

Thirty-fifth Breeding-Bird Census

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The inexplicable slump in the number of breeding-bird censuses taken in 1970 was reversed this year and the total rebounded nearly to the 1968-69 level. The number of contributors rose to 53, an increase of 5 over last year, but the number of states and provinces represented remained the same. It is still sad to see the very poor participation from west of the Mississippi River, a fact that has been emphasized by our past Editor. Only 17 censuses were received from the West, 7 of which were taken in California.

It is interesting that some of the smallest states — West Virginia, Maryland, and Connecticut — account for the highest number of censuses conducted in the East. One need only glance at the accompanying map to be chagrined at the very thin coverage received *anywhere* in the country. Were it not for the organized efforts of Point Reyes Bird Observatory in California, the Brooks Bird Club in West Virginia, the Indiana Academy of Sciences and the White Memorial Foundation in Connecticut, this year's coverage would have been even slimmer. One need be involved in the business of census work only a short time to understand the situation that exists; the same resistance is usually met with by any project that is being carried out. If there is a real value in these breeding-bird censuses, and a real need for them, then a more serious crusade will have to be waged in order to substantially increase coverage. Our corps of birders does not swarm to our assistance like today's young people have to their Woodstocks! Earnest, persistent pressure will have to be exerted, state-by-state, on a personal basis in order to produce satisfactory results.

The standardization of bird census work continues to be a weighty problem. This becomes especially apparent when one attempts to use data from many areas, gathered by a wide assortment of workers. When viewed on a world-wide scope, where techniques and units of measurement tend to be varied, this problem is even more pronounced. Giant steps forward

were recently taken by the International Bird Census Committee and it is hoped that the participants in *American Birds* Breeding-bird Censuses will quickly fall in stride. Recommendations toward this end were presented in last December's issue of *Audubon Field Notes* (24: 723-726). This paper should be studied carefully by all new (and old) participants, before they undertake their 1972 census work. [Note: Line 14, last paragraph, page 726 should read *multiply* males.] Hardly more than one-third of the reports this year gave plot size in the recommended units of measurement (hectares and acres). Workers planning to establish new censuses should give special attention to the plot organization suggestions. In summary, the minimum size should be 40-100 hectares (100-250 acres) in an open habitat and 10-30 hectares (25-75 acres) in a closed habitat. Smaller units than this, especially those presenting large amounts of edge, offer great difficulty in determining the number and size of territories. This point was realized by more than one worker this year (see Censuses 4, 22, 28, 35, 47, 50).

Only two of this year's workers (Censuses 1, 10, 35) used the quantitative method of habitat description presented by James and Shugart (*Audubon Field Notes* 24: 727-736, 1970). Certainly all new workers (as well as those with established plots that might well benefit from a redescription) should study this paper closely. The method presented, although perhaps at first appearing difficult, actually helps one organize his efforts effectively and enables him to present a plot description in a very meaningful manner with just a few hours of field work.

Most of the Connecticut reports (Censuses 8, 36, 46, 59, 64, 65) mentioned the heavy infestation of span worms and Gypsy Moths. Some workers tended to think that bird populations decreased as a result of the defoliation caused by these pests; others felt the abundant food supply that they provided actually benefited the bird population.

Apparently weather conditions did not greatly affect the breeding season throughout most of the country, even though some workers commented upon the lateness of the season. An exception to this was presented by Censuses 39 and 51, which reflected the adverse effects of the severe drought that hit the Southwest. However, even workers as far north as Ohio (Census 43) and Michigan (Census 22) mentioned the dryness of the season.

Past editors have emphasized the importance of long-term studies in showing real trends in population changes. A good example of this point is shown by Census 7. Last year's summary mentioned the sharp (50%) decline in numbers of Slate-colored Juncos. However, this year the total was back up to (and a bit higher than) the 1968-69 level. With the very small sample size presented by our census reports and the many forces acting upon population numbers it is, indeed, difficult to evaluate apparent short-term changes. From year to year the sharp changes that are often shown by a particular plot may merely reflect the normal fluctuations that can be expected in biological populations. Only by continuing the study for a number of years can one expect to measure the real trends that may be taking place.

For the second year a Clay-colored Sparrow was recorded as breeding in western New York (Census 45). This year the nest was actually found and was known to have successfully fledged young. The tête-à-tête between the

Wood Thrush and Veery on Census 67 continues. The Veery was again in top place, however an increase was also recorded for the Wood Thrush. This year the use of a tape recorder to induce singing may have enabled the workers to obtain a better count. The picture of the apparent decline of Black-and-white Warblers is less clear, partly owing to the fact that many of the censuses that previously reported their decline have not been repeated. This warbler continues to be absent from the Upland Mixed Forest (Census 17) in North Carolina, where it showed a steady decline for several years, and is recorded only as a visitor to the New Jersey plot (Census 66) where it was formerly much more abundant. However, in Census 36 Black-and-white showed the following from 1965 to 1971 (not taken in 1970): 3, +, visitor, +, 3.5, 3. This readily shows the danger in attempting to show population changes between any 2 years — or even over a period of 4 or 5. We very clearly need long-term studies before really meaningful trends can be discerned. Alas, that we have so few censuses such as number 70, which has been conducted since 1937.

The census distribution map shows very clearly the areas that need coverage. Fewer than half of the states and provinces are represented by even a single plot and a small number of habitat types are included. There is no doubt that a great challenge presents itself for the coming year(s).



New York State's first breeding Clay-colored Sparrows. See Census 45.

LIST OF CENSUSES

Forest Habitats

Deciduous (Lowland)

- 1. Hickory - Oak - Ash Floodplain Forest Maryland
- 2. Mature Deciduous Floodplain Forest Maryland
- 3. Woodland Swamp North Carolina
- 4. Old Growth Bottomland Forest Indiana
- 5. Floodplain Cottonwood Forest Colorado
- 6. Riparian Oak Woodland California

Deciduous (Upland)

- 7. Upland Deciduous Forest New York
- 8. Second-growth Hardwood Forest Connecticut
- 9. Upland Beech - Maple Forest Connecticut
- 10. Upland Tulip-tree - Maple - Oak Forest Maryland
- 11. Mixed Hardwood Forest Maryland
- 12. Mature Northern Hardwoods West Virginia
- 13. Maturing Oak - Hickory Forest West Virginia
- 14. Oak - Hickory Forest West Virginia
- 15. Pole-sized Oak Woods West Virginia
- 16. Ridge and Valley Hardwood Forest Tennessee
- 17. Upland Mixed Forest North Carolina
- 18. Mountain Ravine Mixed Forest Georgia
- 19. Southern Mixed Hardwood Forest Georgia
- 20. Aspen Forest Ontario
- 21. Mature Poplar Forest Ontario
- 22. Mixed Hardwood Forest Michigan
- 23. Beech - Maple Forest Indiana
- 24. Old Growth Beech - Tulip-tree - Black Gum Forest Indiana
- 25. Old Growth Oak - Hickory Forest Indiana
- 26. Old Growth White Oak - Beech - Sugar Maple Forest Indiana
- 27. Green Ash Woodland Manitoba
- 28. Deciduous Oak Woodland California

Coniferous

- 29. Maturing Upland Red Pine - White Pine Plantation New York
- 30. Black Spruce Forest Ontario
- 31. Mature Jack Pine Forest Ontario
- 32. Ponderosa Pine - Scrub Oak - Mountain Mahogany Woodland Colorado
- 33. Mature Douglas-fir Forest California

Coniferous-Hardwood (Mixed)

- 34. Mixed Coniferous - Hardwood Forest New Brunswick
- 35. Fairly Open Pine - Hemlock - Hardwood Forest Maine
- 36. Climax Hemlock - White Pine Forest with Transition Hardwoods Connecticut
- 37. Disturbed Fir - Spruce Forest with Alder Openings Quebec
- 38. Lodgepole Pine Forest with Aspen Colorado

Desert Habitat

- 39. Mesquite - Palo Verde - Saguaro Desert Arizona

Forest Habitat with Edge

- 40. Oak-Maple Forest and Edge Illinois

Urban Habitats

- 41. Wooded City Ravine Ontario
- 42. Urban Cemetery Ontario
- 43. Residential Street Ohio

Brushy and Scrub Forest Habitats

- 44. Willow - Alder Thickets on Old Fields Quebec
- 45. Upland Scotch Pine Plantation New York
- 46. Upland Brushy Pasture Connecticut
- 47. Powerline Right-of-way Maryland
- 48. Abandoned Bottomland West Virginia
- 49. Cut-over Oak - Hickory Forest West Virginia
- 50. Powerline Clearing through Upland Mixed Forest North Carolina
- 51. Live Oak - Mesquite Brushland Texas
- 52. Juniper - Sage Upland Oregon
- 53. Disturbed Coastal Chaparral California
- 54. Coastal Chaparral California
- 55. Logged Douglas-fir Forest California

Fresh Water Wetland Habitats

- 56. Shrubby Swamp and Sedge Hummocks Connecticut
- 57. Leatherleaf Bog Ontario

Grassland and Cultivated Areas

- 58. Hayfields and Pasture Quebec
- 59. Partially Abandoned Hayfields and Pastures Connecticut
- 60. Cultivated Field and Abandoned Airstrip North Carolina
- 61. Hay Field Ontario
- 62. Wheat and Corn Indiana
- 63. Foothill Grassland California

Mixed Habitats

- 64. Mixed Upland Habitat and Swamp Connecticut
- 65. Suburban Wildlife Sanctuary Connecticut
- 66. Deciduous Forest with Pond and Brook New Jersey
- 67. Mixed Upland Habitat District of Columbia
- 68. Mixed Upland Habitat West Virginia
- 69. Partially Cut-over Pine - Oak Forest West Virginia
- 70. Disturbed Oak - Hickory Forest, Pine Stand, Edge and Pond Ohio
- 71. Mixed Deciduous - Pine and Old Field Mississippi
- 72. Oak - Hickory - Walnut Forest and Meadow Iowa
- 73. Mixed Prairie Park Nebraska

Urban Strip Census

- 74. City Streets and Yards Colorado

by the tulip-tree-maple-oak study plot (census number 10). A buffer strip of at least 50 feet separated the study plot from the old field; at some points along the eastern boundary the golf course approached to within less than 50 feet but this was not felt to have had any measurable influence on the bird population of the study plot. **Topography:** Essentially flat, but sloping about 5 feet per 1000 feet toward the south-southeast. The floodplain is bisected by the Middle Patuxent River. **Elevation:** 297-310 feet. The river flowed through a deep channel. Elevation at low water, 292-295 feet. **Coverage:** June 9, 11, 18, 21, 23, 28, 30; July 5, 6, 7, 15, 16, 31. Census trips started at about dawn. Total man-hours, 38.5. **Census** (territorial males, followed in parentheses by males per square kilometer and males per 100 acres): Acadian Flycatcher, 19 (103, 42); Cardinal, 17 (92, 37); White-eyed Vireo, 11.5 (62, 25); Am. Redstart, 11 (60, 24); Catbird, 10.5 (57, 23); Kentucky Warbler, 9 (49, 20); Wood Thrush, 8.5 (46, 19); Red-eyed Vireo, 8 (43, 18); Carolina Wren, 7 (38, 15); E. Wood Pewee, 6 (33, 13); Tufted Titmouse, 6 (33, 13); Rufous-sided Towhee, 6 (33, 13); Downy Woodpecker, 5 (27, 11); Carolina Chickadee, 5 (27, 11); Cerulean Warbler, 5 (27, 11); Red-bellied Woodpecker, 4 (22, 9); Parula Warbler, 4 (22, 9); Veery, 3 (16, 7); Blue-gray Gnatcatcher, 3 (16, 7); Louisiana Waterthrush, 3 (16, 7); Brown-headed Cowbird, 3 (16, 7); Scarlet Tanager, 3 (16, 7); Yellowthroat, 2.5; Yellow-billed Cuckoo, 2; Yellow-shafted Flicker, 2; White-breasted Nuthatch, 2; Yellow-throated Vireo, 2; Am. Goldfinch, 2; Bobwhite, 1.5; Hooded Warbler, 1.5; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Com. Crow, 1; Indigo Bunting, 1; Red-shouldered Hawk, +; Broad-winged Hawk, +; Mourning Dove, +; Barred Owl, +; Hairy Woodpecker, +; Fish Crow, +; Brown Thrasher, +; Worm-eating Warbler, +; Ovenbird, +. **Total:** 46 species; 180 territorial males (978 per square kilometer, 396 per 100 acres). **Visitors:** Am. Woodcock, Purple Martin, Robin, Blue-winged Warbler, Red-winged Blackbird, Baltimore Oriole, Com. Grackle, Chipping Sparrow. **Remarks:** The diversity of species nesting in the study plot is exceptionally high. This is attributed to the extremely dense undergrowth, especially along the river (the river averages 30 to 40 feet in width). Nesting species of special interest in this study plot are the Pileated Woodpecker (a recent arrival and the only one known in this section of the Middle Patuxent River), the Veery (which is not known to nest elsewhere in the Middle Patuxent watershed) and the Cerulean Warbler (which, although fairly common within the study plot, is at the very edge of its range and is rare and local elsewhere in Howard County). One Cerulean Warbler was seen feeding a young cowbird. Twice in late summer the ground was completely inundated by flood waters. This census and census number 10 in an adjacent upland plot were conducted by personnel of the Antioch College Human Ecology Center as part of a natural inventory of the Middle Patuxent Valley, under contract with the Howard Research and Development Corporation and the Columbia Association and under the technical supervision of U.S. Fish and Wildlife Service biologists

of the Migratory Bird Populations Station. — EDWARD F. CONNOR, DEDRA BUCHWALD, GARY KEETON, RAY NICHOLS, MICHELLE PAVILLARD, PAUL WAGNER; AELRED GEIS, LARRY L. HOOD and CHANDLER S. ROBBINS (compiler), *Antioch College, Columbia, Md.*; and *Migratory Bird Populations Station, Laurel, Md. 20810.*

2. MATURE DECIDUOUS FLOODPLAIN FOREST. — **Location:** Maryland; Glen Echo, 2½ miles northwest of the District of Columbia, between the C. and O. Canal and the Potomac River. **Size:** 18.75 acres. **Description of Area:** See *Audubon Field Notes* 1: 212-213 (1947). A heavily wooded island bounded by Cabin John Creek, the Potomac River, and a narrow partially dry channel separating the island from a narrow strip of mainland adjoining the towpath and canal. **Coverage:** April 11 (2 trips), 15, 18, 27; May 1, 9, 15 (2 trips), 23, 27; June 12, 13, 17, 20. The 15 trips were taken between 5:25 and 10:30 a.m., E.S.T., and totalled 34.1 hours (average 2.27 hours). **Census:** Starling, 25 (133); Red-eyed Vireo, 14 (75); Acadian Flycatcher, 13 (69); Parula Warbler, 10 (53); Am. Redstart, 9 (48); Cardinal, 7 (37); Carolina Chickadee, 5 (27); Tufted Titmouse, 5 (27); Carolina Wren, 5 (27); Brown-headed Cowbird, 5, (27); Downy Woodpecker, 4 (21); Prothonotary Warbler, 3 (16); E. Wood Pewee, 2.5; Song Sparrow, 2.5; Yellow-shafted Flicker, 2; Red-bellied Woodpecker, 2; Veery, 2; Blue-gray Gnatcatcher, 2; Wood Duck, 1; Barred Owl, 1; Great Crested Flycatcher, 1; White-breasted Nuthatch, 1. **Total:** 22 species; 122 territorial males (651 per 100 acres). **Visitors:** Great Blue Heron, Green Heron, Mallard, Spotted Sandpiper, Belted Kingfisher, Blue Jay, Com. Grackle. **Remarks:** Nests found: Yellow-shafted Flicker, 1; Starling, 13. This area has been censused almost every year since 1947. The current data show no significant change in total abundance. The number of species, however, is relatively low, well below the 1947-1971 average of 27 species. This reflects in part a loss of species that previously nested in small numbers but have not nested since 1962-65: the Yellow-throated Vireo, Kentucky Warbler and Scarlet Tanager. The Pileated Woodpecker, which usually nests, failed to do so although it investigated various holes. This year the Wood Thrush failed to nest for the first time. This species provided an average of 5 pairs per season (27 pairs per 100 acres) in the period 1947-57 but began to decrease in 1958, with 2 pairs in that year. In 1962 the Veery (2 pairs) nested in the area for the first time. From 1962 to 1968 Veery and Wood Thrush averaged 6 pairs (3 pairs each), somewhat above the original incidence of 5 pairs for Wood Thrushes alone. Thus the Veery seemed to be occupying areas left vacant by the Wood Thrush. In 1971, however, Veeries dropped to 2 pairs and the Wood Thrush disappeared altogether. Although the total abundance of nesting birds remains about the same, the data show an increase of certain birds and a decrease of others. Since 1960 Starlings have increased substantially both as winter residents and breeding pairs. Meanwhile other species showing a downward trend include the White-breasted Nuthatch, Blue-gray

Gnatcatcher, Red-eyed Vireo, Am. Redstart and Song Sparrow. As stated in previous reports the only obvious change in habitat, coinciding with the shifts in abundance, is the building of a highway across the Canal in 1958, producing greater openness around the census tract and more human activity nearby. — JOAN H. CRISWELL (compiler) and W. H. CRAMER, *Audubon Naturalist Society of the Central Atlantic States, Woodend, 8940 Jones Mill Road, Washington, D. C. 20015.*

3. WOODLAND SWAMP. — Location: North Carolina; near abandoned North Wilkesboro Airport. Size: 6.25 acres. Description of Area: See *Audubon Field Notes* 10: 420 (1956). Coverage: April 30; May 9, 16, 24; June 2, 9, 15; with frequent observations throughout the season. Hours varied from 9 a.m. to 6 p.m. and totaled 22 man-hours. Census: Com. Grackle, 7 (112); Cardinal, 5 (80); Catbird, 4 (64); Bobwhite, 3 (48); Traill's Flycatcher, 3 (48); Carolina Wren, 3 (48); Rufous-sided Towhee, 3 (48); Mourning Dove, 2; Robin, 2; Yellow Warbler, 2; Yellowthroat, 2; Red-winged Blackbird, 2; Indigo Bunting, 2; Song Sparrow, 2; Green Heron, 1; Yellow-billed Cuckoo, 1; Yellow-shafted Flicker, 1; E. Phoebe, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Mockingbird, 1; Brown Thrasher, 1; Wood Thrush, 1; White-eyed Vireo, 1; Red-eyed Vireo, 1; Yellow-breasted Chat, 1; Orchard Oriole, 1; Field Sparrow, 1. Total: 28 species; 56 territorial males (896 per 100 acres). Remarks: Growth of the forest trees has taken place with much more of the area now in shade. This may account for the reduction in the number of warblers. Shrubs and vines are also more dense. — WENDELL P. SMITH, *North Wilkesboro, N.C. 28659.*

4. OLD GROWTH BOTTOMLAND FOREST. — Location: Indiana; North Hemmer Woods, 2 miles southeast of Mackey, Gibson County; 38°14'N, 87°22'W, Lynnvile Quadrangle, U.S.G.S. Size: 18 acres (irregularly trapezoidal, 292 x 440 yards; size measured from map by planimeter as checked by compass and pacing in the field). Description of Area: A remnant of bottomland forest; soil acid, Waverly silt loam, poorly drained. Smith Fork of Pigeon Creek meanders through the stand; 200 feet south of the area, however, is a deeply dredged ditch which carries much or most of the Smith Fork water. Dr. Marion T. Jackson studied the plant ecology of the area in 1968; an extract of his reports (*Proc. Indiana Acad. Sci.* 78: 245-254, 1969, and pp. 98-101 in A. A. Lindsey, D. V. Schmelz and S. A. Nichols, *Natural Areas in Indiana and their Preservation*. Purdue Univ., Lafayette, 1969), follows — "A full tally of 11.33 acres yielded 32 species in the size classes greater than 4 inches DBH. The size of individual trees and the great number of large trees are the most striking features. Eleven species have a total of 74 individuals in the 30 inch or larger classes, and 18 stems greater than 40 inches fell within the study plot. Three Tulip-trees exceed 50 inches; the largest at 54.6 inches is 151 ft. tall with 53 ft. of clear length. The general canopy level is about 120 ft. The shrub stratum is dominated by Spicebush (*Lindera benzoin*), Bladdernut (*Staphylea trifolia*), Wahoo (*Euonymus atropurpureus*), and Greenbrier (*Similax rotundifolia*)." Webster noted the most abundant herbs as Stinging Nettle (*Urtica procera*), Virginia Bluebell (*Mertensia virginica*), Orange Jewelweed (*Impatiens biflora*), and Sweet White Violet (*Viola blanda*). Edge: The woods

TABLE 1. Vegetational attributes in North Hemmer Woods, from Jackson, 1969.

Species	B ₂ (Basal area per acre in sq. ft.)	D ₂ (Density per acre)	V ₃ (Importance)
Tulip-tree <i>Liriodendron tulipifera</i>	23.9	5.7	11.5
Sweet Gum <i>Liquidambar styraciflua</i>	22.7	10.1	13.0
Sycamore <i>Platanus occidentalis</i>	11.7	2.8	5.6
White Oak <i>Quercus alba</i>	9.8	2.2	4.6
Red Maple <i>Acer rubrum</i>	7.9	11.6	8.1
Shagbark Hickory <i>Carya ovata</i>	7.2	6.5	5.6
Sassafras <i>Sassafras albidum</i>	6.7	8.3	6.2
Black Gum <i>Nyssa sylvatica</i>	6.2	6.9	5.4
Am. Elm <i>Ulmus americana</i>	5.3	12.2	7.5
Green Ash <i>Fraxinus pennsylvanica</i>	5.2	3.8	3.4
Hackberry <i>Celtis occidentalis</i>	5.2	12.0	7.3
Red Oak <i>Q. rubra</i>	4.5	1.2	2.2
Red Elm <i>U. rubra</i>	3.7	11.6	6.6
White Ash <i>F. americana</i>	3.5	4.1	3.1
Shellbark Hickory <i>C. laciniosa</i>	2.9	2.2	2.1
River Birch <i>Betula nigra</i>	2.2	1.2	1.3
Black Cherry <i>Prunus serotina</i>	1.5	2.5	1.7
Bitternut Hickory <i>C. cordiformis</i>	1.2	.8	.8
Pawpaw <i>Asimina triloba</i>	.2	1.8	.9
13 other species	2.6	4.3	2.9
	134 (Stand basal area per acre)	111 (Stand density per acre)	

Names of plants and method of plant analysis follow the two papers cited.

is an island-like stand of forest, surrounded by a dirt road (Soybean field beyond) on the west, Corn fields on the north and east, and a hay field (unmown) on the south. The nearest other woods is South Hemmer Woods, 400 feet away across the hay field. Because of the small size of the area, the boundary line used was the extent of the tree branches. While large trees grew right to the margin, there was a brushy transition zone of undergrowth 10-20 feet wide. **Topography:** Rather flat except for a low ridge at the northeast and the creek bed, which has muddy banks 3 feet high in most places. The creek was running until June 25, and full of water (except at one place) until after July 3. Relief 10 feet; elevation 410-420 feet. **Weather:** Generally, late April and May were mild, with a few heavy showers. During count periods, the sky was overcast once, but otherwise clear or mostly so; the wind never exceeded 4 m.p.h.; the temperature ranged from 50 to 83 F. **Coverage:** April 26 (partial), 27; June 9 (partial), 10, 14, 17, 25, 29; July 2, 3. Total 36 man-hours, including 8 complete morning counts (usually 5:00-8:30 a.m.) and 3 brief early evening counts. Also, camp was beside the area and some time each evening was spent listening. **Census:** Wood Thrush, 5 (28); Red-eyed Vireo, 5 (28); Cardinal, 5 (28); Indigo Bunting, 4.5 (25); Red-bellied Woodpecker, 4 (22); Downy Woodpecker, 4 (22); E. Wood Pewee, 4 (22); Carolina Chickadee, 4 (22); Tufted Titmouse, 4 (22); Blue-gray Gnatcatcher, 4 (22); Cerulean Warbler, 4 (22); Kentucky Warbler, 4 (22); Yellow-billed Cuckoo, 3 (17); Red-headed Woodpecker, 3 (17); Yellow-throated Vireo, 3 (17); Mourning Dove, 2.5; Yellow-shafted Flicker, 2; Great Crested Flycatcher, 2; White-eyed Vireo, 2; Com. Grackle, 2; Brown-headed Cowbird, 2 (females); Rufous-sided Towhee, 2; Song Sparrow, 2; Wood Duck, 1; Screech Owl, 1; Black-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Blue Jay, 1; White-breasted Nuthatch, 1; E. Bluebird, 1; Prothonotary Warbler, 1; Yellow-throated Warbler, 1; Hooded Warbler, 1; Summer Tanager, 1; Am. Goldfinch, 1; Hairy Woodpecker, 0.5; Com. Crow, 0.5; Yellowthroat 0.5; Red-tailed Hawk, +; Bobwhite, +; Barred Owl, +; Chuck-will's-widow, +; Pileated Woodpecker, +; E. Kingbird, +; Red-winged Blackbird, +; Field Sparrow, +. **Total:** 48 species; 93.5 territorial males (519 males per 100 acres). **Visitors:** Green Heron, Mallard, Blue-winged Teal, Cooper's Hawk, Chimney Swift, Robin, Yellow Warbler. **Remarks:** The area is, of course, non-uniform because of edge effect. Had the boundary been moved in 50 feet all around, to lessen edge effect, the resulting area would have been unacceptably small, but these species would have been eliminated - Bobwhite, Chuck-will's-widow, E. Bluebird, Red-winged Blackbird, Field Sparrow. It is important to note that the high species number and lack of any especially common species correlate with the trees as analyzed by Jackson - several codominant species and a high species number. We thank Miss Amanda Hemmer and the Messrs. L. H. and E. J. Hemmer, the owners, for permission to make this study in Hemmer woods. Financial assistance was received from the Indiana Academy of Science. - J. DAN WEBSTER and DIANA L. ADAMS, *Hanover College, Hanover, Ind. 47243.*

5. FLOODPLAIN COTTONWOOD FOREST. - **Location:** Colorado, in Jefferson County, about 10 miles southwest of Denver on west bank of South Platte River, 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; NE¼, Section 14, Township 6 S., Range 69 W of 6th P.M.; 39°32'N, 105°5'W, Littleton Quadrangle, U.S.G.S. Elevation 5425 feet. **Size:** 24 acres (in an oval shape about 1600 x 850 feet). **Description of Area:** The census area is immediately adjacent to the river, within a typical high plains floodplain. Fourteen acres of mature, dense groves of Plains Cottonwood (*Populus sargentii*) are interspersed with 10 acres of open grassland. Most cottonwoods range from 60 to 100 feet high; the forest has an average density of 89 trees per acre. The cottonwood trees vary from 3 to 40 inches DBH, with an average of 14 inches. Of the standing trees, 0.3% were dead. All portions of the grove contained mature trees except a half-acre plot having 144 trees with an average DBH of 9 inches. Lanceleaf Cottonwood (*Populus acuminata*) comprising less than 1% of the forest trees, two Box-elders (*Acer negundo*), and a few willow trees (*Salix* sp.) are within the grove. The understory is composed mainly of Poison Hemlock (*Conium maculatum*) growing 8 feet high in certain parts of the grove, Canadian Thistle (*Cirsium arvense*), Slender Wheat Grass (*Agropyron trachycaulum*), W. Snowberry (*Symphoricarpos occidentalis*), Golden Currant (*Ribes aureum*), Woodbine (*Parthenocissus inserta*), and Wild Grape (*Vitis riparia*). The open grass areas are composed mainly of Slender Wheat Grass (*Agropyron trachycaulum*) growing to a height of about 3 feet, Canadian Thistle, and smaller amounts of Smooth Broom (*Bromus inermis*). Bordering the east edge of the grove are 8 mature cottonwoods and 6 willow trees, in six separate groups. Also on the east, a draw 500 feet long and 3 feet deep introduces significant edge. In this draw grow willow bushes (*Salix* sp.), Com. Cattails (*Typha latifolia*), bulrushes (*Scirpus* sp.), and sedges (*Carex* sp.). Botanical names are from W. A. Weber, *Rocky Mountain Flora*, 1967. **Edge:** The boundary on the north and one-third of the east is the river, a perennial stream. The remainder of the east boundary and all of the south edge was cleared of trees in 1970. Low plants are beginning to recover the area. The western boundary is a hay meadow which is harvested each summer. The perimeter for the 24 acres studied is about 4200 feet; however, the perimeter for the 14 acres of cottonwood grove is 8000 feet. This illustrates the irregular configuration of the grove. Approximately ten mature cottonwood trees on the southwest edge were knocked to the ground by winds in late 1970 or early 1971. **Topography:** The entire census area is quite flat since it is within the flood plain. Past floods have carved two small, sandy channels, not over 3 feet deep, south to north through the cottonwood grove. On the western edge are four small depressions which fill with ground water and maintain their level through the summer. **Coverage:** April 3, 17; May 20, 22, 26, 29; June 2, 6, 9, 12, 13, 16, 20, 23, 30; July 3, 4, 7, 14, 18, 21, 28, 31; August 4, 11, 18.

Observation times varied between 6 a.m. and 9 p.m. M. D. T. and totaled 93 man-hours. **Census:** House Wren, 26 (268, 108); Yellow Warbler, 23 (237, 96); W. Wood Pewee, 20 (206, 83); Robin, 13 (134, 54); Great Blue Heron, 9 (93, 38); Mourning Dove, 8 (82, 33); Downy Woodpecker, 8 (82, 33); Red-eyed Vireo, 8 (82, 33); Bullock's Oriole, 7 (72, 29); Am. Redstart, 6 (62, 25); Red-shafted Flicker, 4 (41, 17); Black-capped Chickadee, 4 (41, 17); Starling, 4 (41, 17); Warbling Vireo, 4 (41, 17); Yellowthroat, 4 (41, 17); Am. Goldfinch, 4 (41, 17); Lesser Goldfinch, 3 (31, 12); E. Kingbird, 2; Yellow-breasted Chat, 2; Mallard, 1; Red-tailed Hawk, 1; Great Horned Owl, 1; Broad-tailed Hummingbird, 1; Rufous-sided Towhee, 1. **Total:** 24 species; 164 occupied nests or territorial males (1689 per 100 hectares, 683 per 100 acres). Excluding the colonial nesting herons, 155 territorial males (1596 per 100 hectares, 646 per 100 acres). **Visitors:** *Regular:* Killdeer, Com. Nighthawk, Belted Kingfisher, Barn Swallow, Black-billed Magpie, White-breasted Nuthatch, Brown-headed Cowbird, Lazuli Bunting. *Irregular:* Violet-green Swallow, Cliff Swallow, Catbird, Audubon's Warbler, Wilson's Warbler, Com. Grackle, Red-winged Blackbird, House Finch, Chipping Sparrow, White-crowned Sparrow, Song Sparrow. **Remarks:** This cottonwood grove has hosted a heronry for at least 60 years, and probably much longer. Birds using the grove include not only the Great Blue Herons, but also some Black-crowned Night Herons for a while, and a pair or two of Turkey Vultures for a few years. A Great Horned Owl has nested there regularly. The population of Great Blue Herons was probably slightly greater in previous years than in 1971, in some years by 50%. This census was initiated owing to future plans for the study area. The cottonwood grove will lie within the permanent pool of the reservoir created by the Chatfield Dam. Last autumn some of the trees along the river were cut, but all the trees in this study area were left standing, about 500 yards inside the high water line. The reservoir will begin filling in 1973 or 1974. Presumably the trees will die after flooding, and hopefully the Great Blue Herons will move to another location. The Colorado Game, Fish & Parks Department will develop the area for recreational use, with the plan to include protection of the heronry during the nesting season. The Great Blue Herons arrived on April 3, and by April 17 they had begun sitting on the nests. Of 18 nests in the heronry from past years, the herons used 9 and Red-tailed Hawks and Great Horned Owls used one each. The nests 60-80 feet high, were located in the upper canopy of the cottonwoods. Young herons hatched by May 20, and the majority departed by July 18; all by July 28. At least 25 young successfully fledged. The Red-tailed Hawks nested successfully and two young fledged. The Great Horned Owls produced two young. No conflicts between the herons and owls were observed; the owls had finished nesting shortly after the herons arrived. After leaving the nest they remained in the grove, and occupied the understory while the herons restricted themselves to the treetops. A Mallard nest, in an open wheat grass area, was unsuccessful; the female abandoned the nest after laying four eggs, which were subsequently eaten by a snake. Starlings

nested in the grove early in the season, and most had departed by mid-June. A Red-shafted Flicker took over what had previously been a Starling nest hole. Birds restricted to the edge were the Yellow-breasted Chat, Yellowthroat (3 pairs), and Rufous-sided Towhee (an unmated male). The Bullock's Oriole territories included a part of the perimeter of the trees, and two pairs built nests in isolated cottonwoods. A Mourning Dove nest contained 2 eggs on July 28 and 2 young on August 18. We found numerous nests of the House Wren, Downy Woodpecker, and W. Wood Pewee, and one or more of several other species. One pair each of House Wrens, Downy Woodpeckers, and Red-shafted Flickers simultaneously used the same tree with three different nest holes, all within 5 feet of the center hole. Possibly the Black-billed Magpie and White-breasted Nuthatch nested in the grove. Our thanks to Col. B. P. Pendergrass, U. S. Army, Corps of Engineers, for permission to conduct the study, and to Mrs. Marjorie Shepherd for plant identifications. — NANCY HURLEY, HUGH KINGERY, JO TRAINOR, RICHARD BOTTORFF (compiler), 1626 Logan Street, Apt. 235, Denver, Colo. 80203.

6. RIPARIAN OAK WOODLAND. — Location: California; Ancil Hoffman County Park, along the west bank of the American River in Carmichael, Sacramento County; 38°37'N, 121°18'W, Fair Oaks Quadrangle, U.S.G.S. Size: 32 acres (an irregular rectangle, approximately 2200 x 750 feet, measured on county park map). **Description of Area:** The plot is situated between the bluffs and the river bottom. Before the construction of dams upstream the area was flooded during times of high spring water. The bluffs rise along the northern edge of the plot. A small oxbow pond is situated in the southern part of the plot. Along the eastern border, especially the southeastern section where the plot borders the river bottom, the soil is mostly gravel and the trees are scattered. The northern section has more moist soil and thus a thicker undergrowth than the remainder of the plot. The open canopy, about 60 feet high, is composed mostly of Valley Oaks (*Quercus lobata*). A tree survey, made with six 0.1 acre circles, showed 40 trees per acre with an average DBH of 29 in. composed of 42% Valley Oak, avg. DBH 36 in.; 37% Interior Live Oak (*Q. wislizenii*), avg. DBH 11 in.; and 17% Blue Oak (*Q. douglasii*), avg. DBH 45 in. Fremont Cottonwood (*Populus fremontii*), which composes approximately 3% of the tree species, is confined to the moist northern part of the plot. Other tree species present on the plot are Com. Fig (*Ficus carica*), Redbud (*Cercis occidentalis*), Sierra Plum (*Prunus subcordata*), and Black Walnut (*Juglans nigra*). Shrub species besides live oaks include: California Blackberry (*Rubus ursinus*), which forms a dense undergrowth in the northeast corner of the plot, California Wild Rose (*Rosa californica*), Bush Lupine (*Lupinus albus*), Scotch Broom (*Cytisus scoparius*), California Wild Grape (*Vitis californica*), willow (*Salix* sp.), Mexican Elder (*Sambucus mexicana*), and Poison Oak (*Rhus diversiloba*). Important ground species, besides grasses which were not identified, are Vetch (*Vicia americana*), Lupine (*Lupinus bicolor*), Dill (*Anethum*

graveolens), and Star Thistle (*Centaurea solstitialis*). Names from P. A. Munz, *A California Flora*, 1959 and C. F. Brockman, *Trees of North America*. Edge: The eastern edge is bounded by a narrow buffer similar to the plot beyond which is the river bottom, with only scattered willows and roses growing between rocks. The southern edge is bounded by a buffer about 40 yards wide similar to the plot. Beyond the buffer are a golf course and artificial ponds. The western and northern edges are similar to the plot except for the northeast which is bounded by a residential backyard. **Topography:** A slight slope down to the river bottom, about 70 feet elevation. **Coverage:** March 13, 15, 22, 24, 30; April 10, 17; May 1, 15, 29, 31; June 5. On additional dates visits were made but no censuses were taken. Hours were from 6 to 10 a.m. with a total of about 35 man-hours of actual census work. **Census:** Starling, 13 (41); California Quail, 10 (31); Plain Titmouse, 8.5 (27); Rufous-sided Towhee, 8 (25); Scrub Jay, 7 (22); Bewick's Wren, 7 (22); Com. Bushtit, 6.5 (20); Acorn Woodpecker, 3.5 (11); Ash-throated Flycatcher, 3 (9); Nuttall's Woodpecker, 2; Mourning Dove, 1.5; Anna's Hummingbird, 1.5; Red-shafted Flicker, 1.5; Brown-headed Cowbird, 1.5; Downy Woodpecker, 1; White-breasted Nuthatch, 1; Mockingbird, 1; Brown Towhee, 1; Ring-necked Pheasant, 0.5; Green Heron, +; White-tailed Kite, +; Red-shouldered Hawk, +; W. Meadowlark, +. **Total:** 23 species; 82.5 territorial males (258 per 100 acres). **Visitors:** *Regular* (average number per 100 acres): gulls, 37 (overhead, mostly California); Robin, 12; House Finch, 8; Mallard, 4; Tree Swallow, 4; Com. Crow, 4; Killdeer, 3; Am. Goldfinch, 3; Lesser Goldfinch, 3. *Irregular* (average/number of censuses): Tricolored Blackbird, 50/3 (overhead); Rough-winged Swallow, 5/3; Red-winged Blackbird, 4/4; Yellow-billed Magpie, 3/4; Brewer's Blackbird, 3/4; Cinnamon Teal, 2/1; Wood

Duck, 2/1; Pied-billed Grebe, 1/1; Great Blue Heron, 1/1; Turkey Vulture, 1/1; Cooper's Hawk, 1/1; Red-tailed Hawk, 1/2; Sparrow Hawk, 1/3; Great Horned Owl, 1/1; Black-chinned Hummingbird, 1/2; Belted Kingfisher, 1/3; W. Kingbird, 1/1; Barn Swallow, 1/1; Cliff Swallow, 1/3; Blue-gray Gnatcatcher, 1/1; Bullock's Oriole, 1/4; Black-headed Grosbeck, 1/2; Lazuli Bunting, 1/1. **Remarks:** A pair of Bewick's Wrens nested in the ground under a tree along the bluffs. Acorn Woodpeckers were considered territorial because two different colonies had territories covering sections of the plot. One group nested in cottonwoods and the other in Valley Oaks. Nuttall's and Downy Woodpeckers did not appear to compete with each other. The Downy Woodpeckers were apparently confined to the tree tops, twigs, and small outer branches; the Nuttall's Woodpeckers somewhat to the larger branches and tree trunks. Male Anna's Hummingbirds maintained territories only up to the end of March. A male Ring-necked Pheasant was often seen and heard crowing, but no hen was seen. A pair of Green Herons was often seen along the pond and in trees, sometimes several hundred feet from water, but there otherwise was no indication of nesting. A pair of White-tailed Kites was very active and showed some courtship behavior. After the end of March only an occasional kite was seen hunting and the proximity of any nest is unknown. Possible competition with Red-shouldered Hawks might have been a factor causing the kites to nest off the plot. On one occasion a Red-shouldered Hawk was seen to strike one of the kites and displace it from its perch. A pair of Red-shouldered Hawks was regularly seen and included the plot in its territory. A W. Meadowlark was occasionally seen singing from oaks in the more open southeast section. Common Crows were seen carrying nesting material and later food and apparently nested just to the northwest.



Census 6. A small group of Blue Oaks is in the center of the picture. One of the many trails on the plot is also shown.

Wood Ducks might have nested as a pair was seen sitting in a tree on one occasion and on a later date a female was seen with 12 young in a pond just south of the plot. A male Black-chinned Hummingbird was seen displaying 30 yards east of the plot. House Wrens, which have nested in past years, were not seen. Other vertebrates noted were: Bull Frog (*Rana catesbeiana*), W. Fence Lizard (*Sceloporus occidentalis*), California

Mole (*Scapanus latimanus*), Gray Fox (*Urocyon cinereoargenteus*), California Ground Squirrel (*Citellus beecheyi*), W. Gray Squirrel (*Sciurus griseus*), and Black-tailed Jackrabbit (*Lepus californicus*). Tim Manolis aided with census work during May and with the tree census. Ernie Tangren prepared maps for the census work. — GERALD TANGREN, 1423 Banyan Pl., Davis, Calif. 95616.



Census 6. The small oxbow pond with willows along the right margin.

7. UPLAND DECIDUOUS FOREST. — **Location:** New York; 1 mile southeast of East Branch, Delaware County; 41°58'N, 75°07'W, Long Eddy Quadrangle, U.S.G.S. **Size:** 12.1 ha = 30 acres (rectangular, 107 x 45 rods, paced). **Description of Area:** See *Audubon Field Notes* 21: 613-614 (1967). **Coverage:** May 11-July 10; 5 mornings per week, total 97 man-hours. **Census:** Red-eyed Vireo, 10 (82, 33); Veery, 9.5 (78, 32); Canada Warbler, 8.5 (70, 28); Am. Redstart, 8.5 (70, 28); Slate-colored Junco, 8 (66, 27); Wood Thrush, 7.5 (62, 25); Rose-breasted Grosbeak, 7 (58, 23); Black-and-white Warbler, 6 (49, 20); Black-throated Blue Warbler, 5 (41, 17); Scarlet Tanager, 5 (41, 17); Black-capped Chickadee, 3 (25, 10); House Wren, 3 (25, 10); Winter Wren, 3 (25, 10); Ovenbird, 2+; Downy Woodpecker, 2; Blue Jay, 2; White-breasted Nuthatch, 2; Baltimore Oriole, 1.5+; E. Phoebe, 1.5; Robin, 1+; Hairy Woodpecker, 1; Least Flycatcher, 1; E. Wood Pewee 1; Magnolia Warbler, 1; Black-throated Green Warbler, 1; Mourning Warbler, 1; Brown-headed Cowbird, 1; Yellow-bellied Sapsucker, 0.5+; Chipping Sparrow, 0.5; Tree Swallow, +; Catbird, +; Chestnut-sided Warbler, +. **Total:** 32 species; 105 territorial males (865 per square kilometer, 350 per 100 acres). **Visitors:** Turkey Vulture, Red-tailed Hawk, Broad-winged Hawk, Ruffed Grouse, Yellow-billed Cuckoo, Black-billed Cuckoo, Chimney Swift, Great Horned Owl, Yellow-shafted Flicker, Great Crested Fly-

catcher, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Com. Crow, Cedar Waxwing, Yellow-throated Vireo, Solitary Vireo, Warbling Vireo, N. Waterthrush, Com. Grackle, Cardinal, Purple Finch, House Finch, Am. Goldfinch, Song Sparrow. **Remarks:** One fledgling Brown-headed Cowbird was being fed by a Slate-colored Junco; another by an Ovenbird which was also feeding its young (1) as they ran about on the forest floor. Thirty-eight nests were found in the study area: Wood Thrush, 7; Am. Redstart, 6; Red-eyed Vireo, 4; Scarlet Tanager, 4; Rose-breasted Grosbeak, 4; Veery, 2; House Wren, 2; Hairy Woodpecker, 1; E. Phoebe, 1; Least Flycatcher, 1; Tree Swallow, 1; Blue Jay, 1; Robin, 1; Mourning Warbler, 1; Baltimore Oriole, 1; Chipping Sparrow, 1. The median density of territorial males for 4 years (1967, 1969, 1970, 1971) in the 30-acre study area, located in relatively stable, near-climax forest, is 103 or 848 per square kilometer (343 per 100 acres). — MARGARET COON BOWMAN, *Clinton Corners, N.Y. 12514.*

8. SECOND-GROWTH HARDWOOD FOREST. — **Location:** Connecticut; White Memorial Foundation, Morris; 41°42' 46"N, 73°12' 22"W, Litchfield Quadrangle, U.S.G.S. **Size:** 25 acres (roughly rectangular). **Description of Area:** See *Audubon Field Notes* 19: 590-591 (1965). **Coverage:** May 31; June 3, 7, 11, 15, 18, 23, 24, 28, 30; July 1, 4, 8, 10, 11, 14, 17, 18, 20. Hours varied from 5 a.m. to 11 p.m. and totaled