

Forty-sixth Breeding Bird Census

Edited by Willet T. and Aldeen C. Van Velzen

<i>Habitat</i>	<i>State or Province</i>	<i>Hectares</i>	<i>Pairs per sq. km.</i>	<i>Hrs. Obs.</i>	<i>Species</i>	<i>Years of study</i>
A. Eastern—Deciduous Forest						
1. Second-growth Hardwood Forest	Connecticut	10.1	904	11	36	16
2. Beech—Maple—Birch Forest	New York	20.0	493	50	19	2
3. Young Mixed Forest	New York	4.4	521	9	17	6
4. Young Red Maple—Gray Birch Forest	New York	8.1	927	14	30	7
5. Young White Ash—Basswood Forest	New York	8.1	1,421	16	40	5
6. Aspen (Cut 1980-81)	Pennsylvania	4.18	108	6	3	1
7. Aspen (Cut 1976-77)	Pennsylvania	4.02	560	8	11	1
8. Mixed Oak (Cut 1976-77)	Pennsylvania	3.33	420	6	9	1
9. Mature Aspen (Treated Sector)	Pennsylvania	2.61	364	6	15	1
10. Mature Mixed Oak (Treated Sector)	Pennsylvania	3.24	247	6	12	1
11. Mature Aspen (Untreated Sector)	Pennsylvania	3.0	333	6	12	1
12. Oak—Maple Ridge-top Forest	Pennsylvania	20.2	119	—	19	1
13. Oak—Maple Slope Forest	Pennsylvania	17.4	270	14	22	1
14. Sugar Maple—Mixed Hardwood Forest	Pennsylvania	9.74	713	28	29	1
15. Mature Deciduous Floodplain Forest	Maryland	7.6	863	24	28	30
16. Mixed Hardwood Forest	Maryland	11.3	1,297	23	31	18
17. Mixed Upland Habitat	Dist. of Columbia	14.2	939	64	25	23
18. Maple—Cherry—Beech	West Virginia	6.07	387	12	16	1
19. Maple—Hickory Woods	West Virginia	6.07	264	10	12	2
20. Sugar Maple—Black Cherry Forest	West Virginia	6.07	395	10	14	1
21. Cove Hardwood Forest	Virginia	5.06	366	10	18	1
22. Chestnut Oak—Red Oak—Hickory Forest	Virginia	6.07	568	18	20	1
23. Oak—Hickory—Tulip-tree Forest	Virginia	13.5	349	28	18	4
24. Upland Oak—Hickory Forest	Virginia	11.0	1,004	46	23	10
25. Upland Tulip-tree—Oak Forest	Virginia	20.6	291	15	28	8
		20.6	238	14	22	9
26. Flood Plain Forest	North Carolina	13.0	751	23	31	6
27. Mixed Deciduous Forest	North Carolina	12.6	562	20	31	7
28. Oak—Hickory Forest with Stream I	South Carolina	10.1	415	50	29	1
29. Oak—Hickory Forest with Stream II	South Carolina	10.1	455	44	30	1
30. Upland Oak—Hickory Forest I	South Carolina	10.1	292	35	23	1
31. Upland Oak—Hickory Forest II	South Carolina	10.1	292	31	21	1
32. Upland Oak—Hickory Forest III	South Carolina	10.1	356	43	24	1
33. Upland Oak—Hickory Forest IV	South Carolina	10.1	287	50	22	1
34. Upland Oak—Hickory Forest with Stream I	South Carolina	10.1	371	32	28	1
35. Upland Oak—Hickory Forest with Stream II	South Carolina	10.1	311	33	27	1
36. Upland Oak—Hickory Forest with Stream III	South Carolina	10.1	351	43	25	1
37. Upland Oak—Hickory Forest with Stream and Mountain Laurel Ravine	South Carolina	10.0	346	43	29	1
38. Virgin Hardwood Bottomland Swamp Forest	South Carolina	8.1	729	26	18	3
39. Virgin Hardwood Swamp Forest	South Carolina	8.9	1,763	19	24	3
40. Wooded City Ravine	Ontario	20.0	205	23	20	13
41. Aspen Clearcut	Michigan	9.0	289	13	16	3
42. Aspen Clearcut	Michigan	18.5	200	19	28	4
43. Aspen Clearcut	Minnesota	10.5	271	17	21	2
44. Oak—Hickory Forest	Illinois	10.6	517	25	27	2
45. Black Oak—Sassafras Woods	Indiana	22.2	90	22	9	9
46. Neotoma Valley	Ohio	20.2	450	90	33	5
47. Mixed Deciduous Forest	Tennessee	25.4	290	14	26	1
48. Mississippi Delta Bottomland Hardwoods (Managed)	Arkansas	10.9	1,006	26	28	1
49. Mississippi Delta Bottomland Hardwoods (Unmanaged)	Arkansas	9.7	1,122	30	29	1
50. Oak—Hickory Forest—Second Growth	Missouri	7.9	344	21	22	2
B. Eastern—Coniferous—Deciduous (Mixed)						
51. Climax Hemlock—White Pine Forest, with Transition Hardwoods	Connecticut	10.5	1,036	15	37	16
52. Beech—Spruce—Hemlock Forest	New York	23.9	511	62	20	3
53. Beech—Spruce—Maple Forest	New York	19.4	526	51	24	3
54. Mixed Hemlock—White Cedar—Hardwood Forest	New York	3.8	302	4	14	1
55. Pitch Pine—Scrub Oak Barrens	New York	9.7	470	20	6	6

<i>Habitat</i>	<i>State or Province</i>	<i>Hectares</i>	<i>Pairs per sq. km.</i>	<i>Hrs Obs.</i>	<i>Species</i>	<i>Years of study</i>
56. Second-growth Oak-Pitch Pine Forest	New York	9.3	516	31	12	6
57. Upland Mixed Pine-Spruce-Hardwood Plantation	New York	16.6	512	16	30	9
58. Central Hardwood Forest with Scattered Pine	Dist. of Columbia	26.3	257	30	28	23
59. Mixed Pine-Oak-Hickory Forest	West Virginia	6.1	338	18	18	2
60. Disturbed Mixed Coniferous—Hardwood Forest	Georgia	7.4	578	12	23	1
61. Mature Maple-Hemlock Forest	Ontario	16.0	381	17	39	1
C. Eastern—Coniferous						
62. Young Spruce Forest	Maine	4.1	1,050	12	25	5
63. Red Pine Plantation	Connecticut	8.5	1,100	13	43	5
64. Upland Scotch Pine Plantation	New York	9.3	795	20	22	14
65. White Cedar-Tamarack Swamp I	Ontario	12.0	475	17	40	1
66. White Cedar-Tamarack Swamp II	Ontario	14.0	425	16	44	1
67. Jack Pine Forest	Minnesota	8.9	286	17	22	1
68. Red Pine Forest	Minnesota	8.5	392	14	19	1
69. Red Pine Plantation	Minnesota	10.3	281	15	18	1
70. Cypress Slough	Indiana	10.2	801	44	19	1
71. Cedar Forest I	Tennessee	6.1	264	17	22	1
72. Cedar Forest II	Tennessee	6.1	222	17	16	1
73. Cedar Forest III	Tennessee	8.1	222	17	17	1
D. Eastern—Mixed Habitat						
74. Mixed Upland Habitat and Swamp	Connecticut	14.2	198	11	28	15
75. Oak-Hemlock Forest, transition forest and Thicket	Connecticut	23.1	676	100	51	12
		6.5	614	26	37	12
76. Upland Brushy Pasture	Connecticut	8.5	1,277	11	38	16
77. Moist Deciduous Forest—Lake Ontario Wetland	New York	16.2	902	8	38	1
78. Sub-alpine Balsam Fir and Meadow	New York	4.2	432	7	7	1
79. Deciduous Forest with Pond and Brook	New Jersey	16.2	321	9	29	19
80. Mixed Lowland Forest and Meadow with Stream	Pennsylvania	8.1	1,106	31	45	1
		8.1	1,161	17	44	2
81. Old Field-Meadow and Primary Deciduous Thickets	Pennsylvania	10.1	494	30	27	7
82. Stunted Spruce-Shrub Community	West Virginia	6.1	453	30	8	1
83. Deciduous Clearcut	Virginia	6.1	346	11	7	1
84. Abandoned Pasture Scrubland	Ontario	9.0	650	15	26	1
85. Old Field and Gravel Pit	Ontario	16.0	385	17	36	1
86. Transitional Mixed Forest-Field	Ontario	6.0	1,870	79	22	3
87. Urban Park with Pond	Ontario	10.9	513	16	29	2
88. Disturbed Oak-Hickory, Pine Stand, Edge, and Pond	Ohio	14.2	586	25	38	44
89. Deciduous Clearcut	Tennessee	20.2	445	10	19	8
90. Mixed Mesophytic Woods, Fields, and Brush	Tennessee	27.0	408	56	43	6
91. Suburban Cemetery	Alabama	15.0	588	72	28	5
E. Central—Prairie						
92. Tall Grass Prairie	Illinois	12.1	288	8	17	7
93. Tall Grass Prairie I	Iowa	16.0	256	20	12	1
94. Tall Grass Prairie II	Iowa	64.8	202	55	18	1
95. Tall Grass Prairie III	Iowa	44.8	266	26	19	1
96. Floodplain Tall Grass Prairie	Iowa	18.4	331	18	11	1
97. Spear Grass-June Grass-Alkali Grass Mixed Prairie	Saskatchewan	20.0	172	42	15	1
98. Kentucky Blue Grass Prairie	North Dakota	4.8	62	2	8	11
99. Mixed Prairie I	North Dakota	16.2	124	12	8	1
100. Mixed Prairie II	North Dakota	16.2	139	12	12	1
101. Mixed Prairie III	North Dakota	16.2	120	10	14	1
102. Mixed Prairie IV	North Dakota	16.2	161	—	8	1
103. Mixed Prairie V	North Dakota	16.2	90	12	8	1
104. Mixed Prairie I	North Dakota	10.0	245	6	21	11
105. Mixed Prairie II	North Dakota	6.1	172	3	14	11
106. Mixed Prairie III	North Dakota	3.3	+	1	2	11
		3.3	+	1	3	11
		2.8	36	1	6	11
		2.8	54	1	6	11
107. Mixed Prairie IV	North Dakota	6.1	98	3	10	11
108. Mixed Prairie V	North Dakota	6.1	41	3	5	11
109. Mixed Prairie VIII	North Dakota	8.7	103	3	12	7
110. Tall Grass Prairie	Nebraska	28.3	116	16	8	1
111. Floodplain Tall Grass Prairie	Kansas	10.1	316	17	5	9
F. Central—Disturbed Habitat						
112. Improved Pasture and Oak-Pine Forest	Oklahoma	9.1	824	23	27	4
113. Mixed Habitat-Disturbed Bottomland	Oklahoma	40.5	297	38	39	11
114. Oak-Pine Ravine Forest with Clearings	Oklahoma	7.4	979	23	24	4

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G. Central—Deciduous						
115. Floodplain Cottonwood Forest	Colorado	9.7	2,121	16	7	11
116. Gambel's Oak-Mountain Mahogany Woodland	Colorado	18.4	130	22	11	3
117. Scrub Oak-Mountain Mahogany Woodland	Colorado	8.0	287	20	18	3
118. Maple-Box-elder Creekbottom	Utah	11.1	496	49	11	2
H. Western—Deciduous						
119. River Bottom Forest	Manitoba	14.0	443	21	21	6
120. Cottonwood Forest I	North Dakota	8.1	537	14	20	1
121. Cottonwood Forest II	North Dakota	8.1	550	14	23	1
122. Green Ash Forest	North Dakota	8.1	222	12	13	1
123. Hardwood Draw	North Dakota	14.2	688	18	34	1
124. Oak-Hickory Forest I	Kansas	8.1	451	18	20	5
125. Oak-Hickory Forest II	Kansas	8.1	346	18	20	5
126. Oak-Hickory Forest III	Kansas	8.1	599	26	29	5
127. Oak-Hickory Forest IV	Kansas	8.1	364	16	24	5
128. Oak-Hickory Forest V	Kansas	8.1	321	22	20	5
129. Oak-Hickory Forest VI	Kansas	8.1	327	23	21	5
130. Oak-Hickory Forest VII	Kansas	8.1	692	23	28	2
131. Deciduous Floodplain Forest	Oklahoma	6.7	1,362	28	27	4
I. Western—Coniferous						
132. Douglas-Fir—Ponderosa Pine Forest	Colorado	7.5	545	20	12	1
133. Interior Western Hemlock Forest	British Columbia	10.3	150	12	10	1
134. Douglas-Fir—Western Hemlock Forest: Mount St. Helens Mudflow	Washington	83.6	6	22	2	1
135. Lodgepole Pine—Mixed Coniferous Forest	Washington	9.3	242	16	11	1
136. Burned Pine-Fir Forest	California	8.5	296	29	22	2
137. Mature Pine-Fir Forest	California	8.5	236	27	15	2
138. Old Growth Douglas-Fir—Redwood Forest (1981) (1982)	California	10.2	387	83	20	1
		10.2	328	76	18	2
J. Western—Coniferous-Deciduous (Mixed)						
139. Ponderosa Pine—Scrub Oak—Mountain Mahogany Woodland	Colorado	8.1	321	52	10	15
140. Deciduous-Coniferous North Slope	Utah	20.2	385	55	23	1
141. Riparian Woodland—Live Oak-Juniper	Arizona	9.1	2,284	84	39	4
142. Mixed Mountain Bottomland	British Columbia	6.4	922	18	18	1
143. Mixed Coniferous-Hardwood Forest I (1981) (1982)	California	10.2	548	83	25	1
		10.2	435	74	21	2
144. Mixed Coniferous-Hardwood Forest II (1981) (1982)	California	10.1	553	87	20	1
		10.1	474	75	19	2
K. Western—Mixed Habitat						
145. Abandoned Field with Wooded Intermittent Stream	Texas	3.5	628	70	10	1
146. Mountain Meadow and Open Coniferous Forest	Colorado	13.0	421	46	29	2
147. Urban Cat-tail Marsh and Cottonwood Woodland	Colorado	3.5	843	15	17	2
148. Campground in Old Orchards	Utah	10.1	672	25	20	2
149. Slickrock-Ponderosa Pine-Pygmy Forest-Chaparral	Utah	16.2	312	23	17	3
150. Grassy Field with Alder and Broom Thickets	British Columbia	2.3	642	16	14	1
151. Disturbed Coastal Floodplain	California	9.7	772	17	15	1
152. Urban Park	California	74.9	138	39	11	2
153. Urban Park-Lake, Marsh and Mixed Forest	California	5.0	1,202	12	12	1
154. Urban Park—Mature Mixed Coniferous Forest	California	8.4	561	11	14	2
L. Western—Desert and Scrub						
155. Coastal Sage Scrub	California	9.0	233	15	11	1
156. Coastal Sage Scrub (Buckwheat-Dominated)	California	8.1	395	14	13	1
157. Coastal Sage Scrub (Sage-Dominated)	California	8.1	624	24	15	1
158. Coastal Scrub	California	8.1	488	142	17	10
159. Disturbed Coastal Scrub A	California	4.7	405	94	22	10
160. Disturbed Coastal Scrub B	California	8.1	451	167	20	11
161. Disturbed Coastal Sage Scrub	California	13.7	88	38	3	1
M. Northern Tundra and Taiga						
162. Wet Sedge/Aquatic Tundra	Alaska	50.0	38	127	6	1
163. Mosaic Wet/Moist Sedge Tundra	Alaska	50.1	81	144	8	1
164. Wet Sedge Tundra	Alaska	50.1	64	132	7	1
165. Moist Sedge Tussock-Prostrate Shrub Tundra	Alaska	25.0	68	73	5	1
166. Riparian Medium Willow Thicket I	Alaska	10.0	170	32	6	1
167. Riparian Medium Willow Thicket II	Alaska	9.9	116	32	5	1
168. High Arctic Lowland Oasis	Northwest Territories	1,200.0	13	125	8	2

Habitat	State or Province	Hectares	Pairs per sq km	Hrs Obs	Species	Years of study
169. Scattered Subalpine Fir Forest in Subalpine Meadows	British Columbia	12.3	65	6	4	1
170. Aspen Forest	Manitoba	16.0	312	19	25	1
171. Low Arctic Tundra	Manitoba	16.2	105	11	10	2
N. Wetlands						
172. Shrubby Swamp and Sedge Hummocks	Connecticut	8.1	988	24	20	16
173. Cat-tail Marsh	New York	8.9	623	3	22	4
174. Cat-tail—Bulrush Swamp	New Jersey	5.9	767	8	4	3
175. Freshwater Bulrush Marsh with Scattered Trees	New Jersey	5.0	757	9	6	3
176. Gulf Coast Salt Marsh	Florida	15.0	253	310	3	3
177. Tamarack Bog and Hardwood	Michigan	8.5	259	8	16	7
178. Closed Black Spruce Bog	Minnesota	17.5	223	17	10	3
179. Open Black Spruce Bog	Minnesota	5.0	160	6	5	3
180. Shrub Swamp	Minnesota	12.5	648	11	11	3
181. Open Bog	Minnesota	10.0	450	12	6	3
182. Open Fen	Minnesota	15.0	300	10	4	3
183. Wetland Sedge Meadow I	Nebraska	16.2	244	5	8	2
184. Wetland Sedge Meadow II	Nebraska	16.2	198	5	11	1
185. Bulrush and Cat-tail Marsh in Conifer Forest	Montana	40.5	558	28	60	8
186. Coastal Salt Marsh (1981)	California	6.5	263	12	2	2
(1982)		6.5	278	10	3	3
187. Desert Riparian—Freshwater Marsh and Ponds	California	15.4	1,385	24	43	6
188. Freshwater Marsh	California	9.7	721	27	18	2
189. Restored Coastal Salt Marsh (1981)	California	8.8	285	13	9	2
(1982)		8.8	273	11	11	3
O. Fields and Cultivated Areas						
190. Hay Meadow	New York	2.3	303	2	5	2
191. Old Field Habitat	New Jersey	7.3	730	12	7	3
192. Old Field	Ontario	8.1	259	15	9	1
193. Cultivated Field I	Iowa	10.6	133	5	9	1
194. Cultivated Field II	Iowa	18.7	45	7	12	1
195. Farmstead	Iowa	7.7	1,834	21	23	1
196. Smooth Brome Pasture	Iowa	23.1	186	15	11	1
197. Subirrigated Native Hay	Nebraska	16.2	111	4	5	2
198. Subirrigated Grassland	Nebraska	16.2	111	3	5	2
P. Residential						
199. Suburban Development in Pine—Oak Forest (1979)	Massachusetts	15.0	520	18	27	1
(1980)		15.0	717	37	29	2
(1982)		15.0	920	24	29	3
200. Urban Park I	Dist. of Columbia	0.7	509	2	15	1
201. Urban Park II	Dist. of Columbia	1.5	198	3	17	1
202. Urban Park III	Dist. of Columbia	2.0	469	3	19	1
203. Village, Residential	Ohio	13.8	349	50	8	1
204. Small Town, Residential and Commercial Areas	Kansas	66.9	750	40	32	1
205. Suburban University Campus	California	28.2	612	17	11	1
Q. Unclassified Late Reports						
206. Mixed Oak—Pine Forest I	Pennsylvania	6.0	693	40	33	6
207. Mixed Oak—Pine Forest II	Pennsylvania	11.0	480	40	28	6
208. Abandoned Field I	Pennsylvania	6.0	893	42	22	5
209. Abandoned Field II	Pennsylvania	4.3	704	30	12	4
210. Golf and Country Club	Ontario	45.5	391	93	37	1
211. Mid-Tall Grass Prairie	Wisconsin	8.8	411	25	9	1
212. Mixed Successional Aspen—Oak-Conifer Forest	Minnesota	8.9	1,197	40	25	3
213. Cat-tail—Bur-reed Marsh	Ontario	5.58	1,199	38	7	1
214. Sedge Meadow	Ontario	5.6	868	38	6	1

Dedicated readers of this issue may have discovered that no matter how detailed the plot descriptions, and how well they know their flora, it is extremely difficult to visualize most plots from words alone. Here truly, one picture can bring to life a thousand words. For this reason for studies completed in 1983, we request that all authors include

with their manuscripts at least one reproducible photograph—in a black-and-white glossy print. Do not send slides. If your photograph seems to us a candidate for the January–February cover we will then ask for transparencies. Although we cannot promise to publish a photograph with every study, that would be our goal.

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; 16 intermittent years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AFN 19 590-591 (1965). **Coverage:** May 18; June 4, 9-10, 20-21; dawn to 2200. Total man-hours: 11. **Census:** Ovenbird, 15 (148, 60); Veery, 10 (99, 40); Red-eyed Vireo, 7 (69, 28); Rufous-sided Towhee, 7; Com. Yellowthroat, 5.5 (54, 22); Tufted Titmouse, 4.5 (44, 18); Scarlet Tanager, 4.5; Black-capped Chickadee, 4 (40, 16); Am. Redstart, 3 (30, 12); Com. Flicker, 2.5; Downy Woodpecker, 2; Blue Jay, 2; White-breasted Nuthatch, 2; Am. Robin, 2; Blue-winged Warbler, 2; Song Sparrow, 2; Com. Crow, 1.5; Black-and-white Warbler, 1.5; Ruffed Grouse, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; E. Wood Pewee, 1; House Wren, 1; Gray Catbird, 1; Blue-gray Gnatcatcher, 1; Chestnut-sided Warbler, 1; Louisiana Waterthrush, 1; Brown-headed Cowbird, 1; Rose-breasted Grosbeak, 1; Broad-winged Hawk, 0.5; E. Phoebe, 0.5; Wood Thrush, 0.5; Yellow-throated Vireo, 0.5; N. Oriole, 0.5; Great Horned Owl, +; Barred Owl, +. **Total:** 36 species; 91.5 territorial males ($904/\text{km}^2$, 366/100 acres). **Remarks:** Down 8.5 territorial males from the 1981 census, but up 1 from 1980, so apparently within regular fluctuation. Veery and Ovenbird held fast to 1981 numbers, and another ground-nester, Rufous-sided Towhee, gained 6 over its 1981 number of 1, but arboreal species fell in general. Could the last 2 years of intense Gypsy Moth caterpillar defoliation and more conspicuous Brown-headed Cowbirds finding more conspicuous arboreal nests during those years be partly accountable? This census was sponsored by the White Memorial Foundation.—ANDREW MAGEE, 34 Hobson St., Springfield, MA 01109.

2. BEECH-MAPLE-BIRCH FOREST. — **Location:** New York; Essex Co., on SE slope of Gooseberry Mountain; 44°03'N, 74°14'W, Santanoni Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 20 ha = 49.4 acres. **Description of Plot:** See AB 36:54 (1982). **Weather:** Cool and moist throughout the period. **Coverage:** June 3, 8-9, 11, 14, 18-19, 22, 25, 27; between dawn and 1130. Total man-hours: 50. **Census:** Red-eyed Vireo, 30.5 (153, 62); Am. Redstart, 28 (140, 57); Ovenbird, 7 (35, 14); Veery, 5 (25, 10); Black-throated Blue Warbler, 5; Rose-breasted Grosbeak, 3.5 (18, 7); Least Flycatcher, 3 (15, 6); Black-throated Green Warbler, 3; Yellow-bellied Sapsucker, 2; Scarlet Tanager, 2; E. Wood Pewee, 1.5; Hairy Woodpecker, 1; Downy Woodpecker, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Swainson's Thrush, 1; Solitary Vireo, 1; Black-and-white Warbler, 1. **Total:** 19 species; 98.5 territorial males ($493/\text{km}^2$, 199/100 acres). **Visitors:** Broad-winged Hawk, Ruby-throated Hummingbird, Blue Jay, Brown Creeper, Winter Wren, Hermit Thrush, Cedar Waxwing, Yellow-rumped Warbler, Blackburnian Warbler, Chestnut-sided Warbler, Com. Grackle, Purple Finch, Dark-eyed Junco. **Remarks:** Nests found: Yellow-

bellied Sapsucker, Downy Woodpecker, Black-capped Chickadee, Am. Redstart. This study was conducted at the Adirondack Ecological Center, SUNY College of Environmental Science and Forestry, Newcomb, NY.—SAM DROEGE and BARRY R. NOON, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210, and Dept. of Wildlife, Humboldt State Univ., Arcata, CA 95521.

3. YOUNG MIXED FOREST. — **Location:** New York; St. Lawrence Co., Pierrepont, 0.25 mi E of Howardville Rd., 0.25 SW of Rte 68; 44°33'N, 75°03'W; Pierrepont Quadrangle, USGS. **Continuity:** Established 1976; 6 intermittent years. **Size:** 4.4 ha = 10.9 acres. **Description of Plot:** See AB 32:74 (1978). **Weather:** May warm and very dry; max. temp. 85°F, min. temp. 31°, total precip. 1.32 in. June 1-21: max. temp. 79°, min. temp. 42°, total precip. 2.99 in. **Coverage:** May 11, 19, 26-28; June 4-5, 13, 15, 18, 22; 0445-1940, EDT. Total man-hours: 9. **Census:** Nashville Warbler, 5 (113, 46); Black-capped Chickadee, 2; Veery, 2; Red-eyed Vireo, 2; Black-and-white Warbler, 2; Com. Yellowthroat, 2; Ruffed Grouse, 1.5; Whippoor-will, 1; Blue Jay, 1; Wood Thrush, 1; Rose-breasted Grosbeak, 1; Rufous-sided Towhee, 1; Hairy Woodpecker, 0.5; Golden-winged Warbler, 0.5; Brown-headed Cowbird, 0.5; Red-breasted Nuthatch, +; N. Oriole, +. **Total:** 17 species; 23 territorial birds ($521/\text{km}^2$, 211/100 acres). **Visitors:** Am. Kestrel, Mourning Dove, Com. Flicker, E. Kingbird, Com. Crow, Cedar Waxwing, Chestnut-sided Warbler, Com. Grackle, Am. Goldfinch. **Remarks:** Agitated behavior indicative of nest or young observed in Ruffed Grouse, Hairy Woodpecker, Blue Jay, Nashville Warbler.—KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, NY 13617.

4. YOUNG RED MAPLE-GRAY BIRCH FOREST. — **Location:** New York; St. Lawrence Co., 4 mi NE of Waddington at Coles Creek; 44°53'N, 75°07'W, Louisville Quadrangle, USGS. **Continuity:** Established 1976; 7 consecutive years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 31:31 (1977). **Weather:** A cool season. **Coverage:** May 30; June 13, 17, 22, 24, 26, 28, 30; 0445-2100, EDT. Total man-hours: 14. **Census:** Veery, 17 (210, 85); Com. Yellowthroat, 6 (74, 30); Am. Redstart, 5 (62, 25); Am. Robin, 4 (49, 20); Red-eyed Vireo, 4; Ovenbird, 4; N. Oriole, 4; Com. Flicker, 2; Least Flycatcher, 2; Gray Catbird, 2; Yellow Warbler, 2; Com. Grackle, 2; Rose-breasted Grosbeak, 2; White-throated Sparrow, 2; Song Sparrow, 2; Yellow-billed Cuckoo, 1; Black-billed Cuckoo, 1; Great Crested Flycatcher, 1; E. Wood Pewee, 1; Cedar Waxwing, 1; Nashville Warbler, 1; Chestnut-sided Warbler, 1; Mourning Warbler, 1; Indigo Bunting, 1; Swamp Sparrow, 1; Hairy Woodpecker, +; Downy Woodpecker, +; Wood Thrush, +; Red-winged Blackbird, +; Rufous-sided Towhee, +. **Total:** 30 species; 75 territorial males ($927/\text{km}^2$, 375/100 acres). **Visitors:** Mourning Dove, Belted Kingfisher, E. Kingbird, Tree Swallow, Barn Swallow, Purple Martin, Blue Jay, Com. Crow, Starling, Brown-headed Cowbird, Purple Finch, Am. Goldfinch. **Remarks:** A Wood Duck with

young was seen on the last visit.—J. VAN RIET, 26 Williams St., Massena, NY 13662

5. YOUNG WHITE ASH-BASSWOOD FOREST. — **Location:** New York; St. Lawrence Co., 3 mi SW of Morristown at Jacques Cartier State Park; 44°33'N, 75°41'W, Morristown Quadrangle, USGS. **Continuity:** Established 1976; 5 intermittent years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 31:31-32 (1977). **Weather:** Average temperature 65°. **Coverage:** May 24-25; June 7-8, 14-15, 28-29; 0700-2000 hours. Total man-hours 16. **Census:** Am. Redstart, 12 (148, 60); Song Sparrow, 8 (99, 40); N. Oriole, 7 (86, 35), Wood Thrush, 6 (74, 30); Warbling Vireo, 6, Am. Robin, 5 (62, 25); Yellow Warbler, 5, Rose-breasted Grosbeak, 5; Black-capped Chickadee, 4 (49, 20); Veery, 4; Black-and-white Warbler, 4; Com. Yellowthroat, 4, Great Crested Flycatcher, 3 (37, 15); E. Wood Pewee, 3; Blue Jay, 3; House Wren, 2, Gray Catbird, 2; Red-eyed Vireo, 2; Pine Warbler, 2; Ovenbird, 2; Brown-headed Cowbird, 2; Scarlet Tanager, 2; Indigo Bunting, 2; Am. Goldfinch, 2; Rufous-sided Towhee, 2; Chipping Sparrow, 2; Mallard, 1, Ruby-throated Hummingbird, 1; Yellow-bellied Sapsucker, 1; Downy Woodpecker, 1; E. Kingbird, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Brown Creeper, 1, Cedar Waxwing, 1; Nashville Warbler, 1, Yellow-rumped Warbler, 1; Chestnut-sided Warbler, 1; Com. Grackle, 1; White-throated Sparrow, 1. **Total:** 40 species; 115 territorial males ($1421/\text{km}^2$, 575/100 acres). **Remarks:** Yellow Warbler population is down from previous studies, partially due to increased maturity of vegetation.—GEORGE R. MAXWELL, GERALD A. SMITH and KEN KARROWSKI, Dept. of Zoology, Rice Creek Biological Field Station, State. Univ College, Oswego, NY 13126.

BREEDING (1982) BIRDS OF THE BARRENS GROUSE MANAGEMENT AREA

The following 6 censuses were conducted in 6 habitat types in an area that consists of approximately 1166 ha (2880 acres), one half of which is being managed by the Pennsylvania Game Commission for Ruffed Grouse habitat using even-aged management. The treated (cut or managed sector of the BMGA is divided into a uniform pattern of 136 contiguous, square blocks; each block is approximately 4 ha (10 acres) in size; 60 of the 136 blocks in the treated sector are managed for aspen (*Populus spp.*) regeneration using a 20-year cutting rotation, whereas the remaining 76 blocks are managed for mixed oak (*Quercus spp.*) regeneration using a 40-year rotation. Each of the 136 blocks is subdivided into 4 square patches (designated as patches A, B, C, and D), where an individual patch is approximately 1 ha (2.47 acres) in size. Patch A (positioned in the NW corner of a block) in each of the 136 blocks was cut in winter 1976-77. Patch B (NE corner of a block) was cut only in aspen blocks in winter 1980-81 and was left uncut in mixed-oak blocks, with a scheduled cut in winter 1985-86. Thus, 50% (2 ha) and 25% (1 ha) have been cut in each aspen and mixed-oak block, respectively, in

the treated sector of the BGMA. The cutting schedule and the size of each cut (1 ha) represent a unique experiment in even-aged management for Ruffed Grouse.

The habitat types censused totaled 20.37 ha (50.34 acres) and include: 1) 4 aspen patches cut in winter 1980-81, 2) 4 aspen patches cut in winter 1976-77, 3) 3 mixed oak patches cut in winter 1976-77, 4) 3 mature (uncut) aspen patches in the treated sector, 5) 3 mature (uncut) mixed oak patches in the treated sector, and 6) a mature aspen stand in the untreated (unmanaged) sector of the BGMA. The sixth habitat type is about 1.4 km from the managed sector of the BGMA and is a rectangular (100 × 300 m) plot. The other 5 habitat types are comprised of individual patches of similar age but separated by distances ranging from about 300-2700 ft as a consequence of the cutting pattern. Selection of individual patches for study in each habitat type was made to ensure representative vegetative features and to avoid habitat disturbances created by unimproved dirt roads, restricted access roads, and corridors along transmission powerlines. No streams or lakes occur on the BGMA, but several temporary ponds may be found.

Coverage of all habitat types was Apr. 24; May 1, 5, 12, 25, 30; June 7, 12, 19, 24. Total trips per habitat type was 10, all between sunrise and 1130 hours. Mean minimum temperature during census trips was 46°F (range = 30 to 59°), and light rain occurred on 3 trips. A total of 26 species established territories in 1 or more of the 6 habitat types during spring 1982; breeding species that were observed at the BGMA in spring 1982 but not in the habitat types selected for study included Mallard, Turkey Vulture, Red-tailed Hawk, Broad-winged Hawk, Am. Kestrel, Turkey, Am. Woodcock, Screech Owl, Whip-poor-will, E. Kingbird, Least Flycatcher, Willow Flycatcher, Barn Swallow, Cliff Swallow, Com. Crow, Yellow-throated Vireo, Com. Grackle, Cardinal, and Song Sparrow. This study was supported by the Pennsylvania Agricultural Experiment Station. J. Grimm and B. Johnston assisted with vegetative sampling, and C. Corbat assisted with nest searches.—RICHARD H. YAHNER, Forest Resources Lab., Penn. State Univ., University Park, PA 16802.

6. ASPEN (CUT 1980-81). — **Location:** Pennsylvania; Centre Co., State Game Lands 176, Barrens Grouse Management Area (BGMA); 40°47'N, 78°58'W (patches 49B, 50B); 40°46'30"N, 77°57'30"W (patch 75B); 40°47'N, 77°57'W (patch 79B); Julian Quadrangle, USGS. **Continuity:** New. **Size:** 4 patches totaling 4.18 ha = 10.32 acres (measured). **Description of Plot:** No trees 3-in. diameter or over. The most abundant seedlings are Black Cherry (*Prunus serotina*), Scrub Oak (*Quercus ilicifolia*), Dwarf Chinkapin Oak (*Q. prinoides*), Bigtooth Aspen (*Populus grandidentata*), and Quaking Aspen (*P. tremuloides*). Major species of ground cover are Allegheny Blackberry (*Rubus allegheniensis*), Blackcap Raspberry (*R. occidentalis*), blueberry (*Vaccinium spp.*), Checkerberry Wintergreen (*Gaultheria procumbens*), clubmoss (*Lycopodium spp.*), and Dwarf Cinquefoil (*Potentilla canadensis*). A quantitative survey of the vegetation based on four 0.1-acre circular

plots per patch gave the following results shrub stems/acre 543, ground cover 68%, canopy cover 0%; maximum shrub height, 3-10 ft. **Edge:** All patches are bordered on N and S sides by mature forest (patch C) and on E and W by cut (managed) forest (patch A). **Topography:** Relatively hilly. **Elevation:** 1230 ft (patch 75B), 1280 ft (patches 49B, 50B), and 1300 ft (patch 79B). **Coverage:** Total man-hours, 6.1. **Census:** Field Sparrow, 2.5; Com. Yellowthroat, 1; Rufous-sided Towhee, 1. **Total:** 3 species; 4.5 territorial males (108/km², 44/100 acres). **Visitors:** House Wren, Gray Catbird, Chestnut-sided Warbler.

7. ASPEN (CUT 1976-77). — **Location:** Pennsylvania; Centre Co., State Game Lands 176, Barrens Grouse Management Area (BGMA); 40°47'N, 78°58'W (patches 50A, 51A); 40°46'30"N, 77°57'30"W (patch 76A); 40°47'N, 77°57'W (patch 80A); Julian Quadrangle, USGS. **Continuity:** New. **Size:** 4 patches totaling 4.02 ha = 9.93 acres (measured). **Description of Plot:** Several Pitch Pine (*Pinus rigida*) (55-85 ft tall), 1 White Oak (*Quercus alba*) (35 ft tall), and 2 snags (21 ft tall) were left as residual trees. The most abundant seedlings are Quaking Aspen, Bigtooth Aspen, Scrub Oak, Dwarf Chinkapin Oak, Black Cherry, and Am. Filbert (*Corylus americana*). Major species of ground cover are Allegheny Blackberry, Blackcap Raspberry, blueberry, Checkerberry Wintergreen, clubmoss, and Dwarf Cinquefoil. A quantitative survey of the vegetation based on four 0.1-acre circular plots per patch gave the following results: Trees 3-in. diameter and over, 0.6/acre; total basal area 0.1 ft²/acre. Species comprising 100% of the total number of trees and consisting of a single tree: Black Cherry, 0.6, 100, 100, 6. Trees by diameter size class: A (3-6 in.), 0.6, 100, 0.1, 100. Shrub stems/acre 8,420; ground cover 60%; canopy cover 7%; maximum shrub height ranged from 12-30 ft. **Edge:** All patches are bordered on N and S sides by mature forest (patch D) and on E and W sides by cut (unmanaged) forest (patch B). **Topography:** Relatively hilly. **Elevation:** 1230 ft (patch 76A), 1280 ft (patches 50A, 51A), and 1300 ft (patch 80A). **Coverage:** Total man-hours: 7.9. **Census:** Rufous-sided Towhee, 4 (100, 40); Com. Yellowthroat, 3.5 (87, 35); Field Sparrow, 3.5; Gray Catbird, 3 (75, 30); Golden-winged Warbler, 3; Indigo Bunting, 3; Mourning Dove, 1; Chestnut-sided Warbler, 1; Black-capped Chickadee, 0.5; Brown-headed Cowbird, +; Am. Goldfinch, +. **Total:** 11 species; 22.5 territorial males (560/km², 227/100 acres). **Visitors:** Ruffed Grouse, Blue-gray Gnatcatcher, Black-and-white Warbler, Worm-eating Warbler, Nashville Warbler, Prairie Warbler, Yellow-breasted Chat, Am. Redstart, Rose-breasted Grosbeak. **Remarks:** Nests found (2): Mourning Dove, 1; Gray Catbird, 1.

8. MIXED OAK (CUT 1976-77). — **Location:** Pennsylvania; Centre Co., State Game Lands 176, Barrens Grouse Management Area (BGMA); 40°47'N, 78°58'W (patches 42A, 43A); 40°46'30"N, 77°57'30"W (patch 84A); Julian Quadrangle, USGS. **Continuity:** New. **Size:** 3 patches totaling 3.33 ha = 8.23 acres (measured). **Description of Plot:** The dominant canopy trees are hickory (*Carya*

spp.), White Oak, and White Sassafras (*Sassafras albidum*). The most abundant seedlings are Red Maple (*Acer rubrum*), White Oak, Scrub Oak, Dwarf Chinkapin Oak, Scarlet Oak (*Q. coccinea*), and Black Cherry. Major species of ground cover are Allegheny Blackberry, Blackcap Raspberry, blueberry, Checkerberry Wintergreen, *Solidago* spp., clubmoss, and Dwarf Cinquefoil. A quantitative survey of the vegetation based on four 0.1-acre circular plots per patch gave the following results: Trees 3-in. diameter and over, 7/acre; total basal area 0.8 ft²/acre. Species comprising 90% of the total number of trees: White Oak, 5, 76, 76, 25, White Sassafras, 1, 12, 12, 8; hickory, 1, 12, 12, 8. Trees by diameter size class: A (3-6 in.), 7, 100, 0.8, 100. Shrub stems/acre 8,039, ground cover 53%; canopy cover 22%; maximum canopy height seldom exceeded 24 ft. **Edge:** All patches are bordered on all sides by mature forest (patches B or D). **Topography:** Relatively hilly. **Elevation:** 1290 ft for all patches. **Coverage:** Total man-hours 5.8. **Census:** Com. Yellowthroat, 3.5 (105, 43); Rufous-sided Towhee, 3 (90, 36); Gray Catbird, 2.5; Indigo Bunting, 2; Field Sparrow, 2; Golden-winged Warbler, 1; Yellow-billed Cuckoo, +; Black-billed Cuckoo, +; Great Crested Flycatcher, +. **Total:** 9 species, 14 territorial males (420/km², 170/100 acres). **Visitors:** Black-capped Chickadee, Tufted Titmouse, Brown Thrasher, Black-and-white Warbler. **Remarks:** Nests located (9) Gray Catbird, 5; Black-billed Cuckoo, 2, Com. Yellowthroat, 1; Field Sparrow, 1.

9. MATURE ASPEN (TREATED SECTOR). — **Location:** Pennsylvania, Centre Co., State Game Lands 176, Barrens Grouse Management Area (BGMA); 40°47'N, 78°58'W (patches 50C, 51D); 40°47'N, 77°57'W (patch 80D); Julian Quadrangle, USGS. **Continuity:** New. **Size:** 3 patches totaling 2.61 ha = 6.45 acres (measured). **Description of Plot:** The dominant canopy trees are aspen, oak, and Pitch Pine. Dominant understory plants are Scrub Oak, Dwarf Chinkapin Oak, White Oak, Bigtooth Aspen, and Red Maple. Major species of ground cover are blueberry, Checkerberry Wintergreen, *Solidago* spp., and club moss. A quantitative survey of the vegetation based on four 0.1-acre circular plots per patch gave the following results: Trees 3-in. diameter and over, 170/acre, total basal area 64.0 ft²/acre. Species comprising 90% of the total number of trees: Bigtooth Aspen, 73, 43, 29, 58; White Oak, 30, 18, 25, 42; Scarlet Oak, 19, 11, 20, 50; Pitch Pine, 18, 11, 15, 67; dead trees, 15, 9, 4, 67. Trees by diameter size class: A (3-6 in.), 80, 47, 9, 6, 15; B (6-9 in.), 1, 32, 19, 8, 31; C (9-15 in.), 34, 20, 32.8, 51; D (15-21 in.), 7, 1, 1.8, 3. Shrub stems/acre 5,210; ground cover 50%; canopy cover 51%; maximum canopy height 14 ft. **Edge:** All patches are bordered on N and S sides by cut (managed) forest (either patch A or B) and on E and W sides by mature forest (either patch C or D). **Topography:** Relatively hilly. **Elevation:** 1280 ft (patches 50C, 51D) and 1320 ft (patch 80D). **Coverage:** Total man-hours: 6.1. **Census:** Black-and-white Warbler, 2; Ovenbird, 1.5; Chipping Sparrow, 1+; E. Wood Pewee, 1; Black-capped Chickadee, 1; Red-eyed Vireo, 1; Rufous-sided Towhee, 1; Great Crested Flycatcher, 0.5; Blue Jay, 0.5; Mourning Dove, +; Com-

Flicker, +, Gray Catbird, +, Com Yellow-throat, +, Brown-headed Cowbird, +, Indigo Bunting, +. **Total:** 15 species; 9.5 territorial males ($364/\text{km}^2$; 147/100 acres). **Visitors:** Yellow-billed Cuckoo, Black-billed Cuckoo, Pileated Woodpecker, Downy Woodpecker, Hairy Woodpecker, Tufted Titmouse, White-breasted Nuthatch, Brown Creeper, Brown Thrasher, E. Bluebird, Worm-eating Warbler, Nashville Warbler, Pine Warbler, Scarlet Tanager.

10. MATURE MIXED OAK (TREATED SECTOR). — **Location:** Pennsylvania; Centre Co., State Game Lands 176, Barrens Grouse Management Area (BGMA); $40^\circ47'N$, $78^\circ58'W$ (patches 41B, 42B); $40^\circ46'30''N$, $77^\circ57'30''W$ (patch 83B); Julian Quadrangle, USGS. **Continuity:** New. **Size:** 3 patches totaling 3.24 ha = 8.00 acres (measured). **Description of Plot:** The dominant trees are oak, Bigtooth Aspen, and hickory. Dominant understory plants are Red Maple and Scrub Oak. Major species of ground cover are blueberry, Checkerberry Wintergreen, *Solidago* spp., and clubmoss. A quantitative study of the vegetation based on four 0.1-acre circular plots per patch gave the following results: Trees 3-in. diameter and over, 186/acre; total basal area 81.9 ft.²/ acre. Species comprising 90% of the total number of trees: White Oak, 83, 45, 47, 100; Scarlet Oak, 29, 16, 31, 58; Bigtooth Aspen, 24, 13, 4, 50, hickory, 19, 10, 7, 83; dead trees, 12, 6, 3, 83. Trees by diameter size class: A (3-6 in.), 96, 52, 11.5, 14; B (6-9 in.), 37, 20, 13.2, 16; C (9-15 in.), 48, 26, 46.4, 57; D (15-21 in.), 5, 3, 10, 8, 13. Shrub stems/acre 2,672; ground cover 43%; canopy cover 61%; maximum canopy height 108 ft. **Edge:** All patches are bordered on E and W sides by cut (managed) forest (patch A) and on N and S sides by mature forest (patch C). **Topography:** Relatively hilly. **Elevation:** 1290 ft for all patches. **Coverage:** Total man-hours: 5.8. **Census:** Red-eyed Vireo, 1.5; Scarlet Tanager, 1.5; Yellow-billed Cuckoo, 1; E. Wood Pewee, 1; Blue Jay, 1; Ovenbird, 1; Great Crested Flycatcher, 0.5; Black-and-white Warbler, 0.5; White-breasted Nuthatch, +; N. Oriole, +; Brown-headed Cowbird, +; Rufous-sided Towhee, +. **Total:** 12 species; 10 territorial males ($333/\text{km}^2$, 135/100 acres). **Visitors:** Ruffed Grouse, Com. Flicker, E. Wood Pewee, Tufted Titmouse, White-breasted Nuthatch, Blue-gray Gnatcatcher, Am. Robin, Wood Thrush, Black-and-white Warbler, Worm-eating Warbler, Chestnut-sided Warbler, Pine Warbler, Indigo Bunting, Am. Goldfinch, Rose-breasted Grosbeak, Chipping Sparrow.

Species comprising 90% of the total number of trees: Red Maple, 34, 20, 14, 92, hickory, 33, 19, 19, 75; Quaking Aspen, 25, 15, 9, 25; dead trees, 17, 10, 7, 75; Bigtooth Aspen, 16, 9, 10, 33; Pitch Pine, 11, 6, 13, 58; White Oak, 8, 4, 5, 33; Scarlet Oak, 8, 4, 5, 33. Trees by diameter size class: A (3-6 in.), 79, 47, 9.5, 15; B (6-9 in.), 54, 32, 19.5, 31; C (9-15 in.), 34, 20, 32.8, 52; D (15-21 in.), 1, 1, 1.8, 3. Shrub stems/acre 4135; ground cover 36%; canopy cover 72%; maximum canopy height 120 ft. **Edge:** All sides of the plot are bordered by similar mature forest. **Topography:** Relatively hilly. **Elevation:** 1230 ft on the N border to 1310 ft on the S. **Coverage:** Total man-hours: 6.3. **Census:** Red-eyed Vireo, 1.5; Yellow-billed Cuckoo, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Black-capped Chickadee, 1; Nashville Warbler, 1; Ovenbird, 1; Brown-headed Cowbird, 1; Scarlet Tanager, 1; Downy Woodpecker, 0.5; Com. Yellowthroat, +; Rufous-sided Towhee, +. **Total:** 12 species; 10 territorial males ($333/\text{km}^2$, 135/100 acres). **Visitors:** Ruffed Grouse, Com. Flicker, E. Wood Pewee, Tufted Titmouse, White-breasted Nuthatch, Blue-gray Gnatcatcher, Am. Robin, Wood Thrush, Black-and-white Warbler, Worm-eating Warbler, Chestnut-sided Warbler, Pine Warbler, Indigo Bunting, Am. Goldfinch, Rose-breasted Grosbeak, Chipping Sparrow.

11. MATURE ASPEN (UNTREATED SECTOR). — **Location:** Pennsylvania; Centre Co., State Game Lands 176, Barrens Grouse Management Area (BGMA); $40^\circ45'30''N$, $77^\circ58'W$; Julian Quadrangle, USGS. **Continuity:** New. **Size:** Rectangular plot (100 × 300 m) totaling 3.00 ha = 7.41 acres (measured). **Description of Plot:** The dominant canopy trees are Red Maple, hickory, aspen, Pitch Pine, and oak. Dominant understory plants are Scrub Oak and Red Maple. Major species of ground cover are blueberry, Checkerberry Wintergreen, goldenrods (*Solidago* spp.), violet (*Viola* spp.), and clubmoss. A quantitative study of the vegetation based on four 0.1-acre circular plots per patch gave the following results: Trees 3-in. diameter and over, 168/acre; total basal area 63.6 ft²/acre.

Com Grackle, Am Goldfinch. **Remarks:** The presence of the towhees and the yellow-throats is dependent on the presence of the recently cut area in the plot and adjacent areas. When comparing ridge-top plot to slope plot it can be seen there is greater species diversity in the slope plot: 22 species with 37 territorial males vs 18 species and 24 territorial males on the ridge-top. This is because the tree diversity is greater on the lower, wet slopes and the trees reach greater heights, thus offering more habitat types Howard Reinert and Sherri Labar made available the results of their quantitative habitat analyses.—TOM LECKEY, STEVE NORD, SETH BENZ, Hawk Mountain Sanctuary, Route 2, Kempton, PA 19529

13. OAK-MAPLE SLOPE FOREST. —

Location: Pennsylvania; Berks Co., Hawk Mountain Sanctuary, N side of the River of Rocks; $40^\circ44'N$, $75^\circ50'W$, New Ringgold Quadrangle, USGS. **Continuity:** New. **Size:** 17.4 ha = 43 acres (rectangular). **Description of Plot:** Located on a slope within the Hawk Mountain Sanctuary. See general description of the sanctuary vegetation in Census No. 12. The vegetation on this plot is more diverse than that found on the ridge-top plot primarily because it is a wetter site. In addition to the plants described for Census No 12, the following also make an important contribution to the canopy: Tulip-tree (*Liriodendron tulipifera*) and Black Birch (*Betula lenta*). The understory is dominated by Striped Maple (*Acer pensylvanicum*) and Mountain Laurel (*Kalmia latifolia*). The entire plot is essentially a boulder field over which forest has grown. **Edge:** Bordered on 3 sides by similar forest and on the remaining side by Rhododendron thickets and an exposed boulder field. **Topography and Elevation:** Sloping ESE from 1140 to 860 ft **Weather:** Clear and sunny; temperatures during counts, 0-15°C (average 10°C). **Coverage:** Apr. 1, 18; May 2, 11, 19, 26-27; 0600-0900 hours. Total man-hours: 14. **Census:** Ovenbird, 8 (46, 19); Wood Thrush, 6 (34, 14); Tufted Titmouse, 4 (23, 9); Downy Woodpecker, 3 (17, 7); Great Crested Flycatcher, 3; Red-eyed Vireo, 3; Mourning Dove, 2; Black-capped Chickadee, 2; Scarlet Tanager, 2; Com. Flicker, 1; Red-bellied Woodpecker, 1; E. Wood Pewee, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Black-and-white Warbler, 1; N Oriole, 1; Broad-winged Hawk, +; Ruffed Grouse, +; Great Horned Owl, +; Pileated Woodpecker, +; Worm-eating Warbler, +. **Total:** 22 species; 47 territorial males ($270/\text{km}^2$, 109/100 acres).—TOM LECKEY, STEVE NORD, SETH BENZ, Hawk Mountain Sanctuary, Route 2, Kempton, PA 19529.

14. SUGAR MAPLE-MIXED HARDWOOD FOREST. —

Location: Pennsylvania; Washington Co., 1.5 mi SE of intersection of Routes 79 and 40; $40^\circ08'N$, $80^\circ11'W$, Washington East Quadrangle, USGS. **Continuity:** New. **Size:** 9.74 ha. = 24.07 acres (rectangular, 1254 × 836 ft, measured by pacing and compass). **Description of Plot:** The dominant canopy trees are Sugar Maple (*Acer saccharum*), Slippery Elm (*Ulmus rubra*), Am. Beech (*Fagus grandifolia*), and

Black Cherry (*Prunus serotina*) Prominent in the understory are Spicebush (*Lindera benzoin*) and seedlings of the canopy species. The ground cover includes May-apple (*Podophyllum peltatum*), *Impatiens* sp., and Stinging Nettle (*Urtica dioica*). The census area consist of 2 irregular 12-acre rectangles that are contiguous at their southern ends, forming a V-shaped plot. A small stream flows through each rectangle and the 2 streams parallel each other at the vertex of the V. The two arms of the V are separated by a much younger area of approximately 10 acres, composed mainly of hawthorns (*Crataegus* sp.) A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 142.4/acre; total basal area 94.5 ft²/acre. Species comprising 94% of the total number of trees: Sugar Maple, 52.8, 37.1, 30.8, 83.3; Am. Beech, 19.2, 13.5, 14.2, 33.3; Slippery Elm, 17.6, 12.4, 21.4, 50; Black Cherry, 14.4, 10.1, 11, 66.7; dead trees, 12.8, 8.9, 1.7, 33.3; Black Locust (*Robinia pseudoacacia*), 6.4, 4.5, 3.7, 16.7; Tulip-tree (*Liriodendron tulipifera*), 6.4, 4.5, 5.9, 16.7; White Ash (*Fraxinus americana*), 4.8, 3.4, 2.9, 33.3. Trees by diameter size class: A (3-6 in.) 57.6, 40.4, 5.8, 6.1; B (6-9 in.) 17.6, 12.4, 5.3, 5.6; C (9-15 in.) 48, 33.7, 38.4, 40.6; D (15-21 in.) 11.2, 7.9, 20.2, 21.4; E (21-27 in.) 8, 5.6, 24.8, 26.2. Shrub stems/acre 71,200; ground cover 33.3%; canopy cover 80.8%; average canopy height 81 ft (range 60-100). **Edge:** Similar habitat for 250-300 ft on the E and S, bordered on the W by a partially mowed field with brush and scattered deciduous trees, and on the N by an area of mostly Black Cherry and hawthorns. **Topography:** Two stream valleys that extend through the plot are 20-40 ft deep. **Elevation:** 1200 ft. **Weather:** Partly cloudy most days with very little rain in May. Temperature 56-74°F. **Coverage:** May 17-18, 21, 23, 25-26; June 3-4; 0545-0915. EDT. Total man-hours: 28. **Census:** Red-eyed Vireo, 12 (123, 50); Acadian Flycatcher, 7 (72, 29); Wood Thrush, 6 (62, 25); Cerulean Warbler, 4.5 (46, 19); Scarlet Tanager, 3.5 (36, 15); Red-bellied Woodpecker, 3 (31, 12); Tufted Titmouse, 3; Kentucky Warbler, 3; Brown-headed Cowbird, 3 (females); White-breasted Nuthatch, 2.5; Yellow-billed Cuckoo, 2; Black-billed Cuckoo, 2; Great Crested Flycatcher, 2; Com. Crow, 2; Carolina Chickadee, 2; Blue-gray Gnatcatcher, 2; Cardinal, 2; Ruffed Grouse, 1 (female); Pileated Woodpecker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Blue Jay, 1; Louisiana Waterthrush, 1; Com. Grackle, 1; Ruby-throated Hummingbird, 0.5; Rufous-sided Towhee, 0.5; Gray Catbird, +; Ovenbird, +; Indigo Bunting, +. **Total:** 29 species; 69.5 territorial males or females (713/km², 289/100 acres). **Visitors:** Mourning Dove, Com. Flicker, Am. Robin, Am. Goldfinch. **Remarks:** Courtship was observed in the Great Crested Flycatcher and Scarlet Tanager and 1 Red-eyed Vireo nest was located. The plot is located within the area of brood V of the Seventeen-year Cicada (*Magicicada septendecim*) and these insects were very numerous by the end of the census period. Thanks to Ernest Abernathy for the use of his property, to Vin Lawrence for help in the field, and to Tom Hart for assistance with the quantitative habitat description.—ROY A. ICKES, Biology Dept.,

Washington & Jefferson College, Washington, PA 15301.

15. MATURE DECIDUOUS FLOODPLAIN FOREST. — **Location:** Maryland; Montgomery Co., Glen Echo, 2.5 mi NW of the District of Columbia between the C. & O. Canal and the Potomac River; 38°58'N, 77°8'30"W, Falls Church Quadrangle, USGS. **Continuity:** Established 1947; 30 intermittent years. **Size:** 7.6 ha = 18.75 acres. **Description of Plot:** See AFN 1: 212-213 (1947). **Weather:** Mid-May to mid-June was wet but no flooding. Average temp. 66°F. **Coverage:** Mar. 27; Apr. 11, 17, 24, 30; May 9, 29, 31; June 7, 12, 19, 26; 0600-0900 or 1500-1800, EST. Total man-hours: 24. **Census:** Carolina Chickadee, 6 (79, 32); Starling, 6; Cardinal, 5 (66, 27); Downy Woodpecker, 4 (53, 21); Acadian Flycatcher, 4; Tufted Titmouse, 4; Red-eyed Vireo, 4; Wood Duck, 3 (40, 16); Red-bellied Woodpecker, 3; Blue-gray Gnatcatcher, 3; Com. Flicker, 2; Great Crested Flycatcher, 2; E. Wood Pewee, 2; Carolina Wren, 2; N. Parula, 2; Am. Redstart, 2; Prothonotary Warbler, 1.5; Barred Owl, 1; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Brown Creeper, 1; Cerulean Warbler, 1; Yellow-throated Warbler, 1; Brown-headed Cowbird, 1; Song Sparrow, 1; Indigo Bunting, +. **Total:** 28 species; 65.5 territorial males or females (863/km², 349/100 acres). **Visitors:** Blue Jay, N. Oriole. **Remarks:** Nests located: Starling, 6; Carolina Chickadee, 2; 1 each for Wood Duck, Barred Owl, Ruby-throated Hummingbird, Com. Flicker, Red-bellied Woodpecker, Cardinal. Numbers of Starlings and Red-eyed Vireos dropped to an all time low. Cerulean Warbler bred for the first time since 1968. Average territorial males of, respectively, permanent residents, neotropic migrants, and Starlings have been: for the last 3 years (25, 21, 9), for the last 7 years (25, 25, 12), for the previous 7 years (32.5, 46, 20.5).—JOAN H. CRISWELL, J.R. GAUTHEY (compiler), 6603 Reynard Drive, Springfield, VA 22152.

16. MIXED HARDWOOD FOREST. — **Location:** Maryland; Calvert Co., NW of Plum Pt. and 1 mi inland from Chesapeake Bay on Tobacco Rd between Rtes 263 and 261. **Continuity:** Established 1960; 18 intermittent years. **Size:** 11.3 ha = 28 acres. **Description of Plot:** See AFN 13:333 (1959). **Weather:** Fifteen of the trips were made on clear days; and high temperatures varied between 60° and 91°F. The creek flowed well; and the low area remained wet. **Coverage:** May 1, 5, 23, 27; June 1, 6, 11-12, 14, 19, 21, 26; July 2, 5-6, 14, 19, 26; Aug. 3, 13. Four were part-trips in the evening. Total: The 16 full trips averaged 88 minutes; 0547-1110 EST. **Census:** Red-eyed Vireo, 22 (194, 79); Cardinal, 17 (150, 61); Wood Thrush, 14 (124, 50); Rufous-sided Towhee, 12 (106, 43); White-eyed Vireo, 9 (79, 32); Com. Yellowthroat, 7 (62, 25); Wooded Warbler, 7; Kentucky Warbler, 5 (44, 18); Yellow-breasted Chat, 5; Tufted Titmouse, 4 (35, 14); Mourning Dove, 3 (26, 11); Carolina Chickadee, 3; Summer Tanager, 3; Am. Woodcock, 2; Ruby-throated Hummingbird 2; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Acadian Flycatcher, 2; Com. Crow, 2; Scar-

let Tanager, 2; Indigo Bunting, 2; Bobwhite, 1; Yellow-billed Cuckoo, 1; Carolina Wren, 1; Brown Thrasher, 1; E. Bluebird, 1; Blue-gray Gnatcatcher, 1; N. Parula, 1; Pine Warbler, 1; Ovenbird, 1; Louisiana Waterthrush, 1; Red-tailed Hawk, +; Com. Flicker, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Great Crested Flycatcher, +; Blue Jay, +; Fish Crow, +; Gray Catbird, +; Am. Robin, +; Yellow-throated Vireo, +; Worm-eating Warbler, +; Prairie Warbler, +; Am. Redstart, +; Com. Grackle, +; Brown-headed Cowbird, +. **Total:** 31 species, 147 territorial males, (1297/km², 525/100 acres). **Remarks:** The 31 species on territory were a recovery from last year's all time low of 25. The 22-year average of 35 was the same as for the last 2 years. The 147 territorial males were an increase over last year's 104. This was the highest since 1977 However, the 22-year average dropped again for the eighth consecutive year; but it only dropped slightly from 205 to 203. The Red-eyed Vireo repeated as the most numerous species; and it increased by 7 territories The Cardinal regained second position; and it increased by 12 territories. The Wood Thrush was third, increasing by 9 territories The Rufous-sided Towhee was fourth; and it too increased by 3 territories. The White-eyed Vireo and Com. Yellowthroat were next; each increased by 1 territory. Thirteen of the first 21 species showed gains, 4 were even; and 5 showed only slight losses The only notable loss from last year was the Hooded Warbler, which dropped from 12 to 7 territories. The Carolina Wren fell from 3 to a single territory; and the Indigo Bunting went from 4 to 2. The E. Wood Pewee was absent The increases occurring this year may be owing to the continual return of plant growth, which is more evident now, following the logging that took place 6 years ago.—JOHN H. FALES, 2809 Ridge Road, Neeld Estate, Huntingtown, MD 20639.

17. MIXED UPLAND HABITAT. — **Location:** District of Columbia, the central third of Glover-Archbold Park; 38°55'N, 77°05'W, DC-MD-VA, 7.5 min. series, USGS. **Continuity:** Established 1960; 23 consecutive years. **Size:** 14.2 ha = 35 acres. **Description of Plot:** See AFN 14:502-503 (1960). **Weather:** Temperature 40-80°F, average 63°. Of 27 trips, 18 were clear, 6 partly cloudy, 2 cloudy, with wind calm on 9, light on 12, 10 mph on 4, strong on 1. **Coverage:** Mar 27, Apr. 1-2, 11, 13, 18-19, 24, 29; May 2, 4, 6, 9, 11, 14, 16, 27; June 20, 25, 27; July 3-5, 11, from 0640-1100. Total man-hours: 64.5. **Census:** Gray Catbird, 21 (148, 60); Cardinal, 21, Veery, 16 (113, 46); Wood Thrush, 11 (78, 31); Carolina Chickadee, 9 (64, 26); Tufted Titmouse, 9; Blue Jay, 8 (56, 23); Red-bellied Woodpecker, 5 (35, 14); Carolina Wren, 4 5 (32, 13); Rufous-sided Towhee, 4 (28, 11), Com. Flicker, 3 (21, 9); Com. Crow, 3; Red-eyed Vireo, 3; Downy Woodpecker, 2; White-breasted Nuthatch, 2; Starling, 2; Ovenbird, 2; Am. Robin, 1.5; Mourning Dove, 1; Screech Owl, 1; Pileated Woodpecker, 1; Great Crested Flycatcher, 1, House Sparrow, 1; Com. Grackle, 1; Scarlet Tanager, +. **Total:** 25 species; 133 territorial males (939/km², 380/100 acres). **Visitors:** Mallard, Rock Dove, Chimney Swift, Hairy Woodpecker, E. Wood Pewee, Fish Crow,

House Wren, Mockingbird, Kentucky Warbler, Com. Yellowthroat, Am. Redstart, N. Oriole, Brown-headed Cowbird, Am. Goldfinch. **Remarks.** The ratio of Wood Thrushes to Veeries returned to the levels of 1959-61, changing the steady trend since 1963 for Wood Thrushes to decline, to a + in 1974 with slow improvement to 6 in 1980, while Veeries went up to 28 in 1971 and 1975, and were still 23 in 1981. The almost complete disappearance of flycatchers and warblers since 1963 was slightly changed: Ovenbirds had been our sole remaining species, usually 1 or +, 3.5 in 1978, now back to 2. Three others were visitors after a long absence: Kentucky Warbler for the first time since 1971, mostly missing after decline from 4 in 1962; Am. Redstart, from visitor or + since 1974, was 15 in 1961; yellowthroat declined from 7 to 1 by 1972, missing or visitor since, except for 2 in 1977. Changes in habitat might account for the yellowthroat, as more open areas have grown up. No perceptible changes have occurred in habitats for the others mentioned, thus we still suspect that changes in wintering and migratory areas are the main causes of declines. Nest holes were found for Com. Flicker, Red-bellied Woodpecker, Carolina Chickadee, Tufted Titmouse, and Starling, and presumably the pair of Screech Owls, always seen in the same hole, but not in nesting activity in daylight.—*SHIRLEY A. BRIGGS (compiler), RUTH EISENHART, ROBERT HILTON, OLIVE HOLBROOK, G.T. and SUSAN HUNT, 7605 Honeywell Lane, Bethesda, MD 20814.*

18. MAPLE-CHERRY-BEECH. — **Location:** West Virginia; Randolph-Pendleton Co. line, 5 mi NW of Circleville; 38°42'48"N; 79°21'28"W, Spruce Knob Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The dominant canopy trees are Sugar Maple (*Acer saccharum*) and Black Cherry (*Prunus serotina*). Most prominent in the understory are seedlings of the canopy species. The ground cover is primarily ferns and violets. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 442/acre; total basal area 116.4 ft²/acre. Species comprising 98% of the total number of trees: Sugar Maple, 188, 42, 35, 100; Black Cherry, 35, 8, 36, 100; Beech (*Fagus grandifolia*), 162, 37, 20, 100; Red Maple (*A. rubrum*), 15, 3, 6, 17; Striped Maple (*A. pensylvanicum*), 13, 3, 2, 34. Trees by diameter size class: A (3-6 in.) 219, 49, 22, 12, B (6-9 in.) 118, 27, 36, 19; C (9-15 in.) 68, 15, 56, 28; D (15-21 in.) 27, 6, 48, 25; E (21-27 in.) 8, 2, 26, 13; F (27-33 in.) 2, 1, 8, 4. Shrub stems/acre 5008; ground cover 24%; canopy cover 90%; average canopy height 68 ft (range 54-79). **Edge:** Surrounded on all sides by similar cover. **Topography:** Nearly level. **Elevation:** 4000 ft. **Weather:** Fair to partly cloudy. **Coverage:** June 17-20; 24 trips between dawn and 0755 hours and 2000-2100 hours. Total party-hours: 12. **Census:** Red-eyed Vireo, 8 (132, 53); Black-throated Green Warbler, 7 (115, 47); Veery, 2.5; Wood Thrush, 2; Ovenbird, 2; Am. Robin, 1; Scarlet Tanager, 0.5; Rose-breasted Grosbeak, 0.5; Turkey, +; Barred Owl, +; Hairy Woodpecker, +; Com. Crow, +; Com. Ra-

ven, +, Black-capped Chickadee, +, Brown-headed Cowbird, +, Dark-eyed Junco, +. **Total:** 16 species; 23.5 territorial males (387/km², 157/100 acres). **Visitors:** Broad-winged Hawk, Hermit Thrush, Cedar Waxwing, Magnolia Warbler, Purple Finch. **Remarks:** This plot represents a sample of hundreds of acres of Monongahela Nat'l Forest in which the vegetation is recovering from the removal of timber. It is a fine example of the forest at the level just under the final rise of land forming the highest point in West Virginia. The Dark-eyed Juncos had apparently hatched their broods and were wandering throughout the plot. Census participants: Ken Anderson, E.R. and E.D. Chandler, Robert DeGarmo, Juanita Delancey, Cindy Ellis, Lorraine Harper, George Hurley, Virginia Johnson, John Jones, Carolyn Rudle.—*GLEN PHILLIPS (compiler), Brooks Bird Club, 707 Warwood Ave., Wheeling, WV 26003.*

was thinned but ground cover had not yet grown). Census participants C Bell, A Buckelow, Jr., C. Conrad, G. Eddy, F Giffin, A. Harris, M. & H. Hooker, E. Hutton, Jr., V. Johnson, A. Llewellyn, J. & A McGrew, G. Murray, E. Reichelderfer, R Richardson, R. Smith, W. Smith and M Thacker.—*G. PHILLIPS (compiler), Brooks Bird Club, 707 Warwood Ave., Wheeling, WV 26003.*

20. SUGAR MAPLE-BLACK CHERRY FOREST. — **Location:** West Virginia, Pendleton Co.; 4 mi NNE of Circleville, 38°42'54"N, 79°32'21"W, Spruce Knob Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Spruce Mountain Hiking trail extending NNW. Principally deciduous forest with scattered Hemlock and Spruce trees. The dominant canopy trees are Sugar Maple (*Acer saccharum*) and Black Cherry (*Prunus serotina*). Most prominent in the understory are seedlings of canopy trees and Striped Maple (*A. pensylvanicum*). The ground cover is ferns (*Dryopteris* sp.) and Ground Pine (*Lycopodium* sp.). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 255/acre; total basal area 143 ft²/acre. Species comprising 90% of the total number of trees: Sugar Maple, 160, 63, 61, 100; Black Cherry, 18, 7, 14, 83; Yellow Birch (*Betula lenta*), 25, 10, 8, 50; Am. Beech (*Fagus grandifolia*), 27, 10, 7, 83. Trees by diameter size class: A (3-6 in.) 77, 30, 8, 5; B (6-9 in.) 82, 32, 24, 17; C (9-15 in.) 72, 28, 57, 40; D (15-21 in.) 20, 8, 36, 25; E (21-27 in.) 3, 1, 10, 7; F (27-33 in.) 1, 1, 8, 6. Shrub stems/acre: 4067, ground cover 81%; canopy cover 78%; average canopy height 69 ft (range 57-72 ft). **Edge:** Similar forested area with 2 small openings. **Elevation:** 3950 ft. **Weather:** Cool; misty early, clearing later. **Coverage:** June 17-20, between dawn and 0830, EDT (22 trips) Total party-hours: 10. **Census:** Solitary Vireo, 4 (66, 27); Black-throated Green Warbler, 4; Magnolia Warbler, 3 (49, 20); Wood Thrush, 2; Veery, 2; Scarlet Tanager, 2, Dark-eyed Junco, 2; Black-capped Chickadee, 1; Swainson's Thrush, 1; Golden-crowned Kinglet, 1; Red-eyed Vireo, 1; Indigo Bunting, 1; Ruffed Grouse, +; Rose-breasted Grosbeak, +. **Total:** 14 species, 24 territorial males (395/km², 160/100 acres). **Visitors:** Red-shouldered Hawk, Downy Woodpecker and Com. Raven. **Remarks:** Nest found: Black-throated Green Warbler, 1 female Ruffed Grouse with young was seen. Participants: members of the Brooks Bird Club Sortie party, K. Anderson, E D Chandler, R. DeGarmo, C. Ellis, G. Hurley, V. Johnson, J. Jones, G. Koch.—*E R CHANDLER (compiler), Brooks Bird Club, 707 Warwood Ave. Wheeling, WV 26003.*

21. COVE HARDWOOD FOREST. — **Location:** Virginia; Rockingham Co.; 0.2 mi SE of Briery Branch Gap; 38°28'50"N, 79°13'W, Reddish Knob Quadrangle, USGS. **Continuity:** New. **Size:** 5.06 ha = 12.5 acres (rectangular, 110 × 550 yds, measured longitudinally and estimated laterally). **Description of Plot:** A mature hardwood stand, at the head of an east-facing cove, selectively

logged to remove storm-damaged timber. The dominant canopy trees are Red Oak (*Quercus alba*) and White Oak (*Q. rubra*). Most prominent in the understory are Striped Maple (*Acer pensylvanicum*) and Flowering Dogwood (*Cornus florida*). The ground cover is primarily Mountain Laurel (*Kalmia latifolia*), blueberries (*Vaccinium spp.*) and several ferns including Christmas Fern (*Polystichum acrostichoides*) and Interrupted Fern (*Osmunda claytoniana*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular 0.1-acre samples, 157/acre; total basal area 107 ft²/acre. Species comprising 90% of the total number of trees: Red Oak, 8, 5, 27, 17; White Oak, 17, 11, 20, 33; dead trees, 28, 18, 13, 100; Red Maple (*A. rubrum*), 47, 30, 11, 100; Chestnut Oak (*Q. prinus*), 23, 15, 10, 67; E. Hemlock (*Tsuga canadensis*), 8, 5, 7, 33; Sweet Birch (*Betula lenta*), 10, 6, 5, 33. Trees by diameter size class: A (3-in.) 75, 48, 75, 7; B (6-9 in.) 35, 22, 10.5, 11; C (9-15 in.) 28, 18, 22.7, 21; D (15-21 in.) 7, 4, 12, 11; E (21-27 in.) 7, 4, 20.7, 19, F (27-33 in.) 2, 1, 8.2, 8; G (38-40 in.) 2, 1, 11.8, 11; H (>40 in.) 2, 1, 13.3, 12. Shrub stems/acre 10,141; ground cover 49%; canopy cover 81%; average canopy height 40 ft (range 26-55). **Edge:** Like habitat extends on both sides of the transect, with one end approaching a paved road and the other the edge of the selectively cut stand. Similar but uncut stands surround all sides. **Topography:** A moderately steep east-facing slope near the top of Shenandoah Mountain. **Elevation:** 3440 ft. **Weather:** Seasonable temperatures, mostly clear with only a few days of light rain. **Coverage:** June 6, 8, 11-12, 14, 16, 18, 22, 26; between dawn and 0925 hours or 2020-2050 hours. Total party-hours: 10. **Census:** Dark-eyed Junco, 2.5; E. Wood Pewee, 2; Black-throated Blue Warbler, 2; Indigo Bunting, 2; Rufous-sided Towhee, 2; Red-eyed Vireo, 1.5; Rose-breasted Grosbeak, 1.5; Acadian Flycatcher, 1; Black-capped Chickadee, 1; Wood Thrush, 1; Ovenbird, 1; Great Crested Flycatcher, 0.5; Black-and-white Warbler, 0.5; Downy Woodpecker, +; White-breasted Nuthatch, +; Scarlet Tanager, +; Brown-headed Cowbird (0.5♀ /trip), +, Chipping Sparrow, +. **Total:** 18 species; 18.5 territorial males (366/km², 148/100 acres). **Visitors:** Yellow-billed Cuckoo, Chimney Swift, Pileated Woodpecker, Blue Jay, Com. Raven, Veery, Solitary Vireo, Hooded Warbler, Canada Warbler. **Remarks:** Thanks to Anne Zimmermann, Sharon Wubben, and Jerome Pinkett for helping with the vegetation survey and to Clair Mellinger, Elwood Fisher and Mike and Kathleen Finnegan for helping with the census —ELLEN J. GOETZ, U.S. Forest Service, Harrisonburg, VA 22801.

22. CHESTNUT OAK – RED OAK-HICKORY FOREST. — **Location:** Virginia, Rockingham Co.; 4.5 mi W of the center of Harrisonburg; 38°26'57"N, 78°57'12"W, Bridgewater Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (approximately rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Mole Hill, the local name for this census location, is representative of numerous small peaks arising like wooded islands above the agriculture sea of the

Shenandoah Valley. It is unique in that its bedrock is basaltic, originating from an old volcanic plug, whereas most of the neighboring hills in this limestone valley are composed of sandstone. However the vegetation shows few major differences from that of its neighbors. This woodland has been selectively cut periodically through the years and is now characterized by a relatively high open canopy of mature Chestnut Oak (*Quercus prinus*) and Red Oak (*Q. rubra*) and a much shorter but denser subcanopy of Flowering Dogwood (*Cornus florida*), small Red Maples (*Acer rubrum*), and transitional canopy species. Numerous standing dead trees presumably provide habitat for cavity-nesting species. Because of the relatively open canopy, light often penetrates to the ground allowing Virginia Creeper (*Parthenocissus quinquefolia*) and Japanese Honeysuckle (*Lonicera japonica*) to form extensive patches of ground cover. Other significant shrubs or herbaceous plants include blackberries and raspberries (*Rubus spp.*), Black Cohosh (*Cimicifuga racemosa*), Witch Hazel (*Hamamelis virginiana*), and near the top Striped Maple (*A. pensylvanicum*). Noticeably absent are Mt. Laurel (*Kalmia latifolia*) and blueberries (*Vaccinium spp.*), so common under oaks in the mountains E and W of the valley. A quantitative survey of the vegetation based on six 0.1 acre samples, gave the following results. Trees 3-in. diameter and over, 289/acre; total basal area 98 ft²/acre. Species comprising 90% of the total number of trees: Chestnut Oak, 50, 17, 50.5, 100; Red Oak, 27, 9, 15, 83; dead trees, 32, 11, 8, 83; Red Maple, 37, 13, 6, 83; hickory (*Carya spp.*), 27, 9, 5, 100; White Pine (*Pinus strobus*), 15, 5, 5, 50; Flowering Dogwood, 63, 22, 4, 83; Black Cherry (*Prunus serotina*), 10, 4, 2, 50. Trees by diameter size class: A (3-6 in.) 153, 54, 9, 9; B (6-9 in.) 48, 17, 9, 9; C (9-15 in.) 45, 16, 22, 22; D (15-21 in.) 25, 9, 27, 27; E (21-27 in.) 13, 5, 25, 25; G (33-40 in.) 2, 1, 7, 7. Shrub stems per acre 2833; ground cover 57.5%; canopy cover 81.7%; average canopy height 43 ft (range 35-50). **Edge:** Bounded on 3 sides by similar habitat. However, 50-60 yds from the lower or N edge, the plot borders a farm and a small road. **Topography:** Centered on a narrow trail from near the bottom of the wooded portion of the hill to its summit. The trail ascends slowly at first but rises abruptly near the top for an overall gain of 335 ft over its length. **Elevation:** 1560-1895 ft. **Weather:** An unusually high number of cloudy, rainy, or misty dawns with indirect if any sunlight. **Coverage:** May 24, 29-30; June 1, 3, 6-9, 16, 23; between dawn and 0900 and 2000-2100. Total party-hours: 18. **Census:** Mourning Dove, 5 (82, 33); Rufous-sided Towhee, 5; Cardinal, 4 (66, 27); Great Crested Flycatcher, 3 (49, 20); Tufted Titmouse, 2.5; Wood Thrush, 2.5; Red-eyed Vireo, 2; Scarlet Tanager, 2; Indigo Bunting, 2; E. Wood Pewee, 1.5; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Carolina Wren, 1; White-breasted Nuthatch, 0.5; Brown Thrasher, 0.5; Yellow-billed Cuckoo, +; Pileated Woodpecker, +; Blue-gray Gnatcatcher, +; Brown-headed Cowbird, +; (0.25♀ /trip and 1.9♂ /trip). **Total:** 20 species; 34.5 territorial males (568/km², 230/100 acres). **Visitors:** Purple Martin, Chimney Swift, Am. Robin, Black-and-

white Warbler, Hooded Warbler, Com Grackle, Am. Goldfinch. **Remarks:** The Rockingham Bird Club sponsored this census through the efforts of Kathleen and Michael Finnegan, plot establishment, Elwood Fisher, census and vegetation analysis aid, Ellen Goetz, vegetation analysis aid, and myself.—CLAIR MELLINGER, Biology Dept., Eastern Mennonite College, Harrisonburg, VA 22801.

23. OAK – HICKORY – TULIP-TREE FOREST. — **Location:** Virginia; Amherst Co., 0.4 mi NW of intersection of U.S Route 29 and Sweet Briar College entrance road, 37°33'N, 70°04'W, Amherst Quadrangle, USGS. **Continuity:** Established 1978; 4 intermittent years. **Size:** 13.5 ha = 33.3 acres. **Description of Plot:** See AB 33:61 (1979) **Coverage:** May 19; June 10, 14, 16, 21, 24-25, 27-28, 30; July 1, 7, 29. Total party-hours 28 **Weather:** About average, perhaps slightly cooler than normal. **Census:** Wood Thrush, 16 (119, 48); Scarlet Tanager, 4 (30, 12), Downy Woodpecker, 3 (22, 9); Blue Jay, 3, Yellow-billed Cuckoo, 2; E. Wood Pewee, 2, Great Crested Flycatcher, 2; Acadian Flycatcher, 2; Carolina Chickadee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2, Com. Flicker, 1; Red-bellied Woodpecker, 1, Pileated Woodpecker, 1; Am. Robin, 1; Yellow-throated Vireo, 1; Red-eyed Vireo, 1, Cardinal, 1. **Total:** 18 species; 47 territorial males (349/km², 141/100 acres). **Visitors.** Com. Crow, Carolina Wren, Louisiana Waterthrush, Com. Grackle, Brown-headed Cowbird. **Remarks:** Little change from last year.—DOUGLAS H. SHEDD (Co-compiler), ERNEST P. EDWARDS (Co-compiler), C. MICHAEL STINSON, Sweet Briar College, Sweet Briar, VA 24595.

24. UPLAND OAK-HICKORY FOREST. — **Location:** Virginia; Dranesville District Park, McLean, Fairfax Co., along Route 193 (Old Georgetown Pike), approximately 3/4 mi W of Exit 13, Capital Beltway (Interstate 495); 38°57'N, 77°12'W, Falls Church Quadrangle, USGS. **Continuity:** Established 1973, 10 consecutive years. **Size:** 11.0 ha = 27.2 acres. **Description of Plot:** See AB 25 636 (1971). **Weather:** Temperatures on trips, 37°-81°F (average 56°); light rain on 1 trip. **Coverage:** Apr. 3, 6, 10, 13-17, 20-21, 23-24; May 1, 4, 10-11, 15, 17, 29-30; June 2, 7, 15, 19, 24, July 17; 0530-1200 or 1745-1915, EDT. Total man-hours: 45.8 **Census:** Red-eyed Vireo, 18 (164, 66); Wood Thrush, 14.5 (132, 53), Tufted Titmouse, 10.5 (95, 39); Brown-headed Cowbird, 9 (82, 33); Carolina Chickadee, 7 (64, 26); White-breasted Nuthatch, 7, Red-bellied Woodpecker, 5.5 (50, 20), Downy Woodpecker, 5.5; Cardinal, 5 (45, 18); Acadian Flycatcher, 4 (36, 15); E. Wood Pewee, 4; Blue Jay, 4; Scarlet Tanager, 4, Great Crested Flycatcher, 3 (27, 11); Mourning Dove, 2; Com. Flicker, 1; Pileated Woodpecker, 1; Brown Creeper, 1; Am. Robin, 1, Ovenbird, 1; Louisiana Waterthrush, 1, Com. Grackle, 1; Worm-eating Warbler, 0.5 **Total:** 23 species; 110.5 territorial males (1004/km², 406/100 acres). **Visitors:** Yellow-billed Cuckoo, Hairy Woodpecker, Com. Crow, Carolina Wren, Blue-gray Gnatcatcher, Yellow-throated Vireo, Cerulean Warbler, Summer Tanager, Am. Goldfinch

Remarks: Nests found Red-bellied Woodpecker, 2; Wood Thrush, 2; Blue Jay, 1; Tufted Titmouse, 1; Am. Robin, 1. The number of territorial males was an all-time high, as were the figures for Downy Woodpecker, White-breasted Nuthatch, Tufted Titmouse, and Wood Thrush.—*GILBERT ESPEN-SHADE, JESSICA GIUSTI, KEITH GUTHRIE, BILL PER-LEE, ROBERT J. WATSON* (*compiler*), 2636 Marcy Road, Arlington, VA 22207.

25. UPLAND TULIP-TREE-OAK FOREST.—**Location:** Virginia; Fairfax Co., U.S. Geological Survey Nat'l Center, Reston; 38°56'45"N, 77°21'50"W, Vienna Quadrangle, USGS. **Continuity:** Established 1974; 9 consecutive years. **Size:** 20.6 ha = 50.9 acres. **Description of Plot:** See *AB* 34:49 (1980). The plot continues to become isolated from similar habitat. In late Feb. 1981 ca. 10 acres of forest was cleared NE of the area; in June another 50 acres were cleared 100 ft to the N. Then in March 1982, 20 acres of forest were cut down 100 ft W of the plot. **Weather 1981:** Temperatures averaged near normal in March, above average in April and June, and below normal in May. Rainfall was 1.47 in. below normal during the period. **Coverage 1981:** Apr. 27; May 5, 17, 25; June 4-5, 13, 23; July 7. Total man-hours: 14.5. **Census:** Wood Thrush, 6 (29, 12); Blue Jay, 5 (24, 10); Carolina Chickadee, 5; Tufted Titmouse, 5; Cardinal, 5; Great Crested Flycatcher, 3 (15, 6); E. Wood Pewee, 3; Red-eyed Vireo, 3; Downy Woodpecker, 2; White-breasted Nuthatch, 2; E. Bluebird, 2; Blue-gray Gnatcatcher, 2; Rufous-sided Towhee, 2; Com. Flicker, 1; Red-bellied Woodpecker, 1; Hairy Woodpecker, 1; Acadian Flycatcher, 1; Com. Crow, 1; Carolina Wren, 1; Gray Catbird, 1; Am. Robin, 1; Veery, 1; Worm-eating Warbler, 1; Ovenbird, 1; Kentucky Warbler, 1; Am. Redstart, 1; Brown-headed Cowbird, 1; Scarlet Tanager, 1. **Total:** 28 species; 60 territorial males (291/km², 118/100 acres). **Remarks:** Nests found: Hairy Woodpecker, 1; Downy Woodpecker, 1; Carolina Chickadee, 1; Carolina Wren, 1; Gray Catbird, 1; Am. Robin, 1; Wood Thrush, 4; E. Bluebird, 3; Cardinal, 1. The chickadee nest was successfully parasitized by a cowbird. **Weather 1982:** Temperatures were above average in March and May, below average in April, and near normal in June. Rainfall was 1.62 in. above normal during the period. **Coverage 1982:** May 3, 15, 25, 29; June 8, 16, 22, 26; July 3. Total man-hours: 14. **Census:** Carolina Chickadee, 5 (24, 10); Great Crested Flycatcher, 4 (19, 8); Blue Jay, 4; Tufted Titmouse, 4; Red-bellied Woodpecker, 3 (15, 6); Downy Woodpecker, 3; E. Wood Pewee, 3; Wood Thrush, 3; Cardinal, 3; White-breasted Nuthatch, 2; Red-eyed Vireo, 2; Am. Redstart, 2; Scarlet Tanager, 2; Broad-winged Hawk, 1; Com. Flicker, 1; Com. Crow, 1; Gray Catbird, 1; Ovenbird, 1; Brown-headed Cowbird, 1; Rufous-sided Towhee, 1; Chipping Sparrow, 1; Song Sparrow, 1. **Total:** 22 species; 49 territorial males (238/km², 96/100 acres). **Remarks:** Nests found: Downy Woodpecker, 3; Com. Flicker, 1; Blue Jay, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Cardinal, 1.—*PAUL W. and JOAN C. WOODWARD*, 4117 Virginia St., Fairfax, VA 22032.

26. FLOOD PLAIN FOREST.—**Location:** North Carolina; Orange Co., within the Univ. of N.C. Mason Farm Reserve (Big Oak Woods), 3 mi SE of the center of Chapel Hill; 35°53'N, 79°0'W, Chapel Hill Quadrangle USGS. **Continuity:** Established 1977; 6 consecutive years. **Size:** 13 ha = 32.1 acres.

Description of Plot: See *AB* 32:63 (1978). **Coverage:** 10 visits between Apr. 17 and June 25. Total party-hours: 23. **Census:** Red-eyed Vireo, 25 (192, 78); Blue-gray Gnatcatcher, 10 (77, 31); Acadian Flycatcher, 8 (62, 25); Wood Thrush, 8; Tufted Titmouse, 5 (38, 16); Hooded Warbler, 5; Kentucky Warbler, 4 (31, 12); Scarlet Tanager, 3.5 (27, 11); Ruby-throated Hummingbird, 3 (23, 9); Red-bellied Woodpecker, 3; Downy Woodpecker, 3; Carolina Chickadee, 3; Carolina Wren, 3; Cardinal, 3; Yellow-throated Vireo, 2; Yellow-billed Cuckoo, 2; White-breasted Nuthatch, 2; N. Parula, 2; White-eyed Vireo, 1; Louisiana Waterthrush, 1; Red-headed Woodpecker, 0.5; Red-shouldered Hawk, +; Great Horned Owl, +; Barred Owl, +; Whip-poor-will, +; Pileated Woodpecker, +; Blue Jay, +; Com. Crow, +; E. Bluebird, +; Pine Warbler, +; Brown-headed Cowbird, +. **Total:** 31 species; 97.5 territorial males (751/km², 304/100 acres). **Visitors:** Wood Duck, Bobwhite, Mourning Dove, Com. Grackle, Summer Tanager. **Remarks:** The area was deeply flooded several times this spring; an early territorial Ovenbird probably left as a result. A hummingbird's and a Cardinal's nest were found and recently fledged Tufted Titmice were seen. Barred Owls probably nested; newly fledged young were seen. The total of 28.5 singing male vireos of 3 species on 13 ha is astonishing.—*S. HALL* (*Co-compiler*), *K. HORNER, A. LINDSEY, H. MUELLER* (*Co-compiler*), *E. STEVENS, D. STUCKEY, H. WILEY*. *Dept. of Biol., Univ. of N.C., Chapel Hill, NC 27514.*

27. MIXED DECIDUOUS FOREST.—**Location:** North Carolina; Orange Co., partly within the research area of the N.C. Botanical Garden, 2.5 mi SE of the center of Chapel Hill; 35°21'N 79°01'W, Chapel Hill Quadrangle, USGS. **Continuity:** Established 1976; 7 consecutive years. **Size:** 12.55 ha = 31 acres. **Description of Plot:** See *AB* 31:41 (1977). **Coverage:** 10 visits between Apr. 22 and June 21. Total party-hours: 20. **Census:** Red-eyed Vireo, 12 (96, 39); Wood Thrush, 9.5 (76, 31); Tufted Titmouse, 6 (48, 19); Blue-gray Gnatcatcher, 5 (40, 16); Cardinal, 4 (32, 13); Ovenbird, 3.5 (28, 11); Ruby-throated Hummingbird, 3 (24, 10); Acadian Flycatcher, 3; Carolina Chickadee, 3; Carolina Wren, 3; Red-bellied Woodpecker, 2.5; Hooded Warbler, 2.5; Yellow-billed Cuckoo, 2; Hairy Woodpecker, 2; White-breasted Nuthatch, 1.5; Yellow-throated Vireo, 1.5; Scarlet Tanager, 1.5; Summer Tanager, 1.5; Downy Woodpecker, 1; Pine Warbler, 1; Kentucky Warbler, 1; Mourning Dove, 0.5; Red-shouldered Hawk, +; Great Horned Owl, +; Whip-poor-will, +; Chimney Swift, +; Com. Flicker, +; Pileated Woodpecker, +; Blue Jay, +; Com. Crow, +; Brown-headed Cowbird, +. **Total:** 31 species; 70.5 territorial males (562/km², 227/100 acres). **Visitors:** Bobwhite, Screech Owl, Great Crested Flycatcher, E. Bluebird, N. Parula, Com. Grackle. **Remarks:** Newly

fledged Tufted Titmice and Ovenbirds were seen.—*S. HALL* (*Co-compiler*), *G JAHNKE, K. MEYER, H. MUELLER* (*Co-compiler*), *B. SIMPSON, E. STEVENS, H WILEY*, *Dept. of Biol., Univ. of N.C., Chapel Hill, NC 27514.*

28. OAK-HICKORY FOREST WITH STREAM I.—**Location:** South Carolina, Anderson Co., 7.75 km NW Honea Path, S.C.; 34°22'N, 82°22'W, Honea Path, S.C., 7.5 min. quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (225 × 450 m, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of 120 ha (300 acres) on S side of drainage of Hen Coop Creek, a 1 m wide tributary of which runs along E side Logging activities conducted in the past primarily consisted of removal of pines, although approximately 5 acres in the NW part were farmed for some time after the remainder had reverted to forest. This inclusion is covered primarily with pine. Canopy age, based on sample of 14 trees, 61 years (range 35-93). Dominant canopy trees are White Oak (*Quercus alba*), Tulip-tree (*Liriodendron tulipifera*), Scarlet Oak (*Q. coccinea*), and Shortleaf Pine (*Pinus echinata*). Most prominent in the understory are Flowering Dogwood (*Cornus florida*), Sweet Gum (*Liquidambar styraciflua*), and Am. Holly (*Ilex opaca*). Major ground cover is composed of vines (*Vitis* spp., *Smilax* spp., *Parthenocissus quinquefolia*, *Lonicera japonica*, and *Rhus radicans*). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (USDA Forest Service, SE Forest Exp. Stn., Renewable Resources Evaluation Project, *Field Instructions for South Carolina*, Asheville, NC, 36 p., 1977) 234/acre; total basal area 97.3 ft²/acre Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): White Oak, 38, 16, 22, 80; Flowering Dogwood, 32, 14, 4, 60; dead tree, 32, 14, 7, 60; Shortleaf Pine, 21, 9, 11, 40; Sweet Gum, 19, 8, 7, 60; Sourwood (*Oxydendrum arboreum*), 18, 8, 4, 20; Hickory (*Carya* spp.), 12, 5, 1, 20; Am. Holly, 12, 5, 2, 20; Red Maple (*Acer rubrum*), 10, 4, 3, 40; Tulip-tree, 9, 4, 12, 40; Scarlet Oak, 7, 3, 11, 60; S. Red Oak (*Q. falcata*), 6, 2, 3, 20; Water Oak (*Q. nigra*), 5, 2, 5, 40; Black Oak (*Q. velutina*), 4, 2, 3, 40; Black Gum (*Nyssa sylvatica*), 4, 2, 2, 20; N. Red Oak (*Q. rubra*), 2, 1, 2, 20; Beech (*Fagus grandifolia*) and Loblolly Pine (*P. taeda*), each 0.7, 0.3, 1.5, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 137, 59, 13.3, 14; B (6-9 in.) 28, 12, 9, 9; C (9-15 in.) 47, 20, 33, 34; D (15-21 in.) 19, 8, 33, 34; E (21-27 in.) 3, 1, 9, 9. Shrub stems/acre 58,170, ground cover 47%; canopy cover 88%; average canopy height 86 ft (range 55-131). The foliage height profile, showing percent of space (in 1 ft intervals) occupied by live vegetation, is presented as Figure 1. **Edge:** Bordered on all sides by similar forest, S corner is 30 m from a cultivated field, and SE edge 30 m from a small forest stand that was recently thinned extensively. **Topography:** Nearly flat to gently rolling Piedmont uplands with narrow stream bottom. All mea-

sured slopes were less than 10%, measured aspects included SW, W, NW, N. **Elevation:** 740-810 ft (226-247 m). **Weather:** Frost as severe as that on Apr. 7 (26°F at Anderson) occurs in far fewer than 10% of years. Over the season Apr.-July temperatures in nearby Anderson were 6.1°F above normal, and precipitation there was 3.8 in. below normal. Weather conditions ranged from clear to overcast with light rain. **Coverage:** Apr. 28, 30, May 16, 28-29; June 4, 6, 9, 19, 27, 30; July 6-7, 27; between dawn and 1325, EST. Total man-hours: 49.9. **Census:** Red-eyed Vireo, 9 (89, 36); Tufted Titmouse, 4 (40, 16); Cardinal, 4; Carolina Wren, 3 (30, 12); Acadian Flycatcher, 2.5; Yellow-billed Cuckoo, 2; Ruby-throated Hummingbird, 2; Red-bellied Woodpecker, 2; Yellow-throated Vireo, 2; Blue-gray Gnatcatcher, 1.5; Hooded Warbler, 1.5; Hairy Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Carolina Chickadee, 1; Summer Tanager, 1; Com. Flicker, 0.5; Pileated Woodpecker, 0.5; Wood Thrush, 0.5; Louisiana Waterthrush, 0.5; Scarlet Tanager, 0.5; Red-tailed Hawk, +; Chimney Swift, +; Purple Martin, +; Com. Crow, +; N. Parula, +; Kentucky Warbler, +; Brown-headed Cowbird, +. **Total:** 29 species; 42 territorial males or females ($415/\text{km}^2$, 168/100 acres). **Visitors:** Broad-

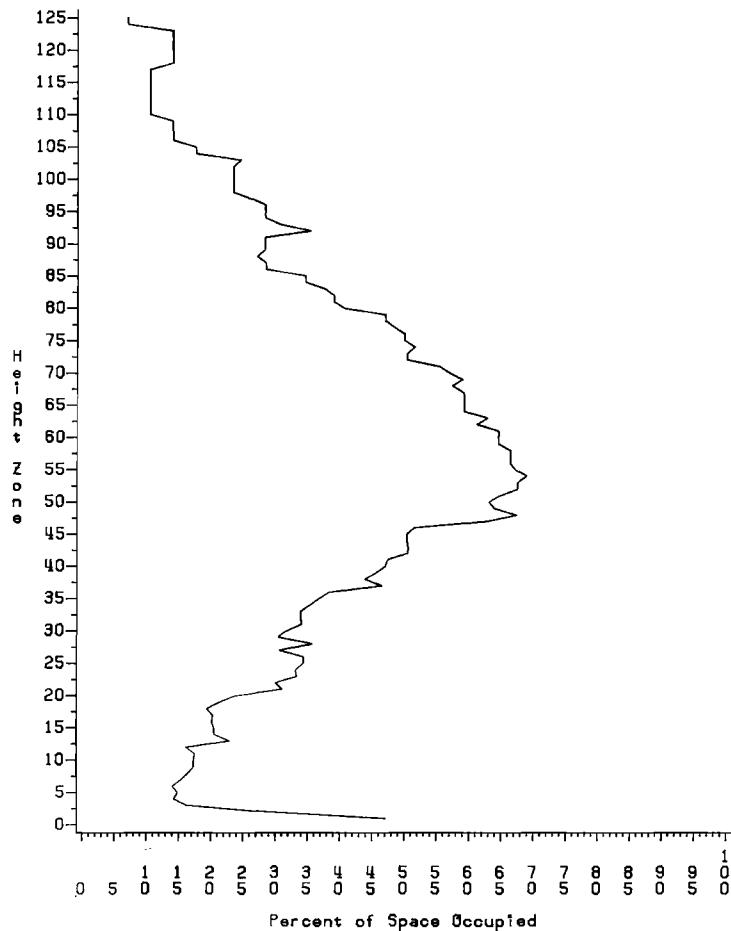
winged Hawk, Chuck-will's-widow, Whippoor-will, Barn Swallow, Am. Robin, White-eyed Vireo, Ovenbird. **Remarks:** Census 29 was conducted on a plot adjacent to this one on the SW. Common Crows nested near SE corner, but nest was not found as young had fledged at the beginning of the study. Nest found: Cardinal. The work was funded by the U.S. Forest Service. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measuring scheme. I thank Mrs. J. Fred Greer and Vernon Wilson for permission to work on their properties. Chuck Dachelet and Robert Sims helped with the fieldwork.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

29. OAK-HICKORY FOREST WITH STREAM II. — **Location:** South Carolina; Anderson Co., 7.75 km NW Honea Path, S.C.; $34^\circ 22'N$, $82^\circ 22'W$; Honea Path, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (225×450 m, surveyed in 50×50 m grid). **Description of Plot:** In stand of ca. 120 ha (300 acres) on S side of drainage of 2 m wide Hen Coop Creek which runs along the NW side. Logging activities conducted in the past consisted primarily of removal of pines. Canopy age, based upon sample of 13 trees, 70 years

(range 38-110). Dominant canopy trees are White Oak (*Quercus alba*) and Tulip-tree (*Liriodendron tulipifera*); a number of large (12+ in. dbh) Sourwoods (*Oxydendrum arboreum*) grow on the plot. Most prominent in the understory are Flowering Dogwood (*Cornus florida*), Tulip-tree, hickory (*Carya* spp.), and Sourwood. Major ground cover species are vines (*Vitis* spp., *Smilax* spp., *Parthenocissus quinquefolia*, *Lonicera japonica*, *Rhus radicans*) and, in the stream bottom, Privet (*Ligustrum* spp.). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf Census 28), 228/acre; total basal area 101.9 ft^2/acre . Species constituting 100% of the total number of trees (figures are number of trees/acre; relative density (%), relative dominance, frequency, respectively): Tulip-tree, 46, 20, 28, 100; hickory, 35, 16, 6, 60; White Oak, 28, 12, 25, 80; N. Red Oak (*Q. rubra*), 25, 11, 3, 40; Water Oak (*Q. nigra*), 19, 8, 5, 60; Sourwood, 16, 7, 6, 60; dead tree, 14, 6, 2, 20; Sweet Gum (*Liquidambar styraciflua*), 10, 5, 6, 80; Black Gum (*Nyssa sylvatica*), 9, 4, 3, 40; Shortleaf Pine (*Pinus echinata*), 9, 4, 4, 20; S. Red Oak (*Q. falcata*), 7, 3, 2, 20; Scarlet Oak (*Q. coccinea*), 4, 2, 4, 20; Persimmon (*Diospyros virginiana*), 3, 1, 2, 20; Red Maple (*Acer rubrum*), 3, 1, 3, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft^2/acre , relative dominance, respectively) A (3-6 in.) 96, 42, 7.4, 7; B (6-9 in.) 54, 24, 15, 15; C (9-15 in.) 59, 26, 43.5, 43; D (15-21 in.) 16, 7, 28.5, 28; E (21-27 in.) 2, 1, 6, 6; F (27-33 in.) 0.3, 0.1, 1.5, 1. Shrub stems/acre 39, 395, ground cover 55%; canopy cover 80%; average canopy ht. 88 ft (range 47-124). **Edge:** Bordered by similar forest except for NW corner, which extends for 0.4 acre (0.2 ha) into a cultivated field, and for a short distance along SW side where another field is closer than 20 m to edge. **Topography:** Nearly flat to gently rolling Piedmont uplands with stream bottom in N 25% of plot. Measured slopes ranged from 1-22%; measured aspects included SW, W, NW, N. **Elevation:** 710-810 ft (216-247 m). **Weather:** see Census 28. Weather conditions during observation periods ranged from clear to overcast with light rain. **Coverage:** Apr. 28; May 16, 28-29; June 4, 6, 9, 19, 27, 30; July 7, 11, 12, 25, 27, between dawn and 1225, EST. Total man-hours: 43.8. **Census:** Red-eyed Vireo, 8 (79, 32); Cardinal, 7.5 (74, 30); Tufted Titmouse, 5 (49, 20); Yellow-billed Cuckoo, 3 (30, 12); Blue-gray Gnatcatcher, 2.5; Ruby-throated Hummingbird, 2; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Carolina Wren, 1.5; Am. Woodcock, 1; Acadian Flycatcher, 1; Blue Jay, 1; Carolina Chickadee, 1; White-eyed Vireo, 1; Yellow-throated Vireo, 1; Louisiana Waterthrush, 1; Kentucky Warbler, 1; Hooded Warbler, 1; Scarlet Tanager, 1; Summer Tanager, 1; Rufous-sided Towhee, 1; Wood Thrush, 0.5; Red-tailed Hawk, +; Chimney Swift, +; Pileated Woodpecker, +; Purple Martin, +; Com. Crow, +; Brown Thrasher, +; N. Parula, +; Brown-headed Cowbird, +. **Total:** 30 species; 46 territorial males or females ($455/\text{km}^2$, 184/100 acres). **Visitors:** Chuck-will's-widow, Whippoor-will, Com. Flicker, Barn Swallow, Indigo Bunting. **Remarks:**

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ID=Anderson County, S. C., Plot No. 1



BBC 28, Similar figures available for Censuses 29-37 from Paul B. Hamel



BBC 29, Anderson Co., S.C. Plot no. 2, Oak Hickory Forest. Photo/Paul B. Hamel

Census 28 was conducted adjacent to this one on the NE. Brown Thrasher and Rufous-sided Towhee associated with dense thicket resulting from heavy thinning in S corner of stand. Nest found: Cardinal. This work was funded by the U.S. Forest Service. I thank Mrs. J. Fred Greer and Vernon Wilson for access to their properties. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measuring scheme. I appreciate the help with the fieldwork provided by Chuck Dachelet, Robert Sims, Caroline Douglass, Stanlee Miller, and Peter Hamel.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC. 29631.

30. UPLAND OAK-HICKORY FOREST

I.—**Location:** South Carolina; Pickens Co., 5 km ENE Table Rock State Park along Hwy. SC 11; 35°00'N, 82°37'W, Table Rock, S.C.-N.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (225 × 450 m, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of ca. 40 ha (100 acres). Across Hwy. 11 to the N, similar forest condition extends for several hundred additional acres. Land was acquired by present owners in 1908 as farmland, and has been left to revert to forest. Logging activities have been confined to removal of pines. A logging road runs across the SW part of the plot. Canopy age, based upon sample of 8 trees, 109 years (range 67-185). Dominant canopy trees are Scarlet Oak (*Quercus coccinea*), White Oak (*Q. alba*), and Shortleaf Pine (*Pinus echinata*). Most prominent in the understory are Blackgum (*Nyssa sylvatica*), Flowering Dogwood (*Cornus florida*), and Sourwood (*Oxydendrum arboreum*) and a few small Chestnuts (*Castanea dentata*) occur. Major groundcover is blueberry (*Vaccinium* spp.); several extensive Mountain Laurel (*Kalmia latifolia*) thickets occur on slopes. A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28.) 571/acre; total basal area 113 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): Sourwood, 103, 18, 11, 100; dead tree, 91, 16, 9, 80; White Oak, 81, 14, 14, 100; Scarlet Oak, 60, 10, 18, 60; Chestnut Oak (*Q. prinus*), 57, 10, 12, 40; Shortleaf Pine, 50, 9, 10, 60; Flowering Dogwood, 36, 6, 2, 40; Black Oak (*Q. velutina*), 19, 3, 4, 60; hickory (*Carya* spp.), 15, 3, 5, 40; Post Oak (*Q. stellata*), 13, 2, 2, 40; Tulip-tree

(*Liriodendron tulipifera*), 12, 2, 1, 20; Black Gum, 12, 2, 1, 20; S. Red Oak (*Q. falcata*), 12, 2, 7, 60; Blackjack Oak (*Q. marilandica*), 5, 1, 1, 20; Red Maple (*Acer rubrum*), 4, 1, 3, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 386, 68, 35, 31; B (6-9 in.) 132, 23, 36, 32; C (9-15 in.) 46, 8, 27, 24; D (15-21 in.) 8, 1, 12, 11; F (27-33 in.) 0.3, 0.04, 1.5, 1; G (33-40 in.) 0.2, 0.04, 1.5, 1. Shrub stems/acre 40,701; ground cover 49%; canopy cover 87%; average canopy height 64 ft (range 44-106). **Edge:** Bordered on 3 sides by similar forest. SC Hwy. 11 is 50 m to the N, providing open habitat near the plot. **Topography:** Rolling to steeply rolling uplands in the upper Piedmont or foothills of the Blue Ridge. Measured slopes ranged from 9-32%; measured aspects included W and NW. A single intermittent seep occurs on the NW side. **Elevation:** 1080-1240 ft (329-378 m). **Weather:** A frost as severe as that on Apr. 7 (25°F at Pickens) occurs about once every five years. Temperatures and precipitation for the period April-July measured at nearby Pickens were normal. **Coverage:** May 14, 17, 21, 29-30; June 7, 21, 23, 28; July 9, 25-26; between dawn and 1255, EST. Total man-hours: 34.9. **Census:** Red-eyed Vireo, 6.5 (64, 26); Great Crested Flycatcher, 3 (30, 12); Ovenbird, 2; Carolina Chickadee, 1.5; Tufted Titmouse, 1.5; Solitary Vireo, 1.5; Cardinal, 1.5; Yellow-billed Cuckoo, 1; Chuck-will's-widow, 1; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Hooded Warbler, 1; Summer Tanager, 1; Whip-poor-will, 0.5; Pileated Woodpecker, 0.5; Worm-eating Warbler, 0.5; Scarlet Tanager, 0.5; Great Horned Owl, +; Louisiana Waterthrush, +. **Total:** 23 species; 29.5 territorial males or females (292/km², 118/100 acres). **Visitors:** Red-tailed Hawk, Chimney Swift, Red-bellied Woodpecker, Acadian Flycatcher, E. Wood Pewee, Barn Swallow, Purple Martin, Com. Crow, Am. Robin, Wood Thrush, Black-and-white Warbler, Brown-headed Cowbird, Rose-breasted Grosbeak. **Remarks:** Census 31 was conducted adjacent to this one to the NE. Cedar Waxwing and Rose-breasted Grosbeak may have been visitors or late migrants. Nest found: Chuck-will's-widow. This work was funded by the U.S. Forest Service. I thank Malcolm Niven for access to the property. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measurement scheme. Cost, Sheffield, Chuck Dachelet, Robert Sims, and Renée and Peter Hamel helped with the fieldwork.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

31. UPLAND OAK-HICKORY FOREST

II.—**Location:** South Carolina; Pickens Co., 5 km ENE Table Rock State Park along SC Hwy. 11; 35°00'N, 82°37'W, Table Rock, S.C.-N.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (225 × 450 m, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of ca. 40 ha (100 acres). Across Hwy. 11 to the N similar forest conditions extend for several hundred more acres. Land was acquired by

present owners in 1908 as farmland and has been left to revert to forest. Logging activities have been confined to removal of pines. A small 0.5 acre (0.2 ha) area has been thinned heavily since 1978. Canopy age, based upon sample of 11 trees, 86 years (range 40-146). Dominant canopy trees are Shortleaf Pine (*Pinus echinata*), Chestnut Oak (*Quercus prinus*), Scarlet Oak (*Q. coccinea*), and hickory (*Carya* spp.). Most prominent in the understory are Black Gum (*Nyssa sylvatica*), S. Red Oak (*Q. falcata*), and Flowering Dogwood (*Cornus florida*). Several small Chestnuts (*Castanea dentata*) occur on the plot. Major groundcover is blueberry (*Vaccinium* spp.) and Mountain Laurel (*Kalmia latifolia*). Mountain Laurel thickets cover much of the NW half. A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28.) 441/acre; total basal area 106.8 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): Shortleaf Pine, 86, 19, 24, 80; Chestnut Oak, 72, 16, 17, 80; S. Red Oak, 51, 12, 9, 60; Flowering Dogwood, 48, 11, 3, 60; dead tree, 43, 10, 5, 80; Scarlet Oak, 42, 10, 13, 80; Post Oak (*Q. stellata*), 39, 9, 7, 20; Sourwood (*Oxydendrum arboreum*), 24, 5, 2, 40; hickory, 12, 3, 10, 60; White Oak (*Q. alba*), 12, 3, 1, 20; Black Oak (*Q. velutina*), 6, 1, 6, 80; Tulip-tree (*Liriodendron tulipifera*), 3, 1, 1, 20; Virginia Pine (*P. virginiana*), 2, 0.4, 1, 20; Red Maple (*Acer rubrum*), 2, 0.3, 1, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 290, 66, 24.3, 23; B (6-9 in.) 78, 18, 22.5, 21; C (9-15 in.) 64, 15, 45, 42; D (15-21 in.) 8, 2, 12, 11; E (21-27 in.) 1, 0.3, 3, 3. Shrub stems/acre 21,502; ground cover 37%; canopy cover 86%; average canopy height 66 ft (range 45-93). **Edge:** Bordered by similar forest on 3 sides; SC Hwy. 11 is 50 m to the NW, providing open habitat near the plot. **Topography:** Rolling to steeply rolling uplands in the upper Piedmont or foothills of the Blue Ridge. Measured slopes ranged from 12-48%; measured aspects included SW, NE, N, and SE. Two small seeps occur along the NW side, and a third is near the SE side. **Elevation:** 1120-1280 ft (341-390 m). **Weather:** See Census 30. Weather during observation periods ranged from clear to fog with light rain. **Coverage:** May 14, 17, 21, 29-30; June 7, 21, 23, 28; July 9, 12, 25; between dawn and 1310, EST. Total man-hours: 31. **Census:** Red-eyed Vireo, 7.5 (74, 30); Hooded Warbler, 2.5; Blue-gray Gnatcatcher, 2; Solitary Vireo, 2; Cardinal, 2; Yellow-billed Cuckoo, 1.5; Whip-poor-will, 1.5; Ruby-throated Hummingbird, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Black-and-white Warbler, 1; Worm-eating Warbler, 1; Ovenbird, 1; Scarlet Tanager, 1; Pileated Woodpecker, 0.5; Great Horned Owl, +; Hairy Woodpecker, +; Louisiana Waterthrush, +. **Total:** 21 species; 29.5 territorial males or females (292/km², 118/100 acres). **Visitors:** Red-tailed Hawk, Chimney Swift, Com. Flicker, Red-bellied Woodpecker, E. Wood

Pewee, Purple Martin, Com. Crow, White-breasted Nuthatch, Am. Robin, Wood Thrush, Pine Warbler, Com. Grackle, Indigo Bunting. **Remarks:** Census 30 was conducted on a plot adjacent to this one to the SW. Louisiana Waterthrush had territory on both sides of Hwy. 11, concentrating his activity on the N side of the road where the seeps entered into a stream. This work was funded by the U.S. Forest Service. I thank Malcolm Niven for access to the property. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measurement scheme. Cost, Sheffield, Chuck Dachelet, Robert Sims, and Renée and Peter Hamel helped with the fieldwork.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

32. UPLAND OAK-HICKORY FOREST
III. — **Location:** South Carolina; Abbeville Co., 0.8 km N Parson's Mountain Lookout Tower, Sumter Nat'l Forest; 34°00'N, 82°15'W, Verdery, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (318 m square, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of 436 ha (1077 acres). Small 1 m wide stream crosses the E corner; another crosses the extreme N corner at the base of a steep 21 m (70 ft) bluff. A number of abandoned gold mines dating from the Civil War era are located on the plot. A motorcycle trail traverses the SW corner. Canopy age, based upon sample of 10 trees, 72 years (range 50-125). Dominant canopy trees are Scarlet Oak (*Quercus coccinea*) and White Oak (*Q. alba*). Most prominent in the understory are Red Maple (*Acer rubrum*), Flowering Dogwood (*Cornus florida*), and Serviceberry (*Amelanchier arborea*), and small individuals of the canopy species. Major ground cover is blueberry (*Vaccinium* spp.). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28.) 657/acre; total basal area 131.7 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): Red Maple, 144, 22, 12, 80; Sourwood (*Oxydendrum arboreum*), 105, 16, 7, 80; Flowering Dogwood, 101, 15, 6, 40; Scarlet Oak, 82, 13, 26, 100; dead tree, 45, 7, 13, 100; White Oak, 43, 6, 8, 60; Sweet Gum (*Liquidambar styraciflua*), 25, 4, 2, 20; hickory (*Carya* spp.) 24, 4, 1, 40; Shortleaf Pine (*Pinus echinata*), 21, 3, 6, 60; Black Gum (*Nyssa sylvatica*), 15, 2, 2, 40; Post Oak (*Q. stellata*), 13, 2, 3, 60; Black Cherry (*Prunus serotina*), 12, 2, 1, 20; Serviceberry, 12, 2, 1, 20; Tulip-tree (*Liriodendron tulipifera*), 4, 1, 5, 80; S. Red Oak (*Q. falcata*), 4, 1, 5, 80; N. Red Oak (*Q. rubra*), 3, 1, 1, 20; Black Oak (*Q. velutina*), 3, 1, 1, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.), 519, 79, 46.2, 35; B (6-9 in.) 72, 11, 21, 16; C (9-15 in.) 48, 7, 28.5, 22; D (15-21 in.) 14, 2, 24, 18; E (21-27 in.) 3, 0.5, 9, 7; F (27-33 in.) 0.6, 0.1, 3, 2. Shrub stems/acre 33,660; ground cover 48%; canopy cover 88%; average canopy ht. 79 ft (range 53-115). **Edge:** Bordered on all sides by similar forest. **Topography:** Rolling Piedmont uplands on the

lower NW slope of Parson's Mountain. Measured slopes ranged from 5-24%, with slopes along bluffs overlooking streams even steeper; measured aspects included NW, N, E. **Elevation:** 460-570 ft (140-174 m). **Weather:** Frost as severe as that on Apr. 7 (26°F in Greenwood) occurs in fewer than 10% of years. Over the season April-July temperatures at nearby Calhoun Falls were 2.6°F below normal; those at Greenwood were 1.4°F below normal. Precipitation at Calhoun Falls was 0.2 in. below normal, that at Greenwood was 0.4 in. below normal. **Coverage:** Apr. 29; May 10, 20, 27-28; June 3, 5, 16, 20, 22, 29; July 5, 8, 24; between dawn and 1300, EST. Total man-hours: 42.9. **Census:** Red-eyed Vireo, 12 (119, 48); Wood Thrush, 3.5 (35, 143); Scarlet Tanager, 3.5; Tufted Titmouse, 2.5; Acadian Flycatcher, 2; Yellow-billed Cuckoo, 1.5; Red-bellied Woodpecker, 1.5; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Carolina Wren, 1; Yellow-throated Vireo, 1; Summer Tanager, 1; Com. Flicker, 0.5; Pileated Woodpecker, 0.5; Ovenbird, 0.5; Red-shouldered Hawk, +; Turkey, +; Barred Owl, +; Chimney Swift, +; Blue-gray Gnatcatcher, +; Louisiana Waterthrush, +. **Total:** 24 species; 36 territorial males or females (356/km², 144/100 acres). **Visitors:** Chuck-will's-widow, Purple Martin, Carolina Chickadee, Brown-headed Cowbird. **Remarks:** Census 36 was conducted on a plot adjacent to this one on the SE. Nests found: Red-bellied Woodpecker, Downy Woodpecker, Red-eyed Vireo. This work was funded by the U.S. Forest Service. I thank personnel of the Long Cane Ranger District of the Sumter Nat'l Forest for permission to work on the land, and for numerous other courtesies. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measuring scheme. I appreciate the help with the fieldwork provided by Eddie Graves, Robert Sims, and Peter Hamel.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

33. UPLAND OAK-HICKORY FOREST
IV. — **Location:** South Carolina; Cherokee Co., 2.5 km SW King's Mountain Nat'l Military Park; 35°00'N, 81°22'W, King's Creek, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (318 m square, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of at least 81 ha (200 acres). Recent logging of nearby tracts has reduced the size of contiguous acreage dramatically from a near 400 ha (1000 acre) extent shown on 1970 aerial photography. Logging in the past 50 years consisted of several episodes of removal of large pines. Canopy age, based upon sample of 6 trees, 60 years (range 47-68). Dominant canopy trees are Scarlet Oak (*Quercus coccinea*) and S. Red Oak (*Q. falcata*). Most prominent in the understory are Sourwood (*Oxydendrum arboreum*), Black Gum (*Nyssa sylvatica*), and Red Maple (*Acer rubrum*). A few small Chestnuts (*Castanea dentata*) occur on the plot. Major groundcover is composed of seedlings of canopy and understory species along with *Vitis* spp., *Smilax* spp., and Mountain Laurel (*Kalmia latifolia*). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based

on 5 clusters of 5 variable radius plots each (cf. Census 28.) 560/acre; total basal area 114.9 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): Dead tree, 95, 17, 13, 80; Sourwood, 84, 15, 7, 100; Scarlet Oak, 80, 14, 34, 100; Red Maple, 68, 12, 10, 80; S. Red Oak, 57, 10, 11, 80; White Oak (*Q. alba*), 48, 9, 6, 80; Flowering Dogwood (*Cornus florida*), 36, 6, 3, 20; Tulip-tree (*Liriodendron tulipifera*), 20, 4, 4, 40; Sweet Gum (*Liquidambar styraciflua*), 19, 3, 2, 20; Black Oak (*Q. velutina*), 16, 3, 2, 40; N. Red Oak (*Q. rubra*), 12, 2, 1, 20; hickory (*Carya* spp.), 10, 2, 3, 20; Shortleaf Pine (*Pinus echinata*), 9, 2, 3, 40; Virginia Pine (*P. virginiana*), 5, 1, 1, 20; Post Oak (*Q. stellata*), 3, 1, 1, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 355, 63, 30.9, 27; B (6-9 in.) 152, 27, 42, 36; C (9-15 in.) 49, 9, 33, 29; D (15-21 in.) 4, 1, 6, 5; E (21-27 in.) 0.9, 0.2, 3, 3. Shrub stems/acre 18,707; ground cover 19%; canopy cover 88%; avg. canopy ht. 64 ft (range 31-81). **Edge:** Bordered on all sides by similar forest, except that NW corner falls along edge of 12 m wide power line that bisects the stand. **Topography:** Rolling Piedmont uplands, primarily along the top third of slopes. Measured slopes ranged from to 6-26%; measured aspects included W, N, E, and SE. A small intermittent stream flows W through the W third of the plot. **Elevation:** 590-700 ft (180-213 m). **Weather:** Frost as severe as that on Apr. 7 (22°F at 99 Islands) occurs in fewer than 10% of years. Temperatures during the Apr.-July period were 3.5°F below normal at nearby 99 Islands, and normal at Inman-Gramling. Precipitation at 99 Islands was 4.2 in. above normal, and that at Inman-Gramling was 3.4 in. below normal. Weather conditions ranged from clear to overcast with light rain. **Coverage:** May 12-13, 19, 26; June 1, 11, 18, 24-25; July 2, 14; between dawn and 1300, EST. Total man-hours: 50.2. **Census:** Red-eyed Vireo, 10.5 (104, 42); Wood Thrush, 2.5; Whip-poor-will, 1.5; Carolina Chickadee, 1.5; Yellow-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher 1; Blue Jay, 1; Tufted Titmouse, 1; Yellow-throated Vireo, 1; Scarlet Tanager, 1; Summer Tanager, 1; Cardinal, 1; Hairy Woodpecker, 0.5; Hooded Warbler, 0.5; Red-shouldered Hawk, +; Broad-winged



BBC 33, Cherokee Co., S.C. Plot no. 1, Upland Oak-Hickory Forest. Photo/Paul B. Hamel.

Hawk, +; Chimney Swift, +; E. Phoebe, +. **Total:** 22 species; 29 territorial males or females ($287/\text{km}^2$, 116/100 acres). **Visitors:** Chuck-will's-widow, Com. Flicker, E. Wood Pewee, Purple Martin, Com. Crow, Carolina Wren, Am. Robin, Blue-gray Gnatcatcher, Worm-eating Warbler, Pine Warbler, Ovenbird, Brown-headed Cowbird, Indigo Bunting. **Remarks:** Census 37 was made on a plot ca. 150 m to the NE of this one in the same stand. Louisiana Waterthrush and Kentucky Warbler had territories in the stand but off the plot. Nest found: Wood Thrush. This work was funded by the U.S. Forest Service. I thank Oscar Utter of Canal Industries, Inc., and George Love for access to the property. Noel Cost and Ray Sheffield of the SE Forest Experiment Station designed the vegetation measurement scheme. Norman Brunswig and Robert Sims helped with the fieldwork.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

34. UPLAND OAK-HICKORY FOREST WITH STREAM I. — **Location:** South Carolina; Union Co., 1.5 km SW Rose Hill State Park; 34°30'N 81°37'W, Sedalia, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (225×450 m, surveyed in 50×50 m grid). **Description of Plot:** Located in a stand of 61 ha (150 acres) on the Tyger District of the Sumter Nat'l Forest. A small 1.5 m wide stream runs NE across the center of the plot and then E along the NE edge. A large erosion gully on the W side indicates that the land was farmed at one time. Canopy age, based upon sample of 13 trees, 84 years (range 57-111). Dominant canopy trees are hickory (*Carya spp.*), White Oak (*Quercus alba*), and Tulip-tree (*Liriodendron tulipifera*). Most prominent in the understory are hickory, White Oak, and Flowering Dogwood (*Cornus florida*). Major groundcover is blueberry (*Vaccinium spp.*), Spicebush (*Lindera benzoin*) and vines (*Vitis spp.*, *Smilax spp.*, *Lonicera japonica*, *Parthenocissus quinquefolia*, and *Rhus radicans*). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28.) 338/acre; total basal area 121.3 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): hickory, 83, 25, 20, 100; dead tree, 65, 19, 7, 60; Flowering Dogwood, 39, 12, 4, 60; White Oak, 37, 11, 18, 100; Sourwood (*Oxydendrum arboreum*), 29, 9, 3, 40; Sweet Gum (*Liquidambar styraciflua*), 21, 6, 2, 20; N. Red Maple (*Acer rubrum*), 15, 4, 7, 40; Shortleaf Pine (*Pinus echinata*), 14, 4, 6, 40; Tulip-tree, 9, 3, 16, 60; Winged Elm (*Ulmus alata*), 7, 2, 4, 40; ash (*Fraxinus spp.*), 6, 2, 5, 20; Red Oak (*Q. rubra*), 5, 2, 2, 40; E. Red Cedar (*Juniperus virginiana*), 3, 1, 1, 20; Chestnut Oak (*Q. prinus*), 3, 1, 2, 40. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in square ft²/acre, relative dominance, respectively): A (3-6 in.) 212, 63, 20.8, 17; B (6-9 in.) 45, 13, 15, 12; C (9-15 in.) 61, 18, 45, 37; D (15-21 in.) 15, 4, 24, 20; E (21-27 in.) 4, 1, 12, 10; F (27-33 in.) 0.6, 0.2, 3, 2; G (33-40 in.) 0.2, 0.1, 1.5, 1. Shrub stems/acre 53,259; ground cover 74%; can-

opy cover 89%; avg. canopy ht. 80 ft (range 48-115). **Edge:** Bordered on all sides by similar forest, except for 1 acre (0.4 ha) on the SW corner which abuts a stand of Loblolly Pine (*Pinus taeda*). **Topography:** Rolling Piedmont uplands. All measured slopes were less than 12%; measured aspects included NW, NE, E. **Elevation:** 460-540 ft (140-165 m). **Weather:** Frost as severe as that on Apr. 7 (27°F at Union) occurs in fewer than 20% of years. Temperatures at nearby Union were 1°F below normal for the period April-July, and precipitation was 4.8 in. above normal. Weather conditions during observation periods ranged from clear to overcast. **Coverage:** Apr. 22; May 11, 18, 25; June 1, 2, 10, 17, 24; July 1, 13; between dawn and 1335, EST. Total man-hours: 32.2. **Census:** Red-eyed Vireo, 13.5 (133, 54); Great Crested Flycatcher, 3 (30, 12); Tufted Titmouse, 3; Yellow-billed Cuckoo, 1.5; Whip-poor-will, 1.5; Acadian Flycatcher, 1.5; Wood Thrush, 1.5; Chuck-will's-widow, 1; Red-bellied Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; Yellow-throated Vireo, 1; N. Parula, 1; Scarlet Tanager, 1; Summer Tanager, 1; Cardinal, 1; Pileated Woodpecker, 0.5; Pine Warbler, 0.5; Cooper's Hawk, +; Red-shouldered Hawk, +; Turkey, +; Screech Owl, +; Barred Owl, +; Chimney Swift, +; Com. Flicker, +; Com. Crow, +. **Total:** 28 species; 37.5 territorial males or females ($371/\text{km}^2$, 150/100 acres). **Visitors:** Red-tailed Hawk, Ruby-throated Hummingbird, Carolina Wren, Brown Thrasher, Blue-gray Gnatcatcher, Worm-eating Warbler, Louisiana Waterthrush, Brown-headed Cowbird, Rufous-sided Towhee. Census 35 was conducted adjacent to this one on the E. Nest found: Acadian Flycatcher. This work was funded by the U.S. Forest Service. I thank personnel at the Tyger District of the Sumter National Forest, particularly Al Schenck, for access to the property and many other courtesies. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measuring scheme. Caroline Douglass provided assistance with plant identification, and Al Schenck and Robert Sims helped with the fieldwork.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

35. UPLAND OAK-HICKORY FOREST WITH STREAM II. — **Location:** South Carolina; Union Co., 1.5 km SW Rose Hill State Park; 34°30'N, 81°37'W, Sedalia, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (225×450 m, surveyed in 50×50 m grid). **Description of Plot:** Located in a stand of 61 ha (150 acres) on the Tyger District of the Sumter Nat'l Forest. A small stream runs along part of the N edge. The S third is an arid N-facing slope dominated by a stand of large Chestnut Oaks (*Quercus prinus*). At the E end of that slope are 2 large erosion gullies, indicating that the area was once farmed. Canopy age, based upon sample of 6 trees, 92 years (range 54-130). Dominant canopy trees are Chestnut Oak, White Oak (*Q. alba*), and hickory (*Carya spp.*). Most prominent in the understory are Chestnut Oak, Loblolly Pine (*Pinus taeda*), Sugar Maple (*Acer saccharum*), and ash (*Fraxinus spp.*). Major groundcover is seedlings of dominant tree species, blueberry (*Vaccinium spp.*), and vines (*Vitis spp.*, *Smilax spp.*, *Parthenocissus quinquefolia*, *Lonicera japonica*). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28.) 211/acre; total basal area 85.6 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): Chestnut Oak, 37, 18, 24, 60; White Oak, 33, 16, 21, 80; Sourwood (*Oxydendrum arboreum*), 24, 11, 2, 40; Loblolly Pine, 24, 11, 2, 20; dead tree, 19, 9, 7, 60; hickory, 14, 7, 10, 60; Post Oak (*Q. stellata*), 13, 6, 9, 40; Black Cherry (*Prunus serotina*), 12, 6, 1, 20; Shortleaf Pine (*P. echinata*), 12, 6, 5, 20; N. Red Oak (*Q. rubra*), 9, 4, 7, 40; Scarlet Oak (*Q. coccinea*), 7, 3, 4, 20; Sweet Gum (*Liquidambar styraciflua*), 3, 1, 2, 20; Winged Elm (*Ulmus alata*), 2, 1, 2, 20; Tulip-tree (*Liriodendron tulipifera*), 2, 1, 4, 40. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 92, 44, 9.1, 11; B (6-9 in.) 50, 24, 15, 18; C (9-15 in.) 50, 24, 33, 39; D (15-21 in.) 17, 8, 25.5, 30; E (21-27 in.) 1, 0.5, 3, 4. Shrub stems/acre 22,304; ground cover 27%; canopy cover 90%; average canopy height 73 ft (range 49-90). The foliage height profile, showing percent of space (in 1 ft intervals) occupied by live vegetation, is presented as Figure 1. **Edge:** Bordered on 3 sides by similar forest. Along the E side an adjacent Loblolly Pine stand intrudes onto the plot for ca. 2 acres (0.8 ha). **Topography:** Rolling to steeply rolling Piedmont uplands. Measured slopes ranged from 6-23%; measured aspects included NW, N, E. **Elevation:** 440-580 ft (134-177 m). **Weather:** see Census 34. Weather conditions ranged from clear to overcast. **Coverage:** May 11, 18, 25; June 1, 10, 17, 24; July 1, 13; between dawn and 1310, EST. Total man-hours: 32.6. **Census:** Red-eyed Vireo, 10.5 (104, 42); Carolina Chickadee, 2; Wood Thrush, 2; Red-bellied Woodpecker, 1.5; Acadian Flycatcher, 1.5; Tufted Titmouse, 1.5; Summer Tanager, 1.5; Yellow-billed Cuckoo, 1; Com. Flicker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Blue-gray Gnatcatcher, 1; Yellow-throated Vireo, 1; Scarlet Tanager, 1; Cardinal, 1; Whip-poor-will, 0.5; Pileated Woodpecker, 0.5; Carolina Wren, 0.5; Pine Warbler, 0.5; Cooper's Hawk, +; Red-shouldered Hawk, +; Turkey, +; Barred Owl, +; Great Crested Flycatcher, +; Com.



BBC 35, Union Co., S.C. Plot no. 2, Upland Oak-Hickory Forest with Stream. Photo/ Paul B. Hamel.

Crow, +, N Parula, + **Total:** 27 species, 31.5 territorial males or females (311/km², 126/100 acres). **Visitors:** Broad-winged Hawk, Mourning Dove, Chuck-will's-widow, Chimney Swift, Ruby-throated Hummingbird. **Remarks:** Census 34 was conducted on a plot adjacent to this one on the W Cedar Waxwing may have been a visitor or late migrant. Nest found: Summer Tanager. This work was funded by the U.S. Forest Service. I thank personnel at the Tyger District of the Sumter National Forest, particularly Al Schenck, for access to the property and many other courtesies. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measuring scheme. Caroline Douglass provided assistance with plant identification, and Al Schenck and Robert Sims helped with the fieldwork.—*PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.*

36. UPLAND OAK-HICKORY FOREST WITH STREAM III. — **Location:** South Carolina; Abbeville Co., 0.8 km N Parson's Mountain Lookout Tower, Sumter Nat'l Forest; 34°00'N, 82°15'W, Verdery, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10.1 ha = 25 acres (318 m square, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of 436 ha (1077 acres). A small, 1 m wide stream crosses the W part of the plot. U.S. Forest Service hiking trail winds through NE side. Canopy age, given by U.S. Forest Service, 54 years. Dominant canopy trees are White Oak (*Quercus alba*), Scarlet Oak (*Q. coccinea*), and hickory (*Carya spp.*). Most prominent in the understory are Sourwood (*Oxydendrum arboreum*), Shortleaf Pine (*Pinus echinata*), Redbud (*Cercis canadensis*), and Paw Paw (*Asimina triloba*). Several small Chestnuts (*Castanea dentata*) occur. Major ground cover is blueberry (*Vaccinium spp.*) and several vines (*Vitis spp.*, *Smilax spp.*, *Rhus radicans*). A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28) 347/acre; total basal area 110.5 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): hickory, 70, 20, 14, 80; dead tree, 67, 19, 8, 60; Sourwood, 48, 14, 3, 40; Shortleaf Pine, 46, 13, 10, 40; Blackjack Oak (*Q. marilandica*), 24, 7, 5, 40; White Oak, 22, 6, 16, 80; Scarlet Oak, 21, 6, 15, 100; Flowering Dogwood (*Cornus florida*), 12, 4, 1, 20; Post Oak (*Q. stellata*), 10, 3, 5, 60; Black Gum (*Nyssa sylvatica*), 8, 2, 3, 40; S. Red Oak (*Q. falcata*), 6, 2, 5, 60; Black Oak (*Q. velutina*), 5, 1, 4, 60; Tulip-tree (*Liriodendron tulipifera*), 4, 1, 7, 60; Beech (*Fagus grandifolia*), 4, 1, 3, 40; N. Red Oak (*Q. rubra*), 0.5, 0.1, 1.4, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 222, 64, 19, 17; B (6-9 in.) 54, 15, 16.5, 15; C (9-15 in.) 53, 15, 37.5, 34; D (15-21 in.) 15, 4, 27, 24; E (21-27 in.) 3, 1, 9, 8; F (27-33 in.) 0.4, 0.1, 1.5, 1. Shrub stems/acre 30,318; ground cover 60%; canopy cover 85%; avg. canopy ht. 73 ft (range 37-105). **Edge:** Bordered on all sides by similar forest. Forest road runs parallel to SE

boundary ca 50 m away. **Topography:** Rolling Piedmont uplands; site is on the lower NW slope of Parson's Mountain. Measured slopes ranged from 10-57%; measured aspects included SW, W, NW, N, E. **Elevation:** 500-600 ft (152-183 m). **Weather:** see Census 32. Precipitation at Calhoun Falls was 0.2 in. below normal, that at Greenwood 0.4 in. below normal. Weather ranged from clear to overcast with rain. **Coverage:** Apr. 29; May 10, 20, 27-28; June 3, 5, 16, 20, 22, 29; July 24; between dawn and 1300, EST. Total man-hours: 42.9. **Census:** Red-eyed Vireo, 8 (79, 32); Great Crested Flycatcher, 3.5 (35, 14); Tufted Titmouse, 2.5; Wood Thrush, 2.5; Summer Tanager, 2; Yellow-billed Cuckoo, 1.5; Red-bellied Woodpecker, 1.5; Acadian Flycatcher, 1.5; Ovenbird, 1.5; Com. Flicker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; Carolina Wren, 1; Blue-gray Gnatcatcher, 1; Yellow-throated Vireo, 1; Pine Warbler, 1; Scarlet Tanager, 1; Ruby-throated Hummingbird, 0.5; Pileated Woodpecker, 0.5; Red-shouldered Hawk, +; Broad-winged Hawk, +; Chimney Swift, +; Louisiana Waterthrush, +. **Total:** 25 species; 35.5 territorial males or females (351/km², 142/100 acres). **Visitors:** Red-tailed Hawk, Chuck-will's-widow, E. Wood Pewee, Purple Martin, Com. Crow, White-breasted Nuthatch, Brown-headed Nuthatch, Cardinal. **Remarks:** Census 32 was conducted adjacent to this one on the NW. Old scrapes indicated Turkey use of the stand during the past year. Nest found: Wood Thrush. This work was funded by the U.S. Forest Service. I thank personnel of the Long Cane Ranger District of the Sumter Forest for permission to work on the land and numerous other courtesies. Noel Cost and Ray Sheffield of the SE Forest Exp. Stn. designed the vegetation measuring scheme. I appreciate the help that Eddie Graves and Peter Hamel provided with the fieldwork.—*PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.*

37. UPLAND OAK-HICKORY FOREST WITH STREAM AND MOUNTAIN LAUREL RAVINE. — **Location:** South Carolina; Cherokee Co., 2.5 km SW of King's Mountain Nat'l Military Park; 35°00'N, 81°22'W, King's Creek, S.C., 7.5 min. Quadrangle, USGS. **Continuity:** New. **Size:** 10 ha = 24.7 acres (350 × 286 m, surveyed in 50 × 50 m grid). **Description of Plot:** Located in a stand of at least 80 ha (200 acres). Recent logging of nearby tracts has reduced the size of contiguous acreage dramatically from a near 400 ha (1000 acre) extent shown on 1970 aerial photography. Logging on the plot in the past 50 years consisted of several episodes of removal of large pines. Canopy age, based upon sample of 8 trees, 70 years (range 43-94). Dominant canopy trees are Scarlet Oak (*Quercus coccinea*), Chestnut Oak (*Q. prinus*), Shortleaf Pine (*Pinus echinata*), and White Oak (*Q. alba*). Most prominent in the understory are Blackgum (*Nyssa sylvatica*), Red Maple (*Acer rubrum*), Flowering Dogwood (*Cornus florida*), and Sourwood (*Oxydendrum arboreum*). A few small Chestnuts (*Castanea dentata*) occur on the plot. Major groundcover plants are Mountain Laurel (*Kalmia latifolia*), *Vaccinium spp.*, *Smilax spp.*, and *Vitis spp.* A dense Mountain Laurel

thicket, covering both sides of the ravine along the creek down the center of the plot, is ca. 10 acres (4 ha) in extent. A quantitative survey of the vegetation gave the following results: Trees 3 in. and over, based on 5 clusters of 5 variable radius plots each (cf. Census 28) 297/acre; total basal area 85.8 ft²/acre. Species constituting 100% of the total number of trees (figures are number of trees/acre, relative density (%), relative dominance, frequency, respectively): Shortleaf Pine, 66, 22, 17, 80; Scarlet Oak, 40, 13, 24, 80; Chestnut Oak, 36, 12, 18, 80; Sourwood, 32, 11, 3, 40; dead tree, 30, 10, 8, 60; Black Oak (*Q. velutina*), 24, 8, 2, 40; White Oak, 24, 8, 12, 60; Red Maple, 18, 6, 3, 40; Hickory (*Carya spp.*), 12, 4, 4, 20; S. Red Oak (*Q. falcata*), 11, 4, 9, 40; Blackjack Oak (*Q. marilandica*), 5, 2, 2, 20. Trees by diameter size class (figures after each class are number of trees/acre, relative density (%), basal area in ft²/acre, relative dominance, respectively): A (3-6 in.) 146, 49, 13.8, 16; B (6-9 in.) 92, 31, 27, 31; C (9-15 in.) 54, 18, 36, 42; D (15-21 in.) 6, 2, 9, 10. Shrub stems/acre 23,157, ground cover 42%; canopy cover 83%; average canopy ht. 66 ft (range 46-87). **Edge:** Bordered on all sides by similar forest. Clearcut in adjacent stand to the S extends to within 60 m of plot. **Topography:** Rolling Piedmont uplands with steep bluffs on either side of 1 m wide stream. Measured slopes ranged from 13-28%; measured aspects included SW, W, NW, and E. **Elevation:** 630-770 ft (192-235 m). **Weather:** See Census 33. Precipitation at 99 Islands was 4.2 in. above normal, while that at Inman-Gramling was 3.4 in. below normal. Weather conditions during observation periods ranged from clear to overcast with light rain. **Coverage:** May 12-13, 19, 26; June 1, 11, 18, 24-25; July 2, 14, between dawn and 1300, EST. Total man-hours: 42.8. **Census:** Red-eyed Vireo, 5.5 (54, 22); Tufted Titmouse, 4 (40, 16); Wood Thrush, 3.5 (35, 14); Whip-poor-will, 2.5; Great Crested Flycatcher, 2.5; Hairy Woodpecker, 2; Downy Woodpecker, 2; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Red-bellied Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; Blue-gray Gnatcatcher, 1; Black-and-white Warbler, 1; Ovenbird, 1; Hooded Warbler, 1; Summer Tanager, 1; Mourning Dove, 0.5; Yellow-billed Cuckoo, 0.5; Carolina Wren, 0.5; Yellow-throated Vireo, 0.5; Scarlet Tanager, 0.5; Cardinal, 0.5; Turkey Vulture, +; Red-shouldered Hawk, +; Broad-winged Hawk, +; Chimney Swift, +; E. Wood Pewee, +; Am. Robin, +. **Total:** 29 species; 35 territorial males or females (346/km², 140/100 acres). **Visitors:** Red-tailed Hawk, Chuck-will's-widow, Com. Flicker, Acadian Flycatcher, Purple Martin, Brown-headed Cowbird, Indigo Bunting, Rufous-sided Towhee. **Remarks:** Census 33 was made on a plot in the same stand 150 m to the SW of this one. Dogs from nearby farms had worn a trail through the plot. Cedar Waxwing and Rose-breasted Grosbeak may have been migrants or visitors. Turkey Vultures roosted on the plot. Indigo Bunting and Rufous-sided Towhee came from territories held at edge of clearcut to the S. Kentucky Warbler held territory in stand between edge and clearcut to the S. Nests found: Ruby-throated Hummingbird; Downy Woodpecker 2. This work was funded by the U.S. Forest Service I



BBC 37, Cherokee Co., S.C. Plot no. 2, Upland Oak-Hickory Forest with Stream and Mountain Laurel Ravine. Photo/Paul B. Hamel.

thank Oscar Utter of Canal Industries, Inc., and George Love for access to the property. Noel Cost and Ray Sheffield of the SE Forest Experiment Station designed the vegetation measurement scheme. Norman Brunswig and Robert Sims helped with the fieldwork.—PAUL B. HAMEL, Dept. of Zoology, Clemson Univ., Clemson, SC 29631.

38. VIRGIN HARDWOOD BOTTOM-LAND SWAMP FOREST. — **Location:** South Carolina; Richland Co., Congaree Swamp Nat'l Monument, 16 mi SE Columbia; 33°N, 80°49'W, Gadsden Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 35:57 (1981). **Weather:** Temperature and rainfall near normal; average max. and min. temperatures for May = 85° and 58°F; average rainfall = 3 in./month. **Coverage:** Apr. 7, 12, 21, 28; May 7, 12, 17, 31; June 14; 0700-1000, EST. Total man-hours: 26. **Census:** N. Parula, 22 (272, 110); Red-eyed Vireo, 6 (74, 30); Tufted Titmouse, 4 (49, 20); Cardinal, 3.5 (43, 18); Acadian Flycatcher, 3 (37, 15); Carolina Wren, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Yellow-billed Cuckoo, 2; Carolina Chickadee, 2; White-eyed Vireo, 2; White-breasted Nuthatch, 1.5; Red-shouldered Hawk, 1; Barred Owl, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Prothonotary Warbler, 1. **Total:** 18 species; 59 territorial males ($729/\text{km}^2$, 295/100 acres). **Visitors:** Wood Duck, Chimney Swift, Fish Crow, Yellow-throated Warbler, Hooded Warbler, Wood Thrush, Summer Tanager, and Com. Grackle. **Remarks:** Density figure for this year (59 pairs) nearly identical with 1981 (60 pairs) but number of species down from 22 to 18. This lower species number was owing to the low density breeders (Hooded Warbler, Yellow-throated Warbler, Wood Thrush, Summer Tanager) which were only recorded as visitors this year. The more common species have shown very stable breeding populations over the last 3 years. Nests found (3): Carolina Wren, Tufted Titmouse, and Carolina Chickadee. As would be expected in a virgin forest, there was no change in vegetation structure; any vegetation changes in this area are from windthrow of large trees which create small openings in canopy. In the last 3 years, there has been 1 opening created (1981).—JOHN EMMETT CELY, Nongame-Endangered Species Sec-

tion, S.C. Wildlife and Marine Resources Dept., P.O. Box 167, Columbia, SC 29202.

39. VIRGIN HARDWOOD SWAMP FOREST. — **Location:** South Carolina; Dorchester and Berkeley Cos., 6.5 miles E of Harleyville, in Nat'l Audubon Society's Francis Beidler Forest in Four Holes Swamp; 33°13'N, 80°20'W, Pringleton Quadrangle, USGS. **Continuity:** Established 1979; 3 intermittent years. **Size:** 8.9 ha = 22 acres. **Description of Plot:** See AB 34:50 (1980). **Weather:** Mostly cloudy and calm, with 4 days of fog or light drizzle. Temperatures 56-70°F. **Coverage:** Apr. 14, 16, 21, 28; May 7, 10, 13, 19, 25; June 4; dawn-0830. Total party-hours: 18.8. **Census:** Blue-gray Gnatcatcher, 29.5 (331, 134); N. Parula, 21 (236, 95); Red-eyed Vireo, 13 (146, 59); Great Crested Flycatcher, 12 (135, 55); Tufted Titmouse, 10 (112, 45); Acadian Flycatcher, 8 (90, 36); Carolina Wren, 7 (79, 32); Prothonotary Warbler, 6.5 (73, 30); Hooded Warbler, 6.5; Red-bellied Woodpecker, 6 (67, 27); Yellow-throated Warbler, 6; Downy Woodpecker, 5.5 (62, 25); Carolina Chickadee, 5 (56, 23); White-eyed Vireo, 4.5 (51, 20); White-breasted Nuthatch, 3 (34, 14); Summer Tanager, 3; Yellow-billed Cuckoo, 2; Pileated Woodpecker, 2; Hairy Woodpecker, 2; Wood Duck, 1; Red-shouldered Hawk, 1; Chimney Swift, 1; Wood Thrush, 1; Cardinal, 0.5. **Total:** 24 species; 157 territorial males ($1763/\text{km}^2$, 714/100 acres). **Visitors:** Yellow-crowned Night Heron, White Ibis, Mourning Dove, Barred Owl, Ruby-throated Hummingbird, Blue Jay, Com. Crow, Com. Grackle, Brown-headed Cowbird. **Remarks:** Compared to the 1980 census, the total nesting density was up 35%. However, it is only up 8% over the previous census (1979), which may simply indicate that 1980 was an unusually low density nesting season. Nevertheless, the species make-up of the nesting population was almost identical in 1980 and 1982. The identities of the 6 most abundant species, which make up 60% of the nesting individuals, were the same both years. Most of the species showed the same dramatic increase in numbers as the population at large. One factor that may have contributed to these increased numbers has been a huge outbreak of Forest Tent Caterpillars (*Malacosoma disstria*) during the last 3 nesting seasons. Not only have the caterpillars themselves provided an unusually large food source, but the defoliation of the canopy which they caused has resulted in greater herbaceous and understory growth. Inexplicably, the only bird which has declined steadily since 1979 is the Yellow-billed Cuckoo, which is a heavy consumer of caterpillars. Compared to the 1981 census of its logged counterpart, this plot exhibited a 19% greater total nesting density, perhaps partly for the reasons given above. The species showing the greatest differences in numbers between the 2 plots probably reflect the effects of logging. Great Crested Flycatchers and Yellow-throated Warblers, normally associated with tall trees, were much more numerous in the virgin forest. White-eyed Vireos and Cardinals, generally associated with shrubby thickets and undergrowth, were more numerous in the logged forest.—KENNETH STROM (compiler), NORMAN BRUNSWIG, MICHAEL DAW-

SON, Route 1, Box 114, Harleyville, SC 29448.

40. WOODED CITY RAVINE. — **Location:** Ontario, York Co., Toronto, Moore Park Ravine, between Moore Ave. and Chorley Park; 43°41'N, 79°22'30"W. **Continuity:** Established 1966; 13 intermittent years. **Size:** 20 ha = 49.4 acres. **Description of Plot:** See AB 25:993 (1971). **Coverage:** Apr. 11; May 16; June 4-5, 8-10, 13, 15, 19-20, 24; July 6; 0630-0930. Total man-hours: 23. **Weather:** 6 days cool, cloudy; 2 days rain; 5 days sunny, warming. Average temperature 60°F (22°-68°). **Census:** Am. Robin, 6 (30, 12); Cardinal, 5 (25, 10); Great Crested Flycatcher, 3 (15, 6); Starling, 3; Com. Grackle, 3; Mourning Dove, 2; Com. Flicker, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; Blue Jay, 2; Black-capped Chickadee, 2; Red-winged Blackbird, 2; Indigo Bunting, 2; Wood Thrush, 1; Gray Catbird, 1; House Sparrow, 1; N. Oriole, 1; Song Sparrow, 1; Yellow-billed Cuckoo, +; Ovenbird +. **Total:** 20 species; 41 territorial males ($205/\text{km}^2$, 83/100 acres). **Remarks:** All species breeding not less than 11 of 12 consecutive years have had a preferred territory, whether or not one or more pairs of that species was present. Rates of return to the preferred territory for different species are: Great Crested Flycatcher and Am. Robin, 100%; Cardinal and Song Sparrow, 91%; Blue Jay, Wood Thrush and Com. Grackle, 83%; Downy Woodpecker and Northern Oriole, 66%; Starling, 58%.—ERIC NASMITH (compiler), 28 Donwoods Drive, Toronto, Ont., Canada M4N 2G1.

41. ASPEN CLEARCUT. — **Location:** Michigan; Ontonagon Co., NE 1/4, Sec. 18, T49N, R39W; 46°40'N, 89°10'W; Rockland Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** 9 ha = 22.2 acres. **Description of Plot:** See AB 35:59 (1981). Aspen now averages 6 ft in height (range 3-10). Dense ground cover consisting primarily of sedges and asters with some large patches of willow-herb (*Epilobium* sp.). **Weather:** Cooler and drier than normal. **Coverage:** May 26-27; June 9-10, 23-24; 0500-0730. Total man-hours: 13.5. **Census:** Mourning Warbler, 5.5 (61, 25); Song Sparrow, 5 (56, 23); White-throated Sparrow, 3.5 (39, 16); Chestnut-sided Warbler, 3 (33, 14); Com. Yellowthroat, 2; Com. Flicker, 1; Alder Flycatcher, 1; Am. Robin, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Brown-headed Cowbird, 1; Black-billed Cuckoo, 0.5; Rufous-sided Towhee, 0.5; Com. Snipe, +; Tree Swallow, +; Gray Catbird, +. **Total:** 16 species; 26 territorial males ($289/\text{km}^2$, 117/100 acres). **Visitors:** Bald Eagle, Great Crested Flycatcher, Com. Raven. **Remarks:** Nests found: Com. Flicker, 1; Song Sparrow, 1.—DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN 55108.

42. ASPEN CLEARCUT. — **Location:** Michigan; Ontonagon Co., SE 1/4, Sec. 8, T49N, R39W; 46°40'N, 89°10'W; Rockland Quadrangle, USGS. **Continuity:** Established 1978; 4 intermittent years. **Size:** 18.5 ha = 45.6 acres. **Description of Plot:** See AB 33:77 (1979). **Weather:** Cooler and drier than nor-

mal Coverage: May 26-27, June 9-10, 23-24, 0200-1100. Total man-hours: 19. **Census:** Chestnut-sided Warbler, 4.5 (24, 10); Song Sparrow, 4.5; Mourning Warbler, 4 (22, 9); Nashville Warbler, 3.5 (19, 8); White-throated Sparrow, 3.5; Veery, 3 (16, 7); Alder Flycatcher, 2; Indigo Bunting, 1.5; Am. Woodcock, 1; Black-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Com. Flicker, 1; Blue Jay, 1; Am. Robin, 1; Brown-headed Cowbird, 1; Rose-breasted Grosbeak, 1; Am. Goldfinch, 1; Cedar Waxwing, 0.5; Golden-winged Warbler, 0.5; Am. Redstart, 0.5, Broad-winged Hawk, +; Am. Kestrel, +, Com. Snipe, +; Chimney Swift, +; Tree Swallow, +; Red-eyed Vireo, +; Black-and-white Warbler, +; Ovenbird, +. **Total:** 28 species; 37 territorial males (200/km², 81/100 acres). **Visitors:** Killdeer, Com. Raven.—**DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN 55108.**

43. ASPEN CLEARCUT. — **Location:** Minnesota; Itasca Co.; Chippewa Nat'l Forest, NE 1/4, Sec. 9; 47°34'N, 93°50'W; Jessie Lake Quadrangle, USGS. **Continuity:** Established 1978; 2 intermittent years. **Size:** 10.52 ha = 26 acres. **Description of Plot:** See AB 33: 77 (1979). Clearcut in 1970, saplings now average 20 ft. **Weather:** Cooler and drier than normal. Misting on last census. **Coverage:** May 29, 31; June 12, 14, 26, 28; 0500-1100. Total man-hours: 17. **Census:** Rose-breasted Grosbeak, 4 (38, 15); Veery, 3.5 (33, 13); Ovenbird, 3.5; Chestnut-sided Warbler, 3 (29, 12); Mourning Warbler, 3; Red-eyed Vireo, 2.5; Am. Woodcock, 1; Black-billed Cuckoo, 1; Blue Jay, 1; Gray Catbird, 1; Nashville Warbler, 1; Canada Warbler, 1; Am. Redstart, 1; Song Sparrow, 1; Ruffed Grouse, 0.5; Connecticut Warbler, 0.5; Com. Flicker, +; Downy Woodpecker, +; Alder Flycatcher, +; Golden-winged Warbler, +; Brown-headed Cowbird, +. **Total:** 21 species; 28.5 territorial males (271/km², 110/100 acres). **Remarks:** Nests found: Rose-breasted Grosbeak, 3.—**DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN 55108.**

44. OAK-HICKORY FOREST. — **Location:** Illinois; Lake Co., Lake Co. Forest Preserve District MacArthur Woods Acquisition, 500 m NW of intersection of Rt. 60 and St. Mary's Rd.; 42°14'N, 87°56'W, Wheeling Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 10.64 ha = 26.28 acres. **Description of Plot:** See AB 36: 63-64 (1982). This is the same plot censused in 1981 except that 40 m was added to all sides to increase sample size. **Weather:** Temperatures somewhat cool (43-73°F) with very little precipitation. **Coverage:** May 31; June 1-4, 6-11, 13-14; 0515-1010. Total man-hours: 24.6. **Census:** Ovenbird, 9 (85, 34); Wood Thrush, 6 (56, 23); Black-capped Chickadee, 4 (38, 15); Am. Robin, 3.5 (33, 13); Blue Jay, 3 (28, 11); Veery, 3; Com. Grackle, 3; Hairy Woodpecker, 2; Great Crested Flycatcher, 2; E. Wood Pewee, 2; Cardinal, 2; Red-eyed Vireo, 1.5; Am. Woodcock, 1; Com. Flicker, 1; Red-bellied Woodpecker, 1; Red-headed Woodpecker, 1; Downy Woodpecker, 1; White-breasted Nuthatch, 1; Brown

Creeper, 1; Gray Catbird, 1; Kentucky Warbler, 1; Red-winged Blackbird, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Rufous-sided Towhee, +. **Total:** 27 species; 55 territorial males (517/km², 209/100 acres). **Visitors:** Broad-winged Hawk, Great Horned Owl, Com. Crow, Blue-gray Gnatcatcher, Cedar Waxwing, Indigo Bunting. **Remarks:** Ovenbird numbers have increased back to 1977, 1979 (unpublished) levels after being low in 1981. Veery numbers are down throughout the upland section of these woods from their 1981 levels (14-9) while Wood Thrushes are up (9-11). This follows the same "see-saw" trend as was observed between these species by Cavanaugh and Magee (AFN 21:626-627, 1967). I thank the Lake Co. Forest Preserve District, Illinois Nature Preserves Commission and the Natural Land Institute for permission to study this woods. The Univ. of Ill. at Chicago Circle supplied flagging tape.—**SCOTT HICKMAN, Biology Dept., College of Lake Co., 19351 W. Washington St., Grayslake, IL 60030.**

45. BLACK OAK-SASSAFRAS WOODS. — **Location:** Indiana; Porter Co., 1.5 mi E intersection of Rtes 49 and 12, within Indiana Dunes Nat'l Lakeshore. Area bisected by country road and bridle path; 41°39'N, 87°02'W, Dune Acres Quadrangle, USGS. **Continuity:** Established 1974; 9 consecutive years. **Size:** 22.22 ha = 54.9 acres. **Description of Plot:** See AB 28: 1007 (1974). **Weather:** Very high water Apr. to July made access virtually impossible. **Coverage:** Apr. 25-Aug. 4 (10 trips). Total man-hours: 22.5. **Census:** Rufous-sided Towhee, 5 (23, 9); Brown Thrasher, 4 (18, 7); Field Sparrow, 3 (14, 5); Gray Catbird, 3; Great Crested Flycatcher, 1; Black-capped Chickadee, 1; Veery, 1; Com. Yellowthroat, 1; Cardinal, 1. **Total:** 9 species; 20 territorial males (90/km², 36/100 acres). **Remarks:** Species and young counts very low—tragic year for ground nesters. Too many cowbirds!—**EMMA B. PITCHER, 46 E. State Park Boundary Rd., Chestertown, IN 46304.**

46. NEOTOMA VALLEY. — **Location:** Ohio; Hocking Co., Good Hope Twp., NW 1/4, Sec. 16, T13N, R18W; approximately 39°36'N, 82°34'W, Rockbridge Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** About 20.2 ha = 50 acres. **Description of Plot:** See AB 33: 37-38 (1979). **Weather:** Except for the above-average temperature for the first 20 days of May, there were no other significant events. **Habitat changes:** The W border of the area is now a clearcut, seeded lane 50-100 ft wide over the course of a buried gas pipeline. Subsequent erosion deposited silt along drainage channels and to some extent down-slope. This land will alter densities within the census area. **Coverage:** June 5-7. Total man-hours: 90 (by members or guests of the Wheaton Club). **Census:** Red-eyed Vireo, 9 (44, 18); Wood Thrush, 8 (40, 16); Scarlet Tanager, 8; Acadian Flycatcher, 6 (30, 12); Ovenbird, 6; E. Wood Pewee, 4 (20, 8); Cerulean Warbler, 4; Red-bellied Woodpecker, 3 (15, 6); Downy Woodpecker, 3; Tufted Titmouse, 3; White-breasted Nuthatch, 3; Black-and-white Warbler, 3; Cardinal, 3;

Yellow-billed Cuckoo, 2; Great Crested Flycatcher, 2; E. Phoebe, 2; Blue Jay, 2; Yellow-throated Vireo, 2; Worm-eating Warbler, 2; Kentucky Warbler, 2; Hooded Warbler, 2; Turkey Vulture, 1; Ruffed Grouse, 1; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Carolina Chickadee, 1; Blue-gray Gnatcatcher, 1; N. Parula, 1; Louisiana Waterthrush, 1; Brown-headed Cowbird, 1; Indigo Bunting, 1; Am. Goldfinch, 1. **Total:** 33 species; 91 territorial males/females (450/km², 182/100 acres) **Remarks:** Internal habitat changes were limited to a few stems of windfall and the previously mentioned siltation. Nests found (4) were much below previous years. Special thanks to Jeff White for extra census efforts.—**A.H. CLAUGUS (compiler), 228 S Lake St., Carey, OH 43316.**

47. MIXED DECIDUOUS FOREST. — **Location:** Tennessee; Washington Co., Horse Cove Gap, about 4.5 mi S of Johnson City; 36°15'N, 82°22'W, Erwin Quadrangle, USGS. **Continuity:** New. **Size:** 25.4 ha = 62.7 acres. **Description of Plot:** The dominant canopy species is Red Maple (*Acer rubrum*). The principal shrub species are Rosebay Rhododendron (*Rhododendron maximum*) and Mountain Laurel (*Kalmia latifolia*). Dense rhododendron thickets occur along the bank of a small, 2 ft wide stream that bisects the plot. Ground cover was sparse with New York Fern (*Thelypteris noveboracensis*) being the most common species. There is one area of about 1 acre that has no vegetation. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 10 circular 0.1 acre samples, 82/acre; total basal area 20.8 ft²/acre. Species comprising 90% of the total number of trees: Red Maple, 27, 33, 24, 90; *Sassafras albidum*, 10, 12, 8, 20; Chestnut Oak (*Quercus prinus*), 6, 7, 16, 50; Scarlet Oak (*Q. coccinea*), 6, 7, 11, 30; Tulip-tree (*Liriodendron tulipifera*), 6, 7, 8, 30; Black Birch (*Betula lenta*), 5, 6, 9, 40; Red Oak (*Q. rubra*), 3, 4, 3, 20; Black Gum (*Nyssa sylvatica*), 3, 4, 6, 20; Striped Maple (*A. pensylvanicum*), 3, 4, 2, 20; Hickories (*Carya spp.*), 3, 4, 2, 20; Sourwood (*Oxydendrum arboreum*), 3, 4, 1, 20. Trees by diameter size class: A (3-6 in.) 39, 47, 3.9, 19; B (6-9 in.) 35, 43, 10.5, 50; C (9-15 in.) 8, 10, 6.4, 31. Shrub stems/acre, 15, 100; ground cover 39%, canopy cover 92%; average canopy height 40 ft (range 25-60). **Edge:** Similar forest on all sides. **Topography:** On the SE slope of a ridge. **Elevation:** 2300-2800 ft. **Coverage:** May 15-16, 18, 22-23, 26-27, 29-30; June 12; 0600-1000, EDT. Total man-hours: 14. **Census:** Red-eyed Vireo, 15 (59, 24); Ovenbird, 12 (47, 19); Hooded Warbler, 7 (28, 11); Wood Thrush, 4 (16, 6); Acadian Flycatcher, 3 (12, 5); Carolina Chickadee, 3; Black-and-white Warbler, 3; Scarlet Tanager, 2.5; Yellow-billed Cuckoo, 2; Whip-poor-will, 2; Ruby-throated Hummingbird, 2; Great Crested Flycatcher, 2; Blue-gray Gnatcatcher, 2; Worm-eating Warbler, 2; Broad-winged Hawk, 1; Ruffed Grouse, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Tufted Titmouse, 1; N. Parula, 1; Black-throated Green Warbler, 1; Kentucky Warbler, 1; Brown-headed Cowbird, 1; Cardinal, 1; Indigo Bunting, 1; Rufous-sided Towhee, 1. **Total:** 26 species; 73.5 territorial males or

females ($290/\text{km}^2$, 117/100 acres). **Remarks:** Nests found: Whip-poor-will, Hairy Woodpecker. This census was a comparison study to Census 81. (Deciduous Clearcut). This plot is a relatively unchanging forested area maintained by the U.S. Forest Service. It closely represents the type of habitat that existed on the clearcut plot before it was cut and also the type of habitat the clearcut should succeed to eventually. Special thanks to Gary Lewis for assistance in measuring the plot and surveying the vegetation.—*RICHARD LEWIS, Rt. 3, Box 470, Bristol, TN 37620.*

48. MISSISSIPPI DELTA BOTTOM-LAND HARDWOODS (MANAGED).—**Location:** Arkansas; Arkansas Co., White River Nat'l Ref., Timber Comp. 6; 1.2 mi SE St. Charles; $34^\circ 22'N$, $91^\circ 7'W$, Indian Bay SE Quadrangle, USGS. **Continuity:** New. **Size:** 10.9 ha = 26.9 acres (trapezoidal, measured with compass and "Hip Chain"). **Description of Plot:** The relatively even-aged canopy is dominated by Willow Oak (*Quercus phellos*), Sugarberry (*Celtis laevigata*), Green Ash (*Fraxinus pennsylvanica*), Water Hickory (*Carya aquatica*), Sweet Gum (*Liquidambar styraciflua*), and E. Cottonwood (*Populus deltoides*). Understory trees include smaller specimens of the canopy species as well as Am. Elm (*Ulmus americana*), Possumhaw (*Ilex decidua*), Ironwood (*Carpinus caroliniana*), Red Mulberry (*Morus rubra*) and others. A few very large Bald Cypress (*Taxodium distichum*), Willow Oak, Water Oak (*Q. nigra*) and Cherrybark Oak (*Q. falcata*) are widely scattered on the plot. River Birch (*Betula nigra*) and Black Willow (*Salix nigra*) occur along the river bank. Trumpet Creeper (*Campsis radicans*) is abundant. There are 2 small, relic Canebrakes (*Arundinaria gigantea*). The ground is mostly bare of green vegetation but with small patches of Poison Ivy (*Toxicodendron radicans*) and *Galactia mohlenbrockii*. The forest was logged in the 1960s and 70s with removal of nearly all merchantable Com. Persimmon (*Diospyros virginiana*) and Pecan (*Carya illinoensis*), and most of the Bald Cypress and Red Oaks. A quantitative survey of the vegetation gave the following results: Trees, 3 in. diameter and over, based on 10 0.1 acre circular samples, 361/acre; total basal area, 140.9 ft²/acre. Species comprising 90.7% of the total number of trees: Sugarberry, 76, 21, 7, 80; dead trees, 57, 16, 9, 90; Am. Elm, 54, 15, 6, 70; Willow Oak, 40, 11, 29, 90; Green Ash, 36, 10, 8, 70; Sweet Gum, 27, 8, 8, 60; Water Hickory and Pecan, 14, 4, 4, 60; Overcup Oak (*Q. lyrata*), 14, 4, 6, 50; Honey Locust (*Gleditsia triacanthos*), 9, 3, 3, 40. Trees by diameter size class: A (3-6 in.) 224, 62, 22, 16; B (6-9 in.) 75, 21, 23, 16; C (9-15 in.) 44, 12, 35, 26; D (15-21 in.) 10, 3, 18, 13; E (21-27 in.) 4, 1, 12, 9; F (27-33 in.) 2, 0.6, 10, 7; G (33-40 in.) 1, 0.3, 7, 5; H (52 in.) 1, 0.3, 14, 10. Shrub stems per acre, 775; canopy cover 81%; ground cover 43%; average canopy height 25 ft (range 15-50). **Edge:** Bounded by the White River on 1 side and similar habitat on the other 3 sides with a 2-yr old field approaching 1 corner. **Topography:** Ridge and swale, and sloping gradually in 1 corner into an area about 1-2 ft lower in elevation, frequently containing standing water. A small semi-permanent slough stagnates dur-

ing low water. **Elevation:** 150-155 ft (45-47 m). **Weather:** Normal for the period. **Coverage:** May 22-24, 28, 30-31; June 1, 3, 7, 9, 14, 18, 21, 23; Sunrise—1000 and 1700-2200. Total man-hours: 26.5. **Census:** Blue-gray Gnatcatcher, 21 (193, 78); Carolina Chickadee, 10 (92, 37); Acadian Flycatcher, 8 (73, 30); Carolina Wren, 6.5 (60, 24); Red-eyed Vireo, 6 (55, 22); Brown-headed Cowbird, 6; Cardinal, 5.5 (51, 20); Ruby-throated Hummingbird, 5 (46, 19); Downy Woodpecker, 5; Tufted Titmouse, 5; Prothonotary Warbler, 5; Yellow-billed Cuckoo, 4.5 (41, 17); N. Parula, 4 (37, 15); Blue Jay, 3 (28, 11); Indigo Bunting, 2.5; Red-bellied Woodpecker, 2; Great Crested Flycatcher, 1.5; White-eyed Vireo, 1.5; Orchard Oriole, 1.5; Broadwinged Hawk, 1; Turkey, 1; Barred Owl, 1;



BBC 48, White River N.W.R., Arkansas Co., Ark. Mississippi Delta Bottomlands (Managed). Photo/Steven P. Christman.

Com. Flicker, 1; Pileated Woodpecker, 1; Summer Tanager, 1; Wood Duck, +; Red-tailed Hawk, +; Wood Thrush, +. **Total:** 28 species; 109.5 territorial males ($1006/\text{km}^2$, 407/100 acres). **Visitors:** Great Horned Owl, Red-headed Woodpecker, Hairy Woodpecker, E. Wood Pewee, Yellow-throated Vireo, Kentucky Warbler, Com. Yellowthroat, Com. Grackle. **Remarks:** Nests located (1 each): Yellow-billed Cuckoo, Acadian Flycatcher.—*STEVEN P. CHRISTMAN, Denver Wildlife Research Center, 412 NE 16th Ave., Gainesville, FL 32601.*

49. MISSISSIPPI DELTA BOTTOM-LAND HARDWOODS (UNMANAGED).—**Location:** Arkansas; Arkansas Co., White River Nat'l Wildl. Ref., Striplin Woods; 0.7 mi SE St. Charles; $34^\circ 22'N$, $91^\circ 7'W$, Indian Bay SE Quadrangle, USGS. **Continuity:** New. **Size:** 9.7 ha = 24.0 acres (trapezoidal; measured with compass and "Hip Chain"). **Description of Plot:** The uneven-aged canopy is dominated by widely-spaced large specimens of Overcup Oak (*Quercus lyrata*), Nuttall Oak (*Q. nuttallii*), Swamp Chestnut Oak (*Q. michauxii*), Willow Oak (*Q. phellos*), Pecan (*Carya illinoensis*), and Sycamore (*Platanus occidentalis*). Large Com. Persimmon (*Diospyros virginiana*), Cedar Elm (*Ulmus crassifolia*), E. Cottonwood (*Populus deltoides*), Honey Locust (*Gleditsia triacanthos*), Sweet Gum (*Liquidambar styraciflua*), and Bald Cypress (*Taxodium distichum*) also contribute to the canopy. River Birch (*Betula nigra*) and large Black Willow (*Salix nigra*) occur along the river bank. Numerous natural tree falls and large dead trees create thicketty openings dominated by Trumpet Creeper (*Campsis radicans*), Grape

(*Vitis* sp.), Pepper-vine (*Ampelopsis arborea*), blackberry (*Rubus* sp.) and small trees of several species. The understory includes Silver Maple (*Acer saccharinum*), Sugarberry (*Celtis laevigata*), Red Mulberry (*Morus rubra*), Am. Elm (*Ulmus americana*), Possumhaw (*Ilex decidua*), *Sassafras albidum*, and others. Trumpet Creeper, Supplejack (*Berchemia scandens*), Pepper-vine, Greenbriar (*Smilax* sp.), Grape and Poison Ivy (*Toxicodendron radicans*) are everywhere in abundance. A relic Canebrake (*Arundinaria gigantea*) persists in 1 corner. The ground is sometimes bare of living vegetation, but often is covered with Poison Ivy sometimes standing to a height of 1 m. The forest has not been logged since the beginning of the century. A quantitative survey of the vegetation gave the following results: Trees, 3 in. diameter and over, based on 10 0.1 acre circular samples, 194/acre; total basal area, 138.5 ft²/acre. Species comprising 90.2% of the total number of trees: Am. Elm, 39, 20, 6, 60; Sweet Gum, 31, 16, 5, 50; dead trees, 21, 11, 11, 80; Sugarberry 18, 9, 2, 60; Com. Persimmon, 15, 8, 9, 40; Overcup Oak, 14, 7, 26, 40; Pecan and Water Hickory, 10, 5, 4, 50; Cedar Elm, 9, 5, 5, 30; Silver Maple, 6, 3, 0.6, 30; Water Oak (*Q. nigra*), 6, 3, 3, 40; Willow Oak, 6, 3, 10, 40. Trees by diameter size class: A (3-6 in.) 101, 52, 10, 7; B (6-9 in.) 33, 17, 10, 7; C (9-15 in.) 30, 16, 24, 17; D (15-21 in.) 15, 8, 27, 20; E (21-27 in.) 10, 5, 31, 22; F (27-33 in.) 2, 1, 10, 7; G (33-40 in.) 2, 1, 14, 10; H (50 in.) 1, 0.5, 13, 9. Shrub stems per acre, 2520; canopy cover 74%; ground cover 49%; average canopy height 57 ft (range 30-80). **Edge:** Bounded by the White River on 1 side, 50-100 m of similar habitat then a terrace on 1 side, 70 m of similar habitat then a dirt road and highway bridge on 1 side, and similar habitat on the remaining side, with a 2-yr old field abutting the corner. **Topography:** Ridge and swale with a small, semi-permanent slough. **Elevation:** 151-155 ft (46-47 m). **Weather:** Normal for the period. **Coverage:** May 26, 30-31; June 1-2, 4-6, 8, 11, 17-18, 21, 23; Sunrise—1000 and 1500-2200. Total man-hours: 30.5. **Census:** Blue-gray Gnatcatcher, 28 (288, 117); Carolina Chickadee, 8 (82, 33); Acadian Flycatcher, 7.5 (77, 31); N. Parula, 7 (72, 29); Ruby-throated Hummingbird, 6 (62, 25); Carolina Wren, 5 (51, 21); Brown-headed Cowbird, 5; Cardinal, 5; Tufted Titmouse, 4 (41, 17); Yellow-billed Cuckoo, 3 (31, 13); Red-bellied Woodpecker, 3; White-eyed Vireo, 3; Downy Woodpecker, 2.5; Prothonotary Warbler, 2.5; Kentucky Warbler, 2.5; Pileated Woodpecker, 2; Great Crested Flycatcher, 2; Wood Thrush, 2; Indigo Bunting, 2; Wood Duck, 1; Mississippi Kite, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; E. Wood Pewee, 1; Blue Jay, 1; Red-eyed Vireo, 1; Swainson's Warbler, 1; Orchard Oriole, 1; Yellow-breasted Chat, +. **Total:** 29 species; 109 territorial males ($1122/\text{km}^2$, 454/100 acres). **Visitors:** Yellow-crowned Night Heron, Barred Owl, Chimney Swift, Com. Flicker, White-breasted Nuthatch, Yellow-throated Vireo, Am. Redstart, Summer Tanager, Com. Grackle. **Remarks:** Nests located (1 each): Ruby-throated Hummingbird, Red-headed Woodpecker, Wood Thrush, Cardinal. Blue-gray Gnatcatchers observed feeding fledgling cowbirds on 4 occasions.—*STEVEN P. CHRISTMAN, Den-*

ver Wildlife Research Center, 412 NE 16th Ave., Gainesville, FL 32601.

50. OAK-HICKORY FOREST-SECOND GROWTH. — **Location:** Missouri; St. Louis Co., Washington Univ. Tyson Research Center, on I-44, 8 mi SW of I-270; 38°31'N, 90°34'W, Manchester Quadrangle, USGS. **Continuity:** Established 1980; 2 intermittent years. **Size:** 7.85 = 19.4 acres. **Description of Plot:** See AB 35:25 (1981). **Weather:** Temperatures 58-73°F. No significant winds. This spring had above-average precipitation. **Coverage:** June 7-9, 11, 13-16, 18, 21; 0540-0930 and 2020-2305. Total man-hours: 21.5. **Census:** Indigo Bunting, 4.5 (57, 23); Blue Jay, 2.5; Unidentified (probably mostly Carolina) Chickadee, 2; Tufted Titmouse, 2; Summer Tanager, 2; Cardinal, 2; Yellow-billed Cuckoo, 1.5; Red-bellied Woodpecker, 1.5; Great Crested Flycatcher, 1.5; White-breasted Nuthatch, 1.5; Wood Thrush, 1.5; Worm-eating Warbler, 1.5; Turkey, 1; Am. Robin, 1; Scarlet Tanager, 1; Barred Owl, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Blue-gray Gnatcatcher, +; Red-eyed Vireo, +; Rose-breasted Grosbeak, +. **Total:** 22 species; 27 territorial males (344/km², 139/100 acres). **Visitors:** Red-tailed Hawk, Broad-winged Hawk, Chimney Swift, Com. Flicker, Willow Flycatcher, Swainson's Thrush, Veery, Com. Grackle, Brown-headed Cowbird, Am. Goldfinch. **Remarks:** A Whip-poor-will was heard 1 trip; the Turkey population has grown noticeably. Cool weather in early spring appears to have delayed some migrants which are among those recorded as visitors.—EMILY BEVER, ROSE ANN BODMAN, JEAN COOKE, MARY FRANCIS GOODLOE, VI HALLETT, EUGENIA LARSON (co-compiler), CARMEN PATTERSON, MARK PETERS, WM. RUDDEN, SKIP RUSSELL, RICHARD W. COLES (compiler), Tyson Research Center, P.O. Box 258, Eureka, MO 63025.

51. 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; 16 intermittent years. **Size:** 10.52 ha = 26 acres. **Description of Plot:** See AFN 19:594-595 (1965). **Coverage:** May 18; June 4-5, 8-10, 19, 23; dawn to 2300. Total man-hours: 15. **Census:** Blackburnian Warbler, 18 (171, 69); Veery, 13 (124, 50); Ovenbird, 9 (86, 35); Brown Creeper, 7, (67, 27); Red-eyed Vireo, 7; Scarlet Tanager, 7; Black-throated Green Warbler, 6 (57, 23); Solitary Vireo, 4 (38, 15); Blue Jay, 3 (29, 12); Black-capped Chickadee, 3; Red-breasted Nuthatch, 3; Yellow-rumped Warbler, 3; Hairy Woodpecker, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Com. Crow, 2; White-breasted Nuthatch, 2; Com. Yellowthroat, 2; Broad-winged Hawk, 1.5; Barred Owl, 1.5; Gray Catbird, 1.5; Wood Thrush, 1.5; Ruffed Grouse, 1; Acadian Flycatcher, 1; House Wren, 1; Am. Robin, 1; Canada Warbler, 1; Brown-headed Cowbird, 1; Purple Finch, 1; Song Sparrow, 1; Red-tailed Hawk, +; Yellow-billed Cuckoo, +; Black-billed Cuckoo, +; Great Horned Owl, +; Com. Flicker, +; Pileated Woodpecker, +;

White-throated Sparrow, +. **Total:** 37 species; 109 territorial males (1036/km², 419/100 acres). **Remarks:** Up 2 species and 7.5 territorial males from last year. The number of territorial males has increased regularly for the last 8 years and has now reached a peak for this plot. The Veery alone is responsible for an increase of 6, up from 7 to a new high of 13. It typically outnumbers the Wood Thrush but not usually by as wide a margin and in at least 2 past years (1971 and 1974) was outnumbered by the Wood Thrush. The Blackburnian Warbler also peaked this year and continues to outnumber the Black-throated Green Warbler as it has for the last 10 years. The Acadian Flycatcher, extending its range NE as a species, is new. This census was sponsored by the White Memorial Foundation.—ANDREW MAGEE, 34 Hobson St., Springfield, MA 01109.

52. BEECH-SPRUCE-HEMLOCK FOREST. — **Location:** New York; Hamilton Co., along the W shore of Catlin Lake; 44°N, 74°15'W, Long Lake Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** 23.9 ha = 59 acres. **Description of Plot:** See AB 36: 66 (1982). **Weather:** Cool and moist throughout period. **Coverage:** June 1, 4-5, 9-10, 14-16, 21-23, 29-30; July 1; between dawn and 1130. Total man-hours: 62. **Census:** Blackburnian Warbler, 25.5 (107, 43); Red-eyed Vireo, 21 (88, 36); Am. Redstart, 10.5 (44, 18); Black-throated Green Warbler, 10 (42, 17); Swainson's Thrush, 7.5 (31, 13); Solitary Vireo, 7.5; Ovenbird, 6.5 (27, 11); Brown Creeper, 6 (25, 10); Black-throated Blue Warbler, 6; Golden-crowned Kinglet, 4 (17, 7); Magnolia Warbler, 4; Yellow-rumped Warbler, 2.5; Yellow-bellied Sapsucker, 2; Hairy Woodpecker, 2; N. Parula, 2; E. Wood Pewee, 1; Black-capped Chickadee, 1; Winter Wren, 1; Scarlet Tanager, 1; Dark-eyed Junco, 1. **Total:** 20 species; 122 territorial males (511/km², 207/100 acres). **Visitors:** Sharp-shinned Hawk, Broad-winged Hawk, Ruffed Grouse, Chimney Swift, Ruby-throated Hummingbird, Pileated Woodpecker, Downy Woodpecker, Great Crested Flycatcher, Least Flycatcher, Blue Jay, White-breasted Nuthatch, Red-breasted Nuthatch, Hermit Thrush, Veery, Black-and-white Warbler, Rose-breasted Grosbeak, Purple Finch, White-throated Sparrow. **Remarks:** Nests found: Yellow-bellied Sapsucker, Hairy Woodpecker. This study was conducted at the Adirondack Ecological Center, SUNY College of Environmental Science and Forestry, Newcomb, NY.—BARRY R. NOON and SAM DROEGE, Dept. of Wildlife, Humboldt State Univ., Arcata, CA 95521.

53. BEECH-SPRUCE-MAPLE FOREST. — **Location:** New York; Essex Co., 0.75 mi E of Catlin Lake; 44°N, 74°15'W, Santanoni and Long Lake Quadrangles, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** 19.4 ha = 47.9 acres. **Description of Plot:** See AB 36:66 (1982). **Weather:** Cool and moist throughout the period. **Coverage:** June 3, 8, 10-12, 15-16, 18, 24-25, 28-30; between dawn and 1130. Total man-hours: 51. **Census:** Red-eyed Vireo, 20 (103, 42); Black-throated Blue Warbler, 13.5 (70, 28); Am. Redstart, 9 (46, 19); Blackburnian War-

bler, 8.5 (44, 18); Black-throated Green Warbler, 8 (41, 17); Solitary Vireo, 7 (36, 15); Swainson's Thrush, 6.5 (34, 14); Ovenbird, 5 (26, 10); Yellow-bellied Sapsucker, 3 (15, 6); Brown Creeper, 3; Yellow-rumped Warbler, 3; Red-breasted Nuthatch, 2; Hermit Thrush, 2; Least Flycatcher, 1.5; Winter Wren, 1.5; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Scarlet Tanager, 1; Purple Finch, 1; Dark-eyed Junco, 1; White-throated Sparrow, 1; Great Crested Flycatcher, 0.5. **Total:** 24 species, 102 territorial males (526/km², 213/100 acres). **Visitors:** Red-tailed Hawk, Ruffed Grouse, Downy Woodpecker, E. Wood Pewee, Blue Jay, Wood Thrush, Veery, Golden-crowned Kinglet, Cedar Waxwing, Magnolia Warbler, Chestnut-sided Warbler, Canada Warbler, Rose-breasted Grosbeak, Purple Finch. **Remarks:** Nests found: Yellow-bellied Sapsucker (2), Brown Creeper, Red-breasted Nuthatch, Hermit Thrush, Dark-eyed Junco. This study was conducted at the Adirondack Ecological Center, SUNY College of Environmental Science and Forestry, Newcomb, NY.—BARRY R. NOON and SAM DROEGE, Dept. of Wildlife, Humboldt State Univ., Arcata, CA 95521.

54. MIXED HEMLOCK - WHITE CEDAR-HARDWOOD FOREST. — **Location:** New York; St. Lawrence Co., Canton, St. Lawrence Univ. Kip Tract; 44°35'N, 75°8'W, Canton Quadrangle, USGS. **Continuity:** New. **Size:** 3.8 ha = 9.4 acres (10 plots 200 ft square surveyed). **Description of Plot:** See AB 34:27 (1980). **Weather:** See Census 62. **Coverage:** June 1, 3, 9, 20, 22, 26, 0800-1020, EDT. Total man-hours: 4. **Census:** Red-eyed Vireo, 1.5; Black-and-white Warbler, 1.5; Yellow-bellied Sapsucker, 1; Brown Creeper, 1; E. Wood Pewee, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Black-capped Chickadee, 1; Veery, 1; N. Waterthrush, 1; Ovenbird, 0.5; Pileated Woodpecker, +; White-breasted Nuthatch, +; Pine Warbler, +. **Total:** 14 species; 11.5 territorial males (302/km², 122/100 acres) **Visitors:** Ruby-throated Hummingbird, Com. Crow, Cedar Waxwing. **Remarks:** Behavior indicative of nest sites observed in Yellow-bellied Sapsucker, Great Crested Flycatcher, Black-capped Chickadee, N. Waterthrush. Diversity and total pairs is very low for mixed forest. Late coverage may have excluded early nesters and resident species; plot boundaries exclude most edge and predominance of conifers in canopy may limit numbers of neo-tropical migrants. Nonetheless, absence of species such as Least Flycatcher and Am. Redstart is surprising.—KENNETH L. CROWELL, Dept of Biology, St. Lawrence Univ., Canton, NY 13617.

55. PITCH PINE-SCRUB OAK BARRENS. — **Location:** New York; Suffolk Co., Westhampton, 0.6 mi S of State Rd. 27 and 0.9 mi W of Co. Rd. 31; 40°51'23"N, 72°39'46"W, Eastport Quadrangle, USGS. **Continuity:** Established 1977; 6 consecutive years. **Size:** 9.67 ha = 23.9 acres. **Description of Plot:** See AB 33:68 (1979). **Weather:** May was warmer and drier than normal (mean temperature 58.6°F, 25-year average 55.6°,

precipitation 1.71 in., 25-year average 3.83 in.) June had somewhat below normal temperatures and much above average precipitation (62.9° vs 65.4° and 12.85 in. vs 2.72 in., the wettest month on record in central Long Island). Weather on count days varied from clear to overcast, temperatures 45-76° and wind speeds 0-50m/s but mostly light. Coverage: May 26-27, 31; June 3, 7, 15-16, 22, 26, 28, 30; 0430-0730 EST. Total man-hours: 20. Census: Prairie Warbler, 19 (196, 79); Rufous-sided Towhee, 14 (145, 59); Field Sparrow, 6 (62, 25); Com. Yellowthroat, 3 (31, 13), Brown Thrasher, 2; Mockingbird, 1.5. Total: 6 species; 45.5 territories (470/km², 190/100 acres). Visitors: Marsh Hawk, Mourning Dove, Yellow-billed Cuckoo, Black-billed Cuckoo, Com. Flicker, Blue Jay, Com. Crow, Black-capped Chickadee, Gray Catbird, Am. Robin, Starling, Red-winged Blackbird, Com. Grackle, Brown-headed Cowbird, Rose-breasted Grosbeak, Am Goldfinch. Remarks: Nest found: Field Sparrow. No apparent habitat change has occurred and no significant population changes or trends are apparent during the 6-year period.—ROBERT ADAMO, EDWARD KEMNITZER (compiler), GILBERT RAYNOR, ALFRED and BARBARA SCHERZER, Moriches Bay Audubon Society, Box 802, Center Moriches, NY 11934.

56. SECOND - GROWTH OAK - PITCH PINE FOREST. — Location: New York; Suffolk Co., Upton, near NE corner of Brookhaven Nat'l Laboratory property, 6000 ft S of State Rd. 25; 40°53'16"N, 72°51'53"W, Wading River Quadrangle, USGS. Continuity: Established 1977; 6 consecutive years. Size: 9.3 ha = 22.97 acres. Description of Plot: See AB 33:69 (1979). Weather: see Census 55. Weather on census trips varied from clear to overcast, temperatures 32-76°F and wind speeds from calm to 5m/s but mostly light. Coverage: Apr. 30; May 4, 6, 11, 17, 21, 26-27, June 2-3, 8, 10, 15, 17-18, 21, 26; 0500-1000, EST. Total man-hours 31.5. Census: Rufous-sided Towhee, 18.5 (199, 81); Ovenbird, 8 (86, 35); N. Oriole, 4 (43, 17); Blue Jay, 3 (32, 13); Great Crested Flycatcher, 2.5; Scarlet Tanager, 2.5; Black-capped Chickadee, 2; White-breasted Nuthatch, 2; Brown Thrasher, 2; Hermit Thrush, 2; Hairy Woodpecker, 1; Tufted Titmouse, 0.5. Total: 12 species; 48 territorial males (516/km², 209/100 acres). Visitors: Sharp-shinned Hawk, Bobwhite, Mourning Dove, Black-billed Cuckoo, Whip-poor-will, Com. Flicker, Downy Woodpecker, E. Wood Pewee, Com. Crow, Fish Crow, Am. Robin, Veery, Red-eyed Vireo, Black-and-white Warbler, Blue-winged Warbler, Pine Warbler, Com. Grackle, Brown-headed Cowbird. Remarks: The number of species and territorial males are near the average for the preceding 5 years. No noticeable habitat change has occurred within or near the plot.—KAREN BLUMER, JAMES CLINTON, SR. (compiler), CLEVELAND DODGE, RAYMOND KUTZMAN and GILBERT RAYNOR, Moriches Bay Audubon Society, Box 802, Center Moriches, NY 11934.

57. UPLAND MIXED PINE-SPRUCE-HARDWOOD PLANTATION. — Location: New York; Allegany Co., on the S side of

Brown Rd., Town of Ward, 3.5 mi W of Alfred; 42°7'30"N, 77°45'W, Andover Quadrangle, USGS. Continuity: Established 1974; 9 consecutive years. Size: 16.6 ha = 41 acres. Description of Plot: See AB 28: 699 (1974). Weather: Data provided by the Alfred Cooperative Weather Station indicated that average daily temperature in May (57.1°F) was nearly 10° warmer than the 63-yr average while June and July (59.1° and 66.0°) were near normal. Precipitation during the same months (3.46 in., 6.67 in., 3.35 in.) was near normal but was concentrated in 4 periods of extended showers that may have had a negative influence on nesting success. These rainy periods occurred on May 20-24, June 2, 4-8, 27-30 and July 17-21. Coverage: Apr. 28; May 4, 7, 15, 23, 29; June 10, 23, 29; July 7, 11; Aug. 5; 0740-2030, EDT. Total man-hours: 16.5. Census: Black-throated Green Warbler, 12 (72, 29); Magnolia Warbler, 10 (60, 24); Blackburnian Warbler, 8 (48, 20); Golden-crowned Kinglet, 7 (42, 17); Dark-eyed Junco, 6 (36, 15); Black-capped Chickadee, 4 (24, 10); Blue Jay, 3 (18, 7); Am. Robin, 3; Yellow-rumped Warbler, 3; Ovenbird, 3; Red-breasted Nuthatch, 2; Brown Creeper, 2; Wood Thrush, 2; Solitary Vireo, 2; Com. Yellowthroat, 2; Indigo Bunting, 2; Purple Finch, 2; Chipping Sparrow, 2; Cooper's Hawk, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; House Wren, 1; Veery, 1; Cedar Waxwing, 1; Brown-headed Cowbird (female), 1; Cardinal, 1; Rose-breasted Grosbeak, 1; Song Sparrow, 1; Broad-winged Hawk, +; Scarlet Tanager, +. Total: 30 species; 85 territorial males (512/km²; 207/100 acres). Visitors: Red-shouldered Hawk, Ruffed Grouse, Turkey, Barred Owl, Pileated Woodpecker, E. Wood Pewee, Com. Crow, White-breasted Nuthatch, Gray Catbird, Pine Warbler and Am. Redstart. Remarks: Nests found: Cooper's Hawk, House Wren (nest box) and robin. Significant disturbance occurred in a third of the plot when the DEC authorized logging in an 11-acre planting of Red Pine (planted in 1935). Between Sept. 1981 and Aug. 1982, 32,000 board feet of Red Pine were harvested. Blackburnian Warbler (12 in 1981, 8 in 1982) and Black-throated Green Warbler (16 in 1981, 12 in 1982) were most adversely affected, along with a Cooper's Hawk which abandoned her nest when trees were cut in the immediate vicinity of the nest tree. Magnolia Warbler and Golden-crowned Kinglet held steady or showed a slight gain. Appreciation to Gaylord Rough for weather data and to Martin Eddy of the Eddy Lumber Co. for information about harvested trees.—ELIZABETH W. BROOKS, 1435 Waterwells Rd., Alfred Station, NY 14803.

58. CENTRAL HARDWOOD FOREST WITH SCATTERED PINE. — Location: Washington, D.C., Rock Creek Park, lying S of Military Road and W of Rock Creek; 38°57'30"N, 77°2'40"W, Washington W Quadrangle, USGS. Continuity: Established 1948; 23 intermittent years. Size: Until 1961, 80 acres; Since 1961, 26.3 ha = 65 acres. Description of Plot: See AFN 2: 153-154 (1948). Weather: Warm and generally clear, averaging 69°F. Coverage: Apr. 17, 21, 29; May 2, 5, 9, 14, 16, 23, 26; June 2, 6, 9, 16, 20, 23; 0530-1000 and 1720-1830, EST. Total man-hours: 30.25 Census: Red-eyed Vireo, 7

(27, 11), Tufted Titmouse, 5 (19, 8), White-breasted Nuthatch, 5; Scarlet Tanager, 5, Carolina Chickadee, 4.5 (17, 7); Wood Thrush, 4.5; Com. Flicker, 3.5 (13, 5); Downy Woodpecker, 3.5; Red-bellied Woodpecker, 3 (11, 5); Blue Jay, 3; Great Crested Flycatcher, 2.5; Cardinal, 2.5; E Wood Pewee, 2; Veery, 2; Ovenbird, 2; Am Robin, 1.5; Pileated Woodpecker, 1; Hairy Woodpecker, 1; E. Phoebe, 1; Com. Crow, 1; Starling, 1; Worm-eating Warbler, 1; Louisiana Waterthrush, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Indigo Bunting, 1; Rufous-sided Towhee, 1; Carolina Wren, +. Total: 28 species; 67.5 territorial males or females (257/km², 104/100 acres). Visitors: Broad-winged Hawk, Mourning Dove, Yellow-billed Cuckoo, Brown Thrasher. Large flocks of Cedar Waxwings, Starlings, and Com. Grackles visited the area of cankerworm infestation to feed. Remarks: Nests located: 1 each for Com. Flicker, E. Phoebe, and Starling. As in 1981, the census area suffered a severe Fall Cankerworm infestation, much more extensive than last year but occurring in the same location. It covered about 20 acres and lasted from early May to early June. About 50% of trees were 100% defoliated. Probably because of the greater openness of the infested area, territories were set up by birds not usually nesting on the plot: the robin, towhee and Indigo Bunting. The Great Crested Flycatcher and E Wood Pewee also preferred this area—JOAN CRISWELL and ROBERT FORD, Rock Creek Park, 5000 Glover Road NW, Washington, D.C. 20015.

59. MIXED - PINE - OAK - HICKORY FOREST. — Location: West Virginia; Hampshire Co.; 5.5 mi SW of Romney; 39°16'24"N, 78°48'36"W, Romney Quadrangle, USGS. Continuity: Established 1967; 2 intermittent years. Size: 6.07 ha = 15.0 acres. Description of Plot: See AFN 21:628 (1967). The dominant canopy trees are hickory (*Carya sp*) and Virginia Pine (*Pinus virginiana*). Most prominent in the understory are Redbud (*Cercis canadensis*) and blueberry (*Vaccinium sp*). The ground cover is primarily White Snakeroot (*Eupatorium rugosum*) and Poverty Grass (*Danthonia spicata*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on six 0.6 acre circular samples, 181/acre; total basal area 70 ft²/acre. Species comprising 92% of the total number of trees: Hickory 45, 25, 17, 83; Virginia Pine 47, 26, 20, 50; Black Oak (*Quercus velutina*) 15, 8, 21, 50; White Ash (*Fraxinus americana*) 15, 8, 6, 67; White Oak (*Q. alba*) 10, 6, 17, 50; Chestnut Oak (*Q. prinus*) 9, 6, 10, 16, Red Oak (*Q. rubra*) 17, 9, 7, 16; Am. Elm (*Ulmus americana*) 5, 3, 1, 16. Trees by diameter size class: A (3-6 in.) 49, 45, 8, 2, 11.6; B (6-9 in.) 37, 34, 18, 5, 26.4; C (9-15 in.) 18, 17, 24, 34; D (15-21 in.) 3, 3, 9, 13; E (21-27 in.) 2, 2, 10.3, 14.7. Shrub stems/acre 3275, ground cover 33%; canopy cover 80%; average canopy height 48 ft (range 29-68 ft). Edge: Same as plot. Topography: The center line follows the crest of a ridge which runs N-S Elevation: 900-1000 ft. Weather: Variable, with fog, light showers and clear on different trips. Coverage: June 5-9; between dawn and 0715 and 1900 and 2015. Total party-hours 18. Census: Red-eyed Vireo, 5 (82, 33); E

Wood Pewee, 3 (49, 20); Great Crested Flycatcher, 2, 5; Tufted Titmouse, 2; Blue-gray Gnatcatcher, 2; Red-bellied Woodpecker, 1; Scarlet Tanager, 1; Worm-eating Warbler, 1; Pine Warbler, 1; Chipping Sparrow, 1; White-breasted Nuthatch, 0.5; Yellow-throated Vireo, 0.5; Pileated Woodpecker, +; Com. Crow, +; Brown Thrasher, +; Brown-headed Cowbird, +; Indigo Bunting, +; Am. Goldfinch, +. Total: 18 species; 20.5 territorial males ($338/\text{km}^2$, 137/100 acres). **Visitors:** Mourning Dove, Am. Woodcock, Com. Flicker, Black-capped Chickadee, Com. Grackle and Cardinal. **Remarks:** A logging road has been cut through part of the plot since the last survey (1967). The Am. Woodcock was flushed during the vegetation survey. Thanks to Mel Hooker for organizing the vegetation survey and to Glen Phillips for his encouragement and guidance.—A. R. BUCKELEW, C. CONRAD, G. EDDY, F. GIFFEN, H. HOOKER, E. JACOBS, V. JOHNSON, JOHN JONES (compiler) and E. SMITH, Brooks Bird Club, 707 Warwood Ave., Wheeling, WV 26003.

60. DISTURBED MIXED CONIFEROUS-HARDWOOD FOREST. — **Location:** Georgia; Fannin Co., Chattahoochee Forest Nat'l Fish Hatchery, 20 mi S of Morganton, Ga.; $34^\circ 42' 19''\text{N}$, $84^\circ 09' 03''\text{W}$, Noontootla Quadrangle, USGS. **Continuity:** New. **Size:** 7.36 ha = 18.18 acres (a 1 mi transect measured by car odometer from hatchery N to an old cemetery, parallel to power lines and a trout stream, over 10 CFS. Width of 150 ft paced 75 ft on each side of centerline of 25 ft dirt roadbed). **Description of Plot:** The transect follows a recreational USFS road and utility rights-of-way. This center one-third has a maximum canopy height of 6 ft. It is cleared every few years. Canopy species quickly colonize the cleared rights-of-way. Ground cover also includes blackberry, raspberry, and dewberry (*Rubus* spp.), Winged Sumac and Poison Ivy (*Rhus copallina* and *R. radicans*), Black Locust (*Robinia pseudoacacia*), Tulip-tree (*Liriodendron tulipifera*), grape (*Vitis* spp.), and alder (*Alnus* sp.). The other two-thirds of the transect is timber. The canopy is 90 ft high and is 90% covered. The site index of some stands (tree ht. @ age 50) nearby is over 100. An analysis of canopy vegetation based on five 0.1 acre circular samples showed for trees one in. or more dbh, 678 stems per acre; total basal area 212 ft^2/acre . Species comprising 90% of the total number of trees: White Pine (*Pinus strobus*), 136, 20, 47, 100; White Oak (*Quercus alba*), 32, 4, 14, 100; E. Hemlock (*Tsuga canadensis*), 228, 34, 13, 60; Red Maple (*Acer rubrum*), 46, 7, 6, 100; Sourwood (*Oxydendrum arboreum*), 40, 6, 5, 80; Flowering Dogwood (*Cornus florida*), 50, 7, 2, 80; Mountain Laurel (*Kalmia latifolia*), 56, 8, 1, 60; Red/Scarlet Oak Group, 24, 4, 8, 60. The other 10% was mostly hickories (*Carya* spp.), Tulip-tree, Holly (*Ilex opaca*), and *Rhododendron* sp. These combined give these numbers: 66, 10, 4, 80. **Edge:** The trout station is the terminus of the narrow utility rights-of-way corridor, a 5-mi corridor from the nearest paved road, through National Forest mature timber lands, next to a road and a stream. The trout station consists of 3 residences and 6 other buildings sharing 6 cleared acres with $\frac{3}{4}$ acre of fish rearing

space. **Topography:** Slope is between 20 and 60%. **Elevation:** 2200 ft. **Weather:** Rainfall in June was 2 in. above normal. **Coverage:** June 1-2, 5-6, 11, 25, 27, 29; July 1, 3-5, 9-10. Total man-hours: 12. **Census:** Chimney Swift, 4 (54, 22); Carolina Chickadee, 4; Indigo Bunting, 4; Song Sparrow, 4; Red-eyed Vireo, 3.5 (48, 19); Tufted Titmouse, 3 (41, 17); Carolina Wren, 3; Ovenbird, 3; Louisiana Waterthrush, 3; Com. Crow, 2; White-breasted Nuthatch, 2; Ruby-throated Hummingbird, 1; Belted Kingfisher, 1; E. Phoebe, 1; Rough-winged Swallow, 1; Gray Catbird, 1; Hooded Warbler, 1; Great Horned Owl, 0.5; Blue Jay, 0.5; Broad-winged Hawk, +; Yellow-billed Cuckoo, +; Pileated Woodpecker, +; Downy Woodpecker, +. Total: 23 species; 42.5 territories ($578/\text{km}^2$, 234/100 acres). **Visitors:** Ruffed Grouse, Screech Owl, Com. Flicker, Acadian Flycatcher, Wood Thrush, Yellow-throated Vireo, Solitary Vireo, Black-and-white Warbler, Worm-eating Warbler, N. Parula, Black-throated Blue Warbler, Black-throated Green Warbler, Yellow-throated Warbler, Cardinal, Am. Goldfinch, Rufous-sided Towhee. **Remarks:** Nests located: Great Horned Owl, 1; E. Phoebe, 1; Carolina Wren, 1; Song Sparrow, 1. The lack of 3-10 year old vegetation is limiting species such as the Chestnut-sided Warbler. Starlings are absent at this site but abundant 5 mi away, at the homes and farms along the main road. Thanks to Ed Clutter, of the USFS in Blue Ridge for sharing vegetation data.—JOHN T. FULTON, Chattahoochee Forest NFH, USDI, Suches, GA 30572.



BBC 60, Chattahoochee Forest, Nat'l Fish Hatchery, Fannin Co., Ga. Disturbed Mixed Coniferous Hardwood Forest. Photo/J. Fulton.

61. MATURE MAPLE-HEMLOCK FOREST. — **Location:** Ontario; Wellington Co., 20 km S of Guelph, Fletcher Creek Swamp Conservation Area; $43^\circ 25' \text{N}$, $80^\circ 05' 30''\text{W}$. **Continuity:** New. **Size:** 16 ha = 39.54 acres (400m \times 400m). **Description of Plot:** Forest covers 85% with 15% an abandoned field. Forest dominated by Sugar Maple (*Acer saccharum*) and E. Hemlock (*Tsuga canadensis*) with subdominants of White Pine (*Pinus strobus*), Black Cherry (*Prunus serotina*), Red Oak (*Quercus rubra*) and Red Ash (*Fraxinus pennsylvanica*). A secondary canopy of Ironwood (*Ostrya virginiana*), Blue Beech (*Carpinus caroliniana*), White Birch (*Betula papyrifera*), Quaking Aspen (*Populus tremuloides*) and Sugar Maple. The dense shade has created a sparse shade-tolerant ground flora. **Edge:** Bordered on N and E by old field, on S by railroad track, on W by old field and swamp forest. **Topog-**

raphy: Flat. **Elevation:** 960-970 ft. **Weather:** See Census 85. **Coverage 1981:** June 9-16, 23-24; July 1; 0530-0900 and 1900-2100, EDT. Total man-hours: 16.6. **Census:** E. Wood Pewee, 5 (31, 13); Ovenbird, 4.5 (28, 11); Am. Robin, 4 (25, 10); Red-eyed Vireo, 4; Rose-breasted Grosbeak, 4; Black-capped Chickadee, 3.5 (22, 9); Great Crested Flycatcher, 3 (19, 8); Red-winged Blackbird, 3; Scarlet Tanager, 3; Cedar Waxwing, 2.5; Song Sparrow, 2.5; Blue Jay, 2; Wood Thrush, 2; Com. Yellowthroat, 2; Cardinal, 2; N. Oriole, 1.5; Am. Goldfinch, 1.5; Ruffed Grouse, 1; E. Kingbird, 1; Nashville Warbler, 1; Yellow Warbler, 1; E. Meadowlark, 1; Indigo Bunting, 1; Swamp Sparrow, 1; Am. Woodcock, 0.5; Mourning Dove, 0.5; Black-billed Cuckoo, 0.5; Great Horned Owl, 0.5; Com. Flicker, 0.5; Alder Flycatcher, 0.5; Com. Grackle, 0.5; Chipping Sparrow, 0.5; Great Blue Heron, +; Mallard, +; Red-tailed Hawk, +; Belted Kingfisher, +; Hairy Woodpecker, +; Bank Swallow, +; Field Sparrow, +. Total: 39 species; 61 territorial males (381/100 ha, 154/100 acres). **Visitors:** Ring-billed Gull, Rock Dove, Chimney Swift, Downy Woodpecker, Brown Creeper, Black-and-white Warbler. **Remarks:** Nests found: Com. Flicker, 1; Rose-breasted Grosbeak, 1. Ed Poropat helped with several censuses. Part of a Conservation Area management studied by Paul Eagles.—PHIL TAYLOR, Dept. of Recreation, Univ. of Waterloo, Waterloo, Ont., Canada, N2L 3GI.

62. YOUNG SPRUCE FOREST. — **Location:** Maine; Hancock Co., Deer Isle, 0.35 mi N of Stinson Point; $44^\circ 10' \text{N}$, 43°W , Deer Isle Quadrangle, USGS. **Continuity:** Established 1977; 5 intermittent years. **Size:** 4.05 ha = 10 acres. **Description of Plot:** See AB 32:72 (1978). **Weather:** June cool and wet; census period temp. range, 50-86°F. No rain. **Coverage:** July 4-7; 14-18; 0500-2000, EDT. Total man-hours: 12. **Census:** Magnolia Warbler, 7 (173, 70); Black-throated Green Warbler, 5 (124, 50); Am. Redstart, 4 (99, 40); Dark-eyed Junco, 3.5 (86, 35); Swainson's Thrush, 3 (74, 30); Black-and-white Warbler, 3; Nashville Warbler, 3; White-throated Sparrow, 3; Am. Robin, 1.5; Yellow-bellied Flycatcher, 1; Blue Jay, 1; Winter Wren, 1; Cedar Waxwing, 1; Starling, 1; Blackburnian Warbler, 1; Ovenbird, 1; Purple Finch, 1; Downy Woodpecker, 0.5; Black-capped Chickadee, 0.5; Gray Catbird, 0.5; Mourning Dove, +; Boreal Chickadee, +; N. Parula, +; Yellow-rumped Warbler, +; Com. Yellowthroat, +. Total: 25 species; 42.5 territorial males ($1050/\text{km}^2$; 425/100 acres). **Visitors:** Com. Flicker, Com. Crow. **Remarks:** Nashville Warbler abundant; Yellow-bellied Flycatcher new. Yearly variation in abundance is caused by changes in status of wide-ranging species such as Mourning Dove and flicker; warblers inhabiting larger conifers on edge (Tennessee, Yellow-rumped, Blackburnian) and scrub edge species (catbird and yellowthroat).—KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, NY 13617.

63. RED PINE PLANTATION. — **Location:** Connecticut; Litchfield Co., White Memorial Foundation, Morris; $41^\circ 42' 30''\text{N}$, $73^\circ 10' \text{W}$, Litchfield Quadrangle, USGS.

Continuity: Established 1978, 5 consecutive years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AB 33:72 (1979). **Coverage:** May 18; June 3, 5, 7, 9-10, 19; dawn to 2230. Total man-hours: 13. **Census:** Gray Catbird, 9 (106, 43); Com. Yellowthroat, 8 (94, 38); Chestnut-sided Warbler, 6 (71, 29); House Wren, 5 (59, 24); Veery, 5; Rufous-sided Towhee, 5; Song Sparrow, 5; Am. Redstart, 4.5 (53, 21); Rose-breasted Grosbeak, 4.5; Blue-winged Warbler, 4 (47, 19); N. Oriole, 4; Com. Flicker, 3 (35, 14); Scarlet Tanager, 3; Red-eyed Vireo, 2.5; Blue Jay, 2; Am. Robin, 2; Wood Thrush, 2; Brown-headed Cowbird, 2; Ruffed Grouse, 1; Black-billed Cuckoo, 1; Harry Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; E. Phoebe, 1; Least Flycatcher, 1; E. Wood Pewee, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Black-and-white Warbler, 1; Ovenbird, 1; Louisiana Waterthrush, 1; Cardinal, 1; White-throated Sparrow, 1; Yellow-throated Vireo, 0.5; Kentucky Warbler, 0.5; Red-tailed Hawk, +; Broad-winged Hawk, +; Great Horned Owl, +; Barred Owl, +; Pileated Woodpecker, +; Com. Crow, +; Tufted Titmouse, +. **Total:** 43 species; 93.5 territorial males (1100/km², 445/100 acres). **Remarks:** Total numbers of species and of territorial males are identical to last year. The species present and their numbers indicate small to moderate changes corresponding to the vegetational changes resulting from a thinning of the canopy, owing to 2 years of intense Gypsy Moth caterpillar infestation previous to this year, and rapidly growing undergrowth. Gray Catbird, Am. Redstart, Chestnut-sided Warbler and House Wren all continued their steady increase in numbers which began after the 1978-79 winter cutting of the Red Pine and all peaked this year. The Kentucky Warbler appeared for the second year, occupying the same territory. This census was sponsored by the White Memorial Foundation.—*ANDREW MAGEE, 34 Hobson St., Springfield, MA 01109.*

64. UPLAND SCOTCH PINE PLANTATION. — **Location:** New York; Allegany Co., 2 mi WSW of Alfred, bordering on the W side of Lake Rd., adjacent to the conifer plantings on the E side of Foster Lake; 42°7'30"N, 77°45'W, Andover Quadrangle, USGS. **Continuity:** Established 1969; 14 consecutive years. **Size:** About 9.3 ha = 23 acres. **Description of Plot:** See AFN 23: 743-744 (1969). **Weather:** See Census 57. **Coverage:** Apr. 19; May 12, 20, 27; June 8, 17, 23; July 2, 8, 16, 22, 31; Aug. 6; Sept. 3; 0850-2040, EDT. Total man-hours: 20.5. **Census:** Chipping Sparrow, 13 (140, 57); Song Sparrow, 13; Com. Yellowthroat, 10 (107, 43); Yellow-rumped Warbler, 5 (54, 22); Cedar Waxwing, 4 (43, 17); Field Sparrow, 4; Purple Finch, 3 (32, 13); Rufous-sided Towhee, 3; Am. Woodcock, 2; Alder Flycatcher, 2; Am. Robin, 2; Nashville Warbler, 2; Magnolia Warbler, 2; Brown-headed Cowbird (females), 2; Indigo Bunting, 2; Black-billed Cuckoo, 1; Black-capped Chickadee, 1; House Wren, 1; Gray Catbird, 1; Prairie Warbler, 1; Blue Jay, +; Black-throated Green Warbler, +. **Total:** 22 species; 74 territorial males (795/km², 322/100 acres). **Visitors:** Sharp-shinned Hawk, Broad-

winged Hawk, Ruffed Grouse, Tree Swallow, Brown Thrasher, E. Bluebird, Red-eyed Vireo, Blue-winged Warbler, Am. Goldfinch. **Remarks:** Nests found (37): Alder Flycatcher, 1; chickadee, 1 (nest box); House Wren, 1 (nest box); robin, 2; Cedar Waxwing, 7; Yellow-rumped Warbler, 4; Prairie Warbler, 1; Purple Finch, 1; towhee, 1; Chipping Sparrow, 7; Field Sparrow, 4; Song Sparrow, 7 (2 nests, both Yellow-rumped Warbler, were parasitized by cowbirds). Significant population declines in Song Sparrow, Chipping Sparrow, robin and Field Sparrow continue while yellowthroats increase with the change to brushy habitat. The maturing unharvested Scotch Pines are not used as nest sites but more recently planted spruce at the S and E sides of the plantation and second growth Scotch Pine prove attractive. This was the lowest total territorial males ever recorded on the plot, and cannot be explained solely on the basis of the changed habitat. County breeding bird censuses also reflect downward trends in Song Sparrow, robin and Field Sparrow. Appreciation to Gaylord Rough for weather data, to Clarence Klingensmith for summaries of Allegany County Breeding Bird Censuses and to Cynthia Clements and Phillips Foster for permission to conduct the survey on their land.—*ELIZABETH W. BROOKS, 1435 Waterwells Rd., Alfred Station, NY 14803.*

65. WHITE CEDAR - TAMARACK SWAMP I. — **Location:** Ontario; Wellington Co.; 20 km S of Guelph, Fletcher Creek Swamp Conservation Area; 43°25'N, 80°05'30"W. **Continuity:** New. **Size:** 12 ha = 29.65 acres (400m × 300m). **Description of Plot:** Swamp forest covers 80%, N 5% an old field-young forest, S 15% a sedge meadow-stunted forest intergrade. Forest dominated by White Cedar (*Thuja occidentalis*) and Tamarack (*Larix laricina*) with secondary canopy of White Birch (*Betula papyrifera*), Balsam Fir (*Abies balsamea*), Red Maple (*Acer rubrum*), Yellow Birch (*Betula lutea*), and Black Spruce (*Picea mariana*). Dense herbaceous ground cover with high species diversity. Several springs present giving rise to streams. Forest gradually grades into a wet sedge (*Carex* sp.) meadow as deepening water limits tree growth. Large power line extends N-S through W portion of plot. Old field on a dry, upland knoll on forest edge Bordered on N by old field and gravel pit, on E by gravel road, on S by railroad tracks and on W by similar swamp. **Topography:** Flat **Elevation:** 950 ft. **Weather:** See Census 85 **Coverage 1981:** June 11, 15, 17, 22, 24, 30, July 1; between 0530-0900 and 1900-2100, EDT. Total man-hours: 16.3 **Census:** Song Sparrow, 10.5 (75, 30); Black-capped Chickadee, 3.5 (25, 10); Com. Yellowthroat, 3.5, Gray Catbird, 3 (21, 9); Cedar Waxwing, 3, Red-winged Blackbird, 3; Am. Goldfinch, 3, White-throated Sparrow, 3; Am. Robin, 2.5, Black-and-white Warbler, 2.5; Blue Jay, 2, N. Waterthrush, 2; Vesper Sparrow, 2; Field Sparrow, 2; Nashville Warbler, 1.5; Yellow Warbler, 1.5; Mourning Dove, 1; E. Kingbird, 1; Alder Flycatcher, 1; Com. Crow, 1, Veery, 1; Grasshopper Sparrow, 1; Chipping Sparrow, 1; Swamp Sparrow, 1; Am. Woodcock, 0.5; Great Horned Owl, 0.5; Com. Flicker, 0.5; Hairy Woodpecker, 0.5; Com. Grackle, 0.5; Rose-breasted Grosbeak, 0.5, Mallard, +; Sharp-shinned Hawk, +; Red-tailed Hawk, +; Broad-winged Hawk, +; Ruffed Grouse, +; Belted Kingfisher, +; Great Crested Flycatcher, +; E. Wood Pewee, +; Bank Swallow, +; Rough-winged Swallow, +; Barn Swallow, +; White-breasted Nuthatch, +; Blue-winged Warbler, +; Indigo Bunting, +. **Total:** 44 species; 59.5 territorial males (425/100 ha², 172/100 acres). **Visitors:** Great Blue Heron, Am. Bittern, Canada Goose, Herring Gull, Rock Dove, Downy Woodpecker, Pileated Woodpecker, Tree Swallow. **Remarks:** Nests found (4), E. Kingbird, 2; Am. Robin, 1; Grasshopper Sparrow, 1. Very dense swamp growth and deadfalls made censusing difficult. Ed Poropat helped with some cen-

Kingfisher, 0.5, Hairy Woodpecker, 0.5, E. Kingbird, 0.5; Rough-winged Swallow, 0.5, Com. Grackle, 0.5; Chipping Sparrow, 0.5, Killdeer, +; Bank Swallow, +; Com. Crow, +; Veery, +; Rose-breasted Grosbeak, +; Field Sparrow, +. **Total:** 40 species; 57 territorial males (475/100 ha², 192/100 acres) **Visitors:** Great Blue Heron, Rock Dove, Tree Swallow, Brown Creeper. **Remarks:** Nest found: Black-capped Chickadee. Ed Poropat helped with censusing. Part of a Conservation Area management study by Paul Eagles.—*PHIL TAYLOR, Dept. of Recreation, Univ. of Waterloo, Waterloo, Ont., Canada, N2L 3G1.*

66. WHITE CEDAR - TAMARACK SWAMP II. — **Location:** Ontario; Wellington Co., 20 km S of Guelph, Fletcher Creek Swamp Conservation Area; 43°25'N, 80°05'30"W. **Continuity:** New. **Size:** 14 ha = 34.6 acres (400m × 350m). **Description of Plot:** Swamp forest covers 60%, N 20% an old field, S 20% a sedge meadow—stunted forest intergrade. Forest dominated by White Cedar (*Thuja occidentalis*) and Tamarack (*Larix laricina*) with secondary canopy of White Birch (*Betula papyrifera*), Balsam Fir (*Abies balsamea*), Red Maple (*Acer rubrum*), Yellow Birch (*Betula lutea*) and Black Spruce (*Picea mariana*). Dense herbaceous ground cover with high species diversity. Several springs present giving rise to streams. Forest gradually grades into a wet sedge (*Carex* sp.) meadow as deepening water limits tree growth. Large power line extends N-S through W portion of plot. Old field on a dry, upland knoll on forest edge Bordered on N by old field and gravel pit, on E by gravel road, on S by railroad tracks and on W by similar swamp. **Topography:** Flat **Elevation:** 950 ft. **Weather:** See Census 85 **Coverage 1981:** June 10, 15, 22-23, 25, 29-30; 0530-0900 and 1900-2150, EDT. Total man-hours: 16.6. **Census:** Song Sparrow, 8 (66.5, 27); Com. Yellowthroat, 7 (58, 24); Red-winged Blackbird, 4.5 (38, 15); Swamp Sparrow, 3.5 (29, 12); Black-capped Chickadee, 3 (25, 10); White-throated Sparrow, 3; Cedar Waxwing, 2.5; Nashville Warbler, 2.5; Blue Jay, 2; Mourning Dove, 1.5; Alder Flycatcher, 1.5; Am. Robin, 1.5; Black-and-white Warbler, 1.5; Ovenbird, 1.5; Ruffed Grouse, 1; Long-eared Owl, 1; Com. Flicker, 1; Great Crested Flycatcher, 1; Gray Catbird, 1; N. Waterthrush, 1; Am. Goldfinch, 1; Green Heron, 0.5; Mallard, 0.5; Sharp-shinned Hawk, 0.5; Broad-winged Hawk, 0.5; Am. Woodcock, 0.5; Com. Snipe, 0.5; Black-billed Cuckoo, 0.5; Belted

suses Part of a Conservation Area management study by Paul Eagles. — *PHIL TAYLOR, Dept. of Recreation, Univ. of Waterloo, Waterloo, Ont. Canada, N2L 3G1.*

67. JACK PINE FOREST. — **Location:** Minnesota; Itasca Co.; Chippewa Nat'l Forest, SW ¼, Sec. 11; 47°33'N, 94°04'W; Max Quadrangle, USGS. **Continuity:** New. **Size:** 8.9 ha = 22 acres. **Description of Plot:** Jack Pine (*Pinus banksiana*) plot logged in 1920. Heights average around 65 ft. Average dbh is 10 in. Red Pine (*P. resinosa*) borders the plot on 2 sides and is scattered throughout the plot. White Birch (*Betula papyrifera*) is also present as a minor canopy and sub-canopy species. The shrub layer is mainly hazel (*Corylus spp.*), Juneberry (*Amelanchier spp.*) plus some cherry (*Prunus spp.*) and alder (*Alnus spp.*). Ground cover is predominantly Bracken (*Pteridium aquilinum*), Wild Sarsaparilla (*Aralia nudicaulis*) and grasses. **Edge:** Bordered on W by a 1-year clearcut; on N and S by 100+ year Red Pine stands and on E by a paved road and similar habitat. **Topography:** Flat. **Elevation:** 1370 ft. **Weather:** Cooler and drier than normal. Generally calm and partly cloudy. **Coverage:** May 30; June 1, 13, 15, 27, 29; 0500-1100. Total man-hours: 17.5. **Census:** Ovenbird, 5 (56, 23); Nashville Warbler, 4.5 (51, 20); Chipping Sparrow, 2.5; Yellow-rumped Warbler, 2; Pine Warbler, 2; Red-breasted Nuthatch, 1.5; Red-eyed Vireo, 1.5; Blue Jay, 1; Black-capped Chickadee, 1; Black-throated Green Warbler, 1; Blackburnian Warbler, 1; Scarlet Tanager, 1; Broad-winged Hawk, 0.5; Am. Robin, 0.5; Hermit Thrush, 0.5; E. Wood Pewee, +; Brown Creeper, +; Gray Jay, +; Mourning Warbler, +; Brown-headed Cowbird, +; Rose-breasted Grosbeak, +; Purple Finch, +. **Total:** 22 species; 25.5 territorial males (286/km², 116/100 acres). **Remarks:** Nests found: Yellow-rumped Warbler, 1; Ovenbird, 1 — *DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN 55108.*

68. RED PINE FOREST. — **Location:** Minnesota; Itasca Co., Chippewa Nat'l Forest, NE ¼, Sec. 10; 47°33'N, 94°05'W; Max Quadrangle, USGS. **Continuity:** New. **Size:** 8.54 ha = 21.1 acres. **Description of Plot:** Red Pine (*Pinus resinosa*) plot clearcut late 1800s. The pines average about 70 ft, with an average dbh of 13 in. Management has kept the understory open. There are a few scattered clumps of willow (*Salix spp.*). Ground cover consists mainly of Bracken (*Pteridium aquilinum*) and blueberry (*Vaccinium spp.*). **Edge:** Bordered on N, E, and S by similar age pines but with dense understory and shrub layer. A similar, open stand to the W is separated from the plot by a paved highway. **Topography:** Essentially flat. **Elevation:** 1380 ft. **Weather:** Cooler and drier than normal. Mostly calm and partly cloudy. **Coverage:** May 30; June 1, 13, 15, 27, 29; 0500-1100. Total man-hours: 14. **Census:** Least Flycatcher, 10 (117, 47); Chipping Sparrow, 4 (47, 19); E. Wood Pewee, 3 (35, 14); Pine Warbler, 2.5; Brown-headed Cowbird, 2.5; Yellow-rumped Warbler, 2; Ovenbird, 2; Com. Flicker, 1; Black-capped Chickadee, 1;

Am. Robin, 1; Red-eyed Vireo, 1; Purple Finch, 1; Rufous-sided Towhee, 1; Com. Nighthawk, 0.5; Gray Jay, 0.5; Red-breasted Nuthatch, 0.5; Blue Jay, +; Hermit Thrush, +; Nashville Warbler, +. **Total:** 19 species; 33.5 territorial males (392 km², 159/100 acres). **Remarks:** Nests found: Com. Nighthawk, 1; Ovenbird, 1; Chipping Sparrow, 1. — *DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN 55108.*

69. RED PINE PLANTATION. — **Location:** Minnesota; Itasca Co.; Chippewa Nat'l Forest, NW ¼, Sec. 9; 47°39'N, 93°52'W; Spring Lake Quadrangle, USGS. **Continuity:** New. **Size:** 10.32 ha = 25.5 acres. **Description of Plot:** Red Pine (*Pinus resinosa*) plantation planted in 1963. Trees average 23 ft. There is dense stocking with some scattered openings choked with *Rubus spp.* There are scattered patches of Choke Cherry (*Prunus virginiana*), Juneberry (*Amelanchier spp.*) and hazels (*Corylus spp.*). The ground cover is primarily Bracken (*Pteridium aquilinum*), strawberry (*Fragaria spp.*) and various grasses. A low, wet area is within the plot borders, but is not included in the census. **Edge:** Bordered on S by a gravel road with similar habitat across the road; N and ½ of W side similar habitat; remaining W border is mature Jack Pine and E border mature Aspen stand. **Topography:** Slopes down from E to W. **Elevation:** 1375-1400 ft. **Weather:** Cooler and drier than normal. Misting on last census. **Coverage:** May 29, 31; June 12, 14, 26, 28; 0500-1100. Total man-hours: 15. **Census:** Chestnut-sided Warbler, 5 (48, 20); Alder Flycatcher, 4 (39, 16); Com. Yellowthroat, 3.5 (34, 14); Nashville Warbler, 3 (29, 12); Mourning Warbler, 3; Ovenbird, 2; Black-billed Cuckoo, 1; Am. Robin, 1; Hermit Thrush, 1; Cedar Waxwing, 1; Golden-winged Warbler, 1; Chipping Sparrow, 1; Song Sparrow, 1; Black-capped Chickadee, 0.5; Gray Jay, 0.5; Yellow-rumped Warbler, 0.5; Veery, +; Am. Goldfinch, +. **Total:** 18 species; 29 territorial males (281/km², 114/100 acres). **Visitors:** Gray Catbird, Indigo Bunting. **Remarks:** Nests found: Alder Flycatcher. — *DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN 55108.*

70. CYPRESS SLOUGH. — **Location:** Indiana; Posey Co., 2.6 mi S of intersection of Indiana Rte 62 and Indian Mounds Rd. (= 500 East Rd.); 37°54'N, 87°50'W, Caborn (Ind.-Ky.) Quadrangle, USGS. **Continuity:** New. **Size:** 10.24 ha = 25.3 acres (measured from topo sheet by planimetry). **Description of Plot:** A marshy area of variable size, the water surface area is dependent on precipitation, Ohio River levels and beavers. Only the water area accessible by canoe SE of the wooden bridge on Indian Mounds Rd. was sampled. The dominant canopy tree is Bald Cypress (*Taxodium distichum*). The dominant understory is Com. Buttonbush (*Cephaelanthus occidentalis*). There is no ground cover, as the area sampled is water. Vegetation analysis showed the following results: Trees 30 mm dbh and over, based on five 0.1 acre (0.04 ha) circular samples, 46/acre. Bald Cypress comprised 100% of

the trees sampled. Number trees/acre, 46, relative density, 100%; relative dominance, 100%; and frequency, 100%. Trees by diameter size classes: A (3-10 cm) 2, 4, .08, 20, B (10-20 cm) 2, 4, 3, 20; C (30-40 cm) 2, 4, 1, 20, D (40-50 cm) 8, 17, 7, 60; E (50-60 cm) 14, 30, 19, 80; F (60-70 cm) 6, 13, 11, 40; G (70-80 cm) 4, 9, 10, 40; H (100-110 cm) 2, 4, 10, 20; I (120-130 cm) 4, 9, 27, 40; J (130-140 cm) 2, 4, 16, 20. Total shrubs/acre, 140; total % canopy cover, 55%; average canopy height, 11.12 m (range 6.3-17.7 m). **Edge:** Bounded on 3 sides by similar cypress slough and on fourth by a hillside covered with mature hardwood forest. **Topography:** Flat. **Elevation:** 350 ft. **Weather:** Above-normal precipitation, normal temperature; 2 severe summer storms affected the habitat by blowing down trees. **Coverage:** May 29-30; June 1-2, 5-6, 8-9, 20, July 22; mostly 0530-1100. Total: 44 man-hours. **Census:** Blue-gray Gnatcatcher, 16 (156, 63); Prothonotary Warbler, 12 (117, 47); Yellow-throated Warbler, 7 (68, 28); White-breasted Nuthatch, 6 (59, 24); Brown Creeper, 6; House Wren, 6; Red-winged Blackbird, 5 (49, 20); Carolina Chickadee, 4 (39, 16); Brown-headed Cowbird (females), 4; Great Crested Flycatcher, 3 (29, 12); Mourning Dove, 2; Yellow-billed Cuckoo, 2; Chimney Swift, 2; Downy Woodpecker, 2; Com. Yellowthroat, 2; Ruby-throated Hummingbird (female), 1; Red-headed Woodpecker, 1; Red-bellied Woodpecker, 1; E Kingbird, +. **Total:** 19 species; 82 territorial males or females (801/km², 324/100 acres). **Visitors:** Great Blue Heron, Green Heron, Wood Duck, Com. Nighthawk, Com. Flicker, E. Wood Pewee, Com. Crow, Tufted Titmouse. **Remarks:** Nests located Ruby-throated Hummingbird, 1; Great Crested Flycatcher, 1; Brown Creeper, 1; Blue-gray Gnatcatcher, 1; Prothonotary Warbler, 1. The Brown Creeper nesting and colony are significant because they confirm the suspected breeding of this species in the area. Thanks to other participants: Jay Craig, Don Dailey, John Dailey and Kathy Weil — *JERRY M. SKINNER, (compiler), Ind State Univ. Evansville, 8600 University Blvd., Evansville, IN 47712.*

71. CEDAR FOREST I. — **Location:** Tennessee; Maury Co., 1.25 mi W of I-65 and Duck River at Whitworth Bend intersection near Columbia; 35°34'00"N, 86°55'45"W, Glendale Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres. **Description of Plot:** The dominant canopy trees are E. Red Cedar (*Juniperus virginiana*), Shagbark Hickory (*Carya ovata*), Am. Elm (*Ulmus americana*), and Green Ash (*Fraxinus pennsylvanica*). The forest cover is occasionally broken by small glade openings (<0.5 acre). Most prominent in the understory are seedlings of E. Red Cedar, Fragrant Sumac (*Rhus aromatica*), Tartarian Bush-honeysuckle (*Lonicera tatarica*), Green Ash, and *Forestiera ligustrina*. Ground cover is primarily Japanese Honeysuckle (*L. japonica*), Fragrant Sumac, Virginia Creeper (*Parthenocissus quinquefolia*), Tartarian Bush-honeysuckle, Prairie-clover (*Petalostemum gattingeri*), Poison Ivy (*Rhus radicans*), with scattered Prickly Pear Cactus (*Opuntia compressa*), and a variety of lichens. A quantitative survey of the vegetation gave the following results: Trees 3 in in

diameter and over, based on 50 1-acre circular plots, 172/acre; total basal area 28 ft²/acre. Species constituting 100% of the total number of trees (figures after each species indicate number of trees/acre; relative density (%); relative dominance (%); frequency (%)) in that sequence): E. Red Cedar 92, 53, 51, 100; Shagbark Hickory 34, 20, 26, 80; Green Ash 10, 6, 4, 80; Am. Elm 10, 6, 4, 80; Winged Elm (*U. alata*) 8, 5, 3, 60; Persimmon (*Diospyros virginiana*) 8, 5, 4, 20; Honey Locust (*Gleditsia triacanthos*) 6, 3, 4, 20, Hackberry (*Celtis occidentalis*) 2, 1, 1, 20, Butternut (*Juglans cinerea*) 2, 1, 1, 10. Trees by diameter size class (figure after each class gives number of trees/acre, relative density (%), basal area in square feet/acre, relative dominance: A (3-6 in.) 132, 77, 13, 47, B (6-9 in.) 34, 20, 10, 36; C (9-15 in.) 6, 3, 5, 17 Shrub stems/acre, 4360; ground cover, 72%, canopy cover, 40%; average canopy height, 28 ft (range 22 to 35 ft). **Edge:** Bordered on 3 sides by similar forest; E boundary borders an old field. **Topography:** Gently rolling terrain on a primarily W-facing slope with limestone outcroppings. **Elevation:** 670 ft. **Weather:** Clear to partly cloudy. Temperatures, 68°-80°F. **Coverage:** June 21-25; 0600-0930. Total man-hours: 17. **Census:** Cardinal, 2; Rufous-sided Towhee, 2; Mourning Dove, 1; Yellow-billed Cuckoo, 1; Carolina Chickadee, 1; Brown Thrasher, 1; Blue-gray Gnatcatcher, 1; White-eyed Vireo, 1; Prairie Warbler, 1; Kentucky Warbler, 1; Yellow-breasted Chat, 1; Brown-headed Cowbird, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Red-bellied Woodpecker, +; Downy Woodpecker, +; Great Crested Flycatcher, +; E. Phoebe, +; Blue Jay, +; Tufted Titmouse, +; Carolina Wren, +; Field Sparrow, +. **Total:** 22 species; 16 territorial males (264/km², 107/100 acres).—*LINDA J. and DALE K. FOWLER, Division of Land and Forest Resources, Tennessee Valley Authority, Norris, TN 37828.*

72. CEDAR FOREST II.—**Location:** Tennessee; Maury Co., 1.25 mi W of I-65 and Duck River intersection at Whitworth Bend near Columbia; 35°37'00"N, 86°55'45"W, Glendale Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres. **Description of Plot:** The dominant canopy trees are E. Red Cedar (*Juniperus virginiana*), Shagbark Hickory (*Carya ovata*), Am. Elm (*Ulmus americana*), Winged Elm (*U. alata*), and Green Ash (*Fraxinus pennsylvanica*). The forest cover is occasionally broken by small glade openings (<0.5 acre). Most prominent in the understory are seedlings of Am. Elm, Tartarian Bush-honeysuckle (*Lonicera tatarica*), E. Red Cedar, Green Ash, Carolina Buckthorn (*Rhamnus caroliniana*), and *Forestiera ligustrina*. Ground cover is primarily Tartarian Bush-honeysuckle, Japanese Honeysuckle (*L. japonica*), Crown-beard (*Verbesina occidentalis*), Virginia Creeper (*Parthenocissus quinquefolia*), Poison Ivy (*Rhus radicans*), Wild Bergamot (*Monarda fistulosa*), Prickly Pear Cactus (*Opuntia compressa*), moss, various grasses and lichens. A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over, based on 50 0.1-acre circular plots, 216/acre; total basal area 40 ft²/acre. Species constituting 100% of the total number of trees (figures after each

species indicate number of trees/acre, relative density (%); relative dominance (%); frequency (%)) in that sequence): E. Red Cedar 116, 54, 38, 100; Shagbark Hickory 36, 17, 11, 60; Am. Elm 10, 4, 2, 80; Winged Elm 10, 4, 3, 60; Green Ash 10, 4, 6, 60; Persimmon (*Diospyros virginiana*) 6, 5, 1, 40; N. Red Oak (*Quercus rubra*) 4, 2, 1, 20; Hackberry (*Celtis occidentalis*), Pignut Hickory (*C. glabra*) 4, 2, 4, 40; Osage-orange (*Mallotus pomifera*) 4, 2, 1, 40; Honey Locust (*Gleditsia triacanthos*) 4, 2, 4, 40; Butternut (*Juglans cinerea*) 2, 1, 1, 10; Sugar Maple (*Acer saccharum*) 2, 1, 1, 20. 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, 87, 19, 47; B (6-9 in.) 18, 8, 5, 13; C (9-15 in.) 8, 4, 6, 16; F (27-33 in.) 2, 1, 10, 24. Shrub stems/acre 5260; ground cover, 57%; canopy cover 37%; average canopy height 22 ft (range 20-27 ft). **Edge:** Bordered on all sides by similar forest. **Topography:** Gently sloping terrain on E-facing slope with limestone outcroppings. **Elevation:** 670 ft. **Weather:** Clear to partly cloudy. Temperatures, 68°-80°F. **Coverage:** June 21-25; 0600-0930 hours. Total man-hours: 17. **Census:** Tufted Titmouse, 3 (49, 20); Cardinal, 2; Rufous-sided Towhee, 2; Mourning Dove, 1; Blue Jay, 1; Carolina Chickadee, 1; Brown Thrasher, 1; Prairie Warbler, 1; Brown-headed Cowbird, 1; Indigo Bunting, 0.5 (8, 3); Yellow-billed Cuckoo, +; Chuck-will's-widow, +; Carolina Wren, +; Wood Thrush, +; White-eyed Vireo, +; Kentucky Warbler, +. **Total:** 16 species; 13.5 territorial males (222/km², 90/100 acres). **Remarks:** Nest found: Chuck-will's-widow.—*LINDA J. and DALE K. FOWLER, Division of Land and Forest Resources, Tennessee Valley Authority, Norris, TN 37828.*

73. CEDAR FOREST III.—**Location:** Tennessee; Maury Co., 0.75 mi E of I-65 and Duck River intersection at Cheek Bend near Columbia; 35°34'00"N, 86°53'15"W, Glendale Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres. **Description of Plot:** The dominant canopy trees are E. Red Cedar (*Juniperus virginiana*), Green Ash (*Fraxinus pennsylvanica*), Shagbark Hickory (*Carya ovata*), and Persimmon (*Diospyros virginiana*). The forest cover is occasionally broken by small glade openings (<0.5 acre). Most prominent in the understory are seedlings of Tartarian Bush-honeysuckle (*Lonicera tatarica*), Fragrant Sumac (*Rhus aromatica*), E. Red Cedar, Green Ash, and Carolina Buckthorn (*Rhamnus caroliniana*). Ground cover is primarily Tartarian Bush-honeysuckle, Fragrant Sumac, Japanese Honeysuckle (*L. japonica*), Poison Ivy (*Rhus radicans*), Cinquefoil (*Potentilla simplex*), Virginia Creeper (*Parthenocissus quinquefolia*), Wild Bergamot (*Monarda fistulosa*), St. John's-wort (*Hypericum spherocephalum*), with scattered Prickly Pear Cactus (*Opuntia compressa*), Prairie-clover (*Petalostemum purpureum*), and various lichens. A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over, based on 50 0.1-acre circular plots, 184/acre; total basal area 29.8 ft²/acre. Species constituting 100% of the total number of trees (figures after each species indicate number of trees/acre; rela-

tive density (%), relative dominance (%), frequency (%) in that sequence); E. Red Cedar 98, 53, 33, 100; Green Ash 28, 15, 12, 80; Shagbark Hickory (*C. ovata*) 24, 13, 12, 80; Persimmon 10, 5, 16, 40; Hackberry (*Celtis occidentalis*) 6, 3, 2, 60; Am. Elm (*Ulmus americana*) 6, 3, 7, 40; White Mulberry (*Morus alba*) 4, 2, 1, 40; Butternut (*Juglans cinerea*) 4, 2, 3, 20; N. Red Oak (*Quercus rubra*) 4, 2, 14, 40. Trees by diameter size class (figure after each class gives number of trees/acre, relative density (%), basal area in square ft/acre, relative dominance: A (3-6 in.) 162, 88, 16, 54; B (6-9 in.) 16, 9, 5, 16, C (9-15 in.) 2, 1, 2, 5; D (15-21 in.) 4, 2, 7, 24. Shrub stems/acre 5160; ground cover, 71%, canopy cover, 36%; average canopy height, 23 ft (range 16-35 ft). **Edge:** Bordered on E and W by similar forest and to N and S by old field. **Topography:** Situated on a slight hill with NW- and SE-facing slopes, moderately sloping terrain with limestone outcroppings. **Elevation:** 660 ft. **Weather:** Clear to partly cloudy; temperatures 68-80°F. **Coverage:** June 21-25; 0600-0930 hours. Total man-hours: 17. **Census:** Cardinal, 3 (37, 15), Prairie Warbler, 2.5; Carolina Chickadee, 2; Rufous-sided Towhee, 2; White-eyed Vireo, 1.5; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1; Carolina Wren, 1; Kentucky Warbler, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Mourning Dove, +, Yellow-billed Cuckoo, +; Red-bellied Woodpecker, +; Blue Jay, +; Field Sparrow, +. **Total:** 17 species; 18 territorial males (222/km², 90/100 acres).—*LINDA J. and DALE K. FOWLER, Division of Land and Forest Resources, Tennessee Valley Authority, Norris, TN 37828.*

74. MIXED UPLAND HABITAT AND SWAMP.—**Location:** Connecticut; Fairfield Co., Newtown, intersection of Route 34 and Zoar Rd.; 41°24'N, 73°14'W, Southbury Quadrangle, USGS. **Continuity:** Established 1968; 15 consecutive years. **Size:** 14.16 ha = 35 acres. **Description of Plot:** See AFN 22 714-715 (1968). **Coverage:** May 21; June 1, 8, 22; July 1; 600-1000, EDT. Total man-hours 11. **Census:** Wood Thrush, 3 (21, 9); Ovenbird, 3; Blue Jay, 2; Tufted Titmouse, 2; Blue-winged Warbler, 2; Rufous-sided Towhee, 2; Mourning Dove, 1; E. Phoebe, 1; E. Wood Pewee, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; House Wren, 1; Gray Catbird, 1; Am. Robin, 1; Veery, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Com. Yellowthroat, 1; Cardinal, 1; Rose-breasted Grosbeak, 1; Ruffed Grouse, +; Chimney Swift, +; Hairy Woodpecker, +; Great Crested Flycatcher, +; Yellow-throated Vireo, +; Brown-headed Cowbird, +; Scarlet Tanager, +; Song Sparrow, +. **Total:** 28 species; 28 territorial males (198/km², 80/100 acres). **Visitors:** Broad-winged Hawk, Pileated Woodpecker, Com Crow, E. Bluebird, N. Oriole, Indigo Bunting. **Remarks:** The total number of species and territorial males were down by 2 and 4 respectively. Defoliation of evergreens is still very apparent.—*LEON L. BARKMAN, Western Conn. Bird Club, P.O. Box 867, Woodbury, CT 06798.*

75. OAK-HEMLOCK FOREST, TRANSITION FOREST AND THICKET.—**Location:** Connecticut; New London Co., Bolles-

wood Natural Area, Conn Arboretum, Conn College, New London; S of Gallows Lane; 41°22'N, 72°W, Uncasville Quadrangle, USGS. **Continuity:** Established 1955 (1953); 12 intermittent years. **Size:** Oak-hemlock forest: 23.1 ha = 57 acres; transition forest and thicket: 6.5 ha = 16.1 acres. **Description of Plot:** See AB 31:57-58 (1977). The trends in vegetation change that occurred between 1953 and 1976 have continued. For example the density of the shrub layer in the oak-hemlock forest has declined since 1976. The transition forest and thicket were formerly designated as semi-open field and shrubland, but this is no longer appropriate because of additional vegetation change. During June most of the study area was severely defoliated by Gypsy Moths. **Weather:** Unusually high rainfall during May and June, with a severe rain storm on June 5-6 that resulted in flooding of the stream. Temperature usually 60-65°F. **Coverage:** May 15, 19, 23, 26, 29; June 3-4, 7-8, 10, 15, 17, 21-22, 24, 28-29; July 2, 4, 6, 8; 0515-0830, EST. Total man-hours: 126. **Census:** Oak-hemlock forest: Veery, 15.5 (67, 27); Ovenbird, 13.5 (59, 24); Black-capped Chickadee, 10 (43, 18); Red-eyed Vireo, 10; Brown-headed Cowbird, 9.5 (41, 17); Tufted Titmouse, 7.5 (32, 13); Gray Catbird, 7.5; House Wren, 6.5 (28, 11); Black-and-white Warbler, 6.5; Cardinal, 6.5; Blue Jay, 5.5 (24, 10); Wood Thrush, 5.5; Rufous-sided Towhee, 5.5; Great Crested Flycatcher, 4.5 (20, 8); Scarlet Tanager, 4.5; E. Wood Pewee, 3.5 (15, 6); Com. Yellowthroat, 3.5; White-breasted Nuthatch, 3 (13, 5); Downy Woodpecker, 2.5; Chestnut-sided Warbler, 2.5; Barred Owl, 2; E. Phoebe, 2; Acadian Flycatcher, 2; White-eyed Vireo, 2; Blue-winged Warbler, 2; Red-winged Blackbird, 2; Mourning Dove, 1.5; Com. Flicker, 1.5; Louisiana Waterthrush, 1.5; Yellow-billed Cuckoo, 1; Black-billed Cuckoo, 1; Hairy Woodpecker, 1; Worm-eating Warbler, 1; N. Oriole, 1; Broad-winged Hawk, 0.5; Rose-breasted Grosbeak, 0.5; Green Heron, +; Ruffed Grouse, +; Red-bellied Woodpecker, +; E. Kingbird, +; Com. Crow, +; Carolina Wren, +; Mockingbird, +; Am. Robin, +; Blue-gray Gnatcatcher, +; Prairie Warbler, +; Hooded Warbler, +; Canada Warbler, +; Com. Grackle, +; Field Sparrow, +; Song Sparrow, +. **Total:** 51 species; 156 territorial males ($676/\text{km}^2$; $274/100 \text{ acres}$). **Census:** Transition forest and thicket: Black-capped Chickadee, 3.5 (54, 22); Tufted Titmouse, 3.5; House Wren, 3.5; Red-eyed Vireo, 3 (46, 19); Gray Catbird, 2.5; Scarlet Tanager, 2.5; Wood Thrush, 2; White-eyed Vireo, 2; Blue-winged Warbler, 2; Com. Yellowthroat, 2; Rufous-sided Towhee, 2; Chestnut-sided Warbler, 1.5; Brown-headed Cowbird, 1.5; Cardinal, 1.5; Downy Woodpecker, 1; E. Wood Pewee, 1; Black-and-white Warbler, 1; Hooded Warbler, 1; Am. Redstart, 1; Great Crested Flycatcher, 0.5; Blue Jay, 0.5; Veery, 0.5; N. Oriole, 0.5; Yellow-billed Cuckoo, +; Black-billed Cuckoo, +; Com. Flicker, +; E. Phoebe, +; Com. Crow, +; White-breasted Nuthatch, +; Am. Robin, +; Starling, +; Yellow Warbler, +; Ovenbird, +; Red-winged Blackbird, +; Com. Grackle, +; Rose-breasted Grosbeak, +; House Finch, +. **Total:** 37 species; 40 territorial males ($614/\text{km}^2$; $248/100 \text{ acres}$). **Remarks:** Oak-hemlock forest: Between 1953 and 1976 there

was a decrease in the number of bird species typical of mature forest in this plot. Five mature forest species disappeared and 2 others showed a consistent decline in density. This pattern has apparently not continued. E. Wood Pewee has become reestablished at densities similar to those recorded in the early censuses. Red-eyed Vireo, which had declined to 4 pairs by 1976, was represented by 10 pairs in 1982 (compared to a maximum of 22 pairs recorded in 1955). Two species that are usually found in mature forest (Worm-eating Warbler and Acadian Flycatcher) had territories in the plot for the first time. There was a decline in the density of N. Oriole and House Wren, 2 suburban species that had been increasing until 1977. Two recently established species, Tufted Titmouse and Cardinal, continued to increase, and Brown-headed Cowbird showed a dramatic increase from 0 to 9.5 males. The unusual presence of the 2 cuckoo species might be associated with the gypsy moth outbreak. **Transition forest and thicket:** The transition from old field to young forest continues to be reflected in the bird community. Common Yellowthroat and Gray Catbird populations have declined, while E. Wood Pewee, Hooded Warbler, and Wood Thrush have either become established or have shown a slight increase in density. Densities of White-eyed Vireo, Chestnut-sided Warbler, and Blue-winged Warbler have remained relatively constant.—ROBERT A. ASKINS, and MARGARET J. PHILBRICK, RFD 1, Box 140, Stonington, CT 06378.

76. UPLAND BRUSHY PASTURE.—Location: Connecticut; Litchfield Co., White Memorial Foundation, Litchfield; 41°42'N, 73°13'28"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965; 16 intermittent years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AFN 19: 609-610 (1965). **Coverage:** May 18; June 2, 5-6, 10-11, 20, 23; 0700-2200. Total man-hours: 11. **Census:** Gray Catbird, 19 (224, 90); Com. Yellowthroat, 9 (106, 43); Blue-winged Warbler, 8 (94, 38); Rufous-sided Towhee, 7 (82, 33); Nashville Warbler, 5.5 (65, 26); Red-eyed Vireo, 5 (59, 24); Blue Jay, 4 (47, 19); Cedar Waxwing, 4; Am. Redstart, 4; Am. Goldfinch, 4; Veery, 3.5 (41, 17); Black-and-white Warbler, 3.5; Ruffed Grouse, 2; Am. Woodcock, 2; Com. Flicker, 2; Black-capped Chickadee, 2; Brown Thrasher, 2; Am. Robin, 2; Wood Thrush, 2; N. Oriole, 2; Brown-headed Cowbird, 2; Rose-breasted Grosbeak, 2; Song Sparrow, 2; Yellow Warbler, 1.5; Chestnut-sided Warbler, 1.5; Black-billed Cuckoo, 1; Downy Woodpecker, 1; Blue-gray Gnatcatcher, 1; Ovenbird, 1; Cardinal, 1; Field Sparrow, 1; Com. Crow, 0.5; Tufted Titmouse, 0.5; Broad-winged Hawk, +; Great Horned Owl, +; Barred Owl, +; Magnolia Warbler, +; Scarlet Tanager, +. **Total:** 38 species; 108.5 territorial males ($1277/\text{km}^2$; $517/100 \text{ acres}$). **Remarks:** Succession from grazed pasture to hardwood forest well underway. Growth of vegetation significant each year. Steady increases in number of species and number of territorial males were followed by 3 years (1979-81) of declines. That trend was short. This year's rise over 1981 is 16.5 territorial males. Last year's new Screech Owl did not return. This year's Blue-gray Gnatcatcher

was new, coming in from peripheral, more mature deciduous woods. This census was sponsored by the White Memorial Foundation. —ANDREW MAGEE, 34 Hobson St, Springfield, MA 01109.

77. MOIST DECIDUOUS FOREST—LAKE ONTARIO WETLAND.—Location: New York; Oswego Co., 5 mi west of SUNY Oswego campus on Lake Ontario shore, 43°26'N, 76°35'W; Oswego West Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres. **Description of Plot:** Buttonbush (*Cephalanthus occidentalis*)—Cat-tail (*Typha spp.*) wetland surrounded by moist deciduous forest bisected by a local road. The dominant wetland vegetation is Buttonbush, Com. Cat-tail, Arrow Arum (*Peltandra virginica*), and Water-willow (*Decodon verticillatus*). The dominant forest trees are Red Maple (*Acer rubrum*) and White Ash (*Fraxinus americana*). The understory is Arrowwood (*Viburnum recognitum*), Speckled Alder (*Alnus incana*), and Red-osier Dogwood (*Cornus alba*). The ground cover is Mayapple (*Podophyllum peltatum*) and Sensitive Fern (*Onoclea sensibilis*). Trees 3-in. diameter and over, based on 5 circular samples 0.1 acre each, 348/acre; total basal area 146 ft²/acre. Species comprising 98% of the total number of trees (numbers following each species are number/acre, relative density (%), relative dominance (%), frequency (%), in that order): Red Maple, 150, 43, 38, 100, White Ash, 76, 22, 23, 100; Black Cherry (*Prunus serotina*), 40, 12, 9, 20; Basswood (*Tilia americana*), 18, 5, 3, 40; Red Oak (*Quercus rubra*); 16, 5, 9, 60; Sugar Maple (*A. saccharum*), 8, 2, 3, 40; Yellow Birch (*Betula lutea*), 8, 2, 2, 20; Striped Maple (*A. pensylvanicum*), 6, 2, 1, 40; Butternut (*Juglans cinerea*), 4, 1, 1, 20. Trees by diameter size class (following each class are number/acre, relative density (%), basal area in ft²/acre, relative dominance: A (3-6 in.) 176, 51, 18, 12; B (6-9 in.) 82, 23, 25, 17; C (9-15 in.) 70, 20, 56, 38; D (15-21 in.) 14, 4, 25, 17, E (21-27 in.) 4, 1, 12, 9; F (27-33) 2, 1, 10, 7 Shrubs stems/acre 2700; ground cover 25%, canopy cover 75%; average canopy height 45 ft (range 35-80). **Edge:** Bounded by wetland, similar forest and residential area. **Topography:** Flat with slight rise away from wetland. **Elevation:** 270 ft. **Weather:** Average temperature 61°F. **Coverage:** June 7, 10, 12, 17-18, 20, 22, 24; between 0700-2030 hours Total man-hours: 8. **Census:** Yellow Warbler, 24 (148, 60); Song Sparrow, 14 (86, 35), Am. Robin, 12 (74, 30); Red-winged Blackbird, 11 (68, 28); Am. Redstart, 9 (56, 23), Com. Yellowthroat, 8 (49, 20); Gray Catbird, 7 (43, 18); House Wren, 5 (31, 13); Veery, 5, Red-eyed Vireo, 4 (25, 10); N. Oriole, 4, Cardinal, 4; Green Heron, 3 (19, 8); E. Wood Pewee, 3; Am. Goldfinch, 3; Virginia Rail, 2, Mourning Dove, 2; Cedar Waxwing, 2; Starling, 2; Yellow-throated Vireo, 2; Brown-headed Cowbird, 2; Chipping Sparrow, 2, Mallard, 1; Wood Duck, 1; Ruffed Grouse, 1, Com. Flicker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; Willow Flycatcher, 1, Tree Swallow, 1; Black-capped Chickadee, 1; Wood Thrush, 1; Blue-gray Gnatcatcher, 1; Com. Grackle, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Rufous-sided Towhee, 1; Swamp Sparrow, 1. **Total:** 38 species; 146 territorial males ($902/\text{km}^2$,

365/100 acres) **Remarks:** Wetland is loafing area for 30 Black-crowned Night Herons.—
GEORGE R. MAXWELL, Dept. of Zool., Rice Creek Biol. Field Station, State Univ. College, Oswego, NY 13126.

78. SUB-ALPINE BALSAM FIR AND MEADOW. — **Location:** New York; Essex Co., Wilmington, Whiteface Mt., 0.5 mi below summit; 44°20'N, 73°55'W, Mt. Marcy Quadrangle, USGS. **Continuity:** New. **Size:** 4.17 ha = 10.3 acres (mapped by pacing and triangulation). **Description of Plot:** Balsam Fir forest broken by rock outcroppings and wet meadows. Whiteface Memorial Highway crosses the upper $\frac{1}{3}$ with 30 ft retaining wall and associated talus. Below this are old ski trails and meadows. Tree growth is 95% Balsam Fir (*Abies balsamea*), up to 5 m high and 12 cm dbh. Other woody plants include small White Birch (*Betula papyrifera*) and alder (*Alnus* spp.). Forest ground cover consists of mosses, ferns (*Dryopteris* spp.) and boreal forbs such as *Clintonia borealis*, *Oxalis*, and *Tribentis*; meadow herbs include *Lycopodium* spp., grasses, sedges, and Bunchberry (*Cornus canadensis*). **Edge:** Essentially similar habitat, grading into krumholz above (W) and into balsam forest to E. **Topography:** Slopes from W to E; drops off steeply on S border. **Elevation:** 4100-4400 ft. **Weather:** Clear; 45-65°F. **Coverage:** June 11-12, 27; 0530-1930, EST. Total man-hours: 7. **Census:** Yellow-rumped Warbler, 6 (144, 58), White-throated Sparrow, 4.5 (108, 44); Gray-cheeked Thrush, 2.5; Dark-eyed Junco, 2.5; Nashville Warbler, 2; Winter Wren, 0.5; Yellow-bellied Flycatcher, +. **Total:** 7 species; 18 territorial males (432/km², 175/100 acres). **Visitors:** Cedar Waxwing. **Remarks:** Absence of Blackpoll Warbler is surprising as it was observed here in 1980, and at elevations 1-2000 ft lower in 1982.—**KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, NY 13617**

79. DECIDUOUS FOREST WITH POND AND BROOK. — **Location:** New Jersey; Bergen Co.; Mahwah; Campgaw Mountain Reservation. **Continuity:** Established 1964; 19 consecutive years. **Size:** About 16.2 ha = 40 acres. **Description of Plot:** See AFN 19 623-624 (1965). **Coverage:** May 18, 20, 25, 27, June 1, 3, 8, 10, 15; 0530-0630. Total party-hours: 9. **Census:** Veery, 4 (25, 10); Tufted Titmouse, 3 (19, 8); Gray Catbird, 3; Starling, 3; Ovenbird, 3; Song Sparrow, 3; Yellow-billed Cuckoo, 2; Com. Flicker, 2; E. Wood Pewee, 2; Tree Swallow, 2; Black-capped Chickadee, 2; Red-eyed Vireo, 2; Com. Yellowthroat, 2; N. Oriole, 2; Scarlet Tanager, 2; Cardinal, 2; Downy Woodpecker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Brown Creeper, 1; House Wren, 1; Blue-winged Warbler, 1; Louisiana Waterthrush, 1; Red-winged Blackbird, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Rufous-sided Towhee, 1. **Total:** 29 species; 52 territorial males (321/km², 130/100 acres).—**N. BRISTOW, K. SJOLANDER, M. TANIS, J. WHITE, J. WORRALL and J. BROTHERTON (compiler), Fyke Nature Assoc., 249 E. Crescent Ave., Mahwah, NJ 07430.**

80. MIXED LOWLAND FOREST AND MEADOW WITH STREAM. — **Location:** Pennsylvania; Erie Co., begins 0.3 mi S of the Borough of Edinboro on W side of State Highway 99; extends S through the Big Conneauttee Creek Valley, 41°51'30"N, 80°07'30"W, Cambridge Springs Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (rectangular, 1205 × 723 ft; measured with tape and compass). **Description of Plot:** The forest consists of 2 bands of variable width (up to 150 ft) running lengthwise through the plot, and separated by grassland, as well as bounded on the outer sides by grassland. One band of forest follows Big Conneauttee Creek and the other occurs principally along the bluff. The forested areas, which contain at least 22 native tree species, have an open canopy dominated by Black Willow (*Salix nigra*), Sugar Maple (*Acer saccharum*), White Ash (*Fraxinus americana*), and Black Cherry (*Prunus serotina*) which average 55 ft in height. One band includes an area with 15 *Pinus sylvestris* and spruce (*Picea* sp.) trees with an average height of 35 ft (75 ft maximum height). There are 4 standing dead trees ranging from 20-65 ft in height. The small tree-shrub story is dominated by apple (*Pyrus* sp.), Swamp Dogwood (*Cornus amomum*), willow (*Salix* sp.), White Ash, and Black Cherry. Abundant ground cover consists of Jewel Weed (*Impatiens* sp.), violet (*Viola* sp.), Dame's Rocket (*Hesperis matronalis*) and Skunk Cabbage (*Symplocarpus foetidus*). The grassland consists of mowed, grazed, 8-year-abandoned, and 20-year-abandoned areas. Trees are widely spaced in the first 3 mentioned areas, but are widespread along with other woody vegetation in the latter area, dominated by apple, Black Cherry, raspberry and blackberry (*Rubus* sp.), Swamp Dogwood, Staghorn Sumac (*Rhus typhina*), Butternut (*Juglans cinerea*), and hawthorn (*Crataegus* sp.). The largest of these are Black Cherry 18 ft in height. There is a heavy ground cover of grasses and composites. Big Conneauttee Creek, which meanders through the length of the area in the more westerly forest band, averages 16 ft in width and has no emergent vegetation. Adjacent to the creek is a marshy area of about 900 ft² in which water remains year-round. There are also 4 smaller areas, remnants of former stream bed, in which water is present most of the year. Three houses and a barn are located within the area along the E side. The plot includes approximately 28% forest, 63% meadow (15% 20-year abandoned), 4% water, 3% buildings and 2% garden. **Edge:** Continuation of stream corridor forested to the N and meadow-bordered to the S. The E edge is paved highway with a row of residential houses, well landscaped, just beyond. The other 3 edges are a combination of abandoned, grazed, and mowed meadow as previously described. **Topography:** Primarily rolling flood plain with a maximum elevation of up to 5 ft above the stream low-water level. A bluff extends along most of the E side and rises an average of an additional 16 ft. Approximately 10% of the total area is located at this higher elevation. **Elevation:** 1180-1200 ft. **1981: Weather:** May was slightly cooler and drier than normal (daily average temp. 0.8°F below normal and precipitation 1.5 in. below normal). June was a little warmer and wetter

than normal (daily average temp. 1.4° above normal and precipitation 1.3 in. above normal). **Coverage:** May 10, 20; June 2, 5-8, 11, 13, 15, 20, 23, 27-28; 0500-0930 and 2000-2130. Total man-hours: 31. **Census:** Song Sparrow, 12 (148, 60); Am. Robin, 10 (124, 50); Starling, 6.5 (80, 33); Gray Catbird, 5 (62, 25); Yellow Warbler, 5; Com. Grackle, 5; House Wren, 3.5 (43, 18); Brown-headed Cowbird, 3 (37, 15); Chipping Sparrow, 2.5; Willow Flycatcher, 2; Cedar Waxwing, 2; Com. Yellowthroat, 2; House Sparrow, 2; Red-winged Blackbird, 2; Indigo Bunting, 2; Am. Goldfinch, 2; Mourning Dove, 1.5; Warbling Vireo, 1.5; Mallard, 1; Black-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Com. Flicker, 1; Yellow-bellied Sapsucker, 1; Downy Woodpecker, 1; E. Phoebe, 1; E. Wood Pewee, 1; Blue Jay, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Red-eyed Vireo, 1; N. Oriole, 1; Cardinal, 1; Rose-breasted Grosbeak, 1; Purple Finch, 1; Am. Kestrel, 0.5; Am. Woodcock, 0.5; Belted Kingfisher, 0.5; Red-headed Woodpecker, 0.5; E. Kingbird, 0.5; Rough-winged Swallow, 0.5; Barn Swallow, 0.5; Meadowlark, 0.5; Great Blue Heron, +; Green Heron, +; Chimney Swift, +. **Total:** 45 species; 89.5 territorial males (1106/km², 448/100 acres). **Visitors:** Killdeer, Spotted Sandpiper, Great Horned Owl, Red-bellied Woodpecker, Hairy Woodpecker, Great Crested Flycatcher, Least Flycatcher, Blue-winged Warbler, Waterthrush sp., Orchard Oriole, Rufous-sided Towhee. **Remarks:** Additional time was spent during late May and June looking for nests; 41 nests of 21 species were located: Am. Robin, 7; Starling, 7; Com. Grackle, 3; Song Sparrow, 3; House Wren, 2; Yellow Warbler, 2; House Sparrow, 2; Chipping Sparrow, 2; Am. Kestrel, 1; Mourning Dove, 1; Com. Flicker, 1; Red-headed Woodpecker, 1; Yellow-bellied Sapsucker, 1; E. Phoebe, 1; Barn Swallow, 1; Blue Jay, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; N. Oriole, 1; Cardinal, 1. **1982: Weather:** May was much warmer than normal with a daily average temperature of 6.3°F above normal and precipitation was 0.6 in. below normal. The daily average temperature for June was 3.3° below normal and precipitation was 2.5 in. above normal. **Coverage:** May 3, 5, 26, 28, 30-31; June 1, 3-4, 26, 28; 0630-1000 and 1700-1900. Total man-hours: 17. **Census:** Am. Robin, 10 (124, 50); Starling, 10; Song Sparrow, 9 (111, 45); Yellow Warbler, 7 (86, 35); Gray Catbird, 6 (74, 30); House Wren, 4.5 (56, 23); Com. Grackle, 4 (49, 20); Red-winged Blackbird, 3 (37, 15); Mourning Dove, 2; Black-capped Chickadee, 2; Wood Thrush, 2; Cedar Waxwing, 2; Red-eyed Vireo, 2; Com. Yellowthroat, 2; House Sparrow, 2; Brown-headed Cowbird, 2; Am. Goldfinch, 2; Chipping Sparrow, 2; Downy Woodpecker, 1.5; Willow Flycatcher, 1.5; Warbling Vireo, 1.5; Cardinal, 1.5; Mallard, 1; Com. Flicker, 1; E. Kingbird, 1; E. Phoebe, 1; Least Flycatcher, 1; Eastern Wood Pewee, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Bobolink, 1; N. Oriole, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Purple Finch, 1; Belted Kingfisher, 0.5; Rough-winged Swallow, 0.5; Field Sparrow, 0.5; Great Blue Heron, +; Green Heron, +; Am. Kestrel, +; Chimney Swift, +; Red-headed Woodpecker, +; Barn Swallow, +

Total: 44 species, 94 territorial males ($1161/\text{km}^2$, 470/100 acres). **Visitors:** Am. Woodcock, Spotted Sandpiper, Great Horned Owl, Com. Crow, Brown Thrasher, Blue-gray Gnatcatcher, E. Meadowlark. **Remarks:** Nests located (33): Starling, 6; House Wren, 3; Gray Catbird, 3; Am. Robin, 3; Com. Grackle, 3; Yellow Warbler, 2; House Sparrow, 2; Mallard, 1; Com. Flicker, 1; E. Kingbird, 1; E. Phoebe, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Red-winged Blackbird, 1; Cardinal, 1; Rose-breasted Grosbeak, 1; Chipping Sparrow, 1; Song Sparrow, 1. Species density and diversity were similar to last year. Although their rank changed, Am. Robin, Starling and Song Sparrow continued as the 3 most abundant nesters. The next 4, the same as last year, were House Wren, Gray Catbird, Yellow Warbler, and Com. Grackle, although their rank changed. Two species (Am. Woodcock and E. Meadowlark) that were territorial last year were visitors; Least Flycatcher, territorial this year, was a visitor last year. Black-billed Cuckoo, Ruby-throated Hummingbird, and Yellow-bellied Sapsucker were not present this year. Wood Thrush, Bobolink, and Field Sparrow were new.—DONALD B. SNYDER, Dept. of Biology, Edinboro State College, Edinboro, PA 16444.

81. OLD FIELD-MEADOW AND PRIMARY DECIDUOUS THICKETS. — **Location:** Pennsylvania; Butler Co., Buffalo Township, 1 mi S of intersection of State Rte. 228 and Keppe Rd.; $40^\circ 44' \text{N}$, $79^\circ 42' \text{W}$, Freeport Quadrangle, USGS. **Continuity:** Established 1974; 7 intermittent years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AB 28:1027-1028 (1974). **Weather:** Temperatures 44-70°F. June was seasonably wet; early July had record cold temperatures; August, average precipitation. **Coverage:** June 3-6, 8, 11-13, 18-19, 24, 27; July 2, 22; 0500-0700, 1800-1930. Total man-hours: 30. **Census:** Rufous-sided Towhee, 6 (59, 24); Field Sparrow, 5.5 (54, 22); Gray Catbird, 5 (49, 20); Com. Yellowthroat, 5; Blue-winged Warbler, 4 (40, 16); Red-eyed Vireo, 3.5 (35, 14); Cardinal, 3 (30, 12); Indigo Bunting, 3; Song Sparrow, 3; Black-capped Chickadee, 1.5; Wood Thrush, 1.5; Cedar Waxwing, 1.5; Ruffed Grouse, 1; Yellow-billed Cuckoo, 1; Com. Crow, 1; White-eyed Vireo, 1; Prairie Warbler, 1; Yellow-breasted Chat, 1; Ruby-throated Hummingbird, 0.5; Hairy Woodpecker, 0.5; Hooded Warbler, 0.5; Pileated Woodpecker, +; Blue Jay, +; Tufted Titmouse, +; Ovenbird, +; Am. Goldfinch, +; Chipping Sparrow, +. **Total:** 27 species; 50 territorial males ($494/\text{km}^2$, 200/100 acres). **Visitors:** Great Blue Heron, Mallard, Turkey Vulture, Cooper's Hawk, Red-tailed Hawk, Broad-winged Hawk, Killdeer, Solitary Sandpiper, Spotted Sandpiper, Mourning Dove, Screech Owl, Great Horned Owl, Chimney Swift, Belted Kingfisher, Com. Flicker, Downy Woodpecker, Great Crested Flycatcher, E. Wood Pewee, Barn Swallow, White-breasted Nuthatch, House Wren, Am. Robin, E. Bluebird, Blue-gray Gnatcatcher, Yellow-throated Vireo, Solitary Vireo, Golden-winged Warbler, Kentucky Warbler, N. Oriole, Com. Grackle, Scarlet Tanager, Rose-breasted Grosbeak, Purple Finch, Grasshopper Sparrow. **Remarks:** Nests found; Ruffed Grouse 1, Yellow-billed

Cuckoo 1, Hairy Woodpecker 1, Com. Crow 1, Prairie Warbler 1, Com. Yellowthroat 1, Indigo Bunting 1.—MIKE STARKER, 1134 Countryside Dr., Harrisburg, PA 17110.

82. STUNTED SPRUCE-SHRUB COMMUNITY. — **Location:** West Virginia; Pendleton Co.; 3 mi NE of Circleville; plot begins $38^\circ 42' 10'' \text{N}$, $79^\circ 37' 09'' \text{W}$, and extends NNE along Huckleberry Trail, following the crest of Spruce Mountain, Spruce Knob Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds measured longitudinally and estimated laterally). **Description of Plot:** The relatively flat ridge with thin soil and areas of exposed boulders of resistant Pottsville sandstone is characteristic. The vegetation at this altitude is stressed by harsh winter weather and contains areas of stunted spruce interspersed with areas of shrubs. The dominant tree is Red Spruce (*Picea rubens*) covering 56% of plot. Most prominent shrubs are *Menziesia pilosa* and Mountain Holly (*Nemopanthus mucronata*) which cover 44% of the area. The ground cover is *Vaccinium* sp. A quantitative survey of the trees gave the following results: Trees 3-in. in diameter and over, based on 5 circular samples, 246/acre; total basal area 53.2 ft²/acre. Species comprising 98% of the total number of trees: Red Spruce 234, 100, 100, 100. Trees by diameter size class: A (3-6 in.) 138, 56, 13.8, 26; B (6-9 in.) 94, 38, 28, 53; C (9-15 in.) 14, 5.2, 11.2, 21. Average tree height 28.9 ft (range 21-34). **Edge:** Similar habitat surrounds the plot. **Topography:** Level at 4800 ft. **Weather:** Cool, clear, sometimes breezy. **Coverage:** June 17-20; between dawn and 0800 or 1800-2030 hrs. Total party-hours: 30. **Census:** Dark-eyed Junco, 10 (165, 67); Magnolia Warbler, 6 (99, 40); Hermit Thrush, 4 (66, 27); Rufous-sided Towhee, 3 (49, 20); Yellow-rumped Warbler, 2.5; Com. Yellowthroat, 2; Am. Robin, +; Purple Finch, +. **Total:** 8 species; 27.5 territorial males ($453/\text{km}^2$, 183/100 acres). **Visitors:** Com. Nighthawk, Blue Jay, Swainson's Thrush, Am. Goldfinch. **Remarks:** The size of the spruce trees is quite comparable to the size of those on Gaudineer Knob, W. Va. in a census made 34 years ago, although that area had a far greater density of trees per unit area. In comparing the 2 censuses one notes particularly the much lower number of Magnolia Warblers on this area, a condition possibly related to the tree density. The Yellow-rumped Warblers have only recently established breeding populations this far south in the Appalachians. Census Participants: L. Chandler, R. DeGarmo, C. Ellis, E. Hutton, N. Laitsch, A. Pyle, Z. Stewart and L. Wilson.—BILL SMITH (compiler) and GEORGE HALL, Brooks Bird Club, 707 Warwood Ave., Wheeling, WV 26003.

83. DECIDUOUS CLEARCUT. — **Location:** Virginia, Augusta Co., 2.25 mi NNW of Stokesville; $38^\circ 23' \text{N}$, $79^\circ 45' \text{W}$, Reddish Knob Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15.0 acres (rectangular, 110 × 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** This area on the George Washington Nat'l Forest was clearcut in late 1977. Average height of stump sprouts is now 9 ft, with Red Maple (*Acer rubrum*), Chestnut Oak (*Quercus prinus*), and Red Oak (*Q. rubra*) predominat-

ing. Most prominent in the understory are Red Maple, Witch Hazel (*Hamamelis virginiana*), and Red Oak. The ground cover is primarily Blueberry (*Vaccinium vacillans*) and Hay-scented Fern (*Dennstaedtia punctilobula*). Shrub stems/acre 3575; ground cover 70.4%; canopy cover 0%. **Edge:** Similar but uncut stands (average age 70 years) surround this 28 acre clearcut on all sides. **Topography:** A moderate E-facing slope at the base of Shenandoah Mountain. **Elevation:** 1840 ft. **Weather:** Cool, humid, with rising morning fog on most censuses. **Coverage:** May 21-22, 25-26, 28; June 1, 3, 6, 12, between dawn and 0930 hrs. Total party-hours: 11.25. **Census:** Prairie Warbler, 6 (5 (107, 43); Indigo Bunting, 6 (99, 40); Rufous-sided Towhee, 5 (82, 33); Chipping Sparrow, 2; Field Sparrow, 1.5; Black-capped Chickadee, +; Gray Catbird, +. **Total:** 7 species, 21 territorial males ($346/\text{km}^2$, 140/100 acres). **Visitors:** Chimney Swift, Ruby-throated Hummingbird, Com. Flicker, Com Raven, Orange-crowned Warbler, Brown-headed Cowbird, Am. Goldfinch. **Remarks:** Small flocks of goldfinches fed regularly on serviceberry trees left standing in the clear-cut. A Chipping Sparrow nest was found. Many thanks to Max Carpenter, Kathleen Finnegan, Lenny Leta, Mary Smith and Charles Ziegenfus for helping with the census and to Elwood Fisher and Clair Mellinger for helping with the vegetation survey—ELLEN J. GOETZ, U.S. Forest Service, Harrisonburg, VA 22801.

84. ABANDONED PASTURE SCRUBLAND. — **Location:** Ontario; Ottawa, Innis Point; $45^\circ 20' \text{N}$, $75^\circ 54' \text{W}$. **Continuity:** New. **Size:** 9.0 ha = 22.24 acres (300m square paced). **Description of Plot:** Several vegetation types exist in the plot; 49% is covered by semi-open shrub area, 17% by mixed wood with a thick understory, 11.5% by coniferous wood, 10.5% by a young deciduous wood, 10.5% by an open area of Quaking Aspen and White Ash, 1% by a shallow sedge-filled pond, and 0.5% was part of the Ottawa River shoreline. The semi-open shrub area consists mostly of open grassland and Poison Ivy (*Rhus radicans*) with scattered thick clumps of Prickly Ash (*Xanthoxylum americanum*), Serviceberry (*Amelanchier* spp.), Nannyberry (*Viburnum lentago*), and Choke Cherry (*Prunus virginiana*), 3-7 ft in height. Occasional scattered Bur Oak (*Quercus macrocarpa*) and White Cedar (*Thuja occidentalis*), 10-30 ft tall, grow in these areas. The dominant trees in the mixed wood are Bur Oak, Quaking Aspen (*Populus tremuloides*), White Cedar and White Spruce (*Picea glauca*), 25-40 ft high. The understory is made up almost exclusively of Nannyberry, 4-8 ft high, with occasional Choke Cherry, Buckthorn (*Rhamnus* spp.) and Honeysuckle (*Lonicera* spp.) with little or no ground cover. The patches of coniferous wood are basically White Cedar, 30-40 ft in height, with occasional White Spruce and White Pine (*Pinus strobus*). Undergrowth is sparse and restricted to small clearings, 8 ft in diameter, where Quaking Aspen, Serviceberry and Prickly Ash saplings grow. Ironwood (*Ostrya virginiana*), 15-25 ft in height, is the dominant species in the deciduous wood, with occasional Red Oak (*Q. rubra*), Bur Oak and Basswood (*Tilia americana*).

(*cana*), 35-40 ft and White Cedar, 15-25 ft in height. The understory is comprised of iron-wood saplings, Serviceberry, and Buckthorn and the ground cover is Poison Ivy. The Quaking Aspen and White Ash (*Fraxinus americana*) area was damp in spring but dried out completely in summer. The aspen and ash, 15-20 ft high are scattered and the understory was made up almost completely of grasses with a little Poison Ivy and a few ash saplings. The Ottawa River shoreline is a pavement of limestone with grasses, Shrubby Cinquefoil (*Potentilla fruticosa*) and White Ash, 2-15 ft high, growing in the cracks. **Edge:** Bounded on 3 sides by similar habitat. The N side bounded by the Ottawa River and its shoreline. **Topography:** Flat. **Elevation:** 175-200 ft. **Coverage:** May 27; June 4, 7, 9, 12, 17, 19, 27; July 1; 0430-0730 and 1900-2030. Total man-hours: 15.5 **Census:** Yellow Warbler, 8.5 (94, 38); White-throated Sparrow, 8 (89, 36); Song Sparrow, 5 (56, 22); Gray Catbird, 4 (44, 18); Nashville Warbler, 4; Great Crested Flycatcher, 3.5 (39, 16); Black-and-white Warbler, 3 (33, 13); Brown-headed Cowbird, 3; Black-capped Chickadee, 2.5; Am. Robin, 2.5; Red-winged Blackbird, 2.5; N. Oriole, 2.5; Brown Thrasher, 1.5; Rose-breasted Grosbeak, 1.5; Ruffed Grouse, 1; Am. Woodcock, 1; Mourning Dove, 1; E. Kingbird, 1; Blue Jay, 1; Cedar Waxwing, 1; Hairy Woodpecker, 0.5; Com. Crow, 0.5; Veery, 0.5; Killdeer, +; Whip-poor-will, +. **Total:** 26 species; 58.5 territorial males (650/km², 263/100 acres). **Visitors:** Great Horned Owl, E. Wood Pewee, Red-eyed Vireo, Magnolia Warbler, Black-throated Green Warbler, Wilson's Warbler, Am. Redstart, Purple Finch, Am. Goldfinch. **Remarks:** Nests found: Yellow Warbler, Downy Woodpecker, Am. Robin, Cedar Waxwing.—JOANNE DEAN, 73 Irving Place, Ottawa, Ontario, K1Y 2A2.

85. OLD FIELD AND GRAVEL PIT. — **Location:** Ontario; Wellington Co., 20 km S of Guelph, Fletcher Creek Swamp Conservation Area; 43°25'N, 80°05'30"W. **Continuity:** New Size: 16 ha = 39.54 acres (400m × 400m). **Description of Plot:** A dry old field with a few small hedgerows cover the N 75% of the plot. An active gravel pit covers the S 25%. Field dominated by Canada Blue Grass (*Poa compressa*), Yellow Hawkweed (*Hieracium floribundum*), Wild Carrot (*Daucus carota*), Black Medick (*Medicago lupulina*) and Com. Daisy (*Chrysanthemum leucanthemum*). Hedgerows contain Black Cherry (*Prunus serotina*), Pin Cherry (*P. pensylvanica*), Basswood (*Tilia americana*) and Wild Apple (*Pyrus malus*). Gravel pit largely open gravels with some sand and little or no vegetation. One small pond is in a secluded corner of the pit with a primary growth of trees and shrubs around the edge including White Birch (*Betula papyrifera*), White Cedar (*Thuja occidentalis*), Tamarack (*Larix laricina*), Quaking Aspen (*Populus tremuloides*) and Willow (*Salix* sp.). **Edge:** Bordered on N and E by old fields, on W by gravel road and S by swamp. **Topography:** Rolling with slope from N to S, steep 10m slopes under excavation in pit. **Elevation:** 950-1000 ft. **Weather:** Average low of 11.3°C, 0.8° below normal, average high at 22.9°C, 1.7° below normal. Total rainfall of 74.2mm, 7.1mm below normal. Total June sunshine of

232.7 hrs, 18.3 below normal. **Coverage:** 1981: June 9-10, 16, 23-24, July 1, 0530-0900 and 1900-2100, EDT. Total man-hours: 16.6. **Census:** Bank Swallow, 73 (456, 185); Grasshopper Sparrow, 12 (75, 30); Field Sparrow, 7.5 (47, 19); Song Sparrow, 6 (37, 15); Vesper Sparrow, 5 (31, 13); Am. Goldfinch, 4 (25, 10); E. Meadowlark, 3.5 (22.9); Indigo Bunting, 3.5; Am. Robin, 2.5; Red-winged Blackbird, 2; Savannah Sparrow, 2; Com. Flicker, 1.5; Killdeer, 1; Spotted Sandpiper, 1; Mourning Dove, 1; E. Kingbird, 1; Horned Lark, 1; House Wren, 1; Brown Thrasher, 1; Starling, 1; Chipping Sparrow, 1; Am. Kestrel, 0.5; Upland Sandpiper, 0.5; Belted Kingfisher, 0.5; Rough-winged Swallow, 0.5; Turkey Vulture, +; Red-tailed Hawk, +; Black-billed Cuckoo, +; Hairy Woodpecker, +; Barn Swallow, +; Blue Jay, +; Com. Crow, +; Gray Catbird, +; Cedar Waxwing, +; N. Oriole, +; Com. Grackle, +. **Total:** 36 species; 61.6 territorial males (385/100 ha² = 156/100 acres) plus a colony of 73 Bank Swallow nests in sand bank. **Visitors:** Great Blue Heron, Mallard, Herring Gull, Ring-billed Gull, Rock Dove, Black-capped Chickadee, Bobolink, Rose-breasted Grosbeak. **Remarks:** Nests found (83): Bank Swallow, 73; E. Meadowlark, 2; Vesper Sparrow, 2; Grasshopper Sparrow, 2; Belted Kingfisher, 1; Rough-winged Swallow, 1; Field Sparrow, 1; Song Sparrow, 1. An exceptional year for Grasshopper Sparrows (large numbers). Ed Poropat helped conduct several censuses. Part of a gravel pit reclamation study supervised by Paul Eagles.—PHIL TAYLOR, Dept. of Recreation, Univ. of Waterloo, Waterloo, Ont., Canada N2L 3G1.

86. TRANSITIONAL MIXED FOREST-FIELD. — **Location:** Ontario, Simcoe Co., Tay Township, Wye Marsh, 4 km SE of Midland; 44°44'N, 79°51'W; Map: Orr Lake 31 D/12; Grid Reference: 533917. **Continuity:** Established 1979; 3 intermittent years. **Size:** 6.0 ha = 14.8 acres. **Description of Plot:** See AB 34:65-66 (1980). **Weather:** The first 2 weeks of June were generally overcast and rainy; the last 2 were much warmer with clear skies. Temperatures 0-30°C over the period. **Coverage:** May 28; June 1, 8, 10, 15, 17, 22, 24; July 7; 0535-0930, EST. Total man-hours: 79. **Census:** Am. Redstart, 13.5 (225, 91); Black-capped Chickadee, 12 (200, 81); Cedar Waxwing, 10.5 (175, 71); Song Sparrow, 10.5; Gray Catbird, 9.5 (159, 64); Am. Robin, 9 (150, 61); Yellow Warbler, 8.5 (142, 57); Red-winged Blackbird, 7.5 (125, 51); Veery, 5.5 (92, 37); Great Crested Flycatcher, 4.5 (75, 30); Rose-breasted Grosbeak, 4.5; Com. Flicker, 3.5 (58, 24); Mourning Dove, 2; E. Phoebe, 2; N. Oriole, 2; E. Kingbird, 1.5; Black-and-white Warbler, 1.5; Com. Yellowthroat, 1.5; Brown Thrasher, 1; Blue Jay, 0.5; Nashville Warbler, 0.5; Bobolink, 0.5. **Total:** 22 species; 112 territorial males (1870/km², 757/100 acres). **Visitors:** Great Blue Heron, Green Heron, Canada Goose, Wood Duck, Mallard, Black Duck, Blue-winged Teal, Osprey, Ruffed Grouse, Killdeer, Am. Woodcock, Com. Snipe, Ring-billed Gull, Caspian Tern, Black Tern, Black-billed Cuckoo, Chimney Swift, Ruby-throated Hummingbird, Belted Kingfisher, Pileated Woodpecker, Hairy Woodpecker, Least Flycatcher, Barn Swallow,

low, Com. Crow, White-breasted Nuthatch, Starling, Red-eyed Vireo, E. Meadowlark, Com. Grackle, Am. Goldfinch, Chipping Sparrow, White-throated Sparrow. **Remarks:** Nests located (16): Cedar Waxwing (4), Am. Robin (3), Yellow Warbler (2), Mourning Dove (1), Blue Jay (1), Black-capped Chickadee (1), Brown Thrasher (1), Am. Redstart (1), Rose-breasted Grosbeak (1). Parasitism by Brown-headed Cowbirds was recorded in 1 Am. Redstart nest. The following populations showed significant changes since 1981: Black-capped Chickadee (5 to 12), Gray Catbird (5 to 9.5), Am. Robin (2 to 9), Am. Redstart (7 to 13.5), Com. Yellowthroat (4 to 1.5) and Song Sparrow (6.5 to 10.5). There was a 60% increase (70 to 112) in the total density of breeding males of all species over 1981. This may have been owing to this year's more favorable weather conditions in the latter part of June. New species on territory recorded over 1981 were Mourning Dove, Com. Flicker, E. Phoebe, Blue Jay, Cedar Waxwing, Nashville Warbler and Red-winged Blackbird. American Goldfinch territories could not be delineated in 1982 as census visits were concentrated in June prior to goldfinch nesting. A special thanks to the staff of the Wye Marsh Wildlife Interpretation Centre, especially Robert Whittam, Douglas Adams, Ian Attridge and Fran Westman for their advice and assistance.—ODETTE BARR and KATHRYN M MILLS, Canadian Wildlife Service, Wye Marsh Wildlife Interpretation Centre, Box 100, Midland, Ontario, Canada L4R 4K6

87. URBAN PARK WITH POND. — **Location:** Ontario; Waterloo Region, Kitchener, Lakeside Park, E portion, near Stirling and Greenbrook Ave.; 43°25'55"N, 80°29'45"W **Continuity:** Established 1981. **Size:** 10.93 ha = 27 acres. **Description of Plot:** See AB 36 77 (1982). **Weather:** 10-22°C during counts, rainfall heavier than average during June. **Coverage:** May 4, 17, 22, 30; June 6, 13, 19-21; 0645-0945, and 1900-2115. Total man-hours: 16. **Census:** Gray Catbird, 5 (46, 19); Red-winged Blackbird, 5; Am. Goldfinch, 5; Song Sparrow, 5; Cardinal, 4 (37, 15); Mallard, 3 (27, 11); Am. Robin, 3; N. Oriole, 3; Mourning Dove, 2; Cedar Waxwing, 2; Starling, 2; Com. Grackle, 2; Brown-headed Cowbird, 2; Sora, 1; Black-billed Cuckoo, 1; Com. Flicker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Black-capped Chickadee, 1; House Wren, 1; Brown Thrasher, 1; Warbling Vireo, 1; Com. Yellowthroat, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Least Flycatcher, +; Yellow Warbler, +; House Sparrow, +. **Total:** 29 species; 56 territorial males (513/km², 207/100 acres). **Remarks:** Nests found: Am. Robin, 2; Gray Catbird, 1; Brown Thrasher, 1; Red-winged Blackbird, 1; Song Sparrow, 1. Broods of young of the following species found: Mallard, 3; Starling, 1; Red-winged Blackbird, 1; N. Oriole, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Cardinal, 1 —KENNETH DANCE, 132 Village Rd., Kitchener, Ontario N2M 4L2 Canada.

88. DISTURBED OAK-HICKORY, PINE STAND, EDGE, AND POND. — **Location:** Ohio; Licking Co., Eden Twp., Camp Falling Rock, 1.2 mi NNE of the intersection of Co Rd. 210 and St. Rt. 79; 40°11'N, 82°18.5'W,

Newark Quadrangle, USGS Continuity: Established 1937, 44 intermittent years. **Size:** Approximately 14.16 ha = 35 acres. **Description of Plot:** See *Bird-Lore* 39:379-80 (1937). Habitat changes: Minor in nature and related to windfall or cut stems. **Weather:** Early May was above average temperature for first 20 days. **Coverage:** June 5, 23; Sept. 5. Total man-hours: 25. **Census:** Red-eyed Vireo, 8 (56, 23); Acadian Flycatcher, 6 (42, 17); Wood Thrush, 6; Am. Robin, 5 (35, 14); Scarlet Tanager, 5; Cerulean Warbler, 4 (28, 11); E. Wood Pewee, 3 (21, 9); House Wren, 3; Gray Catbird, 3; Cardinal, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; E. Phoebe, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Yellow-throated Vireo, 2; Ovenbird, 2; Kentucky Warbler, 2; Mourning Dove, 1; Yellow-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Com. Flicker, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; Blue-gray Gnatcatcher, 1; Cedar Waxwing, 1; Warbling Vireo, 1; Louisiana Waterthrush, 1; N. Oriole, 1; Brown-headed Cowbird, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Chipping Sparrow, 1; Song Sparrow, 1. **Total:** 38 species; 83 pairs (586 km², 237/100 acres). **Remarks:** By May 20 local robins had fledglings out of the nest, able to fly strongly. Those pairs in the plot on June 5 had all young out of the nest, but none had started renesting. A total of 13 nests were found, much below pre-1979 levels. Cicadas supplied food, but they were less numerous than in 1965. No cowbird eggs or fledglings were discovered.—A.H. CLAUGUS, 228 S. Lake St., Carey, OH 43316.

89. DECIDUOUS CLEARCUT. — **Location:** Tennessee; Washington Co., Horse Cove Gap, about 4.5 mi S of Johnson City; 36°14'N, 82°22'W. **Erwin Quadrangle, USGS Continuity:** Established 1975; 8 consecutive years. **Size:** 20.23 ha = 50 acres. **Description of Plot:** See *AB* 29:1117-8 (1975). **Coverage:** May 15-16, 22-23, 26-27, 29-30; June 16; 0600-1000, EDT. Total man-hours: 10. **Census:** Rufous-sided Towhee, 25 (124, 50); Hooded Warbler, 20 (99, 40); Yellow-breasted Chat, 9 (44, 18); Cardinal, 9; White-eyed Vireo, 5 (25, 10); Indigo Bunting, 4 (20, 8); Kentucky Warbler, 3 (15, 6); Ruby-throated Hummingbird, 2; Red-eyed Vireo, 2; Black-and-white Warbler, 2; Yellow-billed Cuckoo, 1; Whip-poor-will, 1; Carolina Chickadee, 1; Carolina Wren, 1; Gray Catbird, 1; Wood Thrush, 1; Blue-gray Gnatcatcher, 1; Worm-eating Warbler, 1; Brown-headed Cowbird, 1. **Total:** 19 species; 90 territorial males or females (445/km², 180/100 acres). **Remarks:** New breeding species for the plot: Wood Thrush. After the sudden appearance of the Swainson's Warbler as a breeding species in 1981 (4 territories), this species was totally absent this year. Highest number of territories yet for Hooded Warbler (previous high 14 in 1981) and Cardinal (previous high 5 in 1981). A new plot near this one, Mixed Deciduous Forest (Census no. 47), was censused this year for comparison. The new plot represents a close approximation of the habitat that existed on this plot before it was clearcut. Total species on the clearcut plot was 7 less than the

wooded plot, however, total territories per 100 acres was 53% higher on the clearcut plot. Hooded Warblers show a definite preference for the 10-year old clearcut with territories being approximately 4 times more dense on the clearcut than the wooded plot.—RICHARD LEWIS, Rt. 3, Box 470, Bristol, TN 37620.

90. MIXED - MESOPHYTIC WOODS, FIELDS, AND BRUSH. — **Location:** Tennessee; Putnam Co., about 5 mi WNW of Monterey, in Barnes Hollow to NW of Lee Knob; 36°9'45"N, 85°22'W, Monterey Quadrangle, USGS. **Continuity:** Established 1977; 6 consecutive years. **Size:** 27.0 ha = 66.7 acres (resurveyed using steel tape). **Description of Plot:** See *AB* 32: 80 (1978) and 33: 79 (1979). Changes: About 4½ (out of ca. 13) acres of brushy fields were mowed between late October and January; most of this acreage was removed between April and late August 1982. An additional ⅓ acre was mowed and then bulldozed during construction of a pond (near the E end) during February. **Weather:** Freezes during late March injured some early foliage and flowers. No droughts this breeding season; rainfall somewhat above normal, no floods during late April-mid July. Temperatures slightly cooler than normal, especially in July and Aug.: 0-22°C (32-72°F) during census trips. **Coverage:** Mar. 3, 12, 18, 20; Apr. 1, 12, 15, 20, 23, 25-26; May 1-2, 5-7, 11, 13, 15, 17, 19, 21, 24, 28, 30; June 5, 8, 13, 23; mostly 0430-0830. Most trips covered ½-¾ of plot. Total man-hours: 56. **Census:** Red-eyed Vireo, 19.5 (72, 29); Field Sparrow, 9 (33, 13); Indigo Bunting, 7.5 (28, 11); Blue-gray Gnatcatcher, 7 (26, 10); Prairie Warbler, 6 (22, 9); Yellow-breasted Chat, 5.5 (20, 8); Cardinal, 5.5; White-eyed Vireo, 5 (19, 7); Carolina Chickadee, 3.5 (13, 5); Kentucky Warbler, 3 (11, 4); Tufted Titmouse, 2.5; Ovenbird, 2.5; Downy Woodpecker, 2; Black-and-white Warbler, 2; Com. Yellowthroat, 2; Summer Tanager, 2; Rufous-sided Towhee, 2; Yellow-billed Cuckoo, 1.5; Ruby-throated Hummingbird, 1.5; Red-bellied Woodpecker, 1.5; Worm-eating Warbler, 1.5; Hooded Warbler, 1.5; Scarlet Tanager, 1.5; Broad-winged Hawk, 1; Am. Woodcock, 1; Whip-poor-will, 1; Hairy Woodpecker, 1; E. Phoebe, 1; Acadian Flycatcher, 1; Wood Thrush, 1; E. Bluebird, 1; Yellow-throated Vireo, 1; Blue-winged Warbler, 1; Brown-headed Cowbird, 1; Chipping Sparrow, 1; Mourning Dove, 0.5; Pileated Woodpecker, 0.5; White-breasted Nuthatch, 0.5; Carolina Wren, 0.5; Am. Goldfinch, 0.5; Chuck-will's-widow, +; E. Wood Pewee, +; Blue Jay, +. **Total:** 43 species; 110 territorial males or females (408/km², 165/100 acres). **Visitors:** Chimney Swift, Com. Crow, Turkey Vulture, Sharp-shinned Hawk, Red-tailed Hawk, Barn Swallow, Purple Martin, Brown Thrasher, Am. Robin. **Remarks:** Nests or nest-holes found: Am. Woodcock, 1; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; E. Phoebe, 1; E. Bluebird, 1; Blue-gray Gnatcatcher, 1; Field Sparrow, 1. Both the Blue-winged Warbler and Chipping Sparrow (pair) disappeared by late May; losses from predation may explain this. Some chats shifted territories during the season, perhaps indicating a lack of female chats or of sufficient nesting cover. Most resident species increased in numbers this year.—

RICHARD W SIMMERS, JR , Box 170, Rt 6, Cookeville, TN 38501.

91. SUBURBAN CEMETERY. — **Location:** Alabama; Jefferson Co., Birmingham, Oakland Cemetery, immediately NE of intersection of Pike and Warrior Rds in Ensley section; 33°29'N, 86°54'W, Bessemer Quadrangle, USGS. **Continuity:** Established 1978, 5 consecutive years. **Size:** 15 ha = 37 acres **Description of Plot:** See *AB* 34: 18-19 (1980) **Weather:** Consistently cool averaging -1.4° to -1.5°F/day throughout the period, ending in an annual deficiency of 310° for the 212-day period through July 31 (-1.46°/day) A wet June (double the normal) has increased the annual precipitation from 26.55 ins on May 30 to 46.18 ins. (11.62 ins. in excess) by July 31. On June 28 a small tornado ripped through the tract uprooting at least 10 mature trees and damaging at least 20 others, many hollow. Most of the trees were *Quercus stellata*, *marilandica*, *falcata*, *velutina*, Sweet Gum, Hackberry, and mature cherry in fruit This damage to bird habitat was not nearly as severe as that done by the frenzy of clearing of wires by power company crews. The loss of bird habitat was especially noted in the loss of hollow trees for roosting and nesting, and the loss of ripe fruit (cherries) but not green fruit. A sharp drop in robins immediately after the storm may be partly due to post-breeding dispersal as shown in prior years, but its very sharpness, a 50% overnight drop, points to the storm. **Coverage:** Mar. 1 to July 31; 0800-2000, 144 ½-hr trips in the 152-day period, virtually daily accompanied by Collie dog. Total man-hours 72 **Census:** (See *AB* 36:14 for Breeding Bird Criteria) **Confirmed breeders:** Starling, 15 (100, 41); House Sparrow, 12 (80, 32); Am Robin, 11 (73, 30); Cardinal, 9 (60, 24); Blue Jay, 7 (47, 19); Mockingbird, 7; Mourning Dove, 5 (33, 14); Rock Dove, 4 (27, 11), Rufous-sided Towhee, 4; Com. Grackle, 3 (20, 8); Brown-headed Cowbird, 2, towhee the host at least three times, Wood Thrush once; Com. Flicker, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Gray Catbird, 1, Brown Thrasher, 1; Wood Thrush, 1; Red-winged Blackbird, +; **Probable breeders** Chimney Swift, +; Red-headed Woodpecker, +; E. Wood Pewee, +; White-breasted Nuthatch, +; Carolina Wren, +, N. Parula, +; E. Meadowlark, +. **Total:** 28 species; 88 territorial males (588/km², 238/100 acres). **Visitors (Possible breeders only):** Yellow-crowned Night Heron, Bobwhite, Com. Nighthawk, E. Kingbird, Barn Swallow, Purple Martin, White-eyed Vireo An additional 48 species were listed on the tract as non-breeders during the period; 16 of these wintered on the tract or nearby **Remarks:** For all confirmed breeders dependent young were seen. The probable and possible breeders appeared to include the following categories: territory larger than the tract—did not occur daily—(most of the probable breeders, Com. Nighthawk); tract failed to meet their breeding requirements—in residence only part of the breeding season—(Bobwhite, E. Wood Pewee, White-eyed Vireo, N. Parula); post-breeding wanderers (most of the possible breeders plus more individuals of the confirmed breeders such as

Starling and Com Grackle) —THOMAS A IMHOF, 1036 Pike Rd., Birmingham, AL 35218

92. TALL GRASS PRAIRIE. —**Location:** Illinois, McLean Co., 6 mi S Gridley; T25N, R2E, SE ¼, NW ¼, Sec 5, 40°40'N, 88°54'W, Normal Quadrangle, USGS. **Continuity:** Established 1976; 7 consecutive years. **Size:** 12.1 ha = 30 acres. **Description of Plot:** See AB 31:88-89 (1977). The site originally was described as forage grass meadow, but has been gradually converted to native tall grass prairie. The cover now consists of native grasses 60% (Big Bluestem, Indian Grass, Little Bluestem, and miscellaneous other grasses), forbs 20%, and in one corner, (20%) a White Oak, Shagbark Hickory savannah with forage grasses and scattered Autumn Olive. A small stream, bordered by sedges, transects a corner of the tract. **Coverage:** June 5, 10, 14, 18, 21, 25, 27; July 4, 6, 8. Total man-hours: 8.5. **Census:** Red-winged Blackbird, 18 (148, 60); Short-billed Marsh Wren, 6 (49, 20); Dickcissel, 4 (33, 13); E. Kingbird, 1; Willow Flycatcher, 1; Am. Robin, 1; Yellow Warbler, 1; Com. Yellowthroat, 1; E. Meadowlark, 1; Bobolink, 1; Ring-necked Pheasant, +; Barn Swallow, +, Warbling Vireo, +; Yellow-breasted Chat, +; Com. Grackle, +; Indigo Bunting, +, Am. Goldfinch, +. **Total:** 17 species; 35 territorial males (288/km², 117/110 acres). **Remarks:** A total of 16 female Red-winged Blackbirds were present. The wrens did not appear until between July 8 and 21. The savannah with its hedge accounts for several shrubland species. The present avifauna of this area is more diverse than when it consisted of only forage grass meadow.—DALE E BIRKENHOLZ, Dept. of Biological Sciences, Ill. State Univ., Normal, IL 61761.

BREEDING BIRD POPULATIONS OF PRAIRIE HABITATS IN NORTHWESTERN IOWA

The following 3 censuses were undertaken with assistance of students in Field Ornithology at Iowa Lakeside Laboratory. All sites are under management to maintain or restore tall grass prairie vegetation. Parts of all 3 areas have never been plowed.

Weather conditions were recorded at the Iowa Lakeside Laboratory campus. For June, mean high temperature was 23.7°C, mean low 10.5°; total precipitation 7.6 cm. Owing to the previous winter's heavy snow fall and a wet spring, depressions and low areas often had standing water.

Class participants were Dean L. Cox, Kevin V. Drees, Karen L. Folkers, Sondra L. Jacobson, Adam A. Leff, D. Mark Maffett, Wade J. Olson, and Peter J. Taft.—PETER E. LOWTHER, Dept. Biol., Univ. Northern Iowa, Cedar Falls, IA 50614.

93. TALL GRASS PRAIRIE I. —**Location:** Iowa; Dickinson Co., Iowa Lakeside Laboratory. NE quarter of NW quarter sec. 23, T99N, R37W; 43°23'N, 95°11'W, Okoboji Quadrangle, USGS. **Continuity:** New. **Size:** 16 ha = 39.54 acres (400m square, measured with tape). **Description of Plot:** A restored prairie area, never plowed, but heavily grazed until 1930, burning management be-

gan after 1950. Based on 20 random 10 m transects, the following species had more than 1% cover: *Poa pratensis*, 56.7; *Solidago rigida*, 17.3; *S. canadensis*, 11.4; *Acer negundo*, 6.5; *Andropogon gerardi*, 5; *Ribes americanum*, 5; *Parthenocissus quinquefolia*, 4.9; *Petalostemon purpureus*, 4.4; *Andropogon scoparius*, 3.5; *Equisetum laevigatum*, 3.2; *Toxicodendron radicans*, 3.2; *Rosa* sp., 3; *Symplocarpus occidentalis*, 2.9; *Cirsium canadense*, 2.3; *Elymus* sp., 2.2; *Convolvulus sepium*, 1.8; *Helianthus occidentalis*, 1.7; *Bromus inermis*, 1.4; *Cirsium vulgare*, 1.2; *Ambrosia artemisiifolia*, 1. Woody species (*Acer*, *Ribes*, *Symplocarpus*) are distributed in dense stands in drainage pattern. **Edge:** Bordered to N and W by crop fields; bordered on S and E by successional woodlands along Miller's Bay of West Lake Okoboji. **Topography:** Rolling hills from 427 m in SE corner to 450 m in NW. **Coverage:** June 9-10; 1100-1145, 0600-0700. Total man-hours: 20. **Census:** Yellow Warbler, 10 (62, 25); Com. Yellowthroat, 8 (50, 20); Red-winged Blackbird, 6 (37, 15); Gray Catbird, 3 (19, 8); W. Meadowlark, 3; Am. Goldfinch, 3; Willow Flycatcher, 2; Brown-headed Cowbird, 2; Ring-necked Pheasant, 1; Mourning Dove, 1; E. Kingbird, 1; Grasshopper Sparrow, 1. **Total:** 12 species; 41 territorial males (256/km², 104/100 acres). **Visitors:** Am. Kestrel, Gray Partridge, Great Horned Owl. **Remarks:** Nests found: Red-winged Blackbird, 6; Gray Catbird, 2; Willow Flycatcher, 1; Am. Goldfinch, 1; 5 of these nests with cowbird eggs. Kendleigh (1941, *Condor* 43:165-174) censused birds in this area in 1940. Earlier vegetational surveys include Anderson (1946, *Amer. Mid. Natur.* 36:431-455) and Rudman & Pohl (1951, *Proc. Iowa Acad. Sci.* 58:189-200). Thanks to Lawrence J. Eilers for assistance in plant identifications.

94. TALL GRASS PRAIRIE II. —**Location:** Iowa; Dickinson Co., Cayler Prairie. NW quarter sec. 17, T99N, R37W; 43°24'N, 95°15'W, Okoboji Quadrangle, USGS. **Continuity:** New. **Size:** 64.75 ha = 160 acres (square, measured from map). **Description of Plot:** Platt (1975, *Ecol. Monogr.* 45:285-305) provides a recent description of the area. Species comprising 85% of dry weight biomass in virgin prairie sites were *Poa pratensis*, 14.5; *Andropogon gerardi*, 9.5; *Liatris aspera*, 9.1; *Panicum oligosanthes*, 8.7; *Amorpha canescens*, 8.3; *Rosa suffulta*, 6.3; *Liatris punctata*, 5.3; *Agropyron trachycaulum*, 4.2; *Andropogon scoparius*, 4.0; *Solidago missouriensis*, 3.8; *Muhlenbergia cuspidata*, 3; *Bouteloua curtipendula*, 2.9; *Echinacea pallida*, 2.7; *Panicum virgatum*, 2.7. For sample sites in formerly grazed areas, 85% of total biomass was comprised of *Poa pratensis*, 60.1; *Panicum oligosanthes*, 10; *Aster ericoides*, 9; *Sporobolus heterolepis*, 4.7; *Solidago missouriensis*, 3.4. **Edge:** Bordered to N and E by wet pastures and Little Sioux River floodplain and to S and W by crop fields. **Topography:** Rolling hills. **Elevation:** 424-440 m. **Coverage:** June 10, 14, 21; 0830-1100, 0600-1000, 0800-1100. Total man-hours: 55. **Census:** Red-winged Blackbird, 28 (43, 18); Grasshopper Sparrow, 24 (37, 15); Com. Yellowthroat, 20 (31, 13); Bobolink, 11 (17, 7); W. Meadowlark, 11; Brown-headed Cowbird, 7 (11, 4); Ring-

necked Pheasant, 6 (9, 4); Dickcissel, 5 (8, 3); Yellow-headed Blackbird, 4 (6, 3); Blue-winged Teal, 2; Mourning Dove, 2; Short-billed Marsh Wren, 2; Savannah Sparrow, 2; Swamp Sparrow, 2; Song Sparrow, 2; Mallard, 1; Upland Sandpiper, 1; Henslow's Sparrow, 1. **Total:** 18 species; 131 territorial males (202/km², 82/100 acres). **Visitors:** Chimney Swift, Barn Swallow. **Remarks:** Nests found: Blue-winged Teal, 2; Mourning Dove, 2; Red-winged Blackbird, 2 (2 with cowbird eggs). Dickcissels were not present until late June. A 1955 vegetational survey of Cayler Prairie was done by Aikman & Thorne (1956, *Proc. Iowa Acad. Sci.* 63:177-200). Parts of the prairie had never been disturbed except for annual late August cutting for hay. More recent acquisitions to the preserve had been grazed until 1958. Thanks to Dean M. Roosa of Iowa's State Preserves Advisory Board for permission to census the area.

95. TALL GRASS PRAIRIE III. —**Location:** Iowa; Dickinson Co., Freda Haffner Kettlehole Preserve. E half of SW quarter and SE quarter of NW quarter of sec. 33, T99N, R37W; 43°20'N, 95°13'W, Milford quadrangle, USGS. **Continuity:** New. **Size:** 44.77 ha = 110.63 acres (rectangular, 407 × 1100 m, from map and deed description). **Description of Plot:** Glenn-Lewin (no date, Iowa Nature Conservancy Report No. 10) gives a vegetational analysis of this preserve. Percent cover of plots characterized as dry prairie: *Andropogon scoparius*, 20; *Bouteloua hirsuta*, 14; *Stipa spartea*, 12.8, *Muhlenbergia cuspidata*, 11; *Aster oblongifolius*, 6; *Solidago missouriensis*, 5.7; *Ambrosia artemisiifolia*, 5; *Amorpha canescens*, 3.8; *Bouteloua curtipendula*, 3.5, *Bouteloua gracilis*, 3.3; *Echinacea pallida*, 3; *Petalostemum purpureum*, 2.7; *Solidago rigida*, 2.5. Percent cover of wet prairie plots: *Poa pratensis*, 52.5; *Andropogon gerardii*, 27; *Andropogon scoparius*, 15.3, *Solidago canadensis*, 16.5; *Solidago rigida*, 10.3; *Artemisia* sp., 9.5; *Helianthus laetiflorus*, 8; *Ambrosia artemisiifolia*, 5; *Panicum virgatum*, 4.8; *Bouteloua curtipendula*, 3.8; *Aster ericoides*, 3.3; *Monarda fistulosa*, 3.3; *Stipa spartea*, 2. The kettle-hole itself contains a 1 ha marshy area with rings of vegetation. These rings include (from the inside) stands of *Potamogeton* spp., *Glyceris grandis*, *Carex* sp., *Solidago* sp., the drier prairie vegetation on the slopes. **Edge:** Bordered on the W by the Little Sioux River floodplain and pasture, to the N by pasture, and on the E and S by crop fields. **Topography:** Generally steep slopes surrounding the kettlehole and to the floodplain. **Elevation:** 442-424 m. **Coverage:** June 11, 23; 0900-1100, 0800-1100. Total man-hours: 26. **Census:** Com. Yellowthroat, 22 (49, 20); Dickcissel, 20 (45, 18); Red-winged Blackbird, 17 (38, 15); Grasshopper Sparrow, 14 (31, 13); Bobolink, 9 (20, 8); Yellow-headed Blackbird, 7 (16, 6); Am. Goldfinch, 5 (11, 5), W. Meadowlark, 4 (9, 4); Brown-headed Cowbird, 4; Savannah Sparrow, 3 (7, 3); Mourning Dove, 2; Willow Flycatcher, 2; Short-billed Marsh Wren, 2; Am. Robin, 2; Swamp Sparrow, 2; Blue-winged Teal, 1; Ring-necked Pheasant, 1; E. Kingbird, 1; Song Sparrow, 1. **Total:** 19 species; 119 territorial males (266/km², 108/100 acres)

Visitors: Red-tailed Hawk, Gray Partridge, Killdeer, Upland Sandpiper, Com. Flicker. **Remarks:** Nests found: Blue-winged Teal, 1; Mourning Dove, 1; Red-winged Blackbird, 19 (with cowbird eggs); Yellow-headed Blackbird, 10. The Freda Haffner Kettlehole Preserve was purchased by the Nature Conservancy in 1972. Those parts too steep to plow had been heavily grazed until 1973 and the flatter portions had been cultivated. The preserve is presently managed to restore prairie vegetation and is occasionally burned. Thanks to Lawrence Cantera, Director Iowa Field Office, The Nature Conservancy, for permission to conduct our census.

96. FLOODPLAIN TALL GRASS PRAIRIE. — **Location:** Iowa, Mills Co., 1½ mi N and ¼ mi W of Hastings; 41°20'30"N, 95°30'00"W, Malvern Quadrangle, USGS. **Continuity:** New. **Size:** 18.4 ha = 45.5 acres. **Description of Plot:** The prairie was burned in April this year. Percent ground cover was determined July 20 from 35 plots. Results were: Indian Grass (*Sorghastrum nutans*) 13.8%; Golden Alexander (*Zizia aptera*) 10.8%; Big Bluestem (*Andropogon gerardii*) 9.0%, Switch Grass (*Panicum virgatum*) 8.9%, White Anemone (*Anemone canadensis*) 8.6%, Red Clover (*Trifolium pratense*) 6.7%, various goldenrods (*Solidago* sp.) 5.4%, Gray-headed Coneflower (*Ratibida pinnata*) 5.4%, Slough Grass (*Spartina pectinata*) 5.1%, Sawtooth Sunflower (*Helianthus grosseserratus*) 3.8%, Compass Plant (*Silphium laciniatum*) 3.2%, Blue Grass (*Poa* sp.) 2.9%, Little Bluestem (*Andropogon scoparius*) 2.4%, and other species, less than 2% each, totaling 13.4%; 54.6% of the ground cover was grasses and sedges, and 45.4% forbs. **Edge:** River, riparian forest, and cultivated fields. **Topography:** Essentially flat. **Elevation:** 1000 ft. **Coverage:** June 11, 24-25, 27-28; July 1-2, 10, 20, 26, 28, 30; Aug. 4, 11, 18. Total man-hours, 18. **Census:** Dickcissel, 16 (87, 35); Red-winged Blackbird, 14 (76, 31); Short-billed Marsh Wren, 13 (71, 29); Com. Yellowthroat, 9 (49, 20); Grasshopper Sparrow, 4 (22, 9); Ring-necked Pheasant females, 2; Bobwhite, 1; Am. Goldfinch, 1; E. Kingbird, 0.5; E. Meadowlark, 0.5; Am. Kestrel, +. **Total:** 11 species; 61 territorial males or females (331/km², 134/100 acres). **Visitors:** Red-tailed Hawk, Great Horned Owl, Chimney Swift, Bank Swallow, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Com. Crow, Bobolink. **Remarks:** Nests found: kestrel, pheasant, wren, Red-winged Blackbird, and Dickcissel (1 each). The wrens appeared between July 20 and 26, when territorial behavior in other species was winding down, and proceeded to nest. The Bobolinks came to molt. My thanks to Otha Wearin for permission to study this fine prairie remnant.—BARBARA L. WILSON, Rt. 1, Box 41, Hastings, IO 51540.

97. SPEAR GRASS-JUNE GRASS-ALKALI GRASS MIXED PRAIRIE. — **Location:** Saskatchewan; 4 km NE of Webb, SE 32 Township 14 Range 16, 50°13'N 108°9'W. **Continuity:** New. **Size:** 20 ha = 49.42 acres (rectangular, 500 × 400 m, surveyed into 80 squares measuring 50 × 50 m). **Description of Plot:** The S third of the plot is low-lying and dissected by a meandering intermittent water

channel that runs from W to E towards Goose Lake. The low-lying areas have a taller and denser growth dominated by Mat Muhley (*Muhlenbergia richardsonis*) and Alkali Grass (*Distichlis stricta*). The Alkali Grass indicates increased salinity in the soil especially in the SE corner closest to Goose Lake. A small pond near the SE corner held water until mid-June. Two low-lying areas in the NW and SW corners have dense growths of Low Prairie Rose (*Rosa arkansana*), Wood's Rose (*R. woodsii*) and Snowberry (*Symporicarpus occidentalis*). A further clump of Snowberry is found in the NE corner. Most of the remaining area is dominated by species typical of the Short Grass Native Prairie: Com. Spear Grass (*Stipa comata*), June Grass (*Koeleria cristata*) and Prairie Selaginella (*Selaginella densa*). A high ridge running from W to E through the middle of the plot creates dry conditions where the vegetation tends to be sparser and lower (mostly < 30 cm.). This piece of native prairie was last grazed by cattle in 1976. Plant species ranked by % of ground cover: Bare ground with plant litter 22.8; Com. Spear Grass 10.8; Prairie Selaginella 9.4; Alkali Grass 6.9; June Grass 6.6; Pasture Sage (*Artemisia frigida*) 5.8; bare ground with no plant litter 5.6; Early Blue Grass (*Poa cusic-kii*) 3.6; Wheat Grass (*Agropyron* sp.) 3.4; Mat Muhley 3.1; Blue Grama Grass (*Bouteloua gracilis*) 1.5; W. Pygmyflower (*Androsace occidentalis*) 0.5; Hairy Golden-Aster (*Chrysopsis villosa*) 0.5; Sagebrush (*Artemisia cana*) 0.6. The remaining 13.3% is divided between a further 64 species of plants. Plant grouping ranked by % ($\geq .5\%$) vertical stratification: Medium and low shrubs ≥ 100 cm-2.8; tall herbs and grasses 30 cm to 100 cm-28.1; low herbs and grasses 0 to 30 cm-15.2; lichens, mosses and clubmosses on the ground-12.2; bare ground 28.4. **Edge:** The S, N and E sides were bordered by similar native prairie. The W side borders on cropland. Some 200 m E of the plot is Goose Lake, a 160 ha saline lake. About 150 m S is a field of Alfalfa (*Medicago sativa*) and Crested Wheat Grass (*Agropyron cristatum*). Due to the wet spring, the low-lying area 200 m W of the SW corner had a pond about 5 ha in size. A clump of willows (*Salix* sp.) was adjacent to the NW corner. **Topography:** The S and N thirds of the plot are low-lying. The middle third is occupied by a ridge using some 15 m and running E-W. **Elevation:** 754 m. **Weather:** Temperatures ranged from 4-20°C. The overall weather for the spring and early summer was wetter and cooler than normal resulting in lush plant growth and high pond levels in adjacent areas to the plot. **Coverage:** June 8-10, 12, 16-17, 19; July 3. Total party-hours: 42.5. **Census:** Savannah Sparrow, 8.5 (42, 17); W. Meadowlark, 6.5 (32, 13); Sprague's Pipit, 6 (30, 12); Baird's Sparrow, 4.5 (22, 9); Brown-headed Cowbird, 2; Chestnut-collared Longspur, 1.5; Clay-colored Sparrow, 1.5; Willet, 1; Upland Sandpiper, 1; E. Kingbird, 1; Grasshopper Sparrow, 1; Pintail, +; Marsh Hawk, +; Sharp-tailed Grouse, +; Short-eared Owl, +. **Total:** 15 species; 34.5 territorial males (172/km², 70/100 acres). **Visitors:** Gadwall, Am. Wigeon, Am. Kestrel, Gray Partridge, Marbled Godwit, Am. Avocet, Mourning Dove, W. Kingbird, Tree Swallow, Barn Swallow, Com. Crow, Brewer's Blackbird,

Am Goldfinch, Lark Bunting, Vesper Sparrow. **Remarks:** Nests found: Pintail 1, Willet 1, and Chestnut-collared Longspur 2 Sprague's Pipit and W. Meadowlark were both noted carrying food. The Baird's and Savannah sparrows were concentrated mainly in the low-lying areas in the southern third of the plot. Sprague's Pipits and W Meadowlarks seemed distributed throughout. Chestnut-collared Longspurs were restricted to areas of shortest grass in the NE and SE corners. The Clay-colored Sparrows were found in the clumps of Rose bushes and Snowberry located in the SW and NW corners. The Grasshopper Sparrow was found on the W side of the high ridge in an area of scattered Sagebrush. Approximately 44 cm of snow were dumped during an unseasonable blizzard, May 28-30. This left drifts of snow in the plot until the first week of June thus delaying the start of field work. Several species of sparrows, including Brewer's, Baird's and Grasshopper, seemed to have their populations reduced by this storm. For instance, a single singing male Brewer's was not seen after the storm. Populations of Baird's and Grasshopper sparrows did seem to recover somewhat by mid-June. Bob Wilson led the surveying work to successful completion. Special thanks to Susan Carlisle for her extensive vegetation analysis—CHRISTOPHER G. HARRIS, Prairie Wildlife Interpretation Centre, Canadian Wildlife Service, Box 10, Webb, Saskatchewan, Canada S0N 2X0.

98. KENTUCKY BLUE GRASS PRAIRIE. — **Location:** North Dakota; Stutsman Co., NE quarter of Sect. 12, T142N, R68W, 47°8'N, 99°14'W, Goldwin Quadrangle, USGS. **Continuity:** Established 1972, 11 consecutive years. **Size:** 4.84 ha = 12 acres. **Description of Plot:** See AB 26 972 (1972). In a retired pasture, this plot has been burned 3 times, most recently on June 3, 1982. Growing vegetation was extremely sparse during the censuses. **Weather:** Precipitation during the preceding fall and winter was adequate to restore most wetlands on the Woodworth Station to average conditions. Precipitation during spring was about normal; totals for May and June were 2.53 and 3.69 inches, respectively. Average high temperatures in May were typical, averaging 67°F, but lows averaged 46°, about 7° above normal. June temperatures were very near normal; the mean high was 74°, the mean low, 51°. **Coverage:** June 8, 10, 15-16; 7 trips, 0520-1200, CDT. Total man-hours: 2.5 **Census:** Killdeer, 1; Upland Sandpiper, 1; Horned Lark, 1; Blue-winged Teal, +, N Shoveler, +; Gadwall, +; Willet, +; Marbled Godwit, +. **Total:** 8 species; 3 territorial males (62/km², 25/100 acres). **Visitors:** Mallard, Ferruginous Hawk, Com. Snipe, Wilson's Phalarope, Ring-billed Gull, Black Tern, W. Kingbird, Barn Swallow, Yellow-headed Blackbird, Red-winged Blackbird, Com. Grackle. **Remarks:** During one visit on May 29, prior to the latest burn, we observed Blue-winged Teal, N. Shoveler, Killdeer, W Meadowlark, and Red-winged Blackbird—DOUGLAS H. JOHNSON and CRAIG A FAANES, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.

BREEDING BIRDS OF GRASSLAND HABITATS ON THE CROSS RANCH NATURE PRESERVE IN NORTH DAKOTA

The following 5 breeding bird censuses were conducted S and E of Hensler. The Nature Conservancy purchased the former ranch of approximately 10,000 acres in January, 1982. Current plans are to retain about 1500 acres of woodland and 4000 acres of native prairie to be managed as a nature preserve. The purpose of the current censuses is to establish baseline data on the species composition and densities of bird species at the time of Conservancy takeover. This will permit the effects of management as a preserve on breeding birds to be assessed at some time in the future.

Each 40-acre plot consisted of a grid of 6 by 6 squares, 220 ft on a side. Site analysis was accomplished by dropping a 0.1 m² frame near the center of each of the 36 squares, and identifying all plant species with stems inside the frame. Each species occurring on 4 or more of the 36 samples is listed in the census results, in order of decreasing frequency.

Special thanks to Joyce Berkey, Ron Martin, and Ron Butler who assisted with various aspects of the work, and to Ron Wieland, who assisted with plant identification. Thanks to the Nature Conservancy for permission to carry out the work. This study was supported in part by a Faculty Research Grant from Minot State College.—*GORDON B. BERKEY, Div. of Science, Minot State College, Minot, ND 58701.*

99. MIXED PRAIRIE I. — **Location:** North Dakota; Oliver Co., SE $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec 35, T143N, R82W, 47°10'N, 101°2'W, Fort Clark NE Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (square, compass and pacing). **Description of Plot:** Upland native prairie with a history of grazing, used rather heavily by cattle this season after June 4. A high voltage transmission line runs diagonally across the SW quarter, and one of the towers is on the plot. One small temporary wetland of approximately $\frac{1}{4}$ acre was maintained by the frequent heavy rains. A prairie road runs through the plot near the E boundary. Ground cover consisted of approximately 75% grasses and sedges, 15% forbs, and 10% woody shrubs, with Wolfberry (*Syphoricarpos occidentalis*) dominant, and Buffalo Berry (*Shepherdia argentea*) and Lead Plant (*Amorpha canescens*) also present. A grid of 36 sites of area 0.1 m² each was sampled, and plants occurring on 10% or more of the sites are listed below, together with the number of sites on which they occurred: Prairie June Grass (*Koeleria cristata*), 25; Western Wheat Grass (*Agropyron smithii*), 24; Threadleaf Sedge (*Carex filifolia*), 23; Needle-and-thread (*Stipa comata*); Blue Grama (*Bouteloua gracilis*), 18; Yellow Sedge (*Carex pennsylvanica*), 12; White Prairie Aster (*Aster ericoides*), 12; Fringed Sage (*Artemisia frigida*), 10; Kentucky Blue Grass (*Poa pratensis*), 8; Little Bluestem (*Andropogon scoparius*), 7; Silver Leaf (*Psoralea argophylla*), 7; Geyer's Spurge (*Euphorbia geyeri*), 7; White Sage (*A. ludoviciana*), 7; *Panicum* sp., 5; Pussytoes

(*Antennaria* sp.), 5; Skeleton Weed (*Lygodesmia juncea*), 5; Blue Wild Lettuce (*Lactuca pulchella*), 5; Big Sand Grass (*Calamovilfa longifolia*), 4; Plains Muhly (*Muhlenbergia cuspidata*), 4; Side-Oats Grama (*Bouteloua curtipendula*), 4; Purple Prairie Clover (*Petalostemum purpureum*), 4; Wolfberry, 4. **Edge:** Bounded on 3 sides by similar habitat, although the land to the E was ungrazed until after the census period. A fence runs along the E border. The N edge is a formerly cultivated area, seeded to Crested Wheat Grass (*A. cristatum*). **Topography:** Rolling hills. **Elevation:** About 1970-2030 ft. **Weather:** Temperatures near normal, with precipitation much above normal. **Coverage:** May 31; June 11, 16-17, 21, 23, 30; July 9; 0450-0930 or 1745-2015 hours, MDT. Total man-hours: 12. **Census:** W. Meadowlark, 4.5 (28, 11); Grasshopper Sparrow, 4 (25, 10); Vesper Sparrow, 3 (19, 8); E. Kingbird, 2; Horned Lark, 2; Sprague's Pipit, 2; Clay-colored Sparrow, 2; Upland Sandpiper, 1.5; Brown-headed Cowbird, 1; Black-billed Magpie, 0.5; Bobolink, +; Chestnut-collared Longspur, +. **Total:** 12 species; 22 5 territorial males or females (139/km²; 56/100 acres). **Visitors:** Killdeer, Com. Nighthawk, Com. Flicker, W. Kingbird, Rough-winged Swallow, Barn Swallow, Com. Crow, Brewer's Blackbird, Am. Goldfinch. **Remarks:** Nests found: W. Meadowlark, 2; Eastern Kingbird, 1. The number of Sprague's Pipit territories is probably an underestimate, as the number singing over the plot built steadily from 1 on June 21 to 5 on July 9; the 2 represent 3 different birds registered on 3 or more visits. It is normal for this species to have separate early and late periods of nesting activity.

100. MIXED PRAIRIE II. — **Location:** North Dakota; Oliver Co., NE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 36, T143N, R82W, 47°10'N, 101°1'W, Fort Clark NE Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (square, by compass and pacing). **Description of Plot:** Upland native prairie with a history of grazing, heavily used by cattle after June 4. A draw running through the N end contains a fairly heavy growth of woody shrubs, including (in order of abundance) Wolfberry, Buffalo Berry, and Hawthorn (*Crataegus rotundifolia*). Ground cover consisted of approximately 75% grasses and sedges, 15% woody shrubs, and 10% forbs. A grid of 36 sites of area 0.1 m² was sampled, and plants occurring on 10% or more of the sites are listed below, together with the number of sites on which they occurred: Threadleaf Sedge, 30; Blue Grama, 24; Needle-and-thread, 22; Prairie June Grass, 20; Western Wheat Grass, 18; Kentucky Blue Grass, 14; Yellow Sedge, 14; Side-Oats Grama, 12; Pasque Flower (*Anemone patens*), 12; White Prairie Aster, 12; Green Needle Grass (*Stipa viridula*), 10; Purple Coneflower (*Brauneria angustifolia*), 8; Little Bluestem, 7; Silver Leaf, 7; Prairie Vetch (*Vicia sparsifolia*), 7; Wolfberry, 7; White Milkwort (*Polygala alba*), 6; Pussytoes, 6; Blue Wild Lettuce, 6; *Panicum* sp., 5; Purple Prairie Clover, 5; Red Mallow (*Sphaeralcea coccinea*), 5; Geyer's Spurge, 5; goldenrod (*Solidago* sp.), 5; Long-headed Coneflower (*Ratibida columnifera*), 5; Green Sage (*Artemisia glauca*), 5; Fringed Sage, 5; Plains Muhly, 4; Bastard Toadflax (*Commandra pallida*), 4; *Gaura coccinea*, 4. **Edge:** Bordered on all sides by similar native prairie. A fence runs along the N border, and the area to the N was not grazed until after the census period was completed. A heavily wooded coulee is about 300 m S of the plot. **Topography:** Rolling prairie. **Elevation:**

1860-1950 ft **Weather:** Near normal temperatures with much above normal precipitation. **Coverage:** June 4, 11, 17, 21, 23-24, 30, July 9; 0500-1100 or 1615-1725 hours, MDT. Total man-hours: 12. **Census:** W. Meadowlark, 4.5 (28, 11); Grasshopper Sparrow, 4 (25, 10); Vesper Sparrow, 3 (19, 8); E. Kingbird, 2; Horned Lark, 2; Sprague's Pipit, 2; Clay-colored Sparrow, 2; Upland Sandpiper, 1.5; Brown-headed Cowbird, 1; Black-billed Magpie, 0.5; Bobolink, +; Chestnut-collared Longspur, +. **Total:** 12 species; 22 5 territorial males or females (139/km²; 56/100 acres). **Visitors:** Killdeer, Com. Nighthawk, Com. Flicker, W. Kingbird, Rough-winged Swallow, Barn Swallow, Com. Crow, Brewer's Blackbird, Am. Goldfinch. **Remarks:** Nests found: W. Meadowlark, 2; Eastern Kingbird, 1. The number of Sprague's Pipit territories is probably an underestimate, as the number singing over the plot built steadily from 1 on June 21 to 5 on July 9; the 2 represent 3 different birds registered on 3 or more visits. It is normal for this species to have separate early and late periods of nesting activity.

101. MIXED PRAIRIE III. — **Location:** North Dakota; Oliver Co., within the S $\frac{1}{2}$ of Sec. 12, T143N, R82W, 47°13'N, 101°1'W, Fort Clark NE Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (square, by compass and pacing). **Description of Plot:** Upland native prairie. Cattle were introduced about June 15, but grazing pressure was not nearly so heavy as on the 2 preceding plots. Ground cover was approximately 75% grasses and sedges, 15% woody shrubs, including numerous clumps of Wolfberry and Buffalo Berry, and 10% forbs. A grid of 36 sites of area 0.1 m² was sampled, and plants occurring on 10% or more of the sites, together with the number of occurrences, are listed below: Threadleaf Sedge, 25; Needle-and-thread, 21; Prairie June Grass, 15; Aromatic Aster (*Aster oblongifolius*), 14; Kentucky Blue Grass, 12; Little Bluestem, 12; Blue Grama, 9; Fringed Sage, 9; Pasque Flower, 8; Silver Leaf, 8; Blue Wild Lettuce, 8; *Panicum* sp., 7; White Sage, 7; W. Wheat Grass, 6; Side-Oats Grama, 6; Wolfberry, 6; Green Sage, 6; Big Sand Grass (*Calamovilfa longifolia*), 5; Stiff Sunflower (*Helianthus rigidus*), 5; Green Needle Grass, 4; Big Bluestem (*Andropogon furcatus*), 4. **Edge:** Bordered on the W and S by similar habitat. A partially wooded draw parallels the plot about 100 m to the N, with similar habitat on the other side of the draw. A road lies about 50 m to the E, and to the E of the road is a lowland pasture seeded to tame grasses. A small stockpond is located just off the plot at the SE corner. **Topography:** Rolling prairie. **Elevation:** 1750-1860 ft. **Weather:** Near normal temperatures and above normal precipitation. **Coverage:** June 11-12, 16, 21, 23-24, 30; July 9; 0455-1020 hours, MDT. Total man-hours: 10. **Census:** Grasshopper Sparrow, 4 (25, 10); W. Meadowlark, 3.5 (22, 9); E. Kingbird, 2; Bobolink, 2; Vesper Sparrow, 2; Upland Sandpiper, 1; Mourning Dove, 1; Com. Nighthawk, 1; Brown-headed Cowbird, 1 (female); Am. Goldfinch, 1; Am Kestrel, 0.5; Yellow Warbler, 0.5; Brown Thrasher, +; Com. Yellowthroat, +. **Total:** 14 species; 19.5 territorial males or females (120/km²; 49/100 acres). **Visitors:** Turkey

Vulture, Red-tailed Hawk, Marsh Hawk, Sharp-tailed Grouse, Killdeer, N. Phalarope, Com. Flicker, Horned Lark, Barn Swallow, Black-billed Magpie, Starling, Red-winged Blackbird. **Remarks:** Nests found: Mourning Dove, 1; Com. Nighthawk, 1; Am. Goldfinch, 1; Grasshopper Sparrow, 1.

102. MIXED PRAIRIE IV. — **Location:** North Dakota; Oliver Co., in the SE $\frac{1}{4}$ of Sec. 36, T144N, R82W, 47°15'N, 101°W, Fort Clark NE Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (square, by compass and pacing). **Description of Plot:** Lowland native prairie, on sandy riverbottom soil, with a history of grazing (ungrazed this season). A pile of slabs from a former sawmill occupies about 100 m² of the plot, with a rank growth of weeds among the slabs in the disturbed soil. About half of the plot was very wet, with from 2-5 acres submerged under up to 6 inches of water; the amount varied during the census period. Ground cover was approximately 80% grasses and sedges, with Kentucky Blue Grass dominating the lower areas and a mixture of native grasses dominating the drier areas, 18% forbs, and 2% woody shrubs, nearly all Wolfberry. A grid of 36 sites of area 0.1 m² was sampled, and plants occurring in 10% or more of the sites are listed below, together with the number of sites at which each occurred: Black Medick (*Medicago lupulina*), 28; W. Wheat Grass, 25; Kentucky Blue Grass, 20; Needle-and-thread, 17; Prairie June Grass, 15; White Sage, 15; Threadleaf Sedge, 12; Blue Wild Lettuce, 12; Silver Leaf, 10; Blue Grama, 9; Com. Dandelion (*Taraxacum officinale*), 9; Side-Oats Grama, 6, Yellow Sedge, 6; Green Needle Grass, 5; Little Bluestem, 5; *Aster* sp., 4. **Edge:** Bordered to the N and W by large expanses of native prairie; the riverbottom forest lies about 300 m to the E. On the S is a cultivated field seeded to corn this season, separated from the plot by about 50 m of prairie, a prairie road, and a fence. **Topography:** Nearly level. **Elevation:** 1670-1690 ft. **Weather:** Near normal temperatures and much above normal precipitation. **Coverage:** June 10, 12, 15-16, 22-23, 30; July 8; 0640-1010 or 1725-1935, MDT. **Census:** Bobolink, 11 (68, 28); W. Meadowlark, 4 (25, 10); Savannah Sparrow, 3.5 (22, 9); Sora, 3 (19, 8); Red-winged Blackbird, 3; Wilson's Phalarope, 1; Upland Sandpiper, 0.5; Brown-headed Cowbird, + (female). **Total:** 8 species; 26 territorial males or females (161/km², 65/100 acres). **Visitors:** Mallard, Red-tailed Hawk, Marsh Hawk, Mourning Dove, Com. Flicker, E. Kingbird, W. Kingbird, Horned Lark, Tree Swallow, Bank Swallow, Barn Swallow, Am. Robin, Sprague's Pipit, Am. Goldfinch, Baird's Sparrow. **Remarks:** Nests found: Bobolink, 2, W. Meadowlark, 1.

103. MIXED PRAIRIE V. — **Location:** North Dakota; Oliver Co., in the NE $\frac{1}{4}$ of Sec. 36, T143N, R82W, 47°15'N, 101°W, Washburn Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (square, by compass and pacing). **Description of Plot:** Lowland prairie, on sandy soil, drier than the preceding plot, grazed for many years (un-

grazed this season) A prairie road runs through the plot near the NE edge. Ground cover was about 80% grasses and sedges, 15% forbs, and 5% woody shrubs, mostly Wolfberry. A grid of 36 sites of area 0.1 m² each was sampled and plants occurring on 10% or more of the sites are listed below, together with the number of sites on which they occurred: Western Wheat Grass, 24; Black Medick (*Medicago lupulina*), 24; Needle-and-thread, 22; Threadleaf Sedge, 20; Kentucky Blue Grass, 18; Prairie June Grass, 18; Blue Wild Lettuce, 18; Blue Grama, 14; Com. Dandelion, 14; Fringed Sage, 13; *Aster* sp., 11; Little Bluestem, 9; Silver Leaf, 8; Side-Oats Grama, 6; Big Sand Grass, 6; White Milkwort (*Polygala alba*), 6; Gaura, 6; Prairie Thistle (*Cirsium undulatum*), 5; Green Needle Grass, 4; Plains Muhly, 4; Big Bluestem, 4; Clover sp. (*Trifolium*), 4; Long-headed Coneflower, 4. **Edge:** Bounded on all sides by similar habitat; the riverbottom forest is about 150 m away from the NE edge. **Topography:** Gently sloping. Elevation about 1690-1750 ft. **Weather:** Near normal temperatures and much above normal precipitation. **Coverage:** June 6, 11, 15-16, 22-23, 30; July 3; 0450-0645 or 1830-2010 hours, MDT. Total man-hours: 12. **Census:** Grasshopper Sparrow, 3 (19, 8); Sprague's Pipit, 2.5; W. Meadowlark, 2.5; Upland Sandpiper, 2; Bobolink, 2; Vesper Sparrow, 2; E. Kingbird, 0.5; Brown-headed Cowbird, + (female). **Total:** 8 species; 14.5 territorial males or females (90/km², 36/100 acres). **Visitors:** Red-tailed Hawk, Swainson's Hawk, Am. Kestrel, Sharp-tailed Grouse, Com. Flicker, W. Kingbird, Tree Swallow, Barn Swallow, Com. Crow, Red-winged Blackbird, Am. Goldfinch, Lark Bunting, Savannah Sparrow, Baird's Sparrow, Chestnut-collared Longspur. **Remarks:** Baird's Sparrows appeared to be on territory, but were not territorial after the first census.

104. MIXED PRAIRIE I. — **Location:** North Dakota; Stutsman Co., NE quarter of Sect. 11, T142N, R68W; 47°8'N, 99°15'W, Woodworth Quadrangle, USGS. **Continuity:** Established 1972; 11 consecutive years. **Size:** 10 ha = 24.7 acres. **Description of Plot:** See AB 26:972 (1972). This plot lies in a control area that has been idle for 16 years. All wetlands contained some water throughout the census period. **Weather:** See Census 98. **Coverage:** June 8, 10, 15-16; 8 trips, 0520-1140, CDT. Total man-hours: 6.2. **Census:** Clay-colored Sparrow, 9.5 (95, 38); Com. Yellowthroat, 3.5 (35, 14); Red-winged Blackbird, 2; Brown-headed Cowbird (female) 1.5; Gadwall, 1; Blue-winged Teal, 1; E. Kingbird, 1; Willow Flycatcher, 1; Short-billed Marsh Wren, 1; W. Meadowlark, 1; Mallard 0.5; Pintail, 0.5; Bobolink, 0.5; Yellow Warbler, 0.5; Am. Bittern, +; N. Shoveler, +; Sharp-tailed Grouse, +; Killdeer, +; Com. Snipe, +; Gray Catbird, +; Am. Goldfinch, +. **Total:** 21 species; 24.5 territorial males or females (245/km², 99/100 acres). **Visitors:** Marsh Hawk, Sora, Mourning Dove, Long-eared Owl, W. Kingbird, Barn Swallow, Com. Grackle, Grasshopper Sparrow.—DOUGLAS H. JOHNSON, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.

105. MIXED PRAIRIE II. — **Location:** North Dakota; Stutsman Co., SW quarter of Sect. 1; T142N, R68W; 47°8'N, 99°15'W, Goldwin Quadrangle, USGS. **Continuity:** Established 1972; 11 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 32:81-82 (1978). This plot was burned in fall 1971, spring 1976, and spring 1979. All ponds contained water. **Weather:** See Census 98. **Coverage:** June 8, 10, 15-16; 8 trips, 0550-1015, CDT. Total man-hours: 3. **Census:** Blue-winged Teal, 3.5 (57, 23); Am. Coot, 1; Willet, 1; Bobolink, 1; Red-winged Blackbird, 1; Mallard, 0.5; Killdeer, 0.5, E Kingbird, 0.5; W. Meadowlark, 0.5; Brown-headed Cowbird (female), 0.5; Clay-colored Sparrow, 0.5; Gadwall, +; Com. Snipe, +; Marbled Godwit, +. **Total:** 14 species, 10.5 territorial males or females (172/km², 70/100 acres). **Visitors:** Black-crowned Night Heron, Ring-billed Gull, Mourning Dove, Bank Swallow, Com. Grackle, Am. Goldfinch.—DOUGLAS H. JOHNSON, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.

106. MIXED PRAIRIE III. — **Location:** North Dakota; Stutsman Co., NW quarter of SW quarter of Sect. 6 T142N, R67W; 47°9'N, 99°14'W, Goldwin Quadrangle, USGS. **Continuity:** Established 1972; 11 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 33:80 (1979). The southern 3.3 ha (8.15 acre) portion was burned on Aug 26, 1981. The remainder was burned on June 10, 1982. **Weather:** See Census 98. **Coverage:** (preburn) June 8, 10; (postburn) June 15-16, 8 trips, 0520-1055, CDT. Total man-hours: 2.6. **Census:** (Fall-burned area, before June burn): W. Meadowlark, +; Brown-headed Cowbird, +. **Total:** 2 species; + territorial males or females. (Fall-burned area, after June burn): W. Meadowlark, +; Brown-headed Cowbird, +; Clay-colored Sparrow, +. **Total:** 3 species; + territorial males or females. **Visitor:** E. Kingbird. (June-burned area, before June burn): Grasshopper Sparrow, 0.5; Clay-colored Sparrow, 0.5; Sharp-tailed Grouse, +; Bobolink, +; W. Meadowlark, +; Brown-headed Cowbird, +. **Total:** 6 species; 1 territorial male (36/km², 14/100 acres). (June-burned area, after June burn): Killdeer, 0.5; Horned Lark, 0.5; Vesper Sparrow, 0.5; Upland Sandpiper, +; Brown-headed Cowbird, +; Clay-colored Sparrow, +. **Total:** 6 species; 1.5 territorial males (54/km², 22/100 acres). **Visitors:** Com. Nighthawk, Mourning Dove, Yellow-headed Blackbird, Com. Grackle.—DOUGLAS H. JOHNSON, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.

107. MIXED PRAIRIE IV. — **Location:** North Dakota; Stutsman Co., SE quarter of Sect. 11, T142N, R68W; 47°8'N, 99°15'W, Woodworth Quadrangle, USGS. **Continuity:** Established 1972; 11 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:973-974 (1972). This plot has been burned 3 times since 1970, most recently in spring 1979. All wetlands on the plot contained average amounts of water. **Weather:** See Census 98. **Coverage:** May 29; June 8, 10, 15-16; 9 trips, 0530-1145, CDT. Total man-hours: 3.4. **Census:** Red-winged Blackbird,

1 5, Bobolink, 1, Brown-headed Cowbird, 1 (female), Blue-winged Teal, 0 5, Com Yellowthroat, 0.5; W. Meadowlark, 0.5; Grasshopper Sparrow, 0.5; Clay-colored Sparrow, 0 5; Upland Sandpiper, +; E. Kingbird, +. **Total:** 10 species; 6 territorial males or females ($98/\text{km}^2$, 40/100 acres). **Visitors:** Com. Snipe, Marbled Godwit, Com. Nighthawk, Com. Grackle, Am. Goldfinch. **Remarks:** Nests found: Gadwall, Upland Sandpiper.—*DOUGLAS H. JOHNSON and CRAIG A. FAANES, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.*

108. MIXED PRAIRIE V. — **Location:** North Dakota; Stutsman Co., SE quarter of Sect. 12, T142N, R68W; 47°8'N, 99°14'W, Goldwin Quadrangle, USGS. **Continuity:** Established 1972; 11 consecutive years. **Size:** 6 1 ha = 15.06 acres. **Description of Plot:** See AB 32:82 (1978). This plot has been burned 7 times since 1969, most recently on Sept. 1, 1981. Vegetation consisted primarily of Kentucky Blue Grass, with virtually no litter. **Weather:** See Census 98. **Coverage:** May 29; June 8, 10, 15-16; 10 trips, 0610-1230, CDT. Total man-hours: 3.1. **Census:** E. Kingbird, 1, W. Meadowlark, 1; Brown-headed Cowbird (female), 0.5; Upland Sandpiper, +; Marbled Godwit, +. **Total:** 5 species; 2.5 territorial males or females ($41/\text{km}^2$, 17/100 acres). **Visitors:** Swainson's Hawk, Killdeer, Willet, Bobolink, Am. Goldfinch, Grasshopper Sparrow, Chestnut-collared Longspur. **Remarks:** Nest found: Blue-winged Teal.—*DOUGLAS H. JOHNSON and CRAIG A. FAANES, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.*

109. MIXED PRAIRIE VIII. — **Location:** North Dakota; Stutsman Co., NW quarter of Sect. 1, T142N, R68W; 47°9'N, 99°14'W, Goldwin Quadrangle, USGS. **Continuity:** Established 1973; 7 intermittent years. **Size:** 8.7 ha = 21.5 acres. **Description of Plot:** See AB 32:82 (1978). All but the SW 1.5 ha of the plot was burned again on September 18, 1981; the remainder was burned June 10, 1982. Seven seasonal wetlands partially or entirely within the plot contained usual amounts of water during the census period. **Weather:** See Census 98. **Coverage:** June 10, 15-16; 6 trips, 0730-1040, CDT. Total man-hours: 3. **Census:** Red-winged Blackbird, 3.5 (40, 16); Am. Coot, 1.5; W. Meadowlark, 1; Brown-headed Cowbird, 1 (female); Pintail, 0.5; Blue-winged Teal, 0.5; Upland Sandpiper, 0 5, E. Kingbird, 0.5; Mallard, +; Killdeer, +, Willet, +; Horned Lark, +. **Total:** 12 species; 9 territorial males or females ($103/\text{km}^2$, 42/100 acres). **Visitors:** Gadwall, Sora, Com. Snipe, Black Tern, Barn Swallow, Long-billed Marsh Wren, Com. Grackle.—*DOUGLAS H. JOHNSON, Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, Jamestown, ND 58401.*

110. TALL GRASS PRAIRIE. — **Location:** Nebraska; Douglas Co., Allwine Prairie Preserve, 144th and State St., Omaha; 41°20'N, 96°09'W, Elkhorn Quadrangle, USGS. **Continuity:** New. **Size:** About 28.3 ha = 70 acres (estimated from aerial photograph). **Description of Plot:** The Preserve is a

reestablished grassland. Percent ground cover of the predominate grass species are as follows: Big Bluestem (*Andropogon gerardii*) 49%; Little Bluestem (*A. scoparius*) 13%; Indian Grass (*Sorghastrum nutans*) 11%; Sideoats Grama (*Bouteloua curtipendula*) 11%; Switch Grass (*Panicum virgatum*) 4%; other grasses 4%; including Smooth Brome (*Bromus inermis*), Foxtail (*Setaria glauca*), and Foxtail (*S. viridis*). Forbs 12%, including Wild Lettuce (*Lactuca canadensis*), Horseweed (*Conyza canadensis*), Red Clover (*Trifolium pratense*), Wood Sorrel (*Oxalis dellenii*), Yellow Sweet Clover (*Melilotus officinalis*), Lamb's Quarters (*Chenopodium album*), and Smartweed (*Polygonum pensylvanicum*). Open soil comprises 9%. **Edge:** Bordered on the E and S by roads separating the plot from adjacent farms. The W boundary consists of sparse woods with a grass understory. The N edge is bordered by 2 small farm ponds surrounded by woods, and a lowland grassland which was burned in May. **Topography:** Terraced north-facing slope and hilltop. **Elevation:** 1150 ft. **Weather:** Temperatures 55-67°C; rainfall above normal; skies clear to overcast; plot usually wet. **Coverage:** May 10, 13, 18, 27-28, 31; 0630-0930. Total man-hours: 16. **Census:** Grasshopper Sparrow, 15 (53, 21); Ring-necked Pheasant, 5 (18, 7); Dickcissel, 4 (14, 6); E. Meadowlark, 3 (11, 4); Brown-headed Cowbird, 2; Field Sparrow, 2; Mourning Dove, 1; W. Meadowlark, 1. **Total:** 8 species; 33 territorial males or females ($116/\text{km}^2$, 47/100 acres). **Visitors:** E. Kingbird, Rough-winged Swallow, Com. Yellowthroat. **Remarks:** The grassland is ungrazed, but is periodically burned as prescribed by a long-term management plan. Approximately $\frac{1}{2}$ of the plot, located in the SW corner, was most recently burned in April 1980. Ground litter depth varied from 6-22 cm. Nests located: Ring-necked Pheasant, 1; Mourning Dove, 1. Special thanks to Barbara Wilson for her guidance throughout the preparation of this census, and to Thomas Bragg for his assistance with the vegetation analysis.—*JEANETTE O'HARE, Biol. Dept., Univ. of Nebraska at Omaha, Omaha, NE 68182.*

111. FLOODPLAIN TALL GRASS PRAIRIE. — **Location:** Kansas; Douglas Co., portion of Baker Wetlands Research Area (Baker Univ., Baldwin City). It occupies much of the NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 18, T-13N, R-20E; 33°55'N, 95°14'W, Lawrence East Quadrangle, USGS. **Continuity:** Established 1974; 9 consecutive years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AB 28: 1031-1032 (1974). **Weather:** Temperatures were slightly below the June norm (59.8° to 78.3°F); July temperatures were closer to the norm (71.8° to 90.3°F). Although May rainfall was very high, amounts in June (5.83 in.) and in July (1.29 in.) were below normal. **Coverage:** May 27; June 19; July 14-16, 19-21; 0730-1000 and 1850-2050, CDT. Total man-hours: 17. **Census:** Dickcissel, 14 (138, 56); Com. Yellowthroat, 7 (69, 28); Red-winged Blackbird, 6 (59, 24); Short-billed Marsh Wren, 3 (30, 12); E. Meadowlark, 2. **Total:** 5 species; 32 territorial males ($316/\text{km}^2$, 128/100 acres). **Remarks:** Visitors and aerial foragers included: Green Heron, Bobwhite, Sora, Mourning Dove, Chimney Swift, Purple Martin, Cliff Swallow, Barn Swallow, Com.

Gackle Numbers of Com Yellowthroats were much higher than in past years. Wrens were present for the first time in 9 years of censusing. They apparently were absent on the May and June censuses, but set up territories and became vocal during July. Time of mowing may influence their occupancy of the area because the wetlands are very often mowed in July; this year was the exception. The area was burned in April, later than usual, and grass cover in mid-May was sparse (10 cm). Abundant rainfall ensured rapid growth however, and stands of *Spartina* in mid-July averaged 150 cm. Our thanks to Mark Pankratz and Tim Wagner for their help in setting up the grid markers.—*CALVIN L. CINK and PARVIZ SEPAHI, Biology Dept., Baker Univ., Baldwin City, KS 66006.*

112. IMPROVED PASTURE AND OAK-PINE FOREST. — **Location:** Oklahoma, Delaware Co., 3.5 mi S of Jay; 36°22'N, 94°48'W, Jay Quadrangle, USGS. **Continuity:** Established 1979; 4 consecutive years. **Size:** 9.11 ha = 22.5 acres. **Description of Plot:** See AB 34:70-71 (1980). **Weather:** Generally mild. Spring and early summer provided adequate rainfall that produced a good growth of vegetation. The last significant rain fell on June 15 and the total for July was only 1.2 inches. **Coverage:** May 9, 13, 29; June 9, 20, 29; July 15, 21; 0425-0913. Total man-hours: 23. **Census:** Indigo Bunting, 8 (88, 36); Yellow-billed Cuckoo, 7 (77, 31); Cardinal, 6.5 (71, 29); Field Sparrow, 6.5; Chipping Sparrow, 4 (44, 18); Summer Tanager, 3.5 (38, 16); Red-bellied Woodpecker, 3 (33, 13); Tufted Titmouse, 3, Prairie Warbler, 3; Brown-headed Cowbird, 3; Blue Grosbeak, 3; E. Kingbird, 2; Great Crested Flycatcher, 2; E. Wood Pewee, 2, Carolina Chickadee, 2; E. Bluebird, 2; Red-eyed Vireo, 2; E. Meadowlark, 2; Am. Goldfinch, 2; Pine Warbler, 1.5; Bobwhite, 1, Downy Woodpecker, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Black-and-white Warbler, 1; Yellow-throated Warbler, 1. **Total:** 27 species, 75 territorial males ($824/\text{km}^2$, 333/100 acres). **Visitors:** Red-tailed Hawk, Mourning Dove, Hairy Woodpecker, Scissor-tailed Flycatcher, Am. Robin, Orchard Oriole, Lark Sparrow. **Remarks:** Increased growth of saplings and shrubs in the pasture has provided an improved habitat for species such as the Prairie Warbler, Cardinal and Field Sparrow. Scott and Linda Shaloway and Michael Carter conducted 2 of the censuses.—*FREDERICK M. BAUMGARTNER, Little Lewis Whirlwind Nature School and Sanctuary, Rte 2, Jay, OK 74346.*

113. MIXED HABITAT - DISTURBED BOTTOMLAND. — **Location:** Oklahoma, Washington Co., Dewey, 2 mi W of intersection of Ninth St. and Hwy 75 and 0.3 mi N on E bank of Caney River; 36°48'N, 95°58'W, Tulsa Quadrangle, USGS. **Continuity:** Established 1972; 11 consecutive years. **Size:** 40.47 ha = 100 acres. **Description of Plot:** See AB 26:976-977 (1972). **Weather:** Mild, rainfall above average. **Coverage:** Apr. 14, 23, 30, May 7, 14, 19, 26; June 14, 24; July 1; 0700-1200, CDT. Total man-hours: 38. **Census:** Blue-gray Gnatcatcher, 20 (49, 20); Indigo Bunting, 13 (32, 13); Cardinal, 11 (27, 11),

Red-winged Blackbird, 6 (15, 6), Yellow-billed Cuckoo, 5 (12, 5), Com. Yellowthroat, 5; Brown-headed Cowbird, 5; Field Sparrow, 5; Red-eyed Vireo, 4 (10, 4); E. Wood Pewee, 3.5 (9, 4); Carolina Chickadee, 3.5; Tufted Titmouse, 3.5; Downy Woodpecker, 3 (7, 3); Yellow-breasted Chat, 3; Am. Goldfinch, 3; Red-bellied Woodpecker, 2.5; Ruby-throated Hummingbird, 2; Red-headed Woodpecker, 2; Great Crested Flycatcher, 2; Kentucky Warbler, 2; Painted Bunting, 2; Blue Jay, 1.5; White-breasted Nuthatch, 1.5; Prothonotary Warbler, 1.5; E. Phoebe, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Am. Robin, 1; Starling, 1; N. Parula, 1; Dickcissel, 1; Bobwhite, 0.5; Barred Owl, 0.5; Acadian Flycatcher, 0.5; E. Bluebird, 0.5; E. Meadowlark, 0.5; Red-tailed Hawk, +; Great Horned Owl, +; Orchard Oriole, +. **Total:** 39 species; 120 territorial males ($297/\text{km}^2$, 120/100 acres). **Visitors:** Green Heron, Killdeer, Mourning Dove, Belted Kingfisher, E. Kingbird, Scissor-tailed Flycatcher, Com. Crow, House Wren, Carolina Wren, Brown Thrasher, Wood Thrush, White-eyed Vireo, Warbling Vireo, Com. Grackle, Summer Tanager, Blue Grosbeak, Lark Sparrow. **Remarks:** Heavy rains in May and June interfered with nesting and censusing; marsh was filled with water for first time in years. Barred Owl territory was in the NW part of the plot while the Great Horned was seen in the extreme SE corner.—ELLA DELAP, 409 N. Wyandotte, Dewey, OK 74029.

114. OAK-PINE RAVINE FOREST WITH CLEARINGS. — **Location:** Oklahoma: Delaware Co., 4 mi S of Jay; $36^\circ 22' \text{N}$, $94^\circ 48' \text{W}$, Lake Eucha E Quadrangle, USGS. **Continuity:** Established 1979; 4 consecutive years. **Size:** 7.4 ha = 18.3 acres. **Description of Plot:** See AB 34:71 (1980). **Weather:** See Census 112. **Coverage:** May 10, 20, 29; June 10, 18, 25; July 1, 24; 0415-0845. Total man-hours: 23. **Census:** Yellow-billed Cuckoo, 9 (122, 49); Cardinal, 7 (95, 38); Indigo Bunting, 6.5 (88, 36); Blue-gray Gnatcatcher, 5 (68, 27); Brown-headed Cowbird, 5; Tufted Titmouse, 4.5 (61, 25); Kentucky Warbler, 4 (54, 22); Carolina Chickadee, 3.5 (47, 19); White-breasted Nuthatch, 3.5; Red-bellied Woodpecker, 3 (41, 16); Black-and-white Warbler, 3; Summer Tanager, 2.5; Blue Jay, 2; Carolina Wren, 2; Red-eyed Vireo, 2; Chuck-will's-widow, 1.5; Whip-poor-will, 1.5; Downy Woodpecker, 1.5; Mourning Dove, 1; Ruby-throated Hummingbird, 1; Great Crested Flycatcher, 1; White-eyed Vireo, 1; N. Parula, 1; Bobwhite, 0.5. **Total:** 24 species; 72.5 territorial males ($979/\text{km}^2$, 396/100 acres). **Visitors:** Pileated Woodpecker, Com. Crow, Am. Goldfinch. **Remarks:** The growth of young trees and shrubs in the old clearings is apparently creating more habitat for the Yellow-billed Cuckoo, Cardinal, and Indigo Bunting. The overall population showed a 20% increase over 1981. Scott and Linda Shalloway and Michael Carter conducted 2 of the censuses.—FREDERICK M. BAUMGARTNER, Little Lewis Whirlwind Nature School and Sanctuary, Rte. 2, Jay, OK 74346.

115. FLOODPLAIN COTTONWOOD FOREST. — **Location:** Colorado; Jefferson

Co., about 10 mi SW of Denver, NE $\frac{1}{4}$ Sec 14, T6S, R69W, 6th P.M., $39^\circ 32' \text{N}$, $105^\circ 5' \text{W}$, Littleton Quadrangle, USGS. **Continuity:** Established 1971; 11 intermittent years. **Size:** 9.7 ha = 24 acres. **Description of Plot:** See AB 25:966 (1971). Since that description, Chatfield Reservoir has filled. It surrounds the plot, with water in the grove 8-12 ft deep. All trees have died. Water action and windstorms have caused a substantial number of trees to fall, so that the plot probably has about $\frac{1}{3}$ the number of trees it had in 1971. **Weather:** A severe windstorm on March 31 felled a number of trees, probably including some in which herons had begun to nest. Since then, the area had typical weather. **Coverage:** May 18, 27; June 8, 22; July 12, 21 (all by foldboat); 0600-0930 hours; plus several trips beginning in February to observe the plot from an overlook 100 yds to the E. Total man-hours: 16. **Census:** Great Blue Heron, 111 (1143, 463); Double-crested Cormorant, 66 (680, 275); Tree Swallow, 13 (134, 54); Starling, 9 (93, 38); Com. Grackle, 5 (51, 21); Great Horned Owl, 1; E. Kingbird, 1. **Total:** 7 species; 206 occupied nests or territorial males ($2121/\text{km}^2$, 858/100 acres). Excluding the colonial nesting herons and cormorants, 29 occupied nests or territorial males (299/ km^2 , 121/100 acres). **Remarks:** The plot probably has reached the species composition expectable after the flooding and dead trees. The species that nested this year will probably continue to nest in the grove so long as the trees remain standing; the present habitat has little potential for other species to return or to colonize. The nest counts of herons and cormorants this year was probably the most accurate of any in the 11 years, thanks to a tree-numbering system initiated by Kathi Green and Sandy Weston (Wildlife Conservation Officer and Colo. Parks Dept. respectively). Last year I estimated 100 heron nests and 27 cormorant nests, compared with 92 heron and 26 cormorants counted in 1980. The numbering system showed that during the season a few nests disappeared and that cormorants took over 5 nests originally occupied by herons. Despite these takeovers I doubt that competition between herons and cormorants affects the population dynamics of the two species. I think that probably the location of food sources has a greater effect. The cormorants can feed in the deep waters of Chatfield Reservoir in the immediate vicinity of their nests; in fact they nested in the plot the year the reservoir first filled. The herons travel great distances to feed—up to 15-25 miles. We found nests for the entire nesting population except 4 swallows and the kingbird. Thanks to the 6 people who joined me to conduct census trips, and to Brad Buckner, Ass't Park Manager, for his cooperation in providing access to the site.—HUGH E. KINGERY, 869 Milwaukee St., Denver, CO 80206.

116. GAMBEL'S OAK - MOUNTAIN MAHOGANY WOODLAND. — **Location:** Colorado; El Paso Co., T14S, R67W, S-E corner of Sec. 16 and N-E corner of Sec 21, off the Gold Camp Road; $38^\circ 49' \text{N}$, $104^\circ 53' \text{W}$, Manitou Springs Quadrangle, USGS. **Continuity:** Established 1979; 3 intermittent years. **Size:** 18.4 ha = 45.5 acres. **Description of Plot:** See AB 34:119 (1980). **Weather:** Tem-

peratures ranged from 65-95°F in early morning to mid-afternoon. Occasional rainfall **Coverage:** Apr. 1, 4; May 11, 18; June 6, 19, 27; July 2, 11, 18; Aug. 7; 0700-0930. Total man-hours: 22. **Census:** Rufous-sided Towhee, 9 (49, 20); Broad-tailed Hummingbird, 4 (22, 9); Solitary Vireo, 3 (16, 7); Scrub Jay, 2; Mountain Chickadee, 2; Am. Robin, 2; Rufous Hummingbird, 1; W. Tanager, 1; Red-tailed Hawk, +; Mourning Dove, +; Rough-winged Swallow +. **Total:** 11 species, 24 territorial males ($130/\text{km}^2$, 53/100 acres) **Visitors:** Black-billed Magpie, Com. Crow **Remarks:** Rufous-sided Towhees continue to be abundant. Common Crows repeatedly frequent the area but nesting not observed. The trail is extensively used by backpackers — SHERRENE ST. HELENS, P.O. Box 6053, Colorado Springs, CO 80934.

117. SCRUB OAK-MOUNTAIN MAHOGANY WOODLAND. — **Location:** Colorado; El Paso Co., 100m W Dwire Hall, Univ. of Colorado campus, Colorado Springs; $38^\circ 52' \text{N}$, $104^\circ 47' \text{W}$, Pikeview Quadrangle, USGS. **Continuity:** Established 1980, 3 consecutive years. **Size:** 8 ha = 19.77 acres. **Description of Plot:** See AB 35:87 (1980) **Weather:** Cooler and with more rainfall than usual all through June, July, Aug. **Coverage:** May 3, 9, 16; June 5, 7, 19-20, 27; July 1, 8, 22; Aug. 7; 0630-0815. Total man-hours 20 **Census:** Rufous-sided Towhee, 8 (100, 40), Black-billed Magpie, 2.5; Brewer's Blackbird, 2.5; House Finch, 2.5; Scrub Jay, 2; Am. Robin, 2; Mourning Dove, 1; Com Flicker, 1; Virginia's Warbler, 1; Com Crow, 0.5; Broad-tailed Hummingbird, +; Mountain Chickadee, +; Starling, +; Brown-headed Cowbird, +; Black-headed Grosbeak, +; Pine Siskin, +; Lesser Goldfinch, +; Chipping Sparrow, +. **Total:** 18 species; 23 territorial males ($287/\text{km}^2$, 116/100 acres). **Visitors:** Cooper's Hawk, Red-tailed Hawk, Rock Dove, White-throated Swift, W. Flycatcher, Violet-green Swallow, House Sparrow, W. Meadowlark **Remarks:** Nest found: Black-billed Magpie This year's census is the highest density of the 3-year sequence both in terms of breeding male density and number of species. A probable cause is the high amount of rainfall which kept the vegetation lush and green all through the summer. I wish to thank Rebecca Holmes for census data during March and April. These data are relevant to the breeding periods of 2 of the corvids on the list (Black-billed Magpie and Scrub Jay) as there is considerable evidence that they are early breeders.—DON VAN HORN, Dept. of Biology, Univ. of Colorado, Colorado Springs, CO 80907.

118. MAPLE - BOX - ELDER CREEK-BOTTOM. — **Location:** Utah; Salt Lake Co., 2.5 mi NE of Fort Douglas, Salt Lake City, $40^\circ 48' \text{N}$, $111^\circ 17' \text{W}$, Fort Douglas Quadrangle, USGS. **Continuity:** Established 1981 **Size:** 11.1 ha = 27.4 acres. **Description of Plot:** See AB 36:86-87 (1982). **Weather:** Mild and extremely wet throughout period with high runoff in creeks on site, June and July among the wettest on record. **Coverage:** Apr 16; May 5, 25; June 5, 12, 24, 26; July 13, Aug. 2; 0600-1000 or 1600-1825 hours. Total man-hours: 49. **Census:** Warbling Vireo, 24 (216, 88); MacGillivray's Warbler, 8 (72, 29),

Broad-tailed Hummingbird, 4 (36, 15), Swainson's Thrush, 4, Yellow Warbler, 4, Lazuli Bunting, 4; Black-capped Chickadee, 3 (27, 11); Dusky Flycatcher, 1; House Wren, 1, Chipping Sparrow, 1; Song Sparrow, 1. **Total:** 11 species; 55 territorial males or females ($496/\text{km}^2$, 201/100 acres). **Visitors:** Cooper's Hawk, Mourning Dove, Downy Woodpecker, Orange-crowned Warbler, W. Tanager, Black-headed Grosbeak, Rufous-sided Towhee. **Remarks:** Nests located (10): Broad-tailed Hummingbird (2), Warbling Vireo (2), Lazuli Bunting (2), Black-capped Chickadee, House Wren, Swainson's Thrush, Chipping Sparrow. While all numbers were down, especially notable is the absence of nesting Com. Flicker and Downy Woodpeckers noted in 1981. Evidence of later breeding than 1981 includes a Swainson's Thrush nest on June 26—young of this species had fledged by June 18, 1981. The site possibly contains the water access portions of territories of several species including Black-capped Chickadee, Orange-crowned Warbler and Rufous-sided Towhee.—**JOSHUA BURNS, VAUGHN LOVEJOY and MARK LEPPERT, Utah Audubon Society, P.O. Box 9419, Salt lake City, UT 84109.**

119. RIVER BOTTOM FOREST.—**Location:** Manitoba; Headingley, 3 mi SW of village and 800 m N of Hwy 241 (4 mi W of jcts. of Hwys 241 and 334); $49^\circ 52' \text{N}$, $97^\circ 30' \text{W}$, Winnipeg 62 H/14. **Continuity:** Established 1977; 6 consecutive years. **Size:** 14 ha = 34.6 acres. **Description of Plot:** See AB 33:64 (1978). **Weather:** Cool and calm with frost on June 2 and 8. **Coverage:** June 1-2, 4, 8, 10, 14, 18-19, 21; 0500-0800 hours. Total man-hours: 21. **Census:** Rose-breasted Grosbeak, 19 (136, 55); N. Oriole, 15 (107, 43); Least Flycatcher, 8 (57, 23); Am. Robin, 4 (29, 12); Great Crested Flycatcher, 3 (21, 9); E. Wood Pewee, 3; Red-eyed Vireo, 3; Warbling Vireo, 2; Scarlet Tanager, 2; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Mourning Dove, +; Black-billed Cuckoo, +; Hairy Woodpecker, +; Blue Jay, +; E. Kingbird, +; House Wren, +; Gray Catbird, +; Swainson's Thrush, +; Brown-headed Cowbird, +. **Total:** 21 species; 62 territorial males ($443/\text{km}^2$, 179/100 acres). **Visitors:** Goshawk, Great Horned Owl, Com. Crow, Cedar Waxwing, Com. Grackle. **Remarks:** Nests found: cuckoo, Mourning Dove, Am. Robin. Shrubs are growing in area owing to lack of recent floods.—**W. KOONZ, Dept. of Natural Resources, 1495 St. James St., Winnipeg, Manitoba, Canada R3H OW9.**

BREEDING BIRDS OF WOODED HABITATS ON THE CROSS RANCH NATURE PRESERVE IN NORTH DAKOTA

The following 4 breeding bird censuses were conducted in Oliver Co., North Dakota. Three of the plots are 20-acre squares in riverbottom forest (Census 120, 121, 122) while the fourth (Census 123) is irregularly shaped and lies in a wooded draw. Sites were characterized by the method of James and Shugart (AFN 24: 727-736 (1970)). The number of 0.1 acre circles used ranged from 5 to 15, depending upon the diversity of

the plot I thank Joyce Berkey, Ron Martin and Ron Butler for assistance with various aspects of the work, and Ron Wieland for assistance with plant identification, and the Nature Conservancy for permission to carry out the work. This study was supported in part by a Faculty Research Grant from Minot State College.—**GORDON B. BERKEY, Division of Science, Minot State College, Minot, ND 58701.**

120. COTTONWOOD FOREST I.—**Location:** North Dakota, Oliver Co., within the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 6, T143N, R81W; $47^\circ 14' \text{N}$, $100^\circ 59' \text{W}$, Sanger Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (square, by compass and pacing). **Description of Plot:** Very open cottonwood forest, with varied ages of trees and many grassy clearings. Shrubs (in order of decreasing abundance) include: Wolfberry, Wood's Rose, Green Ash, and Buffalo Berry. Ground cover was principally grasses. The plot, grazed for many years, was ungrazed this season. A quantitative survey based on 10 circular 0.1 acre samples gave the following results: Trees, 3-in. and larger dbh, 47/acre; total basal area 103.7 ft²/acre. Species: Cottonwood, 46, 98, 99, 80; dead, 1, 2, 1, 10. Trees by diameter size class: B (6-9 in.), 2, 4, 0.6, 1; C (9-15 in.), 13, 28, 10.4, 10, D (15-21 in.), 19, 41, 34.2, 33; E (21-27 in.), 8, 17, 9.8, 9; F (27-33 in.), 2, 4, 9.8, 9; G (33-40 in.), 2, 4, 14.4, 14; H (> 40 in.), 1, 2, 9, 7, 9. Shrub stems/acre 9950; ground cover 55%, canopy cover 42%; average canopy height 65 ft (range 60-70 ft). Bordered on 3 sides by similar habitat; the Missouri River runs parallel to the NE edge at a distance of approximately 50 m from the plot. **Topography:** Flat. **Elevation:** About 1660 ft. **Weather:** Near-normal temperatures and much above-normal precipitation. **Coverage:** June 10, 12, 16, 21, 23-24, 30; July 8; between 0455-1020 or 1700-1815 hours, MDT. Total 14 man-hours. **Census:** House Wren, 7.5 (93, 38), Least Flycatcher, 6 (74, 30); Com. Flicker, 3.5 (43, 18); Warbling Vireo, 3.5; E. Wood Pewee, 3 (37, 15); Am. Robin, 3; E. Kingbird, 2.5; Mourning Dove, 2; N. Oriole, 1.5; Black-headed Grosbeak, 1.5; Am. Kestrel, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Tree Swallow, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Brown Thrasher, 1; E. Bluebird, 1; Yellow Warbler, 1; Brown-headed Cowbird, 1 (female); Clay-colored Sparrow, 0.5; W. Wood Pewee, +; Gray Catbird, +. **Total:** 23 species; 44.5 territorial males or females ($550/\text{km}^2$, 223/100 acres). **Visitors:** Mallard, Red-tailed Hawk, Bank Swallow, Com. Crow, Starling, Red-winged Blackbird, Am. Goldfinch, Song Sparrow. **Remarks:** Nests found: Mourning Dove, 1; Tree Swallow, 1; Black-headed Grosbeak, 1. Immature young that were barely able to fly included 3 E. Bluebirds and 1 Am. Kestrel.

in the Marmath area of Slope Co., North Dakota

121. COTTONWOOD FOREST II.—**Location:** North Dakota, Oliver Co., within the SW $\frac{1}{4}$ of Sec. 30, T144N, R81W; $47^\circ 15' \text{N}$, 101°W , Turtle Creek SW Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (square, by compass and pacing). **Description of Plot:** Very open cottonwood forest, with varied ages of trees and many grassy clearings. Shrubs (in order of decreasing abundance) include: Wolfberry, Wood's Rose, Green Ash, and Buffalo Berry. Ground cover was principally grasses. The plot, grazed for many years, was ungrazed this season. A quantitative survey based on 10 circular 0.1 acre samples gave the following results: Trees, 3-in. and larger dbh, 47/acre; total basal area 103.7 ft²/acre. Species: Cottonwood, 46, 98, 99, 80; dead, 1, 2, 1, 10. Trees by diameter size class: B (6-9 in.), 2, 4, 0.6, 1; C (9-15 in.), 13, 28, 10.4, 10, D (15-21 in.), 19, 41, 34.2, 33; E (21-27 in.), 8, 17, 9.8, 9; F (27-33 in.), 2, 4, 9.8, 9; G (33-40 in.), 2, 4, 14.4, 14; H (> 40 in.), 1, 2, 9, 7, 9. Shrub stems/acre 9950; ground cover 55%, canopy cover 42%; average canopy height 65 ft (range 60-70 ft). Bordered on 3 sides by similar habitat; the Missouri River runs parallel to the NE edge at a distance of approximately 50 m from the plot. **Topography:** Flat. **Elevation:** About 1660 ft. **Weather:** Near-normal temperatures and much above-normal precipitation. **Coverage:** June 10, 12, 16, 21, 23-24, 30; July 8; between 0455-1020 or 1700-1815 hours, MDT. Total 14 man-hours. **Census:** House Wren, 7.5 (93, 38), Least Flycatcher, 6 (74, 30); Com. Flicker, 3.5 (43, 18); Warbling Vireo, 3.5; E. Wood Pewee, 3 (37, 15); Am. Robin, 3; E. Kingbird, 2.5; Mourning Dove, 2; N. Oriole, 1.5; Black-headed Grosbeak, 1.5; Am. Kestrel, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Tree Swallow, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Brown Thrasher, 1; E. Bluebird, 1; Yellow Warbler, 1; Brown-headed Cowbird, 1 (female); Clay-colored Sparrow, 0.5; W. Wood Pewee, +; Gray Catbird, +. **Total:** 23 species; 44.5 territorial males or females ($550/\text{km}^2$, 223/100 acres). **Visitors:** Mallard, Red-tailed Hawk, Bank Swallow, Com. Crow, Starling, Red-winged Blackbird, Am. Goldfinch, Song Sparrow. **Remarks:** Nests found: Mourning Dove, 1; Tree Swallow, 1; Black-headed Grosbeak, 1. Immature young that were barely able to fly included 3 E. Bluebirds and 1 Am. Kestrel.

122. GREEN ASH FOREST.—**Location:** North Dakota, Oliver Co., within the SW $\frac{1}{4}$ of Sec. 31, T144N, R81W; $47^\circ 15' \text{N}$, 101°W , Sanger Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (by compass and pacing). **Description of Plot:** Dense, uniform growth of hardwoods dominated by Green Ash. Shrub understory is nearly absent. Ground cover is a dense tangle of vines and grasses. The plot, grazed for many years, was not grazed this season. A quantitative survey based on 5 circular 0.1 acre samples gave the following results: Trees, 3-in. and larger dbh, 222/acre; total basal area 90 ft²/acre. Species: Green Ash, 174, 78, 68, 100; Boxelder (*Acer negundo*), 14, 6, 10, 40; Black Haw (*Viburnum lentago*), 8, 4, 1, 20.

Am Elm, 6, 3, 6, 20, Cottonwood, 4, 2, 11, 20, dead, 16, 7, 4, 80. Trees by diameter size class: A (3-6 in.), 66, 29, 6.6, 7; B (6-9 in.), 100, 43, 30.0, 33; C (9-15 in.), 50, 22, 40, 45; D (15-21 in.), 4, 2, 7.2, 8; E (21-27 in.), 2, 1, 6.2, 7. Shrub stems/acre 200; ground cover 98%; canopy cover 82%, average canopy height 50 ft (range 35-70 ft). **Topography:** Mostly flat. **Elevation:** 1655-1665 ft. **Weather:** Near-normal temperatures and much above-normal precipitation. **Coverage:** June 6, 12, 15-16, 22-23, 30; July 8; between 0610-1125 or 1800-2000 hours, MDT. Total man-hours: 12. **Census:** Red-eyed Vireo, 7 (86, 35); House Wren, 6 (74, 30); Ovenbird, 1.5; Blue Jay, 1; Am Robin, 1; Turkey, 0.5; Mourning Dove, 0.5; Hairy Woodpecker, 0.5; Black-billed Cuckoo, +; E. Kingbird, +; Great Crested Flycatcher, +; E. Bluebird, +; Com. Yellowthroat, +. **Total:** 13 species; 18 territorial males (222/km², 90/100 acres). **Visitors:** Red-tailed Hawk, Com. Flicker, Com. Crow, Bobolink, N. Oriole, Brown-headed Cowbird, Black-headed Grosbeak, Am. Goldfinch, Field Sparrow. **Remarks:** A brood of 8 Turkeys was frequently seen.

123. HARDWOOD DRAW. — **Location:** North Dakota, Oliver Co., astride the boundary between Sec. 36, T143N, R82W, and Sec 1, T142N, R82W; 47°9'N, 101°1'W, Fort Clark NE Quadrangle, USGS. **Continuity:** New. **Size:** About 14.2 ha = 35 acres (irregular in shape). **Description of Plot:** Non-homogeneous, with many areas of uniform stands of a single tree species, depending on the direction of slope and moisture conditions. Trees interspersed with grassy and shrubby clearings, providing a maximum of edge situations. A small stream runs through the plot. The plot has a history of grazing, and was used heavily by cattle this season because of the availability of water. In addition to the variety of tree species, shrubs present in order of decreasing abundance include: Wolfberry, Wood's Rose, Buffalo Berry, Juneberry (*Amelanchier alnifolia*), Choke Cherry (*Prunus virginiana*), Hawthorn (*Crataegus rotundifolia*), and Gooseberry (*Ribes* sp.). A quantitative analysis based on 15 circular 0.1 acre samples gave the following results: Trees, 3-in. and larger dbh, 106/acre; total basal area 55.4/acre. Species: Quaking Aspen (*Populus tremuloides*), 43, 41, 23, 27; Bur Oak (*Quercus macrocarpa*), 15, 14, 30, 53; Green Ash, 15, 14, 12, 67; Am. Elm, 10, 9, 24, 53; Basswood (*Tilia americana*), 3, 3, 3, 7; dead, 15, 14, 5, 33; other, 5, 5, 4, 27. Trees by diameter size class: A (3-6 in.), 53, 51, 5.7, 10; B (6-9 in.), 14, 13, 4.2, 8; C (9-15 in.), 27, 26, 21.3, 38, D (15-21 in.), 9, 8, 15.6, 28; E (21-27 in.), 1, 1, 2.1, 4; F (27-33 in.), 1, 1, 6.5, 12. Shrub stems/acre, 11,500; ground cover 60%; canopy cover 61%; canopy height, average 37 ft (range 15-75 ft). Bordered on all sides by native prairie, except for a continuation of the wooded draw to the west (upstream). **Topography:** Uneven, with steep slopes into the streambed. **Elevation:** 1860-1950 ft. **Weather:** Near normal temperatures with much above normal precipitation. **Coverage:** June 4, 11, 17, 21-22, 24, 30; July 9; between 0445-1100 or 1725-1930 hours, MDT. Total man-hours: 18. **Census:** House Wren, 11 (78, 31), Mourning Dove, 8 (56, 23); Am. Robin, 8, E. Kingbird, 6 (42, 17); Yellow Warbler, 6;

Com Flicker, 5 (35, 14), Rufous-sided Towhee, 5, Brown Thrasher, 4 (28, 11), N. Oriole, 4; W. Kingbird, 3 (21, 9); Black-capped Chickadee, 3; Black-and-white Warbler, 3; Brown-headed Cowbird, 3 (females); Black-headed Grosbeak, 3; Clay-colored Sparrow, 2.5; White-breasted Nuthatch, 2; Veery, 2; W. Meadowlark, 2; Orchard Oriole, 2; Vesper Sparrow, 2; Field Sparrow, 2; Downy Woodpecker, 1.5; Blue Jay, 1.5; Great Horned Owl, 1; Hairy Woodpecker, 1; Least Flycatcher, 1; Gray Catbird, 1; Warbling Vireo, 1; Yellow-breasted Chat, 1; Red-winged Blackbird, 1; Killdeer, 0.5; Rough-winged Swallow, 0.5; Black-billed Cuckoo, +; E. Bluebird, +. **Total:** 34 species; 97.5 territorial males or females (688/km², 279/100 acres). **Visitors:** Mallard, Pintail, Turkey Vulture, Ferruginous Hawk, Upland Sandpiper, Wilson's Phalarope, Com. Night-hawk, Belted Kingfisher, Tree Swallow, Cliff Swallow, Black-billed Magpie, Sprague's Pipit, Cedar Waxwing, Red-eyed Vireo, Com. Grackle, Am. Goldfinch, Lark Sparrow, Chipping Sparrow. **Remarks:** Nests found: Great Horned Owl, 1; W. Kingbird, 1; Vesper Sparrow, 1. A brood of 3 young Pintails and a single immature Killdeer were seen frequently. The census period was too early to count Cedar Waxwing and Am. Goldfinch territories, but the area is ideal habitat and both species were present in good numbers at the end of the period.

BREEDING BIRD POPULATIONS OF SELECTED OAK-HICKORY FORESTS IN NORTHEASTERN KANSAS

The following 6 breeding bird censuses represent the fifth consecutive summer of data from representative stands of oak-hickory forest. See AB 33:66-67 (1979) for a description of vegetation and topography.

Weather data from the Univ. of Kansas at Lawrence, 12 mi NW of the study areas, show that temperatures were slightly below the June norm, with a mean low of 59.8°F and a mean high of 78.3°. July temperatures were closer to the norm with a mean low of 71.8° and a mean high of 90.3°. Although May rainfall was very high, amounts in June (5.83 in.) and in July (1.29 in.) were below normal.

Strong winds during the summer of 1981 felled a large number of dead elms that had provided nesting cavities. This summer densities of several cavity nesters declined in proportion to the amount of windthrow in each study plot.

Our thanks to the Field Research Committee, Division of Biological Sciences, at the Univ. of Kansas for use of research areas under their control and to Frank Sturdy, Mr. and Mrs. Thomas Beisecker, and Mr. and Mrs. Earl Cutler for access to their properties.—*CALVIN L. CINK, ROGER L. BOYD, and WILLIAM J. STARK, JR., Biol. Dept., Baker Univ., Baldwin City, KS 66006.*

124. OAK-HICKORY FOREST I. — **Location:** Kansas; Douglas Co., on the Univ. of Kansas Wall Biological Reserve. Predominantly on the NW $\frac{1}{4}$, SW $\frac{1}{4}$, Section 28, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established

1978, 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** May 27, June 6, 11, 29, July 11-12; 0630-1150. Total man-hours: 18. **Census:** Tufted Titmouse, 4 (49, 20); Yellow-billed Cuckoo, 3 (37, 15); Blue Jay, 3; White-breasted Nuthatch, 3; Downy Woodpecker, 2.5; Great Crested Flycatcher, 2.5, E. Wood Pewee, 2.5; Rose-breasted Grosbeak, 2.5; Red-bellied Woodpecker, 2; Brown-headed Cowbird, 2; Cardinal, 2; Red-headed Woodpecker, 1.5; Red-tailed Hawk, 1; Com Flicker, 1; Hairy Woodpecker, 1; Black-capped Chickadee, 1; Summer Tanager, 1, N. Oriole, 1; Com. Grackle, +; Scarlet Tanager, +. **Total:** 20 species; 36.5 territorial males (451/km², 183/100 acres). **Visitors:** Alder Flycatcher, Barn Swallow, Am Goldfinch. **Remarks:** Nests found: Red-tailed Hawk (2) (350 yards apart), Downy Woodpecker (1), Rose-breasted Grosbeak (1).

125. OAK-HICKORY FOREST II. — **Location:** Kansas; Douglas Co., on the Univ. of Kansas Breidenthal Biological Reserve and Cedar Crest Wildlife Refuge (Cliff Woods) Predominantly on the NW $\frac{1}{4}$, NE $\frac{1}{4}$, Section 28, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** May 28; June 5-6, 11; July 11-12; 0630-1015. Total man-hours 18. **Census:** Downy Woodpecker, 3 (37, 15), Tufted Titmouse, 3; Cardinal, 2.5; Yellow-billed Cuckoo, 2; Great Crested Flycatcher, 2; Blue Jay, 2; Red-bellied Woodpecker, 1.5, E. Wood Pewee, 1.5; Black-capped Chickadee, 1.5; White-breasted Nuthatch, 1.5, Summer Tanager, 1.5; Mourning Dove, 1, Chuck-will's-widow, 1; Red-headed Woodpecker, 1; E. Bluebird, 1; Kentucky Warbler, 1; Brown-headed Cowbird, 1; Red-eyed Vireo, +; Louisiana Waterthrush, +; Indigo Bunting, +. **Total:** 20 species; 28 territorial males (346/km², 140/100 acres). **Visitors:** Brown Thrasher, Swainson's Thrush, Yellow-throated Vireo, Warbling Vireo, N Oriole; Scarlet Tanager, Rose-breasted Grosbeak. **Remarks:** Nests observed Downy Woodpecker (2), Chuck-will's-widow (1), Tufted Titmouse (1), E. Bluebird (1), Cardinal (1).

126. OAK-HICKORY FOREST III. — **Location:** Kansas; Douglas Co., on the Univ. of Kansas Breidenthal Biological Preserve Predominantly on the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 28, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** May 26; June 5-6, 13; July 3, 7; 0605-1200. Total man-hours 26. **Census:** Tufted Titmouse, 4.5 (56, 23); Great Crested Flycatcher, 3.5 (43, 18); Red-eyed Vireo, 3.5; Yellow-billed Cuckoo, 3 (37, 15), Blue Jay, 3; Cardinal, 3; Hairy Woodpecker, 2.5; Black-capped Chickadee, 2.5; Downy Woodpecker, 2; E. Wood Pewee, 2; N Parula, 2; Louisiana Waterthrush, 2; Kentucky Warbler, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Chuck-will's-widow, 1.5; White-breasted Nuthatch, 1.5; Mourning Dove, 1; Red-bellied Woodpecker, 1; Wood Thrush, 1; Scarlet Tanager, 1; Com Grackle, 1; Rose-breasted Grosbeak, 1, Great Horned Owl, +; Whip-poor-will, +, Ruby-throated Hummingbird, +; Red-

headed Woodpecker, +, Carolina Wren, +, Indigo Bunting, +. **Total:** 29 species, 48 5 territorial males ($599/\text{km}^2$, 243/100 acres). **Visitors:** Red-tailed Hawk, *Empidonax* spp., Swainson's Thrush, E. Bluebird, Red-winged Blackbird, N. Oriole. **Remarks:** Nests found: Hairy Woodpecker, Downy Woodpecker, Tufted Titmouse, Red-eyed Vireo, Kentucky Warbler.

127. OAK-HICKORY FOREST IV. — **Location:** Kansas, Douglas Co., Sturdy's Woods. Predominantly on the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 27, T-14S, R-20E; 38°48'N, 95°10'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** May 25, 28; June 8, 11, 15, 18, 22, 25; 0630-1150. Total man-hours: 16. **Census:** Great Crested Flycatcher, 4 (49, 20); Blue Jay, 3 (37, 15); Cardinal, 3; Yellow-billed Cuckoo, 2; E. Wood Pewee, 2; Tufted Titmouse, 2; Brown-headed Cowbird, 2; Summer Tanager, 1.5; Barred Owl, 1; Whip-poor-will, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Red-eyed Vireo, 1; Kentucky Warbler, 1; Rose-breasted Grosbeak, 1; Mourning Dove, +, Hairy Woodpecker, +; Gray Catbird, +; Black-and-white Warbler, +; N. Oriole, +; Indigo Bunting, +. **Total:** 24 species; 29.5 territorial males ($364/\text{km}^2$, 148/100 acres). **Visitors:** Red-tailed Hawk, Bobwhite, Chimney Swift, Red-headed Woodpecker, Com. Flicker, Com. Crow, Am. Goldfinch. **Remarks:** Nests found: Yellow-billed Cuckoo, Whip-poor-will, Downy Woodpecker, Cardinal (1 each).

128. OAK-HICKORY FOREST V. — **Location:** Kansas; Douglas Co., East Beisecker Woods. Predominantly on the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 35, T-14S, R-20E; 38°48'N, 95°09'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** May 26, 28; June 1, 8, 10, 14, 17, 21; 0630-1230. Total man-hours: 22. **Census:** Red-eyed Vireo, 4 (49, 20); Great Crested Flycatcher, 2.5; Ovenbird, 2; Kentucky Warbler, 2; Summer Tanager, 2; Cardinal, 2; E. Wood Pewee, 1.5; Yellow-billed Cuckoo, 1; Whip-poor-will, 1; Red-headed Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Black-capped Chickadee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Louisiana Waterthrush, 1; Red-bellied Woodpecker, +; Scarlet Tanager, +; Rose-breasted Grosbeak, +. **Total:** 20 species; 26 territorial males ($321/\text{km}^2$, 130/100 acres). **Visitors:** Red-tailed Hawk, Chimney Swift, Com. Flicker, Com. Crow. **Remarks:** Nests found: Whip-poor-will, Kentucky Warbler, Cardinal (1 each).

129. OAK-HICKORY FOREST VI. — **Location:** Kansas; Douglas Co., West Beisecker Woods. Predominantly on the SW $\frac{1}{4}$, NE $\frac{1}{4}$, Section 35, T-14S, R-30E; 38°48'N, 95°09'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** May 26, 28; June 1, 8, 10, 14, 17, 21, 0630-1230. Total man-hours: 23. **Census:** Tufted Titmouse, 3 (37, 15); Ovenbird, 2.5; Yellow-billed Cuckoo, 2; E. Wood Pewee, 2;

Blue Jay, 2; Red-eyed Vireo, 2; Downy Woodpecker, 1.5; Kentucky Warbler, 1.5; Mourning Dove, 1; Chuck-will's widow, 1; Whip-poor-will, 1; Red-bellied Woodpecker, 1; Great Crested Flycatcher, 1; Black-capped Chickadee, 1; Blue-gray Gnatcatcher, 1; Wood Thrush, 1; Summer Tanager, 1; Rufous-sided Towhee, 1; Red-tailed Hawk, +; Black-and-white Warbler, +; N. Oriole, +. **Total:** 21 species; 26.5 territorial males ($327/\text{km}^2$, 133/100 acres). **Visitors:** Chimney Swift, Com. Flicker, Com. Crow, Brown Thrasher, Com. Grackle. **Remarks:** Nests found: Chuck-will's-widow, Whip-poor-will, Yellow-billed Cuckoo, Downy Woodpecker, Rufous-sided Towhee (1 each).

130. OAK-HICKORY FOREST VII. — **Location:** Kansas; Douglas Co., Priestley's Woods, predominantly on NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 22, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 36:85 (1982). **Weather:** Same as for "Breeding Bird Populations of Selected Oak-Hickory Forests in Northeastern Kansas, I-VI." **Coverage:** June 1, 6, 12-13, 21; July 3; between 0600-1230 hr. Total man-hours: 23.5. **Census:** Cardinal, 6 (74, 30); Yellow-billed Cuckoo, 5.5 (68, 28); Downy Woodpecker, 3.5 (43, 18); Red-headed Woodpecker, 3 (37, 15); Red-bellied Woodpecker, 3; E. Wood Pewee, 3; Great Crested Flycatcher, 3; Black-capped Chickadee, 3; Red-eyed Vireo, 3; Indigo Bunting, 3; Tufted Titmouse, 2.5; N. Parula, 2.5; Brown-headed Cowbird, 2.5; Kentucky Warbler, 2; Blue Jay, 1.5; Hairy Woodpecker, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; E. Bluebird, 1; Louisiana Waterthrush, 1; Summer Tanager, 1; Rose-breasted Grosbeak, 1; Com. Grackle, 1; N. Oriole, 1; Red-tailed Hawk, +; E. Kingbird, +; Com. Crow, +; Wood Thrush, +. **Total:** 28 species; 56 territorial males ($692/\text{km}^2$, 280/100 acres). **Visitors:** Warbling Vireo, Red-winged Blackbird, Am. Goldfinch. **Remarks:** Nests found: Cardinal (3), Red-headed Woodpecker (2), Indigo Bunting (2), Red-tailed Hawk, Downy Woodpecker, Great Crested Flycatcher. Red-eyed Vireo observed carrying nest material but nest not located. Our thanks to Nellie Holmes and Martha Buller for permission to conduct the study on their land.—*ROGER L. BOYD and WILLIAM J. STARK, Biol. Dept., Baker Univ., Baldwin City, KS 66006.*

131. DECIDUOUS FLOODPLAIN FOREST. — **Location:** Oklahoma: Delaware Co., 4 mi S of Jay; 36°21'N, 94°48'W, Lake Eucha E Quadrangle, USGS. **Continuity:** Established 1979; 4 consecutive years. **Size:** 6.7 ha = 16.6 acres. **Description of Plot:** See AB 34:53 (1980). **Weather:** See Census 112. **Coverage:** May 9, 14, 30; June 12, 22, 30; July 20, 26; 0420-1005. Total man-hours: 28. **Census:** Cardinal, 8 (119, 48); Acadian Flycatcher, 7 (104, 42); N. Parula, 7; Yellow-billed Cuckoo, 6 (89, 36); Tufted Titmouse, 6; Carolina Chickadee, 5.5 (82, 33); Blue-gray Gnatcatcher, 5 (74, 30); Indigo Bunting, 5; Carolina Wren, 4 (60, 24); White-eyed Vireo, 4; Louisiana Waterthrush, 4; Kentucky Warbler, 4; Brown-headed Cowbird, 4; White-

breasted Nuthatch, 3 (45, 18); Downy Woodpecker, 2.5; Red-bellied Woodpecker, 2; Hairy Woodpecker, 2; Great Crested Flycatcher, 2; Red-eyed Vireo, 2; Prothonotary Warbler, 2; Whip-poor-will, 1; Ruby-throated Hummingbird, 1; E. Phoebe, 1; Com. Yellowthroat, 1; Yellow-breasted Chat, 1; Am. Goldfinch, 1; Com. Crow, 0.5. **Total:** 27 species; 91.5 territorial males ($1362/\text{km}^2$, 551/100 acres). **Visitors:** Red-shouldered Hawk, Barred Owl, Pileated Woodpecker, Summer Tanager. **Remarks:** The small clearings made in the winter of 1980-81 supported an unusually high concentration of birds, resulting in an 8% increase in the total population over 1981. Scott and Linda Shaloway and Michael Carter conducted 2 of the censuses.—*FREDERICK M BAUMGARTNER, Little Lewis Whirlwind Nature School and Sanctuary, Rte 2, Jay, OK 74346.*

132. DOUGLAS - FIR - PONDEROSA PINE FOREST. — **Location:** Colorado, El Paso Co., 0.7 mi E of Univ. of Colo. campus, Colorado Springs, 1000 ft N of the end of Flintridge Drive; 38°53'N, 104°47'W, Pikeview Quadrangle, USGS. **Continuity:** New. **Size:** 7.53 ha = 18.6 acres (chain surveyed). **Description of Plot:** Typical isolated stand on a NW facing slope of a bluff. The dominant canopy trees are Douglas-fir (*Pseudotsuga menziesii*), Ponderosa Pine (*Pinus ponderosa*), Rocky Mountain Juniper (*Juniperus scopulorum*), Com. Juniper (*J communis*), and One-seeded Juniper (*J monosperma*). Most prominent in the understory are Gambel Oak (*Quercus gambelii*), Mountain Mahogany (*Cercocarpus montanus*), and Com. Gooseberry (*Ribes interme*). The ground cover is primarily Prickly Pear Cactus (*Opuntia compressa*), *Polygonum vulgare*, and *Stipa columbiana*. Several other species of flowering herbs were noted such as Spiderwort (*Tradescantia occidentalis*). A quantitative survey of the canopy vegetation gave the following results Trees 3-in. dia. and over, based on 5 circular samples, 280/acre. Species comprising 90% of the total number of trees: Ponderosa Pine, 180, 58, 57, 100; Douglas-fir, 60, 19, 2, 100; Com. Juniper, 29, 9, 8, 75; Rocky Mountain Juniper, 21, 7, 5, 50; One-seeded Juniper, 20, 7, 4, 50. Shrub stems/acre, 2200 (est), ground cover, 30%; canopy cover 20%; mean canopy height 50 ft (range 15-100 ft). **Edge:** Bordered to the N, E and S by similar vegetation. There are 2 houses within 50m of the E border. The W side is an ecotone, and is bordered by a stream meadow. **Topography:** Rugged, 25°-35° slope. Sedimentary rock outcrops and cliffs frequent on area. **Elevation:** 6300-6500 ft. **Weather:** Cooler than average, rainfall and humidity higher than average. **Coverage:** May 7; June 24, 30; July 6, 14-15, 19, 22, 26; Aug. 1, 7; 0730-0930. Total man-hours: 20. **Census:** Rufous-sided Towhee, 9 (120, 48); Black-billed Magpie, 8 (106, 43); Am. Robin, 5 (66, 27); Mourning Dove, 3.5 (46, 19); Bullock's Oriole, 3 (40, 16); House Finch, 2.5; Scrub Jay, 2; Black-capped Chickadee, 2; Virginia's Warbler, 2; Com. Flicker, 1.5; White-breasted Nuthatch, 1.5; Black-headed Grosbeak, 1. **Total:** 12 species; 41 territorial males or females ($545/\text{km}^2$, 220/100 acres). **Visitors:** Killdeer, Com. Nighthawk, Downy Woodpecker, Cliff

Swallow, Com Crow, Red-breasted Nuthatch, W. Meadowlark, Chipping Sparrow, Song Sparrow. **Remarks:** Data for Black-billed Magpie were also obtained from observations February through May because they are early spring nesters. Also during that time 2 Steller's Jays were sighted, but they were not observed again. These birds are indicators of a montane biome, though the census was very similar to nearby woodland censuses. Because this census is an isolated montane stand with woodland and meadow areas nearby it tends to take on those characteristics. Special thanks to Dr. Van Horn for all of his help and guidance.—*SARAH E. TRAYNOR, Dept. of Biol., Univ. of Colo., Colo. Springs, CO 80907.*

133. INTERIOR WESTERN HEMLOCK FOREST. — **Location:** British Columbia; Kootenay Land District; Glacier Nat'l Park; 8 km (5 mi) NE of Rogers Pass; 51°21'30"N, 117°25'30"W; Canadian National Topographical System, Map Sheet 82N/6. **Continuity:** New. **Size:** 10.3 ha = 25.5 acres (irregular rectangle, tape-measured, 600 × 150m to 180m). **Description of Plot:** Western Hemlock (*Tsuga heterophylla*) forms a closed canopy. The forest is homogeneous and continuous over the entire plot. Other tree species found in very small numbers include Douglas-fir (*Pseudotsuga menziesii*), W. Red Cedar (*Thuja plicata*) and W. White Pine (*Pinus monticola*). The sparse shrub layer is primarily young W. Hemlock. Ground cover consists of Mountain Lover (*Pachistima myrsinifolia*), Huckleberry (*Vaccinium membranaceum*), Prince's Pine (*Chimaphila umbellata*), Bunchberry (*Cornus canadensis*), One-sided Wintergreen (*Pyrola secunda*), Large Wintergreen (*P. asarifolia*), Twinflower (*Linnaea borealis*) and mosses. A quantitative survey of the vegetation gave: Trees 3-in. diameter and over, based on five 0.1-acre circular samples, 412/acre; total basal area, 280 ft²/acre. Species comprising 98% of the total number of trees [figures after each give number of trees/acre, relative density (%), relative dominance (%), frequency (%), in that sequence]: W. Hemlock, 382, 93, 77, 100; Douglas-fir, 22, 5, 22, 80. Trees by diameter size class figures after each class give number of trees/acre, relative density (%), basal area (ft²/acre), relative dominance (%): A (3-6 in.) 166, 40, 16.6, 6; B (6-9 in.) 88, 21, 26.4, 9; C (9-15 in.) 92, 22, 73.6, 26; D (15-21 in.) 40, 10, 72, 22; E (21-27 in.) 20, 5, 62, 22; F (27-33 in.) 6, 2, 29.4, 11. Shrub stems/acre, 700; ground cover, 92%, canopy cover, 75%; canopy height, 82 ft (range 65-90). There is a 10 ft wide fire-access road running through the center for the length of the plot but it does not create breaks in the canopy. **Edge:** The same forest type is continuous on all sides. A steep-sided ravine and a steep bank are found 10-50 m away on the 2 long sides of the rectangular plot but both have the same forest cover. **Topography:** Flat, on a glacial terrace at 3000 ft, 200 ft above the Beaver River valley bottom, with dry ravines dissecting about 1/4 of the plot. Soil is a well-drained Dystric Brunisol. **Weather:** Temperatures 45-56°F at dawn. Full overcast on 1 day, other days with clear or nearly clear skies; winds usually calm, never more than 7 mph. **Coverage:** June 11, 14, 16-17, 19, 21, 23,

25, 0415-0626 hrs, PDT Total man-hours 12 **Census:** Swainson's Thrush, 5.5 (53, 22), Chestnut-backed Chickadee, 3.5 (34, 14); Golden-crowned Kinglet, 2.5; Townsend's Warbler, 2; Red-breasted Nuthatch, 1; Hairy Woodpecker, 0.5; Dark-eyed Junco, 0.5; Barred Owl, +; Hammond's Flycatcher, +; Varied Thrush, +. **Total:** 10 species; 15.5 territorial males (150/km², 61/100 acres). **Visitors:** Yellow-bellied Sapsucker, Gray Jay. **Remarks:** Gray Jay juveniles were observed once and may have been fledged up to several weeks before the census period. Pileated Woodpecker workings were common in all areas of the plot; 4 Winter Wrens kept territories in the W. Hemlock forest on the steep ravines and banks adjacent to the plot.—*LES W. GYUG, Canadian Wildlife Service, Box 1349, Revelstoke, British Columbia, V0E 2SO.*

134. DOUGLAS-FIR-WESTERN HEMLOCK FOREST: MOUNT ST. HELENS MUDFLOW. — **Location:** Washington; Skamania Co., Cougar, near Gifford Pinchot Nat'l Forest Service Rd. No. 2588, 7½ mi NW of its junction with Rd. No. 25; 46°09'N, 122°05'W, Mount St. Helens 15 minute quadrangle, USGS. **Continuity:** New. **Size:** 83.6 ha = 206.6 acres (roughly square, measured). **Description of Plot:** A mudflow containing 3 islands of vegetation, these islands making up about 20% of the area. The dominant canopy trees are Douglas-fir (*Pseudotsuga menziesii*) and W. Hemlock (*Tsuga heterophylla*). Willow (*Salix* sp.) is the most prominent understory plant. The ground cover is predominantly Bracken (*Pteridium aquilinum*), Mountain Huckleberry (*Vaccinium membranaceum*), and Tall Blue Huckleberry (*V. ovalifolium*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on five 0.1-acre circular samples, 176/acre; total basal area 25.6 ft²/acre. Species comprising 92.1% of the total number of trees: Douglas-fir, 70, 39.8, 46.1, 60; W. Hemlock, 78, 44.3, 38.2, 40; Grand Fir (*Abies grandis*), 14, 8, 8.6, 60. Trees by diameter size class: A (3-6 in.) 146, 83, 14.6, 57; B (6-9 in.) 26, 14.8, 7.8, 30.5; C (9-15 in.) 4, 2.3, 3.2, 12.5. Shrub stems/acre 5400; ground cover 13%; canopy cover 6%; average canopy height 12.4 ft (range 0-28). **Edge:** All sides are bordered by mudflow debris (principally boulders and ash). A forest service road has been bulldozed along the SE side. **Topography:** Gently sloping from NW to SE. **Elevation:** 850-900 meters. **Weather:** Varied between sunny, cloudy, and rainy throughout the period. Temperatures ranged between 10-20°C. **Coverage:** May 23; June 6, 12-13, 19-20, 26; July 3, 17-18; 0600-1245 hours. Total man-hours: 22. **Census:** White-crowned Sparrow, 3 (4, 1); Dark-eyed Junco, 2. **Total:** 2 species; 5 territorial males (6/km², 2/100 acres). **Visitors:** Com. Nighthawk, Rufous Hummingbird, Com. Flicker, Com. Raven, Am. Robin, Hermit Thrush, Mountain Bluebird, Townsend's Solitaire, Cedar Waxwing, Purple Finch. **Remarks:** Nest located: Dark-eyed Junco. The plot is about 5 mi SW of Mount St. Helens and is in the middle of a mudflow that resulted from the 1980 eruption of the volcano. During the course of the census, several minor eruptions occurred which deposited negligible amounts of ash on

the plot. Between 1967 and 1974 the area in which the plot occurs was logged. At the start of the survey there was no ground cover outside of the 3 islands of vegetation. During the course of the study, a number of plant species grew up in the mud flow debris. Prominent among these were *Lupinus lepidus*, *L. latifolius*, *Penstemon venustus*, Bracken, and a number of grasses.—*PATRICK J. MULLER, 2408 SE Taylor St., Portland, OR, 97214.*

135. LODGEPOLE PINE-MIXED CONIFEROUS FOREST. — **Location:** Washington; Clark Co., Gifford Pinchot Nat'l Forest, 4.5 mi SW of Mt. St. Helens; NE¼ Sec 26 T8N R4E; 46°09'N 122°16'W, Cougar Quadrangle, USGS. **Continuity:** New. **Size:** 9 29 ha = 22.96 acres (square, 1000 × 1000 ft, measured with compass and steel tape). **Description of Plot:** A mixed conifer forest with Lodgepole Pine (*Pinus contorta*) forming almost pure stands on the E half and W central quarter. Mixed conifer stands composed of Douglas-fir (*Pseudotsuga menziesii*), W. Hemlock (*Tsuga heterophylla*), and Pacific Silver Fir (*Abies amabilis*) exist along the central ridge, and N, W, and SW portions of the plot. Scattered large individual Douglas-fir exist within the Lodgepole stands. The 2 forest types form 2 canopies: the Lodgepole about 50 ft in height and the mixed conifer about 65 ft in height. Using an increment borer, samples were taken to determine the approximate age of the forest. The Lodgepole stand is estimated to be about 80 years old with 1 tree over 145 years old. A Douglas-fir and W. Hemlock were sampled and found to be over 200 years old. Shrubs include small coniferous trees and rarely Sitka Alder (*Alnus sinuata*). Ground cover is composed chiefly of Kinnikinnick (*Arctostaphylos uva-ursi*) and a huckleberry (*Vaccinium* sp.) with some Broadleaf Lupine (*Lupinus latifolius*). A quantitative survey of the vegetation using methods described by James and Shugart gave the following results: Trees 3-in. diameter and over based on 5 tenth acre circular samples 442/acre; total basal area 69.8 ft²/acre. Species comprising 100% of the total number of trees: Lodgepole Pine, 280, 63.3, 68.3, 100; Douglas-fir, 78, 18, 17.3, 80; W. Hemlock, 50, 11.3, 10.3, 100, Pacific Silver Fir, 24, 5.4, 3.3, 40; W. Whitebark Pine (*Pinus monticola*), 10, 2, 0.7, 40. Trees by diameter class: A (3-6 in.) 188, 43, 18.8, 13; B (6-9 in.) 198, 45, 59.4, 43; C (9-15 in.) 50, 11, 40, 29; D (15-21 in.) 4, 1, 7.2, 5, G (33-40 in.) 2, 1, 14.2, 10. Shrub stems/acre, 420 (est.); ground cover, 4%; mean canopy height 53 ft (range 50-65 ft estimated). **Edge:** Bordered on N, E, and SW by mixed conifer, on E by Lodgepole. Forest road 8123 marks the W boundary. **Topography:** Gradual slope to SW. A rill extends from the mid N boundary to the lower (SW) corner of the plot at road 8123. A small ridge parallels the rill on its E side. **Elevation:** 2800 ft with relief less than 50 ft. **Weather:** Temperatures: 30-54°F At least 2 inches of rain fell during period Snow, 2-3 ft deep at the beginning of the census finally melted by the June 27 visit. No water present on the plot. **Coverage:** May 23, June 3, 6, 10, 13, 27; July 11; 0500-0820 hours. Total man-hours: 16. **Census:** Dark-eyed (Oregon) Junco, 8 (86, 35); Hermit Thrush, 5.5 (59, 24); Hermit Warbler, 4.5 (48,

20), W Tanager, 2, Yellow-rumped (Audubon's) Warbler, 1 5, Varied Thrush, 1, Hammond's Flycatcher, +; W. Flycatcher, +; Chestnut-backed Chickadee, +; Red-breasted Nuthatch, +; Am. Robin, +. **Total:** 11 species 22.5 territorial males (242/km², 98/100 acres). **Visitors:** Blue Grouse, Great Horned Owl, Com. Nighthawk, Rufous Hummingbird, Com. Flicker, Pileated Woodpecker, Gray Jay, Golden-crowned Kinglet, Evening Grosbeak, Pine Siskin. **Remarks:** No nests found. Both Hermit Thrushes and Dark-eyed (Oregon) Juncos became excited at several locations within the plot suggesting nesting was occurring. A family of Yellow-rumped Warblers was noted on July 11. The plot received some ash and pumice from the 1980 eruptions of Mt. St. Helens. Size of pumice littering the ground was mostly an inch or less although one piece measuring 5 x 4 x 1" was found. Trace amounts of ash fall occurred several times during the study period with one happening on June 27. The very minor ashfalls are thought to have had little or no effect on bird activity. Evidence of a small mudflow from the May 18, 1980 eruption was noted within the rill channel. The mudflow was contained within the rill except for several hundred square feet on the SW corner where the rill becomes almost nonexistent. The mud was not deep enough to kill any trees within the plot although the ground cover was buried. The plot exists on a mudflow which could have formed 350-450 years ago. Thanks go to the following personnel of Gifford Pinchot Nat'l Forest for the help and interest: William Ruediger (Forest Biologist), Alice Purcell and Frank Robertson (District Biologists), and to Robert Everitt, (Wildlife Biologist) of the Washington Department of Game.—DAVID A. ANDERSON, 2703 SE Belmont, Portland, OR 97214.

136. BURNED PINE - FIR FOREST. — **Location:** California; Sierra and Nevada Cos., Sagehen Creek Field Station permanent grid plots, 6.5 km NW of Hobart Mills; 39°26'N, 120°14'W, Truckee Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 8.46 ha = 20.9 acres. **Description of Plot:** See AB 36:88 (1982). **Elevation:** 6450-6750 ft. **Weather:** Average temperature was 46.6°F with extremes of 32° and 57.2°F; slight to moderate breezes were frequent and the sky was open to overcast. **Coverage:** June 7, 10, 13, 16, 18, 21, 25; July 2, 8, 13; 0400-0550, PST. Total man-hours: 27. **Census:** Dark-eyed Junco, 4 (47, 19); Mountain Chickadee, 3.5 (41, 17); Red-breasted Nuthatch, 2; Yellow-rumped Warbler, 2; *Empidonax* sp., 1.5; Hermit Thrush, 1.5; Golden-crowned Kinglet, 1.5; Williamson's Sapsucker, 1; Steller's Jay, 1; Townsend's Solitaire, 1; W. Tanager, 1; Brown Creeper, 0.5; Com. Flicker, +; Nashville Warbler, +; Pine Siskin, +. **Total:** 15 species; 20 territorial males (236/km², 96/100 acres). **Visitors:** Com. Merganser, Great Horned Owl, Calliope Hummingbird, Black-backed Three-toed Woodpecker, W. Wood Pewee, White-breasted Nuthatch, Am. Robin, Evening Grosbeak, Cassin's Finch, Red Crossbill. **Remarks:** Nests found (7): Dark-eyed Junco, 2; Williamson's Sapsucker, 1; *Empidonax* sp., 1; Steller's Jay, 1; Mountain Chickadee, 1; Townsend's Solitaire, 1. Number of territories has remained fairly constant over time for each species as has total number of breeding pairs. I thank G. Oberts, J. Heffron, and D. Shirley for field assistance.—MICHAEL P. YODER-WILLIAMS, Sagehen Creek Field Station, Univ. of Calif., Truckee, CA 95734.

found (12) Com Flicker, 1, Williamson's Sapsucker, 1, Hairy Woodpecker, 1, *Empidonax* sp., 1; Olive-sided Flycatcher, 1; Mountain Bluebird, 1; Mountain Chickadee, 3; Pygmy Nuthatch, 2; W. Tanager, 1; Yellow Warbler, 2. *Empidonax* sp. observed feeding juvenile Brown-headed Cowbird. Fox Sparrow and Mountain Chickadee territories have increased in number over time and Dark-eyed Junco and Mountain Bluebird territories have decreased in number. Total number of territories has not changed significantly. I thank G. Oberts and J. Heffron for field assistance.—MICHAEL P. YODER-WILLIAMS, Sagehen Creek Field Station, Univ. of Calif., Truckee, CA 95734.

137. MATURE PINE-FIR FOREST. — **Location:** California; Nevada Co., Sagehen Creek Field Station permanent grid plots, 6.5 km NW of Hobart Mills; 39°26'N, 120°14'W, Truckee Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 8.46 hectares = 20.9 acres. **Description of Plot:** See AB 36:88-89 (1982). **Elevation:** 6600-6750 ft. **Weather:** Average temperature was 46.6°F with extremes of 32° and 57.2°F; slight to moderate breezes were frequent and the sky was open to overcast. **Coverage:** June 7, 10, 13, 16, 18, 21, 25; July 2, 8, 13; 0400-0550, PST. Total man-hours: 27. **Census:** Dark-eyed Junco, 4 (47, 19); Mountain Chickadee, 3.5 (41, 17); Red-breasted Nuthatch, 2; Yellow-rumped Warbler, 2; *Empidonax* sp., 1.5; Hermit Thrush, 1.5; Golden-crowned Kinglet, 1.5; Williamson's Sapsucker, 1; Steller's Jay, 1; Townsend's Solitaire, 1; W. Tanager, 1; Brown Creeper, 0.5; Com. Flicker, +; Nashville Warbler, +; Pine Siskin, +. **Total:** 15 species; 20 territorial males (236/km², 96/100 acres). **Visitors:** Com. Merganser, Great Horned Owl, Calliope Hummingbird, Black-backed Three-toed Woodpecker, W. Wood Pewee, White-breasted Nuthatch, Am. Robin, Evening Grosbeak, Cassin's Finch, Red Crossbill. **Remarks:** Nests found (7): Dark-eyed Junco, 2; Williamson's Sapsucker, 1; *Empidonax* sp., 1; Steller's Jay, 1; Mountain Chickadee, 1; Townsend's Solitaire, 1. Number of territories has remained fairly constant over time for each species as has total number of breeding pairs. I thank G. Oberts, J. Heffron, and D. Shirley for field assistance.—MICHAEL P. YODER-WILLIAMS, Sagehen Creek Field Station, Univ. of Calif., Truckee, CA 95734.

138. OLD GROWTH DOUGLAS - FIR - REDWOOD FOREST. — **Location:** California; Mendocino Co., 18 mi W of intersection of U.S. 101 and Branscomb Rd.; 39°45'N, 123°37'W, Branscomb Quadrangle, USGS. The plot is within The Nature Conservancy Coast Range Preserve. **Continuity:** Established 1981. **Size:** 10.22 ha = 25.25 acres (approximately rectangular, 1000 x 1100 ft, compass and 50m measuring tape, gridded at 30.5m intervals.) **Description of Plot:** A 400-600 year old growth Douglas-fir (*Pseudotsuga menziesii*) and Redwood (*Sequoia sempervirens*) forest on a NW aspect with the Skunk Creek drainage through the center of the plot. A dirt road extends in a NS direction and separates the site from the south-fork of the Eel River, which is just below and to the W. The S two-thirds of the forest is two tiered in structure, in which the height strata con-

sists of a dense shrub layer of Huckleberry (*Vaccinium ovatum*), and a high canopy of Redwood and Douglas-fir. The N 1/3 is slightly drier, and along with the conifers supports a moderate increase of hardwoods dominated by Tanoak (*Lithocarpus densiflorus*), Canyon Live Oak (*Quercus chryssolepis*), and Madrone (*Arbutus menziesii*). Ground cover is generally sparse with patches of moss and grass. A quantitative vegetation analysis, based on fifty 0.1 acre circular plots, gave the following results Trees (live and snag) 4-in. diameter and over, 166/acre; total basal area 322 ft²/acre Species (live and snag) comprising 90% of the total number of trees, followed by number of trees/acre, relative density (%), relative dominance (%), and frequency (%) were. Tanoak, 71, 43, 9, 98; Redwood, 31, 19, 42, 78; Douglas-fir, 29, 18, 42, 86; Canyon Live Oak, 16, 10, 2, 30; Madrone, 16, 9, 4, 54 Trees (live and snag) by diameter size class, followed by trees/acre, relative density (%), basal area (ft²/acre), and relative dominance (%): A (4-4.9 in.) 24, 15, 3, <1; B (5-10.9 in.) 75, 45, 25, 8; C (11-20.9 in.) 36, 22, 43, 13, D (21-35.9 in.) 17, 10, 76, 23; E (>36 in.) 14, 8, 185, 56. Shrub stems/acre omitted because incompatible with rest of vegetation survey, ground cover 1.3%; canopy cover 90%; average canopy height 77 ft (range 14-206). **Edge:** Bounded by similar forest along all but the N edge, which grades into a mixed coniferous-hardwood forest. A dirt road parallels the W edge, generally away from the boundary but contacts 200 ft of the SW section of the site. The edge effect is minimized by similar forest on both sides of the road. **Topography:** Steep, rugged terrain sloping to the NW. **Elevation:** 1400-2100 ft. **Weather 1981:** Variable throughout the season, ranging from clear and warm to cool and windy. Some early morning fog cover. Area characterized by winter rainfall, summer drought. Average yearly rainfall 60-65 in. Average temperature range, 47-77°. **Coverage 1981:** Apr. 29; May 2, 8-9, 15, 19, 27-28; June 3-4, 11, 15, 20-21, 26-27; 0553-1317 hours. Total man-hours 83 **Census:** W. Flycatcher, 7.5 (73, 30); Brown Creeper, 4.5 (44, 18); Wilson's Warbler, 4.5, Chestnut-backed Chickadee, 3.5 (34, 14), Allen's Hummingbird, 2.5; Hermit Thrush, 2.5, Rufous-sided Towhee, 2.5; Winter Wren, 2, Hermit Warbler, 2; Hairy Woodpecker, 1.5, Wood Duck, 1; Anna's Hummingbird, 1, Com. Flicker, 1; Spotted Owl, 0.5; Pygmy Owl, 0.5; Pileated Woodpecker, 0.5; Acorn Woodpecker, 0.5; Steller's Jay, 0.5; Com Raven, 0.5; Wrentit, 0.5. **Total:** 20 species, 39.5 territorial males or females (387/km², 156/100 acres). **Visitors:** Bushtit, Am. Robin, Solitary Vireo, Hutton's Vireo, Warbling Vireo, W. Tanager, Black-headed Grosbeak, Dark-eyed Junco. **Remarks:** Nest located Com. Flicker. **Weather 1982:** Variable throughout the season, ranging from clear and warm to cool and windy. Some early morning fog cover. Average temperature range, 42-73°. **Coverage 1982:** April 17-18, 26-27; May 5-6, 12-13, 20-21, 26-27; June 4-5, 10-11; 0550-1117 hours. Total man-hours: 76. **Census:** W. Flycatcher, 6 (59, 24); Wilson's Warbler, 5.5 (54, 22); Brown Creeper, 4 (39, 16); Hermit Thrush, 3 (29, 12); Allen's Hummingbird, 2.5; Hermit Warbler, 2.5; Com Flicker, 1.5; Steller's Jay, 1.5; Chestnut-backed Chickadee, 1.5; Winter Wren, 1; Am

Robin, 1; **Com Merganser**, 0.5; **Spotted Owl**, 0.5; **Pygmy Owl**, 0.5; **Pileated Woodpecker**, 0.5; **Com. Raven**, 0.5; **Wrentit**, 0.5; **Hutton's Vireo**, 0.5. **Total**: 18 species; 33.5 territorial males or females ($328/\text{km}^2$, 133/100 acres). **Visitors**: Hairy Woodpecker, Bushtit, Red-breasted Nuthatch, Solitary Vireo, W. Tanager, Black-headed Grosbeak, Pine Siskin, Rufous-sided Towhee, Dark-eyed Junco. **Remarks**: Nests located: Allen's Hummingbird, 1; Com. Flicker, 1; Steller's Jay, 1; Am. Robin, 1. Nesting species registered in 1981, but not in 1982 were: Wood Duck, Anna's Hummingbird, Acorn Woodpecker, Hairy Woodpecker, and Rufous-sided Towhee. The Com. Merganser and Am. Robin, non-nesting species in 1981, were recorded nesting in 1982. Territorial males or females showed a significant decrease from 39.5 last year to 33.5. Discrepancy in total species territory density may be attributed to unusual heavy spring rains in 1982 or difference in time duration of census field season: 1981, April 29 to June 27; 1982, April 17 to June 11. Special thanks to Rocky Gutiérrez for assistance with the quantitative habitat description, Stanley Harris and Cameron and Katie Barrows for suggestions regarding the manuscript and The Nature Conservancy for permitting me to work on The North Coast Range Preserve.—RAY JUDAH, Dept. Wildlife Management, Humboldt State Univ., Arcata, CA 95521.

139. PONDEROSA PINE—SCRUB OAK—MOUNTAIN MAHOGANY WOODLAND.

— **Location**: Colorado; Douglas Co., 1 mi E of Franktown, on Highway #86; 39°20'N, 104°40'W, Elizabeth Quadrangle, USGS. **Continuity**: Established 1968; 15 consecutive years. **Size**: 8.09 ha = 20 acres. **Weather**: Very hot until July 25, then wetter and cloudier than normal. **Coverage**: 9 trips in June and July; 0800-2080 hours. Total man-hours: 52. **Census**: W. Bluebird, 9 (111, 45); Broad-tailed Hummingbird, 3 (37, 15); W. Wood Pewee, 2; White-breasted Nuthatch, 2; Black-headed Grosbeak, 2; House Finch, 2; Lesser Goldfinch, 2; Chipping Sparrow, 2; Hairy Woodpecker, 1; Rufous-sided Towhee, 1. **Total**: 10 species; 26 territorial males ($321/\text{km}^2$, 130/100 acres). **Visitors**: Turkey Vulture, Cooper's Hawk, Mourning Dove, Rufous Hummingbird, Com. Flicker, Hairy Woodpecker, Violet-green Swallow, Steller's Jay, Scrub Jay, Black-billed Magpie, Com. Crow, Black-capped Chickadee, Mountain Chickadee, Pygmy Nuthatch, Am. Robin, Solitary Vireo, Virginia's Warbler, Brown-headed Cowbird, W. Tanager, Pine Siskin, Red Crossbill, Lark Sparrow.—MILDRED O. SNYDER, 161 Del Mar Circle, Aurora, CO 80011.

140. DECIDUOUS — CONIFEROUS NORTH SLOPE. — **Location**: Utah; Washington Co., Zion Nat'l Park, S side of Heaps' Canyon; 37°15'30"N, 112°57'30"W; Zion Nat'l Park Quadrangle; Zion Natural History Ass'n, Zion Nat'l Park, Springdale, Utah 84767. **Size**: 20.23 ha = 50 acres (rectangular, 275 × 880 yds, measured on map). **Continuity**: New. **Description of Plot**: A steep, north-facing slope, shaded from direct sunlight by Lady Mountain, to the S and W, for all but 3-4 hours daily. The vegetation is grouped according to the amount of shade,

with the SE corner mostly Pinyon Pine and Singleleaf Ash, the NE quarter is covered with oaks and maples, and Douglas-fir occurs in the more-shaded W end. A quantitative analysis of the vegetation gave the following results: Trees 3-in. in diameter and over, based on ten 0.1-acre samples: 119/acre; total basal area, 65 ft²/acre. Species comprising 90% of the total number of trees: Gambel Oak (*Quercus gambelii*) 42, 35, 19, 60; Bigtooth Maple (*Acer grandidentatum*) 32, 27, 5, 70; Boxelder (*A. negundo*) 8, 7, 4, 30; Rocky Mountain Juniper (*Juniperus scopulorum*) 6, 5, 2, 20; Douglas-fir (*Pseudotsuga menziesii*) 12, 10, 50, 20; Pinyon Pine (*Pinus edulis*) 10, 8, 5, 20; Singleleaf Ash (*Fraxinus anomala*) 2, 2, 0, 40; dead trees, 7, 6, 15, 30. Trees by diameter size class: A (3-6 in.) 55, 46, 5.5, 8; B (6-9 in.) 39, 33, 11.7, 18; C (9-15 in.) 13, 11, 10.4, 14; D (15-21 in.) 0; E (21-27 in.) 11, 9, 34.1, 52; F (27-33 in.) 1, 1, 4.9, 8. Shrub stems/acre, 182; ground cover 20%; canopy cover 86%; average canopy height 23 ft (range 15-70). **Edge**: Bounded on the S and W by a 2300-ft cliff; on the N by a small stream at the canyon bottom and a S-facing pinyon-juniper slope, and on the E by a juniper-oak slope that drops sharply to the canyon bottom. **Topography**: A 42% slope, ranging from 4300-4650 ft. A 30-60 ft cliff runs lengthwise through the plot. **Weather**: Dry, with no rain between May 15 and July 7; temperatures average. **Coverage**: Apr. 24; May 1, 7, 15, 22, 28; June 4, 11, 19, 25; July 3, 9, 17; 0605-1115, MDT. Total man-hours: 54.75. **Census**: Rufous-sided Towhee, 11 (54, 22); Solitary Vireo, 8 (40, 16); Warbling Vireo, 8; Virginia's Warbler, 8; Black-throated Gray Warbler, 8; Lazuli Bunting, 8; Black-headed Grosbeak, 7 (35, 14); Broad-tailed Hummingbird, 3 (15, 6); W. Flycatcher, 2; Am. Robin, 2; Cooper's Hawk, 1; Pygmy Owl, 1; Belted Kingfisher, 1; Com. Flicker, 1; Ash-throated Flycatcher, 1; W. Wood Pewee, 1; Scrub Jay, 1; Com. Raven, 1; Bushtit, 1; House Wren, 1; Cañon Wren, 1; W. Tanager, 1; Indigo Bunting, 1. **Total**: 23 species; 78 territorial males and female hummingbirds ($385/\text{km}^2$, 156/100 acres). **Visitors**: White-throated Swift, Downy Woodpecker, Violet-green Swallow, Steller's Jay, Dipper. **Remarks**: Western Tanager did not arrive until early June; Ash-throated Flycatcher and W. Wood Pewee were first found on June 25. Violet-green Swallows nested in a cliff on the main canyon wall, just adjacent to Heaps' Canyon; an average of 10 per trip was seen feeding over the plot.—JEROME L. GIFFORD, P. O. Box 85, Springdale, UT 84767.

141. RIPARIAN WOODLAND — LIVE OAK — JUNIPER.

— **Location**: Arizona, Cochise Co., 3 mi SW of Portal, extending 0.5 mi along Cave Creek of the Chiricahua Mts from Stewart F.S. camp upstream to Sunny Flat F.S. camp; 31°54'N, 109°10'W, Portal Quadrangle USGS. **Continuity**: Established 1978; 4 intermittent years. **Size**: 9.11 ha = 22.5 acres. **Description of Plot**: See AB 33:84-5 (1979). **Weather**: Normal, dry and hot; high temperatures in June 90°F or over; 1 shower during period. **Coverage**: May 4-July 5; 0630-1000, MST. Total man-hours: 84. **Census**: W. Wood Pewee, 17 (187, 76); Black-chinned Hummingbird, 15 (165, 67); Bridled Titmouse, 14 (154, 62); Black-throated Gray Warbler, 14; Bewick's Wren, 12 (132, 53);

White-breasted Nuthatch, 11 (121, 49), Rufous-sided Towhee, 10 (110, 44); Solitary Vireo, 9 (99, 40); Wied's Crested Flycatcher, 8 (88, 36); Painted Redstart, 8; Olivaceous Flycatcher, 7.5 (82, 33); Acorn Woodpecker, 7 (77, 31); Warbling Vireo, 6 (66, 27); Black-headed Grosbeak, 6; Am. Robin, 5.5 (60, 24), Hutton's Vireo, 5 (55, 22); Lucy's Warbler, 5; Arizona Woodpecker, 4 (44, 18); Sulphur-bellied Flycatcher, 4; Virginia's Warbler, 4, Hepatic Tanager, 4; Com. Flicker, 3 (33, 13), Scott's Oriole, 3; Brown-headed Cowbird, 3, Cañon Wren, 2.5; Blue-throated Hummingbird, 2; Rivoli's Hummingbird, 2; Mexican Jay, 2; Bushtit, 2; Grace's Warbler, 2; Yellow-eyed Junco, 2; Cassin's Kingbird, 1.5; Rufous-crowned Sparrow, 1.5; Cooper's Hawk, 1; Mourning Dove, 1; Elegant Tropic, 1; Black Phoebe, 1; Bronzed Cowbird, 1; White-winged Dove, +. **Total**: 39 species, 208 territorial males (or females) ($2284/\text{km}^2$, 924/100 acres). **Visitors** (and aerial foragers) Turkey Vulture, Band-tailed Pigeon, White-throated Swift, Coues' Flycatcher, Violet-green Swallow, raven sp. (probably Com.), Brown Creeper, Hermit Thrush, W. Tanager, Indigo Bunting, Lesser Goldfinch. **Remarks**: Nests found (28); 10 additional species were feeding young. Territories of 2 flocks of Mexican Jays, each with 7-8 birds, extended into the plot, but it was not determined if there was more than 1 breeding pair in either flock or more than 1 nest. The methodology was unsuitable for the non-territorial Brown-headed Cowbirds. They were registered on 9 of 14 trips. A Warbling Vireo was observed feeding a Brown-headed Cowbird fledgling. Band-tailed Pigeons came to the creek when water sources of adjacent areas dried up in the hot period before the rains began. It is estimated that between 75-100 arrived daily from May 19 until July 2 at which time the stream was dry. Brown Creeper, an expected breeding species, was only recorded twice; the Coues' Flycatcher and Hermit Thrush twice, and a singing ♂ Indigo Bunting on 3 trips but no female was recorded then or later. Lesser Goldfinches were not registered on the plot until July 1, but in August post-census observations of both male and female suggested breeding activity. No nests were found and the status remained unconfirmed. — HARRIETTE BARKER, 5302 S. Missiondale, Tucson, AZ 85706.

142. MIXED MOUNTAIN BOTTOM-LAND.

— **Location**: British Columbia, Kootenay Land District, Mt Revelstoke Nat'l Park, 1 km (0.6 mi) NW of Lauretta Station; 51°52'N, 117°55'W, Canadian Nat'l Topographic System, Map Sheet 82N/4. **Continuity**: New. **Size**: 6.4 ha = 15.81 acres (approximately 470-500 m × 90-160 m rectangle; area had been previously surveyed for nature boardwalk). **Description of Plot**: The vegetation patterns are complex consisting of W. Red Cedar (*Thuja plicata*) groves, Black Cottonwood (*Populus trichocarpa*) groves, wet Mountain Alder (*Alnus incana*) groves with an understory of Skunk Cabbage (*Lysichiton americanum*), drier Mountain Alder groves with an understory of Elderberry (*Sambucus racemosa*), Honeysuckle (*Lonicera involucrata*), Red-osier Dogwood (*Cornus stolonifera*), willows (*Salix* spp.) and open areas of Swamp Horse-

tail (*Equisetum fluviatile*), and Small-flowered Bulrush (*Scirpus microcarpus*). The heterogeneity of vegetation communities is typical of wet valley bottoms in the area. Western Red Cedar groves were on drier sites with a shrub layer of young cedar and Douglas Maple (*Acer glabrum* var. *douglasii*). Black Cottonwood groves varied from early successional with a very dense shrub layer to later successional stages with a very open shrub layer of young cottonwood and Red-osier Dogwood. Alder groves with Skunk Cabbage were characterized by standing water, as were the open areas of Swamp Horsetail, and Small-flowered Bulrush. Alder groves with Skunk Cabbage were generally later successional with a varying canopy cover and with an open shrub layer of Red-osier Dogwood and willows. Alder groves with an understory of willows, elderberry, honeysuckle, and Red-osier Dogwood varied in successional age and extent of canopy cover. Drier, open Alder groves had an extremely thick and nearly impenetrable shrub layer of alder and willow, with a ground cover of Nettles (*Urtica dioica*), and Touch-me-not (*Impatiens noli-tangere*), which reached heights of 5-6 ft. A quantitative survey of the vegetation gave: Trees 3-in. diameter and over, based on 60 0.1-acre circular samples, 170; total basal area, 51 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]: Alder (*Alnus incana*) 131, 77, 38, 100, Black Cottonwood (*Populus trichocarpa*) 14, 8, 11, 33; W. Red Cedar (*Thuja plicata*) 13, 8, 35, 67. Trees by diameter size class [figures after each give number of trees/acre, relative density (%), basal area (ft²/acre), relative dominance (%)]: A (3-6 in.) 128, 75, 12.8, 25; B (6-9 in.) 24, 14, 7.2, 14, C (9-15 in.) 10, 6, 7.7, 15; D (15-21 in.) 3, 2, 5, 8, 11; E (21-27 in.) 3, 2, 9.9, 19; F (27-33 in.) 2, 1, 7.8, 15. Shrub stems/acre, 1960; ground cover, 92%; canopy cover, 57% overall but 85% in closed, dry groves and 28% in open areas and groves with standing water; canopy height, 37 ft (range 20-70). Edge: Bordered on E by similar vegetation patterns, N by a 66 ft wide clearing for a paved highway (cleared of brush but not mowed), W by a 14 ft wide rushing stream with a grassy mowed area on the W edge of the stream, and S by the Illecillewaet River (fast-flowing river with alder habitat continuous up to river's edge). Topography: A 1500 ft wide valley bottom with steep mountain slopes on both sides. The E side is essentially flat and poorly drained with the water level kept constant by beaver activity at a level about 3 ft above the river at high water. The W side is drier with several ridges and hummocks covered in groves of trees. Elevation: 1950-1990 ft. Weather: Temperatures at dawn 45-58°F. Sky fully overcast on 2 days, clear on 2 days, and variably cloudy within census periods on 4 days. Coverage: June 18, 22, 26, 28-30; July 1, 7; 0410-0700 hrs, PDT. Total man-hours: 18. Census: Song Sparrow, 13.5 (211, 85); Yellow Warbler, 11 (172, 70); McGillivray's Warbler, 8.5 (133, 54); Com. Yellowthroat, 6 (94, 38); Am. Redstart, 4 (63, 25); Warbling Vireo, 3 (47, 19); N. Waterthrush, 3; Rufous Hummingbird, 2.5; Veery, 2, Red-eyed Vireo, 2; Hammond's Fly-

catcher, 1.5, Com. Crow, 1, Black-capped Chickadee, 1, Pileated Woodpecker, +, Yellow-bellied Sapsucker, +; Hairy Woodpecker, +; Swainson's Thrush, +; Orange-crowned Warbler, +. Total: 18 species; 59 territorial males or females (922/km², 373/100 acres). Visitors: Mallard, Belted Kingfisher, Steller's Jay, Am. Robin, Varied Thrush, Cedar Waxwing. Remarks: 1 Black-capped Chickadee nest located. A pair of Com. Crows fledged 2 young before the census period. Cedar Waxwings were flocking and presumed to have nested earlier than the census period and it is not known if they nested on the plot. A 1-km trail- and boardwalk-loop was under construction during the census period but activity of singing males was still high in its immediate vicinity and it did not appear to affect establishment of territories and nesting.—LES W. GYUG, Canadian Wildlife Service, Box 1349, Revelstoke, British Columbia, V0E 2S0.

143. MIXED CONIFEROUS – HARDWOOD FOREST I. — Location: California; Mendocino Co., 18 mi W of intersection of U.S. 101 and Branscomb Rd.; 39°45'N, 123°37'W, Branscomb Quadrangle, USGS; within The Nature Conservancy Coast Range Preserve. Continuity: Established 1981. Size: 10.22 ha = 25.25 acres (approximately rectangular, 1000 × 1100 ft, compass and 50m measuring tape, gridded at 30.5m intervals). Description of Plot: The plot is positioned on a NE aspect along Elkhorn Ridge. The head of Barnwell Creek is just below and to the NE. Intermittent streams are located in the NW and SE sections of the plot. Logging trails wind through the entire plot and create openings in the overstory. A washout ½ acre in size on the NW corner creates some edge effect even though surrounded by mixed forest on all sides. Selectively logged 35 years ago, this mixed forest exhibits an overstory species composition consisting of Redwood (*Sequoia sempervirens*), Douglas-fir (*Pseudotsuga menziesii*), Tanoak (*Lithocarpus densiflorus*), and Madrone (*Arbutus menziesii*). The understory is quite dense with saplings of the tree species and shrub species dominated by Huckleberry (*Vaccinium ovatum*), and *Mahonia nervosa*. Ground cover generally sparse. A quantitative vegetation analysis, based on fifty 0.1 acre circular plots, gave the following results: Trees (live and snag) 4-in. diameter and over, 196/acre; total basal area 122.8 ft²/acre. Species (live and snag) comprising 90% of the total number of trees, followed by number of trees/acre, relative density (%), relative dominance (%), and frequency (%) were: Tanoak, 108, 55, 46, 98; Madrone, 36, 18, 13, 80; Redwood, 34, 18, 31, 68. Trees (live and snag) by diameter size class, followed by trees/acre, relative density (%), basal area (ft²/acre), and relative dominance (%): A (4-4.9 in.) 45, 23, 5, 4; B (5-10.9 in.) 105, 54, 29, 24; C (11-20.9 in.) 35, 18, 42, 34; D (21-35.9 in.) 10, 5, 37, 30; E (>36 in.) 1, <1, 9, 8. Shrub stems/acre omitted because incompatible with rest of vegetation survey; ground cover 2.9%; canopy cover 80%; average canopy height 47 ft. (range 8-175). Edge: Bordered on all sides by similar forest. A jeep trail, 10 ft in width extends 300 ft just outside the SW corner. Topography: Steep, rugged

terrain sloping to the NE. Elevation: 1350-2200 ft. Weather 1981: Variable throughout the season ranging from clear and warm to cool and windy. Some early morning fog cover. Area characterized by winter rainfall, summer drought. Average yearly rainfall 60-65 in. Average temperature range, 47-77°. Coverage: May 3-4, 10-11, 20-21, 29-30; June 5-6, 16-17, 22-23, 28-29; between 0550-1252 hours. Total man-hours: 83. Census 1981: W Flycatcher, 6 (59, 24); Black-headed Grosbeak, 6; Wilson's Warbler, 4.5 (44, 18); Chestnut-backed Chickadee, 4 (39, 16); Nashville Warbler, 3.5 (34, 14); Steller's Jay, 3 (29, 12); Wrentit, 3; Warbling Vireo, 3; Rufous-sided Towhee, 3; Brown Creeper, 2.5; Hutton's Vireo, 2.5; Black-throated Gray Warbler, 2; W. Tanager, 2; Dark-eyed Junco, 2; Hermit Thrush, 1.5; Anna's Hummingbird, 1; Allen's Hummingbird, 1; Com. Flicker, 1; Acorn Woodpecker, 1; Hermit Warbler, 1; Mountain Quail, 0.5; Mourning Dove, 0.5; Pileated Woodpecker, 0.5; Olive-sided Flycatcher, 0.5; Solitary Vireo, 0.5. Total: 25 species; 56 territorial males or females (548/km², 222/100 acres). Visitors: Com. Raven, Bushtit, Red-breasted Nuthatch, Orange-crowned Warbler. Nest located: Steller's Jay. Weather 1982: Variable throughout the season ranging from clear and warm to cool and windy. Some early morning fog cover. Average yearly rainfall 60-65 in. Average temperature range, 42-73°. Coverage: Apr. 15-16, 21-22; May 3-4, 10-11, 18-19, 24-25; June 2-3, 8-9: 0536-1101 hours. Total man-hours: 74. Census 1982: W Flycatcher, 5.5 (54, 22); Black-headed Grosbeak, 5 (49, 20); Wilson's Warbler, 4.5 (44, 18); Steller's Jay, 4 (39, 16); Chestnut-backed Chickadee, 3.5 (34, 14); Rufous-sided Towhee, 3 (29, 12); Wrentit, 2.5; Hutton's Vireo, 2.5; Brown Creeper, 2; Dark-eyed Junco, 2; Warbling Vireo, 1.5; Mountain Quail, 1; Allen's Hummingbird, 1; Com. Flicker, 1; Hermit Thrush, 1; Solitary Vireo, 1; Nashville Warbler, 1; W. Tanager, 1; Pygmy Owl, 0.5; Pileated Woodpecker, 0.5; Olive-sided Flycatcher, 0.5. Total: 21 species; 44.5 territorial males or females (435/km², 176/100 acres). Visitors: Cooper's Hawk, Band-tailed Pigeon, Acorn Woodpecker, Com. Raven, Red-breasted Nuthatch, Orange-crowned Warbler, Townsend's Warbler, Black-throated Gray Warbler. Remarks: Nests located: Steller's Jay, 1; Wrentit, 1. Rufous Hummingbird, recorded April 15 and 21, left the area by May 3. Late departure probably due to heavy winter-early spring rains. Nesting species registered the previous year but not recorded in 1982 were: Anna's Hummingbird, Acorn Woodpecker, Mourning Dove, Black-throated Gray Warbler, and Hermit Warbler. The Pygmy Owl, absent in 1981, nested in 1982. Territorial males or females showed a significant decrease from 56 last year to 44.5. Discrepancy in total species territory density may be attributed to unusual heavy spring rains in 1982 or difference in time duration of census field season 1981, May 3 to June 29; 1982, April 15 to June 9. Special thanks to Rocky Gutiérrez for assistance with the quantitative habitat description, Stanley Harris and Cameron and Katie Barrows for suggestions regarding the manuscript and The Nature Conservancy for permitting me to work on The North Coast Range Preserve.—RAY JUDAH, Dept

144. MIXED CONIFEROUS - HARDWOOD FOREST II. — **Location:** California; Mendocino Co., 18 mi W of intersection of U.S. 101 and Branscomb Rd; 39°45'N, 123°37'W, Branscomb Quadrangle, USGS. The plot is within The Nature Conservancy Coast Range Preserve. **Continuity:** Established 1981. **Size:** 10.13 ha = 25.02 acres (irregular shape, 1300 × 700 and 600 × 300 ft, compass and 50m measuring tape, gridded at 30.5m intervals). **Description of Plot:** Selectively logged about 1947, making for a heterogeneous forest. The plot is positioned on a NW aspect sloping to the south fork of the Eel River. Skid trails create breaks in the canopy cover but some openings have grown up with young conifers. The Sugar Creek drainage extends through the N half of the plot. A dirt road on the SE corner creates some edge effect even though surrounded by mixed forest on all sides. Dominant conifers and hardwood species include Douglas-fir (*Pseudotsuga menziesii*), Tanoak (*Lithocarpus densiflora*), Madrone (*Arbutus menziesii*), Canyon Live Oak (*Quercus chrysolepis*), and California Bay (*Umbellularia californica*). The understory consists of saplings of the tree species and diagnostic shrub species such as Poison-oak (*Rhus diversiloba*), Salal (*Gaultheria shallon*) and Huckleberry (*Vaccinium ovatum*). Ground cover generally sparse. A quantitative vegetation analysis, based on fifty 0.1 acre circular plots, gave the following results: Trees (live and snag) 4-in. diameter and over, 257/acre; total basal area 145 ft²/acre. Species (live and snag) comprising 90% of the total number of trees/acre, relative density (%), relative dominance (%), and frequency (%) were: Tanoak, 89, 35, 28, 74; Madrone, 88, 34, 31, 90; Canyon Live Oak, 25, 10, 7, 36; Douglas-fir, 23, 9, 19, 70; California Bay, 12, 5, 2, 28. Trees (live and snag) by diameter size class followed by trees/acre, relative density (%), basal area (ft²/acre), and relative dominance (%): A (4-4.9 in.), 42, 16, 5, 3; B (5-10.9 in.), 160, 62, 50, 34; C (11-20.9 in.), 46, 18, 54, 38; D (21-35.9 in.), 9, 3, 33, 23; E (>36 in.), <1, <1, 3, 2. Shrub stems/acre omitted because incompatible with rest of vegetation survey; ground cover 2.6%; canopy cover 87%; average canopy height 50.9 ft (range 11-157). **Edge:** Bordered on all sides by similar forest. On the W edge a zone of 100-150 ft of similar forest buffers the plot from a dirt road parallel to the NW boundary and the Preserve's headquarters and meadow on the SW corner. **Topography:** Steep terrain sloping to the NW. **Elevation:** 1300-2200 ft. **Weather 1981:** Variable throughout the season ranging from clear and warm to cool and windy. Some early morning fog cover. Area characterized by winter rainfall, summer drought. Average yearly rainfall 60-65 in. Average temperature range, 47-77°F. **Coverage 1981:** Apr. 27-28; May 5, 7, 13-14, 22, 26; June 1-2, 9-10, 18-19, 24-25; between 0530-1503 hours. Total man-hours: 87. **Census:** Black-headed Grosbeak, 9.5 (94, 38); Wilson's Warbler, 6.5 (64, 26); Warbling Vireo, 5.5 (54, 22); W. Flycatcher, 5 (49, 20); Chestnut-backed Chickadee, 3.5 (35, 14); Black-throated Gray Warbler, 3.5; Dark-eyed Junco, 3.5; Nashville Warbler, 2.5; Rufous-sided Towhee, 2.5; W. Tanager, 2; Rufous-sided Towhee, 2; Dark-eyed Junco, 2; Steller's Jay, 1.5; Hermit Thrush, 1.5; Hairy Woodpecker, 1; Bushtit, 1; Am. Robin, 1; Solitary Vireo, 1; Hutton's Vireo, 1; Brown Creeper, 0.5. **Total:** 20 species; 56 territorial males or females (553/km², 224/100 acres). **Visitors:** Cooper's Hawk, Anna's Hummingbird, Com. Flicker, Hairy Woodpecker, Scrub Jay, Wrentit. **Remarks:** Nest located: W. Flycatcher. **Weather 1982:** Variable throughout the season ranging from clear and warm to cool and windy. Some early morning fog cover. Average temperature range, 42-73°. **Coverage 1982:** April 19-20, 28-29; May 7-8, 14-15, 22-23, 31; June 1, 6-7, 12-13; between 0531-1126 hours. Total man-hours: 75. **Census:** Black-headed Grosbeak, 6 (59, 24); W. Flycatcher, 5.5 (54, 22); Warbling Vireo, 5 (49, 20); Chestnut-backed Chickadee, 4.5 (44, 18); Solitary Vireo, 3 (30, 12); Black-throated Gray Warbler, 3; Hermit Warbler, 3; Orange-crowned Warbler, 2.5; Wilson's Warbler, 2; W. Tanager, 2; Rufous-sided Towhee, 2; Dark-eyed Junco, 2; Steller's Jay, 1.5; Hermit Thrush, 1.5; Hutton's Vireo, 1.5; Allen's Hummingbird, 1; Nashville Warbler, 1; Brown Creeper, 0.5; Am. Robin, 0.5. **Total:** 19 species; 48 territorial males or females (474/km², 192/100 acres). **Visitors:** Cooper's Hawk, California Quail, Mourning Dove, Anna's Hummingbird, Com. Flicker, Ash-throated Flycatcher, Winer Wren, Brewer's Blackbird. **Remarks:** Nest located: Steller's Jay. The only nesting species registered the previous year, but not recorded in 1982, was the Bushtit. Territorial males or females showed a significant decrease from 56 to 48. Discrepancy in total species territory density may be attributed to unusual heavy spring rains in 1982 or difference in time duration of census field season: 1981, April 27 to June 25; 1982, April 19 to June 13. Special thanks to Rocky Gutiérrez for assistance with the quantitative habitat description, Stanley Harris and Cameron Barrows for suggestions regarding the manuscript and The Nature Conservancy for permitting me to work on The North Coast Range Preserve.—RAY JUDAH, Dept. Wildlife Management, Humboldt State Univ., Arcata, CA 95521.

145. ABANDONED FIELD WITH WOODED INTERMITTENT STREAM. — **Location:** Texas; Brazos Co., College Station, 0.25 mi WNW intersection of FM 60 and FM 2818; 30°36'N, 96°22'W, Wellborn Quadrangle, USGS. **Continuity:** New. **Size:** 3.5 ha = 8.65 acres (measured from aerial photograph with dot grid, roughly square, 155 × 225 m). **Description of Plot:** An abandoned field dissected by an intermittent stream with a narrow band (25-50 m) of forest. The dominant canopy trees are Post Oak (*Quercus stellata*) and Winged Elm (*Ulmus alata*), with Sugarberry (*Celtis laevigata*) along the stream. Most prominent in the understory are Yaupon (*Ilex vomitoria*) and Honey Mesquite (*Prosopis glandulosa*). The ground cover is primarily Brownseed Paspalum (*Paspalum plicatulum*) and Dewberries (*Rubus* sp.). A quantitative survey of the vegetation gave the following results: Trees 3 in. diameter and over, based on five 0.1 acre circular plots, 192/acre; total basal area 29.6 ft²/acre. Species comprising 90% of the total number of trees: Winged Elm, 84, 44, 21, 80;

Post Oak, 46, 24, 62, 60, Sugarberry, 36, 19, 10, 40, Water Oak (*Q. nigra*), 8, 4, 3, 20. Trees by diameter size class: A (3-6 in.) 126, 66, 7, 23; B (6-9 in.) 23, 13, 4, 13; C (9-15 in.) 34, 18, 14, 46; D (15-21 in.) 6, 3, 5, 18. Shrub stems/acre 1395; ground cover 41%; canopy cover 48%; average canopy height 44 ft (range 35-60). **Edge:** Bordered on the N and E by tame pasture, on the S by dense Post Oak woodland, and on the W by Mesquite savannah. **Topography:** Generally level with short, gentle slopes along the stream. **Elevation:** 330 ft. **Weather:** Mild; normal precipitation. **Coverage:** Mar. 7, 13-14, 28; Apr. 3-4, 11, 17, 25; May 1-2, 8-9, 22-23, 29; June 6; between dawn and 1100. Total man-hours: 70.5. **Census:** Cardinal, 7 (200, 81); Carolina Chickadee, 3 (86, 35); White-eyed Vireo, 3; Mourning Dove, 2; Mockingbird, 2; Brown-headed Cowbird, 2 (females); Tufted Titmouse, 1, Brown Thrasher, 1; Blue Jay, 0.5, E. Meadowlark, 0.5. **Total:** 10 species, 22 territorial males or females (628/km², 254/100 acres). **Visitors:** Green Heron, Turkey Vulture, Black Vulture, *Accipiter* sp., Yellow-billed Cuckoo, Chuck-will's-widow, Com. Nighthawk, Chimney Swift, Scissortailed Flycatcher, Great Crested Flycatcher, E. Wood Pewee, Com. Crow, Carolina Wren, Loggerhead Shrike, Red-eyed Vireo, Com. Yellowthroat, Great-tailed Grackle, Com. Grackle. **Remarks:** Nest located: Cardinal. Sometime between May 9 and 22 several small areas were cleared by a bulldozer. No evidence of additional clearing was observed on subsequent surveys.—CHUCK DAVIS AND WENDY LEAVENS, 1002B Ursuline St., Bryan, TX 77801.

146. MOUNTAIN MEADOW AND OPEN CONIFEROUS FOREST. — **Location:** Colorado; Boulder Co., 7 mi SW of Boulder, access via County Rd. 77 (Flagstaff-Gross Reservoir Rd.), near Kossler Lake; SW 1/4 of NE 1/4, Sec. 10, T1S, R71W; 39°58'12"N, 105°20'16"W, Eldorado Springs Quadrangle, USGS. **Continuity:** Established 1981. **Size:** About 13 ha = 32 acres. **Description of Plot:** See AB 36:90 (1982). **Weather:** Winter was dry and windy and spring rains came late. There was generally a breeze, with temperatures ranging from 40-80°. Normally the area is dry and typical of Colorado's arid climate in the foothills. **Coverage:** Apr. 10-11, 25, May 4, 8-9, 26, 29-31; June 6, 16, 20, 27; July 3-5, 9-10, 14, 17-18, 24-25; 0630-1030 or 1600-2000. Total man-hours: 46. **Census:** Gray-headed Junco, 5 (39, 16); Chipping Sparrow, 5; House Wren, 4 (31, 13); Am. Robin, 4, Mountain Bluebird, 4; Yellow-rumped Warbler, 4; Mountain Chickadee, 3 (23, 9); Pine Siskin, 3; Vesper Sparrow, 3; Violet-green Swallow, 2; Tree Swallow, 2; Red-breasted Nuthatch, 2; Red Crossbill, 2; Com. Nighthawk, 1; Broad-tailed Hummingbird, 1, Com. Flicker, 1; Barn Swallow, 1; White-breasted Nuthatch, 1; Pygmy Nuthatch, 1; Townsend's Solitaire, 1; Hermit Thrush, 1; Solitary Vireo, 1; Lesser Goldfinch, 1; Blue Grouse, 0.5; Poor-will, 0.5; Hairy Woodpecker, 0.5; Mourning Dove, +; Steller's Jay, +; W. Tanager, +. **Total:** 29 species, 54.5 territorial males or females (421/km², 170/100 acres). **Visitors:** Turkey Vulture, Red-tailed Hawk, Golden Eagle, Am. Kestrel, Rufous Hummingbird, Downy Woodpecker, Clark's Nutcracker, Com. Raven,

Com Crow, Brewer's Blackbird, Cassin's Finch. **Remarks:** Red Crossbills were more numerous on the plot and adjacent areas; many juveniles seen early in period. Nests found (in addition to nesting boxes which were all occupied); Com. Flicker, Mountain Chickadee, Pygmy Nuthatch, Am. Robin (2), W. Tanager and Gray-headed Junco.—*HELEN J. STILES-WAINWRIGHT AND ARTHUR WAINWRIGHT, 150 S. 36th Street, Boulder, CO 80303.*

147. URBAN CAT-TAIL MARSH AND COTTONWOOD WOODLAND. — **Location:** Colorado; El Paso Co., T14S, R66W, SW of the center of Sec. 19 at the NW corner of the intersection of Fountain Creek and Tejon Street; 38°49'N, 104°49'W, Colorado Springs Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 3.5 ha = 8.65 acres. **Description of Plot:** See AB 29:83 (1975). **Weather:** Relatively cool with above average rainfall for the summer. **Coverage:** June 9, 16, 23, July 1, 8, 15, 22, 27; Aug. 3, 10; 0630-0800. Total man-hours: 15. **Census:** Red-winged Blackbird, 8 (229, 92); Song Sparrow, 7 (200, 81), Cliff Swallow, 4 (114, 46); Mallard, 2; Rock Dove, 2; House Finch, 2; Killdeer, 1; Mourning Dove, 1; Black-billed Magpie, 1; Brewer's Blackbird, 1; Com. Yellowthroat, 0.5, Sora, +; Spotted Sandpiper, +; Com. Crow, +; Am. Robin, +; Brown-headed Cowbird, +; Am. Goldfinch, +. **Total:** 17 species; 29.5 territorial males (843/km², 341/100 acres). **Visitors:** Broad-tailed Hummingbird, Belted Kingfisher, Com. Flicker, Rough-winged Swallow, Black-capped Chickadee, House Sparrow, Lark Bunting, Lark Sparrow. **Remarks:** The edges of the grid again seemed to provide a safe zone for non-breeding Red-winged Blackbird males. Prime cat-tail-willow areas in the center of the marsh were defended by territorial males while the edge areas were not. Most species were less abundant than the previous year. This area continues to receive abuse by trash dumping.—*MARK JONES, 803 S. Cascade, Colorado Springs, CO 80903.*

148. CAMPGROUND IN OLD ORCHARDS. — **Location:** Utah; Washington Co., Zion Nat'l Park, Watchman campground, loops A, B and C; 37°12'N, 113°00'W; Zion Nat'l Park Topographic Map (Zion Canyon Section), USGS. **Size:** 10.1 ha = 25 acres. **Continuity:** Established 1981. **Description of Plot:** See AB 36:37 (1982). **Weather:** Dry, with no rain between May 15 and July 7; temperatures average. **Coverage:** May 6, 13, 20, June 1, 7, 12, 27; July 1, 10, 15; 0610-0925, MDT Total man-hours: 24.75. **Census:** Am. Robin, 13 (128, 52); House Sparrow, 9 (89, 36), N. Oriole, 5 (49, 20); Black-headed Grosbeak, 5; Black-chinned Hummingbird, 4 (40, 16), Mourning Dove, 4; Yellow Warbler, 4; House Finch, 4; Starling, 3 (30, 12); Solitary Vireo, 3; Warbling Vireo, 3; Black-capped Chickadee, 2; Lesser Goldfinch, 2; Belted Kingfisher, 1; Com. Flicker, 1; Downy Woodpecker, 1; Ash-throated Flycatcher, 1; Black Phoebe, 1; W. Wood Pewee, 1; Lazuli Bunting, 1. **Total:** 20 species; 68 territorial males or female hummingbirds (672/km², 272/100 acres). **Visitors:** Am. Kestrel, Violet-green Swallow, Lucy's Warbler, W. Tanager, Evening Grosbeak, Pine Siskin, Chipping Sparrow. **Remarks:** The Black

Phoebe territory was only half on the plot, but they raised 2 broods. Am. Kestrel was present on the plot during 5 trips. Kevin Wallace assisted with the count.—*JEROME L. GIFFORD, P. O. Box 85, Springdale, UT 84767.*

149. SLICKROCK-PONDEROSA PINE-PYGMY FOREST-CHAPARRAL. — **Location:** Utah; Washington Co., Zion Nat'l Park, unsurveyed area along Zion-Mt. Carmel highway, with S center of plot at the confluence of Pine and Clear Creeks; 37°12'53"N, 112°56'04"W; Zion Nat'l Park Topographic Map (Zion Canyon Section), USGS. **Size:** 16.19 ha = 40 acres. **Continuity:** Established 1980, 3 consecutive years. **Description of Plot:** See AB 35:91-92 (1981). **Weather:** Dry, with no rain between May 15 and July 7. **Coverage:** May 14, 21, 27; June 3, 10, 20, 26; July 2, 8, 16; 0610-0920, MDT. Total man-hours: 23. **Census:** Bushtit, 9 (56, 23); Black-throated Gray Warbler, 6 (37, 15); Plain Titmouse, 5 (31, 13); Rufous-sided Towhee, 5; White-breasted Nuthatch, 4 (25, 10); Cassin's Finch, 4; Broad-tailed Hummingbird, 3 (19, 8); Gray Vireo, 3; Blue-gray Gnatcatcher, 2; Lesser Goldfinch, 2; Ash-throated Flycatcher, 1.5; Black-chinned Hummingbird, 1; Com. Flicker, 1; Scrub Jay, 1; Rock Wren, 1; Grace's Warbler, 1; Brown-headed Cowbird, 1. **Total:** 17 species; 50.5 territorial males or female hummingbirds and cowbird (312/km², 126/100 acres). **Visitors:** White-throated Swift, Violet-green Swallow, Com. Raven. **Remarks:** Nest found: Black-chinned Hummingbird. The other hummingbirds were assumed to be Broad-tailed, since all males seen in the area were of that species. The Grace's Warbler, new this year, was at much lower elevation than its usual range in the Zion area.—*JEROME L. GIFFORD, P. O. Box 85, Springdale, UT 84767.*

150. GRASSY FIELD WITH ALDER AND BROOM THICKETS. — **Location:** British Columbia; North Vancouver District Municipality, about 2 km E of the 2nd Narrows Bridge; 49°18'30"N, 123°00'W. **Continuity:** New. **Size:** 2.26 ha = 5.58 acres (rectangular, measured with tape, compass and pacing). **Description of Plot:** About 90% of the plot is at the grass-shrub stage of succession, consisting of a variety of grasses and forbs with scattered clumps of Red Alder (*Alnus rubra*) growing to a maximum height of 5m, a small stand of very young Black Cottonwood (*Populus trichocarpa*) growing to a maximum height of 1m and Broom (*Cytisus scoparius*). The remaining 10%, located in the NE corner, is a dense stand of young Red Alder saplings averaging 6-10m tall. Other dominant plant species include the following: (1) in the grass-shrub area, Tall Buttercup (*Ranunculus acris*), Himalayan Blackberry (*Rubus discolor*), European Mountain-ash (*Sorbus aucuparia*), Hardhack (*Spirea douglasii*), Red Clover (*Trifolium pratense*), White Clover (*Trifolium repens*), Common St. Johnswort (*Hypericum perforatum*), Fireweed (*Epilobium angustifolium*), Narrow-leaved Plantain (*Plantago lanceolata*), Pearly Everlasting (*Anaphalis margaritacea*), Canada Thistle (*Cirsium arvense*), Hairy Cat's-ear (*Hypochaeris radicata*), Tansy (*Tanacetum vulgare*) and several grass species which were not identified, (2) in the Alder stand, Horsetail (*Equisetum* sp.), Black Cottonwood (*Populus trichocarpa*), Trailing Blackberry (*Rubus ursinus*), Wall Lettuce (*Lactuca muralis*), and Com. Dandelion (*Taraxacum officinale*). An infrequently used roadway crosses the plot from NW to SE and is largely covered by Broad-leaved Plaintain (*Plantago major*). **Edge:** Bordered on the N by a truck yard, consisting of a large open area with several clumps of Red Alder, Black Cottonwood and Himalayan Blackberry; on the E by a narrow roadway, separated from intertidal mudflats by a narrow row of Red Alder; on the S and SE by the saltwaters of Burrard Inlet and adjacent intertidal mudflats; and on the W by a wide gravel roadway which is separated by a narrow tidal slough from a large area of sandfill in a very early successional stage. **Topography:** Flat; located on an area of sandfill dumped over intertidal mudflats. **Elevation:** About 2-3m above mean sea level. **Weather:** Temperatures, 12-27°C; 5 of the censuses were breezy (not strong enough to restrict bird activity), totally overcast and cool. The remaining censuses had clear skies and high temperatures. **Coverage:** May 22; June 6, 12, 20, 22, 24-25, 28-30; July 9; 0645-0925, PDST Total man-hours: 15.7. **Census:** Willow Flycatcher, 2; White-crowned Sparrow, 2; Bewick's Wren, 1.5; Rufous-sided Towhee, 1.5; Black-capped Chickadee, 1; Orange-crowned Warbler, 1; Yellow Warbler, 1; Am Goldfinch, 1; Savannah Sparrow, 1; Northwestern Crow, 0.5; Am. Robin, 0.5; Red-winged Blackbird, 0.5; Brown-headed Cowbird, 0.5; Song Sparrow, 0.5. **Total:** 14 species; 14.5 territorial males or females (642/km², 260/100 acres). **Visitors:** Gadwall, Ring-necked Pheasant, Rufous Hummingbird, Barn Swallow, Bushtit, Swainson's Thrush, Cedar Waxwing, Starling, Com Yellowthroat, Black-headed Grosbeak, Purple Finch, House Finch, Pine Siskin, Fox Sparrow. **Remarks:** Nests found: White-crowned Sparrow, 1. The Savannah Sparrows successfully raised young although the nest was never located. A good movement of migrants occurred on May 22 and some remained until the June 6 census. The Fox Sparrows, 2 seemingly paired, were seen June 28 and 30. The species is very unusual in summer in the Vancouver area. Special thanks to Wayne C. Weber for his help with the vegetation study.—*MARK K. DALY, 1499 Avonlyn Crescent, North Vancouver, B.C. V7J 2V2.*

151. DISTURBED COASTAL FLOODPLAIN. — **Location:** California; Orange Co., 1 mi NE of Santa Ana River mouth, 33°38'45"N, 117°56'50"W, Newport Beach Quadrangle, USGS. **Continuity:** New. **Size:** 9.7 ha = 24 acres. **Description of Plot:** See 1982 Winter Bird-Population Study, this issue p. 38. Important plant cover species not previously identified: Curly Dock (*Rumex crispus*), Ox-Tongue (*Picris echioides*), Wild Radish (*Raphanus sativus*), and Rush (*Juncus* sp.). **Weather:** Temperature range 52-72°F; early mornings typically overcast, winds light to moderately high; 2 light rains **Coverage:** Apr. 17, 20, 24-25; May 5, 8-9, 11, 0545-0905. Total man-hours: 17. **Census:** Song Sparrow, 24 (247, 100); Com. Yellow-

throat, 14 (144, 58), Anna's Hummingbird, 6 (62, 25), Mourning Dove, 5 (51, 21), Am. Goldfinch, 5; Black-chinned Hummingbird, 4 (41, 17); Allen's Hummingbird, 3 (31, 13); Red-winged Blackbird, 3; Brown-headed Cowbird, 3; N. Oriole, 2; Black-headed Grosbeak, 2; Lesser Goldfinch, 2; White-tailed Kite, 1; W. Meadowlark, 1; Brown Towhee, +. **Total:** 15 species; 75 territorial males or females ($772/\text{km}^2$, 313/100 acres). **Visitors:** Green Heron, Red-tailed Hawk, Red-shouldered Hawk, Cooper's Hawk, Spotted Dove, Black Phoebe, Rough-winged Swallow, Com. Crow, Bushtit, European Starling, House Finch. **Remarks:** Nests found: Black-chinned Hummingbird (2); Mourning Dove, Allen's Hummingbird. Song Sparrow count may not be representative; territorial, singing males first observed in January. Majority (all?) of Anna's Hummingbirds may have finished breeding before census began. Nesting of Allen's Hummingbirds has only recently (1979) been documented for Orange County; a southward expansion of breeding range may be indicated. The vast majority of 30+ Bushtits remained in large flocks throughout census; no nesting activity was observed. This species has bred on the plot in past years. Goldfinch activity may have peaked after census was concluded. Western migrants well represented; food crop excellent. Vandalistic destruction of willows seems to be increasing.—*LOREN R HAYS, 21661 Brookhurst #109, Huntington Beach CA 92646.*

152. URBAN PARK. — **Location:** California; Los Angeles Co., El Dorado Park Area III, Long Beach; $33^\circ 49' \text{N}$, $118^\circ 5' \text{W}$, Los Alamitos Quadrangle, USGS. Bounded on the N by the Naval Hospital grounds, on the S by Wardlow Rd., on the W by the San Gabriel River, and on the E by the San Gabriel River Freeway (I-605). **Continuity:** Estimated 1980; 2 intermittent years. **Size:** 74.9 ha = 185 acres. **Description of Plot:** See AB 35 93 (1981). **Weather:** Low clouds every morning. **Coverage:** Apr. 8, 11, 13, 20, 23, 25, 27, May 4, 7, 11, 13, 16, 19; 0500-0800. Total man-hours: 39. **Census:** Brewer's Blackbird, 42 (56, 23); N. Oriole, 11 (15, 6); Am. Coot, 9 (12, 5); Loggerhead Shrike, 9; Mourning Dove, 8 (11, 4); Tricolored Blackbird, 8 (11, 4); Mockingbird, 7, (9, 4); W. Meadowlark, 6 (8, 3); Pied-billed Grebe, 2; Red-winged Blackbird, 1; Com. Crow, +. **Total:** 11 species; 103 territorial males ($138/\text{km}^2$, 56/100 acres). **Visitors:** Long-billed Curlew, White-throated Swift, Anna's Hummingbird, W. Kingbird, Barn Swallow, Cliff Swallow, Cedar Waxwing, House Sparrow. **Remarks:** Nests located 30: Brewer's Blackbird (9), N. Oriole (7), Loggerhead Shrike (4), Mourning Dove (3), Mockingbird (3). Species seen with young: Pied-billed Grebe, Am. Coot.—*PATRICK HERENDEEN and DELORES LOERA, Dept. Biol., Cal. St. U., Long Beach, CA 90840.*

153. URBAN PARK-LAKE, MARSH AND MIXED FOREST. — **Location:** California; City and Co. of San Francisco, Golden Gate Park, North Lake S of the 43rd Ave. and Fulton St. entrance to the Park; $37^\circ 46' \text{N}$, $122^\circ 30' \text{W}$, San Francisco N Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 4.99 ha = 12.33 acres. **Description of Plot:**

See AB 36 48 (1982). **Weather:** Temperature range, $47\text{-}68^\circ \text{F}$, with clear skies during 4 visits and overcast (fog) on the remaining 7. Rain or wind were not factors on any visit. **Coverage:** Mar. 20, 27; Apr. 16, 24; May 8, 15, 22, 31; June 4, 10, 19; July 3; 0610-1450 hrs, PST. Total man-hours: 12. **Census:** Song Sparrow, 16 (321, 130); Allen's Hummingbird, 12 (240, 97); Brewer's Blackbird, 11 (220, 89); Mallard 6 (120, 49); Mourning Dove, 4 (80, 32); Am. Robin, 3 (60, 24); Red-winged Blackbird, 2; Dark-eyed Junco, 2; Downy Woodpecker, 1; Swainson's Thrush, 1; Starling, 1; White-crowned Sparrow, 1. **Total:** 12 species; 60 territorial males ($1202/\text{km}^2$; 487/100 acres). **Visitors:** Blue-winged Teal, Red-shouldered Hawk, California Quail, N. Phalarope, Rock Dove, Anna's Hummingbird, Belted Kingfisher, Black Phoebe, Violet-green Swallow, Tree Swallow, Bank Swallow, Bushtit, Pygmy Nuthatch, Brown Creeper, Mockingbird, Hutton's Vireo, Orange-crowned Warbler, Nashville Warbler, Com. Yellowthroat, Wilson's Warbler, N. Oriole, Brown-headed Cowbird, Black-headed Grosbeak, Purple Finch, House Finch, Pine Siskin, Brown Towhee. **Remarks:** Nests found: Am. Robin, 2; Starling, 1. At least 5 clutches of Mallards were hatched. A 42% decrease in the number of territorial males from last year may not reflect a dramatic change in population since all species recorded as breeding in 1981 were observed in the plot or nearby. Tree Swallows, for example, were found nesting in a nearby forest area. Total species were down to 54 from 61. The territorial Swainson's Thrush was the first such San Francisco record of which I am aware. The Red-shouldered Hawks, which built a nest across the street from this plot, provided the first "City" record for a nesting attempt for that species. The nest was abandoned during late May. North Lake continued to lose open water space to encroaching vegetation. By the end of the study approximately half the lake was covered by assorted pond vegetation. The planned renovation program has been postponed until fall.—*DANIEL P. MURPHY, 2945 Ulloa St., San Francisco, CA 94116.*

154. URBAN PARK-MATURE MIXED CONIFEROUS FOREST. — **Location:** California; City and Co. of San Francisco, Golden Gate Park, W of the 43rd Ave. and Fulton St. entrance to the Park; $37^\circ 46' \text{N}$, $122^\circ 30' \text{W}$, San Francisco N Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 8.38 ha = 20.7 acres. **Description of Plot:** See AB 36:47 (1982). **Weather:** Temperatures, $47\text{-}60^\circ \text{F}$. Skies were clear during 4 visits and overcast (fog) on the remaining 6. **Coverage:** Mar. 20, 27; Apr. 16; May 2, 8, 22, 31; June 18-19; July 3; 0725-1300 hrs, PST. Total man-hours: 10.8. **Census:** Allen's Hummingbird, 10 (119, 48); Dark-eyed Junco, 9 (107, 43); Pine Siskin, 5 (60, 24); Pygmy Nuthatch, 3 (36, 14); Brown Towhee, 3; White-crowned Sparrow, 3; Mourning Dove, 2; Downy Woodpecker, 2; Tree Swallow, 2; Bushtit, 2; Red-breasted Nuthatch, 2; Am. Robin, 2; Starling, 1; Brown-headed Cowbird, 1. **Total:** 14 species; 47 territorial males or females, ($561/\text{km}^2$, 227/100 acres). **Visitors:** Mallard, California Quail, Band-tailed Pigeon, Rock Dove, Anna's Hummingbird, Olive-sided Flycatcher, Com. Raven, Chest-

nut-backed Chickadee, Brown Creeper, Hutton's Vireo, House Sparrow, Brewer's Blackbird, House Finch. **Remarks:** Nests found: Bushtit, 2; Red-breasted Nuthatch, 2; Allen's Hummingbird, 1; Downy Woodpecker, 1; Tree Swallow, 1; Pygmy Nuthatch, 1; robin, 1. At least 30 trees fell or were cut during the past year. Three clearings were made in the forest for planting new trees. An open spot in the center of the plot, which was overgrown with shrubs, was cleared. Most of the tree removal was undertaken during the early nesting period and may have caused the decline in Mourning Dove and Pygmy Nuthatch numbers.—*DANIEL P. MURPHY, 2945 Ulloa St., San Francisco, CA 94116.*

155. COASTAL SAGE SCRUB. — **Location:** California; Orange Co., Starr Ranch National Audubon Sanctuary, on the S side of Pruesker Peak, about 5.1 mi N of the entrance to Ronald W. Caspers Regional Park on Ortega Hwy; $33^\circ 36' 26'' \text{N}$, $117^\circ 33' 06'' \text{W}$, Cañada Gobernadora Quadrangle, USGS. **Continuity:** New (overlaps in large part an area previously censused. See AB 32:98 (1978)). **Size:** 9.0 ha = 22.24 acres (rectangular, 200 × 450 m, with the long axis approximately N-S; measured with a steel tape). **Description of Plot:** See AB:37, 41, this issue. Vegetation differed from during the W.B.P.S. *Poaceae* spp. accounted for 31.3% of the vegetative coverage. Total coverage was 65.4%. Shrubs averaged 0.37 m in height. The dominant shrubs are: *Lotus scoparius*, 33.7%; *Salvia apiana*, 30.8%; *Artemisia californica*, 25.1%; *Opuntia littoralis* complex, 6.8%. *Calystegia macrostegia* is present over most of the plot and, in some areas, is extremely dense. This area burned in November, 1980. **Weather:** Temperatures, $41\text{-}89^\circ \text{F}$, (mean 49.4 to 79°F). Conditions varied from heavy fog to clear. Rainfall was 0.35 in. **Coverage:** Apr. 15-16, 25-26; May 7, 11, 16, 20; 0520-0910 hours, PDT. Total man-hours: 14.75. **Census:** Costa's Hummingbird, 5 (56, 22); Lazuli Bunting, 3.5 (39, 16); Brown Towhee, 3.5; Rufous-crowned Sparrow, 3 (33, 13); Black-chinned Sparrow, 2; Cactus Wren, 1.5; Mourning Dove, 1; Grasshopper Sparrow, 1; Wrentit, 0.5; Mockingbird, +, California Thrasher, +. **Total:** 11 species, 21 territorial males ($233/\text{km}^2$, 94/100 acres). **Visitors:** California Quail, W. Kingbird, W. Meadowlark, House Finch, Rufous-sided Towhee, Lark Sparrow. **Remarks:** The only nests found belonged to Cactus Wrens. Pairs were observed for all species except Costa's Hummingbird, Mockingbird and Grasshopper Sparrow. Immature Brown Towhees and Rufous-crowned Sparrows were seen on 1 territory each. Special thanks to James M. Sulentic for assistance with the vegetational analysis.—*RAYMOND J. BRANSFIELD, 1751 Loma #22, Long Beach, Ca. 90804*

156. COASTAL SAGE SCRUB (BUCKWHEAT-DOMINATED). — **Location:** California, San Diego Co., Escondido, N of Via Rancho Pkwy., and W of I-15; $33^\circ 04' 30'' \text{N}$, $117^\circ 04' 15'' \text{W}$, Escondido Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (660 × 1320 ft, located by aerial photo, marked and placed by using a hand compass). **Description of Plot:** Vegetation coverage 91.8%. Plant species in order of dominance

California Buckwheat (*Eriogonum fasciculatum*), 57.5%; forbs, 18.5%; grasses, 11.7%; Coastal Sagebrush (*Artemisia californica*), 10.1%; other shrubs, 2.2%. Dry washes cut the NE and NW corners and numerous dirt trails cross the plot. **Edge:** Similar vegetation on all sides. **Topography:** A S-facing ridge. **Elevation:** 390-530 ft. **Weather:** Cooler than average, rainfall near normal. **Coverage:** Feb 27; Mar. 6, 27; Apr. 4, 10, 18, 24; May 2, 9, 16, 22; 0500-1000 and 1330-1600, PST. Total man-hours: 14. **Census:** Brown Towhee, 8 (99, 40); Bushtit, 4 (49, 20); Black-tailed Gnatcatcher (race *californica*), 4; Rufous-crowned Sparrow, 4; Sage Sparrow, 3 (37, 15); Wrentit, 2; California Quail, 1.5; Rufous-sided Towhee, 1.5; Costa's Hummingbird, 1 male; Anna's Hummingbird, 1 male; California Thrasher, 1; Lazuli Bunting, 1; White-tailed Kite, +. **Total:** 13 species; 32 territorial males ($395/\text{km}^2$, 160/100 acres). **Visitors:** Red-tailed Hawk, Red-shouldered Hawk, Roadrunner, W. Kingbird, Mockingbird, House Finch, Lesser Goldfinch. **Remarks:** Nests found: Bushtit, 4; Black-tailed Gnatcatcher, 4. Wrentits, the thrasher, Rufous-sided and Brown towhees, and Rufous-crowned and Sage sparrows were seen attending young. Both hummingbirds, Wrentits, and Rufous-sided Towhees were limited to small areas where sage (*Salvia* sp.) and sumacs (*Rhus* sp.) were present.—*KENNETH L. WEAVER, 1339 Taylor Place, Escondido, CA 92027.*

157. COASTAL SAGE SCRUB (SAGE-DOMINATED). — **Location:** California, San Diego Co., Escondido, N of Via Rancho Pkwy. and W of I-15; $33^\circ04'30''\text{N}$, $117^\circ04'30''\text{W}$, Escondido Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (660×1320 ft, located and marked as in previous census). **Description of Plot:** Vegetation coverage: 89.2%. Plant species in order of dominance: Coastal Sagebrush, 25.2%; White Sage (*Salvia apiana*), 23%; forbs, 21.3%; Black Sage (*S. mellifera*), 14.3%; grasses, 13.7%; other shrubs, 2.5%. The plot is dissected by 3 dry washes and crossed by a network of dirt paths. **Edge:** Similar vegetation on all sides. **Topography:** S to SW-facing hillside. **Elevation:** 465-595 ft. **Weather:** See Census 156. **Coverage:** Feb. 27; Mar. 6, 12, 27; Apr. 4, 10, 18, 24; May 2, 9, 16, 22, 30; 0500-1000 and 1500-1700, PST. Total man-hours: 24. **Census:** Brown Towhee, 10 (124, 50); Costa's Hummingbird, 6 males (74, 30); Rufous-crowned Sparrow, 6; Bushtit, 4 (49, 20); Wrentit, 4; Black-tailed Gnatcatcher (race *californica*), 4; Rufous-sided Towhee, 4; California Quail, 3.5 (43, 18); Lazuli Bunting, 3 (37, 15); Anna's Hummingbird, 2 males; Roadrunner, 1; California Thrasher, 1; Sage Sparrow, 1; Song Sparrow, 1; White-tailed Kite, +. **Total:** 15 species; 50.5 territorial males ($624/\text{km}^2$, 253/100 acres). **Visitors:** Red-tailed Hawk, Bewick's Wren, Mockingbird, House Finch, Lesser Goldfinch, Lawrence's Goldfinch. **Remarks:** Nests found: Bushtit, 4; Black-tailed Gnatcatcher, 3; Brown Towhee, 1. Wrentits, bunting, Rufous-sided Towhees, and Rufous-crowned Sparrows were seen attending young. Most territories were clustered in several favorable spots, each of which featured small rock outcrops and a high frequency of densely branching

shrubs.—*KENNETH L. WEAVER, 1339 Taylor Place, Escondido, CA 92027.*

158. COASTAL SCRUB. — **Location:** California; Marin Co., 4 mi NW of Bolinas and 0.5 mi inside the S boundary of Point Reyes National Seashore; $37^\circ55'\text{N}$, $122^\circ45'\text{W}$, Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 10 intermittent years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 25: 1003-1004 (1971). **Weather:** Overcast, 33%; partly cloudy, 31%; clear, 18%; fog, 15%; rain, 3%. Winds were generally W or SW at 3-7 knots. Morning temperatures, 38-66°F, were much cooler than most years. The period April-June was very wet with rainfall totaling 4.08 in., reflecting the overall excessive rainfall for the year (July 1981-June 1982), which totalled 54.29 in., far above normal. **Coverage:** Apr. 1, 3-4, 6-9, 13-14, 16-21, 23-24, 27-28, 30; May 2, 4-7, 11-12, 14, 19, 21, 24, 26-28, 31; June 4-8, 10, 12-13, 15-17, 19-20, 22, 24-25, 27, 29; 0630-1230. Total man-hours: 142. **Census:** Wrentit, 10 (124, 50); Bewick's Wren, 5.5 (68, 28); White-crowned Sparrow, 5.5; Allen's Hummingbird, 5 (62, 25); Rufous-sided Towhee, 5; Song Sparrow, 4 (49, 20); Orange-crowned Warbler, 2.5; House Finch, 1; Scrub Jay, 0.5; Purple Finch, 0.5; Red-tailed Hawk, +; Mourning Dove, +; Com. Flicker, +; Am. Robin, +; Wilson's Warbler, +; Am. Goldfinch, +; Brown Towhee, +. **Total:** 17 species; 39.5 territorial males ($488/\text{km}^2$, 198/100 acres). **Remarks:** Although the number of breeding species increased, the breeding bird density ($488/\text{km}^2$) was considerably below the mean density recorded over the past 9 years ($562/\text{km}^2$). These previous years showed relatively stable breeding bird densities, even through the severe drought years of 1976-1977. This year's notable decline was attributed to severe weather conditions during the preceding winter, in particular to the combination of cool temperatures and extraordinarily heavy rains. The densities of all permanent resident species were considerably reduced from last year with the exception of Bewick's Wren and Rufous-sided Towhee. Particularly hard hit were Wrentit, White-crowned Sparrow, and Bushtit, the last being completely absent. The existence of color banded populations in these species showed that the decrease was attributable to unusually high winter mortality. In contrast to the permanent resident species, summer residents showed no appreciable declines. In fact, Orange-crowned Warbler and Purple Finch increased, and Mourning Dove, Am. Robin, and Wilson's Warbler were added as new breeding species. This increase may also be attributable to the high winter rains which caused exceptionally lush spring plant growth thereby making the plot more attractive to these primarily insectivorous species. It is evident, therefore, that the previously claimed stability of the avian community of this mature coastal scrub habitat may be not so much inherent as apparent. Nests found (36): Wrentit, 13; White-crowned Sparrow, 11; Song Sparrow, 5; Rufous-sided Towhee, 4; Bewick's Wren, 2; Scrub Jay, 1. Contribution No. 247, PRBO.—*JACK SWENSON, DAVE DESANTE, and JACK FELDMAN, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970.*

159. DISTURBED COASTAL SCRUB A. — **Location:** California; Marin Co., 3.5 mi NW of Bolinas and just inside the S boundary of Point Reyes Nat'l Seashore; $37^\circ55'\text{N}$, $122^\circ45'\text{W}$, Bolinas Quadrangle, USGS. **Continuity:** Established 1972; 10 intermittent years. **Size:** 4.7 ha = 11.6 acres. **Description of Plot:** See AB 26: 987-988 (1972). **Weather:** See census 158. **Coverage:** Apr. 3-5, 7-9, 12-14, 16-17, 20, 23-25, 27; May 3-5, 7, 11-14, 19, 21, 27-31; June 1, 3-6, 10-11, 13-17, 21-24, 26, 28-29; 0630-1230. Total man-hours: 94. **Census:** Song Sparrow, 7 (149, 60); Wrentit, 3.5 (75, 30); Rufous-sided Towhee, 1.5; White-crowned Sparrow, 1; Anna's Hummingbird, 1; Allen's Hummingbird, 1; Am. Goldfinch, 1; Scrub Jay, 0.5; Bushtit, 0.5; Bewick's Wren, 0.5; Orange-crowned Warbler, 0.5; Purple Finch, 0.5; Brown Towhee, 0.5; Red-tailed Hawk, +; California Quail, +; Mourning Dove, +; Com. Flicker, +; Am. Robin, +; W. Bluebird, +; Wilson's Warbler, +; Brown-headed Cowbird, +; House Finch, +. **Total:** 22 species; 19 territorial males ($405/\text{km}^2$, 164/100 acres). **Remarks:** The breeding bird density ($405/\text{km}^2$) showed a pronounced decrease from the previous 3 year's mean density ($547/\text{km}^2$). This decrease, noted in virtually all permanent resident species and especially severe in California Quail, Wrentit, and White-crowned Sparrow, was attributed to high winter mortality caused by the severe weather of the previous winter, particularly the very heavy rainfall (see Census 158). Summer resident species, with exception of Allen's Hummingbird and Am. Goldfinch, showed no appreciable decline. The decrease in Allen's Hummingbird is attributed to displacement by a territorial male Anna's Hummingbird and a late bloom of Bush Monkey Flower, their primary early spring food resource. The decrease in Am. Goldfinch was thought to result from an exceptionally lush growth of annual grasses (a result of the high rainfall) which substantially reduced the density of thistles, the goldfinch's primary summer food resource. Despite the overall reduced breeding density, the number of breeding species actually increased with the addition of 2 new breeding species for the plot, Mourning Dove and Wilson's Warbler. These may have responded positively to the lush spring plant growth caused by the high winter rainfall. Nests found (31): Song Sparrow, 20; Wrentit, 4; Rufous-sided Towhee, 3, Am. Goldfinch, 2; Bushtit, 1; White-crowned Sparrow, 1. Contribution No. 248, PRBO.—*SABRINA PATTERSON, DAVE DESANTE, GREG MARTINSEN, JERRY SCOVILLE, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970.*

160. DISTURBED COASTAL SCRUB B. — **Location:** California, Marin Co., 3.5 mi NW of Bolinas and 0.16 mi inside the S boundary of Point Reyes Nat'l Seashore; $37^\circ55'\text{N}$, $122^\circ45'\text{W}$, Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 11 intermittent years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 25: 1002-1003 (1971). **Weather:** See Census 158. **Coverage:** Apr. 1, 3, 5-8, 12, 14-17, 19-22, 24, 26-28, May 2-5, 7, 8, 11-15, 18-19, 21-22, 24, 26-30, June 2-5, 7-25, 27-30; 0630-1230. Total man-hours: 167. **Census:** Song Sparrow, 10.5 (130,

53), White-crowned Sparrow, 9 (111, 45), Wrentit, 4.5 (56, 23), Allen's Hummingbird, 3.5 (43, 18); Am. Goldfinch, 3 (37, 15); Rufous-sided Towhee, 3; Scrub Jay, 1.5; Bewick's Wren, 0.5; W. Bluebird, 0.5; House Finch, 0.5; Red-tailed Hawk, +; California Quail, +; Mourning Dove, +; Com. Flicker, +; Bushtit, +; Am. Robin, +; Orange-crowned Warbler, +; Brown-headed Cowbird, +; Purple Finch, +; Brown Towhee, +. **Total:** 20 species; 36.5 territorial males ($451/\text{km}^2$, 183/100 acres). **Remarks:** The breeding bird density ($451/\text{km}^2$) showed a decrease from the previous 3 years' mean density ($508/\text{km}^2$) and a pronounced decrease from last year's exceptionally high density ($587/\text{km}^2$). This decrease, noted in most permanent resident species and especially severe in California Quail, White-crowned Sparrow, and Song Sparrow, was attributed to high winter mortality caused by the severe weather, particularly the exceptionally heavy rainfall, of the previous winter (see Census 158). Wrentits were an exception among permanent resident species and increased slightly, presumably because the high winter rainfall caused exceptional vegetative growth which provided acceptable (although marginal) Wrentit habitat in new areas of the plot. In this respect, Wrentits continued a 6 year increasing trend. In contrast to most permanent resident species, summer resident species showed no appreciable decrease. Despite the overall decrease in breeding bird density, the number of breeding species actually increased with the addition of 3 new breeding species for the plot; Mourning Dove, Orange-crowned Warbler, and Purple Finch. These may have responded positively to the lush spring plant growth caused by high winter rainfall. Nests found (53): Song Sparrow, 24; White-crowned Sparrow, 15; Wrentit, 10; Am. Goldfinch, 2; Rufous-sided Towhee, 2. Contribution No. 249, PRBO.—*LEE ELLIOTT, DAVE DESANTE, RICH DELCARLO, CINDY REITTINGER, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970.*

161. DISTURBED COASTAL SAGE SCRUB. — **Location:** California, Orange Co., 100 ft S of Corona del Mar; $33^{\circ}33'24''\text{N}$, $117^{\circ}48'02''\text{W}$, Laguna Beach Quadrangle, USGS. **Continuity:** New. **Size:** 13.67 = 33.8 acres (rectangular 300×545 yds, paced). **Description of Plot:** The dominant vegetation is an assemblage of *Bromus* sp., *Avena* sp., and other Poaceae. The grasses grow to 4 ft in height. Common border vegetation is *Artemesia* sp. (sage) assemblages and stands of *Brassico* (mustard). The sage accounts for 8% of the total cover, the mustard for 5%, paths for 3%, and the remainder is covered with the grasses. **Edge:** Habitat continues to the E and across the highway to the N. The W is bordered by residential area, and the S is a bluff overlooking the Pacific Ocean. **Topography:** Flat with 2 gullies no more than 12 ft deep and 6 ft across. **Elevation:** 40 ft. **Coverage:** Apr. 19-21, 23, 27-28; May 10, 14, 17. Total man-hours: 38. **Census:** Brown Towhee, 8 (58, 24); W. Meadowlark, (22, 9); Song Sparrow, 1. **Total:** 3 species; 12 territorial males ($88/\text{km}^2$, 36/100 acres). Non-territorial Breeders: Anna's Hummingbird, 1 ♀. **Visitors:** White-tailed Kite, Starling,

House Finch —*CHERYL BEEM, Dept. of Biology, Calif. State Univ., Long Beach, CA 90840.*

BREEDING BIRD CENSUSES ON THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE, NORTHEASTERN ALASKA

Breeding bird censuses were conducted in 2 areas of the arctic coastal plain, a relatively flat 790,000 ha portion of the 7,300,000 ha refuge. These censuses were performed to assess annual and spatial variability in breeding bird populations in the major habitat types of the coastal plain. This work is part of the ongoing baseline wildlife inventory of the northern part of the refuge as mandated by Section 1002c of the Alaska National Interest Lands Conservation Act of 1980.

The outer coastal plain plots, which include or were adjacent to large wetland areas of the Okpilak River delta, were located 1-6 km inland from marine waters of the Beaufort Sea and 11-16 km SW of the village of Kaktovik on Barter Island. Four 25-50 ha plots were established and first censused in 1978, however, the 1978 census data were not published in *AB* or elsewhere, but were submitted for recording in computer files of the U.S. Fish and Wildlife Service, Migratory Bird and Habitat Research Lab, Laurel, MD. Two 10 ha plots were established in 1982 in an interior coastal plain area along the Katakturuk River, 15-17 km inland from the Beaufort Sea and 75 km WSW of Kaktovik. The inland area differed from the coastal site primarily by the presence of erect and more extensive growth of willow shrubs along rivers, more extensive prostrate shrub ground cover in the sedge and tussock tundra, and absence of extensive wetlands.

In the habitat descriptions for each plot, habitat classification is based on D.A. Walker, P.J. Webber, and W. Acevedo (1982, "Classification of vegetation and land cover in the Arctic National Wildlife Refuge", Appendix I, p. 451-478. In: *Arctic National Wildlife Refuge Coastal Plain Resource Assessment—Initial Report, Baseline Study*. U.S. Fish and Wildl. Serv., Anchorage, Ak.)

Daily temperature range at the coastal study site averaged 1.1°C to 8.3°C in June. Average July temperatures (to end of census period) were 3.9°C to 10.0°C . Mean daily temperature at Barter Island (NOAA observation station 11 km to NW) was 2.7°C in June, 2.6°C above normal, and 6.6°C in July, 2.1°C above normal. Precipitation at the same location was 23 mm in June, 9 mm above normal, and 12 mm in July, 17 mm below normal. At the inland study site mean daily temperatures during census days averaged 6.6°C in June and 11.1°C in July. The inland study site was considerably warmer owing to the distance from the Beaufort Sea, and less coastal fog. Similarly, snow melt was 100% complete at the inland site by June 8, but was only 15% complete at the coastal site. The coastal site was 95% snow free by June 17, which was approximately 1 week later than normal. Snow melt over the outer coastal plain was delayed in 1982 by cool weather early in the month, combined with late snow storms on June 12 and 16, each of

which deposited 20-30 mm of new snow. On June 21 weather improved markedly with the last week of the month being sunnier and warmer than normal.

Breeding bird population estimates for arctic tundra species have usually been based on number of nests found in intensive nest searches of plots for most non-passerine species, but using territory mapping supplemented by nest data for Passerines (see *AB* 29:1135 (1975); 34:82; and 34:83-84 (1980)). Population estimates in the following censuses were based on nest search data for all species except Passerines and Semipalmated Sandpiper for which territory mapping supplemented with nest search data was considered a more accurate estimator. For species with nests particularly difficult to find (e.g. Am. Golden Plover, Long-billed Dowitcher and Pectoral Sandpiper) probable nest locations, as determined by behavioral observations were also considered. Actual numbers of nests located for all species and numbers of Pectoral Sandpiper territories defended are presented separately in "Remarks".

This project was accomplished with U.S. Fish and Wildlife Service migratory birds program funds to the Arctic National Wildlife Refuge. Thanks to Kaktovik Inupiat Corporation for permission to locate 2 coastal plots on village lands.—*MICHAEL A. SPINDLER, PAMELA A. MILLER, DENNIS E. RONSE, LEANN M. RONSE, LARRY D. MARTIN, and JEFFREY A. KOSCHAK, U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, 101 12th Ave., Fairbanks, AK 99701.*

162. WET SEDGE/AQUATIC TUNDRA.

— **Location:** Alaska; North Slope Borough, 11 km SW of Kaktovik; $70^{\circ}04'\text{N}$, $143^{\circ}50'\text{W}$, Barter Island A-5 Quadrangle (1:63, 360), USGS. **Continuity:** New. **Size:** 50.0 ha = 123.6 acres (rectangular, surveyed, gridded, 900×556 m). **Description of Plot:** Two distinct vegetation types were present, the majority was Wet Sedge Tundra—very wet with smaller portions of Aquatic Tundra-pond complex. The E and W sides of the plot contained extensive open water and pond complex *Arctophila fulva* grass and *Carex aquatilis* sedge emergent wetlands. The center two-thirds of the plot contained homogeneous very wet sedge tundra with mostly flooded centers of low-center polygons. Micro-relief, differences in elevation between low points (polygon centers, polygon troughs) and high points (polygon ridges and mounds) was minimal, averaging only 0.2-0.3 m. Quantitative microhabitat description based on 120 point samples was: low-center polygon, 69%; pond complex, 22%; polygon ridge, 7%; high-center polygon, 2%. Ground cover was dominated by the sedges *Carex aquatilis*, *C. rariflora*, *C. cordorrhiza*, *C. bigelowii*, the grass *Arctophila fulva*, the prostrate shrubs *Salix planifolia pulchra*, *S. reticulata* and *S. arctica*. Quantitative ground cover estimates, based on 52 systematically located 0.25 m^2 quadrats were: water, 32%; litter, 20%; sedge, 19%; moss, 8%; mud, 5%; the remaining percentage in prostrate shrubs, forbs, lichens, algae and grasses. **Edge:** Bordered on the N by higher moist tundra and a pingoo; on the E and W by pond complex wetlands; on the S by a large lake



BBC 166, near Kaktovik, Alaska. Riparian Willow Thicket. Photo/Pamela Miller.

The plot was 1.6 km S of Arey Lagoon, the nearest marine waters. **Topography:** Flat. **Elevation:** 23 ft (7m). **Weather:** See introduction. **Coverage:** June 26; July 1, 10, 15-16. Total man-hours: 126.8. **Census:** Lapland Longspur, 6 (12, 5); Pectoral Sandpiper, 5 (10, 4); N. Phalarope, 4 (8, 3); Red-throated Loon, 1; King Eider, 1; Red Phalarope, 1; Parasitic Jaeger, 1. **Total:** 6 species; 19 nests or territorial males ($38/\text{km}^2$, 15/100 acres). **Visitors:** Arctic Loon, Whistling Swan, Canada Goose, Brant, Pintail, Oldsquaw, Spectacled Eider, Am. Golden Plover, Whimbrel, Red Phalarope, Long-billed Dowitcher, Semipalmated Sandpiper, Buff-breasted Sandpiper, Pomarine Jaeger, Long-tailed Jaeger, Glaucous Gull, Thayer's Gull, Sabine's Gull, Snowy Owl, Short-eared Owl, Com. Raven. **Remarks:** Nests found: N. Phalarope, 4; Pectoral Sandpiper, 3; Lapland Longspur, 3; Red-throated Loon, 1; King Eider, 1; Red Phalarope, 1; Parasitic Jaeger, 1. Total breeding population calculated using the 13 male Pectoral Sandpiper territories defended instead of incubating females: 27 nests or territorial males ($54/\text{km}^2$, 22/100 acres). This plot had the lowest nesting density of the 4 coastal habitats censused in 1982, whereas it had the second-highest density of the same 4 in 1978. Number of nesting species was down from 1978 (10 species) as was number of nests and/or territories ($61/\text{km}^2$ in 1978). Species that had lower breeding populations in 1982 than in 1978 were Red-throated Loon, Com. Eider, N. Phalarope, Red Phalarope, Glaucous Gull and Lapland Longspur. Only Parasitic Jaeger and Pectoral Sandpiper had higher breeding densities in 1982.

163. MOSAIC WET / MOIST SEDGE TUNDA. — **Location:** Alaska; North Slope Borough, 12 km SW of Kaktovik; $70^{\circ}03'N$, $143^{\circ}52'W$, Barter Island A-5 Quadrangle (1:63, 360), USGS. **Continuity:** New. **Size:** 50.1 ha = 123.8 acres (square, surveyed, gridded, 708 × 708 m). **Description of Plot:** Wet Sedge Tunda-wet/moist complex consisting of a mosaic of (1) wet sedge low-center polygon tundra with fairly high and dry polygon ridges; and (2) moist sedge high-center polygon tundra with low, wet polygon

troughs. The "fine-grained" juxtaposition of wet, dry and moist microhabitats resulted in a high microhabitat diversity that was associated with high mean micro-relief (0.5 m). Quantitative microhabitat description based on 120 point samples was: high-center polygon, 30%; polygon trough, 20%; low-center polygon, 17%; polygon ridge, 15%; intermediate-center polygon, 13%; pond complex, 5%. Ground cover was dominated by the prostrate shrubs *Dryas integrifolia*, *Salix reticulata*, *S. planifolia pulchra*, the sedges *Carex aquatilis*, *C. misandra*, *C. bigelowii*, *Eriophorum vaginatum* and *E. angustifolium*. Quantitative ground cover estimates based on 60 systematically-located 0.25 m² quadrats were: litter, 35%; prostrate shrubs, 26%; sedges, 16%; moss, 6%; water, 5%; the remaining percentage in lichen, forbs, grasses and mud. **Edge:** Bordered on the W, N, and E by similar habitat, and on the S by pond complex wetlands. The plot was 0.5 km E of Arey Lagoon, the nearest marine waters. **Topography:** Flat. **Elevation:** 23 ft (7 m). **Weather:** See introduction. **Coverage:** June 15, 27; July 3, 12; July 12. Total man-hours: 143.7. **Census:** Lapland Longspur, 20.5 (41, 17); Pectoral Sandpiper, 8 (16, 6); Semipalmated Sandpiper, 4 (8, 3); Buff-breasted Sandpiper, 2; Red Phalarope, 2; N. Phalarope, 2; Am. Golden Plover, 1; Long-billed Dowitcher, 1. **Total:** 8 species; 40.5 nests or territorial males ($81/\text{km}^2$, 33/100 acres). **Visitors:** Pintail, Oldsquaw, Rock Ptarmigan, Stilt Sandpiper, Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Glaucous Gull, Snowy Owl, Short-eared Owl, Com. Raven. **Remarks:** Nests found: Lapland Longspur, 12; Pectoral Sandpiper, 6; Semipalmated Sandpiper, 3; Buff-breasted Sandpiper, 2; Red Phalarope, 2; N. Phalarope, 2; Am. Golden Plover, 1; Long-billed Dowitcher, 1. Total breeding population calculated using the 13.5 male Pectoral Sandpiper territories defended on the plot instead of incubating females: 46 nests or territorial males ($92/\text{km}^2$, 37/100 acres). This habitat had the highest breeding population of the 4 coastal tundra types censused in 1982 and 1978. Total number of nesting species and number of nests and/or territories were similar to 1978 (8 species, $87/\text{km}^2$), however,

several individual species changed in abundance: Rock Ptarmigan, Semipalmated Sandpiper, N. Phalarope and Lapland Longspur were less abundant in 1982, while Am. Golden Plover, Pectoral Sandpiper and Buff-breasted Sandpiper were more abundant in 1982 as compared to 1978. Mammals observed in 1982 were Arctic Fox, Collared Lemming and Caribou. Collared Lemmings were not seen on the plot in 1978.

164. WET SEDGE TUNDRA. — **Location:** Alaska; North Slope Borough, 12.5 km SW of Kaktovik; $70^{\circ}02'N$, $143^{\circ}48'W$, Barter Island A-5 Quadrangle (1:63, 360), USGS. **Continuity:** New. **Size:** 50.1 ha = 123.8 acres (square, surveyed, gridded, 708 × 708 m). **Description of Plot:** Wet Sedge tundra-non-complex. Vegetation and microhabitat were homogeneous, having only small differences in micro-relief (mean 0.3 m). Polygon centers were evenly vegetated with wet sedge and the polygon ridges were of low relief, harboring a wet sedge or occasionally moist sedge community. There were widely scattered dry ridges and mounds that contained some moist sedges with prostrate willows, birches and ericaceous shrubs. Quantitative microhabitat description based on 120 point samples was: low-center polygon, 54%; polygon ridge, 13%; intermediate-center polygon, 10%; peat ridge, 9%; polygon trough, 9%; pond complex, 3%; mound, 1%, high-center polygon, 1%. Ground cover was dominated by the sedges *Carex saxatilis*, *C. aquatilis*, *C. cordorrhiza*, and *Eriophorum angustifolium*, the prostrate shrubs *Betula nana*, *Salix planifolia pulchra* and *S. reticulata*, and the forb *Pedicularis sudetica*. Quantitative ground cover estimates based on 32 systematically-located 0.25 m² quadrats were: litter, 32%; sedges, 31%; prostrate shrubs, 14%; moss, 10%; water, 7%; the remaining percentage in forbs, mud, lichens and grasses. **Edge:** Bordered on all sides by similar habitat. The plot was 4.2 km S of Arey Lagoon, the nearest marine waters. **Topography:** Flat. **Elevation:** 40 ft (12 m). **Weather:** See introduction. **Coverage:** June 24, 30; July 8, 13; 1150-1705. Total man-hours: 132.3. **Census:** Lapland Longspur, 16 (32, 13); Pectoral Sandpiper, 9 (18, 7); Red Phalarope, 2; Long-billed Dowitcher, 2; Stilt Sandpiper, 1; Buff-breasted Sandpiper, 1; N. Phalarope, 1. **Total:** 7 species; 32 nests or territorial males ($64/\text{km}^2$, 26/100 acres). **Visitors:** Pintail, Oldsquaw, King Eider, Rough-legged Hawk, Marsh Hawk, Willow Ptarmigan, Sandhill Crane, Am. Golden Plover, Semipalmated Sandpiper, Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Snowy Owl, Short-eared Owl, Com. Raven. **Remarks:** Nests found: Lapland Longspur, 11; Pectoral Sandpiper, 3; Long-billed Dowitcher, 2; Red Phalarope, 2; Buff-breasted Sandpiper, 1; N. Phalarope, 1; Stilt Sandpiper, 1. Total breeding population calculated using the 5 ♂ Pectoral Sandpiper territories defended on the plot instead of incubating females: 28 nests or territorial males ($56/\text{km}^2$, 23/100 acres). The plot had the second-lowest breeding population density of the 4 coastal tundra habitats censused in 1982. Number of nesting species was up from 1978 (6 species) as was number of nests and/or territories ($45/\text{km}^2$ in 1978). Pectoral Sandpiper, Long-billed Dowitcher, Red Phalarope, and Lapland Longspur

showed higher nesting densities in 1982 than in 1978. Two species bred on the plot that did not breed in 1978: Stilt Sandpiper and Buff-breasted Sandpiper. Only N. Phalarope showed a lower density than in 1978. Mammals observed were Arctic Fox and Brown Lemming. An average of 8 lemmings/census was seen, whereas none were seen in 1978.

165. MOIST SEDGE TUSSOCK - PROSTRATE SHRUB TUNDRA. — **Location:** Alaska; North Slope Borough, 16 km SW of Kaktovik; 70°02'N, 143°52'W, Barter Island A-5 Quadrangle (1:63,360), USGS. **Continuity:** New. **Size:** 25.0 ha = 61.7 acres (rectangular, surveyed, gridded, 743 × 336 m). **Description of Plot:** The E side of the plot was mostly *Eriophorum vaginatum* tussock tundra mixed with prostrate ericaceous shrubs, dwarf birches and willows. The W half was wetter, with low-center polygons composed of sedge meadow and water, and drier polygon ridges also with ericaceous shrubs, dwarf birches and willows. Micro-relief was comparatively high, averaging 0.5 m. Quantitative microhabitat description based on 72 point samples was: high-center polygon, 40%; polygon trough, 15%; peat ridge, 13%; polygon ridge, 11%; intermediate-center polygon, 10%; low-center polygon, 6%; river terrace, 5%. Ground cover was dominated by the prostrate shrubs *Salix planifolia pulchra*, *S. reticulata*, *Vaccinium vitis-idaea*, *Cassiope tetragona*, *Betula nana*, *Dryas integrifolia* and the sedges *Carex bigelowii*, *Eriophorum angustifolium* and *E. vaginatum*. Quantitative ground cover estimates based on 36 systematically-located 0.25 m² quadrats were: litter, 32%; prostrate shrubs, 24%; moss, 17%; sedges, 16%; lichen, 3%; the remaining percentage in forbs, water, mud and grasses. **Edge:** Bordered on the E by a creek and on the other sides by similar habitat. The plot was 4.5 km SE of Arey Lagoon, the nearest marine waters. **Topography:** Flat. **Elevation:** 50 ft (15m). **Weather:** See introduction. **Coverage:** June 17, 28; July 9, 14-15. Total man-hours: 73.4. **Census:** Lapland Longspur, 12 (48, 19); Oldsquaw, 2; Am. Golden Plover, 1; Pectoral Sandpiper, 1; N. Phalarope, 1. **Total:** 5 species; 17 nests or territorial males (68/km², 28/100 acres). **Visitors:** White-fronted Goose, Pintail, Willow Ptarmigan, Rock Ptarmigan, Stilt Sandpiper, Semipalmated Sandpiper, Red Phalarope, Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Short-eared Owl, Barn Swallow, Savannah Sparrow, Fox Sparrow. **Remarks:** Nests found: Lapland Longspur, 8; Oldsquaw, 2; Am. Golden Plover, 1; N. Phalarope. Total breeding population calculated using the 3 ♂ Pectoral Sandpiper territories defended on the plot instead of incubating females: 18 nests or territorial males (72/km², 29/100 acres). This plot had the second-highest breeding population of the 4 coastal tundra habitats censused in 1982, whereas it had the second-lowest in 1978. Number of nesting species was down from 1978 (7 species) but an increased number of nests and/or territories was found in 1982 (51/km² in 1978). Four species showed higher densities in 1982: Oldsquaw, Pectoral Sandpiper, N. Phalarope, and Lapland Longspur. Mammals observed were Arctic Fox, Brown Lemming and Collared Lem-

ming. An average of 3 lemmings per census was seen.

166. RIPARIAN MEDIUM WILLOW THICKET I. — **Location:** Alaska; North Slope Borough, 74 km WSW of Kaktovik; 69°51'N, 145°18'W, Mt. Michelson D-3 Quadrangle (1:63,360), USGS. **Continuity:** New. **Size:** 10 ha = 24.7 acres (rectangular, surveyed, gridded, 660 × 150 m). **Description of Plot:** Three distinct vegetation types were present, with the majority (60%) composed of Riparian Willow Thicket. This community was dominated by the erect shrubs *Salix alaxensis* (60-200 cm tall), *S. brachycarpa niphoclada*, *S. novae-angliae* and *S. lanata richardsonii* (50 cm tall), the prostrate shrubs *Dryas integrifolia* and *Arctostaphylos rubra*, and the forbs *Anemone parviflora*, *Oxytropis borealis*, *O. nigrescens*, *O. campestris*, *Astragalus alpinus* and *Hedysarum mackenzii*. The vegetation type *Dryas* River Terrace/Dry Prostrate Shrub-Forb Tundra occupied about 25% of the plot and was dominated by *Dryas integrifolia* and *Oxytropis nigrescens*. The type Seral Herb-Partially Vegetated Gravel Bar occupied 10% of the plot and was composed mostly of gravel with the pioneering forbs *Castilleja caudata*, *Epilobium latifolium* and *Hedysarum alpha*. Barren Gravel Bar and River Channel composed 5% of the plot. **Edge:** Bordered on the N and S by channels of the Katakturuk River and on the other sides by similar habitat. The plot was 15.7 km S of Camden Bay, the nearest marine waters. **Topography:** Flat. **Elevation:** 475 ft (145 m). **Weather:** See introduction. **Coverage:** June 21, July 5, 15. Total man-hours: 31.6. **Census:** Lapland Longspur, 5.5 (55, 22); redpoll sp., 4 (40, 16); Semipalmated Sandpiper, 3 (30, 12); Tree Sparrow, 2; Yellow Wagtail, 1.5; Am. Golden Plover, 1. **Total:** 6 species; 17 nests or territorial males (170/km², 69/100 acres). **Visitors:** Rock Ptarmigan, Semipalmated Plover, Baird's Sandpiper, Long-tailed Jaeger, Horned Lark. **Remarks:** Nests found: redpoll sp., 4; Tree Sparrow, 2; Am. Golden Plover, 1; Semipalmated Sandpiper, 1; Lapland Longspur, 1. This plot had the highest breeding population density of any habitat type yet censused on the coastal plain of the Arctic Nat'l Wildlife Refuge. It should be noted, however, that tussock and sedge thicket appeared to have breeding population densities equivalent to and lower than their respective counterparts on the outer coastal plain. Mammals observed included Grizzly Bear, Short-tailed Weasel, Tundra Vole, Caribou and Muskoxen. A Tundra Vole population high was evident during the census period.

167. RIPARIAN MEDIUM WILLOW THICKET II. — **Location:** Alaska; North Slope Borough, 75 km WSW of Kaktovik; 69°50'N, 145°20'W, Mt. Michelson D-3 Quadrangle (1:63,360), USGS. **Continuity:** New. **Size:** 9.9 ha = 24.5 acres (rectangular, surveyed, gridded, 660 × 150 m). **Description of Plot:** Three distinct vegetation types were present: Riparian Willow Thicket, 55%; *Dryas* River Terrace/Dry Prostrate Shrub-Forb Tundra, 25%; Seral Herb-Partially Vegetated Gravel Bar, 10%; and Barren Gravel Bar and River Channel, 10%. These

types are described above in Willow Thicket I (Census 166). **Edge:** Bordered on the W by the Katakturuk River, the E by *Dryas* river terrace, and on the other sides by similar habitat. The plot was 17.2 km SW of Camden Bay, the nearest marine waters. **Topography:** Flat. **Elevation:** 500 ft (152 m). **Coverage:** June 21; July 6, 16. Total man-hours 32.5. **Census:** Lapland Longspur, 5 (50, 20); Semipalmated Sandpiper, 4 (40, 16); Am. Golden Plover, 1; Yellow Wagtail, 1; redpoll sp., 0.5. **Total:** 5 species; 11.5 nests or territorial males (116/km², 47/100 acres). **Visitors:** Rough-legged Hawk, Rock Ptarmigan, Semipalmated Plover, Ruddy Turnstone, Baird's Sandpiper, Buff-breasted Sandpiper, Long-tailed Jaeger. **Remarks:** Nests found: Semipalmated Sandpiper, 4; Lapland Longspur, 5; Am. Golden Plover, 1; Yellow Wagtail, 1. This plot had a lower breeding population than the other Willow Thicket plot censused but exceeded all 4 outer coastal plain tundra plots censused in 1982. Mammals observed were Grizzly Bear, Red Fox, Arctic Fox, Arctic Ground Squirrel, Caribou and Muskoxen.

168. HIGH ARCTIC LOWLAND OASIS. — **Location:** Northwest Territories; Ellesmere Island; Alexandra Fjord, located 154 km SE of Eureka; 78°53'N, 75°55'W. **Continuity:** Established 1980; 2 intermittent years. **Size:** 1200 ha = 2965 acres. **Description of Plot:** See AB 35:96 (1981). **Weather:** Daily maximum air temperatures ranged from 0-12°C; skies clear to cloudy. The tundra was 90% snow-free by June 25. **Coverage:** June 26-July 6; irregularly over July 7-24; between 0900-0200 hours. Total man-hours: 125. **Census:** Snow Bunting, 125 (10 4, 4.2); Baird's Sandpiper, 9 (0.8, 0.3); Hoary Redpoll, 7 (0.6, 0.2); Arctic Tern, 6 (0.5, 0.2), Lapland Longspur, 4 (0.3, 0.1); Rock Ptarmigan, 3 (0.3, 0.1); Oldsquaw, 3; Parasitic Jaeger, 1. **Total:** 8 species; 158 territorial males or females (13.2/km², 5.3/100 acres). **Visitors:** Red-throated Loon, Com. Eider, Ringed Plover, Ruddy Turnstone, Red Phalarope, Long-tailed Jaeger, Glaucous Gull, Black Guillemot. **Remarks:** Nests or broods located (99): Snow Bunting, 83, Arctic Tern, 5; Baird's Sandpiper, 4; Rock Ptarmigan, 3; Oldsquaw, 2; Parasitic Jaeger, 1, Lapland Longspur, 1. This work was funded by the World Wildlife Fund (Canada), the Natural Sciences and Engineering Research Council of Canada, and the Polar Continental Shelf Project, and is part of a larger study of the ecology of a High Arctic oasis at Alexandra Fjord.—B. FREEDMAN, Dept. of Biology and Institute for Resource and Environmental Studies, Dalhousie University, Halifax, Nova Scotia, B3H 4J1.

169. SCATTERED SUBALPINE FIR FOREST IN SUBALPINE MEADOWS. — **Location:** British Columbia; Kootenay Land District, Mount Revelstoke Nat'l Park, Summit of Mount Revelstoke, 6 km (3.7 mi) NW of Revelstoke; 51°03'N, 118°08'30"W; Canadian National Topographic System, Map Sheet 82M/1. **Continuity:** New. **Size:** 12.25 ha = 30.27 acres (square, measured from aerial photos taken 3000 ft above plot, Canada Dept. of Energy Mines and Resources, series A23456—#179.). **Description of Plot:** The canopy tree is Subalpine Fir

(*Abies lasiocarpa*) which occurs generally in a clumped distribution on rocky outcrops within the subalpine meadows. The under-story consists of young Subalpine Fir. The ground cover consists of heathers (*Cassiope merteniana* and *Phyllodoce empetriformis*), Creeping Spirea (*Luetkea pectinata*), Glacier Lily (*Erythronium grandiflorum*), Valerian (*Valeriana sitchensis*), Huckleberry (*Vaccinium membranaceum*), White Rhododendron (*Rhododendron albiflorum*) and sedges (*Carex* spp.). Wet depressions where snowbanks lie late are dominated by sedges. A quantitative survey of the vegetation gave: Trees 3-in. diameter and over based on five 0.1-acre circular samples, 132/acre; total basal area, 27.2 ft²/acre. The species comprising 100% of the total number of trees was Subalpine Fir which occurred on 60% of the circular samples. Trees by diameter size class [figures after each class give numbers of trees/acre, relative density (%), basal area (ft²/acre), relative dominance (%)] A (3-6 in.) 46, 38, 4.6, 8; B (6-9 in.) 38, 31, 11.4, 21; C (9-15 in.) 30, 25, 24, 44; D (15-21 in.) 8, 6, 144, 27. Shrub stems/acre, 250; ground cover, 76%; canopy cover 3%; canopy height, 30 ft (range 25-40 based on the three 0.1-acre circular samples containing trees). A one-lane dirt road runs from S to N through the W half of the plot but was snow-covered and unusable during census period. **Edge:** Vegetation type is continuous on all sides. **Topography:** Terrain slopes from a high of 6375 ft at NW corner to a low of about 6200 ft at the SW corner, on the rolling summit of Mount Revelstoke. **Weather:** Temperatures 32-40°F at dawn. Sky clear for 4 census day, partly cloudy to full overcast 4 days and snowing on July 15 when only an incomplete census was undertaken. Winds below 12 mph on each day except July 15. Average snow depth of 2 ft on 80% of the plot on July 8. Tree clumps were generally snow-free on July 8. **Coverage:** July 8-11, 13, 15; 0420-0800 hours, PDT; Total man-hours: 5.8 **Census:** Dark-eyed Junco, 4 (33, 13); Fox Sparrow, 2.5; Chipping Sparrow, 1; Hermit Thrush, 0.5. **Total:** 4 species; 8 territorial males (65/km², 26/100 acres). **Visitors:** Blue Grouse, Gray Jay, Boreal Chickadee, Pine Siskin. **Remarks:** All territorial birds were associated with clumps of Subalpine Fir trees, either at ground level (Dark-eyed Juncos) or singing from perches within or at the tops of trees (all territorial species). Juvenile Gray Jays were observed and they may have fledged several weeks previous to census. They are known to breed in the vicinity of the plot but it is not known if they nested.—*LES W. GYUG, Canadian Wildlife Service, Box 1349, Revelstoke, British Columbia V0E 2SO*

170. ASPEN FOREST. — **Location:** Manitoba; Cornwallis Municipality; near Brandon 3.2 km E of Hwy #10 along the NW boundary of the Brandon Hills Wildlife Management Area, 50 m S of the parking lot; Sect. 6, T. 9, Rge. 18 W; 49°44'N, 99°55'W, Wawanese, 62G/12. **Continuity:** New. **Size:** 16.0 ha = 39.54 acres (400 by 400 m; 50 m grid laid out with compass and measured rope). **Description of Plot:** The dominant canopy trees are Quaking Aspen (*Populus tremuloides*), Green Ash (*Fraxinus pennsylvanica*) and Balsam Poplar (*P. balsamifera*).

Beaked Hazelnut (*Corylus cornuta*) with Green Ash, Box-elder (*Acer negundo*) and Quaking Aspen regeneration dominates the understory. Other important shrub species include Red Osier (*Cornus stolonifera*), Saskatoon Serviceberry (*Amelanchier alnifolia*) and High Bush-Cranberry (*Viburnum trilobum*). A 1.2 ha marsh lies within the S half of the plot supporting Com. Reed Grass (*Phragmites communis*) and Cat-tail (*Typha* sp.) growth. Sedge (*Carex atherodes*) and Spangle-top (*Scholochloa festucacea*) dominate the basin's periphery. Elsewhere the ground cover is primarily dominated by Wild Sarsaparilla (*Aralia nudicaulis*), Sedge (*Carex tenuiflora*) and W. Snowberry (*Symphoricarpos occidentalis*). A quantitative examination of the vegetation based on fifteen 0.1 acre circular plots gave the following results: Trees 2-in. diameter and over 481/acre, total basal area 142.1 ft²/acre. Species comprising 98% of the total number of trees: Quaking Aspen, 310, 64, 67, 100; Green Ash, 50, 10, 8, 73; Balsam Poplar, 34, 7, 9, 27; Bur Oak (*Quercus macrocarpa*), 27, 6, 7, 60; Boxelder, 5, 1, 1, 20; Pussy Willow (*Salix discolor*), 5, 1, 1, 13. Trees by diameter size class: A (2-6 in.) 322, 67, 96.6, 34; B (6-9 in.) 132, 27, 188.8, 42; C (9-15 in.) 29, 6, 68.8, 24. Shrub stems/acre, 38,400; ground cover 61%; canopy cover 82%; average canopy height 32 ft (range 20-42). **Edge:** Bordered on all sides by similar habitat. **Topography:** Moderate slope on N facing escarpment of Brandon Hills. **Elevation:** About 1500 ft. **Weather:** Clear and relatively calm with the exception of 3 overcast but rain-free mornings. **Coverage:** May 31; June 1-2, 4, 8, 11, 15, 21, 29; 0515-0845 hours, CDT. Total man-hours: 19.3. **Census:** Least Flycatcher, 13.5 (84, 34); Am. Redstart, 4 (25, 10); Red-eyed Vireo, 3.5 (22, 9); Warbling Vireo, 3 (19, 8); Ovenbird, 3; Great Crested Flycatcher, 2.5; Mallard, 2; Veery, 2; Com. Yellowthroat, 2; Am. Goldfinch, 2; Chipping Sparrow, 2; Ruffed Grouse, 1.5; Yellow Warbler, 1.5; Indigo Bunting, 1.5; Sora, 1; Cedar Waxwing, 1; Red-winged Blackbird, 1; N. Oriole, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Mourning Dove, +; Yellow-bellied Sapsucker, +; Downy Woodpecker, +; Blue Jay, +; Black-capped Chickadee, +. **Total:** 25 species; 50 territorial males (312/km², 126/100 acres). **Visitors:** Red-tailed Hawk, Black-billed Cuckoo, Alder Flycatcher, House Wren, Yellow-throated Vireo, Bay-breasted Warbler, Mourning Warbler, Brown-headed Cowbird. **Remarks:** Nests found (4): Mallard, 1; Least Flycatcher, 1; Red-winged Blackbird, 1; Indigo Bunting, 1. The Mallards (2 broods), Sora, Com. Yellowthroats and Red-winged Blackbird were restricted to the small marsh and edge. Whereas Least Flycatchers and Am. Redstarts were evenly distributed throughout the canopy and understory enclosed portions of the plot, the Chipping Sparrows and Yellow Warblers preferred the edge effect of small clearings. The Scarlet Tanager did not establish a territory until mid-June.—*W. CALVIN M. CUTHERBERT, Box 1031, Brandon, Manitoba, Canada, R7A 6A3.*

171. LOW ARCTIC TUNDRA. — **Location:** Manitoba; Churchill, about 2 km S of the main terminal building at the Churchill airport; 58°45'N, 94°13'W, Churchill, Mani-

toba (1:250,000) topographic map. **Continuity:** Established 1981. **Size:** 16.16 ha = 39.9 acres (square 402 × 402 m, paced) **Description of Plot:** See AB 36:97 (1982) **Weather:** The June mean temperature of 3°C was well below the normal of 6.2°. Total precipitation of 120.6 mm was almost 3 times the normal of 43.5 mm. Snow fell during 2 of the count days. Bright sunshine of 149.4 hours was well below the normal of 234 hours for June. **Coverage:** June 22-25; 0400-0630 and 1700-1900. Total man-hours: 11. **Census:** Smith's Longspur, 3 (19, 8); Am. Golden Plover, 2.5; Dunlin, 2; Hudsonian Godwit, 2; Savannah Sparrow, 2; Whimbrel, 1.5; Least Sandpiper, 1; Stilt Sandpiper, 1; Tree Sparrow, 1; White-crowned Sparrow, 1. **Total:** 10 species; 17 territorial males (105/km², 43/100 acres). **Visitors:** Canada Goose, Old-squaw, Willow Ptarmigan, Parasitic Jaeger, Arctic Tern. **Remarks:** An abandoned Canada Goose nest which appeared to have successfully produced several young was found.—*RICHARD L. VERCH, Biology Dept., Northland College, Ashland, WI 54806.*

172. SHRUBBY SWAMP AND SEDGE HUMMOCKS. — **Location:** Connecticut, Litchfield Co.; N end of Bantam Lake, White Memorial Foundation, Litchfield; 41°43' 20"N, 73°12'27"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965; 16 intermittent years. **Size:** 8.09 ha = 20 acres **Description of Plot:** See AFN 19:625-627 (1965). **Coverage:** May 18; June 2, 7, 10, 12, 19, 21; July 2-3, 5; dawn to 2130. Total man-hours: 24. **Census:** Red-winged Blackbird, 22 (272, 110); Swamp Sparrow, 20 (247, 100); Yellow Warbler, 9 (111, 45); Willow Flycatcher, 7 (86, 35); Mallard, 4 (49, 20); Virginia Rail, 3 (37, 15); Gray Catbird, 3; Com. Yellowthroat, 3; E. Kingbird, 2; Canada Goose, 1; Black Duck, 1; Wood Duck, 1; Long-billed Marsh Wren, 1; Cedar Waxwing, 1; Brown-headed Cowbird, 1; Am. Goldfinch, 1; Song Sparrow, 1; Alder Flycatcher, +; Yellow-throated Vireo, +; Chestnut-sided Warbler, +. **Total:** 20 species; 80 territorial males (988/km², 400/100 acres). **Remarks:** The results of this year's census are remarkably similar to those of 1979 and for the same reason. Flooding, from record rains, peaked June 6-8 with 4-5 ft of water over the entire plot. The water level receded to high-normal by June 19. The final count of 80 territorial males, less than half of last year's, reflects partial recovery from this natural disaster. Only one territory, that of a marsh wren marooned in some higher bushes, definitely remained constant before, during and after the flooding. Re-establishment of territories was limited and confusing to record. Song was greatly diminished, many formerly territorial birds wandered with no apparent regard to territory or nesting, and a large percent never did return. Timing, extent and duration of flooding would seem to be the factors affecting numbers. Species requiring low feeding and nesting sites (Virginia Rail, Com. Yellowthroat, Swamp Sparrow, and Song Sparrow) were more adversely affected than those using higher feeding and nesting sites, e.g., Willow Flycatcher. For comparison with this year's numbers, the 7 top species of 1981, a normal year, were: Swamp Sparrow 48, Red-winged

Blackbird 38, Yellow Warbler 24, Virginia Rail 14, Com. Yellowthroat, 12, Willow Flycatcher 10 and Song Sparrow 10. An additional habitat factor is a gradual but clear dying-back of higher saplings (Red Maple, elm, White Ash), *viburnum* sp., Black Willow and shrubby dogwoods, probably due to a succession of unusually wet years. This reduces high-bush and marginal species and tree and cavity breeders. This census was sponsored by the White Memorial Foundation.—ANDREW MAGEE, 34 Hobson St., Springfield, MA 01109.

173. CAT-TAIL MARSH. — **Location:** New York; St. Lawrence Co., 2 mi NW of Canton, NE end of Upper and Lower Lakes Wildlife Management Area; 44°37'N, 75°14'W, Canton Quadrangle, USGS. **Continuity:** Established 1978; 4 intermittent years. **Size:** 8.9 ha = 22 acres. **Description of Plot:** See AB 36:98 (1982). **Weather:** See Census 3. **Coverage:** May 26, 29-30; June 9; 0745-1600, EDT. Total man-hours: 3. **Census:** Red-winged Blackbird, 16 (180, 73); Long-billed Marsh Wren, 6 (67, 27); Yellow Warbler, 5 (56, 23); Com. Gallinule, 4 (45, 18); Alder Flycatcher, 4; Blue-winged Teal, 3 (34, 14); Com. Yellowthroat, 3; Song Sparrow, 3; Pied-billed Grebe, 2; Canada Goose, 2; Least Bittern, 1; Mallard, 1; Killdeer, 1; Gray Catbird, 1; Swamp Sparrow, 1; Com. Snipe, 0.5; E Phoebe, 0.5; Am. Robin, 0.5; Veery, 0.5; Starling, 0.5; Am. Bittern, +; Ring-necked Duck, +. **Total:** 22 species; 55.5 territorial males (623/km²; 252/100 acres). **Visitors:** Green Heron, E. Kingbird, Cedar Waxwing.—KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, NY 13617.

174. CAT-TAIL-BULRUSH SWAMP. — **Location:** New Jersey; Morris Co., 1 mi E of Basking Ridge, Great Swamp Nat'l Wildlife Refuge; 40°41'N, 74°32'W, Bernardsville Quadrangle, USGS. Waterfowl Management Unit No. 2. **Continuity:** Established 1980; 3 consecutive years. **Size:** 5.87 ha = 14.5 acres. **Description of Plot:** See AB 35:98 (1980). **Weather:** Average temperature for May was 60°F (36-84°); total rainfall, 2.98 inches. Average temperature for June was 64°F (41-86°); total rainfall, 5.21 inches. **Coverage:** May 6, 11, 14, 21, 27; June 3, 9; 0600-0715 hours. Total man-hours: 8. **Census:** Long-billed Marsh Wren, 16 (273, 110); Swamp Sparrow, 14 (239, 97); Red-winged Blackbird, 13 (222, 90); Willow Flycatcher, 2. **Total:** 4 species; 45 territorial males (767/km², 310/100 acres). **Visitors:** Great Blue Heron, Green Heron, Least Bittern, Am. Bittern, Canada Goose, Mallard, Wood Duck, Virginia Rail, Sora, Tree Swallow, Barn Swallow, Com. Crow, Yellow Warbler, Com. Yellowthroat, N. Oriole, Com. Grackle, Am. Goldfinch.—HAROLD P. LASKOWSKI and GRAHAM W. TAYLOR, Great Swamp Nat'l Wildlife Refuge, USDI, Fish and Wildlife Service, R.D. 1, Box 152, Basking Ridge, NJ 07920.

175. FRESHWATER BULRUSH MARSH WITH SCATTERED TREES. — **Location:** New Jersey; Morris Co., 1 mi E of Basking Ridge, Great Swamp Nat'l Wildlife Refuge; 40°41'N, 74°32'W, Bernardsville Quadrangle, USGS. Waterfowl Management Unit

No 3A. **Continuity:** Established 1980, 3 consecutive years. **Size:** 5.02 ha = 12.4 acres. **Description of Plot:** See AB 35:97 (1980). **Weather:** Average temperature for May was 60°F (36-84°); total rainfall, 2.98 inches. Average temperature for June was 64°F (41-86°); total rainfall, 5.21 inches. **Coverage:** May 15-16, 26; June 3, 8, 12, 21-22; 0530-0730. Total man-hours: 9. **Census:** Swamp Sparrow, 12 (239, 97); Red-winged Blackbird, 10 (199, 81); Yellow Warbler, 8 (159, 65); Long-billed Marsh Wren, 3 (60, 24); Com. Yellowthroat, 3; Willow Flycatcher, 2. **Total:** 6 species; 38 territorial males (757/km², 306/100 acres). **Visitors:** Great Blue Heron, Green Heron, Canada Goose, Mallard, Wood Duck, Am. Woodcock, Blue Jay, Com. Crow, Am. Robin, Starling, Com. Grackle, Am. Goldfinch.—THEODORE W. GUTZKE, Great Swamp Nat'l Wildlife Refuge, USDI, Fish and Wildlife Service, R.D. 1, Box 152, Basking Ridge, NJ 07920.

176. GULF COAST SALT MARSH. — **Location:** Florida; Levy Co., 6 km NNW of Cedar Key, a marsh bounded on SW by Prodigy Creek, on the S by Live Oak Key and the Gulf of Mexico (Waccasassa Bay) and on the NE by Dorset Creek; 29°11'N, 83°00'W, Cedar Key Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** 15.0 ha = 37.07 acres (decrease from 31 ha in 1981). **Description of Plot:** See AB 35:99, 104 (1980). **Weather:** Mostly clear days, 10-35°C. **Coverage:** Jan. 30; Feb. 12, 19-20, 26-28; Mar. 5-7, 12, 15, 18-21, 24, 26-29, 31; Apr. 2-4, 9-11, 16-18, 23-25; May 1-2, 6-9, 12, 14-16, 19, 21-23, 26, 28-31; June 2, 4-6, 9, 11-13; July 16, 23, 30; Aug. 27. Total man-hours: 310. **Census:** Seaside Sparrow, 27 (180, 73); Clapper Rail, 10 (67, 27); Long-billed Marsh Wren, 1. **Total:** 3 species; 38 territorial males (253/km², 103/100 acres). **Visitors:** White Pelican, Brown Pelican, Double-crested Cormorant, Great Blue Heron, Green Heron, Little Blue Heron, Cattle Egret, Great Egret, Snowy Egret, Yellow-crowned Night Heron, White Ibis, Turkey Vulture, Bald Eagle, Marsh Hawk, Osprey, Virginia Rail, Black-bellied Plover, Willet, Greater Yellowlegs, Lesser Yellowlegs, Least Sandpiper, Dunlin, Short-billed Dowitcher, Sandpiper, Ring-billed Gull, Laughing Gull, Forster's Tern, Royal Tern, Belted Kingfisher, Fish Crow, Bobolink, Red-winged Blackbird, Sharp-tailed Sparrow. **Remarks:** This survey was conducted in conjunction with a research project on the vocalizations of Seaside Sparrows. The size of the plot was decreased from the previous year and is now the same size (15 ha) as originally established. Of the 27 territorial Seaside Sparrows, 25 males were mated; there were no known "floater" males. Most of the nests of these individuals were found and monitored. The first nest was found on March 20; the last on June 13. There was one late (June 4) flood this spring.—MARY VICTORIA McDONALD, Dept. of Zoology, Univ. of Florida, Gainesville, FL 32611.

177. TAMARACK BOG AND HARDWOOD. — **Location:** Michigan; Berrien Co., 1 mi SW of Stevensville in Grand Mere State Park, .05 mi N of Willow Dr; on Wishart Rd; 41°59'30"N, 86°33'W, Bridgman Quadrangle, USGS. **Continuity:** Established 1976; 7 con-

secutive years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AB 30:1049 (1976). **Weather:** Rainfall normal; temp. below normal. **Coverage:** May 29-30; June 5-6, 12-13, 20, 27; 0700-2100 hours. Total man-hours: 8. **Census:** Wood Thrush, 3 (35, 14); Canada Warbler, 3; E. Wood Pewee, 2; Blue Jay, 2; Veery, 2; Red-eyed Vireo, 2; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Am. Robin, 1; Ovenbird, 1; Scarlet Tanager, 1; Cardinal, 1; Com. Flicker, +; Red-bellied Woodpecker, +. **Total:** 16 species; 22 territorial males (259/km², 105/100 acres). **Visitors:** Acadian Flycatcher, N. Parula.—JAMES and CARL MULLINS, 2558 Locust Lane, Stevensville, MI 49127.

BREEDING BIRD CENSUSES: RED LAKE PEATLAND, NORTHERN MINNESOTA

The following 5 censuses were conducted on an 800 km² bog located N of Upper Red Lake. These censuses conclude a 3-year study designed to assess the impact of a 500 kv transmission line and R-O-W on bird populations in the major habitat types within the Peatland. The censuses reported are "control" plots for this study (see AB 35:99-100 (1981), AB 36: 100-101 (1982)).

The census rate was approximately 17 m/min, except in the open fen where it was 20 m/min. Censuses of each plot were rotated among 2 observers. Census routes were 100 m apart, and 2 routes were alternately used so each line in a 50 × 50 m grid system was walked every other census. Censuses were conducted on mornings with winds less than 24 km/h and no precipitation. Temperatures were 40°-70°F. Precipitation for June and overall water levels in the Peatland varied each year. Rainfall for June was 4.2 cm below average in 1980, 7 cm above average in 1981, and 3.5 cm below average in 1982. Funding was provided by Northern States Power Company, Minneapolis, Minnesota.—JOANN M. HANOWSKI and GERALD J. NIEMI, Lake Superior Basin Studies Center and Dept. of Biol., Univ. of Minn., Duluth, 55812.

178. CLOSED BLACK SPRUCE BOG. — **Location:** Minnesota; Koochiching Co., 22.4 km NE of Washkish, W of Pine Island Trail, 48°16'06"N, 94°23'16"W, Wayland SW Quadrangle, USGS. **Continuity:** Established 1980, 3 consecutive years. **Size:** 17.5 ha = 43.24 acres. **Description of Plot:** See AB 35:100 (1980). **Weather:** See introduction. **Coverage:** May 20, 23, 25; June 5, 10, 18, 21, 23; 0500-2035, CDT. Total man-hours: 17. **Census:** Nashville Warbler, 8 (46, 19); Palm Warbler, 8; Connecticut Warbler, 7 (40, 16); Yellow-rumped Warbler, 6 (34, 14); Yellow-bellied Flycatcher, 3 (17, 7); Hermit Thrush, 2; Dark-eyed Junco, 2; Gray Jay, 1; Golden-crowned Kinglet, 1; Chipping Sparrow, 1. **Total:** 10 species; 39 territorial males or females (223/km², 90/100 acres). **Visitors:** Boreal Chickadee, Red-breasted Nuthatch, Winter Wren, Cedar Waxwing, Brown-headed Cowbird, Lincoln's Sparrow. **Remarks:** The species composition changed little in the 3 years. The only species not

present every year were the Blue Jay, Golden-crowned Kinglet, and White-throated Sparrow. The density decreased 20% from 1981 after increasing 32% from 1980 to 1981. The population density of most species followed this same pattern. No large density changes were noted in the 3 years for any species, except the Connecticut Warbler which doubled its population from 1980 to 1981 and then decreased 30% from 1981 to 1982.

179. OPEN BLACK SPRUCE BOG. — **Location:** Minnesota; Lake of the Woods Co., 1.6 km NE of Beltrami and Lake of the Woods Co. line on Minn. Hwy. 72; 48°23'05"N, 94°33'21"W, Chase Brook NE Quadrangle, USGS. **Continuity:** Established 1980, 3 consecutive years. **Size:** 5 ha = 12.36 acres. **Description of Plot:** See AB 35:100 (1980). **Weather:** See introduction. **Coverage:** May 21, 24; June 3-4, 8, 17, 20; 0510-2030, CDT. Total man-hours: 6. **Census:** Savannah Sparrow, 4 (80, 32); Lincoln's Sparrow, 2; Nashville Warbler, 1; Le Conte's Sparrow, 1; Palm Warbler, +. **Total:** 5 species; 8 territorial males or females ($160/\text{km}^2$, 65/100 acres). **Visitors:** E. Kingbird, Yellow-bellied Flycatcher, Hermit Thrush, Yellow-rumped Warbler, **Remarks:** The species density decreased 53% from 1981 and species richness was lower than the previous 2 years.

180. SHRUB SWAMP. — **Location:** Minnesota; Lake of the Woods Co., 3.2 km SW from junction of Minn. Hwy. 72 and Co. Rd. 77, 48°24'19"N, 94°35'51"W, Chase Brook NE Quadrangle, USGS. **Continuity:** Established 1980, 3 consecutive years. **Size:** 12.5 ha = 30.9 acres. **Description of Plot:** See AB 35:100 (1980). **Weather:** See introduction. **Coverage:** May 21, 24; June 3, 8, 16-17, 20; 0520-1940, CDT. Total man-hours: 11. **Census:** Short-billed Marsh Wren, 24 (192, 78); Com. Yellowthroat, 16 (128, 52); Swamp Sparrow, 13 (104, 42); Le Conte's Sparrow, 12 (96, 39); Bobolink, 5 (40, 16); Am. Bittern, 2; Yellow Rail, 2; Alder Flycatcher, 2; Nashville Warbler, 2; Yellow Warbler, 2; Com. Snipe, 1. **Total:** 11 species; 81 territorial males or females ($648/\text{km}^2$, 262/100 acres). **Visitors:** Black-billed Cuckoo, E. Kingbird, Am. Goldfinch. **Remarks:** Nest found: Am. Bittern. The Yellow Rail was present as a breeding species after being absent in 1981. The population density decreased 20% after a slight increase from 1980 to 1981. Most major breeding species showed a pattern of density increase between 1980 and 1981 and then a decrease from 1981 to 1982 except the Swamp Sparrow which decreased each year.

181. OPEN BOG. — **Location:** Minnesota; Lake of the Woods Co., 2.4 km NE of Beltrami—Lake of the Woods Co. line on Minn. Hwy. 72; 48°21'36"N, 94°32'00"W; Ludlow Lookout Tower Quadrangle, USGS. **Continuity:** Established 1980, 3 consecutive years. **Size:** 10 ha = 24.7 acres. **Description of Plot:** See AB 35:100 (1980). **Weather:** See introduction. **Coverage:** May 19, 22; June 2, 9, 16-17, 19, 22; 0520-1840, CDT. Total man-hours: 12. **Census:** Short-billed Marsh Wren, 15 (150, 61); Le Conte's Sparrow, 14 (140, 57); Swamp Sparrow, 5 (50, 20); Com. Yellowthroat, 4 (40, 16); Bobolink, 4; Clay-colored Sparrow, 3 (30, 12). **Total:** 6 species;

45 territorial males or females ($450/\text{km}^2$, 182/100 acres). **Visitors:** Savannah Sparrow. **Remarks:** Nests found: Le Conte's Sparrow. The species composition did not change from 1981 to 1982. The density decreased 40% from 1981 after increasing 53% from 1980 to 1981. All major species densities showed this pattern.

182. OPEN FEN. — **Location:** Minnesota; Beltrami Co., 2.8 km SE of Beltrami—Lake of the Woods Co. line on Minn. Hwy. 72; 48°22'00"N, 94°32'34"W, Ludlow Lookout Tower Quadrangle, USGS. **Continuity:** Established 1980, 3 consecutive years. **Size:** 15 ha = 37.07 acres. **Description of Plot:** See AB 35:100 (1980). **Weather:** See introduction. **Coverage:** May 19, 22; June 2, 9, 16-17, 19, 22; 0510-2020, CDT. Total man-hours: 10. **Census:** Le Conte's Sparrow, 28 (187, 76); Short-billed Marsh Wren, 8 (53, 22); Bobolink, 8; Savannah Sparrow, 1. **Total:** 4 species; 45 territorial males or females ($300/\text{km}^2$, 121/100 acres). **Visitors:** Marsh Hawk, Yellow Rail. **Remarks:** Species composition did not change between 1981 and 1982. The population density decreased 37% from 1981 to 1982 after increasing 38% between 1980 and 1981. All breeding species showed this pattern in density changes during the 3 years.

183. WETLAND SEDGE MEADOW I. — **Location:** Nebraska; Hall Co., NE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 34, T10N, R10W; 40°47'N, 98°26'W, Alda Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 16.2 ha = 40 acres. **Description of Plot:** See AB 36:105-106 (1982). **Weather:** See Census 198. **Coverage:** June 3-4, 7-8, 10-11, 15; 0620-1020, CDT. Total man-hours: 5.2. **Census:** Bobolink, 14 (86, 35); Red-winged Blackbird, 13 (80, 33); W. Meadowlark, 3 (19, 8); Brown-headed Cowbird, 2.5 (females); Upland Sandpiper, 2; Wilson's Phalarope, 2; Mourning Dove, 2; Blue-winged Teal, 1. **Total:** 8 species; 39.5 territorial males or females ($244/\text{km}^2$, 99/100 acres). **Visitors:** Killdeer, E. Kingbird, Barn Swallow, Starling. **Remarks:** Nests found: Red-winged Blackbird, 8; Bobolink, 2; Blue-winged Teal, 1. Red-winged Blackbirds were absent in 1981; their appearance this year is believed to be related to presence of surface water which was absent last year.—*GARY R. LINGLE, and WM S. WHITNEY, 1219 Sixteenth St., Aurora, NE 68818.*

184. WETLAND SEDGE MEADOW II. — **Location:** Nebraska; Hall Co., portions of the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 26 and NE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sect. 35, T10N, R10W, 40°47'N, 98°25'W, Alda Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (square, 440 yds \times 440 yds, surveyed). **Description of Plot:** This plot lies within the same complex as Wetland Sedge Meadow I however its management differs. It is in a pasture which was grazed season-long from May 1 to October 1 and will not be burned. Dominant species in the mesic sites are Spikerush (*Eleocharis palustris*), Little Ragweed (*Ambrosia artemisiifolia*), Aquatic Sedge (*Carex aquatilis*), Fox Sedge (*C. vulpinoides*), Com. Threesquare (*Scirpus americanus*), rushes (*Juncus spp.*), Fog Fruit (*Phyla lanceolata*), and Giant Goldenrod (*Solidago gigantea*). Dominant species on

the xeric sites are Kentucky Blue Grass (*Poa pratensis*), Giant Goldenrod, and Blue Verbain (*Verbena hastata*). Other species present are Slender Wheat Grass (*Agropyron caninum*), Prairie Cord Grass (*Spartina pectinata*), and Marsh Fern (*Thelypteris palustris*). **Edge:** Similar on all 4 sides. **Topography:** Flat with intermittent relic channel areas. **Elevation:** About 1900 ft. **Weather:** See Census 198. **Coverage:** June 3-4, 7, 10-11, 15-16; 0640-0915, CDT. Total man-hours: 5.2. **Census:** Red-winged Blackbird, 15 (93, 38); Upland Sandpiper, 3 (19, 8); Bobolink, 3; W. Meadowlark, 2; Brown-headed Cowbird, 2 (females); Grasshopper Sparrow, 2; Mallard, 1; Blue-winged Teal, 1; Killdeer, 1; Wilson's Phalarope, 1; Mourning Dove, 1. **Total:** 11 species; 32 territorial males or females ($198/\text{km}^2$, 80/100 acres). **Visitors:** Com. Flicker, Barn Swallow. **Remarks:** Nests found: Red-winged Blackbird, 7; Mallard, 1; Blue-winged Teal, 1; Upland Sandpiper, 1. Standing water present throughout period.—*GARY R. LINGLE, and WM S. WHITNEY, 1219 Sixteenth St., Aurora, NE 68818.*

185. BULRUSH AND CAT-TAIL MARSH IN CONIFER FOREST. — **Location:** Montana; Lake Co., on W side of Flathead Lake, 6 mi N of Polson, on Kings Point Rd., 47°35'N, 114°19'W, Wildhorse Island Quadrangle, USGS. **Continuity:** Established 1975, 8 consecutive years. **Size:** 40.47 ha = 100 acres. **Description of Plot:** See AB 31(1):84-85 (1976). **Weather:** First 2 trips, cold and overcast, balance on clear days with little wind. **Coverage:** May 20, 22; June 1, 12, 22; July 1, between dawn and 1000. Total man-hours 28. **Census:** Yellow-headed Blackbird, 24 (59, 24); Red-winged Blackbird, 20 (49, 20); Song Sparrow, 19 (47, 19); Pine Siskin, 9 (22, 9); Am. Coot, 8 (20, 8); Yellow Warbler, 8; Red-breasted Nuthatch, 7 (17, 7); Canada Goose, 6 (15, 6); Redhead, 6; Willow Flycatcher, 6; Am. Robin, 6; Mallard, 5 (12, 5); W. Wood Pewee, 5; Tree Swallow, 5; Com. Yellowthroat, 5; Dark-eyed Junco, 5; Chipping Sparrow, 5; Pied-billed Grebe, 4 (10, 4); Wood Duck, 4; Black-capped Chickadee, 4; Mountain Chickadee, 4; Long-billed Marsh Wren, 4; Swainson's Thrush, 4; Ruby-crowned Kinglet, 3 (7, 3); Cedar Waxwing, 3; Brown-headed Cowbird, 3; Cassin's Finch, 3; Osprey, 2; Ruffed Grouse, 2; Mourning Dove, 2; Calliope Hummingbird, 2; Hammond's Flycatcher, 2; W. Flycatcher, 2; Olive-sided Flycatcher, 2; Barn Swallow, 2; Orange-crowned Warbler, 2; Am. Goldfinch, 2; Cinnamon Teal, 1; Ring-necked Duck, 1; Com. Merganser, 1; Prairie Falcon, 1; Spotted Sandpiper, 1; Great Horned Owl, 1; Saw-whet Owl, 1; Com. Flicker, 1; Downy Woodpecker, 1; Dusky Flycatcher, 1; Com. Raven, 1; Pygmy Nuthatch, 1; Veery, 1; Warbling Vireo, 1; Nashville Warbler, 1; MacGillivray's Warbler, 1; Am. Redstart, 1; W. Tanager, 1; Evening Grosbeak, 1; Great Blue Heron, 0.5; Killdeer, 0.5; Com. Night-hawk, 0.5; E. Kingbird, 0.5. **Total:** 60 species; 226 territorial males ($558/\text{km}^2$, 226/100 acres). **Remarks:** Nests found: Yellow-headed Blackbird, 8; Red-winged Blackbird, 3; Canada Goose, 2; Am. Coot, 2; Song Sparrow, 2; Osprey, 1; Prairie Falcon, 1; Tree Swallow, 2; Pygmy Nuthatch, 1; Long-billed Marsh Wren, 1; Am. Robin, 1; Chipping Sparrow, 1. Additional young located

Pied-billed Grebe, 4; Mallard, 3; Redhead, 6; Ruffed Grouse, 2; Am. Coot, 7; Black-capped Chickadee, 2; Am. Robin, 1; Yellow-headed Blackbird, 12; Red-winged Blackbird, 10; Dark-eyed Junco, 4; Song Sparrow, 1. There was a noticeable reduction in waterfowl production. Warblers, especially the Com. Yellowthroat were also in reduced numbers. The spring was very late and cold, with snow at higher elevations into late June.—*MARCELLA M. BISHOP, Shoreline Route, Polson, MT 59860.*

186. COASTAL SALT MARSH. — **Location:** California, Humboldt Co., Eureka; near foot of Bay Street and KIEM radio towers and bordering Eureka Slough; 40°47'N, 124°07'W, Eureka Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** 6.5 ha = 16 acres. **Description of Plot:** See AB 35:101 (1981). **Weather:** 3 days, clear; 2 days, overcast; 1 day, rain. Tide: 3 high, 3 low. **Coverage 1981:** June 12, 17, 21, 23, July 1; 0630-1200. Total man-hours: 12. **Census:** Long-billed Marsh Wren, 9 (139, 56); Song Sparrow, 8 (124, 50). **Total:** 2 species; 17 territorial males (263/km², 106/100 acres). **Visitors:** The number of visits/species recorded in parentheses. Great Egret (2), Great Blue Heron (1), White-tailed Kite (1), Vaux's Swift (3), Belted Kingfisher (1), Black Phoebe (1), Violet-green Swallow (5), Barn Swallow (6), Cliff Swallow (5), Com. Crow (3), Brewer's Blackbird (2), Brown-headed Cowbird (2). **Remarks:** One Mallard nest was found outside of the census period in dense *Spartina foliosa* cover. The number of Long-billed Marsh Wren territories increased (from 4 in 1980) as did the number of Song Sparrow territories (from 2 in 1980). Only 2 additional Song Sparrow partial territories slightly overlapped the plot boundaries compared with 6 last year. There is no obvious reason for the increase in numbers. We used only 6 visits so that the time period would be comparable to the previous BBC; most territories were so well defined in both passerines that any 3 or 4 visits would have yielded the same results. 1982: Weather: 6 days, overcast; 2 days, clear. Tide: high, 1 day; high-low, 2 days; low, 2 days; low-low, 3 days. **Coverage 1982:** June 5-6, 8, 12, 18, 20, 24, 27. Total man-hours: 10.5. **Census:** Long-billed Marsh Wren, 12 (185, 75); Song Sparrow, 4 (62, 25); Brown-headed Cowbird, 2 females. **Total:** 3 species; 18 territorial males or females (278/km², 113/100 acres). **Visitors:** The number of visits/species recorded in parentheses. Great Blue Heron (1), Snowy Egret (4), Turkey Vulture (1), White-tailed Kite (2), Vaux's Swift (1), Barn Swallow (7), Starling (1), House Sparrow (1), Brewer's Blackbird (2), House Finch (1). **Remarks:** The number of Long-billed Marsh Wren territories has continued to increase (from 9 in 1981). The number of Song Sparrow territories declined (from 8 in 1981); as in 1981, an additional 2 territories slightly overlapped the plot boundaries. Long-billed Marsh Wren fledglings were seen in 2 territories on June 24. This plot is being used as a comparative, healthy salt marsh for a salt marsh restoration project on a nearby slough. This study was funded by the U.S. Fish and Wildlife Service, Wildlife Research Field Station, Arcata, CA. Sandra Jacobson and Dana Base each conducted 3 censuses in

1981 John Kelly conducted the 1982 censuses.—*SANDRA L. JACOBSON, JOHN P. KELLY and DANA L. BASE, 3753 Bamboo Ct., Concord, CA 94520.*

187. DESERT RIPARIAN – FRESH-WATER MARSH AND PONDS. — **Location:** California; San Bernardino Co., 0.5 mi E of Rte. 62, Big Morongo Wildlife Preserve; 34°03'N, 116°35'W, Morongo Valley Quadrangle, USGS. **Continuity:** Established 1977; 6 consecutive years. **Size:** 15.38 ha = 38 acres. **Description of Plot:** See AB 32:113 (1977). **Weather:** Mostly clear and calm with cool to warm days, 38-80°F during censuses. **Coverage:** Apr. 23, 29; May 10, 13, 20, 24, 27; June 3; 0630-0930. Total man-hours: 24. **Census:** Lesser Goldfinch, 35 (228, 92); Bewick's Wren, 20 (130, 53); Starling, 17 (111, 45); Costa's Hummingbird, 12 (78, 32); Song Sparrow, 12; Gambel's Quail, 11 (72, 29); Phainopepla, 10 (65, 26); House Finch, 10; Rufous-sided Towhee, 9 (59, 24); Brown-headed Cowbird, 8 (52, 21); Mourning Dove, 7 (46, 18); House Wren, 7; Anna's Hummingbird, 6 (39, 16); Black-chinned Hummingbird, 5 (33, 13); Virginia Rail, 4 (26, 11); California Thrasher, 4; Yellow-breasted Chat, 4; Ash-throated Flycatcher, 3 (20, 8); Verdins, 3; Bushtit, 3; Com. Yellowthroat, 3; N. Oriole, 3; Summer Tanager, 3; Nuttall's Woodpecker, 2; Blue-gray Gnatcatcher, 2; Am. Kestrel, 1; Barn Owl, 1; Great Horned Owl, 1; Wied's Crested Flycatcher, 1; Black Phoebe, 1; Bell's Vireo, 1; Yellow Warbler, 1; Lucy's Warbler, 1; Hooded Oriole, 1; Indigo Bunting, 1; Cooper's Hawk, +; Red-tailed Hawk, +; White-winged Dove, +; Spotted Dove, +; W. Kingbird, +; Vermilion Flycatcher, +; Cassin's Kingbird, +; Cactus Wren, +. **Total:** 43 species; 213 territorial males or females (1385/km², 561/100 acres). **Visitors:** White-throated Swift, Scrub Jay, Scott's Oriole, Lawrence's Goldfinch. **Remarks:** Nests located 41; Starling, 14; Black-chinned Hummingbird, 5; Anna's Hummingbird, 5; Costa's Hummingbird, 3; House Wren, 2; Cooper's Hawk, 1; Am. Kestrel, 1; Barn Owl, 1; Great Horned Owl, 1; Nuttall's Woodpecker, 1; Black Phoebe, 1; Bushtit, 1; Bewick's Wren, 1; California Thrasher, 1; Phainopepla, 1; Hooded Oriole, 1; House Finch, 1. The census area was very wet again this year with extensive undergrowth of cat-tails, sedges, willows, and cottonwoods developing over the past several years. This increase in undergrowth may be at least partly responsible for the increases in breeding territories. The late, cool spring concentrating more species into a shorter breeding season may also help explain the increase this year. There were 10 species added this year over last year and only the Willow Flycatcher was absent. Two broods of downy young Virginia Rails were observed. The Great Horned Owl failed to fledge young for the second year in a row. Starlings and cowbirds increased in numbers for lack of an adequate control program. Warbling Vireo, Black-headed Grosbeak, and Lazuli Bunting were singing on territory but not long enough to establish breeding with any certainty. Special thanks to the San Bernardino Valley Audubon Society and the San Bernardino County Museum for supporting this study.—*EUGENE A. CARDIFF, JESSIE and ROY KNIFFEN, and*

THEO GLENN, San Bernardino Co Museum, 2024 Orange Tree Lane, Redlands, CA 92373.

188. FRESHWATER MARSH. — **Location:** California; Los Angeles Co., 2 mi W of Wilmington, side of Anaheim St., between Vermont Ave. and State Freeway 11. Harbor Lake (SW corner of T4S, R13W in the Torrance Quadrangle). **Continuity:** Established 1979; 2 intermittent years. **Size:** 9.71 ha = 24.0 acres. **Description of Plot:** See AB 34 101 (1980). **Weather:** Most days were overcast clearing at mid-day, 60-70°F. **Coverage:** Apr 6, 10; May 3, 11, 26; June 5; 0630-1100. Total man-hours: 27. **Census:** Long-billed Marsh Wren, 12 (124, 50); Bushtit, 9 (93, 38); Am. Coot, 8 (82, 33); House Finch, 8; Red-winged Blackbird, 6 (62, 25); Am. Goldfinch, 6; Pied-billed Grebe, 4 (41, 17); Song Sparrow, 3 (31, 13); Green Heron, 2; Mallard, 2; Killdeer, 2; Brown Towhee, 2; Cinnamon Teal, 1; Anna's Hummingbird, 1; Mockingbird, 1; Loggerhead Shrike, 1; Brown-headed Cowbird, 1; Com. Yellowthroat, 1. **Total:** 18 species, 70 territorial males or females (721/km², 292/100 acres). **Visitors:** Great Blue Heron, Black-crowned Night Heron, Ruddy Duck, Cooper's Hawk, Black-necked Stilt, Ring-billed Gull, Caspian Tern, Mourning Dove, Ash-throated Flycatcher, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Starling, W. Meadowlark, N. Oriole, Brewer's Blackbird. **Remarks:** Nests found 21: Long-billed Marsh Wren, 10; Bushtit, 3; Am Goldfinch, 3; House Finch, 2; Song Sparrow, 2; Killdeer, 1. Young were found of the following species: Pied-billed Grebe, Mallard, Am. Coot, Killdeer, Long-billed Marsh Wren, Mockingbird, and Red-winged Blackbird. Most of the nests were placed in mulefat or willows, with the exception of the Long-billed Marsh Wren which seems to prefer the protection of the Com. Cat-tail. Most males seemed to select the cat-tails for territorial perches. Male Red-winged Blackbirds dominated prime portions of the Cat-tails, establishing discrete boundaries between each calling male.—*JOHN J. ISITT, Dept of Biology, Calif. State Univ., Long Beach, CA 90840.*

189. RESTORED COASTAL SALT MARSH. — **Location:** California; Humboldt Co., within 1 mi E of Eureka; 40°47'30"N, 124°07'30"W, Arcata South Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. **Size:** Entire property 8.8 ha = 21.7 acres. The entire property was censused, but the study area of 3.8 ha = 9.3 acres is the part that has been restored to tidal action. Census numbers refer to the entire property. Note that these values are adjusted from previous studies; calculations of birds/100 ha and 100 acres for those studies should be multiplied by a correction factor of 1.12. **Description of Plot:** See AB 34:100-101 (1980) and AB 35:37 (1981). **1981:** **Weather:** Clear 4 days, foggy 2 days, overcast or partly cloudy 1 day each. Tide: 5 low, 3 high. **Coverage 1981:** May 23, 27; June 2, 10, 17, 21, 23, 28; 0800-1100. Total man-hours 13. **Census:** Song Sparrow, 9 (102, 41); Long-billed Marsh Wren, 8 (91, 37); Starling, 2; California Quail, 1; Virginia Rail, 1; Am. Robin, 1; Swainson's Thrush, 1; Red-winged Blackbird, 1; Grasshopper Sparrow, 1. **Total:**

tal: 9 species, 25 territorial males ($285/\text{km}^2$, 115/100 acres). **Visitors:** The number of times each species was recorded is in parentheses. Barn Swallow (8), Cliff Swallow (8), Rough-winged Swallow (6), Mourning Dove (5), Vaux's Swift (5), Belted Kingfisher (5), Killdeer (4), Com. Flicker (4), Black-crowned Night Heron (4), Violet-green Swallow (4), Black Phoebe (4), Brown-headed Cowbird (4), Snowy Egret (3), Am. Bittern (3), Am. Goldfinch (3), Lesser Goldfinch (3), Double-crested Cormorant (2), Turkey Vulture (2), Tree Swallow (2), Chestnut-backed Chickadee (2), Cedar Waxwing (2), Orange-crowned Warbler (2), Brewer's Blackbird (2), Savannah Sparrow (2), Great Egret (1), Mallard (1), Least Sandpiper (1), Allen's Hummingbird (1), W. Flycatcher (1), Com. Crow (1), Black-headed Grosbeak (1), House Finch (1). **Remarks:** This is the first BBC since the dike restraining tidal action was breached in December, 1980. The freshwater marsh and hillside within the property have not been directly affected by the salt water intrusion, but the central study area has begun to show some changes (see AB 35:102 1981). One notable change is the decline of the Savannah Sparrow from 3 nesting pairs in 1980 to visitor status in 1981. Marsh wrens and Song Sparrows have increased this year, as they have also at the comparative salt marsh. **1982:** Weather: Overcast 6 days, partly cloudy 2 days. Tide: High-low 1 day, low 4 days, low-low 3 days. **Coverage 1982:** June 5-6, 8, 12, 18-19, 24, 27; 0800-1100. Total man-hours: 11.5. **Census:** Song Sparrow, 11 (125, 51); Long-billed Marsh Wren, 4 (46, 18); Virginia Rail, 1; Killdeer, 1; Swainson's Thrush, 1; Starling, 1; Com. Yellowthroat, 1; Wilson's Warbler, 1; W. Meadowlark, 1; Red-winged Blackbird, 1; Savannah Sparrow, 1. **Total:** 11 species; 24 territorial males ($273/\text{km}^2$, 111/100 acres). **Visitors:** The number of times each species was recorded is in parentheses. Barn Swallow (8), Cliff Swallow (8), Violet-green Swallow (7), Vaux's Swift (4), Rough-winged Swallow (4), Black Phoebe (3), Am. Goldfinch (3), Snowy Egret (2), Black-crowned Night Heron (2), Mourning Dove (2), W. Flycatcher (2), Am. Robin (2), Turkey Vulture (1), White-tailed Kite (1), Am. Kestrel (1), California Quail (1), Spotted Sandpiper (1), Band-tailed Pigeon (1), Allen's Hummingbird (1), Belted Kingfisher (1), Mockingbird (1), Cedar Waxwing (1), Orange-crowned Warbler (1), Yellow-breasted Chat (1), House Sparrow (1), House Finch (1). **Remarks:** Typically, brackish marsh plants generally show higher frequencies of occurrence than recorded last year. Drainage channels have begun to form within the plot. The number of Song Sparrow territories has increased for the second year (from 9 in 1981). The number of Long-billed Marsh Wren territories, however, decreased (from 8 in 1981), even though the number increased at the comparative salt marsh for this study. The Mockingbird is unusual for this area and was a lone individual, but was singing. Sandra Jacobson and Dana Base conducted censuses during the BBC in 1981; John Kelly conducted the BBC in 1982. David W. Claycomb conducted the vegetation analysis for the plot. This study was funded by the U.S. Fish and Wildlife Service, Wildlife Research Field Station, Arcata, CA.—SANDRA L. JACOBSON,

JOHN P. KELLY, and DANA L. BASE,
3573 Bamboo Ct., Concord, CA 94520.

190. HAY MEADOW. — **Location:** New York, St. Lawrence Co., Pierrepont, Bowers farm on W side of Morrill Rd.; $44^\circ35'N$, $75^\circ02'W$, Pierrepont 7.5' Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 2.3 ha = 5.7 acres. **Elevation:** 700 ft (correction from 1981). **Weather:** See Census 3. **Coverage:** May 13-14, 27, 29; June 4, 13, 18, 27; 0445-2000, EDT. Total man-hours: 2. **Census:** Red-winged Blackbird, 4 (173, 70); Bobolink, 1; E. Meadowlark, 1; Com. Grackle, 1; E. Kingbird, +. **Total:** 5 species; 7 territorial males ($303/\text{km}^2$, 123/100 acres). **Visitors:** Barn Swallow, Am. Robin, Yellow Warbler, Com. Yellowthroat, Chipping Sparrow. **Remarks:** Most visitors nest in shade trees and hedgerow on edge of field. Absence of sparrows is attributed to uniform dense grass with absence of perches and patches.—KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, NY 13617.

191. OLD FIELD HABITAT. — **Location:** New Jersey; Morris Co., Great Swamp NWR. 1 mi E of Basking Ridge. **Continuity:** Established 1980; 3 consecutive years. **Size:** 7.3 ha = 18.1 acres. **Description of Plot:** See AB 35:72 (1981). **Weather:** average temperature for May was 60°F ($36-84^\circ$); total rainfall was 2.98 in. Average temperature for June was 64°F ($41-86^\circ$); total rainfall was 5.21 in. **Coverage:** May 6, 11, 14, 21, 25, 28; June 1, 8, 10; 0545-0730. Total man-hours: 12.5. **Census:** Yellow Warbler, 17 (232, 94); Com. Yellowthroat, 15 (205, 83); Gray Catbird, 6 (82, 33); Willow Flycatcher, 4.5 (61, 25); Song Sparrow, 4 (55, 22); Swamp Sparrow, 4; Blue-winged Warbler, 3 (41, 17). **Total:** 7 species; 53.5 territorial males ($730/\text{km}^2$, 296/100 acres). **Visitors:** Ring-necked Pheasant, Black-billed Cuckoo, Com. Flicker, E. Kingbird, E. Wood Pewee, Mockingbird, N. Parula, Brown-headed Cowbird, Cardinal, Rufous-sided Towhee, Field Sparrow.—JOANNE LASKOWSKI and GRAHAM W. TAYLOR, 153 Pleasant Plains Rd., Basking Ridge, NJ 07920.

192. OLD FIELD. — **Location:** Ontario, Wellington Co., 4 mi N of Hwy 401 and Hwy 6 S; $43^\circ30'N$, $80^\circ08'W$, Topographic Map 40 P/9b, Rockwood. **Continuity:** New. **Size:** 8.1 ha = 20.0 acres (rectangular 348 × 278 yds, paced with compass). **Description of Plot:** Hawthorn (*Crataegus* sp.) was the dominant shrub, mostly less than 10 ft tall and spaced approximately 15 ft apart. Hawthorn was associated with Hawkweed (*Hieracium* sp.), Com. St.-Johnswort (*Hypericum perforatum*), Queen Ann's Lace (*Daucus carota*) and, less abundantly, grasses; this association covered 51% of the plot. An association of goldenrods (*Solidago* sp.) and grasses covered another 31%. Various mixtures of grasses, goldenrods, White Sweet Clover (*Melilotus alba*) and Oxe-eye Daisy (*Chrysanthemum leucanthemum*) covered 15%. Man-made brush and rock piles occupied 3%. **Edge:** Similar to plot for at least 100 yds. **Topography:** Rolling glacial till. **Elevation:** 1160 ft. **Coverage:** May 20, 25; June 1, 7, 13, 19; July 1, 3; between 0500-0700 and 2030-2200. Total man-hours: 15. **Census:** Savan-

nah Sparrow, 9 (111, 45), Bobolink, 3 (5 (43, 18), E. Meadowlark, 2.5, Clay-colored Sparrow, 1.5; Field Sparrow, 1.5; Am. Woodcock, 1; Upland Sandpiper, 1; E. Kingbird, 1; Song Sparrow, +. **Total:** 9 species, 21 territorial males ($259/\text{km}^2$, 105/100 acres) **Visitors:** Red-tailed Hawk, Com. Flicker, Red-winged Blackbird, Am. Goldfinch **Remarks:** Nests found (2): Upland Sandpiper, E. Kingbird.—S.D. WILSON, Dept. of Botany and Genetics, Univ. of Guelph, Guelph, ON N1G 2W1, present address, Dept. of Biology, University of Ottawa, Ottawa, ON K1N 6N5 CANADA.

193. CULTIVATED FIELD I. — **Location:** Iowa, Mills Co., 5 mi N of Hastings, $41^\circ06'N$, $95^\circ30'W$; Malvern Quadrangle, USGS. **Continuity:** New. **Size:** 10.6 ha = 26.1 acres (trapezoidal, measured from aerial photograph). **Description of Plot:** A sloping cultivated field with bench terraces. The 23.5 tilled acres were planted to Oats (*Avena sativa*). The remaining 2.6 acres are terrace facings, end rows, sod waterways, and road ditches, all dominated by Smooth Brome (*Bromus inermis*). **Edge:** Cultivated fields, gravel road, and wooded stream. **Topography:** West-facing slope. **Elevation:** 1050-1140 ft. **Coverage:** Apr. 16; May 17; June 3, 5, 7, 11, 16, 18-19; July 2, 19, 21, 26. Total man-hours: 5.5. **Census:** Dickcissel, 6 (57, 23), Com. Yellowthroat, 3.5 (33, 13); Red-winged Blackbird, 3 (28, 11); Ring-necked Pheasant, 1; E. Bluebird, 0.5; E. Kingbird, +; Horned Lark, +; W. Meadowlark, +; Brown-headed Cowbird, +. **Total:** 9 species, 14 territorial males and females ($133/\text{km}^2$, 54/100 acres). **Visitors:** Barn Swallow **Remarks:** Nests found: E. Bluebird, 2; and a brood of pheasants. The Horned Larks were present in April. Only one Dickcissel was present through June 5. The others probably moved in because nearby fields were tilled or mowed in early June. They and the blackbirds all left after the crop was harvested on July 19.—BARBARA L. WILSON, Rt 1, Box 41, Hastings, IA 51540.

194. CULTIVATED FIELD II. — **Location:** Iowa, Mills Co., 5 mi N and 0.5 mi W of Hastings; $41^\circ06'N$, $95^\circ31'W$; Malvern Quadrangle, USGS. **Continuity:** New. **Size:** 18.7 ha = 46.2 acres (trapezoidal, measured from aerial photograph). **Description of Plot:** A sloping cultivated field with bench terraces. The cultivated area is 41.5 acres, planned to Soybeans (*Glycine max*) in 39-in. rows. The remaining 4.7 acres are terrace faces, sod end rows and waterways, and a road ditch, all dominated by Smooth Brome (*Bromus inermis*). There are 7 trees, producing a canopy cover of 0.8%. **Edge:** Cultivated field, farm-yard, wooded stream, and gravel road. **Topography:** There are 2 hills, and the land slopes mainly to the S. **Elevation:** 1050-1138 ft. **Coverage:** June 3, 5, 7, 11, 16, 18-19, 28, July 2; Aug. 2. Total man-hours, 7. **Census:** House Sparrow, 2; Dickcissel, 2; Vesper Sparrow, 2; Bobwhite, 1; Lark Sparrow, 1, Com. Flicker, 0.5; Red-headed Woodpecker, +; E. Kingbird, +; E. Bluebird, +, W. Meadowlark, +; N. Oriole, +; Brown-headed Cowbird, +. **Total:** 12 species, 8.5 territorial males ($45/\text{km}^2$, 18/100 acres) **Visitors:** Chimney Swift, Barn Swallow, Blue Jay. **Remarks:** Nests found: flicker, 1; Ves-

per Sparrow, 1. The Lark Sparrows were last seen on June 5, shortly before the field was tilled. The Dickcissels arrived in late July, after the nearby oat field was harvested.—*BARBARA L. WILSON, Rt. 1, Box 41, Hastings, IA 51540.*

195. FARMSTEAD. — **Location:** Iowa, Mills Co., 4½ mi N and ¾ mi W of Hastings; 41°06'N, 95°31'W, Malvern Quadrangle, USGS. **Continuity:** New. **Size:** 7.7 ha = 19 acres (nearly square, measured from aerial photograph). **Description of Plot:** This farmstead has numerous medium-sized and small buildings, most of them open. There are windbreaks and scattered trees, hog pastures, and bare lots. Trees 3 in. diameter and over, determined by measuring all the trees, 28/acre; total basal area, 24 ft²/acre. Species comprising 95% of the total number of trees: (figures after each give number of trees/acre, relative density (%), relative dominance (%), in that sequence): Red Mulberry (*Morus rubra*) 15, 54, 29; Red Oak (*Quercus sp.*) 4, 13, 47; dead trees, 18, 6, 1.6; Box-elder (*Acer negundo*) 16, 6, 1.3; Apple (*Pyrus malus*), 13, 5, 0.7; Am. Elm (*Ulmus americana*), 0.9, 3, 1.7; Pine (*Pinus sp.*), 0.7, 3, 4.2; Hackberry (*Celtis occidentalis*), 0.7, 3, 2.6; Siberian Elm (*U. pumila*), 0.6, 2, 5.5; Walnut (*Juglans nigra*), 0.6, 2, 4.5. Trees by diameter size class: (figures after each size class give number of trees/acre, relative density (%), basal area (ft²/acre), relative dominance (%), in that sequence): A (3-6 in.) 10.2, 37, 1.0, 4; B (6-9 in.) 7.6, 28, 2.3, 10; C (9-12 in.) 4.0, 14, 3.2, 13; D (12-15 in.) 2.8, 10, 5.0, 21; E (15-21 in.) 1.6, 6, 5.1, 21; F (21-27 in.) 1.0, 4, 4.9, 20; G (27-33 in.) 0.2, 1, 1.5, 6; H (33-50 in.) 0.1, 0.3, 1.2, 5. Shrub stems/acre, 39; ground cover, 64%; canopy cover, 21%. **Edge:** Bordered by wooded pasture, cultivated field, and gravel road. **Topography:** Sloping to the S and W. **Elevation:** 1040-1090 ft. **Coverage:** Apr 18, 25, 30; May 15, 17, 19, 22, 28, 30; June 1, 3, 8, 18, 23-24, 28-29; July 13. Total man-hours: 21. **Census:** House Sparrow, 119 (1548, 626); House Wren, 3.5 (46, 18); Am. Robin, 3.5; Barn Swallow, 2; E. Bluebird, 2; Bobwhite, 1; Rock Dove, 1; Screech Owl, 1; Chimney Swift, 1; Red-headed Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Starling, 1; N. Oriole, 1; Cardinal, 1; Chipping Sparrow, 1; Mourning Dove, +; Com. Flicker, +; Red-bellied Woodpecker, +; White-breasted Nuthatch, +; Com. Yellowthroat, +; Brown-headed Cowbird, +; Am. Goldfinch, +. **Total:** 23 species; 141 territorial males (1834/km², 742/100 acres). **Visitors:** Com. Grackle. **Remarks:** Nests found: House Sparrow, 253; Am. Robin, 4; 3 each of Blue Jay, House Wren, and E. Bluebird; Barn Swallow, 2; Chimney Swift, 1, also a brood of young Screech Owls. To calculate the number of House Sparrows, I pulled down all accessible nests on April 30, then pulled them down again on June 3, and figured that all the new accessible nests and half the inaccessible ones were active. As I later found additional nests hidden in old woodpecker nests and inside machinery, I doubt this overestimates the population. The hog operation provides the sparrows with food, water, and shelter all year long.—*BARBARA L. WILSON, Rt. 1, Box 41, Hastings, IA 51540.*

196. SMOOTH BROME PASTURE. — **Location:** Iowa, Mills Co., 5.5 mi N and 0.5 mi W of Hastings; 41°06'N, 95°30'W; Malvern Quadrangle, USGS. **Continuity:** New. **Size:** 23.07 ha = 57 acres (nearly rectangular, measured from aerial photograph). **Description of Plot:** Sloping pasture with broad-base terraces. Trees mainly on the W fenceline. Trees 3 in. diameter and over, as determined by measuring all the trees, 2/acre; total basal area = 1 ft²/acre. Species comprising 90% of the total number of trees: (figures after each give number of trees/acre, relative density (%), relative dominance (%), in that sequence): Black Locust (*Robinia pseudoacacia*) 0.6, 29, 10; dead Osage Orange (*Mallotus pomifera*) 0.3, 13, 7; live Osage Orange, 0.1, 12, 14; Am. Elm (*Ulmus americana*) 0.2, 12, 12; Red Mulberry (*Morus rubra*) 0.1, 7, 7; oak (*Quercus sp.*) 0.1, 7, 32; dead Black Locust, 0.1, 6, 2; willow (*Salix sp.*) 0.1, 6, 6. Trees by diameter size class: (figures after each size class give number of trees/acre, relative density (%), basal area (ft²/acre), relative dominance (%), in that sequence): A (3-6 in.) 0.8, 39, 0.08, 8; B (6-9 in.) 0.7, 36, 0.2, 22; C (9-12 in.) 0.4, 19, 0.3, 31; D (12-15 in.) 0.04, 2, 0.1, 11; E (15-21 in.) 0.04, 2, 0.1, 11; F (21-27 in.) 0.02, 1, 0.09, 9; G (27-33 in.) 0.02, 1, 0.1, 13. Shrub stems/acre, 0.4. Percent ground cover: Smooth Brome (*Bromus inermis*), 78%; Blue Grass (*Poa pratense*), 17%; bare ground, 1.6%; Orchard Grass (*Dactylis glomerata*), 1.6%, other species total 2.2%. Canopy cover 2.5%. **Edge:** Bordered by cultivated fields planted to corn and soybeans, and a dirt road. **Topography:** East-facing slope. **Elevation:** 1080-1184 ft. **Coverage:** June 7, 11, 16, 18-19, 24; July 2, 5; Aug. 2. Total man-hours: 15. **Census:** Bobolink, 13 (56, 23); Dickcissel, 12 (52, 21); Grasshopper Sparrow, 7 (30, 12); Red-winged Blackbird, 5 (22, 9); W. Meadowlark, 2; Ring-necked Pheasant, 1; E. Kingbird, 1; Com. Yellowthroat, 1; Am. Goldfinch, 1; Red-headed Woodpecker, +; Brown-headed Cowbird, +. **Total:** 11 species; 43 territorial males (186/km², 75/100 acres). **Visitors:** Turkey Vulture, Am. Kestrel, Chimney Swift, Mourning Dove, Red-bellied Woodpecker, Hairy Woodpecker, Downy Woodpecker, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Blue Jay, Brown Thrasher, Starling, Brown-headed Cowbird. **Remarks:** Nests found: Bobolink, 2; E. Kingbird, 1. Cattle were turned into the pasture on June 17. The Starlings and the majority of the cowbirds came with them. My thanks to Roger Jackson for permission to study this pasture.—*BARBARA L. WILSON, Rt. 1, Box 41, Hastings, IA 51540.*

197. SUBIRRIGATED NATIVE HAY. — **Location:** Nebraska; Hall Co., NW¼ of the SW¼ of Sec. 34, T10N, R10W; 40°47'N, 98°26'W, Alda Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 16.2 ha = 40 acres. **Description of Plot:** See AB 36:105 (1982). **Weather:** See Census 198. **Coverage:** June 3-4, 7-8, 10-11, 15; 0625-1030, CDT. Total man-hours: 4.3. **Census:** Grasshopper Sparrow, 5.5 (34, 14); Bobolink, 5 (31, 13); W. Meadowlark, 4 (25, 10); Brown-headed Cowbird, 2 (females); Upland Sandpiper, 1.5. **Total:** 5 species; 18 territorial males or females (111/km², 45/100 acres). **Visitors:** Wood Duck, Com. Flicker, Barn Swallow,

Brown Thrasher. **Remarks:** Nests found Bobolink, 2, both parasitized by cowbirds, Upland Sandpiper, 1. See Remarks for Census 198 pertaining to Dickcissels.—*GARY R. LINGLE, and WM S. WHITNEY, 1219 Sixteenth St., Aurora, NE 68818.*

198. SUBIRRIGATED GRASSLAND. — **Location:** Nebraska; Hall Co., NE¼ of the SE¼ of Sec. 33, T10N, R10W; 40°47'N, 98°26'W, Alda Quadrangle, USGS. **Continuity:** Established 1981. **Size:** 16.2 ha = 40 acres. **Description of Plot:** See AB 36:105 (1982). **Weather:** Average temperatures for May and June were below normal, 60.8° and 65.8°F respectively. Precipitation for May and June was 6.72 and 5.99 in. respectively which was 4.53 in. above normal. The meadows remained unusually wet throughout the breeding season. **Coverage:** June 3-4, 7, 10-11, 15-16; 0640-0934, CDT. Total man-hours: 3.5. **Census:** Bobolink, 8 (49, 20); W. Meadowlark, 4.5 (28, 11); Brown-headed Cowbird, 2 (females); Grasshopper Sparrow, 2; Upland Sandpiper, 1.5. **Total:** 5 species, 18 territorial males or females (111/km², 45/100 acres). **Visitors:** Chimney Swift, Com. Flicker, E. Kingbird, Barn Swallow, Blue Jay. **Remarks:** This pasture was burned in April and placed within a 4-pasture rotation grazing system. It was grazed after the census period. Dickcissels were not present until the nearby alfalfa fields were cut, after the census period.—*GARY R. LINGLE, and WM S. WHITNEY, 1219 Sixteenth St., Aurora, NE 68818.*

199. SUBURBAN DEVELOPMENT IN PINE-OAK FOREST. — **Location:** Massachusetts; Plymouth Co., between N end of Long Pond and Long Pond Rd., 41°51'N, 70°36'W, Sagamore Quadrangle, USGS. **Continuity:** New (1979); 3 intermittent years. **Size:** 15.0 ha = 37.07 acres (determined from developer's survey). **Description of Plot:** See AB 37:45. **Weather 1979:** 7 visits on cloudy days, 4 on partly cloudy, 3 on clear days. Average census temperature 59°F. **Coverage:** June 7, 12, 14, 22, 25, 27, 29-30; July 7, 10-11, 16, 18-19; mostly 0515-0800, EDT, with one visit 1945-2030, averaging 78 minutes per visit. **Census (1979):** Am. Robin, 22 (147, 59), Blue Jay, 11 (73, 30); N. Oriole, 8 (53, 22), Com. Grackle, 5 (33, 13); Mourning Dove, 4 (27, 11); Black-capped Chickadee, 4; Starling, 3.5 (23, 9); E. Wood Pewee, 3 (20, 8), Chipping Sparrow, 3; White-breasted Nuthatch, 2; House Wren, 2; Gray Catbird, 2; Rufous-sided Towhee, 2; Tufted Titmouse, 1.5; Com. Flicker, 1; House Sparrow, 1; House Finch, 1; Hairy Woodpecker, 0.5; Downy Woodpecker, 0.5; Great Crested Flycatcher, 0.5; Song Sparrow, 0.5; Bobwhite, +; Red-breasted Nuthatch, +; Pine Warbler, +; Ovenbird, +; Com. Yellowthroat, +; Am. Goldfinch, +. **Total:** 27 species; 78 territorial males (520/km², 210/100 acres). **Visitors:** Black-billed Cuckoo, Chimney Swift, E. Phoebe, Tree Swallow, Barn Swallow, Com. Crow, Mockingbird, Blue-gray Gnatcatcher, Cedar Waxwing, Red-winged Blackbird, Brown-headed Cowbird, Cardinal, Purple Finch. **Remarks:** Nests found (3): E. Wood Pewee, 1; Black-capped Chickadee, 1; Starling, 1. This census was carried out by 10 people of the Manomet Bird Observatory. **Weather (1980):**

4 visits on cloudy days, 5 on partly cloudy, 6 on clear days. Average census temperature 63°F. **Coverage:** June 12, 18-19, 23-24; July 2-3, 7, 9, 16, 18, 23, 25, 28-29; 0530-0900, EDT, averaging 150 minutes per visit. **Census (1980):** Am. Robin, 31 (207, 84); Blue Jay, 14 (93, 38); N. Oriole, 10.5 (70, 28); Starling, 6 (40, 16); Chipping Sparrow, 5 (33, 13); Com. Grackle, 4.5 (30, 12); Mourning Dove, 4 (27, 11); Black-capped Chickadee, 4; E. Wood Pewee, 3 (20, 8); House Finch, 3; Tufted Titmouse, 2.5; White-breasted Nuthatch, 2.5; Song Sparrow, 2.5; House Sparrow, 2; Brown-headed Cowbird, 2; Am. Goldfinch, 2, Com. Flicker, 1.5; Downy Woodpecker, 1.5; House Wren, 1; Pine Warbler, 1; Ovenbird, 1; Rufous-sided Towhee, 1; Hairy Woodpecker, 0.5; Great Crested Flycatcher, 0.5; Gray Catbird, 0.5; Cardinal, 0.5; E. Kingbird, +; E. Phoebe, +; Scarlet Tanager, +. **Total:** 29 species; 107.5 territorial males ($717/\text{km}^2$, 290/100 acres). **Visitors:** Chimney Swift, Tree Swallow, Barn Swallow, Com. Crow, Fish Crow, Red-breasted Nuthatch, Brown Thrasher, Cedar Waxwing, Black-and-white Warbler, Red-winged Blackbird, Purple Finch. **Remarks:** Nests found (22): Am. Robin, 6; N. Oriole, 4; Starling, 3; Com. Flicker, 2; Tufted Titmouse, 2; Black-capped Chickadee, 1; Pine Warbler, 1; Com. Grackle, 1; House Finch, 1; Chipping Sparrow, 1. This census was carried out by 13 people of the Manomet Bird Observatory. **Weather (1982):** 2 visits on cloudy days, 2 on partly cloudy, 7 on clear days. Average census temperature 58°F. June had a record rainfall and below average temperatures. **Coverage:** June 1, 3, 9, 11, 15, 22, 26, 30; July 3, 7, 24; 0530-0930, EDT, averaging 132 minutes per visit. **Census (1982):** Am. Robin, 37 (247, 100); N. Oriole, 19 (127, 51); Blue Jay, 14 (93, 38); Starling, 8 (53, 22); Chipping Sparrow, 8; Mourning Dove, 7 (47, 19); House Sparrow, 5.5 (37, 15); Com. Grackle, 5 (33, 13); Pine Warbler, 4 (27, 11); E. Wood Pewee, 3 (20, 8); Black-capped Chickadee, 3; Gray Catbird, 2.5; Downy Woodpecker, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; House Finch, 2; Am. Goldfinch, 2; Rufous-sided Towhee, 2; Com. Flicker, 1.5; Yellow-rumped Warbler, 1.5; E. Kingbird, 1; Great Crested Flycatcher, 1; Wood Thrush, 1; Brown-headed Cowbird, 1 (fledgling); Scarlet Tanager, 1; Song Sparrow, 1; Hairy Woodpecker, 0.5; Cardinal, 0.5; Black-and-white Warbler, +. **Total:** 29 species; 138 territorial males ($920/\text{km}^2$, 372/100 acres). **Visitors:** Yellow-billed Cuckoo, Black-billed Cuckoo, Chimney Swift, Barn Swallow, Red-breasted Nuthatch, Mockingbird, Blue-gray Gnatcatcher, Cedar Waxwing, Ovenbird, Red-winged Blackbird, Purple Finch. **Remarks:** Nests found (43): Am. Robin, 13; Blue Jay, 6; Starling, 5; N. Oriole, 5; Mourning Dove, 4; House Sparrow, 3; Com. Grackle, 3; Hairy Woodpecker, 1; Downy Woodpecker, 1. The fact that nests of 31% of the individuals holding territories were found reflects mostly chance, not special effort. Only about 25% of the tract was readily viewable (from streets). The increase in reported density 1979-1982 probably reflects differences in census dates, variations in experience and techniques of observers, and the subjectiveness of mapping dense species, rather than any significant population trends. Of the 35

species breeding in at least one year, 10 were selected as being more representative of the suburban environment than the surrounding undeveloped forest. These comprised 75%, 75%, and 77% of the territorial males in the 3 census years, respectively, implying that transformation of breeding species occurred very rapidly during and after development (cf. Description of Area). American Robins, Blue Jays, and N. Orioles were clustered independently in 2 or 3 areas of the tract, rather than evenly distributed across it, for no apparent reason. Censusing assistance in 1982 was provided by 2 people of the Manomet Bird Observatory. Trevor Lloyd-Evans deserves special mention for encouraging and guiding this work.—P. WILLIAM SMITH, *Manomet Bird Observatory, P.O. Box 936, Manomet, MA 02345.*

200. URBAN PARK I. — **Location:** Washington, D.C., just SW of intersection of 17th Street, NW and Constitution Ave., 38°53'N, 77°2'W, Washington, D.C.-MD.-VA. Quadrangle, USGS. **Continuity:** New. **Size:** 0.69 ha = 1.7 acres. **Description of Plot:** Landscaped urban park consisting of weekly mown grass field with evenly distributed but sparse stand of sapling to pole stage hardwoods. Analysis of vegetation at 2 randomly selected points yielded the following: Relative dominance of trees: Sweet Gum (*Liquidambar styraciflua*), 69%; Red Maple (*Acer rubrum*), 19.8%; Red Oak (*Quercus rubra*), 11.2%. Relative density of trees: Sweet Gum, 64%; Red Maple, 29%; Red Oak, 7%. Trees by diameter size class: C (9-15 in.), 9; D (15-21 in.), 5; 70 trees/acre ($173/\text{ha}$); total basal area: 16.2 ft²/acre (3.7 m²/ha); shrub density: 7500 stems/acre; ground cover: 83%; canopy cover: 5%; mean canopy height: 20 ft (6 m); range: 0-25 ft (0-7.5m). **Edge:** Bounded on N and E by paved roads, W by man-made pond and S by man-made pond and mown grass field. **Topography:** Flat. **Coverage:** June 16-18, 21, 24, 29; 0710-0815, EDT. Total man-hours: 1.5. **Census:** Mockingbird, 1; Am. Robin, 1; Starling, 1; Song Sparrow, 1; Downy Woodpecker, +; Gray Catbird, +; House Finch, +. **Total:** 3.5 territories; ($509/\text{km}^2$, 206/100 acres). **Visitors:** Mourning Dove, Rock Dove, Barn Swallow, Rough-winged Swallow, Chimney Swift, Com. Crow, Blue Jay, Com. Grackle. **Remarks:** Total species, 6. Heavy use by pedestrians throughout breeding period.—JONATHAN M. ANDREW, *US Fish and Wildlife Service, Div. of Program Plans, Room 2558-MI, 18th and C St., Washington, DC 20240.*

201. URBAN PARK II. — **Location:** Washington, D. C.; approximately $\frac{1}{2}$ km W of Jefferson Memorial, between Tidal Basin waters and Ohio Drive, 38°53'N, 77°2'W, Washington West, D.C.-MD.-VA. Quadrangle, USGS. **Continuity:** New. **Size:** 1.51 ha = 3.74 acres. **Description of Plot:** Landscaped urban park consisting of a strip of trees 75 m wide or less between the Tidal Basin waters (bay of Potomac River) and Ohio Drive. Analysis of vegetation at 4 randomly selected points yielded the following: Relative dominance of trees: Am. Holly (*Ilex apaca*), 37%; Tulip-tree (*Liriodendron tulipifera*), 29%; Cherry (*Prunus sp.*), 26%; Norway Spruce (*Picea abies*), 6%. Relative

density of trees, Am. Holly, 69%, Cherry sp., 22%, Tulip-tree, 6%, Norway Spruce, 3%. Trees by diameter size class: B (6-9 in.), 1; C (9-15 in.), 14; D (15-21 in.), 29; E (21-27 in.), 11; F (27-33 in.), 4; G (33-40 in.), 2, H (40+), 1; 168 trees/acre (48.5 m²/ha); shrub density: 750 shrub stems/acre; ground cover, 65%; canopy cover, 59%; mean canopy height, 36 ft (11m)-range, 33-66 ft (10-20 m) **Edge:** Bounded on E by water (Tidal Basin-Potomac River), on W by paved road and grass field, on N and S by similar but more narrow strip of habitat. **Topography:** Flat **Coverage:** June 16-18, 21, 24, 29; 0555-0732, EDT. Total man-hours: 3. **Census:** Starling, 2; Cardinal, 1; Mallard, +; Rock Dove, +, Com. Crow, +; Carolina Chickadee, +, Mockingbird, +; Com. Grackle, +; House Sparrow, +. **Total:** 3 territories; ($198/\text{km}^2$, 80/100 acres). **Visitors:** Herring Gull, Mourning Dove, Chimney Swift, Downy Woodpecker, E. Kingbird, Great Crested Flycatcher, Blue Jay, Am. Robin. **Remarks:** Total species, 9. Nests found: Starling, 2 Extensive amount of human activity daily throughout nesting season.—JONATHAN M. ANDREW, *US Fish and Wildlife Service, Div. of Program Plans, Room 2558-MI, 18th and C St., Washington, DC 20240.*

202. URBAN PARK III. — **Location:** Washington, D.C.; Just W of 17th Street, NW, $\frac{1}{2}$ km WSW of the Washington Monument; 38°53'N, 77°2'W, Washington West, D.C.-MD.-VA. Quadrangle, USGS. **Continuity:** New. **Size:** 2.0 ha = 5.0 acres **Description of Plot:** Landscaped urban park containing semi-mature stand of hardwoods Analysis of the vegetation at 5 randomly selected points yielded the following: Relative dominance of trees: White Oak (*Quercus alba*), 28%; Red Oak (*Q. rubra*), 23%; White Pine (*Pinus strobus*), 19%; Am. Holly (*Ilex apaca*), 13%; Am. Beech (*Fagus grandifolia*), 10%; Am. Elm (*Ulmus americana*), 4%; Red Maple (*Acer rubrum*), 1%; Willow Oak (*Q. phellos*), less than 1%; Crabapple (*Pyrus sp.*), less than 1%. Relative density of trees: Am. Holly, 33%; White Pine, 26%; White Oak, 11%; Red Maple, 11%; Red Oak, 7%; Am. Beech, 7%; Am. Elm, 2%; Willow Oak, 2%; Crabapple, 2%. Trees by diameter size class: A (3-6 in.), 8; B (6-9 in.), 18; C (9-15 in.), 9; D (15-21 in.), 7; E (21-27 in.), 2, F (27-33 in.), 2; 92 trees/acre (228/ha); total basal area, 42 ft²/acre (9.6 m²/ha); shrub density: 0 stems/acre; ground cover: 72%; canopy cover: 56%; mean canopy height 58 ft (17m), range 29-99 ft (8-29 m). **Edge:** Bounded on the N by a mown grass field, on S and E by paved roads and W by similar habitat. **Topography:** Flat. **Coverage:** June 16-18, 21, 24, 29; 0630-0810, EDT. Total man-hours: 2.75. **Census:** Gray Catbird, 2, Starling, 2; Blue Jay, 1; Mockingbird, 1, Am. Robin, 1; Cardinal, 1; Song Sparrow, 1, Downy Woodpecker, 0.5; Rock Dove, +, Com. Crow, +; Com. Grackle, +. **Total:** 9.5 territories; ($469/\text{km}^2$, 190/100 acres) **Visitors:** Mourning Dove, Chimney Swift, Barn Swallow, Rough-winged Swallow, Fish Crow, Carolina Chickadee, Black-and-white Warbler. **Remarks:** Total species, 11. Nests found: Starling, 2; Gray Catbird, 2; Cardinal, 1. There was a heavily traveled footpath through the center of the plot. Itinerant per-

son "lived" in thicket in SW corner of plot —
JONATHAN M. ANDREW, US Fish and Wildlife Service, Div. of Program Plans, Room 2558-MI, 18th and C St., Washington, DC 20240.

203. VILLAGE, RESIDENTIAL. — **Location:** Ohio, Wyandot Co., Crawford Twp., Carey, central village area, S of 1981 (AB 36 106, 1982) and E of 1980 (AB 35:110, 1981) censuses; S of Dow St., E of N Vance St., W of N Patterson St., and to include the S side of S St. The area is bisected, diagonally (NE to SW), by a railroad and the right-of-way; about 40°57'N, 83°23'15"W, Carey Quadrangle, USGS. **Continuity:** New, but a continuation of a total village census. **Size:** About 13.76 ha = 34 acres. **Description of Plot:** See AB 31:91 (1977) and 32:124 (1978) for a generalized village environment. **Edge:** Supplied by streets, alleys, and railroad right-of-way. Total street-miles, 1.13, railroad-miles, 0.69. Total street-edge miles, 1.84, railroad-edge miles, 1.38. Total trees per 1.13 street-miles, 67, 59/street-mile, 36 5/street-edge mile (trees mostly on the northern and southern 2 streets). Street trees are mostly Silver Maple (*Acer saccharinum*). **Elevation:** 820 ft. **Coverage:** Almost daily. Total man-hours: 50. **Census:** House Sparrow, 25 (182, 74); Chimney Swift, 5 (36, 15); Am Robin, 5; House Wren, 4 (29, 12); Starling, 4; Com. Grackle, 3 (22, 9); Mourning Dove, 1; Song Sparrow, 1. **Total:** 8 species; 48 pairs (349/km², 141/100 acres). **Remarks:** This area of Carey is mostly commercial, the residential sections being on the N and S borders, along 2 streets. The railroad right-of-way was clearcut of all vegetation which decreased the density by at least 3 pairs of 2 species, the Am. Goldfinch and Song Sparrow. The Com. Nighthawk nested in previous years, but moved to another section this year. No cowbird eggs or young were noted. The Rock Dove probably nested.—A. H. CLAUGUS, 228 S. Lake St., Carey, OH 43316.

204. SMALL TOWN, RESIDENTIAL AND COMMERCIAL AREAS. — **Location:** Kansas; Douglas Co., the central portion of Baldwin City, bounded by Kansas highway 56 (Ames St.) on the N, Newton St. on the S, 10th St. on the W, and 6th St. on the E; 38°47'N, 95°11'W, Baldwin City Quadrangle, USGS. **Continuity:** New. **Size:** 66.9 ha = 165 3 acres (rectangular, 1500 × 4800 ft measured from an aerial photo). **Description of Plot:** See AB 37:47 (1983). **Weather:** Same as for "Breeding bird populations of selected oak-hickory forests in northeastern Kansas, I-VI", this issue. **Coverage:** June 7, 10-11, 14, 23-24, 28-29; 8 trips, 0600-1200 hr. Total man-hours: 40. **Census:** Am. Robin, 127 (190, 77); House Sparrow, 108 (161, 65); Starling, 48 (72, 29); Purple Martin, 32 (48, 19); Blue Jay, 29 (43, 18); House Wren, 28 (42, 17); Chimney Swift, 23 (34, 14); Gray Catbird, 16 (24, 10); Cardinal, 15 (22, 9); N. Oriole, 13 (19, 8); Brown-headed Cowbird, 10 (15, 6); Brown Thrasher, 8 (12, 5); Com. Grackle, 8; Mourning Dove, 7 (10, 4); Great Crested Flycatcher, 6 (9, 4); Com. Flicker, 5 (7, 3); Downy Woodpecker, 4 (6, 2); Black-capped Chickadee, 3 (4, 2); Tufted Titmouse, 2; White-breasted Nuthatch, 2; Am. Kestrel, 1; Killdeer, 1; Yellow-billed Cuckoo, 1;

Screech Owl, 1; Ruby-throated Hummingbird, 1; Red-bellied Woodpecker, 1; E. Kingbird, 1; E. Meadowlark, 1; Hairy Woodpecker, +; W. Kingbird, +; E. Wood Pewee, +; Barn Swallow, +. **Total:** 32 species; 502 territorial males (750/km², 304/100 acres). **Visitors:** Black-billed Cuckoo, Great Horned Owl, Com. Nighthawk, Red-headed Woodpecker, E. Phoebe, Com. Crow, Warbling Vireo, Red-winged Blackbird, Rose-breasted Grosbeak, Indigo Bunting, Am. Goldfinch. **Remarks:** Chimney Swift numbers are based on use of chimneys on the area (nesting pairs) rather than aerial forager numbers. Purple Martin numbers are similarly based on pairs occupying martin houses. Other nests found: House Sparrow 42, Am. Robin 15, House Wren 10, Blue Jay 6, Gray Catbird 4, Cardinal 4, N. Oriole 3, Brown Thrasher 2, Com. Grackle 2, Mourning Dove 1, Downy Woodpecker 1; Great Crested Flycatcher 1.—CALVIN L. CINK, Biology Dept., Baker Univ. Baldwin City, KS 66006.

205. SUBURBAN UNIVERSITY CAMPUS. — **Locations:** California; Los Angeles Co., Calif. State Univ. Long Beach (upper campus). 33°48'N, 118°17'W, Los Alamitos Quadrangle USGS. Bounded on the N by a walkway separating upper and lower campus, S by State Hwy 22, E by a residential neighborhood, W by U.S. Veterans Hospital. **Continuity:** New. **Size:** 28.2 ha = 69.7 acres (established from an architectural map; roughly rectangular, about 817 to 866 yds NS and 408 yds EW). **Description of Plot:** Buildings comprise 21% of the area, paved parking lots, roadways, and walkways roughly 20%. The flora of the university consists of 211 species, many of which are exotic. Most buildings are surrounded by low ornamental shrubs, primarily *Bougainvillea glabra*, Privet (*Ligustrum* sp.), Chinese Hibiscus (*Hibiscus rosa sinesis*), Laurel-leaved Snail Seed (*Cocculus laurifolius*), Oleander (*Nerium oleander*), Indian Hawthorne (*Rhaphiolepis indica*), Chinese Wisteria (*Wisteria sinensis*), Shiny Xylosma (*Xylosma congestum*), and Ivy (*Hedera* sp.). The remainder of the area is mowed grass. The dominant trees are Ficus (*Ficus benjamina*, *F. retusa*), Gum (*Eucalyptus citriodora*, *E. polyanthema*), Peach (*Prunus persica*, *P. cerasifera*), Olive (*Olea europaea*), Palms (*Washingtonia filifera*, *Archontophoenix cunninghamiana*, *Prachycarpus fortunei*, *Erythea edulis*), Sycamore (*Platanus racemosa*), California Live Oak (*Quercus agrifolia*), Pines (*Pinus canariensis*, *P. pinea*), Evergreen Ash (*Fraxinus uhdei*), Chinese Elm (*Ulmus parvifolia*). **Topography:** Elevation 10-80 ft with approximately half of the campus 75 ft or higher. The area is fairly level but sloping down at the N end. **Weather:** Temperatures, 52-87°F; average range, 56-71°F; total precipitation, 0.79 in. **Coverage:** Apr. 1, 15, 20, 27; May 4-6. Total man-hours: 17.5. **Census:** House Sparrow, 69 (245, 99); House Finch, 25 (89, 36); Starling, 21 (74, 30); Mockingbird, 14.5 (51, 21); Mourning Dove, 13 (46, 19); Spotted Dove, 12 (43, 17); Anna's Hummingbird, 8.5 (30, 12); Rock Dove, 5 (18, 7); Allen's Hummingbird, 3 (11, 4); Am. Robin, 1; Com. Crow, 0.5. **Total:** 11 species; 172.5 territorial males (612/km², 247/100 acres). **Visitors:** Cliff Swallow,

Scrub Jay, Bushtit, Cedar Waxwing, Yellow-rumped Warbler, Brewer's Blackbird. **Remarks:** Nests found (62): House Sparrow, 49, House Finch, 8; Starling, 3; Mourning Dove, 1; Am. Robin, 1.—STEVEN V. NEELY and HEATHER HOLLIS, 10371 Orangewood Ave, Garden Grove, CA 92640.

206. MIXED OAK-PINE FOREST I. — **Location:** Pennsylvania; Luzerne Co., 1 6 km NNE of Wapwallopen; 41°04'N, 76°07'W, Sybertsville Quadrangle, USGS. **Continuity:** Established 1977; 6 consecutive years. **Size:** 6.0 ha = 14.8 acres. **Description of Plot:** See AB 33:70 (1979). **Weather:** Using data acquired at nearest NOAA station in Avoca, Pa., June was wet (3.82 in. above average) and cool (3.6°F below average). Otherwise weather was fairly normal. During censuses, the average temperature was 60° (range: 43.7-80.0°). The skies were variable, but usually partly cloudy with little or no wind (range: 0-7.5 mph). **Coverage:** May 6, 17, 26; June 8, 15, 23; July 1, 6-7, 14, 26; 0445-1000, EST. Total man-hours: 40. **Census:** Black-capped Chickadee, 6.5 (109, 44); Ovenbird, 5 (83, 34); Red-eyed Vireo, 3 5 (58, 24); Wood Thrush, 3 (50, 20); Scarlet Tanager, 3; Black-and-white Warbler, 2 5; Brown-headed Cowbird, 2.5; Great Crested Flycatcher, 2; Blue Jay, 2; Tufted Titmouse, 2; E. Wood Pewee, 1.5; Blue-gray Gnatcatcher, 1.5; Broad-winged Hawk, 1; Yellow-billed Cuckoo, 1; Com. Flicker, 1; Am. Robin, 1; Cedar Waxwing, 1; Hairy Woodpecker, 0.5; Cardinal, 0.5; Rose-breasted Grosbeak, 0.5; Ruffed Grouse, +; Great Horned Owl, +; Black-billed Cuckoo, +; Ruby-throated Hummingbird, +; Downy Woodpecker, +; Pileated Woodpecker, +; White-breasted Nuthatch, +; Solitary Vireo, +; Worm-eating Warbler, +; Indigo Bunting, +; Am. Goldfinch, +; Rufous-sided Towhee, +; Chipping Sparrow, +. **Total:** 33 species; 41.5 pairs (693/km², 280/100 acres). **Visitors:** E. Kingbird, Com. Crow, Red-breasted Nuthatch, Brown Creeper, Hermit Thrush, Gray Catbird, Prairie Warbler, Am. Redstart, N. Oriole, Orchard Oriole, Com. Grackle, Red-winged Blackbird. **Remarks:** Nests found (1 each): Broad-winged Hawk, Com. Flicker, Great Crested Flycatcher, E. Wood Pewee, Ovenbird. Fledglings observed: Ruffed Grouse, Hairy Woodpecker, Blue Jay, Wood Thrush, Black-and-white Warbler, Indigo Bunting, Rufous-sided Towhee, and Chipping Sparrow. The breeding bird density was higher than in any previous year censused. Although gypsy moth egg cases and early instar caterpillars were abundant, the defoliation was low, less than 10%, and may have been curtailed by the wet and cool weather of June. J. D. Montgomery and V. L. Schnerr assisted with the gypsy moth defoliation study. This census is part of a study supported by the Pennsylvania Power and Light Co.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R.D. 1, Berwick, PA 18603.

207. MIXED OAK-PINE FOREST II. — **Location:** Pennsylvania; Luzerne Co., 3 4 km NE of Beach Haven and 2.8 km NW of Wapwallopen; 41°05'N, 76°07'W, Berwick Quadrangle, USGS. **Continuity:** Established 1977; 6 consecutive years. **Size:** 11.05 ha =

27 3 acres Description of Plot: See AB 33 70 (1979). **Weather:** Like Census 206, but with mean temperatures during censuses 61.7°F (range: 50-84°) and cloud cover variable, sometimes foggy or hazy near dawn. **Coverage:** May 10, 18, 24; June 1-2, 14, 22, 28; July 8, 12-13, 24; 0440-1000, EST. Total man-hours: 40. **Census:** Scarlet Tanager, 6 (54, 22), Black-capped Chickadee, 5 (45, 18); Rose-breasted Grosbeak, 4.5 (41, 16); Wood Thrush, 4 (36, 15); E. Wood Pewee, 3.5 (32, 13), Tufted Titmouse, 3.5; Brown-headed Cowbird, 3.5; Red-eyed Vireo, 3 (27, 11); Blue Jay, 2.5; Cardinal, 2.5; Downy Woodpecker, 2; Hooded Warbler, 2; Com. Flicker, 1.5, Am. Robin, 1.5; Gray Catbird, 1.5; Ovenbird, 1.5; Hairy Woodpecker, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Cedar Waxwing, 1; Rufous-sided Towhee, 1; Yellow-billed Cuckoo, +; Pileated Woodpecker, +; Great Crested Flycatcher, +; Black-and-white Warbler, +; Am. Redstart, +; N. Oriole, +; Indigo Bunting, +. **Total:** 28 species; 53 pairs (480/km², 194/100 acres). **Visitors:** Cooper's Hawk, Broad-winged Hawk, Red-tailed Hawk, Ruffed Grouse, Mourning Dove, E. Kingbird, Com. Crow, Fish Crow, House Wren, Veery, Com. Grackle, Am. Goldfinch. **Remarks:** Nests found: Wood Thrush (4), Com. Flicker (1), Blue Jay (1), Blue-gray Gnatcatcher (1), Gray Catbird (1), Scarlet Tanager (1), Cardinal (1), Rose-breasted Grosbeak (1). Fledglings observed: Downy Woodpecker, Black-capped Chickadee, Tufted Titmouse, and Brown-headed Cowbird. Two male Scarlet Tanagers fed fledgling Brown-headed Cowbirds. Gypsy moth egg masses and early instars were abundant in parts of the plot, but defoliation was slight (less than 5%). J. D. Montgomery and V. L. Schnerr assisted with the gypsy moth defoliation study. This census is part of a study supported by Pennsylvania Power and Light Co.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R. D. 1, Berwick, PA 18603.

208. ABANDONED FIELD I.—**Location:** Pennsylvania, Luzerne Co., 2.6 km NNE of Wapwallopen; 40°05'N, 76°07'W, Sybertsville Quadrangle, USGS. **Continuity:** Established 1978; 5 consecutive years. **Size:** 6.0 ha = 14.8 acres. **Description of Plot:** See AB 34 102 (1980) and addendum in AB 35:102 (1981). **Weather:** As Census 206, except that during censuses temperatures averaged 48.5° (range: 36.5-82°F) and the skies were more hazy. **Coverage:** May 5, 12, 25; June 9, 16, 24; July 2, 23; Aug. 1, 19; Sept. 2; from 0445-0930, EST. Total man-hours: 42. **Census:** Com. Yellowthroat, 10.5 (175, 71); Field Sparrow, 10 (167, 68); Am. Goldfinch, 5 (83, 34); Song Sparrow, 4.5 (75, 30); Yellow Warbler, 3.5 (58, 24); Gray Catbird, 3 (50, 20); Prairie Warbler, 3; Willow Flycatcher, 2; Cedar Waxwing, 2; Yellow-breasted Chat, 2; Indigo Bunting, 2; Rufous-sided Towhee, 2; Starling, 1.5; Black-billed Cuckoo, 1; Golden-winged Warbler, 1; E. Kingbird, 0.5; Ring-necked Pheasant, +; Am. Kestrel, +; Brown Thrasher, +; Blue-winged Warbler, +; Brown-headed Cowbird, +; Cardinal, +. **Total:** 22 species; 53.5 pairs (893/km², 361/100 acres). **Visitors:** Cooper's Hawk, Mourning Dove, Downy Woodpecker, Com. Flicker, Great Crested Flycatcher, Mocking-

bird, Am. Redstart, Com. Grackle, N. Oriole, Chipping Sparrow. **Remarks:** Nests found: Gray Catbird (3), Yellow Warbler (3), Cedar Waxwing (2), Starling (2), Yellow-breasted Chat (2), Am. Goldfinch (2), Field Sparrow (2), Song Sparrow (2), Black-billed Cuckoo (1), E. Kingbird (1), Willow Flycatcher (1), Rufous-sided Towhee (1). Fledglings observed: House Wren, Prairie Warbler, Com. Yellowthroat, Indigo Bunting. The breeding bird density continued its increasing linear trend to a level 2.4 times that of 1978. Most of this increase appears a result of typical old field plant succession. Several plant species demonstrated increasing trends from 1978 to 1981. Among these were Flowering Dogwood, Gray Birch, Red Maple, Gray Dogwood, and Poison Ivy. Parts of the plot have developed a shrub and sapling canopy or a dense thicket of shrubs, saplings, and vines. Thanks to James D. Montgomery for vegetation data. This census is part of a study supported by the Pennsylvania Power and Light Co.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R.D. 1, Berwick, PA 18603.

209. ABANDONED FIELD II.—**Location:** Pennsylvania, Luzerne Co., 2.2 km ENE of Beach Haven and 1.2 km W. of Wapwallopen; 41°04'N, 76°07'W, Berwick Quadrangle, USGS. **Continuity:** Established 1979 (1980); 4 consecutive years. **Size:** 4.34 ha = 10.7 acres. **Description of Plot:** See AB 35:102-3 (1981). **Weather:** As Census 206, except that during censuses the temperature averaged 57.9°F (range 33-82°) and the skies were generally hazy or foggy, then clearing. **Coverage:** May 4, 11, 20, 27; June 10, 18, 25; July 19, 31; Aug. 12, 24; from 0440-0830, EST. Total man-hours: 30. **Census:** Field Sparrow, 8.5 (196, 79); Song Sparrow, 8.5; Am. Goldfinch, 3.5 (81, 33); Willow Flycatcher, 3 (69, 28); Red-winged Blackbird, 2; Gray Catbird, 1.5; Com. Yellowthroat, 1.5; Cedar Waxwing, 1; Yellow Warbler, 1; Cardinal, +; Indigo Bunting, +; Rufous-sided Towhee, +. **Total:** 12 species; 30.5 pairs (704/km², 285/100 acres). **Visitors:** Mourning Dove, E. Kingbird, Barn Swallow, Blue Jay, Mockingbird, Brown Thrasher, Am. Robin, E. Meadowlark, Com. Grackle. **Remarks:** Nests found: Am. Goldfinch (4), Willow Flycatcher (2), Gray Catbird (2), Yellow Warbler (2), Red-winged Blackbird (2), Song Sparrow (2), Cedar Waxwing (1), Field Sparrow (1). As in Census 208, the breeding bird density in this plot has increased linearly as a result of old field plant succession. The density was 56% higher than in 1979. This census is part of a study supported by Pennsylvania Power and Light Co.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R.D. 1, Berwick, PA 18603.

210. GOLF AND COUNTRY CLUB.—**Location:** Ontario; Hamilton-Wentworth Region; Town of Ancaster; Ancaster; 43°13'0"N, 79°58'15"W, Hamilton Golf and Country Club. **Continuity:** New (1981). **Size:** 45.5 ha = 112.4 acres. **Description of Plot:** A combination of several communities including coniferous plantation (25%), deciduous woodlands (25%), shrub wetland (14%), wet meadow (5%), marsh (1%), pond (5%), and mowed grass (25%). The coniferous plantation consists mainly of White Pine (*Pinus strobus*), Norway Spruce (*Picea abies*), and White Spruce (*P. glauca*). A deciduous woodlot dominates the E portion of the plot with species dominance varying according to the age of the community as well as moisture conditions. Red Maple (*Acer rubrum*), Sugar Maple (*A. saccharum*), Shagbark Hickory (*Carya ovata*), White Oak (*Quercus alba*), Red Oak (*Q. rubra*) and White Ash (*Fraxinus americana*) are all well represented in the primary canopy while Hawthorn (*Crataegus* sp.), Blue Beech (*Carpinus caroliniana*), Yellow Birch (*Betula lutea*), and Sugar Maple comprise the majority of the secondary canopy. The herbaceous layer is dominated largely by Herb Robert (*Geranium robertianum*) and Enchanter's Nightshade (*Circaea quadrangularis*). Red-osier Dogwood (*Cornus stolonifera*) and Gray Dogwood (*C. racemosa*) dominate the shrub wetland community with scattered trees of Silver Maple (*A. saccharinum*), and Am. Elm (*Ulmus americana*). Quack Grass (*Agropyron repens*), a sedge (*Carex cristatella*), and Jewelweed (*Impatiens capensis*) abound within the herbaceous layer. The wet meadow contains a few clumps of Gray and Red-osier Dogwood with a few Am. Elm and White Willow (*Salix alba*). Commonest herbs are Spikerush (*Eleocharis obtusa*), *Carex cristatella*, and Rice Cutgrass (*Leersia oryzoides*). Marshy areas are dominated largely by Cat-tails (*Typha angustifolia*). A stream traverses the property from the N and drains into a 12,500 m² pond in the center of the plot. **Edge:** A paved road marks the N periphery as well as a portion of the S end. The E boundary runs adjacent to the back yards of residential homes while the W extremity consists of an arbitrary N-S line cutting through a series of pine plantations and fairways. This latter boundary more or less bisects the golf course. **Topography:** Gently rolling with 3 distinct knolls along the E periphery. **Elevation:** 775-825 ft. **Weather:** Average monthly temperature range with normals in parentheses. Average for May 6.6-18.0°C (6.6-18.5°) average for June 12.3-23.8° (12.1-24.1°). Total rainfall: May, 59.3 mm (64.3 mm); June, 81.0 mm (56.9 mm). Total sunshine: May, 247 hrs (245.8 hrs); June, 270.8 hrs (261 hrs). **Coverage 1981:** May 22-23, 26, 29-30; June 5-6; between 0600-2100, EDT. Total man-hours: 92.5. **Census:** Am. Robin, 21 (46, 19), Com. Grackle, 15.5 (34, 14); Cedar Waxwing, 15 (33, 13); Cardinal, 14 (31, 12); Gray Catbird, 12 (26, 11); Black-capped Chickadee, 10 (22, 9); N. Oriole, 7.5 (16, 7); Song Sparrow, 7.5; Great Crested Flycatcher, 7 (15, 6); Wood Thrush, 7; Rose-breasted Grosbeak, 7; Blue Jay, 5.5 (12, 5); Red-winged Blackbird, 5 (11, 4); Am. Goldfinch, 5; Com. Flicker, 4; Com. Crow, 4; Red-eyed Vireo, 4 (9, 4); Indigo Bunting, 4; E. Wood Pewee, 3 (7, 3); Yellow Warbler, 2.5; Mallard, 2; Brown-headed Cowbird, 2; Starling, 1.5; Chipping Sparrow, 1.5; Canada Goose, 1; Ruffed Grouse, 1; Killdeer, 1; Spotted Sandpiper, 1; Mourning Dove, 1; Great Horned Owl, 1; Bank Swallow, 1; Rough-winged Swallow, 1; Hairy Woodpecker, 1; Belted Kingfisher, 0.5; Barn Swallow, 0.5; House Wren, 0.5; E. Meadowlark, +. **Total:** 37 species; 178 territorial males (391/100 ha, 158/100 acres). **Visitors:** Sharp-shinned Hawk, Red-tailed Hawk, Ring-billed Gull, Rock Dove, Black-billed Cuckoo, Ruby-

throated Hummingbird, E Kingbird, Least Flycatcher, Alder Flycatcher, Tree Swallow, Red-breasted Nuthatch, Swainson's Thrush, Golden-crowned Kinglet, Tennessee Warbler, Nashville Warbler, Magnolia Warbler, Blackburnian Warbler, Chestnut-sided Warbler, Bay-breasted Warbler, Ovenbird, Canada Warbler, Am. Redstart, House Sparrow, Scarlet Tanager, Pine Siskin. **Remarks:** Nests found (15): Com. Grackle (4), Am. Robin (3), Red-winged Blackbird (2), Canada Goose (1), Com. Flicker (1), Blue Jay (1), Starling (1), Gray Catbird (1). Part of an environmental impact assessment supervised by Paul Eagles.—ED POROPAT, Dept. of Recreation, Univ. of Waterloo, Waterloo, Ont., Canada, N2L 3G1.

211. MID-TALL GRASS PRAIRIE.—**Location:** Wisconsin; Dane Co., S border of Madison, Univ. of Wisc. Arboretum-Greene Prairie; T6N, R9E, NE $\frac{1}{4}$ Section 4 (Fitchburg Township); 43°01'N, 89°29'W, Madison Quadrangle, USGS. **Continuity:** New. **Size:** 8.75 ha = 21.62 acres (rectangular, determined by compass and tape). **Description of Plot:** A quantitative survey of 413 0.4m² quadrats shows the frequency of the following species: Yarrow (*Achillea millefolium*), 33.2%; Redtop (*Agrostis alba*), 36.8%; Little Bluestem (*Andropogon scoparius*), 28.6%; Rattlesnake Master (*Eryngium yuccifolium*), 36.1%; Bush Clover (*Lespedeza capitata*), 29.8%; Gayfeather (*Liatris pycnostachya*), 28.8%; Bergamot (*Monarda fistulosa*), 35.1%; *Panicum praecocius*, (30.5%) Kentucky Blue Grass (*Poa pratensis*); 52.5%; Mountain Mint (*Pycnanthemum virginianum*) 34.9%; Blue-eyed Grass (*Sisyrinchium campestre*), 27.9%; Old-field Goldenrod (*Solidago nemoralis*), 29.8%; Indian Grass (*Sorghastrum nutans*), 27.6%. **Edge:** Beyond the prairie itself, the plot is bordered with oak woods and oak openings on all sides except for a railroad track, hedgerow and cornfield on the S and wooded urban lots on the SE. **Topography:** Flat. **Elevation:** 940 ft (287m). **Weather:** June temperatures for the state were 6.2°F below normal; mornings were cold with some days of heavy fog. **Coverage:** June 2, 4-7, 11, 13, 15, 20-21, 27; 0515-0830. Total man-hours: 25. **Census:** Swamp Sparrow, 8 (91, 37); Willow Flycatcher, 7 (80, 32); Red-winged Blackbird, 7; Com. Yellowthroat, 5, (57, 23); Yellow Warbler, 4 (46, 19); Song Sparrow, 2; E. Kingbird, 1; Tree Swallow, 1; E. Meadowlark, 1. **Total:** 9 species; 36 territorial males or females (411/km², 167/100 acres). **Visitors:** Mallard, Short-billed Marsh Wren, Bobolink, Brown-headed Cowbird, Am. Goldfinch, Savannah Sparrow. **Remarks:** Most breeding species were found along the southern edge in the willow thickets and other shrubs. The central prairie was used by only a few species, mainly the E. Kingbird and the E. Meadowlark, with sporadic visits from male Bobolinks and Savannah Sparrows.—ROBIN P. WHITE, UW-Madison, Geography Dept., Madison, WI 53706.

212. MIXED SUCCESSIONAL ASPEN – OAK-CONIFER FOREST.—**Location:** Minnesota, Clearwater Co., 3.5 miles NW of intersection of state highway 200 and U. S.

highway 71, 0.25 miles E of University of Minnesota Forestry and Biological Station, Itasca State Park; 47°10'N, 95°12'W, Lake Itasca Quadrangle, USGS. **Continuity:** Established 1980; 3 consecutive years. Size: 8.9 ha = 22.07 acres (rectangular 366m × 244m). **Description of Plot:** See AB 35, 66-67 (1981). **Coverage:** June 30, from 0600-2300 hrs. July 1, 4, 6-7, 11, 14, from 0600-2300. Total man hours: 40. **Census:** Ovenbird 14 (154, 52); Black-capped Chickadee 12 (132, 52); Com. Crow 9 (99, 39); Cedar Waxwing 8 (88, 34); Chestnut-sided Warbler 7 (77, 30); Yellow-bellied Sapsucker 6 (66, 26); Com. Yellowthroat 6; Mourning Warbler 6; Red-eyed Vireo 5 (55, 22); Great Crested Flycatcher 4.5 (50, 19); Hairy Woodpecker 4 (44, 17); Chipping Sparrow 4; White-breasted Nuthatch 3 (33, 13); Veery 3; Nashville Warbler 2.5 (28, 11); Downy Woodpecker 2 (22, 9); Red-breasted Nuthatch 2; Brown Creeper 2; Com. Flicker 1.5 (17.6); Broad-winged Hawk 1; Ruffed Grouse 1; Golden-winged Warbler 1; N. Parula 1; Indigo Bunting 1; Swamp Sparrow 1. **Total:** 25 species; 107.5 territorial males or females (1197/km², 484/100 acres). **Visitors:** Pileated Woodpecker, Least Flycatcher, Blue Jay, Am. Robin, Wood Thrush, Black-throated Green Warbler, Blackburnian Warbler, Red-winged Blackbird, Brown-headed Cowbird, Rose-breasted Grosbeak, Am. Goldfinch. **Remarks:** Nests recorded: Yellow-bellied Sapsucker, 1.—LIZ TILLOTSON and KATHY HORGAN, 454 North Hall, Menomonie, WI 54751.

213. CAT-TAIL-BUR-REED MARSH.—**Location:** Ontario, Simcoe Co., Tay Township, Concession XIII, Lot 3, 1½ mi E of Fesserton, 44°44'N, 79°38'W. **Continuity:** New. **Size:** 5.58 ha = 13.8 acres (rectangle, compass and tape). **Description of Plot:** Cat-tail-Bur-reed Marsh, with no woody vegetation. Dominant ground cover is Cat-tail (*Typha latifolia*) with Narrow-leaved Cat-tail (*Typha angustifolia*) prominent along open water. Large patches of Bur-reed (*Sparaganium eurycarpum*) and smaller patches of Rush (*Juncus effusus*) are present. Approximately 15% of the study area consisted of shallow bodies of open water. Water level variation was up to 12 in., depending on wind direction and strength. At times of high levels, 90% of the study plot would have one or more in. of water over the ground. Ground cover 80%; canopy cover 0%. **Edge:** Bordered on all sides by similar vegetation. The North River is 200 ft N and "Catfish Bay" 100 yds W of the plot. **Topography:** Essentially flat. **Elevation:** 585 ft. **Weather:** Generally cool, cloudy with wet periods. **Coverage:** May 28, June 1, 4, 14; 0700-1600, 1300-1500, and 0730-1200. Total man-hours 38. **Census:** Long-billed Marsh Wren, 32 (232, 573); Red-winged Blackbird, 15.5 (113, 277); Swamp Sparrow, 10.5 (76, 188); Virginia Rail, 5 (36, 90); Am. Coot, 3.5 (25, 63); Least Bittern, +; Sora, +. **Total:** 7 species; 67 territorial males or females (1199/km², 486/100 acres). **Visitors:** Am. Bittern, Mallard, Blue-winged Teal, Turkey Vulture, Marsh Hawk, Caspian Tern, Black Tern, Tree Swallow, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Com. Crow. **Remarks:** 24 nests located. Long-billed Marsh Wren (12), Red-winged

Blackbird (11), Virginia Rail (1) A Cat-tail stand covering 10% of the area, showed slow and reduced regeneration during census period. Special thanks to Dave J. McLachlin for assistance with the census and R.S.W. Bobbette for vegetation analysis. This project was funded by the Ontario Ministry of Natural Resources as part of a biological inventory of the Matchedash Bay area.—P.H. VAN STAM, 26 John St., Elmvale Ont., L0L 1P0.

214. SEDGE MEADOW.—**Location:** Ontario, Simcoe Co., Tay Township, Concession XII, Lot 2. One mi SE of Fesserton, 44°43'N, 79°39'W. **Continuity:** New. **Size:** 5.6 hectares = 13.8 acres (rectangle, compass and tape). **Description:** Open sedge meadow, supporting no trees and few small shrubs. Dominant ground cover grades E to W from grass species (*Calamagrostis canadensis*) to Sedge (*Carex lacustris*) and (*C. stricta*) to a mixture of Sedge and a scattering of Cat-tails (*Typha latifolia*). A reed (*Phragmites australis*) colony is located near the NE corner. Ground cover 95%; canopy cover 0%. **Edge:** bordered on all sides by similar vegetation. The Coldwater River is 100 yds E of the plot. **Topography:** Essentially flat, drainage from W to E, with standing water "muskrat ponds" in the very poorly drained W half of the plot. **Elevation:** 590 ft. **Weather:** Generally cool with cloudy and wet periods. **Coverage:** May 28, 31, June 2, 3, 4, 7, 0645-1300 and 1200-1600. Total man-hours 38. **Census:** Swamp Sparrow, 24.5 (178, 439); Long-billed Marsh Wren, 11 (80, 197); Red-winged Blackbird, 8 (58, 143); Short-billed Marsh Wren, 2; Com. Yellowthroat, 2; Sora, 1. **Total:** 6 species; 48.5 territorial males or females (868 km², 352/100 acres). **Visitors:** Green Heron, Am. Bittern, Mallard, Blue-winged Teal, Turkey Vulture, Marsh Hawk, Virginia Rail, Black Tern, Chimney Swift, Ruby-throated Hummingbird, Tree Swallow, Rough-winged Swallow, Barn Swallow, Cliff Swallow. **Remarks:** 5 nests located, Red-winged Blackbird (3); Sora Rail (1), Long-billed Marsh Wren (1). Five partial Short-billed Marsh Wren territories located along the drier E edge of the plot. Special thanks to Dave J. McLachlin for assistance with the census and R.S.W. Bobbette for vegetation analysis. This project was funded by the Ontario Ministry of Natural Resources as part of a biological inventory of the Matchedash Bay area.—P.H. VAN STAM, 26 John St., Elmvale, Ont., L0L 1P0

