGS. **Continuity:** Established 1971; 2 intermittent years. **Size:** 18.4 ha = 45.5 acres (L-shaped following the 310-ft contour; surveyed). **Description of Area:** See *AB* 25:963-964, 1971. The dominant canopy trees are Pignut Hickory (*Carya glabra*), Red Oak (*Quercus rubra*), and Green Ash (*Fraxinus pennsylvanica*). **Coverage:** June 6, 8, 23, 27, 29, 30; July 4, 7, 14, 21. All 10 trips in early morning; most started 10 minutes before to 20 minutes after sunrise. Total man-hours: 36. **Census:** (territorial males followed in parentheses by males per square kilometer and males per 100 acres),

Gray Catbird, 27.5 (149, 60), Cardinal, 18 (98, 40), Acadian Flycatcher, 15 (81, 33); Tufted Titmouse, 11 (60, 24); White-eyed Vireo, 10 (54, 22); Blue-gray Gnatcatcher, 8 (43, 18); Red-eyed Vireo, 8 (43, 18); Am. Redstart, 8 (43, 18); Downy Woodpecker, 7.5 (41, 16); Wood Thrush, 7 (38, 15); Carolina Chickadee, 6 (33, 13); Carolina Wren, 6 (33, 13); Kentucky Warbler, 6 (33, 13); N. Parula, 5 (27, 11); Brown-headed Cowbird, 4.5 (24, 10); Yellow-billed Cuckoo, 4 (22, 9); Red-bellied Woodpecker, 4 (22, 9); E. Wood Pewee, 4 (22, 9); Cerulean Warbler, 4 (22, 9); Com. Yellowthroat, 4 (22, 9); Veery, 3.5 (19, 8); White-breasted Nuthatch, 3 (16, 7); Louisiana Waterthrush, 3 (16, 7); Scarlet Tanager, 3 (16, 7); Ruby-throated Hummingbird, 2; Com. (Yellow-shafted) Flicker, 2; Yellow-throated Vireo, 1.5; Am. Goldfinch, 1.5; Rufous-sided Towhee, 1.5; Mourning Dove, 1; Hairy Woodpecker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; Com. Crow, 1; Indigo Bunting, 1; Pileated Woodpecker, 0.5; Blue Jay, 0.5; Hooded Warbler, 0.5; Red-shouldered Hawk, +; Broad-winged Hawk, +; Barred Owl, +. **Total:** 41 species; 196 territorial males ($1,064/\text{km}^2$, 431 per 100 acres). **Visitors:** Bobwhite, Am. Woodcock, Belted Kingfisher, Brown Thrasher, Am. Robin, Starling, Warbling Vireo, Black-and-white Warbler, N. (Baltimore) Oriole, Com. Grackle, White-throated Sparrow.

Remarks: On June 22, 1972, floodwaters from Hurricane Agnes produced major changes in this census plot, illustrated by photographs (AB 27:671) taken from the same spot the winter before and the winter after the flood. Unfortunately, the captions for the photos were not printed, so it is not readily apparent that the two photos represent exactly the same portion of the plot. The view on the right, taken the winter after the flood, shows the bank erosion, the log jam, the debris in the foreground, and the loss of understory in the background. Near the river the fast-moving water had flattened most trees and shrubs that were less than 30 feet tall. Along the west and east sides of the plot, where the 12-foot-deep water flowed more slowly, there was little damage to the woody plants. Some of the bird population changes appear to be directly related to the flood. Two ground-nesting species, Rufous-sided Towhee and Kentucky Warbler, showed the greatest percentage decrease from 1971 to 1973: 74% and 33%, respectively. The Louisiana Waterthrush, which had completed its nesting prior to the flood, maintained its population. The other two species with notable declines are Acadian Flycatcher (19 down to 15) and Am. Redstart (11 to 8), both understory species that would have suffered production loss in the 1972 flood. In spite of these population decreases and a drop from 46 nesting species in 1971 to 41 in 1973, the net change in population was an increase from 180 to 196 territorial males. Catbirds, presumably taking advantage of the heavy tangles along the river, increased markedly from 10.5 to 27.5 territorial males. Tufted Titmice increased from 6 to 11, Blue-gray Gnatcatchers from 3 to 8, and Downy Woodpeckers from 5 to 7.5 — CHANDLER S ROBBINS, Migratory Bird and Habitat Research Laboratory, Laurel, Md. 20810.

13. MATURE DECIDUOUS FLOODPLAIN FOREST. — **Location:** Maryland; Montgomery Co., Cabin John Island, Glen Echo, 2.5 miles NW of the District of Columbia, between the C. and O. Canal and the Potomac River, just south of Cabin John Creek, Falls Church Quadrangle, USGS. **Continuity:** Established 1947; 21 intermittent years. **Size:** 7.6 ha = 18.75 acres (oblong, surveyed). **Description of Plot:** See AFN 1:212-213, 1947. **Weather:** Wet and cool, March through May; warm and dry, June and July. **Coverage:** March 24, 31; April 18, May 5-6, 12, 19, 22, 26; June 2-3, 9, 23, 30; July 7, 15, 22. All trips between 0515 and 1130 hours. Total man-hours: 38. **Census:** Starling, 16 (211, 85); Acadian Flycatcher, 11 (145, 59); Red-eyed Vireo, 11 (145, 59); N. Parula, 9 (119, 48); Carolina Wren, 7 (92, 37); Tufted Titmouse, 6 (79, 32); Downy Woodpecker, 4 (53, 21); Am. Redstart, 4 (53, 21); Cardinal, 4 (53, 21); Wood Duck, 3 (40, 16); E. Wood Pewee, 3 (40, 16); Carolina Chickadee, 3 (40, 16); Prothonotary Warbler, 3 (40, 16); Red-bellied Woodpecker, 2; Great Crested Flycatcher, 2; Veery, 2; Barred Owl, 1; Pileated Woodpecker, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Brown-headed Cowbird, 1; Scarlet Tanager, 1. **Total:** 22 species; 97 territorial males or females ($1278/\text{km}^2$, 517 per 100 acres). **Visitors:** Com. (Yellow-shafted) Flicker, Blue Jay, Com. Crow, Yellow-throated Vireo, Com. Grackle, Rufous-sided Towhee. **Remarks:** Nests found: Wood Duck, 1; Starling, 4. The total population shows an increase over 1972, rising from 89 to 97 pairs. This level is still quite low for the entire period from 1947 and the number of species, 23, is also low compared with the 1947-71 average of 27. The totals of abundance for 1972 and 1973 are the first to indicate a distinct drop in the curve of total abundance. The drop, however, represents a decrease which was evident as early as 1960, in the summer resident population, but was balanced by an increase in the permanent residents, particularly Starlings. Some species, mostly of low incidence, have disappeared entirely: Ruby-throated Hummingbird, Yellow-billed Cuckoo, Wood Thrush, Kentucky Warbler, Com. Yellowthroat, Hooded Warbler. Others show a downward trend Red-eyed Vireo, E. Wood Pewee, Great Crested Flycatcher, Blue-gray Gnatcatcher, N. Parula, Am. Redstart, Scarlet Tanager, Veery. The only common summer resident not showing a downward trend is the Acadian Flycatcher. Meanwhile, Starlings have increased dramatically and other permanent residents such as the Carolina Chickadee, Cardinal, and Tufted Titmouse, have shown some increase. The Carolina Wren was completely wiped out in the hard winter of 1961 but has now risen to its former level. On June 22, 1972, a major flood of the Potomac River covered Cabin John Island to a depth of over 5 ft and after subsiding in a few days, left in the understory a tangle of small trees bent double but living, flood debris, and a few fallen larger trees. (The 1972 census had at that time been completed.) The 1973 area was therefore unusually brushy and had probably lost some trees with nesting holes. As of this year, however, no loss of hole-nesting birds is evident. The brushy habitat may have appealed to Acadian Flycatchers and Carolina Wrens,

which appeared in unusual numbers and largely accounted for the increase of total nesting pairs over 1972. —JOAN H. CRISWELL (compiler), W. H. CRAMER and C. E. CRAVEN, *Audubon Naturalist Society, 8940 Jones Mill Road, Washington, D. C. 20015.*

14. MIXED HARDWOOD FOREST. — **Location:** Maryland: Calvert Co., NW of Plum Point and one mile inland from Chesapeake Bay on Tobacco Road between Routes 263 and 261. **Continuity:** Established 1960; 11 intermittent years. **Size:** 28 acres. **Description of Plot:** See *AFN* 13:333, 1959. **Weather:** 22 of the 26 full trips were on clear days. The high temperatures on census days varied between 58° and 93° F. The creek nearly dried up by the end of the period and the bog remained moist. **Coverage:** March 18, April 7, 14, 18, 23, 25, 29; May 1-2, 5, 7, 11-13, 16, 21, 27, 29; June 2, 9, 11, 15, 29-30; July 3, 7, 13, 20, 27; August 4, 13, 26. There were several night visits. Total: 26 full trips, averaging 1 hour and 41 minutes, started between 0604 and 0900 EST. **Census:** Red-eyed Vireo, 38.5 (340, 138); Wood Thrush, 35 (309, 125); Cardinal, 27 (238, 96); Acadian Flycatcher, 19 (168, 68); Carolina Wren, 16 (146, 59); Ovenbird, 15 (132, 54); Rufous-sided Towhee, 15 (132, 54); Tufted Titmouse, 14.5 (128, 52); N. Parula, 12 (106, 43); Carolina Chickadee, 11 (97, 39); Hooded Warbler, 10.5 (93, 38); Kentucky Warbler, 10 (88, 36); Yellow-throated Vireo, 7 (62, 25); Scarlet Tanager, 7 (62, 25); Red-bellied Woodpecker, 5 (44, 18); Downy Woodpecker, 5 (44, 18); E. Wood Pewee, 5 (44, 18); Blue-gray Gnatcatcher, 5 (44, 18); Mourning Dove, 4 (35, 14); Yellow-billed Cuckoo, 4 (35, 14); Brown-headed Cowbird, 4 (35, 14); Indigo Bunting, 4 (35, 14); Ruby-throated Hummingbird, 3 (26, 11); Louisiana Waterthrush, 3 (26, 11); Am. Redstart, 3 (26, 11); Hairy Woodpecker, 2; Am. Goldfinch, 2; Barred Owl, 1; Pileated Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Gray Catbird, 1; Am. Robin, 1; Yellow-throated Warbler, 1; Com. Yellowthroat, 1; Com. Grackle, 1; Summer Tanager, 1; Field Sparrow, 1. **Total:** 38 species; 298 territorial males, 2630/km², 1064 per 100 acres). **Visitors:** (average number of individuals per 100 acres); Green Heron, +; Bobwhite, +; Am. Woodcock, +; Belted Kingfisher, +; Com. (Yellow-shafted) Flicker, +; E. Phoebe, +; Com. Crow, +; Brown Thrasher, +; White-eyed Vireo, +; Worm-eating Warbler, +; Pine Warbler, +. **Remarks:** Thirty-eight species were judged to be on territory, an increase over last year's 35. The 13-year average is 36. The territorial males showed a marked increase from last year (241 to 298); the 13-year average is 233. The males per hundred acres (1064) increased correspondingly and is the highest yet recorded here. The previous high was 943 in 1968. There is no apparent reason for the increase although a few more than usual trips were made this year. The Red-eyed Vireo was again the most numerous species and had the same number of territories as last year (38.5). Next came the Wood Thrush, Cardinal, Acadian Flycatcher, and Carolina Wren which were in this same order in 1972. Recovering from last year's losses were Great Crested Flycatcher (0 to 1), Yellow-throated Vireo (3 to 7), N. Parula (7 to 12), Hooded Warbler (2.5 to 10.5) and

Cardinal (20 to 27). The Wood Thrush increased markedly (21.5 to 35). Also increasing were Barred Owl, Pileated Woodpecker, Tufted Titmouse, Ovenbird, Scarlet Tanager, Rufous-sided Towhee and Indigo Bunting. The Yellow-throated Warbler showed the worst loss (4 to 1). The Pine Warbler and the Chipping Sparrow (new last year) did not occur. The Am. Robin and Field Sparrow occurred for the first time as did the Green Heron (visitor). Nests of Mourning Dove, Ovenbird and Cardinal were observed closely — JOHN H. FALES, *Ridge Road, Neeld Estate, Huntingtown, Md. 20639.*

15. UPLAND TULIP-TREE-MAPLE-OAK FOREST. — **Location:** Maryland; Howard Co., west edge of Middle Patuxent River valley, SW of Hobbits Glen Golf Course at Columbia; 39°12'55"N, 76°54'40"W, Clarksville Quadrangle, USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 11.98 ha = 29.6 acres (basically rectangular, 1125 ft north-south by 1200 ft east-west). **Description of Plot:** See *AB* 25:971, 1971 and *AB* 26:665, 1972. **Coverage:** April 25; May 30-31; June 21, 26, 28; July 5, 8, 17, 23. All 10 trips in early morning; most started within 20 minutes of sunrise. Total man-hours: 22 **Census:** territorial males followed in parentheses by males per square kilometer and males per 100 acres; Cardinal, 11 (92, 37); Red-eyed Vireo, 10 (83, 34); Acadian Flycatcher, 8 (67, 27), Wood Thrush, 5 (42, 17); Tufted Titmouse, 4.5 (38, 15), Hooded Warbler, 4.5 (38, 15); Rufous-sided Towhee, 4.5 (38, 15); Veery, 4 (33, 14); Kentucky Warbler, 4 (33, 14); Scarlet Tanager, 3 (25, 10); Downy Woodpecker, 2.5; Carolina Chickadee, 2.5; Carolina Wren, 2.5; Cerulean Warbler, 2.5; Red-bellied Woodpecker, 2; Gray Catbird, 2; Yellow-billed Cuckoo, 1.5; Blue-gray Gnatcatcher, 1.5; Mourning Dove, 1; E. Wood Pewee, 1; Black-and-white Warbler, 1; N. Parula, 1; Ovenbird, 1; Am. Redstart, 1; Brown-headed Cowbird, 1; Blue Jay, 0.5; Turkey Vulture, +; Red-shouldered Hawk, +; Broad-winged Hawk, +; Com. (Yellow-shafted) Flicker, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Com. Crow, +; White-breasted Nuthatch, +; Brown Thrasher, +; White-eyed Vireo, +; Yellow-throated Vireo, +; Worm-eating Warbler, +; Louisiana Waterthrush, +. **Total:** 39 species; 83 territorial males (693/km², 280 per 100 acres). **Visitors:** Blue-winged Warbler, Am. Robin, N. (Baltimore) Oriole, Indigo Bunting, Am. Goldfinch. **Remarks:** The breeding population is very similar to that of last year. Territorial males increased by 1; species increased by 5 and reached a new high. The greatest increases (2 pairs each) were Tufted Titmouse, Veery, and Cardinal. The greatest decreases were in Red-eyed Vireo (13 to 10) and Acadian Flycatcher (10 to 8). Blue Jay and Black-and-white Warbler were new nesting species — CHANDLER S. ROBBINS, *Migratory Bird and Habitat Research Laboratory, Laurel, Md. 20810*

16. MIXED UPLAND HABITAT. — **Location:** District of Columbia; the central third of Glover-Archbold Park, a long, narrow stream valley park in the northwest section. **Continuity:** Established 1960, 14 consecutive years. **Size:** 14.2 ha = 35 acres (irregularly shaped area, roughly 1520 x 1000 ft in outside dimensions). **Description of Plot:** See *AFN* 14:502-503, 1960

Coverage: March 18, 25, April 1, 14, 15 (2 trips), 17, 20, 21 (2 trips), 22, 24, May 3, 6, 20, 27, 30, June 2, 8, 23, July 2, 4, 19. Hours ranged from 0623 to 2030 with 17 trips in a.m. and 6 in p.m.; total 51 hours, 55 minutes; 19 complete coverages of the area, averaging 2.66 hours per coverage. **Weather:** Clear for 14 of the trips, cloudy for 6, rain on 3. Wind was above average for 3. Temperatures ranged from 38° F. to 85°, averaging 68.5°. **Census:** Cardinal, 25 (176, 71); Tufted Titmouse, 22 (155, 63); Starling, 21 (148, 60); Carolina Chickadee, 12 (85, 34); Carolina Wren, 12 (85, 34); Veery, 11 (78, 31); Blue Jay, 9 (64, 26); Rufous-sided Towhee, 7 (49, 20); Red-bellied Woodpecker, 6 (41, 17); Com. Crow, 6 (42, 17); Gray Catbird, 6 (42, 17); Red-eyed Vireo, 6 (42, 17); Downy Woodpecker, 5 (35, 14); Com. Flicker, 4 (28, 11); White-breasted Nuthatch, 3 (21, 9); Mourning Dove, 2; Wood Thrush, 2; Scarlet Tanager, 2; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Acadian Flycatcher, 1; Mockingbird, 1; Brown Thrasher, 1; Am. Robin, 1; Red-shouldered Hawk, +; N. Parula, +; Ovenbird, +. **Total:** 27 species; 167 territorial males (1179 per km², 477 per 100 acres). **Visitors:** Wood Duck, Red-tailed Hawk, Yellow-billed Cuckoo, Rock Dove, Chimney Swift, E. Phoebe, Rough-winged Swallow, Fish Crow, Blue-gray Gnatcatcher, Worm-eating Warbler, Louisiana Waterthrush, Com. Yellowthroat, House Sparrow, Com. Grackle, Brown-headed Cowbird, Am. Goldfinch, Song Sparrow. **Remarks:** This census saw a sharp drop in number of species and total territorial males from last year's near-record of 39 species, 220.5 territorial males. Somewhat less coverage in June and July may account for missing a few marginal species, but in some cases the drops were just an acceleration of recent trends. In 1959 we had 6 species of nesting warblers, with a total of 30 pairs. This year we have 2, rated at + only. In the past two years the towhees are down from 15 pairs to 7, the catbirds from 11.5 to 6, the Red-eyed Vireos from 13 to 6, the Acadian Flycatcher from 4 to 1 (we had 9 for many years), and the Veeries from 19 to 11. These are all conspicuous birds that sing regularly and should not have been missed even on minimal coverage. Bobwhites were 3 last year; this year none. One observer wondered whether the heavy rains from Hurricane Agnes last year could have had such damaging effect on nesting birds that this year's breeding population has not recovered. This does not seem to have occurred consistently enough to make a convincing theory. — SHIRLEY A. BRIGGS (compiler), MICHAEL HOFFMAN, DAVID MEHLMAN, PETER NULTY, JOSEPH B. and DOROTHY PHILLIPS, DONALD WEBER, 8940 Jones Mill Rd., Washington, D.C. 20015.

17. UPLAND OAK-HICKORY FOREST. — **Locations:** Virginia; Fairfax Co., Burling Park, McLean, along Route 193 (Old Georgetown Pike), approximately ¾ mile W of Exit 13, Capital Beltway (Interstate 495); 38°57'N, 77°12'W, Falls Church Quadrangle, USGS. **Continuity:** New. A breeding census for 1972 was reported in *Atl. Nat.* 27 (4):184 (1972). **Size:** 11 ha = 27.2 acres (measured on topographic map compiled by photogrammetric methods from aerial photograph). **Description of Plot:** See *AB*

25 636, 1971 and *Atl. Nat.* 26 77-78, 1971. **Weather:** Generally clear throughout census period, light rain on one trip (April 28). Temperatures ranged from 40° on May 5 to 83° on June 15. **Coverage:** April 21-22, 28; May 5, 12 (twice), 19, 16; June 2, 9, 15-16, 24; July 11. Ten trips, mostly between dawn and 1100; two between 1330 and 1610, and two between 1815 and 2100, EDT. Total man-hours: 46. **Census:** Carolina Chickadee, 7.5 (68, 28); Tufted Titmouse, 7 (64, 26); Blue Jay, 6 (55, 22); Wood Thrush, 6 (55, 22); Red-eyed Vireo, 6 (55, 22); E. Wood Pewee, 5.5 (50, 20); White-breasted Nuthatch, 5 (45, 18); Scarlet Tanager, 5 (45, 18); Red-bellied Woodpecker, 4 (36, 15); Downy Woodpecker, 4 (36, 15); Ovenbird, 4 (36, 15); Cardinal, 4 (36, 15); Carolina Wren, 3.5 (32, 13); Great Crested Flycatcher, 3 (27, 11); Kentucky Warbler, 3 (27, 11); Com. Grackle, 3 (27, 11); Acadian Flycatcher, 2.5; Hairy Woodpecker, 2; Yellow-throated Vireo, 2; Pileated Woodpecker, 1; Brown Creeper, 1; Blue-gray Gnatcatcher, 1; Cerulean Warbler, 1; Louisiana Waterthrush, 1; Brown-headed Cowbird, 1. **Total:** 25 species, 89 territorial males or females (809/km², 327 per 100 acres). **Visitors:** Wood Duck, Red-tailed Hawk, Mourning Dove, Ruby-throated Hummingbird, Com (Yellow-shafted) Flicker, E. Phoebe, Com. Crow, Am. Robin, Black-and-white Warbler, Am. Redstart, Summer Tanager, Am. Goldfinch, Rufous-sided Towhee. **Remarks:** The only unusual discovery was the Brown Creeper, which was first observed on June 9, singing loudly and persistently. So far as known, this is the first breeding-season record for this species in Fairfax Co. — JOHN B. BAZUIN, JR., MARTIN BRANDYWEIN, BILL DAVIS, MRS. WILLIAM DAVIS, JESSICA M. GIUSTI, DONALD WEBER, ROBERT J. WATSON (compiler), 2636 Marcey Road, Arlington, Va. 22207.

18. UPLAND MIXED FOREST. — **Location:** North Carolina; Wilkes Co., ¼ mile from North Wilkesboro, just W of Finley Park. **Continuity:** Established 1954, 20 consecutive years. **Size:** 15.0 ha = 37 acres (formerly 40 acres but reduced by building and road construction). **Description of Plot:** See *AFN* 8:367, 1954. **Coverage:** April 8, 14, 20, 27; May 1, 14, 22; June 8, 11, 14, 18, 25, 27. Hours varied from 0800 to 1700, EDT, and totaled 22 man-hours. **Census:** Wood Thrush, 7 (47, 19); Carolina Wren, 6 (40, 16); Cardinal, 6 (40, 16); Rufous-sided Towhee, 6 (40, 16); Mourning Dove, 3 (20, 8); Com Flicker, 3 (20, 8); Acadian Flycatcher, 3 (20, 8); Blue Jay, 3 (20, 8); Tufted Titmouse, 3 (20, 8); Am. Robin, 3 (20, 8); Com. Grackle, 3 (20, 8); Red-bellied Woodpecker, 2; Carolina Chickadee, 2; Ovenbird, 2; Red-eyed Vireo, 2; Scarlet Tanager, 2; Yellow-billed Cuckoo, 1; Screech Owl, 1; Barred Owl, 1; Pileated Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; Summer Tanager, 1; Worm-eating Warbler, 1; Kentucky Warbler, 1. **Total:** 27 species; 67 territorial males (447/km², 181 per 100 acres). **Visitors:** Bobwhite, Mourning Dove, Great Horned Owl, Blue Jay, Wood Thrush, Rufous-sided Towhee. **Remarks:** Six fewer species and territorial males than in 1972. There has been an increase in mature forest species and a decline

in those preferring shrub or open edge habitat. Whether this accounts for the decline as a whole, I cannot say. Houses now ring the area on one half the circumference, although in building them there has been the least possible disturbance of the environment. — WENDELL P. SMITH, North Wilkesboro, N.C. 28659.

19. WOODLAND SWAMP: — **Location:** North Carolina; Wilkes Co., near abandoned North Wilkesboro Airport. **Continuity:** Established 1956; 18 consecutive years. **Size:** 2.5 ha = 6 1/4 acres. **Description of Plot:** see AFN 10:420, 1956. **Coverage:** April 4, 9, 18, 25; May 4, 18, 25; June 7, 12, 17, 26. Hours varied from 0900 to 1730, EDT. Total man-hours: 21. **Census:** Com. Grackle, 7 (277, 112); Cardinal, 5 (198, 80); Carolina Wren, 4 (158, 64); Bobwhite, 3 (119, 48); Gray Catbird, 3 (119, 48); Mourning Dove, 2; Willow Flycatcher, 2; Am. Robin, 2; Com. Yellowthroat, 2; Song Sparrow, 2; Yellow-billed Cuckoo, 1; Screech Owl, 1; Ruby-throated Hummingbird, 1; Com. (Yellow-shafted) Flicker, 1; Blue Jay, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Wood Thrush, 1; White-eyed Vireo, 1; Red-eyed Vireo, 1; Yellow Warbler, 1; Yellow-breasted Chat, 1; Blue Grosbeak, 1; Indigo Bunting, 1; Field Sparrow, 1. **Total:** 25 species; 49 territorial males (1937/km², 784 per 100 acres). **Visitors:** Chimney Swift, Rough-winged Swallow, Mockingbird. **Remarks:** This is the smallest count yet made on this tract. Tree growth has increased in height and shrubbery has taken over much of the marshy area. The former runway of the airport adjoining was bulldozed in early spring. That was included in the adjoining cultivated field but the edge allowed for a less abrupt transition to the wooded swamp. One less Willow Flycatcher nested in the area. Yellow Warblers, yellow-throats, and Yellow-breasted Chats have decreased while Bobwhites have increased. Wood Thrush and Red-eyed Vireo have become summer residents in recent years. A strip of trees under a power line was cut late last summer and left lying; that may in part have counteracted the effect of forest growth. Changes in the environment may have largely accounted for the changes in the avifauna. — WENDELL P. SMITH, North Wilkesboro, N.C. 28659.

20. MOUNTAIN RAVINE MIXED FOREST. — **Location:** Georgia; Rabun Co., headwaters of Cuttingbone Creek in the Chattahoochee National Forest, 4 miles SSE of Clayton. **Continuity:** Established 1969; 5 consecutive years. **Size:** 5.9 ha = 14.7 acres (rectangular, 400 x 1600 ft, measured). **Description of Plot:** See AFN 23:710-711, 1969. There have been no perceptible changes in the mature forest cover in the last year. **Weather:** Nearly 30 inches of rain fell during the months of April, May and June. **Coverage:** March 24; April 3, 12, 20, 24, 26, 27; May 4, 6, 10, 12, 15, 17-18, 21, 25-26, 30; June 2, 4, 7, 10, 14, 17-18, 23, 25, 27, 29; July 1, 4. All trips between daybreak and 1000, EDT. Total man-hours: 56. **Census:** Red-eyed Vireo, 9 (151, 61); Hooded Warbler, 7 (118, 48); Acadian Flycatcher, 5 (84, 34); Tufted Titmouse, 4 (67, 27); Worm-eating Warbler, 4 (67, 27); Carolina Chickadee, 2; Swainson's Warbler, 2; Black-throated Green Warbler, 2; Scarlet Tanager, 2; Cardinal, 2; Pileated Woodpecker, 1; Hairy Wood-

pecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Yellow-throated Vireo, 1; Black-and-white Warbler, 1; Summer Tanager, 1; Yellow-billed Cuckoo, +; Ovenbird, +. **Total:** 22 species; 49 territorial males (824/km², 333 per 100 acres). **Visitors:** Broad-winged Hawk, Ruffed Grouse, Ruby-throated Hummingbird, Com. Crow, Blue-gray Gnatcatcher. **Remarks:** The Ruffed Grouse drumming site was only a few feet above the census area; the grouse was flushed once within the area and many times above it. The Louisiana Waterthrush was strangely not recorded this year. Caroline G. Newhall, Georgine Pindar and Louis Schweizer each assisted in one census. — E. O. MELLINGER, Tiger, Ga. 30576.

21. RED OAK-SUGAR MAPLE FOREST. — **Location:** Ontario; Norfolk Co., 13 miles E of Port Rowan, Squires Ridge on Long Point; 42°33'N, 80°14'W, Little Creek Ridges, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 6.88 ha = 17 acres (L-shaped, surveyed). **Description of Plot:** The dominant canopy trees are Red Oak (*Quercus rubra*) and Sugar Maple (*Acer saccharum*). Most prominent in the understory are two sedges (*Carex pensylvanica*) and (*C. rosea*). The ground cover consisted of Canada Blue Grass (*Poa compressa*) and Kentucky Blue Grass (*P. pratensis*). A quantitative survey of the vegetation gave the following: Trees 3 inches in diameter and over based on the quarter method at 30 points, 75/acre; total basal area 121.8 ft²/acre. Species comprising 90% of the total number of trees: Red Oak, 38, 50, 58, 97; Sugar Maple, 22, 29, 30, 63; White Ash (*Fraxinus americana*), 2, 3, 3, 13; Red Maple (*A. rubrum*), 2, 3, 2, 10; White Oak (*Q. alba*), 3, 4, 2, 13. Trees by diameter size class: A (3-6") 4, 5, 6.1, 0.5; B (6-9") 4, 5, 6.1, 1.1; C (9-15") 23, 30, 36.4, 16.4; D (15-21") 38, 50, 60.6, 53; E (21-27") 4, 5.8, 7, 12.3; F (27-33") 3, 4.2, 5, 1, 16.7. Ground cover 50%; canopy cover 75%; average canopy height 60 ft (range 55-70). Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Bordered on all sides by similar forest. **Topography:** Gently rolling slopes interspersed with small ponds and marshy areas. **Weather:** Sunny and warm with a few overcast days. **Coverage:** June 10, 12, 14-16, 20, 23, 25, 27-28, 30; July 6-7. Censuses were taken between dawn and 1100 hrs or 1630 and 1900. Total man-hours: 50 censusing and 36 surveying and laying out the grid. **Census:** House Wren, 11 (160, 65), E. Wood Pewee, 6 (87, 35); Red-winged Blackbird, 4 (58, 24); Blue-winged Teal, 3 (44, 18); E. Kingbird, 3 (44, 18); Tree Swallow, 3 (44, 18); Blue Jay, 3 (44, 18), Com. Yellowthroat, 3 (44, 18); N. Oriole, 3 (44, 18); Mallard, 2; Am. Woodcock, 2; Rufous-sided Towhee, 2; Am. Robin, 2; Com. Grackle, 2; Mourning Dove, 1; Am. Redstart, 1. **Total:** 16 species; 51 territorial males or females (741/km², 300 per 100 acres). **Visitors:** Wood Duck, Yellow-billed Cuckoo, Com. (Yellow-shafted) Flicker, Hairy Woodpecker, Downy Woodpecker, Gray Catbird, Great Crested Flycatcher, Starling, Red-eyed Vireo, Brown-headed Cowbird, Cardinal. **Remarks:** 13 nests were located: N. (Baltimore) Oriole, 3 contents not examined; Am. Robin, 1 contents not examined; woodcock, 1 with 2 eggs; Blue-winged Teal,

2, one with 4 eggs and one with 12 eggs, Mallard, 1 with 9 eggs; Tree Swallow, 2 contents not examined; Red-winged Blackbird, 3 contents not examined. The grid was inhabited by many Raccoons, E. Chipmunks, and White-tailed Deer. A Long-tailed Weasel was seen once. Special thanks to Tony Reznichek for the quantitative habitat description and the Federation of Ontario Naturalists for financial assistance. — ROBERTA JOHNSTON and BARBARA FEARIS (compiler), *Long Point Bird Observatory, Port Rowan, Ontario, Canada NOE IMO.*

22. WOODED CITY RAVINE. — **Location:** Ontario; York Co., Toronto. Moore Park Ravine (formerly Belt Line Ravine), between Moore Ave. and Chorley Park: 43°41'N, 79°22'30"W. **Continuity:** Established 1966: 4 intermittent years. **Size:** 20 ha = 49.4 acres. **Description of Plot:** See AB 25:993, 1971. **Coverage:** May 19, 30; June 9-10, 13, 16-17, 19; July 8, 15. All trips between 0545 and 0900 hours. Total man-hours: 26.15. **Weather:** 55° min. to 70° max. Varied from cool, cloudy to sunny. **Census:** Cardinal, 6 (30, 12); Am. Robin, 5 (25, 10); Wood Thrush, 5 (25, 10); Downy Woodpecker, 4 (20, 8); Com. Grackle, 4 (20, 8); Indigo Bunting, 4 (20, 8); Song Sparrow, 4 (20, 8); Com. Flicker, 3 (15, 6); Great Crested Flycatcher, 3 (15, 6); Blue Jay, 3 (15, 6); Starling, 3 (15, 6); Mourning Dove, 2; E. Wood Pewee, 2; House Sparrow, 2; N. (Baltimore) Oriole, 2; Black-billed Cuckoo, 1; Red-winged Blackbird, 1. **Total:** 17 species; 54 territorial males (270/km², 109 per 100 acres). **Visitors:** Red-headed Woodpecker, Com. Crow, Black-capped Chickadee, White-breasted Nuthatch, Gray Catbird, Red-eyed Vireo, Scarlet Tanager, Brown-headed Cowbird, Am. Goldfinch. **Remarks:** Five of the visitors — Red-headed Woodpecker, Com. Crow, Black-capped Chickadee, catbird and Scarlet Tanager, were previously breeding species. This year the catbirds appeared three times in late May. They dropped from 4 in 1971, to 2 in 1972, to none this year. This I attribute to the widening and surfacing of the pathway, plus increased usage particularly by bicycles. The Parks Department made the path part of their cycling network. The Scarlet Tanagers showed 3 territorial males last year, their only breeding appearance in four years. Six species stayed the same, three decreased, and eight increased. Of those species retaining their number, the robins have three territories of 3-year tenure, the Song Sparrows also returned to 3 territories of 3-year tenure and founded 1 new territory. Two of the established Song Sparrow territories were subject to considerable disturbance in late April when a hillside slid down to within 50 ft of their area and caused much activity by large earth-moving machinery. However they persisted in their territorial activity, staying on location well into July; 2 young were seen. Of those species whose number decreased, the Indigo Buntings lost their most northerly territory and one-mid-ravine territory, but otherwise retained their previous locations. Of those species showing increases; the Wood Thrushes show a 2-3-5 increase. They re-occupied the 3 territories of last year and filled the gaps between with 2 new territories. The Cardinals sang very frequently in one spot during April and May and then abandoned it altogether. The Black-billed Cuckoo showed 5 registrations

from May 27 to June 19 within an area roughly 300 by 100 meters. During ten days at the end of June, I conducted a group survey of a similar area with respect to cover, edge, tree height, and human activity at a summer vacation location on the Bruce Peninsula on the east side of Lake Huron, about 140 miles northwest of Toronto. I found roughly four times the density of bird-life. The most obvious differences are the comparative lack of insects in the city location, and a replacement of native plants by alien plants in the city — ERIC NASMITH, 37 Pears Avenue, Toronto, Ontario M5R 1S9, Canada.

23. WOODED CITY RAVINE. — **Location:** Ontario, York Co., Toronto, Avoca Vale, in the wooded upper section of David Balfour Park Ravine, between Mount Pleasant Cemetery on the north and the edge of the open parkland on the south. **Continuity:** New. **Size:** 8.36 ha = 20.66 acres (2000 ft in length and varying from 350 to 550 ft in width. Measured from City of Toronto Department of Public Works Map). **Description of Plot:** Heavily wooded except for a partly open area of 0.6 ha = 1.5 acres in the north central section of the ravine. Large Black Willows (*Salix nigra*) grow along the stream which follows the bottom of the ravine. They reach a height of from 60 to 80 ft and spread out to form a canopy which covers the central one-third of the ravine. The remaining canopy is made up of large hardwoods growing on the east and west slopes of the ravine. These hardwoods are mostly Red Oak (*Quercus rubra*), Sugar Maple (*Acer saccharum*), Norway Maple (*A. platanoides*), with lesser numbers of Green Ash (*Fraxinus pennsylvanica*), Beech (*Fagus grandifolia*), Honey-locust (*Gleditsia triacanthos*), White Oak (*Q. alba*), and White Elm (*Ulmus americana*). The understory is made up of smaller trees of the above species plus Box-elder (*A. negundo*) and Staghorn Sumac (*Rhus typhina*). Scientific names of trees were taken from *Native Trees of Canada* by B R Morton. **Edge:** The east side and the north half of the west side are bordered by the back yards of houses on the adjacent residential streets. The south half of the west side is bordered by open park. The south edge is a continuation of the wooded ravine except that the bottom of the ravine becomes open park. The north edge borders on an open weedy area of undeveloped cemetery. **Topography:** A deeply cut ravine traversed by a fast-flowing stream running from north to south and dropping in elevation from 395 to 360 ft above sea level. The ravine varies in depth from 75 ft at the north end to 100 ft at the south end. A large steel and concrete bridge crosses the ravine midway between the north and south ends. **Coverage:** June 3-10, 12, 14. All trips between 0745 and 0930 except one between 2045 and 2130, for a total of 7 man-hours. **Census:** Am. Robin, 4.5 (54, 22), Downy Woodpecker, 3 (36, 15); Wood Thrush, 3 (36, 15); Starling, 3 (36, 15); Cardinal, 3 (36, 15); Indigo Bunting, 2; Com. (Yellow-shafted) Flicker, 1; E. Wood Pewee, 1; Com. Grackle, 1; Brown-headed Cowbird, 1. **Total:** 10 species; 22.5 territorial males (269/km², 109 per 100 acres). **Visitors:** Com. Crow, House Sparrow, Gray Catbird, Blue Jay, Great Crested Flycatcher. **Remarks:** This second census area from Toronto to be labelled "Wooded City Ravine" (see Census 22) in

being much more heavily wooded. This is reflected in the bird population with triple the density of Wood Thrushes and no Song Sparrows or Red-winged Blackbirds. Avoca Vale had not been disturbed for many years until this spring when the stream banks were lined with rock to prevent erosion and a narrow nature trail was cut through. However the damage to the vegetation was negligible and if no further "improvements" are made the construction scars should heal within a year or two. — GEORGE M. FAIRFIELD, 490 Merton Street, Toronto M4S 1B3, Ontario, Canada.

24. MIXED HARDWOOD FOREST. — **Location:** Michigan; Washtenaw Co., 3 miles S of Ann Arbor on the north side of Morgan Road, $\frac{1}{4}$ mile W of the intersection of Morgan and Stone School Roads. **Continuity:** Established 1966; 8 consecutive years. **Size:** 7.2 hectares = 17.8 acres (rectangular 430 x 200 yards, paced). **Description of Plot:** See AFN 20:612, 1966. **Coverage:** March 11, 15, 22, 31; April 1-2, 7, 14, 21, 29; May 5, 8, 12, 19; June 2, 9, 16; July 1. Hours varied from 0500 to 2215, totaling about 33 party-hours. **Census:** Red-eyed Vireo, 4 (56, 22); Com. (Yellow-shafted) Flicker, 3 (42, 17); Downy Woodpecker, 3 (42, 17); Tufted Titmouse, 3 (42, 17); Red-headed Woodpecker, 2; Red-headed Woodpecker, 2; E. Wood Pewee, 2; Blue Jay, 2; White-breasted Nuthatch, 2; Am. Robin, 2; Wood Thrush, 2; Com. Grackle, 2; Cardinal, 2; Starling, 1.5; Rufous-sided Towhee, 1.5; Song Sparrow, 1.5; Mourning Dove, 1; Great Crested Flycatcher, 1; Acadian Flycatcher, 1; Com. Crow, 1; Scarlet Tanager, 1; Indigo Bunting, 1; Black-capped Chickadee, 0.5; Ovenbird, 0.5; Screech Owl, +; Great Horned Owl, +; Hairy Woodpecker, +; E. Kingbird, +; Brown-headed Cowbird, +. **Total:** 29 species; 42.5 territorial males or females ($590/\text{km}^2$, 239 per 100 acres). **Visitors:** Wood Duck, Red-tailed Hawk, Gray Catbird, Com. Yellowthroat, E. Meadowlark, Northern Oriole, Am. Goldfinch, Chipping Sparrow, Field Sparrow. **Remarks:** Although the species count is higher than last year's, the density of birds is not quite as high. Again both spring and early summer were wet. After mosquitoes developed, their numbers were multitudinous. None of the new birds are really new to the immediate area but are merely new on the census area proper this breeding season. — JOAN IRISH, ETHEL KAWAMURA, GARY MILLER, CHRIS RISLEY, DON WIELAND, and JOHN CHEEK (compiler), 1 Medford Court, Ann Arbor, Mich. 48104.

25. OAK-MAPLE FOREST AND EDGE. — **Location:** Illinois, Champaign Co., Trelease Woods, 6 miles NE of Champaign. **Continuity:** Established 1941; 30 intermittent years. **Size:** 22.26 ha = 55 acres (rectangular, surveyed) plus 2.0 km = 1.25 miles of forest-edge. **Description of Plot:** See AFN 2:232-233, 1948. **Coverage:** April 25, 28; June 1, 6, 11, 16, 23. All trips between 0630 and 1000 hours. Total man-hours: 18. The density of the forest-interior species has been calculated as the number of territorial males per square kilometer and 100 acres; the density of the forest-edge species as the numbers per kilometer and mile. **Census:** *Forest-interior Species:* House Wren, 8 (36, 15); E.

Wood Pewee, 5 (22, 9), Red-eyed Vireo, 4 (18, 7), Great Crested Flycatcher, 3 (13, 5), Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; Wood Thrush, 2, Great Horned Owl, 1; Red-bellied Woodpecker, 1, Carolina Wren, 1; Summer Tanager, 1. *Forest-edge Species:* Starling, 18 (9, 14); Red-headed Woodpecker, 10 (5, 8); Blue Jay, 10 (5, 8); Mourning Dove, 7 (4, 6), Com. (Yellow-shafted) Flicker, 7 (4, 6); Indigo Bunting, 7 (4, 6); Am. Robin, 6 (3, 5); Cardinal, 6 (3, 5); Field Sparrow, 4 (2, 3); Brown Thrasher, 3 (2, 2); Com Yellowthroat, 2; Red-tailed Hawk, 1. **Total:** 11 species in forest-interior; 30 territorial males ($135/\text{km}^2$, 55 per 100 acres). 12 species in forest-edge; 81 territorial males ($40/\text{km}$, 65 per mile). **Visitors:** Bobwhite, Ring-necked Pheasant, Am. Woodcock, Ruby-throated Hummingbird, Com. Crow, Carolina Chickadee, White-breasted Nuthatch, Gray Catbird, Yellow-throated Vireo, Ovenbird, Red-winged Blackbird, N. (Baltimore) Oriole, Com. Grackle (numerous but not nesting), Brown-headed Cowbird, Rufous-sided Towhee, Am Goldfinch. — S. CHARLES KENDEIGH, Vivarium Building, University of Illinois, Champaign, Ill. 61820

26. BRUSH WITH EARLY DECIDUOUS FOREST. — **Location:** Indiana; Jefferson Co., 2 miles N of Madison, east side of U.S. 421; east slope of Crooked Creek Valley; $38^\circ 46' \text{N}$, $85^\circ 22' \text{W}$, Canaan Quadrangle, USGS. **Continuity:** New. **Size:** 9.27 ha = 22.9 acres (irregular shape, surveyed by steel tape and compass). **Description of Plot:** The dominant trees in the brush are White Ash (*Fraxinus americana*) and Red Cedar (*Juniperus virginiana*) while Sugar Maple (*Acer saccharum*) and Chestnut Oak (*Quercus prinus*) dominate the young forest. In the brush which covers four-fifths of the area the ground is densely covered with Japanese Honeysuckle (*Lonicera japonica*), which in many spots is waist high and interlaced with saplings. A quantitative tree survey, based on 5 circular 1/10 acre plots, gave the following results: Total density 334/acre; trees 4 inches in diameter and over 112/acre; total basal area 38.5 ft²/acre. Species composing 84% of the total number: White Ash, 6 ft²/acre, 56 trees/acre; Red Cedar, 3.4, 48; Sugar Maple, 8, 104; Chestnut Oak, 7, 6, 30; Osage Orange (*Maclura pomifera*), 2.8, 34; Black Walnut (*Juglans nigra*), 3.2, 6. Trees by diameter size class: A (1-4 in.), 4.8 ft²/acre, 218 trees/acre; B (4-8 in.), 17, 92; C (8-12 in.), 7.8, 14; D (≥ 12 in.), 4.5, 6. Plant names are from George A. Petrides, *Field Guide to Trees and Shrubs*, 2nd Ed., 1958. **Edge:** Bordered on the north by a small creek, on the south and west by an open field, and on the east by a gravel road. **Topography:** Hillside. **Elevation:** 590-800 ft. **Weather:** May was about average; June was unusually rainy. Temperatures ranged from 67-75°F with no rain during censuses. **Coverage:** May 2 (partial), 10; June 5, 15, 19-20, 22, 25, 28, 30; 8 trips between 0500 and 1000 and 2 between 1900 and 2100. Total man-hours: 35. **Census:** Prairie Warbler, 7 (76, 31); Blue-gray Gnatcatcher, 6 (70, 28); White-eyed Vireo, 5 (54, 22); Indigo Bunting, 5 (54, 22); Cardinal, 4 (43, 17); Rufous-sided Towhee, 4 (43, 17); Carolina Wren, 3.5 (38, 15); Gray Catbird, 3 (32, 13); Cerulean Warbler, 2.5; Yellow-breasted Chat, 2.5; Brown-headed Cowbird, 2.5 (females); Ruby-throated Hummingbird, 2; Tufted Titmouse, 2; Field

Sparrow, 2; Yellow-billed Cuckoo, 1.5; E Wood Pewee, 1.5; Bobwhite, 1; Song Sparrow, 1; Black-billed Cuckoo, 1; Mourning Dove, 1; Com. (Yellow-shafted) Flicker, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Wood Thrush, 1; Acadian Flycatcher, 1; Blue Jay, 1; Carolina Chickadee, 1; Am. Robin, 1; Summer Tanager, 1; Cedar Waxwing, 1; Whip-poor-will, 0.5; Barn Owl, +; Pileated Woodpecker, +; Com. Grackle, +. **Total:** 34 species; 69 territorial males or females ($745/\text{km}^2$, 301 per 100 acres). **Visitors:** Com. Crow, Starling. — BILL MANNAN and J. DAN WEBSTER, *Hanover College, Hanover, Ind.* 47243.

27. MIXED DECIDUOUS FOREST. — **Location:** Indiana; Jefferson Co., in Clifty Falls State Park, 1.5 miles from S entrance of park on the main road; on the slope of Clifty Creek Valley; $38^\circ 44' 30''\text{N}$, $85^\circ 25' 30''\text{W}$, Madison West Quadrangle, USGS. **Continuity:** New. **Size:** 7.5 ha = 18.6 acres (surveyed with steel tape and compass). **Description of Plot:** A fairly old forest which has had little disturbance for at least 60 years. The dominant canopy trees are Sugar Maple (*Acer saccharum*) and White Ash (*Fraxinus americana*); average canopy height is about 65 ft. A quantitative survey, based on 7 circular 1/10 acre plots gave the following results: Total basal area 143 ft²/acre; 452 trees/acre; trees with diameters over 4 inches 267 trees/acre. Species comprising 84% of the total number of trees: White Ash, 40 ft²/acre, 64 trees/acre; Sugar Maple, 26, 199; Beech (*Fagus grandifolia*), 17, 8; Slippery Elm (*Ulmus rubra*), 11, 21; Chinquapin Oak (*Quercus muehlenbergii*), 8, 21; Chestnut Oak (*Q. prinus*), 7, 15; White Walnut (*Juglans cinerea*), 6, 11; Red Oak (*Q. rubra*), 5, 8; Black Maple (*A. nigrum*), 2, 22. Trees by diameter classes: A (1-4 in.), 4 ft²/acre, 185/acre; B (4-8 in.), 26, 128; C (8-12 in.), 37, 67; D (≥ 12 in.), 82, 49. Plant names are from George A. Petrides, *Field Guide to Trees and Shrubs*, 2nd Ed., 1972. **Edge:** Bordered on the west by Clifty Creek, on the east (top of slope) by a wooded campground and on the north and south by similar forest. **Topography:** Steep hillside. **Elevation:** 500-770 ft. **Weather:** Temperatures 67-75° and only one brief shower during counts. Generally May was about average; June and July were unusually rainy. **Coverage:** May 1 (partial), 7 (partial), 22; June 4, 18, 22-23, 26, 28; July 2. 8 trips between 0500 and 1000; 2 between 1900 and 2100. Total man-hours: 35. **Census:** Kentucky Warbler, 6 (80, 32); Tufted Titmouse, 4.5 (60, 24); Carolina Wren, 4.5 (60, 24); Cerulean Warbler, 4 (53, 22); Acadian Flycatcher, 3.5 (46, 19); Blue-gray Gnatcatcher, 3.5 (46, 19); Wood Thrush, 3 (40, 16); Red-eyed Vireo, 3 (40, 16); Rufous-sided Towhee, 3 (40, 16); Cardinal, 2.5; Downy Woodpecker, 2; E. Wood Pewee, 2; Carolina Chickadee, 2; Gray Catbird, 2; Summer Tanager, 2; Com. (Yellow-shafted) Flicker, 1.5; Red-bellied Woodpecker, 1.5; Great Crested Flycatcher, 1.5; Brown-headed Cowbird, 1.5 (females); Yellow-billed Cuckoo, 1; Whip-poor-will, 1; Hairy Woodpecker, 1; Blue Jay, 1; Indigo Bunting, 1; Yellow-throated Warbler, 0.5; Com. Grackle, 0.5; Black-billed Cuckoo, +. **Total:** 27 species; 59.5 territorial males or females ($790/\text{km}^2$, 320 per 100 acres)

Visitors: Com. Crow. — BILL MANNAN and J. DAN WEBSTER, *Hanover College, Hanover, Ind.* 47243.

28. OLD GROWTH BEECH-TULIP-TREE-BLACK GUM FOREST. — **Location:** Indiana; Jefferson Co., South Officer's Woods, 1 mile SE of Volga; $38^\circ 46' \text{N}$, $85^\circ 30' \text{W}$, Volga Quadrangle, USGS. **Continuity:** Established 1971; 2 intermittent years. **Size:** 10.1 ha = 24.9 acres. **Description of Plot:** See AB 25:979-980, 1971). A count has been made of all trees over 12 inches dbh on the census area which have died or fallen. In two years since the last census, they were: Downy 7 (3 Beech, 1 Black Cherry, 1 Black Gum, 1 Sugar Maple, 1 Red Maple); died standing 6 (all Beech). **Weather:** May was about average, but June was unusually rainy. During count periods, the sky was clear or mostly clear 8 times, overcast once, and raining (for 20 minutes) followed by clearing once; winds were very light; temperatures ranged from 58 to 79°F. **Coverage:** May 25, 28, June 2, 7, 13-14, 16, 21, 23, 28. Eight early morning counts (usually 0510-0900) and two evenings of listening. Total man-hours: 43. **Census:** Red-eyed Vireo, 10 (99, 40); Cerulean Warbler, 9.5 (94, 38); Acadian Flycatcher, 8.5 (84, 34); Blue-gray Gnatcatcher, 8 (79, 32); Tufted Titmouse, 6.5 (64, 26); Kentucky Warbler, 5 (50, 20); Cardinal, 5 (50, 20); E. Wood Pewee, 3.5 (35, 14); Hooded Warbler, 3.5 (35, 14); Red-bellied Woodpecker, 3 (30, 12); Carolina Chickadee, 3 (30, 12); Summer Tanager, 3 (30, 12); Downy Woodpecker, 2.5; Wood Thrush, 2.5; Yellow-throated Vireo, 2.5; Rufous-sided Towhee, 2.5; Yellow-billed Cuckoo, 2; Black-billed Cuckoo, 2; Great Crested Flycatcher, 2; White-breasted Nuthatch, 2; Brown-headed Cowbird, 2 (females); Hairy Woodpecker, 1.5; Whip-poor-will, 1; Ruby-throated Hummingbird, 1 (female); Com. (Yellow-shafted) Flicker, 1; Blue Jay, 1; Carolina Wren, 1; Starling, 1; Yellow-throated Warbler, 1; Indigo Bunting, 1; Mourning Dove, 0.5; Screech Owl, 0.5; Pileated Woodpecker, 0.5; Red-headed Woodpecker, 0.5; Am. Redstart, 0.5; Louisiana Waterthrush, 0.5; Turkey Vulture, +; Barred Owl, +; Com. Crow, +. **Total:** 39 species; 101 territorial males or females ($1002/\text{km}^2$, 406 per 100 acres). **Visitors:** Broad-winged Hawk, Chimney Swift, Cedar Waxwing, Com. Grackle. **Remarks:** Juanita R. Webster assisted with some of the censuses, but her time was not calculated, above. William I. Officer permitted us to study in his woods. — J. DAN WEBSTER and WILLIAM MANNAN, *Hanover College, Hanover, Ind.* 47243.

29. SECOND-GROWTH HARDWOODS. — **Location:** Ohio; Morgan Co., part of Ravine Nature Trail, Burr Oak State Park beginning about 100 yards from boat ramp; $39^\circ 31' 42''\text{N}$, $82^\circ 2' 7''\text{W}$, Corning Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The canopy is entire, averaging 60-70 ft. Dominant canopy trees are: Sugar Maple (*Acer saccharum*) 10-15 inches dbh, 34%; Red Oak (*Quercus rubra*) 15-28 inches, 20%; Shagbark Hickory (*Carya ovata*). Pignut (*C. glabra*)

and Bitternut (*C. cordiformes*) up to 15 inches, 20%; Beech (*Fagus grandifolia*) to 30 inches, 12%. The remainder includes White Ash (*Fraxinus americana*), Tulip-tree (*Liriodendron tulipifera*), White Oak (*Q. alba*) and Basswood (*Tilia americana*). The understory includes: Pawpaw (*Asimina triloba*), Spicebush (*Lindera benzoin*), Rattle Bush (*Staphylea trifolia*), Flowering Dogwood (*Cornus florida*), Ironwood (*Carpinus caroliniana*) and hawthorn (*Crataegus* sp.). Significant plants of the forest floor include: Christmas Fern (*Polystichum acrostichoides*), Maidenhair Fern (*Adiantum pedatum*), Mayapple (*Podophyllum peltatum*), Smooth Yellow Violets (*Viola pennsylvanica*), Tick Trefoil (*Desmodium* sp.), Jewelweed (*Impatiens pallida*), Blue Cohosh (*Caulophyllum thalictroides*), *Hepatica* and *Trillium grandifolia*. Scientific names of plants from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Bordered on north by lake, on other sides by similar habitat. **Topography:** Steep north-facing slope along side of lake. **Elevation:** 800 ft. **Weather:** Fair in mornings with thunderstorms almost every afternoon. **Coverage:** June 2-7; 12 trips between 0540 and 0830 plus 3 in the late evening. About 11 man-hours. **Census:** Acadian Flycatcher, 7 (115, 47); Cerulean Warbler, 5 (82, 33); Red-eyed Vireo, 4 (66, 27), Blue-gray Gnatcatcher, 3 (49, 20); E. Wood Pewee, 2.5; Tufted Titmouse, 2; Downy Woodpecker, 1, E. Phoebe, 1; Yellow-throated Vireo, 1; Com. (Yellow-shafted) Flicker, 1; Carolina Wren, 1; Gray Catbird, 0.5; Kentucky Warbler, 0.5; Am. Redstart, 0.5, Scarlet Tanager, 0.5; Summer Tanager, 0.5; Cardinal, 0.5; Red-tailed Hawk, +; Whip-poor-will, +; Pileated Woodpecker, +; Red-bellied Woodpecker, +; Com. Crow, +; Carolina Chickadee, +; White-breasted Nuthatch, +; Am. Robin, +; Wood Thrush, +; Brown-headed Cowbird, +. **Total:** 27 species; 31.5 territorial males ($519/\text{km}^2$, 210 per 100 acres). **Visitors:** Yellow-billed Cuckoo, Belted Kingfisher, E. Kingbird, Great Crested Flycatcher, Swainson's Thrush, Warbling Vireo, Louisiana Waterthrush, N. (Baltimore) Oriole, Com. Grackle and Am. Goldfinch. **Remarks:** The pair of Red-tailed Hawks were using the plot as a nesting site as were a pair of Com. Crows. One nest of the Acadian Flycatcher was found. The Yellow-throated Vireo's territory was close to that of a Red-eyed Vireo and, occasionally, they could be heard singing at the same time. The Tufted Titmice were ranging widely suggesting that they had hatched their young and were feeding as families. The Carolina Wren spent most of its time near the edge of the lake. In other parts of the park, others of this species were also numerous near the lake shore. — GLEN PHILLIPS, *Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

30. MIXED DECIDUOUS FOREST—STRIP MINE. — **Location:** Tennessee; Campbell Co., Caryville, 4 miles W of exit 32 on Route I-75; $36^{\circ}18'N$, $84^{\circ}15'30''W$, Block Quadrangle, USGS. **Continuity:** Established 1972. (Formerly called Mixed Deciduous Forest.) **Size:** 25.9 ha = 64 acres (approximately square, surveyed with hand-held compass and measured tape). **Description of Plot:** See AB 26:951-952, 1972. **Elevation:** 1875-2620 ft. **Weather:** Temperatures ranged from 57-87°F; average

75°F during actual census. **Coverage:** May 23, 26-27, 29, June 3, 6-8, 11-15, 17-18. All trips between 0100 and 1145 hours. Total man-hours: 82. **Census:** Am. Redstart, 38 (147, 59); Red-eyed Vireo, 28 (108, 44), Cerulean Warbler, 22 (85, 34); Hooded Warbler, 18 (69, 28); Wood Thrush, 10 (39, 16); Scarlet Tanager, 10 (39, 16); Kentucky Warbler, 9 (35, 14); Cardinal, 7 (27, 11), Black-and-white Warbler, 6 (23, 9); Indigo Bunting, 6 (23, 9); Acadian Flycatcher, 5 (19, 8); Yellow-throated Vireo, 5 (19, 8); Ovenbird, 5 (19, 8); Tufted Titmouse, 4 (15, 6); Carolina Wren, 4 (15, 6); Worm-eating Warbler, 4 (15, 6); Rufous-sided Towhee, 4 (15, 6); Yellow-billed Cuckoo, 3 (12, 5); E. Phoebe, 3 (12, 5); Brown-headed Cowbird, 3 (12, 5); E. Wood Pewee, 2; Carolina Chickadee, 2; Blue-gray Gnatcatcher, 2; Golden-winged Warbler, 2; Yellow-breasted Chat, 2; Com. (Yellow-shafted) Flicker, 1; Pileated Woodpecker, 1; Red-bellied Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; White-breasted Nuthatch, 1; E. Bluebird, 1; White-eyed Vireo, 1; Solitary Vireo, 1; Field Sparrow, 1; Song Sparrow, 1. **Total:** 37 species, 216 territorial males or females ($834/\text{km}^2$, 338 per 100 acres). **Visitors:** Red-tailed Hawk, Broad-winged Hawk, Ruffed Grouse, Ruby-throated Hummingbird, Brown Thrasher, Louisiana Waterthrush, Black-throated Green Warbler. **Remarks:** Four nests were located: E. Phoebe, 2 (contents not examined); Kentucky Warbler, 1 with 4 eggs; Hooded Warbler, 1 with 4 eggs. A substantial increase was noted in the Red-eyed Vireo population, 21 last year to 28; in the Am. Redstart population, 28 to 38; and in the Cerulean Warbler population, 17 to 22. New breeding species included the Hairy Woodpecker (considered a visitor in 1972), Solitary Vireo, Field Sparrow, and Song Sparrow. The Barred Owl, Rough-winged Swallow, and Am. Goldfinch did not nest on the study area but were noted in nearby habitats. Additional species which were not recorded in the study area, but nested in adjacent habitats, included Gray Catbird, Chestnut-sided Warbler, Com. Yellowthroat, and Summer Tanager. — RICHARD H. YAHNER, *University of Tennessee, Department of Zoology, Knoxville, Tenn. 37916.*

31. RIDGE AND VALLEY HARDWOOD FOREST.

— **Location:** Tennessee; Knox Co., Knoxville, 2.5 miles SSW of City Hall, on the University of Tennessee Cherokee Farm Woodlot; $35^{\circ}55'N$, $83^{\circ}56'W$, Knoxville Quadrangle, USGS. **Continuity:** Established 1965; 9 consecutive years. **Size:** 24.28 ha = 60 acres (block-like units, surveyed with hand-held compass and tape). **Description of Plot:** See AFN 19:593-594, 1965. **Weather:** Rainfall: January-through-May total was 26.93 inches; this is over 4 inches above the long term average of 22.24 inches and the wettest of the census years. All 5 months, except March, were colder than normal and May was unusually cold (4.2°F. below normal) and wet (2.21 inches above normal). **Coverage:** April 21; May 1, 9, 13, 18, 25; June 13, 26. All trips between 0600 and 1130. Total man-hours: 35 **Census:** Cardinal, 29 (119, 48); Red-eyed Vireo, 18 (74, 30), Carolina Wren, 17 (70, 28); Tufted Titmouse, 12 (49, 20); Carolina Chickadee, 9 (37, 15); Blue Jay, 6 (25, 10), Brown-headed Cowbird, 6 males (25, 10); Rufous-sided Towhee, 5 (21, 8); Blue-gray Gnatcatcher, 4 (16, 7),

Yellow-billed Cuckoo, 3 (12, 5); **Summer Tanager**, 3 (12, 5); **Kentucky Warbler**, 2; **Com. (Yellow-shafted) Flicker**, 1; **Pileated Woodpecker**, 1; **Red-bellied Woodpecker**, 1; **Hairy Woodpecker**, 1; **Downy Woodpecker**, 1; **Acadian Flycatcher**, 1; **Black-and-white Warbler**, 1; **Hooded Warbler**, 1. Total: 20 species; 122 territorial males ($502/\text{km}^2$, 203 per 100 acres). **Visitors:** Broad-winged Hawk, Great Crested Flycatcher, Com. Crow, White-breasted Nuthatch, Am. Robin, Wood Thrush, Com. Grackle, Indigo Bunting, Am. Goldfinch. **Remarks:** Nest found: 1 Downy Woodpecker containing noisy young. The Cardinal population fell from 39 last year to an all-time low of 29. The Carolina Wren dropped from 25 to 17. The Tufted Titmouse increased from 9 to 12. The Black-and-white Warbler reappeared as a territorial species after an absence of four years, and the Hooded Warbler after an absence of five years. During the census period a road was being built along the north boundary, passing within 75 ft of the plot. Cattle were no longer grazed on a formerly used small portion of the plot. During April and May motorcyclists used about an acre of the area. — J. C. HOWELL, Department of Zoology, University of Tennessee, Knoxville, Tenn. 37916.

32. UPLAND MIXED DECIDUOUS FOREST WITH STRIP MINES. — **Location:** Tennessee; Campbell Co., Caryville, 3.2 miles WSW of Caryville Exit on Interstate 75; $36^{\circ}16'N$, $84^{\circ}16'W$, Block Quadrangle, USGS. **Continuity:** New. **Size:** 22.66 ha = 56 acres (rectangular, surveyed with hand-held compass and measuring tape). **Description of Plot:** The dominant canopy trees are Red Maple (*Acer rubrum*), Sugar Maple (*A. saccharum*), Chestnut Oak (*Quercus prinus*), and Shagbark Hickory (*Carya ovata*). Most prominent in the understory are Sugar Maple, Chestnut Oak, Flowering Dogwood (*Cornus florida*), and Black Locust (*Robinia pseudo-acacia*). The ground cover is primarily Black Snakeroot (*Cimicifuga racemosa*), Solomon's Seal (*Polygonatum biflorum*), Blue Cohosh (*Caulophyllum thalictroides*), and Wild Stone Crop (*Sedum ternatum*). A quantitative survey of the vegetation in the forest gave the following results: Trees 3-inches diameter and over, based on five circular samples, 398/acre; total basal area $135.4 \text{ ft}^2/\text{acre}$. Species comprising 91% of the total number of trees: Red Maple, 88, 22, 11, 80; Black Gum (*Nyssa sylvatica*), 38, 9, 6, 80; Sugar Maple, 35, 9, 13, 80; Flowering Dogwood, 35, 9, 3, 100; Black Locust, 33, 8, 2, 100; Chestnut Oak, 25, 6, 16, 60; Basswood (*Tilia heterophylla*), 25, 6, 3, 40; Shagbark Hickory, 23, 6, 14, 80; Black Oak (*Q. velutina*), 20, 5, 7, 100; Pignut Hickory (*C. glabra*), 8, 2, 3, 20; dead trees, 35, 9, 11, 100. Trees by diameter size class: A (3-6 in.) 244, 61.6, 24.4, 18.1; B (6-9 in.) 74, 18.9, 22.4, 16.6; C (9-15 in.) 58, 14.5, 46, 34; D (15-21 in.) 16, 3.9, 27, 19.9; E (21-27 in.) 6, 1.1, 15.6, 11.4. Shrub stems/acre, 46,200; ground cover 31%; canopy cover 80%; average canopy height 71 ft (range 60-80). Plant names from H. A. Gleason, *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*, 1952. A strip mine 30-100 ft wide bisects the width of the plot, and another strip mine uphill from the former extends for slightly more than half of the width and is separated from the former by 50-100 ft of spoils



Census 32. Upper strip mine with forest above.

bank. Spoils areas located downhill from the lower strip vary from 50 to 600 ft in width. All trees and shrubs on the strips are less than 3 inches in diameter with a density of less than 10/acre. Ground cover on the lower strip is approximately 90% and approximately 30% on the upper strip. Plant growth on both strips is chiefly composed of Meadow Fescue (*Festuca elatior*) and Sweet White Clover (*Melilotus alba*). Ground, shrub, and tree cover on the spoils banks are variable. Dominant trees in the spoils areas are Black Locust, Basswood, Slippery Elm (*Ulmus rubra*), and Tulip-tree (*Liriodendron tulipifera*). Other plants dominant in the spoils areas include Meadow Fescue, Com. Blackberry (*Rubus allegheniensis*), Wild Hydrangea (*Hydrangea arborescens*), and Sweet Scented Grape (*Vitis vulpina*). **Edge:** To the east, west, and north, the woodland



Census 32. Lower strip mine with spoils bank.

continues. The eastern 2/3 of the south side is bordered by a spoils runoff from the lower strip mine. **Topography:** East-facing slope of Hurricane Mountain (average slope $25^{\circ}30'$). **Elevation:** 1875-2725 ft (crest of Hurricane Mountain 3303 ft). **Weather:** Average temperature at the beginning of each census trip 58.5°F , range $40\text{-}73^{\circ}\text{F}$. Total rainfall for January through June, inclusive, was 39.02 inches, 11.74 inches above normal. **Coverage:** April 19-20, 26, 28; May 4, 7, 10, 17-18, 24, 27, 29, 31; June 3, 5, 12, 17-18, 24. All trips were between sunrise and 1100, EDT, except one at 0300 for



Census 32. Large spoils runoff from lower strip mine.
Photos/ Anthony W. Garton.

the purpose of detecting owls. Total man-hours: 72. **Census:** Red-eyed Vireo, 18.5 (82, 33); Hooded Warbler, 15.5 (68, 28); Cerulean Warbler, 15 (66, 27); Am. Redstart, 10 (44, 18); Indigo Bunting, 8 (35, 14); Black-and-white Warbler, 7.5 (33, 13); Carolina Chickadee, 7 (31, 13); Yellow-throated Vireo, 6 (26, 11); Worm-eating Warbler, 5.5 (24, 10); Ovenbird, 5.5 (24, 10); Tufted Titmouse, 5 (22, 9); Kentucky Warbler, 5 (22, 9); Carolina Wren, 4.5 (20, 8); Blue-gray Gnatcatcher, 4.5 (20, 8); Rufous-sided Towhee, 4.5 (20, 8); E. Phoebe, 3 (13, 5); Rough-winged Swallow, 3 (13, 5); Downy Woodpecker, 2; E. Wood Pewee, 2; Blue Jay, 2; Wood Thrush, 2; Golden-winged Warbler, 2; Brown-headed Cowbird, 2; Field Sparrow, 2; Black-throated Green Warbler, 1.5; Chestnut-sided Warbler, 1.5; Am. Goldfinch, 1.5; Yellow-billed Cuckoo, 1; Screech Owl, 1; Com. (Yellow-shafted) Flicker, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Acadian Flycatcher, 1; Blackburnian Warbler, 1; Yellow-breasted Chat, 1; Scarlet Tanager, 1; Cardinal, 1; Red-bellied Woodpecker, 0.5; Red-tailed Hawk, +; Barred Owl, +. **Total:** 40 species; 157 territorial males or females ($693/\text{km}^2$, 280 per 100 acres). **Visitors:** Sharp-shinned Hawk, Ruffed Grouse, White-breasted Nuthatch, E. Bluebird, White-eyed Vireo, Yellow-breasted Chat, Scarlet Tanager. **Remarks:** Spring rains caused numerous minor mud and rock slides within the spoils areas during the census period. One mudslide of more major proportions occurred on May 27 or 28, uprooting all trees and vegetation in a path 25 ft wide and 200 ft long into the forest below the lower strip mine. A Red-tailed Hawk nest was located near the center of the plot approximately 400 ft downhill from the lower strip mine. Incubation had begun before the first census trip on April 19, and two young hawks were successfully fledged before the last census trip. One Rough-winged Swallow nest was located prior to May 27, at which time a small rockslide owing to heavy rains destroyed it. One Hooded Warbler nest was located with an adult incubating three eggs. I would like to thank Richard H. Yahner for his assistance in surveying the plot and for his assistance with the description of the vegetation. I would also like to thank Dr. J. C. Howell for his advice and guidance throughout this census. — ANTHONY W. GARTON, Department of Zoology, University of Tennessee, Knoxville, Tenn. 37916.

33. LOESS BLUFF FOREST. — **Location:** Louisiana: West Feliciana Parish; 4 miles S of St. Francisville and 2 miles E of the Mississippi River. The east boundary of the study area is 200 yards W of State Highway 965 and parallels that highway; $35^\circ 45' \text{N}$, $91^\circ 19' \text{W}$, Section 59, T3S, R2W, New Roads, La. Quadrangle, USGS. **Continuity:** New. **Size:** 16.19 ha = 40 acres (1320 ft square, surveyed with a transit and measured with a steel tape). **Description of Plot:** The dominant canopy trees are Sweetgum (*Liquidambar styraciflua*), Cherrybark Oak (*Quercus falcata* var. *pagodaefolia*), Water Oak (*Q. nigra*), Winged Elm (*Ulmus alata*), Shumard Oak (*Q. shumardii*), Loblolly Pine (*Pinus taeda*), and Black Cherry (*Prunus serotina*). These species comprise 78% of the relative dominance and 73% of the relative density of the stand. Prominent in the understory are oaks (*Quercus* sp.), Corn. Privet (*Ligustrum vulgare*), Black Cherry, Box-elder (*Acer negundo*) and Hackberry (*Celtis laevigata*). The ground cover consists of Honeysuckle (*Lonicera japonica*), grasses (family *Poaceae*), Poison Ivy (*Rhus radicans*), Christmas Fern (*Polystichum acrostichoides*), Aster spp., dewberry (*Rubus* spp.) and greenbriers (*Smilax* spp.). A quantitative survey of the forest canopy gave the following results: Trees 4-inches dbh and over, based on 15 1/5-acre circular plots, 115/acre, total basal area 64 ft^2/acre . Plant names from Radford, et al., *Manual of the Vascular Flora of the Carolinas*, 1968. Four acres in the southeast corner of the plot represent abandoned pasture. It was last clipped in 1969 and presently supports a dense growth of goldenrods (*Solidago* spp.), grasses, dewberry, plume grass (*Erianthus* spp.), Woolyhead (*Jacquemontia tamnifolia*), and broomsedge (*Andropogon* spp.). The remaining 36 acres are mature forest land. **Edge:** Surrounded by identical forest. **Topography:** Steep bluffs and ravines. **Elevation:** Varies from 50 to 115 ft. **Weather:** Hot with frequent afternoon showers throughout the census period. **Coverage:** May 5, 10, 12-13, 19, 27; June 3, 5. All trips between 0600 and 1000, CDT. Total man-hours: 33. **Census:** White-eyed Vireo, 28 (173, 70); Cardinal, 18 (111, 45); Hooded Warbler, 14 (86, 35); Carolina Wren, 11 (68, 28); Yellow-billed Cuckoo, 10 (62, 25); Tufted Titmouse, 9 (56, 22); Red-eyed Vireo, 9 (56, 22); N. Parula, 9 (56, 22); Red-bellied Woodpecker, 8 (49, 20); Worm-eating Warbler, 8 (49, 20); Acadian Flycatcher, 7 (43, 18); Kentucky Warbler, 6 (37, 15); Blue Jay, 5 (31, 12); Yellow-breasted Chat, 5 (31, 12); Prothonotary Warbler, 4 (25, 10); Yellow-throated Vireo, 3 (19, 8); Swainson's Warbler, 3 (19, 8); Summer Tanager, 3 (19, 8); Indigo Bunting, 3 (19, 8); Pileated Woodpecker, 2; Wood Thrush, 2; Rufous-sided Towhee, 2; Broad-winged Hawk, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Com. Yellowthroat, 1. **Total:** 26 species; 173 territorial males ($1069/\text{km}^2$, 432 per 100 acres). **Visitors:** Red-shouldered Hawk, Barred Owl, Ruby-throated Hummingbird, E. Wood Pewee, Com. Crow, Fish Crow, Carolina Chickadee, Gray Catbird, Brown Thrasher, Blue-gray Gnatcatcher, Black-and-white Warbler, Am. Redstart, Orchard Oriole, Brown-headed Cowbird. **Remarks:** There was no systematic search for nests but we did find two during the census

work. The White-eyed Vireo's nest (4 eggs) was destroyed by an unknown predator after incubation was well advanced. The four eggs in a Hooded Warbler nest hatched successfully but when checked three days later the young were gone. The only Indigo Buntings and yellowthroats we observed were in the abandoned pasture in the southeast corner. No nest of the Worm-eating Warbler has ever been found in Louisiana although adults have been observed feeding fledglings in the vicinity of St. Francisville. This census (20 territorial males per 100 acres), however, indicates that the Worm-eating Warbler is a relatively common breeding bird in suitable habitat (steep loess bluffs and ravines). Such habitat within our state is found only in a narrow strip one to five miles wide extending from near St. Francisville to the Louisiana-Mississippi state line. — ROBERT E. NOBLE and ROBERT B. HAMILTON, School of Forestry and Wildlife Management, Louisiana State University, Baton Rouge, La. 70803.

34. MATURE BOTTOMLAND HARDWOOD FOREST. — **Location:** Louisiana; St. Landry Parish, Thistlethwaite Wildlife Management Area, 3 miles N of Washington; 30°40'N, 92°03'W, Opelousas Quadrangle USGS. Located on the western extreme of the Management Area, 1/4 to 1/2 mile S of Plant Road. **Continuity:** New. **Size:** 8.09 ha = 20 acres (rectangular, 660 ft x 1320 ft, surveyed by hand compass and pacing.) **Description of Plot:** See AB 27:676, 1973. The meandering streams of winter are mostly dry during the summer season. Summer ground vegetation to 6 ft height was estimated on 20 mil-acre plots. Following are plant species found on at least half of the plots (by decreasing frequency), the percentage of plots on which they were found, and the estimated area of coverage by the plant: Switch Cane (*Arundinaria gigantea*), 95, 20; oak (*Quercus spp.*), 85, 4; sedge (*Cyperaceae*), 75, 3; Poison Ivy (*Rhus radicans*), 60, 6; Cross Vine (*Anisostichus capreolata*), 60, 3; Sugarberry (*Celtis laevigata*), 55, 3; and Ironwood (*Carpinus caroliniana*), 50, 5. **Weather:** Mean temperatures for May and June were approximately 74° and 81°F respectively. These deviated less than 2°F from the long range means. Temperatures during 9 of the 10 census periods fluctuated between 60° and 80°F. A slightly lower temperature of 55°F was recorded on May 14. Rainfall on the study area was approximately 5 inches during May and 10 inches for June. Estimated wind speed varied from 0 to 8 mph during the census periods. **Coverage:** May 14, 22, 26, 29, 31; June 5, 7, 14-15, 20; 10 trips between 0602 and 0847. Average time for each census was 99 minutes. **Census:** Carolina Wren, 12 (148, 60); White-eyed Vireo, 11 (136, 55); Cardinal, 7.5 (93, 38); Yellow-billed Cuckoo, 7 (86, 35); Tufted Titmouse, 6.5 (80, 33); Acadian Flycatcher, 5 (62, 25); Yellow-throated Vireo, 2.5; Red-eyed Vireo, 2; Swainson's Warbler, 2; Pileated Woodpecker, 1; Red-bellied Woodpecker, 1; Kentucky Warbler, 1; Hooded Warbler, 1; Great Crested Flycatcher, 0.5; Brown-headed Cowbird, 0.5; Rufous-sided Towhee, 0.5; Wood Thrush, 0.5; Blue Jay, +; Summer Tanager, +; N Parula, +. **Total:** 20 species; 61.5 territorial males or females (760/km², 308 per 100 acres). **Visitors:**

Red-shouldered Hawk, Barred Owl, Com. Crow, Com. Grackle, Prothonotary Warbler. **Remarks:** Owing to the forest height (82 ft average of dominants) and the essentially fully stocked understory and overstory, over 90% of the birds were detected by ear. Gray Squirrels, Swamp Rabbits, a Ribbon Snake, and a Red-bellied Snake were seen. Data were collected in conjunction with research sponsored by the Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge. I am thankful to Dr. Robert E. Noble for help in plant identification and to Bruce Bell for assistance in vegetation sampling. — JAMES G DICKSON, School of Forestry and Wildlife Management, Louisiana State University, Baton Rouge, La 70803.

35. BALSAM FIR-BIRCH FOREST. — **Location:** Minnesota; St. Louis Co., Duluth, 1 mile N of Island Lake Reservoir Bridge on County 4; NE1/4-NE1/4, Sect 32, T53N, R14W-4th P.M. Boulder Lake Reservoir Quadrangle, USGS. **Continuity:** Established 1972 **Size:** 11.9 ha = 29.5 acres (square 49-50x50 m. plots, using calibrated wire and compass). **Description of Plot:** See AB 26:956, 1972. **Weather:** Generally clear to overcast with one day of steady drizzle. Windspeed varied from 0 to 5 mph and temperatures ranged from 52° to 78°. **Coverage:** May 26, 28; June 11, 13, 17, 20, 22, 25 All trips between 0545 and 0830; the average length of each trip 2 hours. Total man-hours: 17. **Census:** Ovenbird, 33 (276, 112); Red-eyed Vireo, 14 (117, 47), Nashville Warbler, 12 (101, 41); Blackburnian Warbler, 9 (75, 31); Black-throated Green Warbler, 7 (59, 24), Black-and-white Warbler, 5 (42, 17); Great Crested Flycatcher, 3 (25, 10); Magnolia Warbler, 3 (25, 10), Chestnut-sided Warbler, 3 (25, 10); Ruffed Grouse, 2, Yellow-bellied Sapsucker, 2; Blue Jay, 2; Red-breasted Nuthatch, 2; Mourning Warbler, 2; Evening Grosbeak, 2; Broad-wing Hawk, 1; Downy Woodpecker, 1; Tree Swallow, 1; Com. Crow, 1; Black-capped Chickadee, 1; Veery, 1; Canada Warbler, 1. **Total:** 22 species, 108 territorial males or females (905/km², 366 per 100 acres). **Visitors:** Ruby-throated Hummingbird, Com Flicker, Least Flycatcher, Winter Wren, Am. Robin, Wood Thrush, Swainson's Thrush, N. (Baltimore) Oriole, Brown-headed Cowbird, Purple Finch, White-throated Sparrow. **Remarks:** Four nests were located Broad-wing Hawk, 1 with 2 fledged young; Yellow-bellied Sapsucker, 1 contents not examined; Red-eyed Vireo, 1 with 4 eggs; Ovenbird, 1 with 3 eggs Red Squirrel, White-tailed Deer, and Striped Skunk were sighted at least once with the squirrel population seemingly low. There was an increase in the population from last year with a jump from 81.5 to 108 territorial males within the plot. Most substantial increases were recorded for three species: Ovenbird, from 21 to 33, Nashville Warbler, from 6 to 12; and Blackburnian Warbler, from 2 to 9. Slight decreases are noted in the Red-eyed Vireo, White-throated Sparrow, and Winter Wren; however, these decreases are probably minimal. Special thanks to my wife, Bonnie, and my mother, Tynne, for continued support. — GERALD J NIEMI, 227 W. 4th St., Duluth, Minn. 55806.

36. DECIDUOUS-CONIFEROUS SECOND GROWTH NORTHWOODS. — **Location:** Vermont, Washington Co., SW corner of Cabot; 72°23'N, 44°23'W, Plainfield Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 15 ha = 37 acres (laid out with compass and steel tape; almost square). **Description of Plot:** See AB 26:957-8, 1972. **Coverage:** April 6 to June 4; 27 mostly early morning trips. Total man-hours: 35.5 **Census:** White-throated Sparrow, 7 (47, 19); Ovenbird, 6 (40, 16); Black-capped Chickadee, 5 (33, 14); Ruffed Grouse, 3 (20, 8); Veery, 3 (20, 8); Song Sparrow, 3 (20, 8); Wood Thrush, 2; Hermit Thrush, 2; Nashville Warbler, 2; Magnolia Warbler, 2; Yellow-rumped (Myrtle) Warbler, 2; Com. Yellowthroat, 2; Canada Warbler, 2; Blue Jay, 1; Red-breasted Nuthatch, 1; Brown Creeper, 1; Gray Catbird, 1; Am. Robin, 1; Golden-crowned Kinglet, 1; Ruby-crowned Kinglet, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Black-throated Green Warbler, 1; Chestnut-sided Warbler, 1; Purple Finch, 1; Chipping Sparrow, 1; Lincoln's Sparrow, 1. **Total:** 27 species; 55 territorial males (367/km², 149 per 100 acres). **Visitors:** Broad-winged Hawk, Am. Woodcock, Com. (Yellow-shafted) Flicker, Yellow-bellied Sapsucker, Least Flycatcher, Com. Crow, Bay-breasted Warbler, Brown-headed Cowbird, Rose-breasted Grosbeak, Am. Goldfinch, Red Crossbill **Remarks:** Three nests were located: one Ruffed Grouse with 11 eggs, and one each Red-breasted Nuthatch and Brown Creeper. Fewer White-throated Sparrows were counted this year than last, but this could be the fault of the observer. The White-throated is by far the commonest bird seen or heard. It is so abundant in fact that delination of territories is extremely difficult. — BARBARA CARPENTER, Marshfield, Vt., 05658.

37. MIXED UPLAND FOREST AND EDGE. — **Location:** Vermont; Windsor Co., 1 mile S of S Woodstock center on Route 106; 43°33'N, 72°32'W, Woodstock Quadrangle, USGS. **Continuity:** Established 1972 **Size:** 20.2 ha = 50 acres. **Description of Plot:** See AB 26:956-957, 1972. **Coverage:** All trips between 0530 and 1030 or between 1700 and 1930. Total man-hours: 24 **Census:** White-throated Sparrow, 8 (40, 16); Red-eyed Vireo, 6 (30, 12); Blue Jay, 4 (20, 8); Black-capped Chickadee, 4 (20, 8); Wood Thrush, 4 (20, 8); Black-and-white Warbler, 4 (20, 8); Chestnut-sided Warbler, 4 (20, 8); Ovenbird, 4 (20, 8); Com. Yellowthroat, 4 (20, 8); Rose-breasted Grosbeak, 4 (20, 8); Great Crested Flycatcher, 3 (15, 6); Brown Creeper, 3 (15, 6); Gray Catbird, 3 (15, 6); Veery, 3 (15, 6); Blackburnian Warbler, 3 (15, 6); Am. Redstart, 3 (15, 6); Brown Thrasher, 2; Am. Robin, 2; Red-winged Blackbird, 2; Rufous-sided Towhee, 2; Ruffed Grouse, 1; Downy Woodpecker, 1; E. Phoebe, 1; E. Wood Pewee, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Nashville Warbler, 1; Black-throated Blue Warbler, 1; Yellow-rumped (Myrtle) Warbler, 1; Scarlet Tanager, 1; Cardinal, 1; Indigo Bunting, 1; Chipping Sparrow, 1; Field Sparrow, 1; Song Sparrow, 1. **Total:** 35 species; 98 territorial males (484/km², 196 per 100 acres). — RICHARD B. FARRAR, JR., Vermont Institute of Natural Science, Woodstock, Vt. 05091

38. PITCH, PINE-SCRUB OAK FOREST I. MATURE. — **Location:** Massachusetts; Plymouth Co., Myles Standish State Forest, ¾ miles E of College Pond; 41°52'N, 70°39'W, Wareham Quadrangle, USGS. **Continuity:** New. **Size:** 7.5 ha = 18.53 acres (rectangle 250 x 300 m, surveyed). **Description of Plot:** Mature forest, last burned in 1943 or 1944. The only canopy tree was Pitch Pine (*Pinus rigida*). Scrub Oak (*Quercus ilicifolia*) was the prominent understory species, and the ground cover was predominantly Huckleberry (*Gaylussacia baccata*), Late Lowbush Blueberry (*Vaccinium angustifolium*), and Early Lowbush Blueberry (*V. vacillans*). A survey of 5 random 25 x 25 m plots gave the following results: 223 live Pitch Pines/acre; 218 standing dead pines/acre; 28 seedling pines/acre. Average ht. of live Pitch Pines 7.23 m, (range 1.5-13 m); average ht. of dead pines 5.1 m (range 1-11 m). Average diam. of live pines 9.4 cm; average diam. of dead pines 9 cm. Average cover of Pitch Pines 14%. Within these 5 random plots, 5 10 x 10 m samples gave 16,478 Scrub Oak clumps/acre; average ht. of Scrub Oak 1.4 m (range 1-1.75 m); average cover Scrub Oak 70%. The herbaceous layer was censused by 25 random 1 m squares; average cover was 60%. Plant names are from Gleason, *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*, 4th printing, 1968. **Edge:** The plot was carefully chosen to ensure uniform habitat, however, the eastern edge was set in 25 m from a newly constructed power line that created a new habitat which helps to explain some of the visitors. **Topography:** Essentially flat. **Elevation:** 160 ft. **Coverage:** May 14, 23, 25, 31; June 7, 11-12, 15, 18, 20-22, 25, 28; July 3, 6, 13, 16; August 18. Nearly all visits were made one hour after dawn and averaged 2 hours; some were carried on through the day or at night in order to obtain maximum coverage. Total man-hours: 89.5. **Census:** Prairie Warbler, 16.5 (220, 89); Rufous-sided Towhee, 13 (173, 70); Com. Yellowthroat, 11.5 (153, 62); Black-capped Chickadee, 3 (40, 16); Field Sparrow, 2; Ruffed Grouse, 1; Com. (Yellow-shafted) Flicker, 1; Blue Jay, 1; Hermit Thrush, 1; Ovenbird, 1; E. Kingbird, 0.5, Mockingbird, 0.5. **Total:** 12 species; 52 territories (693/km², 281 per 100 acres). **Visitors:** Red-tailed Hawk, Bobwhite, Mourning Dove, Hairy Woodpecker, Downy Woodpecker, Fish Crow, Brown Thrasher, Com. Grackle, Purple Finch, Am. Goldfinch. **Remarks:** Three young Ruffed Grouse were seen with the female; a Blue Jay nest was found with 4 young (banded) and a Mockingbird with 2 young (banded). The only other nests found were one Hermit Thrush and one Rufous-sided Towhee whose outcomes were unknown. Mammals seen were Red Fox, Red Squirrel, and E. Chipmunk. A brief comparison of this and the two following census plots is given at the end of the census number 40. This census was carried out by more than 20 people, members, students, and staff of the Manomet Bird Observatory. Grateful thanks to them and also for a generous grant from the Bradley Fisk Fund which helped to support the work. — TREVOR L. LLOYD-EVANS, *Manomet Bird Observatory*, Box 0, Manomet, Mass. 02345.

39. PITCH PINE-SCRUB OAK FOREST II. REGENERATING. — **Location:** Massachusetts; Plymouth Co., Myles Standish State Forest, 1½ miles E of College Pond; 41°52'N, 70°38'W, Wareham Quadrangle, USGS. **Continuity:** New. **Size:** 7.5 ha = 18.53 acres (rectangle 250 x 300 m, surveyed). **Description of Plot:** Burned by forest fire in May 1963. The only canopy tree was Pitch Pine (*Pinus rigida*). Scrub Oak (*Quercus ilicifolia*) was the prominent understory species, and the ground cover was predominantly Early Lowbush Blueberry (*Vaccinium vacillans*), Huckleberry (*Gaylussacia baccata*), and Late Lowbush Blueberry (*V. angustifolium*). A survey of 5 random 25 x 25 m plots gave the following results: 517 live Pitch Pines/acre; 57 standing dead pines/acre; 27 pine seedlings/acre. Average ht. of Pitch Pines 2.55 m (range 2-6 m). Average diam. of Pitch Pines 5.9 cm. Average cover of pines 26%. Within these 5 random plots, 5 10 x 10 m samples gave 20,324 Scrub Oak clumps/acre; average ht. of Scrub Oak 1.1 m, (range not available); average Scrub Oak cover 53%. The herbaceous layer was censused by 25 random 1 m squares; average cover was 53%. Plant names are from Gleason, *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*, 4th printing, 1968. **Edge:** The plot was carefully chosen to ensure uniform habitat; and was surrounded by similar vegetation for a considerable distance. **Topography:** Essentially flat. **Elevation:** 170 ft. **Coverage:** May 6, 10, 25, 30; June 5, 7, 12, 20, 29; July 3, 5-6, 9, 17; August 14. Nearly all visits were made one hour after dawn and averaged 2 hours; some were carried on through the day or at night in order to obtain maximum coverage. Total man-hours: 69. **Census:** Prairie Warbler, 19 (253, 103); Rufous-sided Towhee, 13 (173, 70); Com. Yellowthroat, 9 (120, 49); Field Sparrow, 3.5 (47, 19); Brown Thrasher, 3 (40, 16); Hermit Thrush, 2; Black-capped Chickadee, 1.5; House Wren, 1.5; E. Bluebird, 1.5; Bobwhite, 1; Mourning Dove, 1; Whip-poor-will, 1; Com. (Yellow-shafted) Flicker, 1; Hairy Woodpecker, 1; Tree Swallow, 1; Gray Catbird, 0.5. **Total:** 16 species; 60.5 territories (807/km², 326 per 100 acres). **Visitors:** Red-tailed Hawk, Ruffed Grouse, Bobwhite, Harry Woodpecker, Downy Woodpecker, Fish Crow, Black-capped Chickadee, Am. Robin, N. (Baltimore) Oriole. **Remarks:** Only three nests were found: 1 Black-capped Chickadee in a hollow stump, a Gray Catbird nest which was predated, and an E. Bluebird in a dead hollow pine which fledged 3 plus young. Mammals seen were E. Cottontail, Red Squirrel, and E. Chipmunk. A brief comparison of this and two simultaneous censuses is given at the end of the census 40. This census was carried out by more than 20 people, members, students, and staff of the Manomet Bird Observatory. Grateful thanks to them and also for a generous grant from the Bradley Fisk Fund which helped to support the work. — TREVOR L. LLOYD-EVANS, *Manomet Bird Observatory, Box 0, Manomet, Mass. 02345*.

40. PITCH PINE-SCRUB OAK FOREST III. RECENTLY BURNED. — **Location:** Massachusetts; Plymouth Co., Myles Standish State Forest, 1.25 miles SE of College Pond; 41°51'N, 70°39'W, Wareham

Quadrangle, USGS. **Continuity:** New. **Size:** 7.5 ha = 18.53 acres (irregular, surveyed). **Description of Plot:** Burned by forest fire in May 1971. The only canopy tree was Pitch Pine (*Pinus rigida*). Scrub Oak (*Quercus ilicifolia*) was the dominant understory species, and the ground cover was primarily Huckleberry (*Gaylussacia baccata*), Early Lowbush Blueberry (*Vaccinium vacillans*), and Late Lowbush Blueberry (*V. angustifolium*). A survey of 5 random 25 x 25 m plots gave the following results: 19 live Pitch Pines/acre; 1006 standing dead pines/acre; 478 seedling pines/acre. Average ht. of dead pines 4.1 m (range 1-11). Average diam. of dead pines 7.5 cm. Average cover of pines 6%. Within these 5 random plots, 5 10 x 10 m samples gave 12,267 Scrub Oak clumps/acre; average ht. of Scrub Oak 0.85 m (range not available); average cover Scrub Oak 46%. The herbaceous layer was censused by 25 random 1 m squares; average cover was 53%. Plant names are from Gleason, *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*, 4th printing, 1968. **Edge:** The plot was carefully chosen to ensure uniform habitat; however, the eastern edge was set in 25 m from a newly constructed power line that created a new habitat which helps to explain some of the visitors. **Topography:** Essentially flat. **Elevation:** 160 ft. **Coverage:** May 11, 14, 17, 22, 25, 29; June 4, 7, 10, 14, 18, 20, 28; July 3, 5, 12, 19; August 7. Nearly all visits were made one hour after dawn and averaged 2 hours; some were carried on through the day or at night in order to obtain maximum coverage. Total man-hours: 67.5. **Census:** Prairie Warbler, 9.5 (127, 51); Com. Yellowthroat, 9 (120, 49); Rufous-sided Towhee, 9 (120, 49); Field Sparrow, 5 (67, 27); Purple Finch, 2; Com. (Yellow-shafted) Flicker, 1; E. Wood Pewee, 1; Blue Jay, 1; Brown Thrasher, 1; Hermit Thrush, 1; E. Bluebird, 1; E. Kingbird, 0.5; Mockingbird, 0.5. **Total:** 13 species, 41.5 territories (553/km², 224 per 100 acres). **Visitors:** Red-tailed Hawk, Ruffed Grouse, Bobwhite, Harry Woodpecker, Downy Woodpecker, Fish Crow, Black-capped Chickadee, Am. Robin, N. (Baltimore) Oriole. **Remarks:** Nine nests were found: A Com Flicker in a dead Pitch Pine, a pair of E. Kingbirds had two nests, E. Wood Pewee one, and a Mockingbird reared three young (banded). An E. Bluebird nested in the same tree as the flicker and reared only one young (banded). Three nests were found for the two pairs of Purple Finches. Mammals seen during the visits included White-tailed Deer (tracks), Red Fox, Red Squirrel, and E. Chipmunk. A brief comparison can be drawn among the three preceding censuses, even though results are based on only one year of field work. They were carefully chosen to give extremely uniform areas situated in extensive tracts of similar habitats which were typical of the natural succession from burned (III) through regenerating (II) to mature (I) Pitch Pine – Scrub Oak forest. This is the natural vegetation on the dry, rather poor sand and gravel moraines found in much of SE Massachusetts. The plots were all on fairly level ground and within 2 miles of each other at the same elevation. In all three areas Prairie Warbler was the most abundant species, and with yellowthroat and Rufous-sided Towhee these accounted for 71% of all territories. Prairie Warbler was most common in the

regenerating area, then the mature, and least dense as a breeding species in the burned area. This order was true of the total numbers of territories, with the regenerating area having the highest number of breeding species. Despite similarities, each area had its own niches. The mature had sufficiently dense woodland to attract the only Ovenbird; the regenerating area had many excavated holes in the standing dead trees, and these provided nest sites for the only Hairy Woodpecker, Tree Swallow and House Wrens; the most open burned plot had the only E. Wood Pewee and two Purple Finch territories. This census was carried out by more than 20 people, members, students and staff of the Manomet Bird Observatory. Grateful thanks to them and also for a generous grant from the Bradley Fisk Fund which helped to support the work. These reports are contributions numbers 3, 4 and 5 of the Manomet Bird Observatory. — TREVOR L. LLOYD-EVANS, Box 0, Manomet, Mass. 02345

41. CLIMAX HEMLOCK-WHITE PINE FOREST, WITH TRANSITION HARDWOODS. — **Location:** Connecticut; Litchfield Co., White Memorial Foundation, Litchfield; 41°43'20"N, 73°12'W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965; 7 intermittent years. **Size:** 10.52 ha = 26 acres (roughly a trapezium). **Description of Plot:** See AFN 19:594-595, 1965. **Coverage:** June 2-3, 5-6, 11-12, 16, 19, 22-23; July 5-6, 8, 13, 16-17, 19. Hours varied from 0420 to 2240, the great emphasis before 0600. **Census:** Ovenbird, 8 (76, 31), Blackburnian Warbler, 6 (57, 23); Black-throated Green Warbler, 4 (38, 15); Canada Warbler, 3.5 (33, 13), Wood Thrush, 3 (29, 12); Veery, 3 (29, 12); Black-capped Chickadee, 2.5; Scarlet Tanager, 2.5; E. Wood Pewee, 2; Blue Jay, 2; Red-breasted Nuthatch, 2; Brown Creeper, 2; Am. Robin, 2; Red-eyed Vireo, 2; Black-and-white Warbler, 2; Brown-headed Cowbird, 2, Rufous-sided Towhee, 2; Great Crested Flycatcher, 1.5, Mourning Dove, 1; Barred Owl, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Hermit Thrush, 1; Solitary Vireo, 1; Com. Grackle, 1; Purple Finch, 1; Com. (Yellow-shafted) Flicker, +; Pileated Woodpecker, +; Gray Catbird, +; Cardinal, +; White-throated Sparrow, +; Song-Sparrow, +; **Total:** 34 species; 62 territorial males ($589/\text{km}^2$, 238 per 100 acres). **Visitors** (average number of individuals per 100 acres): Cedar Waxwing, 8, Red-winged Blackbird, 2; Broad-winged Hawk, +; Black-billed Cuckoo, +; Great Horned Owl, +; Tufted Titmouse, +; Pine Warbler, +; Com. Yellowthroat, +. **Remarks:** General stability of habitat and density continues, with a few exceptions. Black-throated Green Warblers are continuing a steady decline from a high of 11 in 1967; this year it was notably scarce in all formerly well-occupied local habitat. Blackburnian Warblers, however, have risen by 2.5 since 1967, and for the first time top the Black-throated Green Warbler by 2. A new breeder in 1971, locally on the edge of its range, the Yellow-rumped (Myrtle) Warbler was absent from the census area but present in very small numbers locally. The Broad-winged Hawk, a former breeder and locally fairly common through 1969, continues an alarming decline first obvious in 1971. Young Barred Owls roosted in the census area, and were most obvious

when calling (food-begging?) at dusk. On July 17 the remains of a juvenal Pileated Woodpecker were found below a regular roost. — ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109, sponsored by the Litchfield Hills Audubon Society, Litchfield, Conn

42. DECIDUOUS FOREST WITH POND AND BROOK. — **Location:** New Jersey; Bergen Co., Mahwah, Campgaw Mountain Reservation. **Continuity:** Established 1964; 10 consecutive years. **Size:** Approximately 16.2 ha = 40 acres (rectangular, 250 x 800 yards, paced). **Description of Plot:** See AFN 19:623-624, 1965. **Coverage:** May 29, 31; June 5, 7, 12, 14, 19, 21. Hours of coverage were 0530 to 0645 on each visit. Total man hours: 53. **Census:** Wood Thrush, 3 (19, 8); Ovenbird, 3 (19, 8); Com. (Yellow-shafted) Flicker, 2; Blue Jay, 2; Am. Robin, 2; Starling, 2; Red-eyed Vireo, 2; N. (Baltimore) Oriole, 2; Rufous-sided Towhee, 2; Mallard, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; E. Wood Pewee, 1; Black-capped Chickadee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; House Wren, 1; Gray Catbird, 1; Veery, 1; Yellow-throated Vireo, 1; Black-and-white Warbler, 1; Chestnut-sided Warbler, 1; Louisiana Waterthrush, 1; Com. Yellowthroat, 1; Red-winged Blackbird, 1; Scarlet Tanager, 1; Cardinal, 1; Indigo Bunting, 1. **Total:** 28 species; 39 territorial males ($241/\text{km}^2$, 98 per 100 acres). **Visitors:** Green Heron, Red-shouldered Hawk, Spotted Sandpiper, Mourning Dove, Yellow-billed Cuckoo, Screech Owl, Com Nighthawk, Ruby-throated Hummingbird, Belted Kingfisher, Pileated Woodpecker, Hairy Woodpecker, E. Kingbird, Barn Swallow, Tree Swallow, Com Crow, Blue-winged Warbler, Am. Redstart, Com Grackle, Brown-headed Cowbird, Rose-breasted Grosbeak, Am. Goldfinch. — M. BRACK, J BROTHERTON, P. HORNAK, G. LITTELL, N SJOLANDER, J. WORRAL, *Fyke Nature Association*, Box 141, Ramsey, N. J. 07446.

43. UPLAND PINE-OAK FOREST. — **Location:** New Jersey; Burlington Co., 5 miles N of New Gretna, 39°39'N, 74°23'30"W, Oswego Lake Quadrangle, USGS. **Continuity:** New. **Size:** 9.4 ha = 23.24 acres (rectangular, 250 x 450 yards, tape-measured). **Description of Plot:** Forest crown quite open with an understory of shrubs averaging 3 to 4 ft in height; a heavy ground cover was dominated by woody plants such as blueberry (*Vaccinium* sp.), huckleberry (*Gaultheria* sp.), and oak saplings (*Quercus* sp.). Mosses and lichens were predominant in some areas, typical Pine Barrens of southern New Jersey. Trees average 15 to 20 ft in height and 4 to 6 inches dbh: 63% Pitch Pine (*Pinus rigida*), 20% dead Pitch Pine, 8% Post Oak (*Q. stellata*), 7% Black Oak (*Q. velutina*). Scientific names of plants from "Gray's Manual, 1950." **Edge:** Bounded on four sides by similar forest. **Topography:** Flat; elevation 70 ft. **Coverage:** May 1, 7, 10, 17, 31; June 5, 8, 11-12, 14, 18. Hours varied from 0510 to 2200. All 10 morning visits began before 0600 EDT. Total man-hours: 40. **Census:** Rufous-sided Towhee, 20 (213, 86); Carolina Chickadee, 2.5; Whippoor-will, 2; Pine Warbler, 2; Prairie Warbler, 2; Brown Thrasher, 1.5; Ovenbird, 1.5; Mourning Dove,

1, Com Yellowthroat, 1, Brown-headed Cowbird, 1 (female). **Total:** 10 species; 33.5 territorial males (356/km², 144 per 100 acres). **Visitors:** Black-billed Cuckoo, Com. Flicker, Hairy Woodpecker, Great Crested Flycatcher, E. Wood Pewee, Blue Jay, Gray Catbird, Black-and-white Warbler, Com. Grackle. **Remarks:** Both the thrasher and the towhee nests were on the ground. Brown Thrashers and Carolina Chickadees were especially common in early May. Locations of Whip-poor-will territories were based on one night visit, and are therefore approximate. —M. A. POKRAS AND M. L. POKRAS, *Ichthyological Associates, Absecon, N. J.* 08201.

44. CENTRAL HARDWOOD FOREST WITH SCATTERED PINE. — **Location:** Washington, D. C.; Rock Creek Park, lying S of Military Road and W of Rock Creek. **Continuity:** Established 1948; 16 intermittent years. **Size:** Until 1961, 80 acres; since 1961, 26.3 ha = 65 acres (triangular, surveyed). **Description of Plot:** See *AFN* 2:153-154, 1948. **Weather:** Wet and cool in April and May; warm and dry in June and July. **Coverage:** April 7, 14, 21 (2 trips), 29; May 5, 12-13, 26, 29, June 10, 17, 23, 30; July 4, 7-8. All trips between 0430 and 1200 hours and (one trip) 1845 and 1945 hours, EST. Total man-hours: 45. **Census:** Tufted Titmouse, 10 (38, 15); Carolina Wren, 8 (30, 12); Ovenbird, 7.5 (29, 12); Carolina Chickadee, 7 (27, 11); Red-eyed Vireo, 6.5 (25, 10); Cardinal, 5.5 (21, 8); Downy Woodpecker, 5 (19, 8); Scarlet Tanager, 5 (19, 8); Blue Jay, 4.5 (17, 7); Red-bellied Woodpecker, 4 (15, 6); White-breasted Nuthatch, 4 (15, 6); Veery, 4 (15, 6); Acadian Flycatcher, 3 (11, 5); Wood Thrush, 3 (11, 5); Am. Redstart, 3 (11, 5); Com (Yellow-shafted) Flicker, 2; Com. Crow, 1.5; Rufous-sided Towhee, 1.5; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Starling, 1; Brown-headed Cowbird, 1 (female). **Total:** 22 species; 89 territorial males or females (338/km², 137 per 100 acres). **Visitors:** Broad-winged Hawk, Mourning Dove, E. Wood Pewee, Am. Robin, Gray Catbird, Am. Goldfinch. **Remarks:** Nests located: Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Hairy Woodpecker, 1; Cardinal, 1. The Rock Creek Park area was censused this year for the first time since 1969, at which time a radical change in the breeding population seemed to be occurring. The trend continued this year with an even greater drop in total density. This drop seems to represent two opposing trends: permanent residents are increasing and summer residents are decreasing. Since the Red-eyed Vireo and Ovenbird were originally by far the most abundant species, the overall effect is a sharp decrease in total abundance. Among the summer residents, a definite decrease has appeared in the Red-eyed Vireo, Ovenbird, Acadian Flycatcher, and Wood Thrush. Birds that have disappeared from the area as regular nesters are the Hooded and Kentucky Warblers and probably the E. Wood Pewee and Great Crested Flycatcher. Permanent residents increasing are the Tufted Titmouse, Downy Woodpecker, Cardinal, Carolina Wren and Blue Jay. So far, study of territory locations does not show any parts of the area preferred by summer or permanent residents. We are not yet sure of the cause of the above trends. But the change in population composition has coincided with increasing

disturbance of surrounding areas including the building of two riding stable buildings and enlarging a nearby highway. There has been increasing human use of bridle trails and a small picnic area. —JOAN H. CRISWELL (compiler) and C. E. CRAVEN, *Audubon Naturalist Society, 8940 Jones Mill Road, Washington, D. C.* 20015.

45. COASTAL MIXED PINE-OAK FOREST. — **Location:** North Carolina; Brunswick Co., in Pinner's Point, Long Beach on Oak Island, 10 miles W of Southport; 33°55'N, 78°10'W, Lockwoods Folly Quadrangle USGS. **Continuity:** New. **Size:** 16.30 ha = 40.29 acres (rectangular, in a grid of blocklike units, 150 x 150 ft, surveyed with hand compass and tape). **Description of Plot:** The plot is being developed and 10 acres are covered by paved streets with accompanying cleared rights of way; midway between these streets the tall trees have been cut for 20 ft power easements which total 2.4 acres. Part is subdivided into lots, but the total area has not been disturbed seriously as yet. In general the plot is a Loblolly Pine - Live Oak - Pignut Hickory forest, with understory of Scrub Oak, Am. Holly and Yaupon in the southeastern coastal plain. Elevation, 10 ft. The whole area was cultivated fields about 35-40 years ago so tree growth is relatively young. The area suffered considerable tree damage in the severe ice storm of January, 1973. A plant analysis was made by the 0.1 acre circular plot as described by James and Shugart (*AFN*, 24:727-36), and is summarized as follows: Trees 3-inches diameter and over, based on five circular samples, 414/acre; total basal area 147.6 ft²/acre. Species comprising 93% of the total number of trees [figures after each give number of trees/acre, relative density (%), relative dominance, frequency, in that sequence]: Loblolly Pine (*Pinus taeda*), 162, 39.2, 45.9, 100; Live Oak (*Quercus virginiana*), 114, 27.6, 20.3, 80, Laurel Oak (*Q. laurifolia*), 60, 14.5, 8.2, 100; Pignut Hickory *Carya glabra*, 26, 6.3, 8.7, 20; S. Red Oak (*Q. falcata*), 22, 5.3, 6.6, 60. Other trees of less frequency are: Dead trees (3.4%); Am. Holly (*Ilex opaca*); Black Tupelo (*Nyssa sylvatica*); Turkey Oak (*Q. laevis*), Red Cedar (*Juniperus virginiana*). Trees by diameter size class [figures after each class give number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance]: A (3-6 in.) 188, 46, 18.8, 12.8; B (6-9 in.) 128, 31, 38.4, 26; C (9-15 in.) 84, 20, 68.8, 46.6; D (15-21 in.) 12, 3, 21.6, 14.6. Shrub stems/acre 1,740; ground cover 51%; canopy cover 90%; average canopy height 47 ft (range 20-80). Major shrub stems are young Live Oak, young Laurel Oak, young Loblolly Pine, Yaupon (*Ilex vomitoria*), Wax Myrtle (*Myrica cerifera*). Cover for the plot includes Virginia Creeper (*Parthenocissus quinquefolia*), Muscadine (*Vitis rotundifolia*), Woolly Mullein (*Verbascum thapsus*), Yellow Jessamine (*Gelsemium sempervirens*), Morning Glory (*Ipomoea sagittata*), Poison Ivy (*Rhus radicans*), Saw-Brier (*Smilax glauca*). Plant names taken from Brockman's *Trees of North America*, Dean's *Trees and Shrubs*, and *Smith Island* by Parnell and Adams. **Edge:** Similar on all sides; salt water marsh about 200 ft from southern edge and the intra-coastal waterway about 300 ft from northern edge. **Weather:** The spring season was wet, but the breeding survey periods were generally clear, or

with light clouds. Only one period was shortened because of rain, June 12. **Coverage:** April 6, 21, May 6, 12, 15, 17, 22; June 4, 8, 12, 14, 27. All surveys were made between 0600 and 1030 hours, EDST. A further 8 hrs was spent during the initial measurements and the plant survey. Total man-hours: 72. **Census:** (territorial males, followed in parenthesis by males/km² and per 100 acres): Cardinal, 8.5 (52, 21); Great Crested Flycatcher, 7.5 (46, 19); Carolina Wren, 6.5 (40, 16); Red-bellied Woodpecker, 6 (37, 15); Blue-gray Gnatcatcher, 4.5 (28, 11); Bobwhite, 3.5 (21, 9); Blue Jay, 3.5 (21, 9); Tufted Titmouse, 3.5 (21, 9); Mourning Dove, 3 (18, 7); Red-eyed Vireo, 3 (18, 7); Pine Warbler, 3 (18, 7), Yellow-billed Cuckoo, 2; Com. (Yellow-shafted) Flicker, 2; Pileated Woodpecker, 2; Downy Woodpecker, 2; Carolina Chickadee, 2; Summer Tanager, 2; Painted Bunting, 2; Red-headed Woodpecker, 1.5; Screech Owl, 1; Chuck-will's-widow, 1; Brown Thrasher, 1; White-eyed Vireo, 1; Yellow-throated Warbler, 1. **Total:** 25 species; 75 territorial males or females (460/km², 186 per 100 acres). **Visitors:** Ground Dove, Belted Kingfisher, Com. Nighthawk, Hairy Woodpecker, E. Phoebe, Acadian Flycatcher, Rough-winged Swallow, Brown-headed Nuthatch, Mockingbird, Gray Catbird, Black-and-white Warbler, N. Parula, Prairie Warbler, Red-winged Blackbird, Orchard Oriole, Boat-tailed Grackle, Com. Grackle, Brown-headed Cowbird. **Remarks:** Gray Squirrels are abundant. The area is being developed as a coastal community with nine houses already built. Most of these are summer week-end cottages. In our opinion this pattern of development will continue over the next several years, and our observations will be directed toward the recording of changes of breeding birds as the disturbance of the area progresses. — SAMUEL R. and ISABEL H. TIPTON, W 23rd Street, Long Beach, Star Route 2, Box 780, Southport, N. C. 28461.

46. SOUTHERN MIXED HARDWOOD FOREST. — **Location:** Georgia; Chatham Co., Wormsloe Plantation, Isle of Hope, approximately 9 miles S of the civic center of Savannah; 31°57'35"N, 81°04'25"W; Isle of Hope Quadrangle USGS. **Continuity:** Established 1963, 11 consecutive years. **Size:** 10 ha = 25 acres rectangular, 328 meters (300 yards) by 428 meters (400 yards), measured. **Description of Plot:** See AFN 18:555, 1964. **Coverage:** April 20, 27; May 11, 13, 18, 22, 31; June 1, 5. Hours varied from 0630 to 2030, EST, and totaled 28 man-hours. At least two hours were spent censusing before 1100 on each date indicated. **Census:** Carolina Wren, 6 (59, 24); Cardinal, 6 (59, 24); Rufous-sided Towhee, 5.5 (54, 22); Tufted Titmouse, 4 (40, 16); Yellow-billed Cuckoo, 3.5 (35, 14); Red-bellied Woodpecker, 3 (30, 12); Blue Jay, 3 (30, 12); N. Parula, 3 (30, 12); Pine Warbler, 3 (30, 12); Blue-gray Gnatcatcher, 2.5; Summer Tanager, 2.5; Red-eyed Vireo, 1.5; Downy Woodpecker, 1; Yellow-throated Warbler, 1. **Total:** 14 species; 45.5 territorial males (450/km², 182 per 100 acres). **Visitors:** Red-tailed Hawk, Screech Owl, Great Horned Owl, Pileated Woodpecker, Great Crested Flycatcher, Acadian Flycatcher, Fish Crow, Carolina Chickadee. **Remarks:** This very low population is not substantially different, in composition or in numbers, from last year's. — L. B. DAVENPORT,

JR, Biology Department, Armstrong State College, Savannah, Ga. 31406

47. UPLAND SCOTCH PINE PLANTATION. — **Location:** New York; Allegany Co., 2 mi WSW of Alfred, bordering on the west side of Lake Road, adjacent to the evergreen plantings on the east side of Foster Lake; 42°7'30"N, 77°45'W, Andover Quadrangle, USGS. **Continuity:** Established 1969; 5 consecutive years. **Size:** Approximately 9.3 ha = 23 acres (roughly rectangular; 1881 ft in length, varying in width from 209 ft at the north end to 627 ft at the south end, measured with tape and compass, and divided into one-acre plots). **Description of Plot:** See AFN 23:743-744, 1969. Last fall, approximately 4000 Scotch Pine trees were harvested (up from 2000 trees harvested in 1971 and 2700 trees in 1972). Six acres in the middle of the study area exhibit increasingly larger open spaces. Growth of Choke Cherry and bramble patches has provided another interesting habitat alteration. **Weather:** Data provided by the Alfred Cooperative Weather Station indicated that both mean temperature (52° in May and 66.9° in June) and rainfall (3.70" in May and 2.83" in June) were within normal range and would have had no adverse effect on nesting. **Coverage:** April 30; May 7, 9-10, 15, 19, 22-23; June 2-3, 9, 11, 18, 23; July 7. Hours varied from 0800 to 2030 EDT and totaled 18 man-hours. An additional 10 hours was spent in an attempt (fruitless) to find any of the Clay-colored Sparrows that had nested in the plantation during the previous 3 or 4 years. **Census:** Song Sparrow, 23 (247, 100); Chipping Sparrow, 17 (183, 74); Am. Robin, 11 (118, 48); Purple Finch, 8 (86, 35); Field Sparrow, 8 (86, 35); Rufous-sided Towhee, 5 (54, 22); Brown-headed Cowbird, 4 (43, 17); Am. Woodcock, 3 (32, 13); Brown Thrasher, 2.5; Yellow-rumped (Myrtle) Warbler, 2; Com. Yellowthroat, 2; Alder Flycatcher, 1; Tree Swallow, 1; Mallard, 1; Gray Catbird, +. **Total:** 15 species; 89 territorial males (956/km², 387 per 100 acres). **Visitors:** Black-billed Cuckoo, Com. (Yellow-shafted) Flicker, Great Crested Flycatcher, Blue Jay, Com. Crow, Black-capped Chickadee, E. Bluebird, Cedar Waxwing, Nashville Warbler, Magnolia Warbler, Black-throated Green Warbler, Chestnut-sided Warbler, Bobolink, Red-winged Blackbird, Com. Grackle, Am Goldfinch, Red Crossbill, Savannah Sparrow. **Remarks:** Both Am. Goldfinch and Cedar Waxwings were active but no territories were defined or nests discovered. The Tree Swallow was a resident of a nest box located at the south end of the plantation. A flock of up to 14 Red Crossbills appeared almost daily until June 4 and were thought to be nesting in the vicinity but no nests were discovered. Bobolink, Red-winged Blackbirds and Savannah Sparrows in greater numbers than previous years used the more open midsection of the plantation as foraging territory. Yellowthroats are increasing with the growth of bramble patches and other suitable nest habitat. Ruffed Grouse, Vesper Sparrow and Clay-colored Sparrow were not seen this season. While Am Woodcock, Brown Thrasher and yellowthroat showed slight gain in number of territorial males, the total number declined from 107.5 in 1972 to 89 in 1973. Although this does not exceed the low figure of 84 in 1971,

it does represent a substantial decline, perhaps a result of the poor nesting season last year owing to the extended wet periods at the time of Tropical Depression Agnes. Fifteen nests were located this year. The Tree Swallow produced 5 eggs – all destroyed by an unknown predator. Of 10 Am. Robin nests documented, 4 nestings were successful, producing a total of 12 young. The remaining 6 nests with a total of 21 eggs were unsuccessful. One Yellow-rumped Warbler nest successfully fledged 3 young. One Purple Finch nest successfully produced 2 or 3 young. One Chipping Sparrow nesting fledged 4 young and 1 Song Sparrow nest produced 3 young. No nests studied were found to be parasitized by Brown-headed Cowbirds. Appreciation is extended to Eddy Foster for granting permission to conduct this study on his land; to Dan Stutzman, co-owner of the Christmas trees; to Clarence Klingensmith for helpful suggestions; and to Laura Brooks for assistance in the field. — ELIZABETH W. BROOKS, *Water Wells Road, Alfred Station, N. Y. 14803.*

48. TAMARACK-WHITE CEDAR SLOUGH. — **Location:** Ontario; Norfolk Co., Port Rowan, 2 miles W of Long Point Lighthouse; 42°33'N, 80°05'W; Gravelly Bay, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 4.05 ha = 10 acres (rectangular, surveyed). **Description of Plot:** The slough is composed of two major habitats. One is marsh and open water, while the other is Tamarack and White Cedar forest. For the most part, the grid is comprised of parallel, forested dune ridges running east to west along its length, with marsh and areas of open water in the interdunes. Parts of the forested ridges were flooded by this year's exceptionally high water levels which killed a number of saplings and small trees. These two distinct habitats were analyzed separately and are written up this way; the forest area first and the marsh and open water area last. The dominant canopy trees are Tamarack (*Larix laricina*) and White Cedar (*Thuja occidentalis*). Most prominent in the understory are Canada Blue Joint (*Calamagrostis canadensis*), Marsh Vetch (*Lathyrus palustris*), Wild Grape (*Vitis riparia*), Swamp Candle (*Lysimachia terrestris*), Marsh Fern (*Dryopteris thelypteris*), Skull Cap (*Scutellaria epilobiifolia*), and Clear Weed (*Pilea pumila*). A quantitative survey of the vegetation gave the following: Trees 3 inches in diameter and over, based on the quarter method at 20 points, 350/acre; total basal area 118 ft²/acre. Species comprising 90% of the total number of trees: Tamarack, 166, 48, 44, 80; White Cedar, 123, 35, 24, 75; White Birch (*Betula papyrifera*), 39, 11, 25, 25; Trees by diameter size class: A (3-6") 136, 38.8, 17.9, 15.2; B (6-9") 105, 30, 29, 4, 24.9; C (9-15") 105, 30, 3, 63.1, 53.5; D (15-21") 4, 1.2, 7.6, 6.4. Shrub stems/acre 160; ground cover 100%; canopy cover 75%; average canopy height 30 ft (range 25-35). The marsh areas were comprised mainly of Canada Blue Joint, Sedge (*Carex aquatilis*), and Hard-stem Bulrush (*Scirpus acutus*). These three plants amounted to almost 100 % of the cover and other plants present contributed very little. Plant names from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** The north, east and west edges border on similar habitat.

The south edge borders on a fairly open dry juniper-cottonwood savannah. **Topography:** Essentially marsh and open water interrupted by parallel dune ridges and rows of flooded trees, owing to high water. **Elevation:** 570 ft. **Weather:** Generally sunny and breezy on census dates. **Coverage:** May 31; June 6-7, 9, 12, 14, 18-19, 22, 26; July 2, 6; All trips between dawn and 1230 or 1400 and 1930. Total man-hours: 62.5 censusing and 24 surveying and laying out the grid. **Census:** Red-winged Blackbird, 6.5 (161, 65); Yellow Warbler, 4 (99, 40), House Wren, 4 (99, 40); Song Sparrow, 2.5; Great Crested Flycatcher, 2; Starling, 2; Tree Swallow, 2, Com. (Yellow-shafted) Flicker, 1; E. Kingbird, 1, E Wood Pewee, 1; Brown-headed Cowbird, 1; N. (Baltimore) Oriole, 1; Cardinal, 1; Com. Yellowthroat, 1, Gray Catbird, 1. **Total:** 15 species; 30 territorial males or females (741/km², 300 per 100 acres). **Visitors:** Least Bittern, Am. Bittern, Mallard, Wood Duck, Am Woodcock, Yellow-billed Cuckoo, Great Horned Owl, Belted Kingfisher, Hairy Woodpecker, Blue Jay, Com. Crow, Black-capped Chickadee, Carolina Wren, Brown Thrasher, Red-eyed Vireo, Com Grackle, Am. Goldfinch, Red Crossbill, Rufous-sided Towhee, Chipping Sparrow, Field Sparrow. **Remarks:** 18 nests were located: E. Kingbird, 1 with 4 eggs, E Wood Pewee, 1 with 3 eggs; Starling, 1 contents not examined; Red-winged Blackbird, 10 nests, 1 with 3 eggs, 8 with 4 eggs, 1 with 5 eggs; N. Oriole, 1 contents not examined; Cardinal, 1 with 3 eggs; Tree Swallow, 2 contents not examined; Yellow Warbler, 1 with 5 eggs; Brown-headed Cowbirds laid eggs in 3 nests – Red-winged Blackbird, 1 egg; Cardinal, 2 eggs; Yellow Warbler, 2 eggs, Special thanks to Tony Reznicek for the quantitative habitat description and the Federation of Ontario Naturalists for financial assistance — DOUGLAS J. NAKASHIMA, *Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE IMO.*

49. WHITE PINE-WHITE CEDAR FOREST. — **Location:** Ontario; Norfolk Co., Port Rowan, 3.5 miles W of Long Point Lighthouse; 42°32'56"N, 80°6'01"W, Gravelly Bay, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 1.21 ha = 3 acres (rectangular, surveyed). **Description of Plot:** The dominant canopy trees are White Pine (*Pinus strobus*) and White Cedar (*Thuja occidentalis*). Most prominent in the understory is Ground Juniper (*Juniperus communis*), Star Flower (*Trientalis borealis*), Sedge (*Carex eburea*), Hound's Tongue (*Cynoglossum officinale*), and Rock Cress (*Arabis lyra*). A quantitative survey of the vegetation gave the following results: Trees 3 inches in diameter and over, based on quarter method at 20 points, 83/acre; total basal area 64.3 ft²/acre. Species comprising 90% of the total number of trees: White Pine, 50, 60, 84, 95; White Cedar, 25, 30, 12, 70. Trees by diameter size class: A (3-6") 17, 20, 12, 3.4; B (6-9") 14, 16.3, 10, 6.0; C (9-15") 35, 42.5, 27, 44.3; D (15-21") 18, 21.3, 14, 46.2. Shrub stems/acre 34; ground cover 80%; canopy cover 50%; average canopy height 40 ft (range 35-50). Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** North bordered by an open pond; east by similar habitat, but marshy; south by dry juniper-cottonwood savannah,

west by similar habitat. **Topography:** Sand dunes, maximum height of 10 ft. **Elevation:** 580 ft. **Weather:** Generally sunny and breezy on census dates. **Coverage:** May 31; June 4, 8, 11, 14, 21, 26; July 2, 8, 11. All trips between dawn and 1200 hrs except for one between 1700 and 1830. Total man-hours: 55.5 plus 30 surveying and laying out the grid. **Census:** Rufous-sided Towhee, 2; Chipping Sparrow, 2; House Wren, 1.5; Mallard, 1; Mourning Dove, 1; Com. (Yellow-shafted) Flicker, 1; Great Crested Flycatcher, 1; E. Wood Pewee, 1; Com. Yellowthroat, 0.5. **Total:** 9 species; 10.5 territorial males (865/km², 350 per 100 acres). **Visitors:** Yellow-billed Cuckoo, E. Kingbird, Blue Jay, Black-capped Chickadee, Gray Catbird, Brown Thrasher, Song Sparrow. **Remarks:** Three nests were located: Mallard, 1 with 10 eggs; Mourning Dove, with 2 young; Com. Flicker, 1 contents not examined. White-tailed Deer and Cottontail Rabbits were frequently seen. Special thanks to Tony Reznicek for the quantitative habitat description and the Federation of Ontario Naturalists for financial assistance. — JAYNE E. EVANS, Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE IMO.

50. FIR-SPRUCE SWAMP. — **Location:** West Virginia, Randolph Co., 1½ miles SE of Cheat Bridge, and less than ¼ mile NW of the junction of U.S. Route 250 and Monongahela National Forest Route 27 leading to Gaudineer Knob fire tower; 38°36'N, 79°51'W. **Continuity:** Established 1968; 2 intermittent years. **Size:** 6.07 ha = 15 acres (110 yards by 660 yards, rectangular, measured). **Description of Plot:** See AFN 22:667-668, 1968. Since the original description, some of the larger trees, mostly Fraser's Fir, have been uprooted and blown down. There has been no appreciable change in the other vegetation. **Edge:** Bordered on all sides by similar forest except for one small area of more open marshy land on the western edge. **Elevation:** 3650 ft. **Weather:** Warm and humid with fog in the mornings and one shower at night during the census period. **Coverage:** June 10-14. All trips between 0530 and 0745 or 1915 and 2045 hours. Total man-hours: 36. **Census:** Blackburnian Warbler, 12 (198, 80); Magnolia Warbler, 7.5 (124, 50); N. Waterthrush, 7 (115, 47); Dark-eyed (Slate-colored) Junco, 4.5 (74, 30); Golden-crowned Kinglet, 4 (66, 27); Canada Warbler, 4 (66, 27); Solitary Vireo, 3 (49, 20); Red-breasted Nuthatch, 2; Wood Thrush, 2; Swamp Sparrow, 2; Brown Creeper, 1.5; Blue Jay, 1; Black-capped Chickadee, 1; Winter Wren, 1; Swainson's Thrush, 1; Red-eyed Vireo, 1; Black-throated Green Warbler, 1; Purple Finch, 1; Red-shouldered Hawk, +; Ruffed Grouse, +; Veery, +; Brown-headed Cowbird, +. **Total:** 22 species; 55.5 territorial males (914/km², 370 per 100 acres). **Visitors:** Cedar Waxwing, Pine Siskin, Am. Goldfinch, Red Crossbill. **Remarks:** One Wood Thrush nest was located. The Blackburnian Warbler population increased from 3.5 to 12. Two other species also showing substantial increases were the Magnolia Warbler from 4.5 to 7.5 males, and the N. Waterthrush from 3.5 to 7. The Swamp Sparrows were located in the more marshy area at the western end of the plot. — KYLE BUSH, E. E. HUTTON, JR., CAROL RUDY (compiler), MARTIN RUDY, Brooks Bird Club, 707 Warwood Ave., Wheeling, W. V. 26003.

51. YOUNG SPRUCE FOREST. — **Location:** West Virginia, Pocahontas and Randolph Counties, on top of Gaudineer Knob, Shavers Mountain, Monongahela National Forest, about 5 miles N of Durbin. The center-line starts at 38°37'08"N, 79°50'39"W, Durbin Quadrangle, USGS, and extends south. **Continuity:** Established 1947; 7 intermittent years. **Size:** 6.1 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** See AFN 22:667, 1968. A thick, uniform, natural stand of 97% Red Spruce (*Picea rubens*) and 3% Yellow Birch (*Betula lutea*) about 35 ft tall and open and bare beneath except for moss and a border of Mountain Laurel (*Kalmia latifolia*) along the access road which bisects the plot to a fire tower at 440 yards. **Edge:** Continuous uniform habitat except for access road from the north. **Topography:** A nearly flat mountain top, elevation 4445 ft at the high point. **Weather:** Unusually warm, dry, and calm. **Coverage:** June 10-14; 14 trips between 0545 and 0800 and one trip in the late evening. Total party-hours: 12. **Census:** Dark-eyed (Slate-colored) Junco, 6 (99, 40); Golden-crowned Kinglet, 5 (82, 33); Am. Robin, 2; Magnolia Warbler, 1.5; Blue Jay, 1; Black-capped Chickadee, 1; Winter Wren, 1; Solitary Vireo, 0.5; Red-eyed Vireo, 0.5; Swainson's Thrush, 0.5; Red-breasted Nuthatch, +; Ovenbird, +; Pine Siskin, +. **Total:** 13 species; 18 territorial males (297/km², 120 per 100 acres). **Visitors:** Chimney Swift, N. Waterthrush. **Remarks:** A local yearly census shows a population decrease of Magnolia Warblers from 50 to 10 per 100 acres since last year which indicates that this species can be added to the list of birds seriously affected by the inclement weather of 1972. White-tailed Deer were seen each day. — ELIZABETH DE-GARMO and GEORGE KOCH (compilers), LAURA KOCH, KIT PRICE, LEON WILSON, Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.

52. SLASH PINE PLANTATION. — **Location:** Louisiana; Vernon Parish, 3.5 miles N of the intersection of state highways 111 and 464 and S of highway 464; in Sections 11 and 12, T2S, R11W; 30°27'N, 93°27'W, Knight Quadrangle, USGS. **Continuity:** New. **Size:** 16.19 ha = 40 acres (square, surveyed by hand compass and pacing). **Description of Plot:** The dominant vegetation is Slash Pine (*Pinus elliottii*) planted in January 1952. Understory vegetation is very sparse and consists of Longleaf Pine (*Pinus palustris*), Red Cedar (*Juniperus virginiana*), Blackjack Oak (*Quercus marilandica*), Sweet Gum (*Liquidambar styraciflua*), Am. Holly (*Ilex opaca*), Devil's Walking Stick (*Aralia spinosa*), Wax-Myrtle (*Myrica cerifera*), Yellow Jessamine (*Gelsemium sempervirens*), and blackberry (*Rubus sp.*). The ground cover is a mixture of native grasses that have been smothered out by pine needles. A cruise of the dominant vegetation based on 16, 20 factor points indicates 255 trees per acre, 3 inches dbh and over. The average dbh is 8.3 in and average height of dominant trees is 65 ft. This plantation was thinned in 1969 and again in 1972 and has been control burned periodically, which accounts for the lack of hardwood understory. There is an old road on the west

side of the plot and seepage into the road ditches has furnished water for the birds this summer. **Edge:** Bordered on all sides by similar forest. **Topography:** Essentially flat except for the road which has been worn down 2 to 3 ft below the average level of the rest of the area. **Elevation:** 290 ft. **Weather:** Temperature varied from 40° to 80°. Skies and winds were quite variable. **Coverage:** April 1, 7, 13, 19, 27; May 5, 19, 28; June 3, 10, 16. All trips were between dawn and 1000 hours. Total man-hours: 26.5. **Census:** Pine Warbler, 7 (43, 18); E. Bluebird, 4 (25, 10); Red-bellied Woodpecker, 3 (19, 8); E. Wood Pewee, 3 (19, 8); Blue Jay, 3 (19, 8); Brown-headed Nuthatch, 3 (19, 8); Chipping Sparrow, 3 (19, 8); Great Crested Flycatcher, 2; Summer Tanager, 2; Bachman's Sparrow, 2; Carolina Chickadee, 1; Acadian Flycatcher, +; Carolina Wren, +. **Total:** 13 species; 33 territorial males or females ($204/\text{km}^2$; 82 per 100 acres). **Visitors:** Pileated Woodpecker, Red-headed Woodpecker, Red-cockaded Woodpecker, Com. Crow, Com. Grackle. **Remarks:** Four E. Bluebird nests were located, two on the plot and two just off. All nests were in Slash Pine (*Pinus elliottii*) that had died owing to infection by Annosus root rot (*Formes annosus*) or lightning. — E. C. CLEAVELAND, 61 Harvard Drive, DeRidder, La. 70634.

53. MIXED FOREST, OLD FIELD AND HOME-SITE. — **Location:** Vermont; Windsor Co., 1.5 mile S of Woodstock on Church Hill Road; 43°36'N, 72°31'W, Woodstock Quadrangle, USGS. **Continuity:** New. **Size:** 11 ha = 27 acres (determined from available maps). **Description of Plot:** Roughly rectangular, strongly sloping from the long NE line to the middle of the property and gently sloping from there to the front. About two-thirds of the land is forested, including the strongly sloping portion and a section along the SE border. A preliminary analysis shows a definite gradation of species dominance along the strong slope, with 36% Hemlock (*Tsuga canadensis*), 38% Am. Beech (*Fagus grandifolia*), 21% Sugar Maple (*Acer saccharum*), and 5% other species at the NW end, becoming a younger forest along the slope, of 33% White Birch (*Betula papyrifera*), 20% Yellow Birch (*B. lutea*), 17% Am. Beech, 14% White Ash (*Fraxinus americana*) and 16% other species. A two-acre stand of homogeneous White Pine (*Pinus strobus*) is included. Similarly, along the SE side and extending to a stream border, 100% Hemlock, 10% Sugar Maple, 10% Am. Elm (*Ulmus americana*) and 18% others, and then to 28% Hemlock, 15% Sugar Maple, 14% Yellow Birch, 14% Am. Beech, 13% Am. Elm and 16% others. The rest of the property includes a homesite, pond, grassland and reverting old fields. The latter have scattered White Pine, Quaking Aspen (*Populus tremuloides*), and Wild Black Cherry (*Prunus serotina*) most evident, with Apple (*Pyrus malus*), White Ash and willow (*Salix* sp.) at lower elevation. An intermittent stream follows the front of the property along the SW border. Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Bordered by forest along the NE ridge line and along the boundary at the SE. Rural farmland borders the NW and SW lines. **Elevation:** 1250 ft along the NE ridge line, to 920 ft at the front of the property. **Coverage:** June 8-13, 15, 18, 28. All trips between 0630

and 1130 or between 1700 and 1900 Total man-hours 23. **Census:** Song Sparrow, 16 (146, 59), Blue Jay, 8 (73, 30); Robin, 8 (73, 30); Red-eyed Vireo, 8 (73, 30), Veery, 7 (64, 26); Ovenbird, 7 (64, 26); Great Crested Flycatcher, 6 (55, 22); Black-capped Chickadee, 6 (55, 22); E. Wood Pewee, 5 (46, 19); Magnolia Warbler, 5 (46, 19); Com. Yellowthroat, 5 (46, 19); Red-winged Blackbird, 5 (46, 19); White-throated Sparrow, 5 (46, 19); Least Flycatcher, 4 (37, 15); Gray Catbird, 4 (37, 15); Wood Thrush, 4 (37, 15); Hermit Thrush, 4 (37, 15), Scarlet Tanager, 4 (37, 15); Chestnut-sided Warbler, 4 (37, 15); N. (Baltimore) Oriole, 4 (37, 15); Rufous-sided Towhee, 4 (37, 15); Com. (Yellow-shafted) Flicker, 3 (27, 11); Downy Woodpecker, 3 (27, 11); Brown Thrasher, 3 (27, 11); E. Bluebird, 3 (27, 11); Warbling Vireo, 3 (27, 11); Black-and-white Warbler, 3 (27, 11); Yellow-rumped (Myrtle) Warbler, 3 (27, 11); Am. Redstart, 3 (27, 11); Ruffed Grouse, 2; Ruby-throated Hummingbird, 2; Yellow-bellied Sapsucker, 2; Hairy Woodpecker, 2; E. Phoebe, 2; Tree Swallow, 2; White-breasted Nuthatch, 2; Cedar Waxwing, 2, Starling, 2; Com. Grackle, 2; Canada Warbler, 2; Rose-breasted Grosbeak, 2. **Total:** 41 species; 170 territorial males ($1556/\text{km}^2$, 630 per 100 acres). **Visitors:** Red-shouldered Hawk, Am. Kestrel, Pileated Woodpecker, E. Kingbird, Barn Swallow, Com. Crow, Brown Creeper, House Wren, Black-throated Green Warbler, Pine Siskin, Am. Goldfinch, Savannah Sparrow, Chipping Sparrow. **Remarks:** Vegetational analyses made with the help of Debbie Arnold, Chris Bacher, Nils Sundquist, Torsten Bedecker, Brooke Feeley, Laurie Yntema, Drew Stevens, Jenny Haberman, Adrienne Anderson, Daphne Meyer and Katie Eberhardt. — JULIE NICHOLSON, *Vermont Institute of Natural Science*, Woodstock, Vt. 05091

54. RURAL STREAM BORDER — **Location:** Vermont; Windsor Co., 1 mile S of S Woodstock center on Route 106; 43°33'N, 72°32'W, Woodstock Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 108 ha = 40 acres. **Description of Plot:** See AB 26:1000-1001, 1972. The previously published description included by error a vegetational analysis done for another plot. The study area along the Kedron Brook is mainly open land, including the buildings of the Green Mountain Horse Association and the Woodstock Country School. The stream itself averages about eight feet in width and is immediately bordered by dense shrubs and Am. Elm (*Ulmus americana*) of 40-50 ft height. The other stream branch, extending at right angles from its point of confluence with the Kedron Brook, averages only 3 or 4 ft in width. The part of the study area along its length has many more trees and shrubs in areas away from the immediate stream bank, including an old Apple (*Pyrus malus*) orchard and evergreen ornamental plantings around an old mansion. Also in the area are two smaller houses, a horse barn and pasture and a dirt road which runs parallel to the stream for about one-half mile. **Coverage:** May 20, 24, 29; June 1-5, 10, 12, 14. All trips between 0530 and 1030 or between 1700 and 1930. Total man-hours: 23. **Census:** Song Sparrow, 17 (105, 43), Am. Robin, 13 (80, 33); Gray Catbird, 8 (49, 20); Starling, 8 (49, 20); House Sparrow, 6 (37, 15); E. Phoebe, 5 (31, 13); Chipping Sparrow, 5 (31, 13); Red-eyed Vireo, 4

(25, 10), Yellow Warbler, 4 (25, 10), Com Yellow-throat, 4 (25, 10), Am. Redstart, 4 (25, 10), Com. Grackle, 4 (25, 10); Least Flycatcher, 3 (19, 8); Barn Swallow, 3 (19, 8); Black-capped Chickadee, 3 (19, 8); Red-winged Blackbird, 3 (19, 8); Brown-headed Cowbird, 3 (19, 8); Pine Siskin, 3 (19, 8); E. Kingbird, 2.5; Brown Creeper, 2; Wood Thrush, 2; Cedar Waxwing, 2; Chimney Swift, 1; Com. (Yellow-shafted) Flicker, 1; Great Crested Flycatcher, 1; Tree Swallow, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Warbling Vireo, 1; Black-and-white Warbler, 1; Chestnut-sided Warbler, 1, Canada Warbler, 1; N. (Baltimore) Oriole, 1; Cardinal, 1; Indigo Bunting, 1; Purple Finch, 1; White-throated Sparrow, 1; Bobolink, 0.5. **Total:** 34 species; 124 territorial males or cowbird and House Sparrow females ($766/\text{km}^2$ or 310 per 100 acres). **Remarks:** Pine Siskins nested in large numbers by late March, all over the State, for the first time in recent years. Preliminary work on the vegetation was done by Debbie Arnold. — RICHARD B. FARRAR, JR., *Vermont Institute of Natural Science, Woodstock, Vt. 05091.*

55. ARBORETUM: CONIFEROUS PARKLAND. — **Location:** Massachusetts; Suffolk Co., at Arnold Arboretum, Jamaica Plain, Boston; areas along Bussey Brook and to the north (east of Walter St.) that are dominated by conifers; $42^\circ 17' 45''\text{N}$, $71^\circ 7' 45''\text{W}$, Newton Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 9.07 ha = 22.4 acres. **Description of Plot:** See *AB* 26 961-2, 1972. A few minor changes have taken place; two Douglas-firs were cut down and removed last winter, for instance. **Coverage:** May 1, 16, 24, 28; June 1, 5, 9, 17, 20, 22, 25; July 7, 17. Trips between 0742 and 1530, EDT. Total man-hours: over 15. **Census:** Chipping Sparrow, 7 (77, 31); Song Sparrow, 5 (55, 22); Purple Finch, 2; Am. Robin, 1.5; Cardinal, 1.5; Gray Catbird, 1; Starling, 1; Indigo Bunting, 1; Com. (Yellow-shafted) Flicker, 0.5; E. Kingbird, 0.5; Brown Thrasher, 0.5; Great Crested Flycatcher, +; Blue Jay, +, Black-capped Chickadee, +; Red-winged Blackbird, +; Brown-headed Cowbird, +; Rufous-sided Towhee, +. **Total:** 17 species; 21.5 territorial males or females ($237/\text{km}^2$, 96 per 100 acres). **Visitors:** Bobwhite, Downy Woodpecker, Com. Crow, White-breasted Nuthatch, Red-breasted Nuthatch, Mockingbird, Starling, House Sparrow, Com. Grackle (may be nesting). **Remarks:** Two nests were found: Cardinal, 1; Chipping Sparrow, 1 with 3 well-grown young. The large drop in the breeding bird density from 1972 ($419/\text{km}^2$ to $237/\text{km}^2$) may be owing in large part to the very heavy human usage during April and May (reportedly, motorcycling and all-night beer parties occurred, among other things); increased police patrols by late May more or less terminated these activities. The disturbance to birds setting up territories must have been severe. The Purple Finch, a treetop bird preferring the tall Norway Spruces for its activities, seemed to be the least affected. Song Sparrows, however, seemed less numerous than last year even in early April. Four Red-breasted Nuthatches were seen May 1. This latter bird was very secretive; I was unable to find a nest site. The cone crop on most conifers (except for pines) was poor to nonexistent this year, following the bumper

crop in 1972, but insects were fairly numerous — RICHARD W. SIMMERS, JR., 62 Buckingham St., Cambridge, Mass. 02138.

56. ARBORETUM: DECIDUOUS PARKLAND.

Location: Massachusetts; Suffolk Co., at Arnold Arboretum, Jamaica Plain, Boston; Bussey Hill and adjacent areas; $42^\circ 18' \text{N}$, $71^\circ 7' 25''\text{W}$, Boston South Quadrangle, USGS. **Continuity:** Established 1972 (1973) **Size:** 20.4 ha = 50.5 acres (irregular; taken from a 1949 map of the arboretum). **Description of Plot:** Rather open groves of deciduous trees, mostly in groups of a single genus, occupy most of the plot; shrubs dominate areas, mostly near the paved road in the northern third. Two small ponds, totalling less than 1 acre, are near the northeast corner. Near the top of Bussey Hill open meadow about 1 acre in size is bordered by shrubbery (*Cotoneaster*, *Cytisus*, etc.). Most of the conifers occur near this meadow. A dense hedgerow runs across Bussey Hill, passing near this meadow. Trees 3-inches diameter and over average 41/acre; total basal area 36.5 ft²/acre. Over 93% of the trees are hardwoods. In order of decreasing relative dominance, trees are (figures are for trees/acre, relative density, and relative dominance): White Oak group (*Quercus alba* and related American spp.), 1.9, 4.7, 13.3; Black Oak group (*Q. velutina* and related spp.), 1.9, 4.6, 13.0; miscellaneous hardwoods (46 genera), 8.3, 20.4, 9.7; exotic elms (*Ulmus* spp.), 2.5, 6.1, 8.8; exotic beeches (*Fagus* spp.), 1.1, 2.7, 6.1; hickories (*Carya* spp.), 1.8, 4.5, 5.9, native elms (*Ulmus*, 3 spp.), 1.2, 2.9, 5.1; ashes (*Fraxinus* spp.), 2.2, 5.4, 4.8 (White Ash, *F. americana*, is 0.5, 1.1, 1.9); White Pine (*Pinus strobus*), 1.3, 3.3, 4.4; Am. Beech (*Fagus grandifolia*), 1.7, 4.3, 4.1; birches (*Betula* spp.), 1.8, 4.5, 3.7; E. Hemlock (*Tsuga canadensis*), 1.0, 2.5, 3.6; exotic oaks (*Quercus* spp.), 0.8, 2.0, 2.5; wingnuts (*Pterocarya* spp.), 0.4, 1.0, 1.7; miscellaneous conifers (6 genera), 0.5, 1.3, 1.4; walnuts (*Juglans* spp.), 0.5, 1.2, 1.4; cherries and plums (*Prunus* spp.), 2.3, 5.6, 1.3; hornbeams (*Carpinus* spp.), 1.6, 3.7, 1.2; planetrees (*Platanus* spp.), 0.2, 0.4, 1.2; Flowering Dogwood (*Cornus florida*), 1.3, 3.1, 0.9, catalpas (*Catalpa* spp.), 0.4, 0.9, 0.8; mulberries (*Morus* spp.), 0.4, 1.0, 0.7; honey-locusts (*Gleditsia* spp.), 0.3, 0.8, 0.7; mountain ashes (*Sorbus* spp.), 0.7, 1.7, 0.6; lilacs (*Syringa* spp.), 1.0, 2.5, 0.5; shadbushes (*Amelanchier* spp.), 0.8, 1.9, 0.4; *Evodia* spp., 0.4, 0.9, 0.4; locusts (*Robinia* spp.), 0.4, 0.9, 0.4; *Viburnum* spp., 1.1, 2.7, 0.3; hazels (*Corylus* spp.), 0.8, 1.9, 0.3, *Euonymus* spp., 0.7, 1.7, 0.2. Trees are from 15 to about 70 ft high; the largest is an Am. Elm (*U. americana*) 45 in dbh. The relative frequencies of trees by diameter size classes are: A (3-6 in.), 40.8%; B (6-9 in.), 16.9%; C (9-15 in.), 18.7%; D (15-21 in.), 13.2%, E (21-27 in.), 6.9%; F (27-33 in.), 2.7%; G (33-40 in.), 0.6%; H (over 40 in.), 0.1%. Important shrubs are azaleas (*Rhododendron* spp.), which form clumps under or near the oak trees; also lilacs, forsythias (*Forsythia* spp.), mock-oranges (*Philadelphus* spp.), viburnums (*Euonymus* spp.), brooms (*Cytisus* spp.), *Cotoneaster* spp., and *Ilex* spp. Ground cover plants are mostly grasses and various lawn weeds. Leaf-litter and bare soil occur in places, chiefly under dense shrubs or evergreen trees. Many newly-planted trees

are mulched with old manure. Plant names are those used on the arboretum labels. **Edge:** Part of the habitat bordering the north and southwest is disturbed deciduous woodland (oaks, Black Birch, Sugar Maple, etc.); the rest is deciduous parkland, in places mostly shrubs. Some deciduous parkland occurs to the east, also a few buildings and some conifers. South of this plot is the Coniferous Parkland habitat (Census 55) and the Hemlock Hill mixed woods. Across Centre St., which forms much of the northwest border, is a hospital complex.

Topography: Rolling. **Elevation:** 48 to 190 ft.

1972. Weather: May and June were cool and wet; about 6.5 inches of rain fell in June. **Coverage:** May 28; June 6, 11-12, 14, 18, 21, 25, 29; July 2, 4. All trips were between 0750 and 1310, EDT, and totalled over 20 man-hours. **Census:** Gray Catbird, 12.5 (61, 25); N. (Baltimore) Oriole, 6 (29, 12); Chipping Sparrow, 6 (29, 12); Brown Thrasher, 5.5 (27, 11); Yellow Warbler, 4 (20, 8); Indigo Bunting, 3.5 (17, 7); Am. Robin, 3 (15, 6); Song Sparrow, 3 (15, 6); Red-winged Blackbird, 2.5; Red-eyed Vireo, 2; Warbling Vireo, 2; E. Kingbird, 1.5; Rufous-sided Towhee, 1.5; Mockingbird, 1; Purple Finch, 1; Downy Woodpecker, 0.5; Orchard Oriole, 0.5; Brown-headed Cowbird, 0.5 (females); Cardinal, 0.5; Am. Kestrel, +; Ring-necked Pheasant, +; Com. (Yellow-shafted) Flicker, +; Great Crested Flycatcher, +; Tufted Titmouse, +. **Total:** 24 species; 57 territorial males or females ($279/\text{km}^2$, 113 per 100 acres). **Visitors:** Rock Dove (in large flocks under elms), Mourning Dove, Chimney Swift, Blue Jay, Com. Crow, Black-capped Chickadee, Starling (in large flocks), Com. Yellowthroat, Am. Redstart, House Sparrow, Com. Grackle. **Remarks:** Nests found include N. Oriole, 5; Am. Robin, 2; E. Kingbird, 1; Yellow Warbler, 1; Red-winged Blackbird, 1. Nesting appeared to be fairly successful.

1973. Weather: May cool and damp, following a warm March and April. June and July warmer than normal, with about average rainfall. August with record-breaking heat. **Coverage:** May 1, 10, 14, 23-24, 30; June 3, 5, 7-10, 14, 19, 20, 24, 28; also some casual coverage into August. Trips between 0712 and 1305, EDT, and totalled over 42 man-hours. **Census:** Gray Catbird, 16.5 (81, 33); N. Oriole, 10 (49, 20); Brown Thrasher, 7.5 (37, 15); Am. Robin, 5.5 (27, 11); Chipping Sparrow, 5.5 (27, 11); Yellow Warbler, 5 (24, 10); Indigo Bunting, 4 (20, 8); E. Kingbird, 2.5; Red-winged Blackbird, 2.5; Blue Jay, 2; Cardinal, 2; Song Sparrow, 2; Mockingbird, 1.5; Warbling Vireo, 1.5; Black-capped Chickadee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Starling, 1; Rose-breasted Grosbeak, 1; Purple Finch, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 1; Mourning Dove, 0.5; Hairy Woodpecker, 0.5; Downy Woodpecker, 0.5; Wood Thrush, 0.5; House Finch, 0.5; Com. Flicker, +; Great Crested Flycatcher, +; Brown-headed Cowbird + (females). **Total:** 30 species; 78.5 territorial males or females ($384/\text{km}^2$, 155 per 100 acres). **Visitors:** Bobwhite, Ring-necked Pheasant, Rock Dove, Chimney Swift, Com. Crow, Red-breasted Nuthatch, Starling (large flocks), Am. Redstart, House Sparrow, Com. Grackle. **Remarks:** Nests found include N. Oriole, 8; Gray Catbird, 2 (1 with 4 eggs); Starling, 1; Am. Robin, 1; Yellow Warbler, 1; Rose-breasted Grosbeak, 1. The in-

creased density in 1973 probably reflects the increased coverage in part, especially for the hole nesters and the Blue Jay. The better weather this year may also have affected some species. The increase in the Mockingbird and Cardinal reflects the mild winter of 1972-73. Insect and fungus injury were important this year; canker-worms were very abundant in late May and were especially injurious to walnuts, wingnuts, hickories, oaks, and ashes (these trees put out new growth later). Spraying with Sevin and Zineb in June was extensive; it may have disturbed the Warbling Vireos in particular. Despite this, nesting success appeared high for orioles, Cardinal, Mockingbird, Chipping Sparrow, Yellow Warbler, E. Kingbird, and perhaps other species. This plot was barely affected by the hordes of people that camped (etc.) in the nearby Coniferous Parkland plot, fortunately for the breeding birds. However, human activity is normally rather high on weekends in portions of this plot. Other mammals observed were Gray Squirrel, E. Chipmunk, cottontails, and dogs. Amphibians observed were American Toad and Bullfrog. Butterflies were quite numerous this year. Special thanks to Andy Agush, who confirmed some of the interesting species, and to Dr. Gordon DeWolfe for information about spraying. — RICHARD W. SIMMERS, JR., 62 Buckingham St., Cambridge, Mass 02138.

57. MIXED UPLAND HABITAT AND SWAMP. —

Location: Connecticut; Fairfield Co., Newtown, intersection of Route 34 and Zoar Road; $41^\circ 24' \text{N}$, $73^\circ 14' \text{W}$, Derby Sheet, USGS. **Continuity:** Established 1968, 6 consecutive years. **Size:** 14.2 ha = 35 acres (irregular, greatest dimensions 653 x 364 yards, surveyed). **Description of Plot:** See AFN 22:714-715, 1968. **Coverage:** May 16-20, 22, 24, 26-30; June 1-3, 5, 7-13, 29; July 1, 8, 17. All trips between 0430 and 1210 or 1430 and 1750 hours, EDT, but mainly between 0855 and 1130. Total man-hours: 60. **Census:** Ovenbird, 16 (113, 46); Wood Thrush, 13 (92, 37); Red-eyed Vireo, 13 (92, 37); Rufous-sided Towhee, 12 (85, 34); Gray Catbird, 6 (42, 17); Am. Robin, 6 (42, 17); Rose-breasted Grosbeak, 6 (42, 17); Com. (Yellow-shafted) Flicker, 5 (35, 14); House Wren, 5 (35, 14); Great Crested Flycatcher, 4 (28, 11); Veery, 4 (28, 11); Black-and-white Warbler, 4 (28, 11); N. (Baltimore) Oriole, 4 (28, 11); Blue Jay, 3 (21, 9); Black-capped Chickadee, 3 (21, 9); Brown Thrasher, 3 (21, 9); Com. Yellowthroat, 3 (21, 9); Scarlet Tanager, 3 (21, 9); Cardinal, 3 (21, 9); Field Sparrow, 3 (21, 9); Downy Woodpecker, 2; E. Wood Pewee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Blue-winged Warbler, 2; Brown-headed Cowbird, 2 (females); Ruffed Grouse, 1 (female); E. Phoebe, 1; Yellow-throated Vireo, 1; Purple Finch, 1; Chipping Sparrow, 1; Song Sparrow, 1. **Total:** 32 species; 137 territorial males or females ($967/\text{km}^2$, 391 per 100 acres). **Visitors:** Mourning Dove, E. Kingbird, Cedar Waxwing, Starling, Com. Grackle. **Remarks:** Seven nests were located: Com. Flicker, 1 contents not examined; E. Phoebe, 1 with 2 broods, (1 and 5 young); House Wren, 3, 2 with 2 broods; Am. Robin, 1 with young; Wood Thrush, 1 with young; Red-eyed Vireo, 1 with 2 smashed, partly incubated eggs on ground; Chipping Sparrow, 1 with at least 2 young. Compared with

1972 there was a net drop of 3 species but a rise in total individuals from 113.5 to 137. The Red-eyed Vireo fluctuations from 1968 to 1973 are 12.7-9.7-5-13. For 9 recorded years and longer, Cedar Waxwings have visited when Tartarian Honeysuckle berries are ripe. — LAURA H. MOSELEY, 1083 Hillsboro Beach, Pompano Beach, Fla. 33062.

58. OAK-HEMLOCK FOREST AND SEMI-OPEN FIELDS AND SHRUBLAND. — **Location:** Connecticut; New London Co., Conn. Arboretum Natural Area at Conn. College, New London; 41°22'N, 72°7'W, Uncasville Quadrangle, USGS. **Continuity:** Established 1953 (1955); 10 intermittent years. **Size:** 19.8 ha = 49 acres of oak-hemlock forest; 8.09 ha = 20 acres of semi-open fields and shrubland. **Description of Plot:** See AFN 9:429-430, 1955 and AB 26 962-965, 1972 for changes. **Edge:** Since last year two plots contiguous with the western boundary of the study area have been cleared of semi-open field and early forest vegetation and developed with homes. **Weather:** Temperatures were mild ranging between 32° and 75°F. **Coverage:** May 14, 16-17, 21, 25, 27, 29-30; June 1, 3, 7, 10, 14-15, 18, 23, 27; July 8. All trips were between 0500 and 0945 or 2100 and 2215 hours. Total man-hours: 69. **Census:** OAK-HEMLOCK FOREST SPECIES: Ovenbird, 11 (55, 22); Veery, 10 (50, 20); Rufous-sided Towhee, 10 (50, 20); Gray Catbird, 9.5 (48, 19); Blue Jay, 7 (35, 14); Black-capped Chickadee, 7 (35, 14); Wood Thrush, 7 (35, 14); House Wren, 5 (25, 10); Black-and-white Warbler, 5 (25, 10); Great Crested Flycatcher, 4 (20, 8); Red-winged Blackbird, 4 (20, 8); Brown Thrasher, 3 (15, 6); Scarlet Tanager, 3 (15, 6); Com. (Yellow-shafted) Flicker, 2.5; N. (Baltimore) Oriole, 2.5; Downy Woodpecker, 2; Red-eyed Vireo, 2; Chestnut-sided Warbler, 1.5; Ruffed Grouse, 1; Yellow-billed Cuckoo, 1; White-breasted Nuthatch, 1; Winter Wren, 1; Am. Robin, 1; Com. Yellowthroat, 1; Hooded Warbler, 1; Cardinal, 1; Rose-breasted Grosbeak, 0.5. **Total:** 27 species; 104.5 territorial males (527/km², 213 per 100 acres). **Visitors:** Mallard, Black Duck, Wood Duck, Broad-winged Hawk, Green Heron, Mourning Dove, Black-billed Cuckoo, Barred Owl, Belted Kingfisher, Hairy Woodpecker, E. Phoebe, E. Wood Pewee, Com. Crow, Tufted Titmouse, Blue-gray Gnatcatcher, White-eyed Vireo, Louisiana Waterthrush, Canada Warbler, Am. Redstart, Com. Grackle, Brown-headed Cowbird, Am. Goldfinch, Chipping Sparrow. **Census:** SEMI-OPEN FIELDS AND SHRUBLAND SPECIES: Gray Catbird, 7.5 (93, 38); Rufous-sided Towhee, 5 (62, 25); Blue-winged Warbler, 3 (37, 15); Ruffed Grouse, 2; Com. Yellowthroat, 2; Scarlet Tanager, 2; Black-capped Chickadee, 1; House Wren, 1; Veery, 1; White-eyed Vireo, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Ovenbird, 1; Field Sparrow, 1; Indigo Bunting, 0.5; Chestnut-sided Warbler, +. **Total:** 16 species; 30 territorial males (358/km², 145 per 100 acres). **Visitors:** Mourning Dove, Yellow-billed Cuckoo, Black-billed Cuckoo, Com. Flicker, Blue Jay, Carolina Wren, Starling, Prairie Warbler, Canada Warbler, Am. Redstart, Brown-headed Cowbird, Chipping Sparrow. **Remarks:** This year was noticeably quieter than last. Total pairs

per 100 acres declined from 331 to 215 in the Oak-Hemlock Forest and from 325 to 145 in the Semi-open Fields and Shrubland. Last year's count was unusually high, possibly owing in part to displacement from extensive nearby construction. Comparison of this year's census with the 20-year averages for Oak-Hemlock Forest and Semi-open Fields and Shrubland, 211 and 237 birds per 100 acres respectively, reveals close similarity in the forest but a population well below the mean in Semi-open Fields and Shrubland sites. In the latter area an analysis of the 20-year pattern shows an initial increase as the physiognomy of the vegetation became increasingly dominated by the shrub phase. With the exception of the 1972 census, a decline followed after 1961 as the shrub cover became more continuous and mixed with taller tree species. Suspected trends toward long-term reductions of Red-eyed Vireos and Hooded Warblers were further confirmed by this year's census. These species averaged 36 and 20 pairs per 100 acres respectively between 1953 and 1964 in the Oak-Hemlock Forest. Since 1967 the averages per 100 acres have declined to 6 and 4. A sudden decline during nearby construction in 1967 and persistence of the low population now suggests the possibility that these species are particularly sensitive to urbanization. The low Red-eyed Vireo population may also reflect a widespread decline related to pesticides. The Ovenbird population, however, which also was reduced in 1967, has returned to its former level and has become stable. Population increases of Black-and-white Warblers, Wood Thrushes, Rufous-sided Towhees, catbirds and Veeries have returned to within the range of former censuses. For the first time the Winter Wren and Downy Woodpecker established territories in the Oak-Hemlock Forest. The Blue-gray Gnatcatchers that built a nest over a frequently used trail outside the Oak-Hemlock forest would probably have had a partial territory had they not disappeared in mid-May. Last year's high count in the Semi-open Fields and Shrubland, especially for Rufous-sided Towhees and catbirds, has also returned this year to within the range of earlier censuses. The gradual decline of yellowthroats recorded in the past continued this year, most probably in response to change in the physiognomic structure of the vegetation from semi-open fields and shrublands bordered by forest to dense shrub thickets and scattered early forest stands containing only small areas of open field. The Hooded Warbler, goldfinch and Ring-necked Pheasant formerly recorded in this habitat were absent again this year — TONY DEGANGE, STEPHAN SYZ (compiler), Connecticut College, New London, Conn. 06320.

59. UPLAND BRUSHY PASTURE. — **Location:** Connecticut; Litchfield Co., White Memorial Foundation, Litchfield; 41°42'50"N, 73°13'28"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965, 7 intermittent years. **Size:** 8.5 ha = 21 acres (parallelogram). **Description of Plot:** See AFN 19:609-610, 1965 **Coverage:** June 1, 5, 7, 9, 12, 19, 21, 23; July 6, 8, 12-14, 18. Hours varied from 0430 to 2200 and totaled about 30. **Census:** Gray Catbird, 9 (106, 43); Rufous-sided Towhee, 9 (106, 43); Blue-winged Warbler, 6 (71, 29); Com. Yellowthroat, 6 (71, 29); Am. Robin, 5 (59, 24),

Field Sparrow, 5 (59, 24), Am. Goldfinch, 4 (47, 19), Song Sparrow, 4 (47, 19), Am. Woodcock, 3 (35, 14), Wood Thrush, 3 (35, 14); Veery, 3 (35, 14); Cedar Waxwing, 3 (35, 14); Yellow Warbler, 3 (35, 14); Am. Redstart, 3 (35, 14); Brown-headed Cowbird, 3 (35, 14); Prairie Warbler, 2; Indigo Bunting, 2; Yellow-billed Cuckoo, 1; Black-billed Cuckoo, 1; Com. (Yellow-shafted) Flicker, 1; Black-capped Chickadee, 1; Brown Thrasher, 1; Red-eyed Vireo, 1; Rose-breasted Grosbeak, 1; Purple Finch, 1; Ruffed Grouse, 0.5; Downy Woodpecker, 0.5; E. Kingbird, 0.5; House Wren, 0.5; Black-and-white Warbler, 0.5; Chestnut-sided Warbler, 0.5; Cardinal, 0.5; Red-tailed Hawk, +; Hairy Woodpecker, +; Great Crested Flycatcher, +; Least Flycatcher, +; Blue Jay, +; Warbling Vireo, +; Nashville Warbler, +; N. (Baltimore) Oriole, +. **Total:** 40 species; 84.5 territorial males ($994/\text{km}^2$, 402 males per 100 acres). **Visitors:** (average number of individuals per 100 acres): Barn Swallow, 8; Tree Swallow, 6; Com. Crow, 6; Starling, 6; Red-winged Blackbird, 4; Com. Grackle, 4; Mourning Dove, 3; Yellow-throated Vireo, 1; Ovenbird, 1; Scarlet Tanager, 1; Turkey Vulture, +; Broad-winged Hawk, +; Com. Nighthawk, +; Chimney Swift, +; E. Wood Pewee, +; Tufted Titmouse, +; White-eyed Vireo, +. **Remarks:** Habitat continues to undergo rapid change in its evolution from open, grazed pasture to hardwood forest. Table 1 shows the density of all species since the first census in 1965 which have

Table 1. Upland Brushy Pasture. Density of commoner breeding species, 1965-1973 (territorial males on plot).

Species	'65	'66	'67	'68	'69	'71	'73
Song Sparrow		11	12	11	10	6	4
Field Sparrow		8	9	10	10	5	5
Prairie Warbler	8	6	5	5	4	5	2
Rufous-sided Towhee		6	6.5	5	5.5	7.5	9
Gray Catbird		5.5	5	6	7	9	9
Brown Thrasher		4	3	3	2	5	1
Blue-winged Warbler		3.5	4.5	5	4	4.5	6
Am. Woodcock		3	3	4	3	3	3
Am. Robin		3	3	3	3.5	3	5
Am. Goldfinch		3	3	4	4	4	4
Com. Yellow-throat		2	2.5	4	5	6	6
Brown-headed Cowbird		2	2	2	3	3	3
Veery		1	1	2	3	1.5	3
Cedar Waxwing		1	1	3	3	3	3
Yellow Warbler		1	1	2.5	3.5	3.5	3
Am. Redstart		+		3	4	3	4
Wood Thrush					1	3	3

attained (at least) the arbitrary number of 3 territorial males (14 per 100 acres). — ANDREW MAGEE, 34 Hobson Street, Springfield, Mass. 01109, sponsored by the Litchfield Hills Audubon Society, Litchfield, Conn.

60. DRY COTTONWOOD SAND DUNE. —

Location: Ontario, Norfolk Co., Port Rowan, 3.2 miles W of Long Point Lighthouse; $42^{\circ}32'30''\text{N}$, $80^{\circ}07'\text{W}$, Gravelly Bay, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 10.52 ha = 26 acres (rectangular, very long and narrow owing to the nature of the grid, surveyed). **Description of Plot:** The only canopy tree is Cottonwood (*Populus deltoides*). Most prominent in the understory is Dune Grass (*Ammophila breviligulata*), Switch Grass (*Panicum virgatum*), Sand Dropseed (*Sporobolus cryptandrus*), Little Blue Stem (*Andropogon scoparius*), Milkweed (*Asclepias syriaca*) and Wormwood (*Artemisia campestris*). A quantitative survey of the vegetation gave the following: Trees 3 inches and over in diameter, based on quarter method at 20 points, 56/acre; total basal area $9.7 \text{ ft}^2/\text{acre}$. Species comprising 100% of the total number of trees are listed below, followed by number per hectare, relative density (%), relative dominance (%), and frequency (%). Cottonwood, 56, 100, 100. Trees by diameter size class (figures after each class give number of trees/acre, relative density, basal area in ft^2/acre , and relative dominance): A (3-6') 38, 67.5, 4.4, 458; B (6-9') 18, 31.3, 5, 507; C (9-15') 1, 1.3, 0.5, 3.5. Shrub stems/acre 79; ground cover 25%, canopy cover 30%; average canopy height 25 ft. Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** The dune is bounded on the north by a long narrow pond of the interdune. The south edge opens onto the beach and Lake Erie. The west and east edges border on similar habitat. **Topography:** The first dune is continuous up to 15 ft high, roughly straight. **Elevation:** 580 ft. **Weather:** Generally sunny and breezy on census dates. **Coverage:** May 31; June 8, 20, 24; July 1, 7, 17, 19. All censuses between dawn and 1200, or 1600 and 1845. Total man-hours: 16.5 censusing and 48 surveying and laying out the grid. **Census:** Red-winged Blackbird, 1.5; E. Kingbird, +. **Total:** 2 species; 1.5 territorial males ($14/\text{km}^2$, 6 per 100 acres). **Visitors:** Killdeer, Spotted Sandpiper, Belted Kingfisher, Com. (Yellow-shafted) Flicker, Barn Swallow, Tree Swallow, Com. Crow, N. (Baltimore) Oriole, Com. Grackle, Brown-headed Cowbird. **Remarks:** There were no complete territories on the first dune. Red-winged Blackbirds nested in the interdune pond north of the dune. There were a large number of visiting birds, possibly using the area en route to the beach and shoreline. Special thanks to Tony Reznicek for the quantitative habitat description and to the Federation of Ontario Naturalists for financial assistance. — JAYNE E EVANS and DOUGLAS J. NAKASHIMA (compiler), *Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE IMO*.

61. DRY JUNIPER-COTTONWOOD SAVANNAH. —

Location: Ontario, Norfolk Co., Port Rowan, 2.5 miles W of Long Point Lighthouse; $80^{\circ}05'\text{W}$, $42^{\circ}32'48''\text{N}$, Gravelly Bay, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 8.30 ha = 20.5 acres (approximately rectangular, irregularly shaped to follow the line of the dunes; surveyed) **Description of Plot:** The dominant canopy trees are Red

Cedar (*Juniperus virginianus*) and Cottonwood (*Populus deltoides*). Most prominent in the understory are Canada Blue Grass (*Poa compressa*), Rock Cress (*Arabis lyrata*), Sand Dropseed (*Sporobolus cryptandrus*), Little Bluestem (*Andropogon scoparius*), Bearberry (*Arctostaphylos uva-ursi*), Ground Juniper (*Juniperus communis*), Milkweed (*Asclepias syriaca*), Switch grass (*Panicum virgatum*), Gray Goldenrod (*Solidago nemoralis*), Indian Grass (*Sorghastrum nutans*), Red Cedar, Canada Wild Rye (*Elymus canadensis*), Puccoon (*Lithospermum caroliniense*), Russian Thistle (*Salsola kali*), Dune Grass (*Ammophila breviligulata*). The following are the results of the quantitative survey of vegetation: Trees 3 inches diameter and over, based on the quarter method at 20 points, 22/acre; total basal area 6.4 ft²/acre. Species comprising 90% of the total number of trees: Red Cedar, 18, 83, 48, 100; and Cottonwood, 4, 18, 52, 55. Trees by diameter size class: A (3-6") 14, 62.5, 1.6, 24.3; B (6-9") 5, 22.5, 1.6, 25; C (9-15") 2.5, 11.3, 1.7, 27.1; D (15-21") 1, 3.8, 1.8, 23.5. Saplings/acre 52; ground cover 50%, canopy cover 20%, average canopy height 20 ft, (range 15-35). Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** The south edge borders on similar habitat but with more cotton-woods, ending with an open pond; the east mainly on marshy ground and open water; the north on a reedy marsh and a reedy pond; the west on open water. **Topography:** Rolling sand dunes, maximum height 20 ft, with intermittent flat areas. **Elevation:** 580 ft. **Weather:** Generally sunny and breezy on census dates. **Coverage:** May 26, 31; June 2, 6, 9, 12, 24; July 1, 6. All trips between dawn and 1200 hrs. Total man-hours: 56 censusing and 48 surveying and laying out the grid. **Census:** Brown Thrasher, 3 (36/km², 15 per 100 acres); Tree Swallow, 2; Chipping Sparrow, 2; Field Sparrow, 1; Mallard, 1;

Starling, 1, E. Meadowlark, 1, E. Kingbird, 0.5, Song Sparrow, 0.5. **Total:** 9 species; 12 territorial males, 145/km², 59 per 100 acres). **Visitors:** Marsh Hawk, Am. Bittern, Killdeer, Mourning Dove, Blue Jay, Mockingbird, Gray Catbird, Cedar Waxwing, Red-winged Blackbird, N. (Baltimore) Oriole, Cardinal, Am. Goldfinch. **Remarks:** 8 nests were located: Mallard, 1 with 5 eggs; Tree Swallow, 2 contents not examined; Starling, 1 contents not examined; Brown Thrasher, 1 nest abandoned; E. Meadowlark, 1 with four young; Chipping Sparrow, 1 with four young; Field Sparrow, 1 with four eggs. Special thanks to Tony Reznichek for the quantitative habitat description and the Federation of Ontario Naturalists for financial assistance. —JAYNE E. EVANS, *Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE IMO.*

62. BURNED JACK PINE RIDGE. — **Location:** Minnesota; St. Louis Co., Ely, 34 miles NW of Ely, on the Echo Trail, the 1971 Little Sioux Fire area, Superior National Forest; NW Quarter Section 31, T66N, R14W, Shell Lake Quadrangle USGS. **Continuity:** New. **Size:** 12.25 ha = 30.27 acres. **Description of Plot:** The canopy trees remained only as burned snags. Prior to the fire in 1971, the dominant tree species were Jack Pine (*Pinus banksiana*), Quaking Aspen (*Populus tremuloides*), and Black Spruce (*Picea mariana*). The present ground cover is primarily Bindweed (*Polygonum cilinode*), Large-leaved Aster (*Aster macrophyllus*), Blueberries (*Vaccinium angustifolium* and *V. myrtillodes*). In lower elevations the aspen suckers per ha = 76,000 with an average height of 5 ft; ground cover 75%. Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. The Jack Pine ridge was characterized by Vermilion Granite outcrops and bordered



Census 62. Aspen suckers on burned jackpine ridge. Photo/Barbara Bergstedt

on the E by logging road. **Edge:** Bordered by similar plant communities on all sides with a bog to the SE. **Elevation:** 1400-2000 ft. **Weather:** Damp and cloudy, temperatures between 60 and 70°. **Coverage:** June 13-18. All trips between 0700 and 1131 or 1600 and 1800 hours. Total man-hours: 13. **Census:** Chestnut-sided Warbler, 12 (98, 40); White-throated Sparrow, 11 (90, 36), House Wren 10 (82, 33); Song Sparrow, 8 (65, 26); Red-eyed Vireo, 6 (49, 20); Com. Grackle, 4 (33, 13); Mourning Warbler, 2; Com. (Yellow-shafted) Flicker, 1, Brown Thrasher, 1. **Total:** 9 species; 55 territorial males or females ($449/\text{km}^2$, 182 per 100 acres). **Visitors:** Killdeer, Downy Woodpecker, N. Three-toed Woodpecker, Least Flycatcher, Blue Jay, Com. Crow, Hermit Thrush, Veery, and Purple Finch. **Remarks:** One nest was located, Brown Thrasher male and female carrying nesting material, contents not examined. The Killdeer were nesting alongside the road leading in to the plot. A total of three young were hatched. White-tailed deer (*Odocoileus virginianus*) were seen frequently along with signs of Timber Wolf (*Canis lupus*) and Moose (*Alces alces*). Special thanks to Judge and Mrs. Ernest M. Vieux for assistance in establishing the study plot, and the Dr. Miron L. Heinselman for assistance with plot location and information pertaining to fire ecology. — BARBARA VIEUX BERGSTEDT, 9867 North Shore Drive, Duluth, Minn. 55804.

63. DISTURBED OAK-HICKORY FOREST, PINE STAND, EDGE AND POND. — **Location:** Ohio; Licking Co., Eden Township, Camp Falling Rock, 1.2 miles NNE of the intersection of County Road 210 and Route 79, $40^{\circ}11'N$, $82^{\circ}18.5'W$, Newark Quadrangle, USGS. **Continuity:** Established 1937; 35 intermittent years. (Formerly listed under 5 other titles, with variations.) **Size:** 14.16 ha = approximately 35 acres (quadrilateral, compass and tape surveyed). **Description of Plot:** See *Bird-Lore* 39:379-380, 1937; and subsequent years. **Habitat changes:** Minor loss of high canopy took place as a result of several periods of high wind velocity. One dead Shagbark Hickory, 20" dbh, and two dead Am. Elms, 12-15", were felled. **Weather:** Much less severe than in 1972 with high winds and rainstorms coming outside the most concentrated nest-building and incubation periods. **Coverage:** May 10; June 2, 4-5; July 1-2; August 27-28. Total man-hours: 40. **Census:** Acadian Flycatcher, 9 (64, 26); Wood Thrush, 8 (56, 23); Red-eyed Vireo, 8 (56, 23); E. Wood Pewee, 5 (35, 14); Am. Robin, 5 (35, 14); Cerulean Warbler, 5 (35, 14); Scarlet Tanager, 5 (35, 14); Cardinal, 4 (28, 11); Ruby-throated Hummingbird, 3 (21, 9); House Wren, 3 (21, 9); Gray Catbird, 3 (21, 9); Downy Woodpecker, 2; Great Crested Flycatcher, 2; E. Phoebe, 2; Tufted Titmouse, 2, Carolina Wren, 2; Yellow-throated Vireo, 2; Ovenbird, 2; Kentucky Warbler, 2; Brown-headed Cowbird, 2, Chipping Sparrow, 2; Song Sparrow, 2; Mourning Dove, 1; Yellow-billed Cuckoo, 1; Com. (Yellow-shafted) Flicker, 1; Red-bellied Woodpecker, 1; Hairy Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Louisiana Waterthrush, 1; Am. Redstart, 1; N. (Baltimore) Oriole, 1; Summer Tanager, 1; Indigo Bunting, 1, Am. Goldfinch, 1; Field Sparrow, 1. **Total:** 38

species, 96 territorial males or females ($678/\text{km}^2$, 274 per 100 acres). **Regular visitors:** Green Heron, Ruffed Grouse, Whip-poor-will, Chimney Swift, Belted Kingfisher, Pileated Woodpecker, Red-headed Woodpecker, Com. Crow, Cedar Waxwing, Starling, Warbling Vireo, Yellow Warbler, Com. Yellowthroat, Yellow-breasted Chat, Com. Grackle, Indigo Bunting, Rufous-sided Towhee, Chipping Sparrow. **Irregular visitors:** Great Blue Heron, Wood Duck, Turkey Vulture, Red-tailed Hawk, Red-shouldered Hawk, Spotted Sandpiper, Great Horned Owl, Barred Owl, Rough-winged Swallow, Barn Swallow, Purple Martin, Red-winged Blackbird. **Remarks:** The population this year of 38 species and 96 pairs was equalled for species in 1947-1948 and exceeded for total pairs of 97 in 1969. Although habitat changes are limited usually to an unspectacular operation of normal patterns, an aspect of the environment became very evident this census. The south-facing slope, upland zone, where in 1968 insect damage nearly eliminated Scarlet Oak (*Quercus coccinea*) and reduced other species, showed recovery to a denser ground cover of greenbrier (*Smilax*), Deerberry (*Vaccinium*), and Mountain Sumac (*Rhus copallina*). This stage of growth nearly duplicates the habitat first recorded and which persisted throughout the early years of the census. Density factors usually mentioned in this census were assigned to a "normal" status. The number of nests (28) located this year was much lower than expected (See Table 3, AB, 25 1016, 1971). (Corrections, same table: 1941: Species, 29, 1939: Nests, 31; species, 30; 1938: Species, 32; percentages, rounded off, remain unchanged). — A H CLAUGUS, 228 S. Lake St., Carey, Ohio 43316

64. MIXED DECIDUOUS-PINE AND PASTURE LAND. — **Location:** Mississippi; Oktibbeha Co., Mississippi State University South Farm, 3 miles SW of the main campus. **Continuity:** Established 1971; 3 consecutive years. (Formerly Mixed Deciduous-Pine and Old Field.) **Size:** 11.7 ha = 29 acres. **Description of Plot:** See AB 25:1017, 1971. **Weather:** Temperatures ranged from 54° - 89°F ; 10 count days had clear skies, 5 had scattered clouds. **Coverage:** May 17-June 6; 15 trips of 2 hours each ranging from 0500 to 2000. Total: 30 man-hours. The same observer conducted each trip. **Census:** Carolina Wren, 8 (68, 28); E. Meadowlark, 8 (68, 28), Cardinal, 8 (68, 28); Bobwhite, 7 (60, 24); Mockingbird, 6 (51, 21); Mourning Dove, 5 (43, 17); E. Kingbird, 5 (43, 17); E. Wood Pewee, 5 (43, 17); Killdeer, 4 (34, 14); Yellow-billed Cuckoo, 3 (26, 10); Com. Nighthawk, 3 (26, 10); Red-bellied Woodpecker, 3 (26, 10); Blue Jay, 3 (26, 10); Carolina Chickadee, 3 (26, 10); Brown Thrasher, 3 (26, 10); Red-winged Blackbird, 3 (26, 10), Com. Grackle, 3 (26, 10); Ground Dove, 2; Tufted Titmouse, 2; Am. Robin, 2; Wood Thrush, 2; E. Bluebird, 2; Red-eyed Vireo, 2; Pine Warbler, 2; Yellow-breasted Chat, 2; Rufous-sided Towhee, 2; Chipping Sparrow, 2; Field Sparrow, 2; Green Heron, 1; Red-tailed Hawk, 1; Am. Kestrel, 1; Chuck-will's-widow, 1; Com. (Yellow-shafted) Flicker, 1; Red-headed Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Gray Catbird, 1; Blue-gray Gnatcatcher, 1; Loggerhead Shrike, 1; White-eyed Vireo, 1; N. (Baltimore) Oriole,

1, Summer Tanager, 1, Indigo Bunting, 1, Red-shouldered Hawk, +, Am. Woodcock, +, Screech Owl, +; Yellow Warbler, +; Am. Redstart, +; Orchard Oriole, +; Painted Bunting, +. **Total:** 50 species; 117 territorial males ($997/\text{km}^2$, 403 per 100 acres). **Visitors** (average number per trip): Brown-headed Cowbird, +. **Remarks:** In late 1972 the area was converted to pastureland. Most of the wooded portions were cut, and much of the terrain was levelled by bulldozers. Gravel roads were constructed within the study site, and barbed wire fences were emplaced for holding cattle. Most of the pine and larger deciduous trees were cut, but many brush heaps remain. Many small thickets of scrub brush and several lone trees were left standing. Cattle grazed only a portion of the area. — JAMES N. SAPPINGTON, Department of Zoology, Mississippi State University, State College, Miss. 39762.

65. KENTUCKY BLUE GRASS PRAIRIE. — **Location:** North Dakota; Stutsman Co., NE quarter of Sect. 12, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 4.86 ha = 12 acres (rectangular, 201 x 241 m = 660 x 792 ft, paced). **Description of Plot:** See AB 26: 972, 1972. This plot was subjected to a prescribed burn in the fall of 1972. As a result, the vegetation was short and sparse this year. **Coverage:** June 4-5, 7-8, 12, 14 (2 trips), 28. All trips between 0620 and 1050 hours. Total man-hours: 2.5. **Census:** Marbled Godwit, 1; W. Meadowlark, 1; Brown-headed Cowbird, 0.5 (female); Savannah Sparrow, 0.5; Red-winged Blackbird, +; Chestnut-collared Longspur, +. **Total:** 6 species; 3 territorial males or females ($62/\text{km}^2$, 25 per 100 acres). **Visitors:** Upland Sandpiper, Willet, E. Kingbird, W. Kingbird, Barn Swallow, Bobolink. — DOUGLAS H. JOHNSON, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

66. MIXED PRAIRIE (I). — **Location:** North Dakota; Stutsman Co., NE quarter of Sect. 11, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972 but expanded in size this year. **Size:** 10 ha = 24.7 acres (square, 316 m = 1037.5 ft, paced). **Description of Plot:** See AB 26: 972, 1972. **Coverage:** June 4-5, 7-8, 11-12, 14, 18, 28. All trips between 0555 and 1230 hours. Total man-hours: 8.5. **Census:** Clay-colored Sparrow, 11 (110, 45); Com. Yellowthroat, 4.5 (45, 18); Red-winged Blackbird, 4.5 (45, 18); W. Meadowlark, 3.5 (35, 14); Brown-headed Cowbird, 2.5 (females); Savannah Sparrow, 2; Grasshopper Sparrow, 2; Willow Flycatcher, 1; Baird's Sparrow, 1; E. Kingbird, 0.5; Yellow Warbler, 0.5; Bobolink, 0.5; Sharp-tailed Grouse, +; Ring-necked Pheasant, +; Upland Sandpiper, +; Willet, +; Dickcissel, +; Am. Goldfinch, +; Song Sparrow, +. **Total:** 19 species; 33.5 territorial males or females ($335/\text{km}^2$, 136 per 100 acres). **Visitors:** Barn Swallow, Cliff Swallow. — DOUGLAS H. JOHNSON, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

67. MIXED PRAIRIE (II). — **Location:** North Dakota, Stutsman Co., SW quarter of Sect. 1, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15.07 acres (square, 247 m, surveyed). **Description of Plot:** See AB 26: 972-973, 1972. The vegetation has increased in height and density following the prescribed burn in the fall of 1971. **Edge:** To the west is now a field of Yellow Sweet Clover (*Melilotus officinalis*) and tame grasses. **Coverage:** June 4-5, 7-8, 11-12, 14, 28. All trips between 0730 and 1210 hours. Total man-hours: 5. **Census:** W. Meadowlark, 3 (49, 20); Grasshopper Sparrow, 2, Savannah Sparrow, 1.5; Bobolink, 1; Red-winged Blackbird, 1; Brown-headed Cowbird, 1 (female), Clay-colored Sparrow, 1; Willet, +; Mourning Dove, +; Black-billed Cuckoo, +; Am. Goldfinch, +. **Total:** 11 species; 10.5 territorial males or females ($172/\text{km}^2$, 70 per 100 acres). **Visitors:** Marbled Godwit, Com Nighthawk, E. Kingbird, W. Kingbird, Tree Swallow, Barn Swallow. — DOUGLAS H. JOHNSON, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

68. MIXED PRAIRIE (III). — **Location:** North Dakota; Stutsman Co., NW quarter of SW quarter of Sect. 6, T142N, R67W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15.07 acres (square, 247 m, paced). **Description of Plot:** See AB 26: 973, 1972. **Coverage:** June 5, 8, 12 (2 trips), 13, 15, 18, 21, 28. All trips between 0705 and 1115 hours. Total man-hours: 6.5. **Census:** Grasshopper Sparrow, 4.5 (74, 30); Clay-colored Sparrow, 2.5; W. Meadowlark, 1; Brown-headed Cowbird, 1 (female), Savannah Sparrow, 1; Upland Sandpiper, +; E. Kingbird, +; Bobolink, +. **Total:** 8 species; 10 territorial males or females ($164/\text{km}^2$, 66 per 100 acres). **Visitors:** Willet, W. Kingbird, Tree Swallow, Red-winged Blackbird, Com. Grackle. — GARY L. KRAPU and DOUGLAS H. JOHNSON, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

69. MIXED PRAIRIE (IV). — **Location:** North Dakota; Stutsman Co., SE quarter of Sect. 11, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15.07 acres (square, 247 m, paced). **Description of Plot:** See AB 26: 973-4, 1972. This plot was subjected to a prescribed burn in the fall of 1972. As a result, the sparse vegetative cover present during the censuses was largely new growth. **Coverage:** June 5, 8, 11-13, 15, 18, 21. All censuses were conducted between 0610 and 0935 hours. Total man-hours: 4. **Census:** Red-winged Blackbird, 2, Horned Lark, 1; Upland Snadpiper, 0.5; Brown-headed Cowbird, 0.5 (female); W. Meadowlark, +; Vesper Sparrow, +; Clay-colored Sparrow, +. **Total:** 7 species; 4 territorial males or females ($66/\text{km}^2$, 27 per 100 acres). **Visitors:** Blue-winged Teal, Willet, Cliff Swallow. — GARY L. KRAPU, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

70. MIXED PRAIRIE (V). — **Location:** North Dakota, Stutsman Co., SE quarter of Sect. 12, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15.07 acres (square, 247 m, paced). **Description of Plot:** See AB 26:974, 1972. This tract was again subjected to a prescribed burn in the fall of 1972. Continued burning and damage from the cable-chain device used in nest searching is resulting in the reduction of Hawthorn (*Crataegus chrysocarpa*) and Choke Cherry (*Prunus virginiana*) thickets. **Coverage:** June 11 (2 trips), 12 (2 trips), 28. All trips between 0655 and 1045 hours. Total man-hours: 2.5. **Census:** Clay-colored Sparrow, 3 (49, 20); Red-winged Blackbird, 1; Brown-headed Cowbird, 1 (female); E. Kingbird, 0.5; Willow Flycatcher, 0.5; W. Meadowlark, 0.5; Upland Sandpiper, +; Com. Nighthawk, +; Gray Catbird, +; Brown Thrasher, +; Yellow Warbler, +; Com. Grackle, +; Am. Goldfinch, +; Grasshopper Sparrow, +; Chestnut-collared Longspur, +. **Total:** 15 species; 6.5 territorial males or females (107/km², 43 per 100 acres). **Visitors:** Willet, Marbled Godwit, Bobolink. — DOUGLAS H. JOHNSON, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

71. MIXED PRAIRIE (VI). — **Location:** Stutsman Co., NW quarter of Sect. 11, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15.07 acres (square, 247 m, paced). **Description of Plot:** See AB 26: 974, 1972. **Coverage:** June 11 (2 trips), 14 (2), 28. All trips between 0725 and 0945 hours. Total man-hours: 2.5. **Census:** Clay-colored Sparrow, 6 (98, 40); Grasshopper Sparrow, 3 (49, 20); W. Meadowlark, 1; Red-winged Blackbird, 1; Brown-headed Cowbird, 1 (female); Savannah Sparrow, 1; Sharp-tailed Grouse, +; Upland Sandpiper, +; Willet, +; E. Kingbird, +; Am. Goldfinch, +. **Total:** 11 species; 13 territorial males or females (213/km², 86 per 100 acres). **Visitor:** Killdeer. — DOUGLAS H. JOHNSON, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

72. MIXED PRAIRIE (VII). — **Location:** North Dakota; Stutsman Co., NW quarter of NE quarter of Sect. 14, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15.07 acres (square, 247 m, paced). **Description of Plot:** See AB 26:974-5, 1972. **Edge:** The mixed prairie on the north was burned in the fall of 1972. **Coverage:** June 5, 8, 11-13, 15, 18, 21. All censuses were conducted between 0630 and 0930 hours. Total man-hours: 6. **Census.** Red-winged Blackbird, 3 (49, 20); W. Meadowlark, 2.5; Clay-colored Sparrow, 2.5; Brown-headed Cowbird, 1 (female); Grasshopper Sparrow, 0.5; Sharp-tailed Grouse, +; Upland Sandpiper, +; Willet, +; Lark Bunting, +; Savannah Sparrow, +; Chestnut-collared Longspur, +. **Total:** 11 species; 9.5 territorial males or females (156/km², 63 per 100 acres). **Visitors:** Mallard, Gadwall, Blue-winged Teal, W. Kingbird. — GARY L. KRAPU, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

73. MIXED PRAIRIE (VIII). — **Location:** North Dakota, Stutsman Co., NW quarter of Sect. 1, T142N, R68W, New Rockford Quadrangle, USGS. **Continuity:** New. **Size:** 8.7 ha = 21.46 acres (rectangular, 518 x 168 m = 1700 x 550 ft, paced). **Description of Plot:** Grazed through the summer of 1967 and left idle since then. Seven seasonal wetlands are partially or entirely within the plot. Wetlands total approximately 0.9 ha. Stands of Wolfberry (*Symporicarpos occidentalis*) and to a lesser extent Silverberry (*Eleagnus commutata*) occur and Kentucky Blue Grass (*Poa pratensis*) is abundant. Needle-and-thread (*Stipa comata*), Yarrow (*Achillea lanulosa*), Fringed Sage (*Artemisia frigida*), and Prairie Wild Rose (*Rosa arkansana*) are common. Other plants regularly occurring on the uplands include Pasque Flower (*Anemone patens*), Harebell (*Campanula rotundifolia*), Purple Prairie-clover (*Petalostemon purpureus*), Goatsbeard (*Tragopogon major*), Ground Plum (*Astragalus caryocarpus*), Purple Coneflower (*Echinacea angustifolia*), Long-headed Coneflower (*Ratibida columnifera*), Narrow-leaved Blazing Star (*Liatris punctata*), N. Bedstraw (*Gallium boreale*), and Stiff Goldenrod (*Solidago rigidula*). Little Bluestem (*Andropogon scoparius*) was abundant on slopes adjoining certain wetlands and Blue Grama (*Bouteloua gracilis*) was abundant on hilltops. Wet-meadow zone plants include Fowl Blue Grass (*Poa palustris*), Wild Mint (*Mentha arvensis*), Perennial Sow Thistle (*Sonchus arvensis*), Willow-leaved Dock (*Rumex mexicanus*) and Wild Barley (*Hordeum jubatum*). Reed-Meadow Grass (*Glyceria grandis*) and Slough Sedge (*Carex atherodes*) occur in the central portion of seasonal wetlands. Gumweed (*Grindelia squarrosa*) and Russian Thistle (*Salsola kali*) are common along a trail running through the plot. Two former cropland areas totaling approximately 1.7 ha exist within the plot. The prairie of these areas was plowed in late 1967, seeded to Flax (*Linum usitatissimum*) in 1968, and planted to a mixture of Tall Wheat Grass (*Agropyron elongatum*), Yellow Sweet Clover (*Melilotus officinalis*), and Alfalfa (*Medicago sativa*) in 1969. **Edge:** Similar on north and west. Railroad right-of-way and tracks border the south and cropland adjoins on the east. **Topography:** Rolling. **Elevation:** About 580 meters. **Coverage:** June 5, 8, 11-13, 15, 18, 21. Censuses were conducted between 0610 and 0930 hours. Total man-hours: 5. **Census:** Clay-colored Sparrow, 4 (46, 19); W. Meadowlark, 3 (35, 14); Grasshopper Sparrow, 2.5; Savannah Sparrow, 2.5; Brown-headed Cowbird, 1.5 (females); Mallard, 1.0; Marbled Godwit, 1.0; Com. Yellowthroat, 1.0; Red-winged Blackbird, 1.0; Blue-winged Teal, +; Upland Sandpiper, +; Wilson's Phalarope, +; E. Kingbird, +. **Total:** 13 species; 17.5 territorial males or females (202/km², 82 per 100 acres). **Visitors:** Willet, Com Nighthawk, Com. (Yellow-shafted) Flicker, Am Goldfinch. — GARY L. KRAPU, U. S. Bureau of Sport Fisheries and Wildlife, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.

74. SHORTGRASS PRAIRIE. — **Location:** Colorado; Weld Co., 8 miles NNW of Nunn on the Central Plains Experimental Range of the Agricultural Research Service, Pawnee National Grassland; 40°49'N,

104°55'W Continuity: Established 1972 **Size:** 40.5 ha = 100 acres (south block measures 60 x 20 chains, central block 20 x 10, north block 10 x 20, borders are contiguous; blocks marked with grid interval of 2 chains; surveyed with 2-chain tape and staff compass). **Description of Plot:** See AB 26:975-976, 1972. **Weather:** Average maximum air temperature - April, 12.7°C.; May, 20.7°C.; June, 28.1°C. Total precipitation - April, 23.4 mm; May, 4.8 mm; June, 29.2 mm. Snow storms on April 7, 19, 15 and May 1. Hail storms on June 12 and 14. **Coverage:** April 15; May 8, 15, 21, 31; June 4, 12, 19, 27; July 4. All counts began about sunrise and lasted approximately 3 hours. Five different starting points were randomly used. Additional partial coverage occurred during much of May and June. **Census:** Horned Lark, 27 (67, 27); McCown's Longspur, 18.5 (46, 19); Mountain Plover, 2 (5, 2); Lark Bunting, 0.5 (1, 1). **Total:** 4 species; 48 territorial males (119/km², 48 per 100 acres). **Visitors:** Regular - Mourning Dove, W. Meadowlark; Irregular - Swainson's Hawk, Am. Kestrel, Com. Nighthawk, Barn Swallow, Cliff Swallow, Clay-colored Sparrow. **Remarks:** A total of 43 nests containing eggs or nestlings was found - McCown's Longspur, 23; Horned Lark, 18; Mountain Plover, 1; Lark Bunting, 1. Nineteen Horned Lark and 7 McCown's Longspur empty nests were also found and helped determine territories. Nesting success (percent of nests successfully fledging at least one young) in the plot was Horned Lark, 40%, and McCown's Longspur, 64%. The former figure represents a 14% decline from last year's rate. The Lark Bunting nest was the first one found in this 320-acre heavily grazed pasture since studies were initiated in 1968. An additional "nesting" species was represented with the birth of a Pronghorn on June 19. This study was supported by National Science Foundation Grants GB-31862X and GB-31862X2 to the Grassland Biome, U.S. International Biological Program, for "Analysis of Structure, Function, and Utilization of Grassland Ecosystems." — DAVID K. PORTER, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colo. 80521.

75. MIXED PRAIRIE PARK. — **Location:** Nebraska, Lancaster Co., Lincoln, Chet Ager Nature Center, in the SW corner of Pioneers Park. **Continuity:** Established 1971; 3 consecutive years. **Size:** 15.99 ha = 39.5 acres (determined by survey). **Description of Plot:** See AB 25:648-649, 1971. **Weather:** Between May 12 and July 3 temperatures ranged from 24° to 97°. During this period the study plot received 4.74 inches of precipitation. **Coverage:** May 12, 26-28; June 2, 7, 10, 14, 17, 27, July 3. Two trips were taken between 1600 and 1700; all others were between 0830 and 1230. Total man-hours 19. **Census:** House Wren, 18 (113, 46); Red-winged Blackbird, 15 (95, 38); Com. Grackle, 13 (81, 33); Mourning Dove, 11 (69, 28); Cardinal, 10 (63, 25); Am. Robin, 9 (56, 23); N. (Baltimore) Oriole, 9 (56, 23); Com. (Yellow-shafted) Flicker, 8 (50, 20); Blue Jay, 8 (50, 20); House Sparrow, 8 (50, 20); Rough-winged Swallow, 7 (44, 18); E. Kingbird, 6 (38, 15); Brown Thrasher, 6 (38, 15); Com. Yellowthroat, 6 (38, 15); Brown-headed Cowbird, 6 (38, 15); Am. Goldfinch, 6 (38, 15); Black-capped Chickadee, 5 (31, 13); Red-

headed Woodpecker, 4 (25, 10), Gray Catbird, 4 (25, 10), Yellow-billed Cuckoo, 3 (19, 8), Rose-breasted Grosbeak, 3 (19, 8); Indigo Bunting, 3 (19, 8); Dickcissel, 3 (19, 8); Chimney Swift, 2; Belted Kingfisher, 2, Downy Woodpecker, 2; Barn Swallow, 2; Starling, 2; Bell's Vireo, 2; Orchard Oriole, 2; Song Sparrow, 2; Least Bittern, 1; Bobwhite, 1; Black-billed Cuckoo, 1; Hairy Woodpecker, 1; Warbling Vireo, 1; Yellow Warbler, 1; Chipping Sparrow, 1. **Total:** 38 species; 194 territorial males or females (1214/km², 491 per 100 acres). **Visitors:** (Number following indicates number of censuses seen.) Green Heron, 1; Mallard, 1; Blue-winged teal, 1; Red-tailed Hawk, 2; Com. Nighthawk, 1; Ring-necked Pheasant, 1; Killdeer, 3; Sora, 1; Screech Owl, 2; E. Wood Pewee, 2; Great Crested Flycatcher, 1; Empidonax sp., 2; Purple Martin, 1; Com. Crow, 1; E. Meadowlark, 2; W. Meadowlark, 5. **Remarks:** A nest survey was conducted during part of the census period; 49 nests representing 19 species were found. They are as follows: Red-winged Blackbird, 9; Am. Robin, 6; Com. Grackle, 6; Mourning Dove, 4; N. Oriole, 4; Rough-winged Swallow, 3; E Kingbird, 2; Barn Swallow, 2; Blue Jay, 2; Brown Thrasher, 2; Least Bittern, 1; Screech Owl, 1; Com Flicker, 1; Red-headed Woodpecker, 1; Downy Woodpecker, 1; House Wren, 1; Orchard Oriole, 1; Cardinal, 1; Dickcissel, 1. The census this year was started on May 12, much later than last year's starting date of March 25. We found that by May 12 most winter resident and migratory species had moved out of the area, simplifying the census, and the late start apparently did not affect the accuracy of the census. This year's census, compared to 1972, showed no major changes. Most species were found to be in about the same numbers as last year. Three species were found breeding this year which were not recorded last year. The Nature Center is indebted to Jim Commers who conducted the field work and spent many hours on the nest survey. Thanks also go to Sue Blackman, Carol Thompson, Carol Meyers, Roseann Anderson, Roger DiSilvestro and Gig Tollefson for their help with the nest survey, and the coordinating assistance of Dr. Esther Bennett is greatly appreciated. — BRYCE ANDERSON, 1215 Arapahoe, Apt. #213, Lincoln, Neb., 68502.

76. MIXED HABITAT-DISTURBED BOTTOM-LAND. — **Location:** Oklahoma; Washington Co., Dewey, 2 miles W of intersection of Ninth Street and Highway 75 and .03 mile N on E bank of Caney River, 36°48'N, 95°58'W, Tulsa Quadrangle, USGS **Continuity:** Established 1972. **Size:** 40.47 ha = 100 acres (irregular rectangle roughly 600 x 800 yards) determined from SCS aerial map. **Description of Plot:** See AB 26:976-977, 1972. **Weather:** Mild. Clear to partly cloudy on count days with temperatures ranging from 40 to 88°. **Coverage:** April 2, 17, 25, 30; May 7, 14, 24, 28, June 1, 8, 16, 20; July 2. Three trips between 1400 and 1740; all others between 0600 and 1300. Total man-hours: 63. **Census:** Indigo Bunting, 13 (32, 13); Com Yellowthroat, 10 (25, 10); Red-winged Blackbird, 9 (22, 9); Cardinal, 8 (20, 8); Blue-gray Gnatcatcher, 7 (17, 7); Dickcissel, 6 (15, 6); Tufted Titmouse, 5.5 (14, 6); Brown-headed Cowbird, 5 (12, 5); E. Wood Pewee,

4.5 (11, 5), Yellow-billed Cuckoo, 4 (10, 4), Red-bellied Woodpecker, 3.5 (9, 4); Downy Woodpecker, 3.5 (9, 4), Carolina Chickadee, 3.5 (9, 4); Ruby-throated Hummingbird, 3 (7, 3); Great Crested Flycatcher, 3 (7, 3); Killdeer, 2; Red-headed Woodpecker, 2; Red-eyed Vireo, 2; Orchard Oriole, 2; Com. Grackle, 2; Am. Goldfinch, 2; Blue Jay, 1.5; White-breasted Nuthatch, 1.5; Painted Bunting, 1.5; Green Heron, 1; Mourning Dove, 1; Com. Crow, 1; Carolina Wren, 1; E. Bluebird, 1; Starling, 1; Bell's Vireo, 1; Prothonotary Warbler, 1; N. Parula, 1; Yellow Warbler, 1; Kentucky Warbler, 1; Yellow-breasted Chat, 1; House Sparrow, 1; Summer Tanager, 1; Lark Sparrow, 1; Field Sparrow, 1; Acadian Flycatcher, 0.5; Red-tailed Hawk, +; Bobwhite, +; Belted Kingfisher, +; Pileated Woodpecker, +; E. Kingbird, +; Rough-winged Swallow, +; E. Meadowlark, +. **Total:** 48 species; 121.5 territorial males (300/km², 122 per 100 acres). **Visitors:** Great Blue Heron, Little Blue Heron, Wood Duck, Sparrow Hawk, Barred Owl, Chimney Swift, Com. Nighthawk, Com. (Yellow-shafted) Flicker; Hairy Woodpecker, Scissor-tailed Flycatcher, E. Phoebe, Barn Swallow, Am. Robin, White-eyed Vireo, Black-and-white Warbler, N. (Baltimore) Oriole. **Remarks:** One landowner burned the large open area (about 20 acres) in the north of the plot in March. This removed shrubby habitat favored by Indigo Buntings and Com. Yellowthroats. Both species showed a decrease of 6; the Yellow-breasted Chat decreased from 5 to 1; and the Blue Grosbeak was absent. The total for territorial males was 18 less than in 1972, but the number of species having territories was 7 more. The purification ponds, very oily in 1972, supported cattails and sedges this year and provided extra Red-winged Blackbird territory. Two Cardinal nests were found; the one examined held three young. Raccoons are suspected as a chief predator. Eggs disappeared from two Killdeer nests and no young were seen. The female Yellow Warbler disappeared after building her nest. Nest holes of Red-bellied and Downy Woodpeckers, and Great Crested Flycatcher were found. — ELLA DELAP, 409 N. Wyandotte, Dewey, Okla. 74029.

77. BROAD-LEAF EVERGREEN FOREST WITH SHRUB-FILLED OPENINGS. — **Location:** California; Alameda Co., "Garin Woods", 1 mile SE of Science Building of California State University, Hayward; 37°38'45"N, 122°02'28"W, Hayward 7½ min. Quadrangle, USGS. **Continuity:** Established 1966; 2 intermittent years. **Size:** (somewhat expanded from 1966, see below.): 15.4 ha = 38.0 acres (irregular, measured by planimeter on vegetation map developed from vertical aerial photo plus correction for distortion of map owing to slope). **Description of Plot:** See AFN 20 633-34, 642-43, 1966. The two most numerous tree species, Coast Live-Oak and California-Laurel, show little change but the third one, Madrone, has continued to suffer from a fungus disease. Many have died completely and over half of these have fallen since 1966. The openings thus created are rapidly filled by shrubs (mostly Poison-oak) together with some tall forbs of many species. To the 1966 plot of 11.1 ha or 27.5 acres (remeasured on more accurate photo, compared to 26 acres reported) the following acres were added:

three small indentations (2 grassy) along the north edge of the woods totalling 0.35 ha, an area of 1.31 ha on the northwest mostly in a south-trending tributary canyon; and 2.70 ha on the east end, being in a north-trending tributary canyon. Both of the added canyons involve continuation of the same woods with essentially similar composition, although the eastern one and part of the north addition include about 10 more Big-leaf Maples, several quite large. **Edge:** Bordered on 180-meter east boundary by similar forest extending another half-mile along north-facing slope, and on 65-70 meters of the north part of the west boundary by a gallery forest strip of oaks and laurels with a few maples continuing for a mile down canyon. In the added tributary canyons arbitrary boundaries of 122 and 215 meters are adjacent to similar forest that soon becomes more broken and terminates within a few hundred meters. Along the remaining 1940 meters of the perimeter the adjacent vegetation is annual grassland with a few patches of subshrubs at or near the woods edges on steeper slopes or rocky areas. About 0.10 ha is represented by the two small grassy indentations on the north, and about 0.16 ha by the buildings and adjacent paved and weedy area at the University Field Station at the northwest edge—the only significant areas without essentially solid woody plant cover. **Topography:** Mostly a relatively smooth north-facing slope of about 30° pitch plus the tributary canyon additions with their wooded east- and west-facing slopes. **Weather:** (Data from hygrothermograph in standard weather box at Field Station in northwest part of plot.) Exceptionally heavy rainfall of 36 inches, late September through March (about twice normal) with subsequent small rains on April 12-13, 17, and May 4. A freeze on December 8-14 with minimum temperatures in the 20's (18°F on Dec. 9) broke all records for the county. Despite much damage to tender exotic plants in the cities, no persistent impact on the native plants in the plot was evident. Temperatures were about normal by January and maxima reached above 80° on 5 days in May (90° F on the 28th); and breeding of birds was but slightly if at all delayed. The usual night and early morning low overcast of late spring and summer was present on four coverages, and was augmented by the last light rain on May 4, interrupting that trip. The creek through the north part of the plot held considerably more water than in 1966, and still flowed continuously at the end of the rainless (normal) summer, but rivulets in the tributaries dried up by mid-May. **Coverage:** April 19, 27; May 4-5 (part each day), 11, 14, 22, 25. All trips between 0430 and 1235, PST, averaging 6.5 hrs. per trip (range 5.5-7.1). Total man-hours 45.5 **Census:** Rufous-sided Towhee, 11 (72, 29); Dark-eyed (Oregon) Junco, 11 (72, 29); Orange-crowned Warbler, 9 (59, 24); Chestnut-backed Chickadee, 8 (52, 21), Com. Bushtit, 7 (46, 18); California Quail, 6 (39, 16), Steller's Jay, 6 (39, 16); Plain Titmouse, 6 (39, 16), Brown Towhee, 6 (39, 16); Wrentit, 5 (33, 13); Bewick's Wren, 5 (33, 13); W. Flycatcher, 4 (26, 11); Warbling Vireo, 4 (26, 11); Black-headed Grosbeak, 4 (26, 11), Hutton's Vireo, 3 (20, 8); Ash-throated Flycatcher, 2.5; Scrub Jay, 2.5; California Thrasher, 1.5; Allen's Hummingbird, 1 male (2 females); Mourning Dove, 1; Anna's Hummingbird, 1 male; Am. Robin 1; Swain-

son's Thrush, 1, Purple Finch, 1, Rufous-crowned Sparrow, 1, Song Sparrow, 1, Great Horned Owl, 0.5, Com. (Red-shafted) Flicker, 0.5; Mockingbird, +; Starling, + (unmated male); N. (Bullock's) Oriole, +. **Total:** 31 species; 111 territorial males or pairs ($721/\text{km}^2$, 292 per 100 acres). In addition, one Brown Creeper and one Wilson's Warbler sang for 4 and 3 trips, respectively, from territories near the creek, but did not persist through May. **Visitors:** Downy Woodpecker, W. Kingbird, W. Wood Pewee, W. Meadowlark, Red-winged Blackbird, Lazuli Bunting, House Finch, Lesser Goldfinch. **Remarks:** Five nests were located — Chestnut-backed Chickadee, 3; Com. Bush-tit, 1; Rufous-sided Towhee, 1 with 4 eggs. Fledglings fed or protected by adults were noted in several locations for most species, including the Horned Owl (1 young). Compared to the 1966 census there are a number of items of interest. First, the total bird density happens to be almost exactly the same. In addition to the gradual disappearance of the Madrone trees in the plot, several land use changes in the vicinity may have had an influence on the populations of some species. Conversion of most of the ranch to the west, south, and southeast to a regional park in 1971 has so far yielded some increased visits by people but far less than the increase in number of class and student trips from the University. Grazing has continued irregularly and was heavy in 1972 following a very dry winter until cattle were taken off in the fall (except some returned in area west of plot in December-January). Understory near the creek bed in the plot was noticeably reduced and adjacent grassy areas had bare ground exposed — until heavy rains of the 1972-73 winter fostered a tall growth of Milk Thistle (*Silybum marianum*) and mustard (*Brassica* spp.) on the slopes most heavily grazed earlier, and medium to tall grasses and some forbs elsewhere. The increased representation of grassland or field border birds in the woods edge (mostly as visitors) may have resulted in part from this. A second change was the establishment of the University's Ecological Field Station at the NW corner of the 1966 plot, with a 24 x 48 ft concrete block building and few small outbuildings and animal enclosures. The water from the latter increases the flow in the creek below. The deer food and occasionally baited bird-trapping stations have augmented seed supply, but neither was in use during this census period. The land to the northeast and east of the plot (a cattle ranch in 1966) has been partly developed for housing with the most direct effect on the plot coming from the removal in 1968 of all trees and many shrubs from a several-forked tributary canyon just to the north, and in 1969 along the main canyon to the east for a thousand feet. One of the larger canyon forks was half filled for additional lots by 1970 with earth removed from a nearby hilltop. This area, though outside the plot, formerly attracted a number of birds which spilled over into main woods (California Quail, Bewick's Wren, Lazuli Bunting) and were thus at lower census levels in 1973. The Black Phoebe pair in the same area did not reappear after the wooden bridge under which they nested in 1966 was destroyed. Within the main woods several common species were found in numbers identical or close to their 1966 densities, e.g., Rufous-sided Towhee, Dark-eyed

Junco, Orange-crowned Warbler, and Steller's Jay. Decided increases were found in numbers of Western Flycatcher (one temporary territory in 1966, 3 along same area plus one in tributary canyon in 1973), bushtit (8 to 18/100 acres), Hutton's Vireo (4 to 8), Warbling Vireo (4 to 11), and Brown Towhee (8 to 16). All these were conceivably associated in part with the wetter winter — except the Brown Towhee. Only the Wrentit and Bewick's Wren showed significant drop in numbers from other than minimal levels among species of the woods interior: 17 to 13, and 37 to 13 per 100 acres, respectively. In this plot in 1971, R. A. Rowlett found the titmouse to have a density of 22 pairs per 100 acres, compared to my data of 19 in 1966, and 16 in 1973, and she measured territory size for 7 pairs at 2.2 to 6.1 acres plus one at 10.7 that included about 2.5 acres of grass and low shrubs. For the chickadee (my 1966 data reported 15/100 acres) Rowlett also indicates an approximate density of 22 per 100 acres, agreeing closely with the 21 reported here. This woods remains an area of comingling and territorial overlap of these two species, with some interspecific aggression. — HOWARD L. COGSWELL, Dept. of Biological Science, California State University, Hayward, Calif 94542.

78. DECIDUOUS OAK WOODLAND. — **Location:** California; San Mateo Co.; on the Jasper Ridge Biological Experimental Area of Stanford University, 3.5 miles WSW of Stanford University's Main Quadrangle; 37°24'N, 122°13'30"W, Palo Alto Quadrangle, USGS. **Continuity:** Established 1970; 4 consecutive years. **Size:** 3.24 ha = 8 acres **Description of Plot:** See AFN 24:554-55, 749-750, 1970. A quantitative survey of the vegetation gave the following results. Trees 3 inches and over, based on five circular samples, 102/acre, total basal area 55.8 ft²/acre. Species comprising over 95% of the total number of trees [figures after each give number of trees/acre, relative density (%), relative dominance (%), frequency (%) in that sequence]: Blue Oak (*Quercus douglasii*), 96, 94, 99 6 80; dead tree (not identified as to species), 4, 4, 2, 20, Live Oak (*Q. agrifolia*), 2, 12, 2, 20. Trees by diameter size class [figures after each size class give number of trees/acre, relative density (%), basal area ft²/acre, relative dominance (%)]: A (3-6 in.), 2, 2, 0.2, 1; B (6-9 in.), 28, 29, 8.4, 6; C (9-15 in.), 38, 39, 29.2, 21; D (15-21 in.), 16, 16, 28.8, 21; E (21-27 in.), 6, 6, 18.6, 13; F (27-33 in.), 6, 6, 29.4, 21; G (33-40 in.), 0; H (>40), 2, 2, 25, 18. Shrub stems/acre 26,600 (96% *Rhus diversiloba*), ground cover 67%; canopy cover 44%; average canopy height 51 ft (range 44-58). Plant names from Thomas, *Flora of the Santa Cruz Mountains of California*. **Weather:** Temperatures were about normal in April and May with a high of 89°F and a low of 39°F. Total rainfall for the twelve month period ending June 30 was approximately 1.7 times the average, although April and May were drier than usual. (Weather data from the weather stations at the Jasper Ridge Experimental Area and at the Junior Museum in Palo Alto.) **Coverage:** April 24, 26-27; May 1, 3, 5, 8, 10, 19, 22, 24. Hours from 0545 to 1210, totaling 28.3. **Census:** (Territorial males or females, followed in parentheses by males/km² and per 100 acres); Rufous-sided Towhee, 9 (278, 113); Plain

Titmouse, 8 (247, 100), Dark-eyed (Oregon) Junco, 8 (247, 100); Anna's Hummingbird, 7 (216, 88); Orange-crowned Warbler, 6 (185, 75); Scrub Jay, 5.5 (170, 69); Violet-green Swallow, 4.5 (139, 56); Ash-throated Flycatcher, 3.5 (108, 44); California Quail, 2.5; Chestnut-backed Chickadee, 2; Hutton's Vireo, 1.5; White-breasted Nuthatch, 1; Bewick's Wren, 1; Brown Towhee, 1. **Total:** 14 species; 58.5 territorial males (1736, 731). **Visitors:** Sharp-shinned Hawk, 2; Cooper's Hawk, 1; Red-tailed Hawk, 7; Band-tailed Pigeon, 5; Mourning Dove, 4; Great Horned Owl, 1; Allen's Hummingbird, 2; Belted Kingfisher, 2; Com. (Red-shafted) Flicker, 2; Acorn Woodpecker, 6; Hairy Woodpecker, 2; Downy Woodpecker, 1; W. Wood Pewee, 2; Cliff Swallow, 1; Steller's Jay, 5; Com. Crow, 2; Com. Bushtit, 11; Wrentit, 1; Mockingbird, 3; Am. Robin, 4; W. Bluebird, 10; Warbling Vireo, 4; Wilson's Warbler, 1; W. Meadowlark, 3; Black-headed Grosbeak, 2; Lazuli Bunting, 1; Purple Finch, 1; House Finch, 4; Am. Goldfinch, 1. **Remarks:** The number of territorial males in the study area this season was 28% greater than the average for the three preceding seasons. The heavy rainfall last winter with the concomitant rise in insect population levels was most probably responsible for the increase. The four migratory species on the plot: Ash-throated Flycatcher, Violet-green Swallow, Blue-gray Gnatcatcher, and Orange-crowned Warbler, showed a 120% increase (over their three-year average) compared to a 21.5% rise among winter residents. Migratory species have a higher capacity to adjust their numbers according to local food supply. It is likely that winter residents were adversely affected by the cold, rainy winter and the drought which preceded it. The numbers of many "resident" species were markedly increased in the breeding season compared to their winter numbers; Anna's Hummingbird (4/trip-7 territorial females), Rufous-sided Towhee (3/trip-9 territorial males), and Dark-eyed Junco (9-8). The plot is in an exposed spot on the top of the ridge. It is likely that birds wintered at lower elevations nearby. The three species mentioned were significantly more abundant this season than in the same period last year: Anna's Hummingbird (3-7), Rufous-sided Towhee (5.5-9), Dark-eyed Junco (4-8). Migratory species definitely more common than in the same period last year were: Ash-throated Flycatcher (1.5-3.5) and Orange-crowned Warbler (1.5-6). The Plain Titmouse has shown a steady increase over the last three breeding seasons; winter census figures show a four-year rising trend. Birds definitely less common than in the same period last year were: White-breasted Nuthatch (2.5-1), Bewick's Wren (2.5-1). Bewick's Wren has shown a steady decrease over the last four years, supporting the findings of the 1973 winter census. The Brown Towhee has shown a steady decline over the last three years. The Acorn Woodpecker, W. Wood Pewee and Com. Bushtit bred in 1972 but were seen only irregularly this spring. We would like to thank David DeSante and Dr. Harold A. Mooney for their sponsorship and members of the Columbae community for providing transportation to the plot. — ELLEN STEIKER and SUSAN MAAS, Department of Biology, Stanford University, Stanford, Calif. 94305.

79. DISTURBED FLOODPLAIN WOODLAND.

Location: California; Butte Co., a remnant of dense riparian growth bordering the Sacramento River 5.75 miles W of Chico; 39°42'N, 121°56'W, Chico Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 11.4 ha = 28.1 acres (a roughly triangular-shaped peninsula formed by the merging of Big Chico Creek and the Sacramento River). **Description of Plot:** See AB 26:978-979, 1972. **Weather:** A "normal" spring following the wettest winter in many years. The winter rains swelled the Sacramento River to the point that, during late January and February, most of the plot was flooded and there were days when the entire peninsula was inundated April and May, however, were rather dry and mild. **Coverage:** April 14, 25; May 2, 9, 12, 16, 21, 24, 29; June 2. Total man-hours: 19. (Man-hours for 1972 totaled 20.5, not 205 as published in AB 26:978.) All censuses between 0600 and 1000. Visits were made on other days, but no censuses taken. **Census:** Bewick's Wren, 19 (167, 68); Black-headed Grosbeak, 18.5 (163, 66), Rufous-sided Towhee, 11 (97, 39); W. Wood Pewee, 10 (88, 36); N. (Bullock's) Oriole, 7 (62, 25); California Quail, 5 (44, 18); Nuttall's Woodpecker, 5 (44, 18), Plain Titmouse, 5 (44, 18); Lesser Goldfinch, 5 (44, 18), Scrub Jay, 4.5 (40, 16); Downy Woodpecker, 4 (35, 14), Ash-throated Flycatcher, 4 (35, 14); Am. Robin, 4 (35, 14); Yellow Warbler, 4 (35, 14); Mourning Dove, 3 (26, 11); Com. Bushtit, 3 (26, 11); Starling, 3 (26, 11), Brown-headed Cowbird, 3 (26, 11); Am. Goldfinch, 3 (26, 11); Tree Swallow, 2; Brown Towhee, 2; Ring-necked Pheasant, 1; W. Kingbird, 1; Hutton's Vireo, 1, Com. Yellowthroat, 1; Blue Grosbeak, 1; House Finch, 1; Red-shouldered Hawk, 0.5; Yellow-billed Cuckoo, +; Com. (Red-shafted) Flicker, +. **Total:** 30 species; 131.5 territorial males or females (1156/km², 468 per 100 acres). **Visitors:** Great Blue Heron, Mallard, Wood Duck, Great Horned Owl, Black-chinned Hummingbird, Belted Kingfisher, Acorn Woodpecker, Black Phoebe, Bank Swallow, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Yellow-breasted Chat, House Sparrow, Red-winged Blackbird, Brewer's Blackbird, Lazuli Bunting. **Remarks:** Nests of the following species were found: Red-shouldered Hawk, 1; Nuttall's Woodpecker, 1; Downy Woodpecker, 1; W. Kingbird, 1; W. Wood Pewee, 1; Tree Swallow, 2; Plain Titmouse, 1; Am. Robin, 4; Black-headed Grosbeak, 3. Fledglings of the following species were noted: Ring-necked Pheasant, Nuttall's Woodpecker, Downy Woodpecker, bushtit, Bewick's Wren, Black-headed Grosbeak, Rufous-sided Towhee. The most noticeable differences from last year were the lack of breeding Lazuli Buntings and the breeding of Yellow Warblers and Am. Goldfinches for the first time. Brown Towhees were surprisingly absent during the winter period when the peninsula was flooded, and when they returned in the spring, they were down in numbers from the previous year. The pair of Hutton's Vireos, pioneering in a region and habitat where the species has never before been known to breed, had the misfortune to end up raising a fat cowbird instead of legitimate offspring. Two female House Sparrows on May 16 were the first I have seen at any season. Additions to the list of vertebrates found in-

clude Racer, Com Garter Snake, Opossum, River Otter, and Valley Pocket Gopher. — TIM MANOLIS, 4409 44th Avenue, Sacramento, Calif. 95824.

80. FLOODPLAIN RIPARIAN FOREST. — **Location:** California; Glen and Butte Cos., 4.3 miles N of Glenn, on W bank of the Sacramento River; 39°35'N, 122°00'W, Glenn and Llano Seco Quadrangles, USGS. **Continuity:** New. **Size:** 10.4 ha = 25.6 acres (rectangular, 228 x 360 m = 945 x 1181 ft, paced). **Description of Plot:** Part of the dense cottonwood-willow forest that occupies the floodplain of the Sacramento River. Recurrent inundation by flood waters prevents intrusion by Valley Oaks (*Quercus lobata*) and Sycamores (*Platanus racemosa*). The canopy thus consists entirely of Fremont Cottonwoods (*Populus fremontii*) and willow (*Salix* spp.). Many trees are draped with grape vines (*Vitis californica*). Willows (*Salix* spp.), Blue Elderberry (*Sambucus caerulea*), Box-elder (*Acer negundo*) and lesser numbers of Black Walnut (*Juglans nigra*), Seep-willow (*Baccharis glutinosa*), White Alder (*Alnus rhombifolia*) and Oregon Ash (*Fraxinus latifolia*) form a well-defined and nearly impenetrable woody understory. Ground cover, most prominent where this understory is lacking, is composed predominantly of Mugwort (*Artemisia vulgaris*), Stinging Nettle (*Urtica dioica*), horsetail (*Equisetum*), Poison Oak (*Rhus diversiloba*) and blackberry (*Rubus*). A fair number of dead willow and cottonwood stumps are dispersed throughout the site. An old river channel cuts through the center of the plot. Piles of dead wood, deposited by winter floods, litter this and other parts of the area. A quantitative survey of the vegetation gave the following results: Trees, 3-inch diameter and over, based on five 0.1-acre circular samples 143/acre; total basal area: 99.2 ft²/acre. Species comprising 90% of the total numbers of canopy trees (figures after each give number of trees/acre, relative density in per cent, relative dominance and frequency in that sequence): Cottonwood, 77, 53, 71, 100; willow, 50, 35, 14, 80; dead trees, 12, 8, 15, 40. Canopy trees by diameter size class (figures after each class give number of trees/acre, relative density in per cent, basal area in square feet/acre, relative dominance): A (3-6 inches) 27, 18, 2.7, 3; B (6-9 inches) 40, 28, 12.0, 12; C (9-15 inches) 37, 26, 26.0, 26; D (15-21 inches) 40, 28, 58.5, 59. Species comprising 90% of the total understory shrubs and small trees (figures after each give number of plants/acre, relative density in per cent, and frequency, in that sequence): Willow, 258, 72, 100; Blue Elderberry, 58, 16, 40; Box-elder, 25, 7, 60. Understory stems/acre: 183,000. Ground cover 49%; canopy cover 59%. Average understory height 15 ft (range 10-20); average canopy height 82 ft (range 70-100). Trees supporting grape vines 30%. Plant names are from Munz, *A California Flora*, 1959. **Edge:** Bordered to the east by the floodplain gravel bar of the Sacramento River; bordered on other sides by similar habitat. **Topography:** A generally flat, featureless flood plain crisscrossed by sloughs which, although flooded in early spring, were dry by late April. Drainage very poor. The entire plot is flooded during severe winters. **Elevation:** 85 ft. **Weather:** Dry and hot during census period, averaging

2 7°F above average April-June. Precipitation for the same period was 0.23 inches, 2.01 below average. **Coverage:** April 11, 16, 22, 25, 30; May 14, 16, 28, 30, June 24; July 10. All trips between 0500 and 1000 hours, PST. Total man-hours: 55. **Census:** Black-headed Grosbeak, 13 (125, 51); Bewick's Wren, 8 (77, 31); Am. Goldfinch, 8 (77, 31); Rufous-sided Towhee, 6 (60, 23), Nuttall's Woodpecker, 5 (48, 20); Am. Robin, 5 (48, 20); N. (Bullock's) Oriole, 5 (48, 20); W. Wood Pewee, 4.5 (43, 18); Ash-throated Flycatcher, 4 (39, 16), Brown-headed Cowbird, 4 (39, 16); Scrub Jay, 3.5 (34, 14); House Finch, 3.5 (34, 14); California Quail, 3 (29, 12); Downy Woodpecker, 3 (29, 12); Plain Titmouse, 3 (29, 12); Com. Bushtit, 3 (29, 12); House Wren, 3 (29, 12); Mourning Dove, 2; Tree Swallow, 2; Brown Towhee, 2; Great Horned Owl, 1; Com. (Red-shafted) Flicker, 1; Lesser Goldfinch, 1; Yellow-billed Cuckoo, 0.5; Yellow Warbler, 0.5. **Total:** 25 species; 94.5 territorial males or females (912/km², 369 per 100 acres) **Visitors:** Wood Duck, Red-tailed Hawk, White-breasted Nuthatch, Com. Yellowthroat, Yellow-breasted Chat, Lazuli Bunting. **Remarks:** Nests (27) of the following species were located: Black-headed Grosbeak, 3; Bewick's Wren, 1; Am. Goldfinch, 1, Rufous-sided Towhee, 2; Nuttall's Woodpecker, 1, Am. Robin, 3; N. Oriole, 1; W. Wood Pewee, 1; Ash-throated Flycatcher, 1; Scrub Jay, 1; House Finch, 2, Mourning Dove, 1; Tree Swallow, 2; Com. Flicker, 1, Lesser Goldfinch, 1. The following additional species were continually present and probably bred along the forest edge and/or on the floodplain gravel bar: Mallard, Am. Kestrel, Killdeer, Spotted Sandpiper, Lesser Nighthawk (two young July 8), W. Kingbird, Black Phoebe, Starling, Yellow-breasted Chat, W. Meadowlark, Brewer's Blackbird, Blue Grosbeak, Lazuli Bunting, Lark Sparrow. A herony of at least 42 active nests of Great Blue Heron and 31 active nests of Com. Egret occupied several large sycamores on the E bank of the river directly across from the census plot. Nesting in the steep banks of the river in this area were Belted Kingfisher, Bank Swallow and Rough-winged Swallow. This census is indicative of the richness of the nesting avifauna (45+ species) of undisturbed lowland riparian. In California, this habitat has been almost completely destroyed by diversion of water for irrigation, depletion of ground water, agricultural development, urbanization, levee construction and maintenance and river channelization. Vertebrates other than birds noted: Pacific Treefrog, Bullfrog, Racer, Com Garter Snake, Gopher Snake, W. Fence Lizard, Raccoon, Calif. Ground Squirrel, W. Gray Squirrel, Beaver, Muskrat, Black-tailed Jackrabbit, Mink, Mule Deer. — DAVID A. GAINES, Route 1, Box 2563, Davis, Calif. 95616.

81. OAK-CALIFORNIA-BAY-BUCKEYE-MIXED FOREST. — **Location:** California; Marin Co., 3.5 miles NW of Bolinas, just inside the southern boundary of Point Reyes National Seashore; 37°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 4 ha = 10 acres (irregular, measured) **Description of Plot:** See AB 26:979, 1972. **Weather:** Fog was common during morning hours with NW winds in the afternoon. **Coverage:** April 13; May 10, 15, 29; June

5, 7 Total man-hours 26 Trips made between 0700 and 1800 hours. **Census:** Orange-crowned Warbler, 5.5 (136, 55); Wilson's Warbler, 5.5 (136, 55); Song Sparrow, 5 (124, 50); Winter Wren, 4 (99, 40); Am. Robin, 4 (99, 40); Swainson's Thrush, 4 (99, 40); Warbling Vireo, 4 (99, 40); W. Flycatcher, 3 (74, 30); Com. Bushtit, 3 (74, 30); Chestnut-backed Chickadee, 2; Wrentit, 2; Brown-headed Cowbird, 2; Black-headed Grosbeak, 2; Purple Finch, 2; Brown Towhee, 2; Bewick's Wren, 1.5; Hutton's Vireo, 1.5; Pine Siskin, 1.5; Com. (Red-shafted) Flicker, 1; Olive-sided Flycatcher, 1; Violet-green Swallow, 1; Steller's Jay, 0.5; Scrub Jay, 0.5; Anna's Hummingbird, +; Allen's Hummingbird, +; W. Bluebird, +; Tree Swallow, +; Rough-winged Swallow, +; Am. Goldfinch, +; Rufous-sided Towhee, +; White-crowned Sparrow, +. **Total:** 31 species; 58.5 territorial males (1446/km², 585 per 100 acres). **Visitors:** Barn Swallow, Cliff Swallow, Starling. **Remarks:** Nests found (9); Am. Robin (4), one feeding nestlings on June 20; another feeding nestlings on June 5 and feeding fledglings on June 20; another feeding nestlings on June 11 and 20; another had either eggs or young nestlings on June 20; Tree Swallow (1), young left nest box on June 19; Violet-green Swallow (1), building in nest box on May 29; Allen's Hummingbird (1), incubating on May 1; Warbling Vireo (1), building on May 29; incubating eggs on June 4-9; nest disturbed and no adults present by June 11; Bewick's Wren (1), building in nest box on May 24; 3 eggs on June 4 and 11; 3 young on June 18. One Wilson's Warbler was at least 7 years old. Contribution No. 75, PRBO. — ROBERT M. STEWART, *Point Reyes Bird Observatory, Bolinas, Calif. 94924.*

82. RIPARIAN OAK WOODLAND. — **Location:** California; Sacramento Co., Ancil Hoffman County Park, along the north bank of the American River, Carmichael; 38°37'N, 121°18'W, Fair Oaks Quadrangle, USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 13 ha = 32 acres (an irregular rectangle, approximately 2200 x 750 ft, measured on county park map). **Description of Plot:** See AB 25:967-969, 1971. **Elevation:** 100 ft. **Weather:** Extremely hot and dry. Spring weather was nearly nonexistent, as summer weather manifested itself early. **Coverage:** March 18, 25; April, 8, 17-19; May 13-14. All trips between dawn and 1200 hours. Total man-hours: 27. **Census:** Starling, 13 (100, 41); California Quail, 9 (69, 28); Plain Titmouse, 8 (62, 25); Scrub Jay, 7 (54, 22); Bewick's Wren, 7 (54, 22); Com. Bushtit, 6 (46, 19); Rufous-sided Towhee, 6 (46, 19); Acorn Woodpecker, 4.5 (35, 14); House Wren, 3 (23, 9); Mourning Dove, 2; Anna's Hummingbird, 2; Nuttall's Woodpecker, 2; Warbling Vireo, 2; W. Meadowlark, 2; Brown-headed Cowbird, 2; Brown Towhee, 2; Com. (Red-shafted) Flicker, 1.5; White-breasted Nuthatch, 1.5; Mockingbird, 1.5; Am. Robin, 1.5; Ash-throated Flycatcher, 1; Green Heron, +; White-tailed Kite, +; Red-shouldered Hawk, +; Ring-necked Pheasant, +. **Total:** 25 species; 85 territorial males or females (656/km², 266 per 100 acres). **Visitors:** Wood Duck, Sharp-shinned Hawk, Cooper's Hawk, Red-tailed Hawk, Am. Kestrel, Killdeer, Barn Owl, Black-chinned Hummingbird, Belted Kingfisher, Black

Phoebe, Violet-green Swallow, Tree Swallow, Bank Swallow, Rough-winged Swallow, Barn Swallow, Yellow-billed Magpie, Com. Crow, Hutton's Vireo, Red-winged Blackbird, N. (Bullock's) Oriole, Brewer's Blackbird, Black-headed Grosbeak, House Finch, Am. Goldfinch, Lesser Goldfinch, Lark Sparrow, Chipping Sparrow. **Remarks:** One Com. Bushtit nest and one robin nest were located; neither of them was inspected. The White-tailed Kite seemed to exhibit dominance over the Red-shouldered Hawk in territorial establishment, as the kite took over the southern end of the plot which had been occupied earlier by the Red-shouldered Hawks. The Anna's Hummingbird left a territory in the interior by the beginning of March, yet territories were still being occupied on the edge of the river's flood plain in May. The Bewick's Wrens and House Wrens occupied identical habitat, yet no interspecific aggression was observed. Other vertebrates observed were: California Ground Squirrel, W. Gray Squirrel, Black-tailed Jackrabbit, Bull Frog, W. Pond Turtle, W. Fence Lizard. — DAVID W. WINKLER, 6109 Golden Dawn Way, Sacramento, Calif. 95841.

83. FLOODPLAIN COTTONWOOD FOREST. — **Location:** Colorado: Jefferson Co., about 10 miles SW of Denver on west bank of S. Platte R., 2 miles upstream from its confluence with Plum Creek and about 4 miles downstream from where the river exits from the foothills of the Rocky Mountains onto the high plains; NE/4, Sec. 14, T6S, R69W, 6th P.M.; 39°32'N, 105°5'W, Littleton Quadrangle, USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 9.7 ha = 24 acres (an oval about 1600 x 850 ft, determined with compass and tape). **Description of Plot:** See AB 25:966-967, 1971. The edge vegetation continues to grow, with young cottonwoods along some fringes up to 10 ft high. **Elevation:** 5425 ft. **Weather:** Cool and wet through mid-June, then hot and dry. **Coverage:** April 14, 29; May 17, 24; June 6, 14, 20-21, 27, 30; July 4, 12, 19, 25. Observation times varied from 0600-2030, with most trips from 1730-2030. Total man-hours 45 **Census:** House Wren, 26 (268, 108); Great Blue Heron, 16 (165, 67); Yellow Warbler, 16 (165, 67); Am. Robin, 13 (134, 54); Starling, 10 (103, 42); W. Wood Pewee, 9 (93, 38); Red-eyed Vireo, 6 (62, 25); N. (Bullock's) Oriole, 6 (62, 25); Am. Goldfinch, 5 (51, 21); Lazuli Bunting, 5 (51, 21); Downy Woodpecker, 4 (41, 17); Warbling Vireo, 3 (31, 12); Com. Yellowthroat, 3 (31, 12); Broad-tailed Hummingbird, 2; E. Kingbird, 2; Lesser Goldfinch, 2; Am. Kestrel, 1; Mourning Dove, 1; Yellow-billed Cuckoo, 1; Great Horned Owl, 1; Com. (Red-shafted) Flicker, 1; Black-billed Magpie, 1; Indigo Bunting, 1; Rufous-sided Towhee, 1; Song Sparrow, 1. **Total:** 25 species, 137 territorial males (1411/km², 571 per 100 acres). Excluding the colonial nesting herons, 121 territorial males (1246/km², 504 per 100 acres). **Visitors:** Sharp-shinned Hawk, Red-tailed Hawk, Com. Nighthawk, Belted Kingfisher, Com Grackle, Brown-headed Cowbird. **Remarks:** Two factors may have influenced nesting in the grove this year. The S. Platte R. sprung its banks upstream, and caused the flood plain actually to function as such. Through mid-June water flowed through the grove in the old channels, up to 3 ft deep, and deep channels surrounded

the grove. We would expect ground-nesting and ground-feeding birds to feel the greatest effect from this, but only the Yellow-breasted Chat, a marginal breeder here, was missing. The principal species missing or reduced were tree-nesting, canopy-using birds like W. Wood Pewee—to half of its 1971 population, Mourning Dove—from an average of 7 to 1 pair (perhaps part of a general population reduction), Com. Flicker, Yellow Warbler, and Am. Redstart (present only in 1971). The other influencing factor came 200–300 yards west of the grove, where an extensive dawn-to-dusk gravel mining operation functioned. Pumps from this operation ran 24 hours. The section of the grove closest to the operation had fewer birds than it had in the past, with some common species totally absent from that section. The herons seemed untroubled by the gravel operation, and we counted, and estimated 16 active nests before the leaves hid activity. The herons returned to the grove later than last year, but were present by April 14. We think laying and incubation began later, and not all the young herons had left the nests by the end of July. The Great Horned Owl, using the same old heron nest as last year, fledged 2 young, which inhabited the grove all summer, and when flushed brought forth many species defending territories. We found a total of 33 nests: 16 heron, 6 House Wren, 4 Starling, 3 Downy Woodpecker, 2 oriole, 1 hummingbird, and 1 robin. The young, bush-like cottonwoods sprouting up around the grove may have attracted the buntings, which had no territories the first year. Many territorial males occupied areas surrounding the grove, including at least one more Indigo Bunting. The buntings and herons are the only species to show significant population increases. Chatfield Dam construction is complete, but water will not begin to back up until 1974, perhaps after the breeding season. — RICHARD BOTTORFF, NANCY HURLEY, JO TRAINOR, HUGH KINGERY (compiler), 10 Emerson, Denver, Colo. 80218.

84. FLOODPLAIN COTTONWOOD FOREST. — **Location:** Colorado; Weld Co., on the west bank of the South Platte River about 6 miles S and 1.5 miles W of Johnstown, extending from the confluence of St. Vrain Creek and the South Platte River S about $\frac{3}{4}$ miles. Parts of Sects. 34 & 35. T4N. R67W; 104°52'N, 40°14'W, Milliken Quadrangle, USGS. **Continuity:** New **Size:** 52.2 ha = 128.9 acres (measured from an aerial photo with a planimeter). **Description of Plot:** Over 75% riparian woodland, primarily Plains Cottonwood (*Populus sargentii*) and willows (*Salix* spp.) with an understory of Snowberry (*Symphoricarpos occidentalis*), Skunkbush (*Rhus trilobata*) and Poison Ivy (*Rhus radicans*); less than 25% grassy openings of W. Wheat Grass (*Agropyron smithii*), Cheat Grass (*Bromus tectorum*), Kentucky Blue Grass (*Poa pratensis*), Canary Grass (*Phalaris arundinacea*) and various annual weeds. **Edge:** Bordered on the north by St. Vrain Creek, on the east and south by South Platte River, and on the west by a 21 acre pond and agricultural and pasture land. **Topography:** Essentially flat with steep to perpendicular river banks on the south, east, and north. **Elevation:** 4790 ft. **Weather:** Clear to overcast, dry, warm to hot throughout census period.

Coverage: May 25, June 5, 8, 12, 15, 20, 22, 25, July 5, 10, 13. All trips between dawn and 0930 hours. Total man-hours: 28. **Census:** House Wren, 27 (52, 21); Starling, 4 (8, 3); Com. Yellowthroat, 3 (6, 2); Mourning Dove, 2; E. Kingbird, 2; Am. Robin, 2; N. (Bullock's) Oriole, 2; Am. Kestrel, 1; Great Horned Owl, 1; Com (Red-shafted) Flicker, 1; Red-headed Woodpecker, 1, W. Meadowlark, 1. **Total:** 12 species; 47 territorial males (90/km², 36 per 100 acres). **Visitors:** Killdeer, Downy Woodpecker, Black-billed Magpie, Black-capped Chickadee. **Remarks:** The Com. Yellowthroat population showed a substantial decrease from 9 in 1972 to 3. Other population fluctuations were minor. Increases were noted in 2 species, decreases in 6 species and no change in 2 species. Two new species were present and 5 were absent. The study area was completely flooded in early May and this may account for the decrease in the Com. Yellowthroat population. An abnormally cold spring may have also been partially responsible for the decline of some species. The study area was established in 1972 as a portion of an environmental monitoring program in conjunction with the completion of the Fort St. Vrain Nuclear Power Site. The power site is scheduled to become operational early in 1974 and the data gathered thus far will serve as baseline measurements for comparison after plant operation begins. Special thanks to Del Benson for providing the 1972 data. — BRUCE R. JOHNSON, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colo. 80521.

85. CALIFORNIA-BAY – BISHOP PINE – MIXED FOREST. — **Location:** California; Marin Co., 0.5 mile S. of Inverness; 38°03'N, 122°50'W, Inverness Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 11.7 ha = 29 acres (approximately rectangular, 900 x 1500 ft, measured). **Description of Plot:** See AB 26:981, 1972. **Weather:** Foggy in the early morning on approximately half of the census dates. **Coverage:** April 11, 17, May 2, 7, 16, 23; June 8. All trips between 0700 and 1230 hours. Total man-hours: 29.5. **Census:** Wilson's Warbler, 13 (111, 45); W. Flycatcher, 8 (68, 28); Purple Finch, 5.5 (47, 19); Rufous-sided Towhee, 5.5 (47, 19), Warbling Vireo, 5 (43, 17); Chestnut-backed Chickadee, 4.5 (38, 16); Pine Siskin, 4.5 (38, 16); Brown Creeper, 4 (34, 14); Swainson's Thrush, 4 (34, 14), Com. Bushtit, 3.5 (30, 12); Bewick's Wren, 3 (26, 10), Hutton's Vireo, 3 (26, 10); Golden-crowned Kinglet, 2.5; Orange-crowned Warbler, 2.5; Dark-eyed (Oregon) Junco, 2.5; California Quail, 2; Hairy Woodpecker, 2; Violet-green Swallow, 2; Wrentit, 2; Hermit Thrush, 2; Acorn Woodpecker, 1.5; Song Sparrow, 1.5; Anna's Hummingbird, 1; Steller's Jay, 1; Band-tailed Pigeon, 0.5; Mourning Dove, 0.5; Olive-sided Flycatcher, 0.5; Pygmy Nuthatch, 0.5; Am. Goldfinch, 0.5; Downy Woodpecker, +; Winter Wren, +. **Total:** 31 species; 88.5 territorial males (754/km², 305 per 100 acres). **Visitors:** Sharp-shinned Hawk, Red-tailed Hawk, Com. Raven. **Remarks:** Because this plot is protected from strong prevailing winds by Inverness Ridge it was probably high rainfall during the previous winter that caused falling of five apparently healthy Bishop Pines (dbh 30 inches or greater). Several snags used last year by hole-nesting species were also down.

Perhaps this was the reason for the decline in numbers of two species of hole-nesters, the Chestnut-backed Chickadee (8 males in 1972 to 4.5) and the Pygmy Nuthatch (5 in 1972 to 0.5). Nests found (7): — Violet-green Swallow (1), building on May 16; Chestnut-backed Chickadee (2), first — building on April 11 and nestlings May 16, second — both adults around freshly worked cavity on April 17; Com. Bushtit (1), feeding nestlings May 16 and fledglings June 8; Brown Creeper (2), first — building on April 17, feeding nestlings May 23, second — building on May 7; Orange-crowned Warbler (1), 3 nestlings judged less than one day old on May 2, but intact nest had no young on May 7. Thanks to Jacqueline and Gordon Ford for permission to continue this census on their property in the Nature Conservancy Bishop Pine Preserve. Contribution No. 71, PRBO — ROBERT M. STEWART, *Point Reyes Bird Observatory, Bolinas, Calif. 94924.*

86. LODGEPOLE PINE FOREST WITH ASPEN.

— **Location:** Colorado; Summit Co., 1 mile W of Silverthorne and N of Mesa Cortina West subdivision; 39°27'N, 105°6'W, Dillon Quadrangle, USGS. **Continuity:** Established 1970; 3 intermittent years. **Size:** 13.35 ha = 33 acres (measured by steel tape and compass). **Description of Plot:** See AFN 24:550-551, 1970. **Edge:** Lodgepole Pine on 65% of the site, Quaking Aspen on 35%. **Topography:** Sloping, with two small ponds. **Weather:** Normal. **Coverage:** June 16-17, 24; July 7-8, 14. Trips from 0600-0845, except one 1800-2000. Total man-hours: 12. **Census:** Gray-headed Junco, 5 (37, 15); Mountain Chickadee, 3 (22, 9); Ruby-crowned Kinglet, 3 (22, 9); Yellow-rumped (Audubon's) Warbler, 2; House Wren, 1; Warbling Vireo, 1; W. Flycatcher, 0.5. **Total:** 7 species; 15.5 territorial males (116/km², 47 per 100 acres). **Visitors:** Gray Jay, White-breasted Nuthatch, Red-breasted Nuthatch, Brown Creeper, Am. Robin, Hermit Thrush, Pine Siskin. **Remarks:** The pure lodgepole section continues to see little use for nesting purposes. A light, wet snow fell on June 16, and the W. Flycatcher was feeding on insects plucked from the undersides of aspen leaves, in the same manner as a Ruby-crowned Kinglet feeds. In fact, both the flycatcher and a kinglet fed the same way that day, in the same tree 2 ft from each other. Young from the 2 junco nests found fledged about 2 weeks apart. About 50 ft E of the census area, a Hairy Woodpecker and a Yellow-bellied Sapsucker nested, but they did not use the study area during census trips. Tree Swallows, which have fed and nested in previous years, inspected but apparently did not use a hole in the same tree the Hairy nested in; swallows seemed scarce in the vicinity this year. — HUGH E. KINGERY, *10 Emerson, Denver, Colo. 80218.*

87. PONDEROSA PINE-SCRUB OAK-MOUNTAIN MAHOGANY WOODLAND. — **Location:** Colorado; Douglas Co., E of Franktown, on Highway 86, 39°20'N, 104°40'W, Elizabeth Quadrangle, USGS. **Continuity:** Established 1968; 6 consecutive years. **Size:** 8.09 ha = 20 acres (surveyed, a trapezium, 453.7 ft on the north, 607.3 ft on the south along Highway 86, 1906.4 ft on the east, 1649.9 ft on the west). **Description of Plot:** See AFN 22:673-4, 1968. **Weather:** Spring

was cool and late, July had 2 weeks of 95° to 100° weather, it then was cooler than normal through the rest of the period. **Coverage:** June 6, 15, 23; July 2, 12, 22, 26; August 3, 12. All trips varied from 0800 to 2030 hours. Total man-hours: 32. **Census:** W. Bluebird, 14 (173, 70); House Wren, 4 (49, 20); Rufous-sided Towhee, 4 (49, 20); Black-headed Grosbeak, 3 (37, 15), Mourning Dove, 2; Broad-tailed Hummingbird, 2, W. Wood Pewee, 2; Solitary Vireo, 2; House Finch, 2, Lesser Goldfinch, 2; White-breasted Nuthatch, 1, Pygmy Nuthatch, 1; Am. Robin, 1; Mountain Bluebird, 1; Virginia's Warbler, 1. **Total:** 15 species, 42 territorial males (519/km², 210 per 100 acres). **Visitors:** Cooper's Hawk, Com. Nighthawk, Rufous Hummingbird, Com. (Red-shafted) Flicker, Hairy Woodpecker, Steller's Jay, Scrub Jay, Black-capped Chickadee, Mountain Chickadee, Brown-headed Cowbird, W. Tanager, Cassin's Finch, Pine Siskin, Lark Sparrow, Chipping Sparrow. **Remarks:** Five species brought young to the food and water but I could not determine if they had territories on the plot: Broad-tailed Hummingbird, Hairy Woodpecker, Scrub Jay, Black-headed Grosbeak, Rufous-sided Towhee. Some of the Chipping Sparrows could have been young. **Remarks:** There were 19 nests in boxes; 6 other nests were found. Again the White-breasted Nuthatch failed, this time the nest was torn out of the box and a House Wren took over. It was the first nesting of Violet-green Swallow, 3 young were banded. A first nesting of the Mountain Bluebird was found in a hole in a corner of the roof of a new building. Of the W. Bluebird nests, one had 6 eggs, seven had 5 eggs, four had 4 eggs and two had 3 eggs for a total of 51 eggs. There were 4 infertile eggs, others predators got. Of those that hatched, 31 fledged (21 young were banded). Four male Black-headed Grosbeaks and 6 females and/or young were at the feeder at one time. — MILDRED O. SNYDER, *161 Del Mar Circle, Aurora, Colo. 80011.*

88. BISHOP PINE FOREST. — **Location:** California, Marin Co., 3.75 miles WNW of Inverness; 38°37'N, 122°53'W, Drakes Bay Quadrangle USGS. **Continuity:** Established 1952 (1951); 5 intermittent years. **Size:** 10.5 ha = 26 acres (irregular, measured). **Description of Plot:** See AFN 6:313, 1952 and AB 26:986, 1972. **Weather:** Foggy in early morning approximately half of the census days. **Coverage:** May 3, 6, 9, 19, 22, 25; June 1, 6. All between 0630 and 1300 hours. Total man-hours 29. **Census:** Wilson's Warbler, 8.5 (81, 33); Wrentit, 8 (76, 31); Pine Siskin, 7 (67, 27); W. Flycatcher, 6 (57, 23); Pygmy Nuthatch, 5 (48, 19); Dark-eyed (Oregon) Junco, 5 (48, 19); Chestnut-backed Chickadee, 4 (38, 15); Brown Creeper, 4 (38, 15); Bewick's Wren, 4 (38, 15); Swainson's Thrush, 4 (38, 15); Rufous-sided Towhee, 4 (38, 15); Song Sparrow, 4 (38, 15); Violet-green Swallow, 3 (29, 12); Com. Bushtit, 3 (29, 12), Hutton's Vireo, 3 (29, 12); Purple Finch, 3 (29, 12), Chipping Sparrow, 2.5; Hairy Woodpecker, 2; Orange-crowned Warbler, 2; White-crowned Sparrow, 2, California Quail, 1; Tree Swallow, 1; Steller's Jay, 1; Winter Wren, 1; Golden-crowned Kinglet, 1; Starling, 1, House Finch, 1; Am. Goldfinch, 1; Mourning Dove, 0.5; Downy Woodpecker, 0.5; Olive-sided Flycatcher, 0.5; Allen's Hummingbird, +; Com. (Red-shafted)

Flicker, + Total: 33 species, 93 5 territorial males ($889/\text{km}^2$, 360 per 100 acres). **Visitors:** Red-tailed Hawk, Com. Raven, Am. Robin, Brewer's Blackbird, Brown Towhee. **Remarks:** The unusually wet, cold winter of 1972-73 had no apparent effect on the habitat, nor on the numbers of resident breeding species. Nests found (24): — Hairy Woodpecker (1), incubation May 3, nestlings May 22, 27; fledglings June 6; W. Flycatcher (1), building May 22, incubating 3 eggs on June 1, Violet-green Swallow (1), investigating hole May 20 and June 1; Chestnut-backed Chickadee (4), first-incubation on April 11; second-nestlings May 9, 19; fledglings on May 27; third-nestlings May 22, 27, fledglings June 6; fourth-nestlings May 22; fledglings June 1; Pygmy Nuthatch (5), first-building May 9, 19; feeding nestlings June 1; second, third—presumably incubating on May 9; fourth-contained nestlings May 26 and June 1; fifth-contained nestlings June 1; Brown Creeper (3). The entrances to these nests were unusual because they were old cavities open at the top owing to progressive decay. First-contained nestlings May 22 and 27; second-contained nestlings on May 26 and June 1; third-contained nestlings on June 1; Bewick's Wren (2), first-nestlings May 22, and 25; fledglings May 26; second-nestlings May 25; Starling (2), well-developed nestlings in both nests by May 9; Wilson's Warbler (1), 4 eggs May 14, 19; nestlings June 1; young leaving nest June 3; Pine Siskin (2), first-sitting on May 9; second-sitting May 14, 19; Dark-eyed Junco (2), first-nestlings May 19; second-nestlings June 1. Contribution No. 70, PRBO. — ROBERT M. STEWART and JAMES HIGBEE, *Point Reyes Bird Observatory, Bolinas, Calif. 94924.*

89. BISHOP PINE FOREST. — **Location:** California; Marin Co., on Point Reyes National Seashore, 1.5 miles W of Inverness, 0.75 miles NW of Mt. Vision; $38^\circ 06' \text{N}$, $122^\circ 52' \text{W}$, Drakes Bay Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 8.5 ha = 21 acres (irregular, approximately 700 x 1100 ft, measured). **Description of Plot:** See AB 26:985-986, 1972. **Weather:** Early morning hours were consistently foggy, cool, and damp. It usually became clear and warm by 1000 hours. Between July 1972 and June 1973 57.44 inches of rain fell. This compares with only 22.92 inches between July 1971 and June 1972 (rainfall data from Point Reyes Bird Observatory, 7 miles S of plot). The heavy rains this year did no visible damage to the vegetation. **Coverage:** March 23; April 11, 27; May 11, 23, 29, 30. All trips between 0600 and 1600 hours, and one between 1700 and 2400. Total man-hours: 40. **Census:** Wrentit, 12.5 (147, 60); Wilson's Warbler, 10 (118, 48); W. Flycatcher, 6 (71, 29); Rufous-sided Towhee, 5.5 (65, 26); Winter Wren, 4 (47, 19); Swainson's Thrush, 4 (47, 19); Pine Siskin, 4 (47, 19); Purple Finch, 3.5 (41, 17); Chestnut-backed Chickadee, 2.5; Hutton's Vireo, 2.5; Dark-eyed (Oregon) Junco, 2.5; Com. Bushtit, 2; Pygmy Nuthatch, 2; Bewick's Wren, 2; Orange-crowned Warbler, 1.5; California Quail, 1; Mourning Dove, 1; Allen's Hummingbird, 1; Hairy Woodpecker, 1; Steller's Jay, 1; Song Sparrow, 1; White-crowned Sparrow, 0.5; Great Horned Owl, +; Am. Robin, +; Warbling Vireo, +; Am. Goldfinch, +; Chipping Sparrow, +. **Total:** 27 species; 71 territorial

males ($835/\text{km}^2$, 338 per 100 acres) **Visitors:** Red-tailed Hawk, Band-tailed Pigeon, Violet-green Swallow, Barn Swallow, Purple Martin, Com. Raven, Com Crow, Black-headed Grosbeak, Red Crossbill. **Remarks:** Nests found (6)—W. Flycatcher (1), had 3 eggs May 30; Pygmy Nuthatch (1), 8 eggs May 30 (a comparison of nesting data gathered in 1972 and 1973 will show that last year's nestlings of the above 2 species were already being fed May 23); Com. Bushtit (1), pair building April 11, female brooding April 27, nestlings May 11; Wilson's Warbler (1), 4 nestlings May 23; Purple Finch (1), began to build April 27, never completed; Allen's Hummingbird (1), building May 23. Since immatures of this species are indistinguishable from adult females in the field, it is possible that more than one pair of Allen's Hummingbirds bred. A fledgling Hutton's Vireo was being fed by both parents May 11. A fledgling Winter Wren was being fed May 30. Species composition was virtually the same as last year except for the addition of Swainson's Thrush and the absence of Red-breasted Nuthatch and Brown Creeper. Special thanks to Bob Stewart for consultation during the study. Contribution No. 78, PRBO — ROBERT HANSEN, *Point Reyes Bird Observatory, Bolinas, Calif. 94924.*

90. DISTURBED BISHOP PINE FOREST. — **Location:** California; Marin Co., Inverness Ridge, Point Reyes National Seashore, 3 miles NW of Inverness Park; $38^\circ 4' \text{N}$, $122^\circ 51' \text{W}$, Inverness Quadrangle, USGS. **Continuity:** Established 1972. **Size:** Approximately 12 ha = 29.67 acres (irregular shape, long and narrow, surveyed). **Description of Plot:** See AB 26:984-985, 1972. **Weather:** Precipitation was heavier than usual in winter but very light in spring. Clear sky on census days except for early morning fog on 5 of 9 trips. Temperatures were comfortable; there were occasional light to moderate winds. **Coverage:** March 20, 27; April 6, 14, 27; May 15, 23; June 5, 18. All trips between 0500 and 1100 hours, PST. Total census-hours: 38. **Census:** Wrentit, 19.5 (162, 66); Allen's Hummingbird, 10 (83, 34); Pine Siskin, 8 (67, 27), Bewick's Wren, 5 (42, 17); Rufous-sided Towhee, 5 (42, 17); Pygmy Nuthatch, 4.5 (37, 15); Wilson's Warbler, 4.5 (37, 15); Purple Finch, 4.5 (37, 15); W. Flycatcher, 4 (33, 13); Violet-green Swallow, 4 (33, 13), Chestnut-backed Chickadee, 4 (33, 13); Com. Bushtit, 4 (33, 13); Swainson's Thrush, 4 (33, 13); Hutton's Vireo, 3 (25, 10); Orange-crowned Warbler, 3 (25, 10); Hairy Woodpecker, 2; Steller's Jay, 1.5; Mourning Dove, 1; Com. (Red-shafted) Flicker, 1; Purple Martin, 1; Brown Creeper, 1; Dark-eyed (Oregon) Junco, 1; Tree Swallow, 0.5; Turkey Vulture, +; Red-tailed Hawk, +; Band-tailed Pigeon, +; Com. Raven, +. **Total:** 27 species; 96 territorial males or females ($800/\text{km}^2$, 324 per 100 acres). **Visitors:** Com. Crow, W Bluebird, Am. Goldfinch. **Remarks:** Three nests were located: One each for Pygmy Nuthatch, Chestnut-backed Chickadee, and Com. Bushtit. Breeding activity was markedly less evident this year than last. There were fewer observations of nesting activity and of singing males this year, with lower totals for species as well as individuals. While 6 species showed slight population gains, 20 species showed losses averaging 2 breed-



Figure 1. View of a portion of the plot, taken from one of the two major clearings within it. In the foreground are (mainly) ceanothus and manzanita, the two dominant shrubs; in the middleground are immature Bishop Pines; in the background, mature trees. Dirt road at right is the one shown going through the plot on the USGS map (Fig. 1).



Figure 2. View of the edge of a second major clearing in the plot. Broken snags occur frequently in Bishop Pine forest and furnish suitable habitat for hole-nesting birds.

ing pairs per species, with 5 species disappearing. Species showing the greatest decrease in numbers (by either 3 or 4 breeding pairs) are Wilson's Warbler, Pygmy Nuthatch, Rufous-sided Towhee, Bushtit, and W. Flycatcher. The relationship, if any, between declining bird population and changes in weather is unclear. Map and photographs by Nick Story. Contribution No. 77, PRBO. — HELEN STORY, Point Reyes Bird Observatory, Bolinas, Calif. 94924.

91. LOGGED DOUGLAS-FIR-RESEEDED WITH MONTEREY PINE. — **Location:** California; Marin Co.; 4.5 miles S of Olema, about 0.5 miles E of east gate to Lake Ranch, Point Reyes National Seashore; 37°58'N, 122°45'W, Double Point Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 8.17 ha = 20.2 acres (irregular, approximately 1200 x 700 ft, measured). **Description of Plot:** See AB 26:983-984, 1972. **Weather:** Clear and warm with NW winds on 7 census days. One morning was cold with rain and fog. Winds exceeded force 2 (Beaufort) on 4 census days. **Coverage:** April 2, 17, 25; May 2, 7, 24; June 1-2. All trips between 0600 and 1300 hours with one all-day trip between 0815 and 2230 hours. Total man-hours: 47. **Census:** Wrentit, 9.5 (116, 47); Rufous-sided Towhee, 9.5 (116, 47); Orange-crowned Warbler, 8.5 (104, 42); Wilson's Warbler, 6.5 (80, 32); Purple Finch, 5.5 (67, 27); Swainson's Thrush, 5 (61, 25); Pygmy Nuthatch, 3.5 (43, 17); Violet-green Swallow, 3 (37, 15); Chestnut-backed Chickadee, 3 (37, 15); Bewick's Wren, 3 (37, 15); Pine Siskin, 3 (37, 15); Hutton's Vireo, 2.5; California Quail, 2; Com. Bushtit, 2; W. Bluebird, 2; W. Flycatcher, 1.5; Black-headed Grosbeak, 1.5; Song Sparrow, 1.5; Com. (Red-shafted) Flicker, 1; Acorn Woodpecker, 1; Hairy Woodpecker, 1; Olive-sided Flycatcher, 1; Purple Martin, 1; Steller's Jay, 1; Starling, 1; Mourning Dove, 0.5; Scrub Jay, 0.5; Turkey Vulture, +; Red-tailed Hawk, +; Band-tailed Pigeon, +; Allen's Hummingbird, +; Pileated Woodpecker, +; Am. Robin, +. **Total:** 33 species; 81 territorial males (991/km², 401 per 100 acres). **Visitors:** Sharp-shinned Hawk, Ash-throated Flycatcher, Com. Raven, Red-winged Blackbird, Brewer's Blackbird, Brown-headed Cowbird. **Remarks:** Nests found (13) — Turkey Vulture (1), 1 egg abandoned by May 11; Com. Flicker (1); Purple Martin (1), brooding female June 2; Com. Bushtit (1), nestlings May 24, all young fledged prior to June 1; Pygmy Nuthatch (3), all 3 with nestlings June 2; W. Bluebird (2), nestlings on June 2; Starling (1), young June 1; Orange-crowned Warbler (1), 4 downy nestlings June 2; Purple Finch (1), building June 2; Pine Siskin (1), building April 25, never completed. Fledglings of the following species were seen on June 1 and 2; Chestnut-backed Chickadee, 2 families; Com. Bushtit, 2 families; Orange-crowned Warbler, 1; Wilson's Warbler, 2. The number of adult female Allen's Hummingbirds was not estimated since they are indistinguishable from young birds in the field. This species may have held more than the computed number of territories. High species diversity depends on the presence of dense understory living Douglas-firs and fir snags. The dense understory supported high numbers of Wrentits, Rufous-sided Towhees, and Orange-crowned Warblers; species not found in high numbers in a pure stand of

Douglas-fir Nests of the Purple Martin, Pygmy Nuthatch, W. Bluebird, and Starling were located in Douglas-fir cavities. The thick stands of Monterey Pine hold fewer birds than any other habitat. The Purple Finch seems to be the only species nesting in Monterey Pine. The Pileated Woodpecker, listed as a fractional breeder, was included although seen on only one occasion. A pair of this species was observed at close range on June 1 at the east gate to the Lake Ranch (0.5 miles W of plot) and one was seen and heard on April 23 at the same location. The bird in this plot was a male, foraging on Douglas-fir snags. The telltale signs of feeding by this large woodpecker were visible at scattered locations among the remaining stands of Douglas-fir. Special thanks to Bob Stewart for consultation during this study. Contribution No. 79, PRBO. — ROBERT HANSEN, Point Reyes Bird Observatory, Bolinas, Calif. 94924.

92. MATURE DOUGLAS-FIR FOREST. — **Location:** California; Marin Co., 4 miles NW of Bolinas; 1.75 miles N of Point Reyes Bird Observatory in Point Reyes National Seashore; 37°56'N, 122°43'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1971, 3 consecutive years. **Size:** 6.1 ha = 15.15 acres (rectangular, 600 x 1100 ft, measured). **Description of Plot:** See AB 25:987-988, 1971. **Edge:** Bordered by similar habitat. **Topography:** Essentially level. **Weather:** Variable, ranging from clear and warm to cool and windy. One morning was cold with rain and fog. Heavy rains during the previous winter did no visible damage to the vegetation. **Coverage:** April 1, 6-7, 12, 15, 18, 21, 28-29, May 11-13, 25, 28; June 8. All trips between 0730 and 1500 hours, and two between 1500 and 1700. Total man-hours: 54. **Census:** Wilson's Warbler, 11 (179, 73); W Flycatcher, 4 (65, 26); Wrentit, 4 (65, 26); Song Sparrow, 4 (65, 26); Chestnut-backed Chickadee, 3 (49, 20), Rufous-sided Towhee, 3 (49, 20); Golden-crowned Kinglet, 2.5; Dark-eyed (Oregon) Junco, 2; Winter Wren, 1.5; Hairy Woodpecker, 1; Steller's Jay, 1; Red-breasted Nuthatch, 1; Pygmy Nuthatch, 1; Brown Creeper, 1; Purple Finch, 1; Pine Siskin, 1; Hermit Thrush, 0.5; Orange-crowned Warbler, 0.5; Allen's Hummingbird, +; Com. Bushtit, +; Bewick's Wren, +, Am. Robin, +. **Total:** 22 species; 43 territorial males (701/km², 284 per 100 acres). **Visitors:** Sharp-shinned Hawk, Red-tailed Hawk, Com. (Red-shafted) Flicker, Com. Raven. **Remarks:** Nests found (4): Hairy Woodpecker (1), at least one nestling June 8; Chestnut-backed Chickadee (1); Red-breasted Nuthatch (1); Pygmy Nuthatch (1); still excavating nest April 28. Gray Squirrels were occasionally seen. Many thanks to Bob Stewart for consultation during this census. Contribution No. 76, PRBO. — ELLERY AKERS and ROBERT HANSEN, Point Reyes Bird Observatory, Bolinas, Calif. 94924.

93. DISTURBED DOUGLAS-FIR-LODGEPOLE PINE FOREST. — **Location:** Montana; Missoula Co., 35 miles E of Missoula on Montana Highway 200; 46°52'N, 113°18'W, Greenough Quadrangle, USGS. **Continuity:** New. **Size:** 9 ha = 22.2 acres (square, surveyed). **Description of Plot:** The study area was logged in 1929 for 15 to 30 inch dbh Douglas-fir and Western

Larch. Present tree cover is predominantly Lodgepole Pine with a strong mixture of Douglas-fir. Diameters of overstory trees run from 4 to 16 inches. Two forks of an intermittent stream occur on the plot. Dense alder, Mountain Maple, and willow occur adjacent to these drainageways. A 20% sample of the vegetation was obtained on 72 plots, each 250 m² in area. Trees over 10 cm dbh, in order of decreasing basal area/hectare are (figures are for basal area/hectare, trees/hectare, and frequency %) Lodgepole Pine (*Pinus contorta*), 63 1, 2440, 86%; Douglas-fir (*Pseudotsuga menziesii*), 27 8, 910, 68%; Engelmann Spruce (*Picea engelmannii*), 9 9, 145, 7%; Subalpine Fir (*Abies lasiocarpa*), 6.5, 180, 8%; W. Larch (*Larix occidentalis*), 1.2, 45, 7%; Quaking Aspen (*Populus tremuloides*), 0.2, 15, 1%; Ponderosa Pine (*P. ponderosa*), 0.2, 15, 1%. Saplings (2.5 to 10 cm dbh) in order of decreasing basal area/acre are Douglas-fir, 3.8, 1485, 69.4%; Lodgepole Pine, 3 3, 1015, 59.7%; Engelmann Spruce, 0.2, 45, 2.8%; W Larch, 0.1, 30, 4.2%; Subalpine Fir, 0.1, 30, 5.6%. Ground cover is primarily huckleberry (*Vaccinium* spp.), Kinnikinnick (*Arctostaphylos uva-ursi*), *Arnica cordifolia*, sedges (*Carex* spp.), and grasses. **Edge:** Bordered on all sides by similar forest. **Topography:** Generally a north-facing watershed. Since the plot straddles the drainage, both east and west slopes also occur. **Weather:** A drier-than-normal spring with early snow melt. **Coverage:** June 6, 10, 21, 25, 27; between 0530 and 0900. Total man-hours: 15. **Census:** Yellow-rumped (Audubon's) Warbler, 5 (56, 23), MacGillivray's Warbler, 5 (56, 23); Ruby-crowned Kinglet, 4.5 (50, 20); Dark-eyed Junco, 4.5 (50, 20), Warbling Vireo, 4 (45, 18); Chipping Sparrow, 4 (45, 18); W. Tanager, 3.5 (39, 16); Pine Siskin, 3.5 (39, 16), Hammond's Flycatcher, 3 (33, 14); Swainson's Thrush, 3 (33, 14). **Total:** 10 species; 40 territorial males (445 per km², 180 per 100 acres). **Visitors:** Ruffed Grouse, Pileated Woodpecker, Williamson's Sapsucker, Black-capped Chickadee, Mountain Chickadee, White-breasted Nuthatch, Red-breasted Nuthatch, Hermit Thrush, Solitary Vireo, Evening Grosbeak. **Remarks:** The single drumming male Ruffed Grouse produced a brood which was observed in the area. The aldermountain maple thickets along the drainage bottoms provided habitat quite different from the overall study area. Birds restricted to these hardwood areas were: Ruffed Grouse, Hammond's Flycatcher, Swainson's Thrush, and MacGillivray's Warbler. — SIDNEY S. FRISSELL, School of Forestry, University of Montana, Missoula, Mont. 59801

94. PONDEROSA PINE FOREST. — **Location:** Colorado; Boulder Co., in the lower foothills 0.5 mile S of Baseline Road, Boulder; in the eastern part of S1, T1S, R71W, 6th PM. **Continuity:** Established 1954, 10 intermittent years. (Formerly Lower Foothills, Ponderosa Pine Forest.) **Size:** 8.09 ha = 20 acres (rectangular, surveyed). **Description of Plot:** See AFN 8:372-373, 1954. **Weather:** Boulder had a damp and cold spring; the season was late. The last week of June and the first part of July were unusually hot. **Coverage:** April 22, 29; May 12, 23, 29; June 1, 9-10, 16, 24; July 4, 15. All trips between 0630 and 1130. Total man-hours 12.5. **Census:** W. Wood Pewee, 13 (161, 65); Chipping

Sparrow, 8 (99, 40); Am. Robin, 6 (74, 30); Mourning Dove, 5 (62, 25); Solitary Vireo, 5 (62, 25); Mountain Chickadee, 4 (49, 20); Pygmy Nuthatch, 4 (49, 20); Broad-tailed Hummingbird, 2; White-breasted Nuthatch, 2; W. Tanager, 2; House Wren, 1; Pine Siskin, 1; Gray-headed Junco, 1. **Total:** 13 species; 54 territorial males or females (667/km², 270 per 100 acres). **Visitors:** Com. (Red-shafted) Flicker, Hairy Woodpecker, Downy Woodpecker, Steller's Jay, Black-billed Magpie, Brown-headed Cowbird, Black-headed Grosbeak, Evening Grosbeak, House Finch, Lesser Goldfinch, Red Crossbill. **Remarks:** The 1972 season had the greatest variety of species (14); 12 species nested in 1963. The population was one of the highest, comparable to 57 in 1969, 52 in 1972 and 50 in 1967. Because of the late spring, some species were slow in settling down; Chipping Sparrows were most noticeably slow in this respect. Six nests were located: Pygmy Nuthatch, 2; Mountain Chickadee, 1; White-breasted Nuthatch, 1; House Wren, 1; robin, 1. Steller's Jays were unusually scarce. Thanks to Art Wainwright. — LOUISE HERING, 568 Marine Street, Boulder, Colo. 80302.

95. SCATTERED MIXED CONIFEROUS FOREST IN SUBALPINE MEADOWS AND SPRUCE BOGS. — **Location:** Oregon; Grant Co., Bates, ½ mile E of Indian Rock Lookout; 44°45'N, 118°45'W, Desolation Butte Quadrangle, USGS. **Continuity:** New. **Size:** 32.38 ha = 80 acres (rectangle, laid out in 2.5 acre squares with compass and measured rope). **Description of Plot:** The canopy trees are Subalpine Fir (*Abies lasiocarpa*), Lodgepole Pine (*Pinus contorta*), and Engelmann Spruce (*Picea engelmannii*). The understory consists of young trees of the above species. The ground cover is primarily W. Coneflower (*Rudbeckia*

occidentalis) and False Dandelion (*Agoseris aurantiaca*). A quantitative survey of the vegetation gave the following results: Trees 3-inches diameter and over, based on 10 circular samples (0.1-acre), 128/acre; total basal area 56.8 ft²/acre. Species comprising 90% of the total number of trees: Subalpine Fir, 71, 56, 34, 70; Lodgepole Pine, 25, 19, 50, 40; Engelmann Spruce, 15, 12, 8, 40; dead trees, 17, 13, 8, 40. Trees by diameter size class: A (3-6 in.) 62, 48, 6.2, 11; B (6-9 in.) 37, 29, 11.1, 20; C (9-15 in.) 12, 9, 9.6, 17; D (15-21 in.) 11, 8, 14.4, 25; E (21-27 in.) 6, 5, 15.5, 27. Shrub stems/acre 1,000; ground cover 62%; canopy cover 22%; average canopy height 32.7 ft (range 21-62). Plant names are from Warren R. Randall, *Manual of Oregon Trees and Shrubs*, 1963. A jeep road, formerly a trail, runs roughly NW-SE through the plot. (Located in the Vinegar Hill-Indian Rock Scenic Area on the boundary between the Malheur and Umatilla National Forests.) **Edge:** Bordered on the north and south by similar habitats. The west and east are bordered by a dense Lodgepole Pine and Subalpine Fir forest. The edge effect on the west is broken by open meadows; on the east by a steep hill and open ground. A sage brush rocky habitat on the NE corner is sufficiently close to possibly influence the habitat choice of some species, i.e. Brewer's Sparrow and Rock Wren. **Topography:** Terrain slopes from 7280 ft on the NE to approximately 7,000 ft on the SW corner. The soil type is montmorillonite formed from a basaltic base which overlays granite. The porosity of the basalt forms storage for melting snows and runoff rainfall which give rise to a number of springs when the water reaches the impervious granite. This results in numerous Spruce Bogs with dry rocky ground in between. The plot is on a southwest exposure of the Greenhorn Mountains, a part of the more extensive Blue Mountains of Northeastern Oregon and



Census 95. Scattered mixed conifer forest in subalpine meadows and spruce bogs. Photo/ Ken Jones.

Southeastern Washington Weather: Temperatures ranged from 22° to 58°. It was clear on 8 and overcast or foggy on the remaining 6 censuses. Rainfall amounted to 0.47 inches during the census period while the preceding fall, winter and spring precipitation amounts were well below normal. There was an average of one foot of snow remaining on May 26. **Coverage:** May 26-27; June 3, 8-9, 12, 16, 21, 24, 27; July 1, 3, 5, 8, 11, 15. Both May 26-27 and June 8-9 were split censuses, 40 acres being covered on each of the 2 days. June 15 showed positive tapering of territorial behavior. All trips were between 0420 and 0830 hours; PDST. Total man-hours: 100.5, with layout 56 hours; vegetative survey, 5 hours; and census 39.5 hours. **Census:** Chipping Sparrow, 31 (96, 39); White-crowned Sparrow, 18 (56, 23), Lincoln's Sparrow, 9 (28, 11); Yellow-rumped (Audubon's) Warbler, 8 (25, 10); Am. Robin, 7 (22, 9); Ruby-crowned Kinglet, 7 (22, 9); Cassin's Finch, 5 (15, 6), Mountain Chickadee, 4 (12, 5); Fox Sparrow, 4 (12, 5), Mountain Bluebird, 3.5 (11, 4); Lazuli Bunting, 3 (9, 4); Pine Siskin, 2; Spotted Sandpiper, 1; Steller's Jay, 1; Brewer's Sparrow, 1. **Total:** 15 species; 104.5 territorial males ($323/\text{km}^2$, 131 per 100 acres). **Visitors:** Great Horned Owl, Rufous Hummingbird, Com. (Red-shafted) Flicker, Hairy Woodpecker, Clark's Nutcracker, Red-breasted Nuthatch, Rock Wren, Varied Thrush, Golden-crowned Kinglet, Red Crossbill, Vesper Sparrow, Dark-eyed (Oregon) Junco. **Remarks:** Three nests were located: Mountain Chickadee, 1 contents not examined but adults carrying food on 3 separate occasions; Mountain Bluebird, 1 contents not examined but one empty egg found away from nest; White-crowned Sparrow, 1 with 4 eggs—4 young hatched and were fed over a period of ten days before the nest was found empty. The Lazuli Buntings, first heard singing on June 24, showed no territorial behavior until July 1. An Olive-sided Flycatcher's territory adjoined the south boundary but it was never recorded calling during the census. Owing to extreme drought the streams dried up early so the sandpipers left earlier than normal. They were never observed with chicks but egg shells were found near the NW corner. Vesper Sparrows were found a number of times; one pair observed in mating behavior and one male heard singing once. It was never confirmed whether they bred there or in the immediate area. Many Clark's Nutcrackers used the plot for feeding but no nest was found. After July 15 the numbers of nutcrackers declined drastically, indicating that they might breed very early on or near the plot. This was also noted in regards to the numbers of visiting Red Crossbills. Hairy Woodpeckers showed mating behavior and were recorded several times drumming and calling but no nest tree was found. The open meadowland provided feeding areas for a wide variety of sparrows while the scattered groves of trees provided cover as well as feeding and nesting areas. The White-crowned Sparrows, being primarily ground nesting species, were found to start their territorial behavior somewhat later than the other sparrows owing to the snow pack. Lincoln's Sparrows were located exclusively in the Spruce Bogs. The Lazuli Buntings sang from the highest of the spruce in the vicinity of the Spruce Bogs while the Yellow-rumped Warblers were found in either spruce habitat or

the drier Lodgepole Pine association. After the breeding census was completed a number of regular visitors appeared that probably bred in the surrounding area: Red-tailed Hawk, Golden Eagle, Am. Kestrel, Williamson's Sapsucker, Gray Jay, Com. Raven, House Wren, Townsend's Solitaire, Warbling Vireo, Townsend's Warbler, MacGillivray's Warbler and Evening Grosbeak. Other vertebrates seen: Western (Boreal) Toad, Pacific Tree Frog, Rocky Mountain Elk, Mule Deer, Long-tailed Weasel, N. Pocket Gopher, Red Squirrel, Columbian and Belding Ground Squirrels, Badger, Least Chipmunk, Coyote. The Elk are one of the prime grazers early in the season. Later on domestic cattle move in, but fortunately arrive after the ground nesters are about finished. In the late 1800s and early 1900s this area was heavily overgrazed by domestic sheep, leaving much of the area devoid of ground cover. With the sheep now banned, the area is slowly recovering. We are grateful to the staff of the Malheur National Forest for their cooperation and assistance. — MERLE A. ARCHIE and ROBERT A. HUDSON, P.O. Box 81, Bates, Ore. 97817.

96. CLEARCUT IN DOUGLAS-FIR FOREST.—

Location: Washington; King Co., 3.2 miles S of Hobart on the Issaquah-Hobart (or Ravensdale) Road, on the Landsburg clearcut in the Cedar River Watershed (Seattle City Water Department); SW quarter of Sect 20, T22N, R7E, Hobart, Washington Quadrangle, USGS. **Continuity:** New. **Size:** 6.78 ha = 16.75 acres (roughly triangular; 1000 ft in length, varying in width from 1000 to 200 ft; a grid composed of 100 ft squares was plotted with tape and compass). **Description of Plot:** Within a six year-old clearcut surrounded by a seral Douglas-fir (*Pseudotsuga menziesii*) forest. After logging, there were unsuccessful attempts to burn the remaining slash. Stumps, snags, and remnants of slash are thus prominent features. The relative composition of the prominent seedling and shrub cover is — Western Hemlock (*Tsuga heterophylla*) 72.2%, Douglas-fir 15%, Red Alder (*Alnus rubra*) 11.6%, Vine Maple (*Acer circinatum*) 0.6%, and Cascara (*Rhamnus purshiana*) 0.6%. A dirt road crosses a portion of the western edge. There are three small shallow temporary water-filled depressions. **Edge:** Surrounded by a small band of clear-cut beyond which is a 70-100 year-old Douglas-fir forest. **Topography:** The northern portion is generally flat while the southern part is gently sloping. **Elevation:** 600 ft. **Weather:** Partly cloudy to cloudy for ten census days, drizzle for two. **Coverage:** May 1, 4, 7, 10, 12, 15, 18, 20, 22, 25-26, 30. Trips made between 0700-1130 hours. Total man-hours: 28. **Census:** White-crowned Sparrow, 10 (148, 60); Dark-eyed (Oregon) Junco, 7 (103, 43); Song Sparrow, 6 (88, 36), Rufous-sided Towhee, 4 (59, 24); Bewick's Wren, 3 (44, 18); Am. Goldfinch, 3 (44, 18); Willow Flycatcher, 2; Olive-sided Flycatcher, 1; MacGillivray's Warbler, 1; Com. Yellow-throat, 1. **Total:** 10 species; 38 territorial males ($561/\text{km}^2$, 227 per 100 acres). **Visitors:** Cooper's Hawk, Rufous Hummingbird, Com. (Red-shafted) Flicker, Hammond's Flycatcher, W. Wood Pewee, Barn

Swallow, Com Crow, Townsend's Solitaire, Am Robin, Ruby-crowned Kinglet, Evening Grosbeak, Brewer's Blackbird, Pine Siskin, W. Tanager, Golden-crowned Sparrow. — NANCY FIELD and DAVID A. MANUVAL, College of Forest Resources, University of Washington, Seattle, Wash., 98105.

97. COASTAL SCRUB. — **Location:** California; Marin Co., 4 miles NW of Bolinas, 0.5 mile inside the southern boundary of Point Reyes National Seashore; 37°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 8.1 ha = 20 acres (approximately rectangular, 800 x 1100 ft, measured). **Description of Plot:** See AB 25 1003-1004, 1971. **Edge:** Bounded on two sides by similar habitat, and on the SW and NE edge by grassy fields with scattered Coyote Brush (*Baccharis pilularis*). **Weather:** Fog is common in the mornings with NW winds from 10-20 mph in the afternoons. Rainfall between July 1972 and July 1973 was 57.43 inches compared to 23.20 inches in 1971-1972 taken at PRBO headquarters 1/4 mile from the plot. On the other hand, spring rainfall (April-July) of 0.66 inches was the lowest in 7 years of recording. We experienced a very cold winter; the temperature went below freezing on 9 consecutive days between December 7-15, 1972. During this period the daily high-low temperature extremes varied between 42° and 18°F. **Coverage:** March 18; April 6, 10, 19, 23, 26; May 1, 10, 19; June 18. Trips were variable between 0700 and 1800 hours. Total man-hours: 25, plus undetermined number of hours watching individuals and looking for nests. **Census:** White-crowned (Nuttall's) Sparrow, 14 (173, 70); Wrentit, 11 (136, 55); Song Sparrow, 6 (74, 30); Rufous-sided Towhee, 4 (49, 20); House Finch, 3 (37, 15); Bewick's Wren, 2.5; Orange-crowned Warbler, 2; Scrub Jay, 0.5; Com. (Red-shafted) Flicker, +. **Total:** 9 species; 43 territorial males (531/km², 215 per 100 acres). **Visitors:** Sharp-shinned Hawk, Red-tailed Hawk, Am. Kestrel, California Quail, Mourning Dove, Allen's Hummingbird, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Com. Raven, Com. Bushtit, Brown-headed Cowbird, Pine Siskin, Am. Goldfinch. **Remarks:** The very wet, cold winter may have been a factor in the decline in numbers of White-crowned Sparrows and Rufous-sided Towhees from last year. In 1972 there were 17 pairs of White-crowns and three unmated males, while this year there were 14 pairs and 1 unmated male. There were fewer one-year-old White-crowns this year (19%) than last (41%), but the minimum average age was virtually the same (2.29 in 1972 and 2.34 in 1973). Orange-crowned Warblers occurred for the first time in the three years of the census. There was no return of Black-chinned Sparrows after a first breeding record for Marin County in 1972 (but see census 98). Nests found (17): — Wrentit (4), first-nest lining not complete April 6; complete April 10; 4 eggs April 19; nest found disturbed with only egg shell and embryonic young in nest April 26; second-lining complete April 19; found destroyed April 26; third-4 eggs April 10, 19; 4 young (1-day old) April 26; young had left nest by May 10, fourth-two well-developed nestlings and one egg June 18; House

Finch (4), first-3 eggs May 1, 5 eggs May 15, eggs not hatched and apparently abandoned May 25, second-4 nestlings (about one-day old) May 12; nest intact but no young May 17; third-5 eggs May 15; found nest destroyed May 23; fourth-nest complete but no eggs on June 3; White-crowned Sparrow (9). Contribution No 72, PRBO. — ROBERT M. STEWART, Point Reyes Bird Observatory, Bolinas, Calif. 94924.

98. DISTURBED COASTAL SCRUB (A). — **Location:** California; Marin Co., 3.5 miles NW of Bolinas, just inside the southern boundary of Point Reyes National Seashore; 37°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1972 **Size:** 4.7 ha = 11.6 acres (irregular, approximately 600 x 600 ft, measured). **Description of Plot:** See AB 26:987-988, 1972. **Weather:** (See census 97). **Coverage:** March 11-12, 25, 31; April 8, 14, 28; May 6, 19; June 1. Visits varied between 0800 and 1600 hours. Total man-hours: 26. **Census:** Song Sparrow, 6 (128, 52), White-crowned Sparrow, 5 (107, 43); Wrentit, 2; Bush-tit, 1; Rufous-sided Towhee, 1; Scrub Jay, +. **Total:** 6 species; 15 territorial males (320/km², 129 per 100 acres). **Visitors:** Red-tailed Hawk, Allen's Hummingbird, Com. (Red-shafted) Flicker, Tree Swallow, Barn Swallow, Cliff Swallow, Am. Robin, Brown-headed Cowbird, Black-headed Grosbeak, House Finch, Pine Siskin, Am. Goldfinch. **Remarks:** The Black-chinned Sparrow bred for the first time in Marin County in 1972. This year a male was heard singing just off the plot May 18 (last year the first singing was May 17). A male was observed singing in the plot May 24, but no further sightings were made despite subsequent searches. The average age of 7 color-banded White-crowned Sparrows was 2.29 years compared to 20 individuals averaging 1.75 years in 1972. Only 2 of 7 (29%) known-aged White-crowns were one year old this year compared to 12 of 20 (60%) last year. We suggest that at least one factor in the decline of White-crowns this year was the cold, wet winter of 1972-73. Nests found (3): Com Bushtit (1), building April 6, nestlings May 18; White-crowned Sparrow (2). Contribution No. 73, PRBO — BARBARA CHAMBERLAIN and ROBERT M STEWART, Point Reyes Bird Observatory, Bolinas, Calif. 94924.

99. DISTURBED COASTAL SCRUB (B). — **Location:** California; Marin Co., 3.5 miles NW of Bolinas, and 0.16 mile inside the southern boundary of Point Reyes National Seashore; 37°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 5.6 ha = 14 acres (approximately rectangular, 600 x 1000 ft, measured). **Description of Plot:** See AB 25:1002-1003, 1971. **Weather:** (See census 97). **Coverage:** March 15; April 6, 19, 26; May 1, 10; June 1, 8, 18. Trips were variable between 0730 and 1800 hours. Total man-hours: 20, plus undetermined number of hours watching individuals and looking for nests. **Census:** White-crowned (Nuttall's) Sparrow, 6.5 (115, 46); Rufous-sided Towhee, 2; Am. Goldfinch, 2; Song Sparrow, 1.5; Com (Red-shafted) Flicker, +; Rough-winged Swallow, +, Cliff Swallow, +; Scrub Jay, +; W. Bluebird, +; Am Robin, +. **Total:** 10 species; 12 territorial males

(212/km², 85 per 100 acres) **Visitors:** Red-tailed Hawk, California Quail, Mourning Dove, Violet-green Swallow, Tree Swallow, Barn Swallow, Wrentit, Orange-crowned Warbler, Black-headed Grosbeak, House Finch, Pine Siskin. **Remarks:** Nests found (5): Am. Goldfinch (1), 4 eggs June 2, 2 eggs and 2 young (one day old) June 9, 3 young June 17; White-crowned Sparrow (3); Song Sparrow (1), an undetermined number of young left the nest April 23. The White-crowned Sparrows were previously color-banded and their ages known. The average age was 1.67 (N=13) years compared to 1.53 (N = 20) in 1972. There were only 5 White-crowned Sparrow pairs and 3 unmated males figuring in the census this year compared to 7 pairs and 6 unmated males in 1972. In the 6 acres bordering the northwest edge there were 1.5 territorial male Song Sparrows. Contribution No. 74, PRBO. — ROBERT M STEWART, *Point Reyes Bird Observatory, Bolinas, Calif. 94924.*

100. DISTURBED RIPARIAN STREAM BORDER.

— **Location:** California; Solano Co., Lake Solano County Park (campground), along the south bank of Putah Creek 4 miles SW of Winters; 38°36'N, 122°2'W, Mt. Vaca Quadrangle, USGS. **Continuity:** New. **Size:** 6.35 ha = 15.7 acres (approximately rectangular 240 x 2850 ft, paced). **Description of Plot:** A newly established overnight campground consisting of 55 campsites (with grills and picnic tables), restrooms, and a paved roadway system. The eastern fourth of the plot lacks camping facilities and roads. The dominant tree is Fremont Cottonwood (*Populus fremontii*), intermixed with large numbers of Black Walnut (*Juglans nigra*), and willows (*Salix spp.*) and lesser numbers of Elderberry (*Sambucus mexicana*) and Box-elder (*Acer negundo*). The understory consists largely of young individuals of the preceding species with some blackberry (*Rubus sp.*) and Poison Oak (*Rhus diversiloba*). Ground cover is predominantly Wild Oats (*Avena barbata*), *Elymus triticoides*, and W. Ragweed (*Ambrosia psilostachya*). The vegetation is discontinuous because of the roads and campsites. A quantitative analysis of the vegetation gives the following results: Trees, 3-inches diameter and over, based on five 0.1 acre circular samples, 182/acre; total basal area 89.2 ft²/acre. Species comprising 97% of the total number of trees [figures after each give number of trees/acre, relative density (%), relative dominance (%), frequency (%), in that sequence]: Willow spp., 62, 34, 10, 80; Black Walnut, 50, 27, 36, 80; Fremont Cottonwood, 46, 25, 46, 60; Elderberry, 14, 8, 3, 80; Box-elder, 8, 4, 2, 40. Trees by diameter size class [figures after each class give number of trees/acre, relative density (%), basal area (ft²/acre), rel. dominance (%)]: A (3-6 in) 100, 55, 5.0, 10.0; B (6-9 in) 46, 25, 13.8, 15, C (9-15 in) 26, 14, 20.8, 23; D (15-21 in) 4, 2, 7.2, 8; E (21-27 in) 4, 2, 12.4, 14; H (>40 in) 2, 1, 25.0, 28. Shrub stems/acre 11,200; ground cover 69%; canopy cover 56%; average canopy height 50 (range 35-65). The ground cover figure is strongly affected by the lack of any vegetation on the paved roads but it is otherwise almost continuous. Botanical reference was P. A. Munz, *A California Flora*, 1970. **Edge:** The eastern boundary is a paved road; the northern boundary fol-

lows the course of Putah Creek and is paralleled by a 6 ft wide path approximately 15 ft in from the stream. The eastern half of the bordering vegetation is a pure stand of willow (*Salix spp.*). The western boundary is a walnut orchard and a narrow strip of dense vegetation whose composition is similar to that of the plot itself. The southern edge is bounded by a narrow strip of disturbed grassland which grades into an oak woodland. **Topography:** Essentially flat with a very gradual incline from the stream to a 6-8 ft embankment on the southern boundary. **Elevation:** 120 ft. **Weather:** Hot and dry. Temperatures averaged 2.4° F above normal. Only 0.45 inches of rain fell during the study period. However, the preceding winter was very cool (1.8°F below normal for the rainy season from Oct.-March) **Coverage:** April 27-29; May 4-6, 11, 14, 18, 21, 25, 27, June 7; 13 trips, all between 0610 and 0930 PDT. Total man-hours: 33. **Census:** Starling, 8 (126, 51); Ash-throated Flycatcher, 5 (79, 32); Scrub Jay, 5 (79, 32), Bewick's Wren, 5 (79, 32); Plain Titmouse, 4 (63, 25), Black-headed Grosbeak, 4 (63, 25); Rufous-sided Towhee, 4 (63, 25); California Quail, 3 (47, 19); Acorn Woodpecker, 3 (47, 19); Nuttall's Woodpecker, 3 (47, 19); Brown Towhee, 3 (47, 19); Song Sparrow, 3 (47, 19); Downy Woodpecker, 2; House Sparrow, 2, N (Bullock's) Oriole, 2; Brown-headed Cowbird, 2, Wood Duck, 1; Screech Owl, 1; Com. (Red-shafted) Flicker, 1; Com. Bushtit, 1; Black Phoebe, 0.5. **Total:** 21 species; 62.5 territorial males (984/km²; 398 per 100 acres). **Visitors:** Band-tailed Pigeon, Tree Swallow, Cliff Swallow, Mockingbird, Phainopepla, Red-winged Blackbird, House Finch. **Remarks:** The bridge at the northeast corner provided nesting sites for a large colony of Cliff Swallows, four pairs of House Sparrows, and a pair of Black Phoebes. An additional Black Phoebe nest was attempted on a ledge of a restroom but was abandoned before completion. A pair of Wood Ducks selected a nest cavity approximately 80 ft up in a large cottonwood but nesting success may have been hampered by predation since a W. Gray Squirrel was seen at the mouth of the nest hole on a subsequent visit. Another female, however, was seen on Putah Creek followed by 15 young. The Band-tailed Pigeon was seen a few times near the end of the study period but its status is uncertain because this species has an extended breeding season and may have bred later in the summer. The presence of a large number of Starlings deserves comment. Their success was apparently aided by the availability of much pasture land nearby suitable for foraging and the abundance of possible nesting holes especially in cottonwoods. Their nest holes averaged about 40 ft from the ground. The species in this habitat most likely to be affected by competition for nesting sites are the Com. Flicker, Acorn Woodpecker, and Ash-throated Flycatcher. Nest cavities noted are as follows: Com. Flicker 1, Acorn Woodpecker 2, Ash-throated Flycatcher 1. Other vertebrates noted during survey: Bullfrog, W. Fence Lizard, S. Alligator Lizard, W. Garter Snake, Gopher Snake, California Ground Squirrel, W. Gray Squirrel, and Beaver — W. DAVID SHUFORD, 1525 H Street #4, Davis, Calif. 95616.

101. NORTHERN DESERT SHRUB. — **Location:** Utah, Uintah Co., 4 miles SE of Utah Highway 45 bridge over White River; 39°50'N, 109°10'W; T10S, R25E, Salt Lake Base Meridian; Southam Canyon, Utah Quadrangle, USGS. **Continuity:** New. **Size:** 36 ha = 88.9 acres (square, rough survey with chain and hand level). **Description of Plot:** Dominant shrubs are Big Sage (*Artemisia tridentata*) 28% composition, Shadscale (*Atriplex confertifolia*) 24%, Greasewood (*Sarcobatus vermiculatus*) 8%, and rabbit brush (*Chrysothamnus* spp.) 6%. Ground cover is composed primarily of Cheat Grass (*Bromus tectorum*) 24% composition, Indian Rice Grass (*Oryzopsis hymenoides*) 3%, and Bottlebrush Squirreltail (*Sitanion hystrix*) 2%. Plant names are from Harrington, H. D., *Manual of the Plants of Colorado*, 1954. **Edge:** Bordered on all sides by similar habitat. **Topography:** Broken hills cut by numerous dry washes and canyons. **Elevation:** Sloping from 5800 to 5600 ft. **Weather:** Mostly hot, dry and clear, but cool and rainy on May 24 and 30. **Coverage:** May 24, 30; June 4, 6, 13, 18, 22, 26. All counts between 0900 and 1400 hours. Total man-hours: 40. **Census:** Brewer's Sparrow, 28 (78, 31); Sage Sparrow, 16 (44, 18); Lark Sparrow, 3 (8, 3); Sage Thrasher, 3 (8, 3); Black-throated Sparrow, 2. **Total:** 5 species; 52 territorial males or females (145/km², 58 per 100 acres). **Visitors:** Am. Kestrel, Mourning Dove, Com. Night-hawk, Loggerhead Shrike, Horned Lark, Barn Swallow, Violet-green Swallow, W. Meadowlark, Green-tailed Towhee, Vesper Sparrow. **Remarks:** Nests located (9): 7 Brewer's Sparrow, mean clutch = 3.4, mean hatched/nest = 1.8, mean fledged/nest = 1.3; 1 Lark Sparrow with 4 eggs, 1 hatched and fledged; 1 Sage Thrasher with 5 eggs, 4 hatched and fledged. Desert Cottontails and signs of Mule Deer were occasionally seen and Blue-bellied Lizards were abundant. The area is a heavily grazed winter sheep range within one of the Bureau of Land Management's Utah oil shale prototype lease tracts. This census was taken as part of a baseline wildlife inventory prior to prototype development of oil shale processing. — MARK A STRONG, P. O. Box 944, Vernal, Utah. 84078.

102. CONIFER-BRUSH-GRASS PLAINS-FOOT-HILLS ECOTONE. — **Location:** Colorado; SW of Colorado Springs, above Cheyenne Mountain High School. **Continuity:** Established 1964; 2 intermittent years. **Size:** 28.33 ha = 70 acres (roughly square; mapped from aerial photograph). **Description of Plot:** See AFN 18:401-402, 1964. **Weather:** There was a late spring, with wet and cool weather until early June, followed by a hot, dry early summer and a wetter, milder mid-summer. The late spring delayed some breeding activity and migratory movement. **Coverage:** May 9, 11, 17; June 9, 13, 24, 30; July 7, 22, 24. Hours varied from 0645 to 1845, MDT. Total man-hours: 22. **Census:** Virginia's Warbler, 21 (74, 30); Rufous-sided Towhee, 19 (67, 27); Am. Robin, 8 (28, 11); Mourning Dove, 6 (21, 9); Scrub Jay, 4 (14, 6); Chipping Sparrow, 4 (14, 6); Broad-tailed Hummingbird, 3 (11, 4); W. Wood Pewee, 3 (11, 4); Solitary Vireo, 3 (11, 4); Black-headed Grosbeak, 2; Black-billed Magpie, 1; Black-capped Chickadee, 1; Mountain Chickadee, 1; White-breasted Nuthatch, 1; Pygmy Nuthatch, 1; W.

Tanager, 1; Gray-headed Junco, 1. **Total:** 17 species, 80 territorial males or females (282/km², 114 per 100 acres). **Visitors:** Com. (Red-shafted) Flicker, Brown-headed Cowbird, House Finch, Pine Siskin, Lesser Goldfinch, Vesper Sparrow. **Remarks:** Four nests were located: Mourning Dove, 1 with 1 egg; Broad-tailed Hummingbird, 1 contents not examined; W. Wood Pewee, 1 with 3 young, later abandoned; Black-billed Magpie, 1 contents not examined. The plot has not changed greatly since 1964, although there has been an increase in human population and houses in the surrounding area. Also, there has not been much change in the bird population, with 17 species and a density of 80 territorial males for 1973 compared with 15 species and a density of 82 in 1964. The brushland-inhabiting Virginia's Warbler and Rufous-sided Towhee continue to be the most abundant breeding species. The Black-headed Grosbeak, however, which ranked 3rd in 1964 (8 males), was down to only 2 in 1973, with the decrease coming after 1971. The most conspicuous absentee was the Com. Flicker, which was still nesting in 1971 but was only an occasional visitor in 1973, despite the fact that previous nesting sites were still available. The bird population in this ecotonal area seems to be at about carrying capacity, with most habitat niches filled. The enclosed grasslands appear too small and too disturbed ecologically (more weeds than grass) to support grassland species, although meadowlarks and Vesper Sparrows do nest in larger adjacent grassland sites. The little cattail marsh would also seem too small to support a distinctive bird population, true this year although in 1971 the marsh was inhabited by a pair of Song Sparrows — RICHARD G. BEIDLEMAN, Dept. of Biology, Colorado College, Colorado Springs, Colo. 80903

103. COTTONWOOD RIVERBOTTOM-PASTURE. — **Location:** Colorado; Weld Co., about 6 miles S and 1 mile W of Johnstown on the east bank of the St. Vrain Creek and about one mile upstream from its confluence with the South Platte River. The area is bordered on the east by Weld Co. road #38. Sect. 3, T3N, R67W; 104°52'N, 40°14'W, Johnstown Quadrangle, USGS. **Continuity:** New. **Size:** 71.6 ha = 176.9 acres (measured from an aerial photo with a planimeter). **Description of Plot:** Approximately 50% grazed pasture with corridors of deciduous trees interspersed. The dominant trees are Plains Cottonwood (*Populus sargentii*) and willows (*Salix* spp.) with an understory of Snowberry (*Symphoricarpos occidentalis*). Pastures are mainly Cheat Grass (*Bromus tectorum*) and W. Wheat Grass (*Agropyron smutii*) with some Blue Grama (*Bouteloua gracilis*) and Prickly Pear (*Opuntia polyacantha*). There are also two small (<0.5 ha) wetlands, mainly Com. Cattail (*Typha latifolia*) and Alkali Bulrush (*Scirpus paludosus*). Plant names are from H. D. Harrington, *Manual of the Plants of Colorado*, 1954. **Edge:** Bordered on the west and north by St. Vrain Creek, on the east by Weld County Road #38, and on the south by pasture land. **Topography:** Flat except for a shallow stream traversing the area and emptying into St. Vrain Creek. **Elevation:** 4790 ft. **Weather:** Clear to overcast; dry, warm to hot throughout census period. **Coverage:** May 21,

June 4, 14, 19, 21, 26, 28, July 4, 6, 9, 12 All trips between dawn and 0930 hours. Total man-hours. 33. **Census:** House Wren, 14 (20, 8); W. Meadowlark, 9 (13, 5); Red-winged Blackbird, 9 (13, 5); Com. Yellow-throat, 5 (7, 3); Yellow-headed Blackbird, 5 (7, 3); Starling, 4 (6, 2); Mourning Dove, 3 (4, 2); Virginia Rail, 2; Am. Kestrel, 2; E. Kingbird, 2; Com. Snipe, 1; Com. Flicker, 1; Yellow Warbler, 1; N. Oriole, 1; Song Sparrow, 1. **Total:** 15 species; 60 territorial males ($84/\text{km}^2$, 34 per 100 acres). **Visitors:** Great Blue Heron, Mallard, Killdeer, Downy Woodpecker, Barn Swallow, Brewer's Blackbird, Com. Grackle. **Remarks:** No major fluctuations occurred from 1972 to 1973. Minor population increases were noted in three species, minor decreases in six species, and no change in one species. Four new species were present and four former breeders were absent. Largest increases occurred in the House Wren and Yellow-headed Blackbird and the largest declines occurred in the Com. Flicker and Red-headed Woodpecker. An abnormally cold spring may have been partially responsible for the decline in the number of territories of certain species. The study area was established in 1972 as a portion of an environmental monitoring program in conjunction with the completion of the Fort St. Vrain Nuclear Power Site. The power site is scheduled to become operational early in 1974 and data gathered thus far will serve as baseline measurements for comparison after the operation begins. Special thanks to Del Benson for providing the 1972 data. — BRUCE R. JOHNSON, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colo 80521.

104. MATURE BIRCH AND POPLAR FOREST. — **Location:** Saskatchewan, by Michel Pt. road about 3 miles from its end, and 0.25 mile NE of Dore Lake fire tower; $54^\circ 41' \text{N}$, $107^\circ 15' \text{W}$; map 73J, Green Lake, NTS. **Continuity:** New. **Size:** 17.5 ha = 43.24 acres (rectangle 500 by 350 m; 50 m grid set up with compass and measured rope). **Description of Plot:** A mature stand of Paper Birch (*Betula papyrifera*), Quaking Aspen (*Populus tremuloides*), Balsam Poplar (*P. balsamifera*), and White Spruce (*Picea glauca*), with very little understorey except near the north end, where speckled Alders (*Alnus rugosa*) and willows (*Salix bebbiana* and *S. scouleriana*) occur. The ground is largely covered with dead leaves, with Twinflower (*Linnaea borealis*), Woodland Strawberry (*Fragaria vesca*), Dewberry (*Rubus pubescens*), Bunchberry (*Cornus canadensis*), and Tall Lungwort (*Mertensia paniculata*) prominent among the low plants. A knee-high layer of Wild Sarsaparilla (*Aralia nudicaulis*) completely covers the lower vegetation in much of the plot. There is very little dead wood, and almost no bare ground. A quantitative survey of the vegetation gave the following: Trees 3-inches diameter and over, based on 20 circular 1/10 acre samples, 479/acre; total basal area $147.9 \text{ ft}^2/\text{acre}$. Species comprising 90% of the total number of trees: Paper Birch, 222, 46, 46, 95; White Spruce, 114, 24, 22, 90; Quaking Aspen, 73, 15, 22, 75; Balsam Poplar, 62, 13, 10, 70. Trees by diameter size class: A (3-6 in) 196, 41, 21.7, 15; B (6-9 in) 180,

38, 55, 6, 38, C (9-12 in) 80, 17, 48, 2, 33, D (12-15 in) 22, 5, 22.4, 15. Shrub stems per acre. 700, ground cover 82%; canopy cover 80%; average canopy height 63 ft (range 50-72). Plant names from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Bordered by similar forest on all sides, but mostly with somewhat larger proportions of spruce. The road clearance, about 15 m in width, breaks the canopy 50 m away parallel to the east edge. **Topography:** A steep side-hill, rising from E to W. **Elevation:** About 1750-1950 ft. **Weather:** Generally cool, with frequent rains. Two counts had temperatures of 70°F or more, two had some drizzle; winds were force 4 or more for part of one count. **Coverage:** May 27, 31; June 2, 7, 10, 13, 22, 26; July 8. All trips between 0405 and 1237 hours. Total man-hours: 26.5, plus 9.5 hours on plant survey July 5 (only less common birds noted), and 8.5 hours while measuring and marking the grid May 21-22. **Census:** Red-eyed Vireo, 22 (126, 51); Ovenbird, 20.5 (117, 47); Least Flycatcher, 6.5 (37, 15); Black-throated Green Warbler, 6.5 (37, 15); Tennessee Warbler, 4.5 (26, 10); Chipping Sparrow, 3 (17, 7); Bay-breasted Warbler, 2; Yellow-rumped (Myrtle) Warbler, 1; Rose-breasted Grosbeak, 1; Black-capped Chickadee, 0.5, Boreal Chickadee, 0.5; Ruffed Grouse, +. **Total:** 12 species; 68 territorial males ($389/\text{km}^2$, 157 per 100 acres). **Visitors:** Broad-winged Hawk, Blackburnian Warbler, Mourning Warbler, Pine Siskin, White-winged Crossbill, White-throated Sparrow. **Remarks:** The Least Flycatchers were restricted to an area 350 by 150 m near the NE corner, and the Red-eyed Vireos were also concentrated in the northeastern half of the plot, where spruces were less numerous. The Black-throated Green, Yellow-rumped, and Bay-breasted Warblers were in the areas with many spruces. Territories of Tennessee Warblers, Chipping Sparrows, and Rose-breasted Grosbeaks were poorly defined, since these species seldom sang after mid-June. The Ruffed Grouse was twice heard drumming off to the west (on the ridge-top), and a brood was flushed on July 5. The Broad-winged Hawk was detected only once, but was noted one-half mile to the south or east on 4 other occasions; it might be counted as a breeding bird, with a "+" status. Many of the aspen trees were defoliated in mid-June during the outbreak of forest tent caterpillars; they were growing new leaves again in early July. The decline in song of some species after mid-June cannot be correlated with the defoliation, since it also occurred in areas with few or no caterpillars. — ANTHONY J. ERSKINE, *Migratory Bird Populations, Canadian Wildlife Service, Ottawa, Canada K1A OH3*.

105. YOUNG ASPEN FOREST. — **Location:** Saskatchewan, by Dore Lake road near mile 24, about $\frac{3}{4}$ mile N of jct. with Smoothstone Lake road; $54^\circ 28' \text{N}$, $107^\circ 14' \text{W}$; map 73J, Green Lake, NTS. **Continuity:** New. **Size:** 17.6 ha = 43.5 acres (rectangle 550 by 350 m, with SE corner omitted; 50 m grid set up with compass and measured rope). **Description of Plot:** An even-aged stand, following fire about 30 years ago, of Quaking Aspen (*Populus tremuloides*), with small amounts of Paper Birch (*Betula papyrifera*) and Balsam

Poplar (*P. balsamifera*) White Spruce (*Picea glauca*), Balsam Fir (*Abies balsamea*), and Beaked Willow (*Salix bebbiana*), with saplings of the tree species, make up the understorey. The ground cover is varied, with dead leaves and fallen logs important, and Wild Rose (*Rosa acicularis*), Woodland Strawberry (*Fragaria vesca*), Dewberry (*Rubus pubescens*), Bunchberry (*Cornus canadensis*), Twinflower (*Linnaea borealis*), and Sweet Coltsfoot (*Petasites palmatus*) the major plants. A quantitative survey of the vegetation gave the following: Trees 1½-inches diameter and over (3-inches & over in parentheses) based on 21 circular 1/10 acre samples, 1290/acre (230/acre); total basal area 56.2 ft²/acre (26.7 ft²/acre). Species comprising 90% of the total number of trees: Quaking Aspen, 889, 69, 76, 100 (202, 88, 88, 100); Paper Birch, 140, 11, 8, 95 (7, 3, 3, 29); Balsam Poplar, 87, 7, 7, 95 (19, 8, 8, 48); White Spruce, 89, 7, 5, 100 (3, 1, 1, 33). Trees by diameter size class: A (1½-3 in) 1060, 82, 29.5, 53; B (3-6 in) 219, 17, 24.3, 43 (219, 95, 24.3, 91); C (6-7 in) 11, 1, 2.4, 4 (11, 5, 2.4, 9). Shrub stems/acre 1150 (2210); ground cover 63%; canopy cover 71%; average canopy height 34 ft (range 20-40). Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950.

Edge: Bordered by similar forest on all sides except to the southeast, where a more open area of small Balsam Poplars and White Spruces borders a boggy swale.

Topography: Essentially flat.

Elevation: About 1580 ft.

Weather: Generally cool, with frequent rains. Two counts had temperatures of 70°F or more; one had drizzle throughout; winds were light on all count days.

Coverage: May 28, 30; June 3, 6, 12, 21, 23-27; July 4, (6). All trips between 0430 and 1244 hours, except July 6 until 1845 hours. Total man-hours: 24½, plus 10¼ hr on combined plant and bird survey on July 6, and about 14 hr while measuring and marking the grid May 14-15.

Census: Ovenbird, 14 (80, 32); Tennessee Warbler, 12.5 (71, 29); Red-eyed Vireo, 5.5 (31, 13); Swainson's Thrush, 2; Black-and-white Warbler, 2; Black-capped Chickadee, 1; Hermit Thrush, 1; Philadelphia Vireo, 1; Magnolia Warbler, 0.5; Yellow-bellied Flycatcher, +.

Total: 10 species; 39.5 territorial males (224/km², 91 per 100 acres).

Visitors: Gray Jay, Canada Warbler, Am. Redstart, Chipping Sparrow.

Remarks: The Magnolia Warbler and Yellow-bellied Flycatcher were associated with an area having a denser spruce understorey, along the east edge. The Black-and-white Warbler territories were unusually large, one measuring about 250 m each way, but the birds were detected in these areas on almost every survey so are counted as territorial. The Chipping Sparrow records, however, were in one area June 3-12 and about 350 m to the south on later surveys, so no territory was claimed. This study area was not affected by the infestation of forest tent caterpillars prevalent only a few miles to the north. —ANTHONY J. ERSKINE, *Migratory Bird Populations, Canadian Wildlife Service, Ottawa, Canada K1A OH3.*

106. WHITE CEDAR-BALSAM FIR SWAMP FOREST. — **Location:** New Brunswick; Kent Co.; Kouchibouguac National Park, ¼ mile S of Calendar Beach; 46°48'N, 64°55'W, Point Sapin, 21 I/15 W.

Continuity: New. **Size:** 9.3 ha = 23.0 acres (rectangular

2000 ft NS x 500 ft EW, with grid lines at intervals of 250 ft. Half the grid lines had already been surveyed and cut, the other half were laid out with compass and measured rope).

Description of Plot: A relatively uniform swamp forest. The soil is mostly poorly drained, with moist hummocks and wet hollows. Standing water occurs in many hollows at the northern end. At the extreme southern edge, moderately well-drained hummocks tend to support ground flora typical of mesic coniferous forests in the district. The tree canopy is composed of White Cedar (*Thuja occidentalis*), 51%; Balsam Fir (*Abies balsamea*), 33%; Red Maple (*Acer rubrum*), 6%; Black Spruce (*Picea mariana*), 5%, White Birch (*Betula papyrifera*), 2%; Black Ash (*Fraxinus nigra*), 2%; other species, 1%. The species distribution is fairly uniform throughout with the exception of Red Maple, which accounts for almost 25% of the trees in the wet, northeastern corner, and Black Spruce which comprises 22% of the trees at the southern boundary. Canopy trees are about 30-35 ft in height and 4 to 8 inches dbh. Some, especially the spruce, reach 50 ft high and 12 inches dbh. Densities are mostly in the range from 15-25 trees per 100 metre². A moderate understory (3 to 20 ft high) of shrubs and saplings is dominated by Balsam Fir, Mountain Holly (*Nemopanthus mucronata*), White Cedar, and Speckled Alder (*Alnus rugosa*), which are found virtually throughout the plot. Canada Holly (*Ilex verticillata*), Wild-Raisin (*Viburnum cassinoides*), and Black Ash are important in restricted areas. The ground vegetation (up to 3 ft in height) is dominated by ferns, especially Cinnamon Fern (*Osmunda cinnamomea*) which is very common throughout. Also common in large portions of the plot are Canada Yew (*Taxus canadensis*), Bracken (*Pteridium aquilinum*), Sensitive Fern (*Onoclea sensibilis*), Wild Sarsaparilla (*Aralia nudicaulis*), Blue-bead Lily (*Clintonia borealis*), Bunchberry (*Cornus canadensis*), and peat mosses (*Sphagnum* spp.). Important in a few areas are Sheep Laurel (*Kalmia angustifolia*), Interrupted Fern (*Osmunda claytonia*), a white violet (*Viola* sp.), Wood Aster (*Aster acuminatus*), Painted Trillium (*Trillium undulatum*), and Twinflower (*Linnaea borealis*). Many other species of herbaceous vegetation occur but are of little importance individually. Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950.

Edge: Essentially the same except that bordering the northwestern portion is a 3-5 ft rise in elevation, giving a dryer soil with more Balsam Fir, Black Spruce, and Quaking Aspen (*Populus tremuloides*); 400 ft to the east is the Kouchibouguac Lagoon, a saltwater estuary. The cedar-fir forest continues to the lagoon.

Topography: Practically flat, the differences between high and low areas being not more than 3 ft. This however, makes the difference between very wet patches and the drier areas.

Elevation: 5 ft.

Weather: Conditions in June were very close to average in temperature and rainfall. Rainfall in July was heavier than average. Starting temperatures on coverages averaged 57°F (range 42°-68°) and finishing temperatures averaged 65°F (range 57°-70°). Wind force was never more than 3 (Beaufort). Two coverages were rained out part way through and several others witnessed moderate rainfalls.

Coverage: May 31; June 4, 7, 12, 24, 26,

July 4 (part), 5 (part), 11 (part), 13 (part), plus a few observations during the plant survey July 9. All trips between 0605 and 1005, ADT. Total man-hours: 26.5. **Census:** Canada Warbler, 11.5 (124, 50); White-throated Sparrow, 9.5 (102, 41); Tennessee Warbler, 8.5 (91, 37); N. Parula, 8.5 (91, 37); Bay-breasted Warbler, 8.5 (91, 37); Black-throated Green Warbler, 8 (86, 35), Swainson's Thrush, 7.5 (81, 33); Ovenbird, 7 (75, 30), Yellow-bellied Flycatcher, 5.5 (59, 24); Nashville Warbler, 4.5 (48, 20); Brown Creeper, 4 (43, 17); Winter Wren, 3 (32, 13); Ruby-crowned Kinglet, 3 (32, 13), Black-and-white Warbler, 3 (32, 13); Ruffed Grouse, 1; E. Wood Pewee, 1; Golden-crowned Kinglet, 1; Red-eyed Vireo, 1; Yellow-rumped (Myrtle) Warbler, 1; Blackburnian Warbler, 1; Am. Redstart, 1; Hermit Thrush, 0.5; N. Waterthrush, 0.5; Com. Yellowthroat, +. **Total:** 24 species; 100 territorial males ($1074/\text{km}^2$, 435 per 100 acres). **Visitors:** Com. (Yellow-shafted) Flicker, Yellow-bellied Sapsucker*, Hairy Woodpecker, Gray Jay, Blue Jay, Com. Crow, Black-capped Chickadee, Boreal Chickadee*, Am. Robin*, Veery, Solitary Vireo*, Cape May Warbler, Red-winged Blackbird, Com. Grackle, Brown-headed Cowbird, Rose-breasted Grosbeak*, Evening Grosbeak, Purple Finch*, Pine Siskin, Dark-eyed (Slate-colored) Junco (species marked * were observed frequently and may have bred, but the evidence for the presence of territorial males was inconclusive). **Remarks:** A very rich area for birds. The ten commonest species were found virtually throughout the plot. The Ruffed Grouse, Red-eyed Vireo, and Am. Redstart were confined to the northern end where Red Maple was common, the only area where deciduous trees were important. One nest of White-throated Sparrow (3 eggs) was discovered July 13, and one nest of Hermit Thrush (4 eggs) just outside the plot May 31. A recently flying Am. Robin and a family group of Gray Jays with fairly mature young were noted. This plot was studied as part of an avifaunal survey of Kouchibouguac National Park under contract to Parks Canada. Detailed maps of the plot have been deposited with the Applied Research Division, Parks Canada, Department of Indian and Northern Affairs, Ottawa. David S. Christie assisted with the vegetative analysis. M. Beaulieu, G. Burns, R. Lafarge, C. Rooney, and S. Tingley assisted in setting up the plot. — C. ERIC TULL, *Département de Biologie, Université de Moncton, Moncton, Nouveau-Brunswick, Canada.*

107. BALSAM FIR FOREST. — **Location:** Saskatchewan, by Dore Lake road $\frac{1}{4}$ -mile N of mile 25, near track to Shirley Lake; $54^\circ 29' \text{N}$, $107^\circ 16' \text{W}$; map 73J, Green Lake, NTS. **Continuity:** New. **Size:** 17.5 ha = 43.24 acres (rectangle 500 by 350 m; 50 m grid set up with compass and measured rope). **Description of Plot:** A mixed-age stand containing small numbers of mature Balsam Firs (*Abies balsamea*), White and Black Spruces (*Picea glauca* and *P. mariana*), Quaking Aspens (*Populus tremuloides*), Balsam Poplars (*P. balsamifera*), and Paper Birches (*Betula papyrifera*), with dense younger growth of Balsam Fir. Fallen trees, snags, and stubs are frequent. The understorey is made up of young Balsam Firs with some alders (*Alnus*

sp.). The ground cover is dominated by fir needles, dead leaves, and mosses, especially *Pleurozium schreberi*. Frequent herbs include Wild Sarsaparilla (*Aralia nudicaulis*), False Mitrewort (*Mitella nuda*), Bunchberry (*Cornus canadensis*), and Tall Lungwort (*Mertensia paniculata*). A quantitative survey of the vegetation gave the following: Trees 1½-inches diameter and over (3-in. and over in parentheses) based on 20 circular 1/10 acre samples, 1397/acre (372/acre), total basal area 123.7 ft²/acre (95.3 ft²/acre). Species comprising 90% of the total number of trees: Balsam Fir, 1229, 88, 65, 100 (278, 75, 57, 100); Quaking Aspen, 67, 5, 10, 75 (37, 10, 12, 65); White Spruce, 35, 3, 9, 100 (24, 6, 11, 95); Balsam Poplar, 33, 2, 9, 60 (16, 4, 11, 55); Paper Birch, 30, 2, 7, 90 (15, 4, 8, 80) Trees by diameter size class: A (1½-3 in) 1024, 73, 28.4, 23; B (3-6 in) 274, 20, 30.4, 25 (274, 74, 30.4, 32), C (6-9 in) 39, 3, 12.1, 10 (39, 11, 12.1, 13); D (9-12 in) 30, 2, 18.0, 15 (30, 8, 18.0, 19); E (12-15 in) 19, 1, 18.9, 15 (19, 5, 18.9, 20); F (15-18 in) 9, 1, 13.3, 11 (9, 2, 13.3, 14), G (18-24 in) 1, trace, 2.4, 2 (1, trace, 2.4, 3). Shrub stems per acre: 820 (1844); ground cover 54%; canopy cover 72%; average canopy height 54 ft (range 30-80) Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Bordered by similar forest on all sides; the road passes 50 metres from the NE corner. **Topography:** Essentially flat. **Elevation:** About 1750 ft. **Weather:** Generally cool, with frequent rains. Most surveys were on relatively warm days, 3 attained 70°F or more. Skies were generally clear and winds light on all surveys. **Coverage:** May 28, 30; June 6, 8, 12, 21, 23, 27; plus combined plant and bird survey July 3-4. All trips between 0419 and 1246 hours, except July 3-4 to 1525 and 1345 hours. Total man-hours: 25.5, plus 11¾ hours on July 3-4, and about 20 hours while measuring and marking the grid May 16-18. **Census:** Bay-breasted Warbler, 11 (63, 25); Swainson's Thrush, 9 (51, 21); Magnolia Warbler, 8.5 (49, 20); Black-throated Green Warbler, 7.5 (43, 17); Tennessee Warbler, 7 (40, 16); Winter Wren, 4.5 (26, 10); Chipping Sparrow, 3 (17, 7); White-throated Sparrow, 2.5; Red-eyed Vireo, 2; Yellow-rumped (Myrtle) Warbler, 2; Pine Siskin, 2 (non-territorial); White-winged Crossbill, 1 (non-territorial); Boreal Chickadee, 1; Red-breasted Nuthatch, 0.5; Canada Warbler, 0.5; Rose-breasted Grosbeak, 0.5; Ruffed Grouse, +; Hairy Woodpecker, +; Canada Jay, +. **Total:** 19 species, 62.5 territorial & non-territorial males ($357/\text{km}^2$, 145 per 100 acres). **Visitors:** Yellow-bellied Flycatcher, Yellow-bellied Sapsucker, Blue Jay, Ruby-crowned Kinglet, Purple Finch, Dark-eyed (Slate-colored) Junco. **Remarks:** The Chipping and White-throated Sparrows were in areas with fallen trees and young fir regeneration, while the Canada Warbler was in a relatively open area of scrubby birch and poplar near the NW corner. The Red-eyed Vireos usually sang from tall poplars above the fir canopy. Tennessee Warblers, which sang much less frequently after about June 10 (though still present in numbers), were found mostly in young trees along old logging trails and around blowdowns. White-winged Crossbills only appeared in the region about June 23, but were singing regularly thereafter and are counted as breeding. Winter Wrens have been considered very rare in Sas-

katchewan, where breeding has never been proved, they were found regularly throughout the region, wherever fir occurred as an important tree species. — ANTHONY J. ERSKINE, *Migratory Bird Populations, Canadian Wildlife Service, Ottawa, Canada K1A OH3.*

108. BLACK SPRUCE STAND WITH ALDER SWALES. — **Location:** Saskatchewan, Dore Lake, about 300 metres south of airstrip, W edge along old trail running S from opposite Dore Lake school; 54°37'N, 107°23'W; map 73J, Green Lake, NTS. **Continuity:** New. **Size:** 23.4 ha = 57.7 acres (rectangular, 600 by 450 m with an irregular area omitted at the SW corner; 50 m grid set up with compass and measured rope). **Description of Plot:** A heterogeneous stand dominated by Black Spruce (*Picea mariana*). Parts are very dense, with no understorey, and ground cover of mosses, mainly *Pleurozium schreberi* and *Hylocomium splendens*; other areas are more open, with a low shrub cover of Labrador-tea (*Ledum groenlandicum*) and Velvet-leaf Blueberry (*Vaccinium myrtilloides*), growing in moss hummocks. Two brooks meander across the plot in wet swales of Speckled Alder (*Alnus rugosa*), Red-osier Dogwood (*Cornus stolonifera*), and sedges (*Carex* spp.). Along the edges of the swales are large White Spruces (*Picea glauca*) and a few Balsam Poplars (*Populus balsamifera*), while towards the south end Quaking Aspens (*P. tremuloides*) become more frequent. A quantitative survey of the vegetation gave the following: Trees 1½-inches diameter and over (3-in and over in parentheses) based on 28 circular 1/10 acre samples, 1292/acre (647/acre); total basal area 130.7 ft²/acre (112.8 ft²/acre). Species comprising 90% of the total number of trees: Black Spruce, 1102, 85, 64, 78 (542, 84, 61, 78); White Spruce, 66, 5, 24, 36 (51, 8, 28, 36); Speckled Alder, 41, 3, 1, 29 (4, 1, trace, 7); Quaking Aspen, 25, 2, 5, 29 (23, 4, 6, 21). Trees by diameter size class: A (1½-3 in) 645, 50, 17.9, 14; B (3-6 in) 553, 43, 61.4, 47 (553, 86, 61.4, 55); C (6-9 in) 55, 4, 16.9, 13 (55, 9, 16.9, 15); D (9-12 in) 24, 2, 14.6, 11 (24, 4, 14.6, 13); E (12-15 in) 6, 1, 6.4, 5 (6, 1, 6.4, 6); F (15 in & over) 7, 1, 13.3, 10 (7, 1, 13.3, 12). Shrub stems per acre: 695 (1340); ground cover 80%; canopy cover 53%; average canopy height 43 ft (range 10-70). Plant names from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Bordered by similar forest, except to the south where it blends into dense Balsam Fir (*Abies balsamea*) regeneration beneath tall aspens and White Spruces. An old logging trail crosses the plot from N to S, and another follows the western border. **Topography:** Essentially flat, rising slightly towards the southeast corner. **Elevation:** About 1530-1560 ft. **Weather:** Generally cool, with frequent rains. Two surveys experienced 70° or more; another had winds up to Beaufort 4; most surveys had overcast skies. The woods were usually very wet from rains the previous day or night; high water levels in the swales necessitated wearing waders except for the first survey. **Coverage:** May 29; June 2, 4, 8, 10, 14, 24, 26; July 8. All trips between 0426 and 1305 hours. Total man-hours: 27.5; a few birds were also noted during the plant survey (13 hr) on June 30-July 2 (mostly

drizzly with high winds), and while measuring and marking the grid (14 hr) on May 19, 20, 24. **Census:** Yellow-rumped (Myrtle) Warbler, 10.5 (45, 18); Tennessee Warbler, 9 (39, 16); Ruby-crowned Kinglet, 5 (21, 9); Swainson's Thrush, 4 (17, 7); Cape May Warbler, 3.5 (15, 6); Dark-eyed (Slate-colored) Junco, 3.5 (15, 6); Chipping Sparrow, 3 (13, 5); Gray Jay, 2 (family groups); Pine Siskin, 2 (non-territorial); White-winged Crossbill, 2 (non-territorial); Boreal Chickadee, 1; Brown Creeper, 1; Golden-crowned Kinglet, 1; Bay-breasted Warbler, 1; White-throated Sparrow, 1; Red-tailed Hawk, +; Com. Raven, +; Com. Crow, +; Winter Wren, +. **Total:** 19 species; 49.5 territorial and non-territorial males (212/km², 86 per 100 acres) **Visitors:** Alder Flycatcher, Olive-sided Flycatcher, Com. (Yellow-shafted) Flicker, Hairy Woodpecker, Red-eyed Vireo, Evening Grosbeak, Lincoln's Sparrow, Swamp Sparrow. **Remarks:** The Tennessee Warblers were confined to the alder swales; of the other major species, only the Chipping Sparrows favored this habitat. The territories of Ruby-crowned Kinglets and Swainson's Thrushes were poorly defined, as these species seldom sang; the thrushes were missed completely on 4 of the 9 surveys, including the two hot days and the windy one. There was some confusion between songs and calls of Brown Creeper, Golden-crowned Kinglet, Cape May and Bay-breasted Warblers, all of which were found in the same areas, but the relative numbers of each are probably correct. The numbers of Pine Siskins and White-winged Crossbills are educated guesses only, as these birds moved freely about; although the crossbills were not detected until June 14, they were seen and heard regularly thereafter and were believed to be breeding. The crows were the only ones seen in the area (except one pair nesting amid a gull colony on an island in Dore Lake), they moved between the N edge and the dump one-half mile to the east. The Red-tailed Hawk was seen or heard 3 times, arousing considerable alarm in the crows. — ANTHONY J. ERSKINE, *Migratory Bird Populations, Canadian Wildlife Service, Ottawa, Ontario, Canada K1A OH3.*

109. OPEN SPHAGNUM BOG. — **Location:** New Brunswick; Kent Co., Kouchibouguac National Park, 3 miles SW of Point Sapin; 46°55'N, 64°53'W; Point Sapin 21 I/15W. **Continuity:** New. **Size:** 40 ha = 98.84 acres (rectangular, 1000 m 150° by 400 m 60°; 100 m grid laid out with compass and measured rope). **Description of Plot:** A raised, flat, open bog with a scattering of low hummocks of spruce and ericaceous shrubs. There are four main types of vegetation: A) Open areas with Cyperaceae, 15% A base of peat mosses (*Sphagnum* spp.) supporting an open growth of Tufted Clubrush (*Scirpus cespitosus*) and of two to six-inch-high ericaceous shrubs, mainly Leatherleaf (*Chamaedaphne calyculata*), Bog Huckleberry (*Gaylussacia dumosa*), and Sheep Laurel (*Kalmia angustifolia*), but also including small amounts of Labrador-tea (*Ledum groenlandicum*), Black Huckleberry (*G. baccata*), Bog Laurel (*K. polifolia*), and Bog Rosemary (*Andromeda glaucophylla*). Small Bog Cranberry (*Vaccinium oxycoccos*) and Black Crowberry (*Empetrum nigrum*) are common trailing

ground covers. Cotton-grass (*Eriophorum* sp.) occurs as scattered clumps. Also frequent, but of limited importance, are Reindeer Lichen (*Cladonia rangiferina*), Baked-apple-berry (*Rubus chamaemorus*), Pitcher-plant (*Sarracenia purpurea*), Round-leaved Sundew (*Drosera rotundifolia*), and Grass-pink (*Calopogon pulchellus*). A few very wet spots lack the shrubs and large herbs and have much Bladderwort (*Utricularia cornuta*). B) Open areas without Cyperaceae, 43%. Vegetation very similar to type A but with little or no Tufted Clubrush and Cotton-grass. C) Mixed scrub, 36%. Clumps of low, layered Black Spruce (*Picea mariana*), surrounded by equal amounts of dense Leatherleaf, Sheep Laurel, Bog Huckleberry and a little Labrador-tea. Beneath are Peat Mosses, an unidentified moss, and Reindeer Lichen. Pitcher-plant is scattered among the shrubs. Towards the southeastern end small Tamarack (*Larix laricina*) replace the spruce in some clumps. D) Black Spruce scrub, 6%. Dense Black Spruce scrub about 3½ ft high, with scattered small trees 5–10 ft high. Sheep Laurel is common among the spruce and there is some Labrador-tea and Rhodura (*Rhododendron canadense*). In addition there are two small ponds in the southeastern corner, surrounded in part by a dense growth of Leatherleaf and Bog Rosemary. The other borders of the ponds are very wet and treacherous. Here Peat Moss supports Bladderwort, Narrow-leaved Sundew (*D. intermedia*) and unidentified sedges (*Carex* spp.). Cow Lily (*Nuphar variegatum*) occurs as an emergent in the pond. Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th. Ed., 1950.

Edge: Essentially the same along the two longer sides, while the two ends tend towards scattered small Black Spruce as they are towards the more treed edges of the bog. There are two small ponds in the southeast corner just outside the plot. **Topography:** Flat. **Elevation:** 10 ft. **Weather:** Conditions in June were very close to average in temperature and rainfall. Rainfall in July was heavier than average. Temperatures on coverages were usually in 60s though low 50s on June 14; wind was a maximum of 3 (Beaufort) on any day. There was slight drizzle at the end of the coverage on July 3. **Coverage:** May 31, June 7, 13 (part), 14 (part), 26; July 3, 10; plus a few observations during plant survey July 9. All trips between 0620 and 0912, ADT. Total man-hours: 19.5. **Census:** Savannah Sparrow, 9 (22, 9); Com. Yellowthroat, 7.5 (19, 8); Song Sparrow, 4.5 (11, 5); Lincoln's Sparrow, 3 (7, 3); Palm Warbler, 1. **Total:** 5 species; 25 territorial males (62/km², 25 per 100 acres). **Visitors:** White-throated Sparrow. **Remarks:** A much poorer bog for birds than that studied by Erskine in New Brunswick (AFN 22:704-705, 1968; 23:739-740, 1969, probably owing to its more open nature. In this respect it more resembles the two bogs studied by Erskine in Québec (AFN 24:768-770, 1970), where the total densities were comparable though the species composition was different. The Savannah Sparrows were restricted to the more open areas, while the Com. Yellowthroats were restricted to the more scrubby areas. They overlapped little, but together occupied most of the plot. The Lincoln's Sparrows occupied some of the scrubby treed patches. They

arrived late and stopped singing early. The Palm Warbler territory was in scrubby Black Spruce near the edge of the plot. Palm Warblers and Com. Yellowthroats were more common in the denser Black Spruce scrub at the edges of the bog, which was outside the plot. No birds were seen on or at the edge of the ponds. This plot was studied as part of an avifaunal survey of Kouchibouguac National Park under contract to Parks Canada. Detailed maps of the plot have been deposited with the Applied Research Division, Parks Canada, Department of Indian and Northern Affairs, Ottawa. David S. Christie assisted with the vegetative analysis. —GORDON R BURNS, STUART I. TINGLEY, C. ERIC TULL, *Département de Biologie, Université de Moncton, Moncton, Nouveau-Brunswick, Canada.*

110. SHRUBBY SWAMP AND SEDGE HUMMOCKS. — **Location:** Connecticut; north end of Bantam Lake, White Memorial Foundation, Litchfield; 41°43'02"N, 73°12'27"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965; 7 intermittent years. **Size:** 49.4 ha = 20 acres. **Description of Plot:** See AFN 19:625-627, 1965. A river delta in two parts, 5 and 15 acres respectively, on either side of the Bantam River as it flows into Bantam Lake. **Coverage:** June 1-3, 7-11, 14, 20-21, 23; July 5, 7-8, 13, 15-16, 18-19. Hours varied from 0410 to 2300 and totaled 64. **Census:** Swamp Sparrow, 32 (395, 160); Red-winged Blackbird, 28 (346, 140); Yellow Warbler, 24 (297, 120); Gray Catbird, 10 (124, 50); Com. Yellowthroat, 10 (124, 50); Willow Flycatcher, 9 (111, 45); Am. Goldfinch, 8 (99, 40); Song Sparrow, 7 (86, 35); Mallard, 6 (74, 30); Cedar Waxwing, 6 (74, 30); Alder Flycatcher, 4 (49, 20); Wood Duck, 3 (37, 15); Virginia Rail, 3 (37, 15); Black-billed Cuckoo, 3 (37, 15); E. Kingbird, 2; Tree Swallow, 2; Brown-headed Cowbird, 2; Yellow-billed Cuckoo, 1.5; Black-capped Chickadee, 1; Green Heron, +; Canada Goose, +; Black Duck, +; Barred Owl, +; Belted Kingfisher, +. **Total:** 24 species; 161.5 territorial males (1995/km², 808 per 100 acres). **Regular Visitors** (average number of individuals per 100 acres): Barn Swallow, 60; Red-winged Blackbird, 40; Com. Grackle, 20; Bank Swallow, 15; Starling, 15; Rough-winged Swallow, 10; Canada Goose, 5; Com. Crow, 4; Veery, 1. **Irregular Visitors** (number of individuals seen) Spotted Sandpiper, 4; Hooded Merganser, 2; Red-tailed Hawk, 2; Broad-winged Hawk, 2; Killdeer, 2; Great Blue Heron, 1; Black-crowned Night Heron, 1; Com. Gallinule, 1; Am. Coot, 1; Great Horned Owl, 1; Com. Nighthawk, 1; Cliff Swallow, 1. **Remarks:** Habitat change was not noticeable, except that the water level began and remained considerably higher than usual owing to heavy June rains. The entire area, except for the sedge hummock tops, was under water from 1.5 to 4 ft deep. This made entrance into the area very difficult. Fortunately, for listening and considerable watching, sitting or standing in a canoe along the lake or river's edge is fairly adequate, but plunging in for the gallinaceous and waterfowl hidden inside was not feasible. Locomotion was too clumsy. I suspect the "visiting" Com. Gallinule and Am. Coot of breeding. But these birds,

as well as most ducks, retired from feeding along the open lake edge very shortly after daybreak, forced to hide by the constant daylight (and often night-time) presence of fishermen in motorboats just offshore past the lilypads. The herons and kingfisher and groups of ducks and Canada Geese would all leave at daybreak, and not return until dark. — ANDREW MAGEE, 34 Hobson Street, Springfield, Mass. 01109, sponsored by the Litchfield Hills Audubon Society, Litchfield, Conn.

111. SEDGE-RUSH SWALE. — **Location:** Ontario; Norfolk Co.; Port Rowan; 3.2 miles W of Long Point Lighthouse; 42°32'30" N, 80°07'W, Gravelly Bay, Dept. of Energy, Mines and Resources. **Continuity:** New. **Size:** 10.32 ha = 25.5 acres (roughly rectangular, surveyed). The plot was very long and narrow owing to the nature of the grid. **Description of Plot:** The single canopy tree is Cottonwood (*Populus deltoides*), while the understory is Red Cedar (*Juniperus virginiana*). Most prominent in the ground cover are Baltic Rush (*Juncus balticus*), Elliptical Spikerush (*Eleocharis elliptica*), Variegated Horsetail (*Equisetum variegatum*), Grass-of-Parnassus (*Parnassus glauca*), Alpine Rush (*J. alpinus*), Sneezeweed (*Helenium autumnale*), Yellow Flax (*Linum medium*), bladderwort (*Utricularia*, spp.). A quantitative survey of the vegetation gave the following results: Trees 3 inches in diameter and over based on sixteen 0.5 acre samples, 6/acre; total basal area 0.5 ft²/acre. Species comprising 100% of the total number of trees: Cottonwood, 6, 100, 100, 38. Trees by diameter size class: A (3-6 in.) 6, 98, 96, 38; B (6-9 in.) 0.12, 2, 4, 6. Shrub stems/acre, 18; Ground cover 85%; canopy cover 1%; average canopy height 15 ft (range 12-20). Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** The north edge borders on rolling cottonwood sand dunes, while the south edge is shielded from the open beach by the dry cottonwood sand dune. The western edge borders on similar dry interdune habitat, while the eastern edge is of similar wet interdune habitat. **Topography:** The wet interdune consists of a long narrow pond running to depths of approximately 4 ft. and up to 148 yds wide. The dry interdune continues where the pond finishes, near the west end of the grid, and is essentially flat. **Elevation:** 570 ft. **Weather:** Generally sunny and breezy on census dates. **Coverage:** May 31; June 8, 20, 24; July 1, 7, 17, 19; all censuses between 0600 and 1200 or 1600 and 1845. Total man-hours: 16.5 censusing and 48 surveying and laying out the grid. **Census:** Red-winged Blackbird, 3.5 (34, 14); Mallard, 1; E. Kingbird, 1. **Total:** 3 species; 5.5 territorial males (53/km², 22 per 100 acres). **Visitors:** Blue-winged Teal, Am. Bittern, Great Blue Heron, Spotted Sandpiper, Killdeer, Belted Kingfisher, Com. (Yellow-shafted) Flicker, E. Meadowlark, Com. Grackle, Field Sparrow, Song Sparrow, Barn Swallow, Tree Swallow. **Remarks:** The following nests were located: Red-winged Blackbird, 5 nests: 2 with 4 eggs each, 1 with 3 eggs and 2 not examined; E. Kingbird, 1 with no eggs (the nest was poorly constructed and the bottom fell out). Most of the Red-winged Blackbirds nested along the edge of the pond.

Their territories extended partly over the interdune and partly over the adjacent dunes. Mallard and Blue-winged Teal nestlings were seen but there was no evidence of their nesting on the grid. Special thanks to Joe Johnston and Geoff Holroyd for the quantitative habitat description and to the Federation of Ontario Naturalists for financial assistance. — DOUGLAS J. NAKASHIMA, Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE IMO.

112. CATTAI MARSH. — **Location:** Illinois, Cook Co.; 1/4 miles due W of the Chicago suburb of Palos Park; 1/2 mile north (on the W side of 104 Avenue) of the intersection of 123 Street and 104 Avenue; 41°40'13"N, 87°52'30"W; Palos Park Quadrangle, USGS. **Continuity:** New. **Size:** 2.43 ha = 6 acres (including edge area varying from 0 to maximum depth of 2 ft; size was obtained by tape). **Description of Plot:** A road bordering the east side of the marsh has recently been raised and improved with a resultant increase of traffic and run off. Picnic area borders the marsh to the north with two pit lavatories on the marsh edge (high water this year completely engulfed one). Brush and scattered trees to the west and high open prairie to the south. Although this is the first official census, the area has been studied for the last 5 years. There has been a growth of algae owing presumably to sewerage runoff. The water level has been steadily increasing with resultant destruction of the edge. The marsh drains (thru underroad culvert) into Horsetail Slough. This drainage, however, has been all but stopped for the last two years owing to reconstruction work on the Slough. Lesser Duckweed (*Lemna minor*) covers most of the water surface from shore out to 5 ft. Most of the pond weeds have been drowned by the high water levels. The dominant edge/water plant is Broad-leaved Cattail (*Typha latifolia*) though its numbers have been drastically reduced. The main edge grasses are Cord Grass (*Spartina pectinata*) and Cut Grass (*Leersia oryzoides*). Also within the study area are a Black Willow (*Salix nigra*) and several drowned Cottonwoods. Scientific names are from *A Manual of Aquatic Plants* by N. C. Fassett. **Weather:** Temperature range in the 40s and 50s; skies overcast or clear. Little wind. **Coverage:** April 6, 12, 17, 23; May 8, 15, 13, 30, June 6, 11, 19. Hours varied from 0800 to 1900 and totaled 33 man-hours. **Census:** Red-winged Blackbird, 7 (288, 117); Com. Grackle, 5 (206, 83); Pied-billed Grebe, 1; Blue-winged Teal, 1; Com. (Yellow-shafted) Flicker, 1; Swamp Sparrow, 1. **Total:** 6 species; 16 territorial males (659/km², 267 per 100 acres). **Visitors:** Com. Yellowthroat (2); Yellow Warbler (4); Song Sparrow (1); Am. Robin (4); Gray Catbird (3); Green Heron (1); Killdeer (1); Belted Kingfisher (1); E. Kingbird (2); Tree Swallow (5); Purple Martin (4); Black-capped Chickadee (7); Am. Goldfinch (4). **Remarks:** This marsh once supported a greater number of species and a more diverse population including Sora and Virginia Rails, Mallards and Com. Gallinules. The increasingly higher water levels of the last five years have

destroyed much of the verge cover and for the last 3 years construction has been in progress on the east side (the first year on the road, the next two on Horsetail Slough) and these factors probably account for the decrease. Once the slough reconstruction is finished and the normal drainage pattern for the marsh is reestablished it is hoped that the verge growth will reestablish itself. It is also hoped that the pit toilets will be moved with resultant increase in water quality. — J. BAKER, 4800 S. Shore, Chicago, Ill. 60615.

113. BLUEGRASS-MILKWEED GRASSLAND. — **Location:** Ontario; Norfolk Co.; Port Rowan; 6.08 miles W of Long Point Lighthouse; 42°32'45"N, 80°9'45"W, Little Creek Ridges, Dept. of Energy, Mines and Resources. **Continuity:** New. **Size:** 6.68 ha = 16.5 acres (rectangular, surveyed). **Description of Plot:** There are 15 live trees in the canopy. There is no understory. The ground cover was sampled by 20 1-meter square plots. Plants occurring in at least 10% of the plots in decreasing order: Canada Blue Grass (*Poa compressa*), Kentucky Blue Grass (*P. pratensis*), Milkweed (*Asclepias syriaca*), Canada Blue-joint (*Calamagrostis canadensis*), Clammy Ground Cherry (*Physalis heterophylla*), Sandwort (*Arenaria serpyllifolia*), Sand Dropseed (*Sporobolus cryptandrus*), Tall Couch Grass (*Agropyron trachycaulum*), Marsh Fern (*Dryopteris thelypteris*), Skull Cap (*Scutellaria epilobiifolia*), Deadly Nightshade (*Solanum dulcamara*), Field Thistle (*Sonchus arvensis*), Lyre-leaved Rock Cress (*Arabis lyrata*), Sedge (*Carex muhlenbergia*), Indian Grass (*Sorghastrum nutans*), Horseweed (*Erigeron canadensis*). A count of all live trees in the census area gave the following results: Trees 3 inches in diameter and over, 0.9/acre; total basal area 0.7 ft²/acre. Species comprising 100% of the trees: Red Ash (*Fraxinus pennsylvanica*), 0.4, 31.6, 35.2, 1.6; Red Oak (*Quercus rubra*), 0.2, 15.7, 26.5, 15.7; White Pine (*Pinus strobus*), 0.2, 15.7, 10.8, 15.7; Silver Maple (*Acer saccharinum*), 0.1, 5.3, 9.2, 5.3; Choke Cherry (*Prunus virginiana*), 0.1, 5.3, 0.3, 5.3, Red Cedar (*Juniperus virginiana*), 0.1, 5.3, 0.3, 5.3; dead trees, 0.2, 21.1, 17.7, 21.1. Trees by diameter size class A (3-6 in) 0.1, 10.5, 0.01, 0.3, B (6-9 in) none; C (9-15 in) 0.6, 52.6, 0.55, 37.1, D (15-21 in) 0.3, 26.3, 0.48, 32.5; E (21-27 in) 0.1, 5.3, 0.20, 13.5; F (27-33 in) 0.1, 5.3, 0.24, 16.3. Sapling/acre 0.2; ground cover 75%; canopy cover + %, average canopy height 20 ft (range 15-30). Plant names from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** The east, west and south edges border on similar habitat. The north edges on a long narrow pond with similar habitat beyond. **Topography:** Open rolling dunes, spotted with small marshy interdunes. **Elevation:** 580 ft. **Weather:** Generally clear and hot on census dates. **Coverage:** June 10, 20-21, 25, 30; July 5, 10, 19. All trips taken between 0600 and 1200. Total man-hours: 15 censusing plus 49 surveying and laying out the grid. **Census:** Red-winged Blackbird, 4 (60, 24); E. Meadowlark, 2.5; Black Duck, 1; Marsh Hawk, 1; E. Kingbird, 1; Field

Sparrow, 1, Tree Swallow, 1, Mallard, 0.5. **Total:** 8 species; 12 territorial males, (180/km², 73 per 100 acres). **Visitors:** Am. Bittern, Great Blue Heron, Mourning Dove, Com. (Yellow-shafted) Flicker, Com. Grackle, Am. Goldfinch, Com. Yellowthroat. **Remarks:** 8 nests were located: Mallard, 1 nest robbed by a predator; Black Duck, 1 with 5 eggs, also robbed; Marsh Hawk, 1 with 7 eggs. This nest was under observation for a five week period, during which the eggs were laid, incubated and had begun to hatch. Two of the eggs were well pipped when a predator robbed the nest; E. Kingbird, 1 contents not examined; Red-winged Blackbird, 2 nests with 2 and 3 eggs respectively; E. Meadowlark, 1 with 4 eggs; Tree Swallow, 1 contents not examined. All the Red-winged Blackbirds held territories in the low marshy sections of the grid. The Marsh Hawk nested on the edge of one of the marshy areas. Special thanks to Joe Johnston and Tony Reznichenko for the quantitative habitat description and the Federation of Ontario Naturalists for financial assistance. — JAYNE E EVANS and DOUGLAS J. NAKASHIMA (compiler), *Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE IMO*.

114. ABANDONED FIELD. — **Location:** New York, Nassau Co., Plainview, 2.5 miles N of intersection of Washington Avenue and Manetto Hill Road, 40°48'N, 73°27'W. **Continuity:** New. **Size:** 5.06 ha = 12.5 acres (measured with steel tape). **Description of Plot:** The dominant wild flowers were Early Goldenrod (*Solidago juncea*), Gray Goldenrod (*S. nemoralis*) and Com. Milkweed (*Asclepias syriaca*). The most abundant invading trees were Paper Birch (*Betula papyrifera*), Red Maple (*Acer rubrum*), S. Bayberry (*Myrica cerifera*) and Shining Sumac (*Rhus copallina*). Other plants found less commonly but which constituted more habitat were Pennsylvania Smartweed (*Polygonum pensylvanicum*), hawkweeds (*Hieracium* sp.), Wild Carrot (*Daucus carota*), Boneset (*Eupatorium perfoliatum*), Evening Primrose (*Oenothera biennis*) and Com. Cinquefoil (*Potentilla simplex*) was the most common ground cover. Other trees included Sassafras (*Sassafras albidum*), cherry (*Prunus* sp.), Red Oak (*Quercus rubra*), Bigtooth Aspen (*Populus grandidentata*) and Honey Locust (*Gleditsia triacanthos*). A dense thicket of Poison Ivy (*Rhus radicans*), Shining Sumac and Japanese Honeysuckle (*Lonicera japonica*), along the north edge, was also censused. Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th Ed., 1950. **Edge:** Woods surround the plot except along part of the east side where an overgrown hedgerow separates it from another field. Dirt trails encircle three sides. **Topography:** Essentially flat but mounds of dirt that average 5 ft high exist in the NE corner. **Elevation:** 280 ft. **Weather:** Very hot with moderate rainfall. **Coverage:** April 21; June 4-6, 8, 11-12, 14, July 1; August 21, 24. All trips between 1720 and 1840 except one between 0615 and 0640. Total man-hours 10. **Census:** Red-winged Blackbird, 11 (217, 88); Field Sparrow, 5 (99, 40); Song Sparrow, 5 (99, 40); Am. Goldfinch, 3 (59, 24); Am. Woodcock, 2; Com

Yellowthroat, 2; Bobwhite, 0.5; House Wren, +
Total: 8 species; 28.5 territorial males ($563/\text{km}^2$, 228 per 100 acres). **Visitors:** Mourning Dove, Com. (Yellow-shafted) Flicker, E. Kingbird, Barn Swallow, Gray Catbird, Brown Thrasher, Am. Robin, Bobolink, Com. Grackle. **Remarks:** Two nests were located: 1 Red-winged Blackbird without eggs; 1 goldfinch with five eggs which later hatched. The plot is former farmland last used in 1968. An abundance of ticks made censusing difficult and hampered it. Many thanks to Neil Jacobs for helping map the plot. — ALAN JAY LERNER, 43 Cornell Drive, Plainview, N. Y. 11803.

115. PARTIALLY ABANDONED HAYFIELDS AND PASTURES. — **Location:** Connecticut; Fairfield Co., 7 miles N of the Center of Fairfield; 41°12'N, 73°17'W, Westport Quadrangle, USGS. **Continuity:** Established 1971; 3 consecutive years. **Size:** 7.7 ha = 19 acres. **Description of Plot:** See *AB* 25:1007-8, 1971. **Weather:** Both temperature and precipitation were normal. **Coverage:** Daily; April 17-July 20. Hours varied from 0001 to 2350 and averaged 1.5 per day. **Census:** Red-winged Blackbird, 21 (273, 111); Am. Robin, 7 (91, 37); Blue-winged Warbler, 7 (91, 37); N. (Baltimore) Oriole, 7 (91, 37); Gray Catbird, 5 (65, 26); Song Sparrow, 5 (65, 26); Cardinal, 4 (52, 21); House Finch, 4 (52, 21); Chipping Sparrow, 4 (52, 21); Starling, 3 (39, 16); Brown-headed Cowbird, 3 (39, 16) females; Field Sparrow, 3 (39, 16); Am. Woodcock, 2; Mourning Dove, 2; Chimney Swift, 2; Rose-breasted Grosbeak, 2; Am. Goldfinch, 2; Ring-necked Pheasant, 1; Whip-poor-will, 1; Com. (Yellow-shafted) Flicker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; Least Flycatcher, 1; Blue Jay, 1; Black-capped Chickadee, 1; Tufted Titmouse, 1; House Wren, 1; Brown Thrasher, 1; Wood Thrush, 1; Cedar Waxwing, 1; Blue-winged X Brewster's Warbler, 1; Yellow Warbler, 1; Com. Yellowthroat, 1; House Sparrow, 1; E. Meadowlark, 1; Com. Grackle, 1; Purple Finch, 1; Rufous-sided Towhee, 1. **Total:** 37 species plus 1 hybrid; 104 territorial males or females ($1353/\text{km}^2$, 547 per 100 acres). **Visitors:** Bobwhite, Killdeer, Yellow-billed Cuckoo, Black-billed Cuckoo, Screech Owl, Saw-whet Owl, Ruby-throated Hummingbird, Pileated Woodpecker, Hairy Woodpecker, Downy Woodpecker, E. Phoebe, E. Wood Pewee, Tree Swallow, Barn Swallow, Rough-winged Swallow, Com. Crow, White-breasted Nuthatch, Brown Creeper, Mockingbird, Veery, E. Bluebird, Warbling Vireo, Red-eyed Vireo, Black-and-white Warbler, Ovenbird, Am. Redstart, Bobolink, Orchard Oriole, Scarlet Tanager. **Remarks:** Mammals observed were E. Chipmunk, Opossum, E. Gray Squirrel, Striped Skunk, White-tailed Deer, Norway Rat, mouse sp., mole sp., and Red Fox. Reptiles and amphibians observed were: E. Garter Snake, Black Rat Snake, N. Spring Peeper. Over the three-year period of this study, the number of species has fluctuated from 36-44-38, an average of 39.3 per year. The total number of individuals has declined from 160 to 157 to 104. Robins decreased from 19 in 1972 to 7, Northern Orioles from 12 to 7, Rose-breasted Grosbeak from 5 to 2, and catbird from 10 to 6. Chipping

Sparrows continued their amazing decline—15 (1971), 6 (1972) and 4 in 1973. For the robin, oriole, catbird and grosbeak, we can hypothesize only that these birds cycle in this area according to the insect situation. There was no insect problem this year. Gypsy moth was almost absent in 1972 and was not seen this year. Also, both cuckoos did not nest here this year. New additions to the breeding census this year were Whip-poor-will, Purple Finch, House Sparrow and Brewster's Warbler. In the previous non-census years, all but the Brewster's Warbler were recorded as nesters. The Brewster's Warbler was a female nesting with a male Blue-winged Warbler. Blue-winged Warblers increased from 5 in 1972 to 7, and Field Sparrows from 2 to 3. The Orchard Oriole failed to nest even though it was a regular visitor; 1 pair bred in 1971 and 1972. The Saw-whet Owl breeds regularly in this area and was recorded as a visitor on July 5. Thirteen of the above visitors have previously been recorded as breeding on the census proper. The nesting of the Purple Finch for the first time since this census was started, represents a strong resurgence by this species in Connecticut. Throughout it is successfully holding its own against the House Finch. In the mid-1960's, when the House Finch really began to spread, we noticed a decline in the Purple Finch. However since 1969, the Purple Finch has increased. In fact it has been found to be more common in its range than before the House Finch was introduced. Also, the House Sparrow, whenever it is wiped out, either does not come back where the House Finch is established or does in far fewer numbers. We include this information on the House Finch's interaction with these species because we believe it to be of value to those interested in land birds. — HELEN G HILLS and CHARLES F. HILLS (compiler), 3052 Burr Street, Fairfield, Conn. 06430.

116. ABANDONED FIELD. — **Location:** Maryland, Prince Georges Co., Accokeek, Piscataway Park, Potomac River, 3 miles W of intersection of Route 210 and Bryan Point Road; 38°41'N, 77°04'W, Mt Vernon Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 6.1 ha = 15 acres (irregular parallelogram, delineated by steel stakes into one-half acre plots using steel tape). **Description of Plot:** See *AB* 26:995-996, 1972. **Weather:** Temperature range was 42°-85° F. The second week of May was very cold and wet. **Coverage:** May 16, 22, 30; June 4, 19, 28, July 2, 12, 17; August 7. All trips between 0615 and 1150. Total man-hours: 20. **Census:** Field Sparrow, 5 (82, 33); Com. Yellowthroat, 4 (66, 27); Am. Goldfinch, 3 (49, 20); Song Sparrow, 3 (49, 20); Indigo Bunting, 3 (49, 20); Carolina Wren, 1; Red-winged Blackbird, 1; Cardinal, 1. **Total:** 8 species; 21 territorial males or females ($346/\text{km}^2$, 140 per 100 acres). **Visitors:** Red-tailed Hawk, Red-shouldered Hawk, Mourning Dove, Yellow-billed Cuckoo, Chimney Swift, Red-bellied Woodpecker, Downy Woodpecker, E. Kingbird, Rough-winged Swallow, Barn Swallow, Purple Martin, Blue Jay, Com. Crow, Fish Crow, Carolina Chickadee, E. Bluebird, Starling, E Meadowlark, Orchard Oriole, Com. Grackle, Blue

Grosbeak Remarks: Nests—Field Sparrow, 1, 4 eggs, 3 nestlings; Carolina Wren, 1, abandoned (in milk-carton nest box). One new reptile was found — E. Kingsnake. Grasshopper Sparrows were absent and Cardinal and Blue Grosbeak were new to the area.
— LEONARD TEUBER and M. KATHLEEN KLIMKIEWICZ (compiler), 5737 13th St., NW, Washington, D. C. 20011.

117. CULTIVATED FIELD AND ABANDONED AIRPORT STRIP. — **Location:** North Carolina; Wilkes Co., 0.5 mile from North Wilkesboro. **Continuity:** Established 1959; 15 consecutive years. **Size:** 25.5 ha = 63 acres (formerly 90 acres but reduced by a shopping center with 27 acres in buildings and asphalt located in the center of the tract). **Description of Plot:** See AFN 13:468, 1959 and 22:707, 1968. **Coverage:** April 6, 12, 17, 26; May 2, 13, 17, 23; June 9, 15, 21, 28. Hours varied from 0830 to 1700, EDT, and totaled 18 man-hours. **Census:** E. Meadowlark, 4 (16, 6); Field Sparrow, 3 (12, 5); Starling, 1. **Total:** 3 species; 8 territorial males ($31/\text{km}^2$, 13 per 100 acres). **Visitors:** Bobwhite, Mourning Dove, Com. Crow, Mockingbird, Brown Thrasher, Am. Robin, Red-winged Blackbird, Blue Grosbeak, Com. Grackle. **Remarks:** Nearly one-third of the former area has been removed. A compensating change has been the cessation of grazing on the remaining tract. Twenty-five acres of the censused area had been previously bulldozed and abandoned; Erigeron, Am-brosia, and other weeds had overgrown most of it. In the four-acre airstrip the bulldozer left a few trees and shrubs; there some of the Field Sparrows nested. A barn remaining on the tract provided a nesting site for the Starling. — WENDELL P. SMITH, North Wilkesboro, N. C. 28659.

118. MATURE (1949, 1950) EIGHT-ROW BELT. — **Location:** North Dakota; Cass Co., 0.5 mile N, 64 ft W of county road, Section 25, Fargo North Quadrangle, USGS. **Continuity:** Established 1956; 2 intermittent years. (formerly called Shelterbelt I; 1958-1960 data in *Breeding bird population in nine selected shelterbelts in eastern North Dakota*, by R. D. Clarens, thesis at N.D.S.U. Library, Fargo, North Dakota). **Size:** 1.0 ha = 2.47 acres (96 x 1120 ft, measured). **Description of Plot:** See AFN 10:416-419, 1956. Outside rows averaged 10 ft in height. Inner rows ranged from 30 to 45 ft. Undergrowth consisted of about $\frac{3}{4}$ saplings under 7 ft and $\frac{1}{4}$ grasses. **Edge:** Bounded on south, west, and north by a small grain crop with short grasses used for hay on the east. **Topography:** Flat, elevation 897 ft. **Weather:** Spring came a little early, but weather was not unusual. Fargo Weather Bureau recorded a high of 93°F and a low of 39°F for the census period. Precipitation of 0.25 inch or more fell on June 19; July 9, 11. **Coverage:** June 8, 10-11, 16, 28; July 4, 12. Hours varied from 0530 to 2130 and totaled 8 man-hours. **Census:** Mourning Dove, 2; Least Flycatcher, 2; Yellow Warbler, 2; Am. Robin, 1. **Total:** 4 species; 7 territorial males ($700/\text{km}^2$, 283/100 acres). **Visitors:** Black-billed Cuckoo, Com. Flicker, W. Kingbird, Com. Crow, Brown Thrasher, Gray Catbird, Swain-

son's Thrush, Com. Yellowthroat, House Sparrow, N (Baltimore) Oriole, Brown-headed Cowbird, Com. Grackle, W. Meadowlark, Red-winged Blackbird, Vesper Sparrow. **Remarks:** This belt has shown a decrease in breeding pairs as follows: 1956, 15; 1958, 20; 1959, 11; 1960, 7; 1973, 7. The decrease may be the result of the shelterbelt's close proximity to the municipal airport, about $\frac{1}{4}$ mile away, and to the busy county road, 64 ft away. These factors create a rather high noise level, which is possibly offensive to the birds. Thanks to W. A. Heller for his permission to study the belt, and to Dr. J. Frank Cassel for his assistance with the project. —WARREN G. RESELL, Department of Zoology, North Dakota State University, Fargo, N. D. 58102.

119. MATURE (1945) NINE-ROW BELT. — **Location:** North Dakota; Cass Co., 4 miles N of Fargo on Cass County 31; Section 12, Fargo North Quadrangle, USGS. **Continuity:** Established 1956; 2 intermittent years. (Formerly called Shelterbelt III. Also see Census 118.) **Size:** 1.1 ha = 2.83 acres (108 x 1140 ft, measured). **Description of Plot:** See AFN 10:416-419, 1956. Height ranged from 12 to 45 ft. Undergrowth consisted almost entirely of saplings under 4 ft. A path between rows 4 and 5 was kept mowed by the owner. **Edge:** Bounded on the north and west by a small grain crop, on the south by short grasses used for hay, and on the east by a strip of summer fallow. **Topography:** Flat, elevation 890 ft. **Weather:** See Census 118. **Coverage:** June 16, 18, 28; July 4, 6, 13-14. All trips between 0530 and 2130. **Total:** 12 man-hours. **Census:** Yellow Warbler, 3 (262, 106); Vesper Sparrow, 3 (262, 106); Mourning Dove, 2; Brown Thrasher, 2, Blue Jay, 1; Gray Catbird, 1; Am. Robin, 1; Com. Grackle, 1; Lark Sparrow, 1. **Total:** 9 species, 15 territorial males ($1310/\text{km}^2$, 530 per 100 acres). **Visitors:** Black-billed Cuckoo, Downy Woodpecker, E. Kingbird, Least Flycatcher, Com. Crow, House Wren, Hermit Thrush, House Sparrow, N. (Baltimore) Oriole, Brown-headed Cowbird, Red-winged Blackbird, Am. Goldfinch, Rose-breasted Grosbeak, Savannah Sparrow. **Remarks:** Some trees in the belt were utilized as singing posts by 2 Red-winged Blackbirds and a Savannah Sparrow, which nested outside the belt. The belt was invaded frequently by numerous House Sparrows from farm building about 120 ft to the east. The number of breeding pairs has varied as follows: 1956, 13; 1958, 17; 1959, 10; 1960, 8; 1973, 15. Thanks to Ward Harris for his permission to study the belt, and to Dr. J. Frank Cassel for his assistance with the project. —WARREN G. RESELL, Zoology Department, North Dakota State University, Fargo, N. D. 58102.

120. MATURE (1949) SIX-ROW BELT. — **Location:** North Dakota; Cass Co., 4 miles W of Harwood, Section 35, West Fargo Quadrangle, USGS. **Continuity:** New (Also see Census 118). **Size:** 1.17 ha = 2.89 acres (72 x 1750 ft, measured). **Description of Plot:** From north to south: row 1, Plum (*Prunus americana*), average height 10 ft; row 2, Green Ash (*Fraxinus pennsylvanica*), 35 ft; row 3, Chinese Elm (*Ulmus pumila*), 30 ft; row 4, White Willow (*Salix*

alba), 30 ft, row 5, Green Ash (*Fraxinus pennsylvanica*), 35 ft, row 6, Russian Olive (*Elaeagnus angustifolia*), 25 ft. Undergrowth was not dense, about $\frac{3}{4}$ grasses, $\frac{1}{4}$ saplings. Plant names from Stevens, 1963, *Handbook of North Dakota Plants*. **Edge:** Surrounded on all sides by a small grain crop, except for a summer fallowed field adjoining about half of the south side. The west end of this belt is only about 20 ft from the northeast corner of belt 4. **Topography:** Flat, elevation 895 ft. **Weather:** See Census 118. **Coverage:** June 8, 11, 30; July 7, 13-14. All trips between 0530 and 1130 or 1900 and 2130. Total man-hours: 11. **Census:** Mourning Dove, 8 (684, 277); Least Flycatcher, 5 (428, 173); E. Kingbird, 4 (342, 138); Yellow Warbler, 4 (342, 138); W. Kingbird, 2; Black-billed Cuckoo, 1; Brown Thrasher, 1. **Total:** 7 species; 25 territorial males ($2138/\text{km}^2$, 865 per 100 acres). **Visitors:** Com. (Yellow-shafted) Flicker, Blue Jay, Gray Catbird, Am. Robin, Warbling Vireo, N. (Baltimore) Oriole, Brown-headed Cowbird, Com. Grackle, Orchard Oriole, Red-winged Blackbird, Am. Goldfinch, Clay-colored Sparrow, Dickcissel, Savannah Sparrow, Vesper Sparrow. **Remarks:** Mourning Doves showed a marked preference for row 6; of eight nests found, four were in this row. Two nests were in row 3, and one nest each in rows 1 and 4. This belt showed an increase in breeding pairs, from 22 in 1959 and 19 in 1960 to 25 in 1973. Thanks to Clarence Krogh for permission to study his shelterbelt and to Dr. J. Frank Cassel for his assistance with the project. — WARREN G. RESELL, Zoology Department, North Dakota State University, Fargo, N. D. 58102.

121. MATURE (1949, 1953) SIX-ROW BELT. — **Location:** North Dakota; Cass Co., 4 miles W of Harwood; Section 35, West Fargo Quadrangle, USGS. **Continuity:** New. (Also see Census 118). **Size:** 3.08 ha = 7.6 acres (72 x 4600 ft, measured). **Description of Plot:** This belt was planted in two plantings, the north 2600 ft in 1949, and the south 2000 ft in 1953. The north portion is as follows, west to east: row 1, Plum (*Prunus americana*), average height 12 ft; row 2, Green Ash (*Fraxinus pennsylvanica*), 35 ft; row 3, Am. Elm (*Ulmus americana*), 30 ft; row 4, Cottonwood (*Populus deltoides*), 70 ft; row 5, Chinese Elm (*Ulmus pumila*), 35 ft; row 6, Honeysuckle (*Lonicera sp.*), 12 ft. The south portion is as follows, west to east: Row 1, Russian Olive (*Elaeagnus angustifolia*), 25 ft; row 2, Green Ash, 35 ft; row 3, Chinese Elm, 35 ft; row 4, Cottonwood 70 ft; row 5, Chinese Elm, 35 ft; row 6, Honeysuckle, 12 ft. Undergrowth in the north portion consisted of about $\frac{1}{2}$ saplings under 6 ft, $\frac{1}{2}$ grasses. The south portion was more open, about $\frac{1}{4}$ saplings under 5 ft, $\frac{3}{4}$ grasses. Plant names are from Stevens, 1963, *Handbook of North Dakota Plants*. **Edge:** Bordered on west by sunflowers, remainder by a small grain crop. The northeast corner is about 20 ft from the west end of Belt 3. **Topography:** Flat, elevation 895 ft. **Weather:** See Census 118. **Coverage:** June 9, 11, 24, 30; July 7, 13-14. All trips between 0530 and 1100 or 1800 and 2130. Total man-hours: 20. **Census:** Mourning Dove, 7 (228, 92); Am. Robin, 6 (195, 79); Indigo Bunting, 5 (195, 79); Blue Jay, 3 (98, 39); Brown

Thrasher, 3 (98, 39), Gray Catbird, 2, N. (Baltimore) Oriole, 2, Com. Grackle, 2, Red-winged Blackbird, 2; Black-billed Cuckoo, 1; E. Kingbird, 1, Warbling Vireo, 1; Orchard Oriole, 1; Dickcissel, 1. **Total:** 14 species; 37 territorial males ($1203/\text{km}^2$, 487/100 acres). **Visitors:** Hairy Woodpecker, Com (Yellow-shafted) Flicker, Least Flycatcher, W. Kingbird, Com. Crow, Black-capped Chickadee, House Wren, Com. Yellowthroat, Yellow Warbler, Brown-headed Cowbird, W. Meadowlark, Am. Goldfinch, Vesper Sparrow. **Remarks:** There were 24 breeding pairs in 1959, 38 in 1960, and 37 in 1973. Present in at least three territories in 1959 and 1960, but not breeding in 1973 were Yellow Warblers, Least Flycatchers, and Vesper Sparrows. New species possessing at least three territories in 1973, but absent in 1959 and 1960 are Indigo Buntings, Am. Robins, and Blue Jays. I wish to express my appreciation to Clarence Krogh for permission to study his shelterbelts and to Dr. J. Frank Cassel for his assistance in planning the project and in analyzing the data. — WARREN G. RESELL, Zoology Department, North Dakota State University, Fargo, N. D. 58102.

122. HORSE FARM AND SECOND-GROWTH EDGE. — **Location:** Vermont; Windsor Co., Woodstock, 0.5 mile E of Route 106 on Town Road 64, $43^\circ 35' \text{N}$, $72^\circ 30' \text{W}$, Woodstock Quadrangle, USGS. **Continuity:** Established 1972. **Size:** 16.2 ha = 40 acres. **Description of Plot:** See AB 26:960-61, 1972. Additions for this census include 5 acres clipped pasture in use; 10 acres unused pasture coming in to hardhack, Ground Juniper and Gray Birch with new growth maple and White Birch on edge; 8 acres former pasture. White Pine and birch community giving way to maples on 15-18% slope. **Weather:** Windy, warm season; excessive rain and flooding in lowlands during June 30-July 3. **Coverage:** May 27; June 3, 9-10, 16-26, July 1-2. All trips between dawn and 0930 hours. Total man-hours: 34. **Census:** Am. Robin, 6 (37, 15), Cliff Swallow, 5 (31, 13); E. Phoebe, 4 (25, 10), Barn Swallow, 4 (25, 10); Wood Thrush, 4 (25, 10), Rufous-sided Towhee, 4 (25, 10); Chipping Sparrow, 4 (25, 10); White-throated Sparrow, 4 (25, 10); Song Sparrow, 4 (25, 10); Com. (Yellow-shafted) Flicker, 3 (19, 8); Com. Yellowthroat, 3 (19, 8); Dark-eyed (Slate-colored) Junco, 3 (19, 8); Least Flycatcher, 2, E. Wood Pewee, 2; Red-breasted Nuthatch, 2; White-breasted Nuthatch, 2; Gray Catbird, 2; Veery, 2, E. Bluebird, 2; Red-eyed Vireo, 2; Black-and-white Warbler, 2; Yellow-rumped (Myrtle) Warbler, 2; Chestnut-sided Warbler, 2; Ovenbird, 2; N. (Baltimore) Oriole, 2; Field Sparrow, 2; Ruffed Grouse, 1, E. Kingbird, 1; Great Crested Flycatcher, 1; Tree Swallow, 1; Brown Thrasher, 1; Hermit Thrush, 1; Blackburnian Warbler, 1; Red-winged Blackbird, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Warbling Vireo, +; Magnolia Warbler, +. **Total:** 38 species, 80 territorial males, ($494/\text{km}^2$, 200 per 100 acres) **Visitors:** Red-tailed Hawk, Red-shouldered Hawk, Cedar Waxwing, Nashville Warbler, Yellow Warbler, Black-throated Blue Warbler, Am. Redstart, Cardinal, Com. Grackle, Purple Finch. **Remarks:** A larger area of observation did not yield a corresponding increase

in numbers of nesting species Cliff Swallows have increased slowly from 0 in 1970 to 6 pairs. Indigo Bunting, Cedar Waxwing, Nashville Warbler, Yellow Warbler, and Am. Redstart were absent as nesting species. Overall warbler numbers have decreased. — MARTHA L. WILLIAMSON, S. Woodstock, Vt. 05071.

123. CAT-TAIL MARSH WITH WILLOW EDGE.—

Location: California; Santa Cruz Co., Neary's Lagoon, ¾ miles S of Santa Cruz City Hall; 36°58'N, 122°02'W, Santa Cruz Quadrangle, USGS. **Continuity:** New. **Size:** 8.5 ha = 21 acres (irregular, measured). **Description of Plot:** Surrounds the location of a former open-water lagoon that has been drained and filled over the last century. The plot is covered by fresh-water marsh, weed-covered fill, recently dredged ponds, and on three sides by willow thicket. The center of the plot is a 10-acre rectangular tract of marsh divided into four sections by three north-south gravel roads. The dominant species of marsh vegetation are Broad-leaved Cat-tail (*Typha latifolia*), Narrow-leaved Cat-tail (*T. angustifolia*), California Tule (*Scirpus californicus*), and some Water Hemlock (*Circuta douglasii*). Stands of cat-tail cover most of the marsh; there are two small stands of tules. Nine acres of marsh are flooded to a depth of 3 ft with 1 ft of water covering most of the marsh. The remaining acre is a stand of unflooded tule. The two central marsh sections are largest; one is about 4 acres of vigorous vegetative growth and the other 5 acres are essentially dead. The two end sections are small patches bordering the willow edge. Along the east, north and west edges is willow thicket covering approximately 1.5 acres. The dominant species is Arroyo Willow (*Salix lasiolepis*), with a few Yellow Willows (*S. lasiandra*) and Box-elder (*Acer negundo*). Eleven trees in two stands were over 2 ft in diameter; all other willows in the thicket were smaller. Crown height in the 11 trees was approximately 40 ft; the rest of the thicket was 20-30 ft. Crown cover within the thicket is essentially 100%, but the understory cover varies greatly between the different sections of willows. One acre of thickets covering the east and west ends has heavy understories of California Blackberry (*Rubus ursinus*), with some Poison Oak (*Rhus diversiloba*), Baneberry (*Actaea arguta*), and fallen tree limbs. The younger thicket along the north edge has an understory of *Iris pseudocorus*. Two ponds dredged during the winter of 1971-72 cover three acres and have six small islands covered with willow thicket and marsh vegetation. The dredged material lies between the ponds and marsh and is covered with weed species and marsh plants. Five acres of older fill are much less densely covered with plants, mainly grasses. Plant identification based on Munz, *A California Flora*, 1959. **Edge:** Located at the edge of the floodplain of the San Lorenzo River and at the base of a sandstone embankment which separates it from suburban developments to the south and east. The Santa Cruz Harbor (Monterey Bay) lies ¼ mile east. The immediate edge on the south side is a sewage plant and its access road; on the north is a condominium complex and a large pasture; on the west is a willow thicket contained only partly on the plot and

extending several miles up a canyon, and on the east side railroad tracks separate the willows from residential development. **Topography:** Essentially flat with west to east drainage through culverts and ponds to the Santa Cruz Harbor. Elevation 210 ft. **Weather:** Most a.m.'s foggy and p.m.'s clear with frequent 10-20 mph winds. It rained on two visits; an extremely wet winter preceded the study. **Coverage:** March 11, 17, 21, 25; April 4-5, 7, 10-11, 13-14, 21, 23-27, 29; May 1, 5-12, 14-19, 21, 23-24, 27, 29; June 4, 6, 8-10 Visits from 0630 to 2100, mainly from 0700-1000 and 1600 to 1930. Total man-hours: 210. **Census:** Tricolored Blackbird, 60 (706, 286); Song Sparrow, 27 (318, 129), Red-winged Blackbird, 18 (212, 86); Com. Yellowthroat, 16 (188, 76); Allen's Hummingbird, 12 (141, 57); Mallard, 8 (94, 38); Com. Bushtit, 8 (94, 38), Am. Coot, 6 (71, 29); Killdeer, 4 (47, 19); Wrentit, 3 (35, 14); Chestnut-backed Chickadee, 3 (35, 14); Swainson's Thrush, 3 (35, 14); Mourning Dove, 2, Yellow Warbler, 2; Cinnamon Teal, 1; Com. Gallinule, 1; Ring-necked Pheasant, 1; Downy Woodpecker, 1; Bewick's Wren, +; Wilson's Warbler, +, Brown Towhee, +. **Total:** 21 species; 176 territorial males or females (2071/km², 838 per 100 acres) **Visitors:** Green Heron, California Quail, Sora, Virginia Rail, Spotted Sandpiper, Belted Kingfisher, Violet-green Swallow, Rough-winged Swallow, Cliff Swallow, Barn Swallow, Scrub Jay, Mockingbird, Am Robin, Starling, Warbling Vireo, Orange-crowned Warbler, W. Meadowlark, Yellow-headed Blackbird, Hooded Oriole, N. (Bullock's) Oriole, Brewer's Blackbird, Brown-headed Cowbird, Purple Finch, House Finch, Lesser Goldfinch, Am. Goldfinch. **Remarks:** The following nests were found: Mallard, 2 with 12 and 18 eggs; Cinnamon Teal, 1 with 5 destroyed eggs, Downy Woodpecker, 1; Chestnut-backed Chickadee, 2; Com. Bushtit, 6; Wrentit, 1 with 3 young; yellowthroat, 1 with 3 young; Red-winged Blackbird, 16 abandoned, 6 successful with 2-3 young, four unknown; Tricolored Blackbird, 37 averaging 3 young per nest on April 25 — colony destroyed and abandoned on May 2. The following juveniles were seen: Mallard, 75 young in 10 broods; Cinnamon Teal, 9 young; Ring-necked Pheasant, 2; Mourning Dove, 1; Com. Bushtit, large, uncounted number; Wrentit, 3; yellowthroat, 16; Red-winged Blackbird, large uncounted number; Song Sparrow, 48 in 15 broods. Broods of the following visitors were seen: House Finch, Lesser Goldfinch, Pine Siskin. This plot covers large amounts of edge between willows and marsh. This allows us to include the total territories of several important species: Com. Yellowthroat, Red-winged Blackbird and Song Sparrow. All three species are most common around the edge of the marsh. The inclusion of a willow edge accounts for a large number of partial territories in such species as Bewick's Wren, Wilson's Warbler, and Brown Towhee. The following species were found to roost in the marsh at night: Red-winged Blackbird, 150+ mostly males, Starling, 30-50; Brown-headed Cowbird, 50; Brewer's Blackbird, 75-100; Tricolored Blackbird, 3; Yellow-headed Blackbird, 3 (unusual on coast in spring) Hummingbird territories censused were female's There were also 5 male Anna's and one male Allen's

on territory. Only one female Anna's was found. Species of *Rallidae* were hardly ever seen after mid-April. Sora and Virginia Rail may breed but we have no observations after mid-April. Large numbers of birds came to feed in the weedy areas around the marsh including: quail, blackbirds, finches, and doves. Other vertebrates: Slender Salamander, Bullfrog, Pacific Tree Frog, W. Pond Turtle, S. Alligator Lizard, Gopher Snake, Santa Cruz Garter Snake, W. Terrestrial Garter Snake, Bat sp., Racoon, Domestic Dog, Brush Rabbit, Fox Squirrel, Merriam's Chipmunk, Norway Rat. During the study the vegetation on the north side was cut down to make way for an apartment complex. This destroyed several known nests and displaced many birds north of the plot. Poachers on the land also represent a threat to the wildlife. This study was sponsored by Dr. Kenneth Norris, University of California at Santa Cruz. — RUSSELL GREENBERG and CARL SCHILT, 1210 Rose Street, Berkeley, Calif. 94702.

124. OAK FOREST, PASTURES AND THICKETS.

— **Location:** Connecticut, Middlesex County, East Haddam, 0.6 mile W of County Line on Dolbia Hill Road; 41°28'N, 72°20'W; Hamburg Quadrangle, USGS. **Continuity:** Established 1964, recensused in 1967. **Size:** Plot I, Oak Forest, 14.15 ha = 35 acres; Plot II, Pasture, Thicket, and Young Forest, 14.15 ha = 35 acres (surveyed). **Description of Plots:** See AFN 18:568-569, 1964; 21:669-670, 1967. Plot I, Oak Forest: There was partial defoliation from gypsy moths this year. Plot II, Pasture, Thicket, and Young Forest: Successional changes have taken place in the ungrazed portions of this plot. The four-acre hay field was harrowed and seeded to clover in April. Eight head of cattle were in the remaining 12 acres of pasture during the census period. **Edge:** Plot I is bounded on three sides by similar forested area and on the fourth side by Plot II. Plot II is bounded on all sides by forest, that on the north described in AFN 19:592-593, 1965. **Topography:** Plot I, ledgy ridges ranging from 330 to 430 ft elevation; Plot II, gently sloping, from 350 to 450 ft elevation. **Coverage:** Plot I: May 22-23, 26, 30; June 5, 7, 16, 19-20, 22, 26, 29. Plot II: May 22, 24, 27; June 3, 7, 8 (twice), 14, 21, 24, 27; July 2. All trips between dawn and 2100 hours. Total man-hours: 37. Miscellaneous observations not included in this figure. **Census:** Plot I: Wood Thrush, 10 (71, 29); Black-and-white Warbler, 6 (42, 17); Rufous-sided Towhee, 6 (42, 17); Red-eyed Vireo, 5 (35, 14); Worm-eating Warbler, 5 (35, 14); Ovenbird, 5 (35, 14); Ruffed Grouse, 3 (21, 9); Am. Robin, 3 (21, 9); N. (Baltimore) Oriole, 3 (21, 9); Hooded Warbler, 3 (21, 9); Mourning Dove, 2; Blue Jay, 2; Black-capped Chickadee, 2; Gray Catbird, 2; Am. Redstart, 2; Red-winged Blackbird, 2; Scarlet Tanager, 2; Cardinal, 2; Yellow-billed Cuckoo, 1; Whip-poor-will, 1; E. Wood Pewee, 1; Barn Swallow, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; House Wren, 1; Brown Thrasher, 1; Veery, 1; Black-throated Green Warbler, 1; Chipping Sparrow, 1. **Total:** 29 species; 76 territorial males ($537/\text{km}^2$, 217 per 100 acres). **Visitors:** Turkey Vulture, Red-tailed Hawk, Herring Gull, Rock Dove, Black-billed Cuckoo, Great Horned Owl,

Barred Owl, Chimney Swift, Red-bellied Woodpecker, Downy Woodpecker, Great Crested Flycatcher, E Phoebe, Com. Crow, White-breasted Nuthatch, Mockingbird, Cedar Waxwing, Starling, Yellow-Throated Vireo, Tennessee Warbler, Yellow-rumped (Myrtle) Warbler, N. Waterthrush, Louisiana Waterthrush, Canada Warbler, House Sparrow, Red-winged Blackbird, Com. Grackle, Brown-headed Cowbird, Evening Grosbeak, Purple Finch, Pine Siskin, Dark-eyed (Slate-colored) Junco, White-throated Sparrow. **Census, Plot II:** Rufous-sided Towhee, 8 (57, 23), Blue-winged Warbler, 5 (35, 14); House Wren, 4 (28, 11); Field Sparrow, 3 (21, 9); Yellow-billed Cuckoo, 2; Chimney Swift, 2; Gray Catbird, 2; Brown Thrasher, 2; N. (Baltimore) Oriole, 2; Scarlet Tanager, 2; Rose-breasted Grosbeak, 2; Indigo Bunting, 2; Am. Woodcock, 1; Mourning Dove, 1; Com. (Yellow-shafted) Flicker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; E. Phoebe, 1; Tree Swallow, 1; Black-capped Chickadee, 1; Mockingbird, 1; Am. Robin, 1; Wood Thrush, 1; E. Bluebird, 1; Starling, 1; Black-and-white Warbler, 1; Prairie Warbler, 1; Ovenbird, 1; E. Meadowlark, 1; Red-winged Blackbird, 1; Am. Goldfinch, 1; Chipping Sparrow, 1. **Total:** 32 species, 56 territorial males ($396/\text{km}^2$, 160 per 100 acres) **Visitors:** Canada Goose, Mallard, Turkey Vulture, Red-tailed Hawk, Ruffed Grouse, Bobwhite, Greater Yellowlegs, Black-billed Cuckoo, Barred Owl, Whippoor-will, Ruby-throated Hummingbird, Barn Swallow, Blue Jay, Com. Crow, Red-eyed Vireo, Nashville Warbler, Chestnut-sided Warbler, Com. Yellowthroat, Am. Redstart, House Sparrow, Com. Grackle, Purple Finch, Song Sparrow. **Remarks:** In both plots, the number of territorial males was identical to the last (1967) census. Total breeding species decreased by one in Plot I between 1967 and 1973, and increased by five in Plot II. However, bird populations in the areas in 1967 may have been affected by a late spring, a storm May 25-26, and extensive aerial spraying of sevin in adjacent areas for gypsy moth control. The number of territorial males in 1964 exceeded the 1973 figures by 14 in Plot I and 20 in Plot II. The number of breeding species within the plots in 1964 and 1973 were the same. Most significant is the decrease in breeding bird density from 1964 to 1973 of 15.6% for Plot I and 26.4% for Plot II. Significant changes in bird populations in Plot I from the 1964 and 1967 censuses to 1973 include the following: Wood Thrush (4 territorial males in 1964, 6 in 1967, 10 this year), Worm-eating Warbler (2 in 1964, 1 in 1967, 5 this year), Ovenbird (10 in 1964, 8 in 1967, 5 this year), Hooded Warbler (8 in 1964, 5 in 1967, 3 this year). In Plot II, slight decreases from the 1964 and 1967 censuses to this year occurred in the number of breeding towhees and Field Sparrows. — ALLEN T. CARROLL and RICHARD H. GOODWIN, Connecticut College, New London, Conn. 06320.

125. MIXED DECIDUOUS FOREST. — **Location:** North Carolina; Orange Co., $4\frac{1}{2}$ miles N of Chapel Hill on N.C. Highway 86; Duke Natural Area, 35°59'N, 79°04'W, Chapel Hill Quadrangle, USGS. **Continuity:** New. **Size:** 8.8 ha = 21.8 acres (estimated by plotting boundaries on a map of the area and de-

terminating the area from the map) **Description of Plot:** The dominant canopy trees are Am. Beech (*Fagus grandifolia*), Red Maple (*Acer rubrum*), N. Red Oak (*Quercus rubra*), and Tulip-tree (*Liriodendron tulipifera*). A quantitative study measured the per cent cover of each tree species along 26 regularly spaced, 50 meter transects. Per cent cover is here defined as the per cent of the transect covered (vertical projection) by the limbs and branches of a tree species. This study yielded the following averages for trees representing more than 5% cover: Am. Beech, 41.4%; Red Maple, 18.0%; N. Red Oak, 14.4%; Tulip-tree, 12.1%; White Oak (*Quercus alba*), 9.8%; Am. Hornbeam (*Carpinus caroliniana*), 9.6%; Flowering Dogwood (*Cornus florida*), 8.6%; Sweet Gum (*Liquidambar styraciflua*), 8.6%; Sourwood (*Oxydendrum arboreum*), 6.8%; Loblolly Pine (*Pinus taeda*), 6.2%. All pines were scattered near the eastern edge of the plot; canopy cover was nearly total. Understory plants, locally common but absent from much of the area included: Greenbrier (*Smilax sp.*), Smooth Alder (*Alnus serrulata*), Winged Elm (*Ulmus alata*), Sassafras (*Sassafras albidum*), Poison Ivy (*Rhus radicans*) and Southern Bush-Honeysuckle (*Diervilla sessilifolia*). Ground cover was diverse and was never dominated by only a few species; among the species found were: Christmas Fern (*Polystichum acrostichoides*), Drooping Trillium (*Trillium flexipes*), Downy Rattlesnake Plantain (*Goodyera pubescens*), Round-lobed Hepatica (*Hepatica americana*), violets (*Viola sp.*), False Solomon's Seal (*Smilacina sp.*), Foamflower (*Tiarella cordifolia*), Trout Lily (*Erythronium americanum*), May-apple (*Podophyllum peltatum*), and Violet Wood-Sorrel (*Oxalis violacea*). Plant names are from M. L. Fernald, *Gray's Manual of Botany*, 8th ed., 1950. The census plot lies in the North Carolina Piedmont. Old Field Creek is intersected within the plot by smaller, swifter Center Branch Creek. Center Branch Creek has a gradient of 27.5 m/km = 140 ft/mile. Two general soil types are represented within the plot: a Congaree soil type, consisting of alluvial deposits from igneous rocks and moderately well drained, found along both of the above mentioned creeks; also a well-drained George Weille soil type consisting of silt loam of which the apparent material is fine grained slates; found in upland areas. **Edge:** The plot is bor-

dered by N C Highway 86 on the west, a dense Loblolly Pine forest (planted in 1943) to the south, a mixed deciduous-coniferous forest, similar to the census plot except for increased numbers of pines, to the east and to the north. **Topography:** rolling; elevation ranges from 131-149 m = 430-475 ft. **Weather:** Very wet through census period. **Coverage:** April 1, 3, 8, 10, 17, 20, 24, 29; May 1, 10, 13; June 8, 14. All trips between dawn and 0840 hours. Total man-hours 19. **Census:** Acadian Flycatcher, 11 (125, 51); Red-eyed Vireo, 10 (114, 46); Wood Thrush, 8.5 (97, 39); Carolina Wren, 8 (91, 37); Tufted Titmouse, 4 (46, 18); Cardinal, 3.5 (40, 16); Ovenbird, 3 (34, 14); Red-bellied Woodpecker, 2.5; Scarlet Tanager, 2.5; Carolina Chickadee, 2; Blue-gray Gnatcatcher, 2; Louisiana Waterthrush, 2; Yellow-throated Warbler, 1.5; Hairy Woodpecker, 1; Blue Jay, 1; Hooded Warbler, 1; Rufous-sided Towhee, 0.5; Downy Woodpecker +; Pine Warbler +; Yellow-billed Cuckoo +. **Total:** 20 species: 67 territorial males (764/km², 308 per 100 acres). **Visitors:** Red-shouldered Hawk, Bobwhite, Mourning Dove, Ruby-throated Hummingbird, Belted Kingfisher, Com. (Yellow-shafted) Flicker, Com. Crow, White-breasted Nuthatch, Mockingbird, Am. Robin, Yellow-throated Vireo, Worm-eating Warbler, N Parula, Com. Yellowthroat, Yellow-breasted Chat, Red-winged Blackbird, Com. Grackle, Indigo Bunting, Am. Goldfinch. **Remarks:** No nests found. Tufted Titmouse: 2 ad., 4 imm. seen together on June 8; Carolina Wren: 2 ad., 3 imm. on June 14. Very high densities of Wood Thrush (scattered throughout) and Acadian Flycatcher (along creeks) were noteworthy. Migratory Red-eyed Vireos were very abundant and confused the records; the estimate of residents was obtained from the last four censuses only, and is surely an underestimate. Yellow-billed Cuckoo, first noted on June 8, could not be estimated from the records; entered as (+). The Hooded Warbler arrived very late (after June 8) and was perhaps not mated. Special thanks to Ingrid Olmsted and Dr. Boyd Strain for providing the data for the habitat description; Dr. Bornkamm for providing information on soil types. — GARD OTIS (compiler), Dept. of Systematics and Ecology, University of Kansas, Lawrence, Kans. 66045, SEBASTIAN PATTI, ROBERT S. RIDGELY.