

# Forty-fourth Breeding Bird Census

*Edited by Willet T. Van Velzen*  
**List of Censuses**

Habitat	State or Province	Hec-tares	Pairs per sq. km.	Hrs. Obs.	Spec-ies	Yrs of Study
<b>A. Eastern—Deciduous Forest</b>						
1. Maple-Birch Forest	Nova Scotia	12.3	646	44	21	1
2. Mature Mixed Upland Forest	Connecticut	12.6	321	20	20	1
3. Mixed Upland Forest and Red Maple Forest	Connecticut	11.5	391	35	23	1
4. Second-growth Hardwood Forest	Connecticut	10.1	895	13	38	14
5. Young Red Maple-Gray Birch Forest	New York	8.1	1112	12	32	5
6. Red Maple-Pin Oak-Mixed Hardwoods	New Jersey	5.0	707	15	16	1
7. Birch-Maple-Oak Forest	Pennsylvania	9.0	557		24	6
8. Bottomland Red Maple-White Ash-Pin Oak Forest	Pennsylvania	3.0	1145	53	15	1
9. Upland Oak-Tulip-tree Forest	Pennsylvania	3.2	1313	70	30	1
10. Upland Tulip-tree-Maple-Oak Forest	Maryland	12.0	776	16	28	9
11. Mature Tulip-tree-Oak Forest	Maryland	14.6	1077	32	30	6
12. Mixed Hardwood Forest	Maryland	11.3	785	17	42	20
13. Mature Deciduous Floodplain Forest	Maryland	7.6	652	25	26	28
14. Mixed Upland Habitat	Dist. of Columbia	14.2	1013	34	26	21
15. Basswood-Tulip-tree Forest	West Virginia	6.1	552	12	18	1
16. Oak-Birch Forest	West Virginia	6.1	568	9	22	1
17. Oak-Maple-Hickory Forest	West Virginia	6.1	379	11	18	1
18. Oak-Maple-Tulip-tree Forest	West Virginia	7.9	241	8	17	1
19. Oak-Tulip-tree Forest	West Virginia	6.1	642	9	21	1
20. Tulip-tree-Beech-Oak Forest	West Virginia	6.1	659	31	17	1
21. Oak-Hickory-Tulip-tree Forest	Virginia	13.6	480	29	20	2
22. Red Maple-Black Gum Mixed Hardwoods	Virginia	10.1	613	35	19	3
23. Upland Oak-Hickory Forest	Virginia	11.0	722	38	22	8
24. Upland Tulip-tree-Oak Forest	Virginia	20.6	301	22	22	7
25. Oak-Maple Forest	Tennessee	8.1	371	40	19	1
26. Oak-Maple Forest	Tennessee	8.1	284	40	16	1
27. Floodplain Forest	North Carolina	13.0	593	25	28	4
28. Mixed Deciduous Forest	North Carolina	8.8	459	40	17	7
29. Mixed Deciduous Forest	North Carolina	12.6	578	25	29	5
30. Virgin Hardwood Bottomland Swamp Forest	South Carolina	8.1	933	32	23	1
31. Virgin Hardwood Swamp Forest	South Carolina	8.9	1309	19	24	2
32. Mature Beech-Magnolia Forest	Florida	15.8	695	25	25	1
33. Wooded City Ravine	Ontario	20.0	210	19	21	11
34. Elm-Ash-Birch Forest	Minnesota	8.7	971	24	23	1
35. Upland Maple-Oak Forest	Wisconsin	5.4	279	9	14	4
36. Mature Mixed Hardwood Forest	Michigan	9.3	811	20	23	7
37. Aspen Clearcut (1st year)	Michigan	9.0	83	9	12	1
38. Aspen Clearcut (4th year)	Michigan	18.5	203	19	23	2
39. Floodplain Forest	Illinois	7.7	559	15	22	1
40. Oak-Hickory-Maple Forest	Illinois	13.0	301	16	39	5
41. Riparian Oak-Hickory Forest	Illinois	8.1	451	17	19	1
42. Black Oak-Sassafras Woods	Indiana	22.2	162	56	15	7
43. Mixed Hardwood Regenerating	Ohio	20.2	237	20	29	5
44. Neotoma Valley	Ohio	20.2	479	120	35	3
45. River Bottom Forest	Manitoba	14.0	450	26	22	4
46. Oak-Hickory Forest	Kansas	9.4	1289	400	28	3
		9.4	937	300	23	4
47. Oak-Hickory Forest I	Kansas	8.1	432	12	23	3
48. Oak-Hickory Forest II	Kansas	8.1	272	11	20	3
49. Oak-Hickory Forest III	Kansas	8.1	642	16	31	3
50. Oak-Hickory Forest IV	Kansas	8.1	618	20	24	3
51. Oak-Hickory Forest V	Kansas	8.1	655	24	28	3
52. Oak-Hickory Forest VI	Kansas	8.1	432	24	25	3
53. Oak-Hickory Forest Second growth	Missouri	7.85	847	26	25	1
54. Deciduous Floodplain Forest	Oklahoma	6.7	960	25	26	2
<b>B. Eastern-Coniferous-Deciduous (Mixed)</b>						
55. Mature Balsam Fir Forest with Alder Thickets and Treed Bog	Newfoundland	9.0	295	17	17	1
56. Mature Black Spruce and Balsam Fir Forest with Alder and Tamarack Thickets	Newfoundland	6.3	857	16	22	1
57. Second-growth Hardwood Forest with Softwood Remnants	Newfoundland	6.3	1587	18	21	1
58. Maple-Pine-Oak Second-growth Forest	Massachusetts	11.8	322	26	27	5
59. Climax Hemlock-White Pine Forest	Connecticut	10.5	960	14	37	14
60. Beech-Spruce-Hemlock Forest	New York	20.4	544	68	22	1
61. Beech-Spruce-Maple Forest	New York	19.4	534	73	27	1
62. Pitch Pine-Scrub Oak Barrens	New York	9.7	357	15	5	4

Habitat	State or Province	Hectares	Pairs per sq. km.	Hrs. Obs.	Species	Yrs of Study
63. Second-growth Oak-Pitch Pine Forest	New York	9.3	328	25	8	4
64. Upland Mixed Pine— Spruce- Hardwood Plantation	New York	16.6	594	16	38	7
65. Mixed Oak-Pine Forest I	Pennsylvania	6.0	459	31	26	4
66. Mixed Oak-Pine Forest II	Pennsylvania	11.1	462	38	32	4
67. Central Hardwood Forest with Scattered Pine	Dist. of Columbia	26.3	97	18	21	21
68. Slash Pine-Turkey Oak Forest	Florida	16.0	78	19	11	1
69. Mixed Conifer-Hardwood Forest	Michigan	13.9	172	16	16	1
70. Mature Pine-Fir-Birch Forest	Minnesota	12.8	894	26	26	1
71. Mixed Successional Aspen- Oak Conifer Forest	Minnesota	8.9	801	27	22	1
72. Mature Mixed Hardwood- Relict Hemlock Forest	Indiana	5.0	640	22	21	1
73. Mixed Hardwood and Hemlock Ravines	Ohio	4.9	844	18	27	3
<b>C. Eastern-Coniferous</b>						
74. Spruce-Cedar Forest	New Brunswick	4.3	880	16	15	1
75. Young Spruce Forest	Maine	4.1	1063	9	18	3
76. Red Pine Plantation	Connecticut	8.5	782	14	39	3
77. Upland Scotch Pine Plantation	New York	9.3	865	20	21	12
78. Atlantic White Cedar	Virginia	7.0	1256	64	23	1
79. Atlantic White Cedar Stand	North Carolina	7.0	1369	64	17	1
80. Mature Longleaf Pine Forest	Georgia	20.0	473	25	33	1
81. Longleaf Pine Forest	Florida	20.0	185	23	18	1
82. Cutover Subtropical Slash Pine Forest	Florida	20.4	84	38	13	1
83. Virgin Subtropical Slash Pine Forest	Florida	16.6	368	19	21	1
84. Jack Pine Forest	Michigan	14.3	154	18	20	1
85. Jack Pine-Black Spruce Forest	Michigan	17.5	246	82	21	1
<b>D. Eastern-Mixed Habitats</b>						
86. Maple-Birch Forest-5 year Clear-cut	Nova Scotia	10.9	578	44	21	1
87. Abandoned Pasture- Young Mixed Forest	New York	4.4	686	11	24	4
88. Mature Upland Forest and Shrub Swamp	Connecticut	12.6	476	20	33	1
89. Mixed Upland Habitat and Swamp	Connecticut	14.2	318	11	39	13
90. Upland Brushy Pasture	Connecticut	8.5	1164	15	40	14
91. Deciduous Forest with Pond and Brook	New Jersey	16.2	303	12	28	17
92. Old Field Habitat	New Jersey	7.3	757	14	9	1
93. Brushy Field and Wooded Edge	Pennsylvania	7.5	669	14	23	3
94. Mixed Upland Habitat	Pennsylvania	7.8	1402	26	29	4
95. Old Field-Meadow and Primary Deciduous Thickets	Pennsylvania	10.1	242	25	16	6
96. Mixed Pasture and Deciduous Woodland	Virginia	6.1	799	19	22	1
97. Surface Mine	West Virginia	6.1	239	6	21	1
98. Varied Habitat	West Virginia	6.1	519	18	37	1
99. Birch-Oak Savannah and Wetland	Ontario	5.9	1290	29	19	2
100. City Ravine	Ontario	34.0	312	35	32	1
101. Marsh with Bushy Fields	Ontario	16.6	771	27	47	1
102. Transitional Mixed Forest— Field	Ontario	6.1	1203	87	32	2
103. Mixed Wetland with Tamarack and Aspen Groves, Shrubland and Fen	Wisconsin	16.9	696	13	38	4
104. Tamarack Bog and Hardwood	Michigan	8.5	271	8	19	5
105. Disturbed Oak-Hickory Forest, Pine Stand, Edge, and Pond	Ohio	14.2	614	14	39	42
106. Deciduous Clearcut	Tennessee	20.2	447	31	21	6
107. Deciduous Clearcut (2-year)	Tennessee	8.1	210	12	4	1
108. Mixed-Mesophytic Woods, Fields, and Brush	Tennessee	30.0	321	38	41	4
109. Deciduous Clearcut	Georgia	6.9	407	10	9	4
110. Improved Pasture and Oak—Pine Forest	Oklahoma	9.1	664	18	25	2
<b>E. Central-Prairie</b>						
111. Mixed Prairie I	North Dakota	4.1	99	8	3	2
112. Mixed Prairie II	North Dakota	10.1	30	7	2	1
113. Mixed Prairie III	North Dakota	13.7	102	20	5	1
114. Mixed Prairie IV	North Dakota	4.1	514	18	14	1
115. Mixed Prairie V	North Dakota	13.1	57	11	4	1
116. Kentucky Blue Grass Prairie	North Dakota	4.9	144	2	8	9
117. Mixed Prairie I	North Dakota	10.0	155	5	12	9
118. Mixed Prairie II	North Dakota	6.1	90	4	8	9
119. Mixed Prairie III	North Dakota	6.1	74	3	6	9
120. Mixed Prairie IV	North Dakota	6.1	90	2	7	9
121. Mixed Prairie V	North Dakota	6.1	66	3	9	9
122. Mixed Prairie VIII	North Dakota	8.7	138	4	15	5
123. Floodplain Tallgrass Prairie	Kansas	10.1	287	4	5	
		10.1	316	4	6	
		10.1	237	9	4	7
<b>F. Central—Disturbed Habitat</b>						

Habitat	State or Province	Hectares	Pairs per sq. km.	Hrs. Obs.	Species	Yrs of Study
124. Ash—Box-elder—Elm Hardwood Draw	North Dakota	4.8	1056	17	14	1
		4.8	1573	14	21	2
125. Ash—Cottonwood Draw	North Dakota	3.0	1102	15	11	2
126. Ash-Elm Hardwood Draw	North Dakota	2.9	1305	16	12	2
127. Ash-Elm Hardwood Draw II	North Dakota	5.4	1338	20	18	1
		5.4	1375	16	21	2
128. Ash-Elm Hardwood Draw III	North Dakota	9.9	577	36	27	1
129. Ash-Elm Hardwood Draw IV	North Dakota	16.2	297	30	21	1
130. Aspen Draw	North Dakota	5.6	510	28	19	1
131. Buffaloberry Shrub Community	North Dakota	11.1	176	14	9	1
132. Cottonwood Floodplain I	North Dakota	19.0	686	36	29	2
133. Cottonwood Floodplain II	North Dakota	13.0	691	30	27	2
134. Cottonwood Floodplain III	North Dakota	15.7	594	36	30	1
135. Green Ash Draw	North Dakota	13.6	247	20	18	1
136. Green Ash Escarpment	North Dakota	18.0	331	30	23	1
137. Red Cedar-Mixed Grass Prairie Draw	North Dakota	2.6	463	11	6	1
		2.6	309	7	4	2
138. Unreclaimed Surface Mine I	North Dakota	5.4	295	6	7	1
		5.4	259	5	6	2
139. Unreclaimed Surface Mine II	North Dakota	16.2	173	13	10	1
		16.2	192	13	9	2
140. Mixed Habitat—Disturbed Bottomland	Oklahoma	40.5	347	35	42	9
141. Oak-Pine Ravine Forest with Clearings	Oklahoma	7.4	878	21	20	2
<b>G. Central—Coniferous</b>						
142. Ponderosa Pine I	North Dakota	20.2	388	28	13	2
143. Ponderosa Pine II	North Dakota	4.1	272	11	5	2
144. Red Cedar Coulee	North Dakota	1.5	390	13	3	2
<b>H. Central—Shelterbelts</b>						
145. Immature (1974) Three-row Belt	Minnesota	0.2	2399	5.9	6	2
146. Immature (1966) Four-row Belt	Minnesota	0.3	5036	9.6	6	2
147. Immature (1961) Nine-row Belt	Minnesota	0.8	764	9.3	6	2
148. Mature (1951) Three-row Belt	Minnesota	0.3	618	6.7	3	2
149. Mature (1949) Eight-row Belt	Minnesota	0.4	5431	10.7	9	2
150. Mature (1948) Five-row Belt	Minnesota	0.7	3124	13.3	7	2
151. Mature (1946) Four-row Belt	Minnesota	0.7	2873	18.7	11	2
152. Immature (1971) Five-row Belt	North Dakota	1.0	1209	14	8	1
153. Mature (1940) Eight-row Belt	North Dakota	1.2	2185	30	14	1
154. Mature (1953) Eight-row Belt	North Dakota	1.8	1292	15	9	1
		1.8	1769	7	13	2
155. Mature (1959) Thirteen-row Belt	North Dakota	3.2	834	10	10	1
		3.2	1081	6	10	2
<b>I. Western—Deciduous</b>						
156. Floodplain Cottonwood Forest	Colorado	9.7	1689	20	13	10
157. Gambel's Oak—Mountain Mahogany Woodland	Colorado	18.4	152	20	7	2
158. Scrub Oak—Mountain Mahogany Woodland	Colorado	8.0	137	14	10	1
159. Coast Live Oak Woodland	California	6.6	925	17	18	1
160. Deciduous Oak Woodland	California	5.7	379	24	16	3
161. Sycamore—Coast Live Oak—Riparian Woodland	California	6.2	1674	16	26	2
<b>J. Western—Coniferous—Deciduous (Mixed)</b>						
162. Open Aspen Grove—Scattered Conifers	Colorado	14.0	436	28	30	5
163. Ponderosa Pine—Scrub Oak Forest	Colorado	12.0	196	14	79	1
164. Mixed Sub-climax Riparian Forest	Washington	8.3	2132	34	33	1
165. Red Alder Floodplain Forest—Farmland	Washington	6.9	1549	46	35	1
<b>K. Western—Mixed Habitats</b>						
166. Bulrush and Cat-tail Marsh in Conifer Forest	Montana	40.5	586	35	55	6
167. Scattered Mixed Coniferous Forest	Oregon	32.4	148	20	11	8
168. Cottonwood—Willow Creekbottom	Colorado	8.1	776	34	16	1
169. Ponderosa Pine—Scrub Oak—Mountain Mahogany Woodland	Colorado	8.1	334	60	9	13
170. Sagebrush—Grassland—Nonmanipulated (1979)	Utah	16.2	100	13	5	1
(1980)	Utah	16.2	108	22	5	2
171. Sagebrush—Grassland—4-year Old Chain (1979)	Utah	16.2	80	11	4	1
(1980)	Utah	16.2	90	17	5	2
172. Sagebrush—Grassland—5-year Old Burn (1979)	Utah	16.2	105	12	5	1
(1980)	Utah	16.2	90	16	6	2
173. Slickrock Ponderosa Pine—Pygmy Forest—Chaparral	Utah	16.2	179	31	12	1
174. Desert Riparian—Freshwater Marsh and Ponds	California	15.4	829	23	34	4

Habitat	State or Province	Hectares	Pairs per sq. km.	Hrs. Obs.	Species	Yrs of Study
175. Riparian Woodland and Oak Savanna	California	8.8	399	21	29	2
176. Suburban Park	California	63.5	47	36	9	2
I 77. Suburban Park	California	31.6	79	21	6	1
178. Urban Park	California	74.9	138	56	13	1
179. Urban Nature Center	California	34.4	337	60	19	4
180. Urban Nature Center	California	7.3	2361	35	24	2
<b>L. Western—Desert and Scrub</b>						
181. Coastal Scrub	California	8.1	556	207	15	8
182. Disturbed Coastal Scrub A	California	4.7	543	252	19	8
183. Disturbed Coastal Scrub B	California	8.1	507	282	16	9
<b>M. Northern—Tundra and Taiga</b>						
184. Inland Coastal Tundra	Alaska	100.0	76	900	15	2
185. Upland White Spruce—Paper Birch Forest	Alaska	2.2	516	15	10	1
186. Wet Coastal Plain Tundra	Alaska	100.0	152	1484	14	2
187. Wet Coastal Plain Tundra I	Alaska	33.0	100	36	10	6
188. Wet Coastal Plain Tundra II	Alaska	36.0	99	39	15	6
189. Wet Coastal Plain Tundra III	Alaska	36.0	153	51	11	3
190. High Arctic Lowland Oasis	Northwest Territories	1200.0	13	125	9	1
191. Aspen Forest	Manitoba	16.0	328	21	12	4
192. Aspen Forest	Manitoba	6.0	952	46	14	1
<b>N. Wetlands</b>						
193. Shrubby Swamp and Sedge Hummocks	Connecticut	8.1	1934	16	33	14
194. Freshwater Bulrush Marsh with Scattered Trees	New Jersey	5.0	877	11	9	1
195. Cat-tail-Bulrush Swamp	New Jersey	5.9	903	16	4	1
196. Cat-tail Marsh	New York	6.9	727	19	14	2
197. Cat-tails Bordered by Water	Ontario	5.5	1472	22	10	1
198. Buttonbush Swamp	Ontario	5.0	1230	42	10	1
199. Bur-reed-Sedge Marsh	Ontario	2.0	2874	19	5	1
200. Salt Marsh	Florida	15.0	327	118	3	1
201. Closed Black Spruce Bog	Minnesota	17.5	160	25	11	1
202. Open Black Spruce Bog	Minnesota	12.4	260	7	7	1
203. Shrub Swamp	Minnesota	12.5	800	18	12	1
204. Open Bog	Minnesota	10.0	490	17	8	1
205. Open Fen	Minnesota	15.0	293	21	4	1
206. Cat-tail and Sedge Marsh	Wisconsin	13.8	996	45	6	5
207. Cat-tail—Tule Marsh	California	2.8	2134	12	9	2
208. Coastal Salt Marsh	California	6.5	124	11	3	1
209. Diked Coastal Brackish Marsh	California	8.2	438	26	6	1
210. Diked Coastal Salt Marsh	California	7.9	305	10	13	2
211. Diked Coastal Salt Marsh	California	6.0	848	49	7	1
<b>O. Fields and Cultivated Areas</b>						
212. Abandoned Field	Pennsylvania	6.0	584	30	14	3
213. Abandoned Field II	Pennsylvania	4.3	450	11	9	1
		4.3	566	27	8	2
214. Old Field	Pennsylvania	7.1	604	8	19	7
215. Abandoned Turf Field	Maryland	6.3	330	8	9	6
216. Grassland	West Virginia	6.1	395	6	4	1
217. Orchard Grass—Tall Fescue Meadow	Illinois	12.1	140	12	8	5
218. Grass Fields	Minnesota	21.4	295	6	15	1
219. Whitetop Meadow	Manitoba	15.0	727	23	14	1
220. Alfalfa Hayland I	North Dakota	16.2	56	14	4	1
221. Alfalfa Hayland II	North Dakota	10.8	218	14	12	1
222. Mixed Prairie—Hayland	North Dakota	8.5	136	14	5	1
223. Plowed Cropland	North Dakota	20.9	38	14	1	1
224. Small Grain Cropland	North Dakota	16.2	62	14	4	1
225. Urban Abandoned Field	California	13.5	74	10	3	1
<b>P. Residential</b>						
226. Village Residential	Ohio	13.4	403	90	16	1
<b>Q. Received Late</b>						
227. Hinterland Ravine	Ontario	41.4	234	28	40	1
228. Alpine-Subalpine Ecotone, Ridgetop	Washington	32.3	96	55	11	1

**1. MAPLE-BIRCH FOREST.**—**Location:** Nova Scotia; Kings Co.; 44°50' N, 64°44' W. **Continuity:** New. **Size:** 12.3 ha = 30.4 acres. **Description of Plot:** The dominant canopy trees are White Birch (*Betula papyrifera*), Red Maple (*Acer rubrum*), and Sugar Maple (*A. saccharum*). Most prominent in the understory are Am. Beech (*Fagus grandifolia*), Red Maple, Speckled Alder (*Alnus rugosa*), and Witherod (*Viburnum cassinoides*). The ground cover is primarily Wood Fern (*Dryopteris spinulosa*), Hay-scented Fern (*Dennstaedtia punctilobula*), Wild Sarsaparilla (*Aralia nudicaulis*), and Bunchberry (*Cornus canadensis*). A quantitative survey of the vegetation gave the following results: Trees 2-in. diameter and over, based on 15 65.2 ft.<sup>2</sup> plots, 685/acre; total basal area 113 ft.<sup>2</sup>/acre. Species comprising 90% of the total number of trees [figures after each give number of trees/acre, relative density (%), relative dominance, frequency, in that sequence]: White Birch, 190, 28, 31, 100; Red Maple, 167, 24, 28, 93; Sugar Maple, 107, 16, 18, 67; Am. Beech, 20, 3, 1, 60; White Ash (*Fraxinus americana*), 11, 2, 5, 13; dead trees, 88, 13, 6, 100. Trees by diameter size class [figures after each class give number of trees/acre, relative density (%), basal area in sq. ft./acre, relative dominance]: A (2-6 in.) 483, 71, 43, 38; B (6-9 in.) 165, 24, 46, 41; C (9-15 in.) 37, 5, 23, 21; D (15-21 in.) 1, 0.1, 1, 1. Shrub stems/acre, 1730; ground cover 62%; canopy cover 76%; average canopy height 56 ft (range 43-66). **Edge:** Bordered on all sides by similar forest. **Topography:** Essentially flat. **Elevation:** 600 ft. **Weather:** Hot and dry. **Coverage:** May 29 - July 9; between dawn and 1130 or 1900 and 2150. Total hours: 44. **Census:** Ovenbird, 18 (5 (150, 61); Least Flycatcher, 16 (130, 53); Am. Redstart, 8.5 (69, 28); Red-eyed Vireo, 6 (49, 20); Hermit Thrush, 5 (41, 16); Black-and-white Warbler, 5; Black-throated Green Warbler, 4 (33, 13); Solitary Vireo, 3.5 (28, 12); N. Parula, 3.5; Veery, 2; Dark-eyed Junco, 2; Am. Robin, 1; Black-throated Blue Warbler, 1; N. Waterthrush, 1; Rose-breasted Grosbeak, 1; White-throated Sparrow, 1; E. Wood Pewee, 0.5; Ruffed Grouse, +; Com. Nighthawk, +; Yellow-bellied Sapsucker, +; Hairy Woodpecker, +. **Total:** 21 species; 79.5 territorial males (646/km<sup>2</sup>, 262/100 acres). **Visitors:** Ruby-throated Hummingbird, Pileated Woodpecker, Downy Woodpecker, Blue Jay, Black-capped Chickadee, Swainson's Thrush, Magnolia Warbler, Yellow-rumped Warbler, Chestnut-sided Warbler, Canada Warbler, Scarlet Tanager, Purple Finch. **Remarks:** This work was funded by the Canadian National Sportsmen's Fund and the Natural Sciences and Engineering Research Council of Canada, and is part of a larger study of the impacts of forestry operations on populations of breeding birds and small mammals.—*B. FREEMAN, C. BEAUCHAMP, I. A. MCLAREN, and S. TINGLEY, Dept. of Biology, Dalhousie Univ., Halifax, N.S. B3H 4J1.*

**2. MATURE MIXED UPLAND FOREST.**—**Location:** Connecticut; Fairfield Co., Greenwich. Approximately 0.6 mi N of Merritt Parkway; 41°06'45"N, 73°38'30"W, Greenville Quadrangle, USGS. **Continuity:** New. **Size:** 12.61 ha = 31.15 acres (rectangular, surveyed). **Description of Plot:** Approximately 75% mature mixed upland forest,

15% Red Maple swamp, and 10% dry oak ridge. The dominant upland canopy trees are Red Maple (*Acer rubrum*), Red Oak (*Quercus rubra*), Tulip-tree (*Liriodendron tulipifera*), Black Birch (*Betula lenta*), and Black Oak (*Q. velutina*). The most common forest shrubs are: Mountain Laurel (*Kalmia latifolia*), Low Bush Blueberry (*Vaccinium vacillans*), Witch Hazel (*Hamamelis virginiana*), and Sweet Pepperbush (*Clethra alnifolia*). Most of the plot has a dense understory of Mountain Laurel 6-15 ft high. The swamp is dominated by an overstory of Red Maple, Yellow Birch (*B. alleghaniensis*), and Black Birch, with an understory of Com. Spicebush (*Lindera benzoin*), Highbush Blueberry (*V. corymbosum*), Skunk Cabbage (*Symplocarpus foetidus*) and Sweet Pepperbush. An analysis of the vegetation revealed the following: trees 4 cm dbh and over based on five 1/10 acre rectangular samples, 242 trees/acre, total basal area 98.86 ft<sup>2</sup>/acre. Species comprising a majority of the total number of trees: Red Maple, 108, 45, 5.57, 100; Red Oak, 32, 13.3, 2.08, 80; Black Birch, 18, 7.5, .75, 80; Tulip-tree, 14, 5.83, 1.23, 80; Am. Beech (*Fagus grandifolia*), 14, 5.83, .05, 20; dead trees, 14, 5.83, .55, 80; Chestnut Oak (*Q. prinus*), 12, 5.0, .47, 80; Yellow Birch, 8, 3.3, .05, 40; Flowering Dogwood (*Cornus florida*), 6, 2.5, .005, 40; Black Oak, 6, 2.5, .18, 40; Am. Hornbeam (*Carpinus caroliniana*), 4, 1.66, .002, 20; *Sassafras albidum*, 4, .83, .005, 40. Ground cover moderately dense, canopy cover less than 50% because of significant gypsy moth caterpillar defoliation; average canopy height of upland areas 24m, of Red Maple swamp 16m. **Edge:** Similar undeveloped forest and swampland surrounds the plot. The nearest residence is 0.5 mi away; the nearest paved road is 0.4 mi away. **Topography:** Upland areas are hilly with exposed bedrock common. Slopes are moderate, less than 10% and generally facing E and W. Red Maple swamp is flat with no definable watercourse. Four small (less than 0.3 acre) vernal pools retain water in winter and early spring. **Weather:** Somewhat dry. **Coverage:** May 3, 14, 31; June 7, 11, 22; July 1, 12; between dawn and 1000 hrs; one night visit for owls. Total hours: 20. **Census:** Blue Jay, 5 (40, 16); Black-capped Chickadee, 4 (32, 13); Wood Thrush, 4; Black-and-white Warbler, 4; Scarlet Tanager, 3 (24, 10); Yellow-billed Cuckoo, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Veery, 2; Ovenbird, 2; Com. Yellowthroat, 2; Rufous-sided Towhee, 2; Ruffed Grouse, 1; Com. Flicker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Com. Crow, 1; Louisiana Waterthrush, 1; Pileated Woodpecker, 0.5; Great Horned Owl, +. **Total:** 20 species; 40.5 territorial males (321/km<sup>2</sup>, 130/100 acres). **Remarks:** Vegetation analysis extrapolated from a botanical survey conducted by Virginia Burkhardt and Regina Rochefort. The plot is within a 297 acre municipal parkland. This study was made possible with contributions from the Greenwich Audubon Society and the Greenwich Conservation Commission.—*THOMAS R. BAPTIST, 41 Westview Place, Riverside, Conn. 06878.*

**3. MIXED UPLAND FOREST AND RED MAPLE SWAMP.**—**Location:** Connecticut; Fairfield Co., Stamford. Approximately 0.2 mi W of South Lake Drive; 41°9'9"N, 75°36'15"W, Pound Ridge Quadrangle, USGS. **Continuity:** New. **Size:** 11.52 ha = 28.41 acres (rectangular, surveyed). **Description of Plot:** Approximately 65% upland mixed hardwood and hemlock forest and 35% mature Red Maple swamp. The dominant upland canopy trees are: Tulip-tree (*Liriodendron tulipifera*), Red Oak (*Quercus rubra*), Pignut Hickory (*Carya glabra*), and E. Hemlock (*Tsuga canadensis*). Of 22 shrubs keyed, the most common are: Flowering Dogwood (*Cornus florida*), Witch Hazel (*Hamamelis virginiana*), Com. Spicebush (*Lindera benzoin*), Maple-leaf Viburnum (*Viburnum acerifolium*), Wild Azalea (*Rhododendron* sp.), Sweet Pepperbush (*Clethra alnifolia*), and Mountain Laurel (*Kalmia latifolia*). The dominant swampland herbs include: Jewelweed (*Impatiens*), Swamp Buttercup (*Ranunculus septentrionalis*), Skunk Cabbage (*Symplocarpus foetidus*), Fowl Meadow Grass (*Glyceria canadensis*), Tussock sedge (*Carex* sp.), and Dodder (*Cuscuta* sp.). Analysis of the vegetation revealed the following: Trees 3 in. dbh and over based on ten 1/10 acre square samples, 260 trees/acre, total basal area 130.7 ft<sup>2</sup>/acre. Species comprising 85% of the total number of trees: Tulip-tree, 30, 11, 9, 80; E. Hemlock, 30, 9, 8, 80; Red Oak, 30, 8, 8, 50; Red Maple (*Acer rubrum*), 25, 8, 11, 20; Pignut Hickory, 20, 7, 6, 30; Black Cherry (*Prunus serotina*), 20, 6, 7, 60; White Oak (*Q. alba*), 15, 6, 6, 30; Shagbark Hickory (*C. ovata*), 15, 6, 6, 30; Yellow Birch (*Betula lutea*), 10, 5, 3, 30; Sugar Maple (*A. saccharum*), 10, 4, 3, 10; White Ash (*Fraxinus americana*), 10, 4, 1, 20; Am. Hornbeam (*Carpinus caroliniana*), 10, 3, 4, 40; Horse Chestnut (*Aesculus hippocastanum*), 10, 3, 4, 10; dead trees, 15, 2, 3, 90; Scarlet Oak (*Q. coccinea*), 10, 1, 5, 10; Shrub stems/acre, 5200; ground cover 46%, canopy cover 85%, average canopy height upland area 23.2 m, average canopy height swampland 17.5 m. **Edge:** Similar habitat continues S for over a mile N of the plot, the habitat is similar, but a low-density residential area is 0.5 mi away. Western edge is mostly upland forest. A large 400+ acre reservoir is 0.25 mi away. Eastern edge is mostly Red Maple swamp of 60± acres. Low-density housing is within 0.2 mi of this boundary. **Topography:** Upland areas are hilly with exposed bedrock common. Swampland flat with stream entering from the NE and flowing SW. **Elevation:** Streambed 424 ft, upland 426-510 ft. **Water:** Black Brook drains a large 100+ acre watershed nearby and flows through the center of the plot. **Weather:** Somewhat dry with average monthly precipitation at or below normal. **Coverage:** Apr. 27; May 4, 11, 17, 24; June 7, 21, 29; July 9; between dawn and 1200 hrs. Total hours: 35. **Census:** Ovenbird, 7 (61, 25); Blue Jay, 5 (43, 18); Wood Thrush, 5; Black-and-white Warbler, 5; Yellow-billed Cuckoo, 4 (35, 14); Rose-breasted Grosbeak, 3 (26, 11); Downy Woodpecker, 2; Great Crested Flycatcher, 2; Tufted Titmouse, 2; Scarlet Tanager, 2; Rufous-sided Towhee, 2; Ruffed Grouse, 1; Black-capped Chickadee, 1; Gray Catbird, 1; Worm-eating Warbler, 1; Louisiana Waterthrush, 1; Canada Warbler, 1; Great Horned Owl, +; Com. Flicker, +; Com. Crow, +; Veery, +; Com. Yellowthroat, +. **Total:** 23 species; 45 territorial males (391/km<sup>2</sup>, 158/100 acres). **Visitors:**

Pileated Woodpecker, Black-billed Cuckoo, N Oriole. **Remarks:** A significant defoliation of the oaks, beeches, and maples occurred as a result of a Gypsy Moth caterpillar invasion. The overall increase in cuckoos can be related to this invasion.—*THOMAS R. BAPTIST, 41 West View Pl., Riverside, Conn. 06878.*

**4. 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, 14 intermittent years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See *AFN* 19 590-591 (1965). **Coverage:** May 6; June 3-5, 10-11. Total hours: 13. **Census:** Veery, 12 (119, 48); Ovenbird, 11 (109, 44); Com. Yellowthroat, 8 (79, 32); Rufous-sided Towhee, 7 (69, 28); Red-eyed Vireo, 6 (59, 24); Black-capped Chickadee, 5 (49, 20); E. Wood Pewee, 4.5 (45, 18); Brown Creeper, 3 (30, 12), Black-and-white Warbler, 3; Red-breasted Nuthatch, 2.5; Wood Thrush, 2.5; Com Flicker, 2; Hairy Woodpecker, 2; Downy Woodpecker, 2; Blue Jay, 2; Tufted Titmouse, 2; Broad-winged Hawk, 1; Turkey, 1; E. Phoebe, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; Am. Robin, 1; Blue-winged Warbler, 1; Chestnut-sided Warbler, 1; N. Oriole, 1; Brown-headed Cowbird, 1; Scarlet Tanager, 1; Song Sparrow, 1; Barred Owl, 0.5; E. Kingbird, 0.5, Blue-gray Gnatcatcher, 0.5; Am. Redstart, 0.5; Cardinal, 0.5; White-throated Sparrow, 0.5; Black-billed Cuckoo, +; Great Horned Owl, +; House Wren, +. **Total:** 38 species; 90.5 territorial males (895/km<sup>2</sup>, 362/100 acres). **Remarks:** No new species or surprising changes. Thanks to Jim Cavanaugh.—*ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.*

**5. 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; 5 consecutive years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See *AB* 31:31 (1977). **Weather:** Cool and dry, wet near end of census **Coverage:** May 26, 29; June 5, 14, 21, 29, July 1, 7; 0445-2015, EDT. Total hours: 11.5 **Census:** Veery, 18 (220, 90); Am. Redstart, 9 (11, 45); N. Oriole, 5 (62, 25); Red-eyed Vireo, 4 (49, 20); Yellow Warbler, 4; Com. Yellowthroat, 4; Rose-breasted Grosbeak, 4; Great Crested Flycatcher, 3 (37, 15); Am. Robin, 3; Warbling Vireo, 3; Com. Grackle, 3; Com. Flicker, 2; E. Kingbird, 2; Least Flycatcher, 2; Black-capped Chickadee, 2; Gray Catbird, 2; Wood Thrush, 2; Cedar Waxwing, 2; Red-winged Blackbird, 2; White-throated Sparrow, 2; Song Sparrow, 2, Pileated Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Blue Jay, 1; Starling, 1; Black-and-white Warbler, 1; Chestnut-sided Warbler, 1; Ovenbird, 1; Indigo Bunting, 1; Scarlet Tanager, +. **Total:** 32 species; 90 territorial males (1112/km<sup>2</sup>, 450/100 acres). **Visitors:** Great Blue Heron, Mallard, Broad-winged Hawk, Killdeer, Am. Woodcock, Spotted Sandpiper, Ring-billed Gull, Rock Dove, Ruby-throated Hummingbird, Tree Swallow, Barn Swallow, Purple Martin, Com. Crow, White-breasted Nuthatch, Nashville Warbler,

Canada Warbler, Brown-headed Cowbird, Purple Finch, Am. Goldfinch, Rufous-sided Towhee.—*J. VAN RIET, 26 Williams St., Massena, N.Y. 13662.*

**6. RED MAPLE - PIN OAK - MIXED HARDWOODS.**—**Location:** New Jersey; Morris Co., 1 mi E of Basking Ridge, Great Swamp National Wildlife Refuge. **Continuity:** New. **Size:** 5.02 ha = 12.4 acres, (surveyed with tape and compass). **Description of Plot:** Trees 3 in. diameter and over based on ten 0.01 acre circular sample plots, 590/acre; total basal area 180 ft<sup>2</sup>/acre. Species comprising forest canopy: Red Maple (*Acer rubrum*), 500, 84.7, 71.7, 100; Pin Oak (*Quercus palustris*), 40, 6.8, 8.3, 40; Sweet Gum (*Liquidambar styraciflua*), 10, 1.7, 4.4, 10; Gray Birch (*Betula populifolia*), 10, 1.7, 0.6, 10; Am. Elm (*Ulmus americana*), 10, 1.7, 0.6, 10; dead trees, 20, 3.4, 14.4, 10. Trees by diameter size classes: A (3-6 in.) 410, 69.5, 41, 22.8; B (6-9 in.) 70, 11.9, 21, 11.6; C (9-15 in.) 70, 11.9, 64, 35.6; D (15-21 in.) 40, 6.7, 54, 30. Shrub stems/acre, 3090; average canopy height, 50 ft. **Edge:** Bordered on N, E and S by similar habitat. On W boundary, habitat grades into open field. **Topography:** Flat. **Elevation:** 228-232 ft. **Weather:** May temp. 28-88°F (mean 58°); June 30-89°F (mean 62°); total precipitation 6.21 in. **Coverage:** May 17, 24, 26, 30; June 12-13, 15, 22; 0500-0800 hours. Total: 15 hours. **Census:** Com. Yellowthroat, 8 (159, 65); Veery, 5 (100, 40); Blue-winged Warbler, 3 (60, 24); Ovenbird, 2.5 (50, 20); House Wren, 2 (40, 16); Gray Catbird, 2; White-eyed Vireo, 2; Am. Redstart, 2; Rufous-sided Towhee, 2; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Black-capped Chickadee, 1; Wood Thrush, 1; Cardinal, 1; Rose-breasted Grosbeak, 1. **Total:** 16 species; 35.5 territorial males (707/km<sup>2</sup>, 286/100 acres). **Visitors:** Red-tailed Hawk, Am. Woodcock, Yellow-billed Cuckoo, Black-billed Cuckoo, Com. Flicker, E. Wood Pewee, Blue Jay, Tufted Titmouse, White-breasted Nuthatch, Am. Robin, Black-and-white Warbler, Com. Grackle, Scarlet Tanager.—*PHILIP N. MYERS, THEODORE W. GUTZKE (compiler), and HAROLD P. LASKOWSKI, Great Swamp National Wildlife Refuge, USDI, Fish and Wildlife Service, R.D. #1, Box 148, Basking Ridge, N.J. 07920.*

**7. BIRCH-MAPLE-OAK FOREST.**—**Location:** Pennsylvania: Butler Co., Buffalo Township, 1 mi S of intersection of State Route 228 and Kepple Road on Todd Sanctuary; 44°44'N, 79°42'W, Freeport Quadrangle, USGS. **Continuity:** Established 1974; 6 intermittent years. **Size:** 9 ha = 22.4 acres. **Description of Plot:** See *AB* 28:992-993 (1974). **Weather:** Cold with frequent rains. Temperatures 32°-68°F. **Coverage:** June 5-6, 11, 13-16, 21; 0530-0700 or 1840-1940. **Census:** Red-eyed Vireo, 9.5 (105, 42); Acadian Flycatcher, 5.5 (61, 25); Blue-gray Gnatcatcher, 5.5; Cardinal, 5 (55, 22); Scarlet Tanager, 4 (44, 18); E. Wood Pewee, 3 (33, 13); Kentucky Warbler, 3; Tufted Titmouse, 2.5; Wood Thrush, 2; Louisiana Waterthrush, 2; Downy Woodpecker, 1.5; White-breasted Nuthatch, 1.5; Ruffed Grouse, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Broad-winged Hawk, 0.5; Black-

capped Chickadee, 0.5, Gray Catbird, 0.5, Hooded Warbler, 0.5; Chipping Sparrow, 0.5; E. Phoebe, +; Ovenbird, +; Brown-headed Cowbird, + (female); Rufous-sided Towhee, +. **Total:** 24 species; 50.5 territorial males or females (557/km<sup>2</sup>, 225/100 acres) **Visitors:** Yellow-billed Cuckoo, Ruby-throated Hummingbird, Belted Kingfisher, Pileated Woodpecker, Com. Crow, Am. Robin, Yellow-throated Vireo. **Remarks:** Nests located: Broad-winged Hawk, Hairy Woodpecker, Downy Woodpecker, E Phoebe. Red-eyed Vireo numbers continue to drop from 19 in 1975 to 15.5 in 1977, to this year's 9.5. My thanks to Greg Kojadinovich and Beth Holland for their assistance. This research was funded by a grant from the Audubon Society of Western Pennsylvania —*GEORGE REESE, 213 Silverview Dr., Sarver, Pa. 16055.*

**8. BOTTOMLAND RED MAPLE-WHITE ASH-PIN OAK FOREST.**—**Location:** Pennsylvania; Chester Co., 3 mi W of the intersection of Pa. Routes 100 and 401, 40°07'N, 75°46'W, Wagontown Quadrangle, USGS. **Continuity:** New. **Size:** 2.97 ha = 7.34 acres (approximately a square with an appendage on the NW corner; shaped similarly to the State of Idaho; steel tape and compass). **Description of Plot:** An immature sawtimber stand of the species typical for bottomlands in SE Pennsylvania. The dominant canopy trees are Red Maple (*Acer rubrum*), White Ash (*Fraxinus americana*), and Pin Oak (*Quercus palustris*). Most prominent in the understory is Spicebush (*Lindera benzoin*), a variety of annual grasses, Virginia Creeper (*Parthenocissus quinquefolia*), Stinging Nettle (*Urtica dioica*), Jewelweed (*Impatiens capensis*), and Poison Ivy (*Toxicodendron radicans*). A quantitative vegetation survey of seven 0.1 acre samples gave trees 3 in. in diameter and over, 137; total basal area 66.5 ft<sup>2</sup>/acre. Species comprising 92% of the total number of trees: Red Maple 77, 56, 46, 86; White Ash 18, 13, 12, 29; Pin Oak 10, 7, 22, 57; dead trees 10, 7, 2, 71; Am. Elm (*Ulmus americana*) 7, 5, 3, 57; and Black Cherry (*Prunus serotina*) 4, 3, 2, 43. Trees by diameter size class: A (3-6 in.) 48, 34.6, 7, 100; B (6-9 in.) 38, 27.6, 17, 100; C (9-15) 38, 27.6, 35, 86; D (15-21) 13, 9, 34, 72; E (21-27) 1, 1, 7, 14. Shrub stems/acre 2129; ground cover 50%; canopy cover 81%; average canopy height 81.6 ft (range 70-99 ft). **Edge:** Bordered on NW by cultivated fields, to the N by similar habitat, to the E by a maintained powerline right-of-way, which includes various herbaceous growth with some invading woody plants and briars. Within about 25 m of the SW boundary the forest habitat undergoes a transition to a marsh with various marsh grasses. Parallel to the SW boundary and 105 to 110 m away is the permanently flowing clearwater Marsh Creek, beyond which is a mixed oak and Tulip-tree forest. Less than 100 m beyond Marsh Creek and parallel to it the Pennsylvania Turnpike right-of-way begins. **Topography:** Relatively flat, with an almost permanently flowing clearwater stream (Lyons Run) traversing the plot. The marsh between the plot and Marsh Creek is the extreme low-altitude terminus of a geologically significant periglacial swamp. A man-made earthen and concrete dam has been constructed across the swamp SW of the

SW corner Stretching NW from the dam is a shallow pond whose maximum depth is about 1 m and which usually covers an area in excess of 50 acres (20 ha). A portion of the pond is less than 40 m from the SW corner. **Elevation:** 510-530 ft. **Weather:** See Census 9. **Coverage:** May 3, 10, 18, 23; June 13-14, 21, 28, July 12, 14; 0420-1700 (majority of visits in midday and afternoon). Total hours: 53. **Census:** Tufted Titmouse, 4 (135, 54); Gray Catbird, 4; Com. Yellowthroat, 4; Carolina Chickadee, 3 (101, 41); Veery, 3; Red-winged Blackbird, 3; Downy Woodpecker, 2; Blue Jay, 2; Wood Thrush, 2; Rose-breasted Grosbeak, 2; Red-bellied Woodpecker, 1; Am. Robin, 1; Blue-winged Warbler, 1; N. Oriole, 1, Cardinal, 1. **Total:** 15 species; 34 territorial males or females ( $1145/\text{km}^2$ , 463/100 acres). **Visitors:** Mourning Dove, Yellow-billed Cuckoo, Black-billed Cuckoo, Com. Flicker, Hairy Woodpecker, E. Phoebe, E. Wood Pewee, Com. Crow, White-breasted Nuthatch, Yellow Warbler, Ovenbird, Com. Grackle, Scarlet Tanager, Indigo Bunting, Rufous-sided Towhee, Chipping Sparrow, White-throated Sparrow, Song Sparrow. **Remarks:** On June 21 a dead female Rose-breasted Grosbeak was discovered. Although several species were observed either feeding young or carrying food, a few species feeding young in the plot could not be shown to be territorial: Yellow-billed Cuckoo, Hairy Woodpecker, White-breasted Nuthatches have nested within the site in recent past years, as have Hairy Woodpeckers.—T. DOMAN ROBERTS (compiler), 430 Cassatt Rd., Berwyn, Pa. 19312.

**9. UPLAND-OAK TULIP-TREE FOREST.**—**Location:** Pennsylvania; Chester Co., 2 mi W of the intersection Pa. Routes 100 and 401,  $40^\circ08' \text{N}$ ,  $75^\circ44' \text{W}$ , Pottstown Quadrangle, USGS. **Continuity:** New. **Size:** 3.16 ha = 7.81 acres (approximately rectangular, 1560 x 218 ft, steel tape and compass). **Description of Plot:** An immature sawtimber stand of mixed oak, typical for SE Pennsylvania. The dominant canopy trees are Black Oak (*Quercus velutina*), Tulip-tree (*Liriodendron tulipifera*) and Chestnut Oak (*Q. prinus*). Most prominent in the understory are Mapleleaf Viburnum (*Viburnum acerifolium*) and Spicebush (*Lindera benzoin*). The ground cover varies greatly depending on the density of the shrub and tree canopy but includes leaf litter, Solomon's seal (*Polygonatum* sp.), and blueberry (*Vaccinium* sp.). A quantitative vegetation survey of six 0.1 acre samples gave the following results: trees 3 in. in diameter (dbh) and over 130/acre; total basal area 105.2  $\text{ft}^2/\text{acre}$ . Species comprising 85% of the total number of trees: Black Oak 40, 31, 65, 100; Chestnut Oak 20, 15, 6, 50; Red Maple (*Acer rubrum*) 18, 14, 3, 83; Dogwood (*Cornus florida*) 14, 11, 1, 67; Sweet Birch (*Betula lenta*) 10, 8, 1, 17, and Tulip-tree 8, 6, 15, 20. Trees by diameter size class: A (3-6 in.) 52, 40, 5, 100; B (6-9 in.) 24, 19, 7, 100; C (9-15 in.) 20, 15, 15, 84; D (15-21 in.) 22, 17, 38, 100; E (21-27 in.) 12, 9, 35, 84. Shrub stems/acre 2533; ground cover 16%; canopy cover 69%; average canopy height 96.5 ft (range 88-102). **Edge:** Bordered on the NW by a maintained powerline right-of-way. The vegetation includes various herbaceous

growth with some invading woody plants and briars. Immediately surrounding the NE, SE, and SW sides is a continuation of the plot timber type. About 40 m to the NE is a township road, beyond which is a formerly cultivated field now in early stages of plant succession. The powerline right-of-way is nominally 61 m wide, beyond which is a continuation of the plot timber type over most of the distance. Near the road, however, is a planted forest of Norway Spruce (*Picea abies*) and European Larch (*Larix decidua*). **Topography:** The average slope to the SW is about 7°. An almost permanently flowing clearwater creek passes over 20 m outside the NW corner and increases its distance from the rest of the SW boundary. No other water is available nearby. The centerline of the plot approximately parallels the utility line clearing, perpendicular to the contour. **Elevation:** 640-780 ft. **Weather:** Average temperatures: May, 1°C above normal; June 1° below normal; July, 1° above normal. Precipitation: May, about normal; June, about 4 cm below normal; July, about 6 cm above normal. Data from NOAA office at Philadelphia Int'l Airport, 31 mi SE. **Coverage:** May 3, 16, 18, 26; June 7, 11-14, 17, 21, 28; July 12, 14; at varying times between 0415 and 1940 hours. Total hours: 70. **Census:** Gray Catbird, 4 (127, 51); Ovenbird, 3.5 (111, 45); Com. Yellowthroat, 3 (95, 38); Indigo Bunting, 3; Chestnut-sided Warbler, 2.5; Com. Flicker, 2; Downy Woodpecker, 2; E Wood Pewee, 2; Blue Jay, 2; Wood Thrush, 2; Com. Grackle, 2; Red-bellied Woodpecker, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Com. Crow, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Am. Robin, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Blue-winged Warbler, 1; Kentucky Warbler, 1; Veery, 0.5; Am. Goldfinch, 0.5; Rufous-sided Towhee, 0.5; Yellow-billed Cuckoo, +; Brown-headed Cowbird, +; Cardinal, +; Field Sparrow, +. **Total:** 30 species; 43 territorial males or females ( $1361/\text{km}^2$ , 551/100 acres). **Visitors:** Mourning Dove, Pileated Woodpecker, Brown Thrasher, Starling, Golden-winged Warbler, Golden-winged X Blue-winged (Lawrence's) Warbler, Am. Redstart, N. Oriole, Scarlet Tanager. **Remarks:** Estimates of territorial populations within 100 m of a boundary, primarily within or on an opposite boundary of the power line clearing: Blue-winged Warbler, 1; Chestnut-sided Warbler, 3; Com. Yellowthroat, 3; Indigo Bunting, 3; and Am. Goldfinch, 4. There were 1 and possibly 2 territorial pairs of Yellow-breasted Chats 100-200 m away. Within the plot the nesting populations are somewhat more dense in the lower altitude region near a creek. When any doubt exists about territorial populations within the plot, the quoted numbers tend to be conservative.—T. DOMAN ROBERTS (compiler), 430 Cassatt Rd., Berwyn, Pa. 19312.

**10. UPLAND TULIP-TREE-MAPLE-OAK FOREST.**—**Location:** Maryland; Howard Co., W edge of Middle Patuxent River Valley, SW of the Hobbits Glen Golf Course at Columbia;  $39^\circ12'55'' \text{N}$ ,  $76^\circ54'40'' \text{W}$ , Clarksville Quadrangle, USGS. **Continuity:** Established 1971; 9 intermittent years. **Size:** 11.98 ha = 29.6 acres. **Description of Plot:**

See AB 32 61-62 (1978). **Coverage:** May 27, June 8, 22; July 2, 4-5, 7-8. Average starting time was 4 min before sunrise and average length of trip was 2 hours. Total hours: 16. **Census:** Acadian Flycatcher, 12 (100, 41), Wood Thrush, 12; Red-eyed Vireo, 10.5 (88, 35); Gray Catbird, 7 (58, 24); Cardinal, 7, Veery, 5.5 (46, 19); Mourning Dove, 4 (33, 14); Scarlet Tanager, 4; Yellow-billed Cuckoo, 3 (25, 10); Red-bellied Woodpecker, 3; Ovenbird, 3; Kentucky Warbler, 3; Hooded Warbler, 3; Downy Woodpecker, 2; E Wood Pewee, 2; Tufted Titmouse, 2; Carolina Chickadee, 1.5; Hairy Woodpecker, 1, White-breasted Nuthatch, 1; Worm-eating Warbler, 1; N. Parula, 1; N. Oriole, 1, Brown-headed Cowbird, 1; Rufous-sided Towhee, 1; Yellow-shafted Flicker, 0.5; Blue Jay, 0.5; Yellow-throated Vireo, 0.5; Pileated Woodpecker, +. **Total:** 28 species; 93 territorial males ( $776/\text{km}^2$ , 314/100 acres). **Visitors:** Am. Woodcock, Great Crested Flycatcher, Com. Crow, Fish Crow, Louisiana Waterthrush, Com. Grackle, Indigo Bunting. **Remarks:** Nesting warblers have increased from a low of 7 pairs of 4 species in 1978 to 11 pairs of 5 species in 1980. Worm-eating Warbler nested on the plot for the first time since 1971.—CHANDLER S. ROBBINS, 7902 Brooklyn Bridge Road, Laurel, Md 20810.

#### 11. MATURE TULIP-TREE-OAK FOREST.

**Location:** Maryland; Prince Georges Co., 6 mi. N of Upper Marlboro;  $38^\circ53'45'' \text{N}$ ,  $76^\circ45'46'' \text{W}$ , Lanham Quadrangle, USGS. **Continuity:** Censused previously in 1947, 1975-78. See AFN 1:211-212 (1947). **Size:** 14.6 ha = 36 acres. **Description of Plot:** See AB 31:91 (1977). **Coverage:** May 30; June 5, 12, 14, 26. Total: 32 observer-hours. **Census:** Red-eyed Vireo, 46 (316, 128); Wood Thrush, 23 (158, 64); Acadian Flycatcher, 14 (96, 39); Red-bellied Woodpecker, 12 (82, 33); Ovenbird, 11 (76, 31); E. Wood Pewee, 9.5 (65, 26); Cardinal, 9 (62, 25); Downy Woodpecker, 5 (34, 14); Kentucky Warbler, 5; Hooded Warbler, 5; Blue Jay, 4 (27, 11), Carolina Chickadee, 4; Tufted Titmouse, 4, Scarlet Tanager, 4; Yellow-throated Vireo, 2.5; Com. Flicker, 2; White-breasted Nuthatch, 2; Yellow-billed Cuckoo, 1; Hairy Woodpecker, 1; Carolina Wren, 1; Gray Catbird, 1; Am. Robin, 1; Turkey Vulture, +, Red-tailed Hawk, +; Pileated Woodpecker, +; Com. Crow, +; Blue-gray Gnatcatcher, +; Brown-headed Cowbird, +. **Total:** 30 species; 157 territorial males ( $1077/\text{km}^2$ , 436/100 acres). **Remarks:** This South Tract was discussed in an article in AB 31:17-23 (1977). Previous censuses recorded edge species as well as forest interior species. This year the edge population included Indigo Bunting, 7, Com. Yellowthroat, 2; Mourning Dove, 1, Mockingbird, 1; Am. Robin, + and Bobwhite, +. Rufous-sided Towhee was scored as a visitor. A higher species richness this year resulted in part from treefalls, which attracted Am. Robin and Gray Catbird as breeders. The reappearance of Carolina Wren in this upland woods parallels a regional trend reflecting the mild winter of 1979 that followed the severe winters of 1977 and 1978. The nearby North Tract woods (AB 31:17-23) was heavily logged in the spring of 1980; the nest tree of Red-tailed Hawk was cut. Other breeders may have also been dis-

placed, so increases in the South Tract of Acadian Flycatcher, Red-eyed Vireo, Ovenbird and Hooded Warbler might be ascribed to this disturbance; but point surveys in the disturbed North Tract indicated that the majority of breeders had remained there despite the disturbance. Unfortunately, a complete census of the disturbed tract would have been required to assess the role of the disturbance in contributing breeding individuals to the adjacent South Tract.—ROBERT WHITCOMB, U.S. Dept. of Agriculture, ARS, PPI, Beltsville, Md. 20705, NANCY E. MACCLINTOCK, 327 Scott Drive, Silver Spring, Md. 20904 (compiler).

**12. MIXED HARDWOOD FOREST.**—**Location:** Maryland; Calvert Co., NW of Plum Pt. and one mi inland from Chesapeake Bay on Tobacco Road between Routes 263 and 261. **Continuity:** Established 1960; 20 intermittent years. **Size:** 11.3 ha = 28 acres. **Description of Plot:** See AFN 13:333, 1959. **Weather:** The counts were made on clear days, high temperatures, 58-87°F. The creek flowed continually, and the low area remained wet. **Coverage:** May 1, 3, 9, 12, 17, 26, June 1, 7, 11, 20, 28; July 5. Total: 10 morning and 2 evening trips averaged 83 min. **Census:** Red-eyed Vireo, 14 (124, 50); Rufous-sided Towhee, 8 (71, 29); Com. Yellowthroat, 7 (62, 25); Hooded Warbler, 6 (53, 21), White-eyed Vireo, 5 (44, 18); Tufted Titmouse, 4 (35, 14); Carolina Wren, 4; Wood Thrush, 4; Yellow-breasted Chat, 4; Cardinal, 4; Indigo Bunting, 4; Mourning Dove, 2, Red-bellied Woodpecker, 2; Acadian Flycatcher, 2; Pine Warbler, 2; Kentucky Warbler, 2; Scarlet Tanager, 2; Summer Tanager, 2, Bobwhite, 1; Am. Woodcock, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Carolina Chickadee, 1; Am. Robin, 1; Prairie Warbler, 1; Ovenbird, 1; Am. Redstart, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Red-shouldered Hawk, +; Red-tailed Hawk, +; Yellow-billed Cuckoo, +; Whip-poor-will, +, Com. Flicker, +; Great Crested Flycatcher, +; Blue Jay, +; Com. Crow, +; Fish Crow, +; Gray Catbird, +; Blue-gray Gnatcatcher, +; N. Parula, +; Louisiana Waterthrush, +. **Total:** 42 species; 89 territorial males ( $785/\text{km}^2$ , 318/100 acres). **Remarks:** Territorial males dropped to 89, the lowest to date; there were 138 last year, and the 20-year average is 210. The Red-eyed Vireo, Rufous-sided Towhee and Com. Yellowthroat repeated as the most numerous species, and in the same order. However, each had reduced territories. Only 12 species showed no drop in territories. All others showed losses. The N. Parula and Louisiana Waterthrush were considered visitors for the first time. There were no increases. This plot was logged 4 years ago. Two homes were built this summer on land adjacent to the N boundary.—JOHN H. FALES, 2809 Ridge Road, Neeld Estate, Huntingtown, Md. 20639.

**13. MATURE DECIDUOUS FLOODPLAIN FOREST.**—**Location:** Maryland, Montgomery Co.; Cabin John Island, Glen Echo; 2.5 mi. NW of the District of Columbia, between the C. and O. Canal and the Potomac River; Falls Church Quadrangle, USGS. **Continuity:** Established 1947; 28 intermittent years. **Size:** 7.6 ha = 18.75 acres.

**Description of Plot:** See AFN 1.212-213 (1947). **Weather:** Temperatures averaged: April, 57° F.; May, 60°; June, 75°. Weather was quite dry in June. **Coverage:** Apr. 12, 19, 26; May 10, 17, 25, 31; June 7, 14, 28; 0430-0945, EST. Total hours: 25. **Census:** Starling, 10 (132, 53); Red-eyed Vireo, 6 (79, 32); Cardinal, 4 (53, 21); Carolina Chickadee, 3 (40, 16); Tufted Titmouse, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Acadian Flycatcher, 2; Brown Creeper, 2; Carolina Wren, 2; N. Parula, 2; Wood Duck, 1; Barred Owl, 1; Com. Flicker, 1; Pileated Woodpecker, 1; E. Wood Pewee, 1; Blue-gray Gnatcatcher, 1; Warbling Vireo, 1; Yellow-throated Warbler, 1; N. Oriole, 1; Song Sparrow, 0.5; White-breasted Nuthatch, +, Prothonotary Warbler, +; Am. Redstart, +; Brown-headed Cowbird, +. **Total:** 26 species; 49.5 territorial males ( $652/\text{km}^2$ , 264/100 acres). **Visitors:** Com. Crow, Cerulean Warbler, Louisiana Waterthrush, Com. Yellowthroat, Orchard Oriole. **Remarks:** Nests found Starling, 10; Com. Flicker, Pileated Woodpecker, Red-bellied Woodpecker, Downy Woodpecker, Tufted Titmouse, Blue-gray Gnatcatcher, Warbling Vireo, N. Oriole, and Cardinal, 1 each. Number of species, 26 compared with 24 last year, includes 2 entirely new for this area, the N. Oriole and the Warbling Vireo. The total of 49.5 territories (69 last year) reflects in part the continuing loss of summer residents including the Red-eyed Vireo, N. Parula, Am. Redstart, Prothonotary Warbler, and Acadian Flycatcher. Such losses are increasingly being reported in other population studies. The Carolina Wren, after a major decrease in the severe winter of 1977, is slowly recovering, with 2 pairs, as compared with 7 in 1976 reduced to 1 in 1977. —J. R. GAUTHEY, JOAN H. CRISWELL (compiler), 3519 Jermantown Road, Fairfax, Va. 22030.

**14. MIXED UPLAND HABITAT.**—**Location:** District of Columbia, the central third of Glover-Archbold Park.  $35^{\circ}55'N$ ,  $77^{\circ}05'W$ , Washington W. Quadrangle, USGS. A narrow, long stream valley park in the NW section. **Continuity:** Established 1960; 21 consecutive years. **Size:** 14.2 ha = 35 acres. **Description of Plot:** See AFN 14:502-503 (1960). **Coverage:** Apr. 12, 19-20, 27; May 4, 17, 26; June 1, 7-8, 14, 24-25; July 1, 13; between 0810 and 2110. Total: 33.6 hours. **Weather:** Clear on 12 trips, cloudy on 3, intermittent rain on 2; temperature 54-85°F, (mean 65°); wind calm on 11 trips, up to 5 mph on 4, 10 and 15 mph on 2. **Census:** Veery, 22 (155, 63); Cardinal, 21 (148, 60); Gray Catbird, 15 (106, 43); Rufous-sided Towhee, 11 (78, 31); Carolina Chickadee, 10 (71, 29); Tufted Titmouse, 10; Blue Jay, 8 (56, 23); Red-bellied Woodpecker, 6.5 (46, 19); Carolina Wren, 6 (42, 17); Wood Thrush, 6; Red-eyed Vireo, 5 (35, 14); Rock Dove, 3 (21, 9); Downy Woodpecker, 3; Com. Crow, 3; White-breasted Nuthatch, 2; Am. Robin, 2; Starling, 2; Com. Grackle, 2; Mourning Dove, 1; Screech Owl, 1; Com. Flicker, 1; Pileated Woodpecker, 1; Louisiana Waterthrush, 1; House Sparrow, 1; Wood Duck, +; Song Sparrow, +. **Total:** 26 species; 143.5 territorial males ( $1013/\text{km}^2$ , 410/100 acres). **Visitors:** Red-shouldered Hawk, Chimney Swift, Hairy Woodpecker,

Great Crested Flycatcher, E. Phoebe, House Wren, Mockingbird, Blue-gray Gnatcatcher, White-eyed Vireo, House Finch, Am Goldfinch. **Remarks:** After the first mild winter following 3 unusually cold ones, some year round residents have increased. Cardinals are up from 13 last year, Rufous-sided Towhees and Carolina Wren from 4, Com Flickers to 1 from visitor. Other have remained steady. Migrants show some increases also: catbirds up from 11, Veeries from 17, Wood Thrushes from 3, Red-eyed Vireo from 1.5. Including both nesting birds and visitors, we have almost the same total species as last year: 37, with 38 last year, 42 in 1978. Greater contrasts come with comparisons to earlier figures. Only one warbler nested this year, as last, but it was a Louisiana Waterthrush rather than an Ovenbird, the first year that we have not had the latter at least as a visitor. We have pointed out in previous years the drastic drop in warblers, flycatchers, vireos, and Wood Thrushes since the census began, and especially since about 1963. Most year round residents have maintained numbers or increased, with the exception of Starlings, that started at 3, reached 25 in 1970, and remained at a low of 2 as in 1978-79. Veeries and catbirds remain the two migratory species that have kept their abundance. The park and its surrounding areas have not been altered appreciably in the period of the census, so we look to changes in climate and in wintering areas for explanations of the changes. Coverage this year was average, with species and territorial male totals consistent with the past 5 years, weather considered.—SHIRLEY A. BRIGGS (compiler), OLIVE HOLBROOK, G.T. and SUSAN HUNT, GEORGE J. MAURER, KAY STORTZ, 7605 Honeywell Lane, Bethesda, Md. 20014.

**15. BASSWOOD-TULIP-TREE FOREST.**—**Location:** West Virginia; Kanawha Co.,  $4\frac{1}{2}$  mi SW of Glen;  $38^{\circ}21'38''N$ ,  $81^{\circ}18'30''W$ , Mammoth Quadrangle, USGS; extends SE. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular 110 x 660 yards, length measured, width estimated). **Description of Plot:** A cove hardwood forest last cut before 1940. The dominant canopy trees are Basswood (*Tilia americana*) and Tulip-tree (*Liriodendron tulipifera*). Most prominent in the understory are Spicebush (*Lindera benzoin*), Flowering Dogwood (*Cornus florida*) and *Hydrangea arborescens*. The ground cover is primarily Wood Nettle (*Laportea canadensis*), Jewelweed (*Impatiens capensis*) and several species of ferns. A vegetation survey of six 0.1 acre samples gives: trees 3 in dbh and over 263/acre; total basal area 122.5 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Basswood, 87, 33, 33, 100, Tulip-tree, 33, 13, 25, 83; Buckeye (*Aesculus octandra*), 15, 6, 8, 67; Sugar Maple (*Acer saccharum*), 43, 16, 7, 83; Red Maple (*A. rubrum*), 7, 3, 1, 17; Cucumber-tree (*Magnolia acuminata*), 7, 3, 7, 33; Hemlock (*Tsuga canadensis*), 2, 1, 7, 17; Red Elm (*Ulmus rubra*), 12, 4, 2, 33; Beech (*Fagus grandifolia*), 5, 2, 2, 33; White Ash (*Fraxinus americana*), 7, 3, 1, 50; Black Birch (*Betula lenta*), 8, 3, 1, 50, dead trees, 13, 2, 3, 50. Trees by diameter size class: A (3-6 in.), 158, 60, 15.8, 13; B (6-9 in.), 45, 17, 13.5, 11; C (9-15 in.), 38, 15, 30.7, 25; D (15-21 in.), 8, 3, 15, 12; E (21-27

in.), 10, 4, 31, 25, F (27-33 in.), 3, 1, 16.3, 13. Shrub stems/acre 2300; ground cover 55%; canopy cover 67%; average canopy height 89 ft (range 81-100). **Edge:** Similar habitat on all sides. **Topography:** The centerline follows a steep (to 15°) jeep trail up the NE side of a very steep hill (20-35°), from 900-1250 ft elevation. The surface was relatively smooth with very few outcrops. **Weather:** Cool with light morning fog. **Coverage:** May 22-25; between dawn and 0800 or 1900-2030 hours. Total hours: 12. **Census:** Red-eyed Vireo, 7 (115, 47); Am. Redstart, 5 (82, 33); Ovenbird, 4 (66, 27); Black-and-white Warbler, 3 (49, 20); N. Parula, 2; Cerulean Warbler, 2; Indigo Bunting, 2; Acadian Flycatcher, 1.5; Worm-eating Warbler, 1.5; Kentucky Warbler, 1.5; Wood Thrush, 1; Blue-gray Gnatcatcher, 1; Hooded Warbler, 1; Scarlet Tanager, 1; Carolina Chickadee, +; Tufted Titmouse, +; Black-throated Green Warbler, +; Cardinal, +. **Total:** 18 species; 23 territorial males (379/km<sup>2</sup>, 153/100 acres). **Visitors:** Mallard, Black-billed Cuckoo, Great Crested Flycatcher, Swainson's Warbler, N. Parula, Kentucky Warbler, and Am. Goldfinch. **Remarks:** The Swainson's Warbler was close enough to the centerline to be heard on each trip but only once sang within the plot.—*ELIZABETH CHANDLER, ROBERT DEGARMO, NEVADA LAITSCH, VIRGINIA OLSEN and GLEN PHILLIPS (compiler) Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

**16. OAK-BIRCH FOREST.**—**Location:** West Virginia; Kanawha Co.; about 20 mi E of Charleston; 38°21'48"N, 81°17'37"W, Mammoth Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The dominant trees are White Oak (*Quercus alba*), Red Birch (*Betula nigra*) and Black Birch (*B. lenta*). Most prominent in the understory are Spicebush (*Lindera benzoin*) and *Rhododendron maximum*. The ground cover is primarily Stinging Nettle (*Urtica dioica*) and ferns (*Dryopteris* sp.). A quantitative survey of the vegetation gave the following results: trees 3-in. diameter and over, based on six 0.1 acre circular samples, 334/acre; total basal area 145 ft<sup>2</sup>/acre. Species comprising 91.1% of the total number of trees: Red Birch, 55, 16.4, 10.2, 50; White Oak, 38, 11.4, 16.3, 67; Tulip-tree (*Liriodendron tulipifera*), 38, 11.4, 15.9, 83; Am. Hornbeam (*Carpinus caroliniana*), 35, 10.4, 3.3, 83; Black Birch, 28, 8.4, 5.9, 100; Sycamore (*Platanus occidentalis*), 17, 4.9, 14.7, 67; Black Willow (*Salix nigra*), 17, 4.9, 1.9, 17; Red Maple (*Acer rubrum*), 15, 4.4, 2.5, 67; Am. Beech (*Fagus grandifolia*), 15, 4.4, 11.4, 50, dead trees, 15, 4.4, 1.2, 83; Sweet Gum (*Liquidambar styraciflua*), 10, 2.9, 0.9, 17; Sugar Maple (*A. saccharum*), 8, 2.4, 4.1, 67; Black Walnut (*Juglans nigra*), 8, 2.4, 5.1, 50; Umbrella Magnolia (*Magnolia tripetala*), 8, 2.4, 0.6, 50. Trees by diameter size class: A (3-6 in.) 170, 50, 17, 12; B (6-9 in.) 73, 22, 22, 15, C (9-15 in.) 73, 22, 56, 39; D (15-21 in.) 10, 3, 18, 12; E (21-27 in.) 5, 1.4, 15, 11; F (27-33 in.) 3, 1, 16, 11. Shrub stems/acre 6900, ground cover 57%; canopy cover 80%; average canopy height 88 ft (range 67-109). **Edge:** Bordered on all sides by similar habitat. **Topography:** The centerline follows Blue Creek road and includes the creek for about half the measured distance. **Elevation:** 920 ft. **Weather:** Mostly clear; light rain on 3 trips. **Coverage:** May 22-24; between dawn and 0850, dusk and 1108-1229, EDT. Total hours: 8.5. **Census:** Red-eyed Vireo, 7 (115, 47), Am. Redstart, 5 (82, 33); Acadian Flycatcher, 4 (66, 27); Cerulean Warbler, 4; In-

digo Bunting, 3 (49, 20), Wood Thrush, 1.5, Ovenbird, 1.5; Louisiana Waterthrush, 1.5; Carolina Chickadee, 1; Tufted Titmouse, 1; Blue-gray Gnatcatcher, 1; Yellow-throated Vireo, 1; Black-and-white Warbler, 1; E. Wood Pewee, 0.5; Worm-eating Warbler, 0.5; Scarlet Tanager, 0.5; Cardinal, 0.5; Yellow-billed Cuckoo, +; Whip-poor-will, +; Ruby-throated Hummingbird, +; Pileated Woodpecker, +; Downy Woodpecker, +. **Total:** 22 species; 34.5 territorial males (568/km<sup>2</sup>, 230/100 acres). **Visitors:** Mallard, Black-billed Cuckoo, Great Crested Flycatcher, Swainson's Warbler, N. Parula, Kentucky Warbler, and Am. Goldfinch. **Remarks:** The Swainson's Warbler was close enough to the centerline to be heard on each trip but only once sang within the plot.—*ELIZABETH CHANDLER, ROBERT DEGARMO, NEVADA LAITSCH, VIRGINIA OLSEN and GLEN PHILLIPS (compiler) Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

### 17. OAK-MAPLE-HICKORY FOREST.

—**Location:** West Virginia; Lewis Co., 2 mi N of Weston; 39°04'36"N, 80°27'27"W, Weston Quadrangle, USGS, extends NNE. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular 110 x 660 yds, length measured, width estimated). **Description of Plot:** A hardwood forest predominantly oak, but with a fair amount of both maple and hickory. Some timber was removed about 1950. Most prominent in the understory are Maple-leaved Viburnum (*Viburnum acerifolia*), *Vaccinium* sp., and Red Elm (*Ulmus rubra*). The ground cover is primarily Black Snakeroot (*Cimicifuga racemosa*), Bedstraw (*Galium* sp.), and Christmas Fern (*Polystichum acrostichoides*). A vegetation survey of six 0.1-acre samples gives: trees 3 in. dbh or larger 323/acre; total basal area 149.2 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Chestnut Oak (*Quercus prinus*), 30, 9, 25.5, 17; Scarlet Oak (*Q. coccinea*), 17, 5, 21.7, 14; Red Oak (*Q. rubra*), 13, 4, 11.5, 8; Red Maple (*Acer rubrum*), 80, 25, 23.3, 16; Sugar Maple (*A. saccharum*), 7, 2, 3.8, 3; Pignut Hickory (*Carya glabra*), 32, 10, 15.3, 10; Shagbark Hickory (*C. ovata*), 11, 3, 9, 6; Beech (*Fagus grandifolia*), 22, 7, 11.3, 8; *Sassafras albidum*, 17, 4, 4, 3; Tulip-tree (*Liriodendron tulipifera*), 7, 2, 2.8, 2; Sourwood (*Oxydendrum arboreum*), 8, 2, 1.5, 1; dead trees, 48, 15, 12.3, 8. Trees by diameter size class: A (3-6 in.) 160, 49, 16, 11; B (6-9 in.) 67, 21, 20, 13; C (9-15 in.) 65, 20, 52, 35; D (15-21 in.) 28, 9, 51, 34; E (21-27 in.) 3, 1, 10.3, 7. Shrub stems/acre 6400; ground cover 32%; canopy cover 84%; average canopy height 78 ft (range 62-98). **Edge:** Similar habitat on all sides. **Topography:** Centerline follows a flat along a NW sloping hillside at about 1250 ft. Average fall across plot 50 ft. **Weather:** Warm days, light fog in mornings. **Coverage:** May 31 to June 3; between dawn and 0730 hours or 1900-2030 hours. Total hours: 11. **Census:** Red-eyed Vireo, 7 (115, 47); Acadian Flycatcher, 4 (66, 27); Blue-gray Gnatcatcher, 3 (49, 20); Ovenbird, 3; Hooded Warbler, 2; E. Wood Pewee, 1; Wood Thrush, 1; Yellow-throated Vireo, 1; Cerulean Warbler, 0.5; Scarlet Tanager, 0.5; Yellow-billed Cuckoo, +; Great Crested Flycatcher, +; Tufted Titmouse, +; White-

breasted Nuthatch, +; Black-and-white Warbler, +; Kentucky Warbler, +; Brown-headed Cowbird, +; Rufous-sided Towhee, +. **Total:** 18 species; 23 territorial males (379/km<sup>2</sup>, 153/100 acres). **Visitors:** Red-tailed Hawk, Com. Crow.—*K. BUSH, E HUTTON, E. REICHELDERFER, G HALL, M. KIFF, J. BUCKELOW, A LLEWELLYN, J. and S. WEIMER, and B SMITH (compiler) Brooks Bird Club, 707 Warwood Avenue, Wheeling, W. Va. 26003*

### 18. OAK-MAPLE-TULIP-TREE FOREST.

—**Location:** West Virginia; Lewis Co., 5 mi N of Weston; 39°05'56"N, 80°28'26"W, Weston Quadrangle, USGS. **Continuity:** New. **Size:** 7.9 ha = 19.5 acres (more or less triangular). **Description of Plot:** A mature woods at Jackson's Mill State 4-H Camp between camp picnic area and West Fork River, ½ extends N and ¼ E with intersecting ravine. The dominant canopy trees are maples (*Acer rubrum* and *saccharum*), and Tulip-tree (*Liriodendron tulipifera*). Most prominent in the understory are Spicebush (*Lindera benzoin*) and seedlings of canopy trees. The ground cover is primarily May-apple (*Podophyllum peltatum*), Wild Geranium (*Geranium maculatum*) and ferns. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 250/acre; total basal area 200 ft<sup>2</sup>/acre. Species comprising 91.5% of the total number of trees: Red Oak (*Quercus rubra*), 20, 8, 24, 67; White Oak (*Q. alba*), 12, 5, 6, 67; Red Maple, 77, 31, 23, 83, Sugar Maple, 17, 7, 3, 33; Tulip-tree, 58, 23, 24, 67; dead trees, 15, 6, 9, 33; Am. Beech (*Fagus grandifolia*), 17, 7, 4, 33. Trees by diameter size class: A (3-6 in.) 80, 32, 8, 4, B (6-9 in.) 68, 27, 20, 10; C (9-15 in.) 62, 25, 49, 24; D (15-21 in.) 28, 11, 51, 26; F (27-33 in.) 7, 3, 33, 16; G (33-40 in.) 2, 1, 12, 6; H (over 40 in.) 3, 1, 27, 13. Shrub stems/acre 4233, ground cover 52%; canopy cover 84%; average canopy height 93 ft (range 79-105). **Edge:** Secondary highway on the W side, West Fork River on the N, and camp cabins on the E. **Topography:** A fairly level wooded area with intersecting ravines. **Elevation:** 1020 ft. **Weather:** Generally cloudy with intermittent rain or fog, clearing later. **Coverage:** May 31-June 4; between dawn and 0730 plus 1 mid-morning trip, 1 late afternoon and 1 evening. (12 trips). Total hours: 8. **Census:** Wood Thrush, 4 (51, 21); Acadian Flycatcher, 3 (38, 15); Red-eyed Vireo, 2; Louisiana Waterthrush, 2; Scarlet Tanager, 2; Red-bellied Woodpecker, 1; E. Phoebe, 1; E. Wood Pewee, 1; Blue-gray Gnatcatcher, 1; Hooded Warbler, 1; Summer Tanager, 0.5, Cardinal, 0.5; Barred Owl, +; Pileated Woodpecker, +; Great Crested Flycatcher, +; Com. Crow, +; Tufted Titmouse, +. **Total:** 17 species; 19 territorial males (241/km<sup>2</sup>, 97/100 acres). **Visitors:** Com. Flicker, Downy Woodpecker, Blue Jay, White-breasted Nuthatch. **Remarks:** Barred Owls and Com. Crow with young; nests of Pileated Woodpecker, Red-bellied Woodpecker, E Phoebe, and Wood Thrush. Census participants: E. Gregg, E. Jacobs, V. Johnson, G & A. McGrew, E. Reichelderfer. Assistance with the vegetation survey: R. DeGarmo, P. Harrison, G. Koch, G. McGrew, W. Murray, G. Phillips, W. Smith.—*E.R. and E.D. CHANDLER (compilers) Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003*

**19. OAK-TULIP-TREE FOREST.**—**Location:** West Virginia; Kanawha Co.; 20 mi E of Charleston,  $38^{\circ}21'49''N$ ,  $81^{\circ}17'51''W$ , Mammoth Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** A bridle path along a wooded hillside beginning in a W direction and curving N. A small stream flows along the base of the hill. The dominant canopy trees are White and Red oaks (*Quercus alba* and *rubra*) and Tulip-tree (*Liriodendron tulipifera*). Most prominent in the understory are Spicebush (*Lindera benzoin*) and Dogwood (*Cornus florida*). The ground cover is primarily Christmas and New York Ferns and Skulcap (*Scutellaria* sp.). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 343/acre; total basal area 119 ft<sup>2</sup>/acre. Species comprising 98% of the total number of trees: White and Red oaks, 149, 43, 45, 74; Tulip-tree, 42, 12, 16, 100; Sycamore (*Platanus occidentalis*), 8, 2, 10, 33; hickories (*Carya* spp.), 30, 9, 55, 100; Basswood, (*Tilia americana*), 12, 3, 65, 67; Cucumber (*Magnolia acuminata*), 17, 5, 4, 67; Am. Beech (*Fagus grandifolia*), 12, 3, 42, 50; Black Birch (*Betula lenta*), 13, 4, 3, 67; dead trees, 28, 8, 2.7, 100. Trees by diameter size class: A (3-6 in.) 185, 54, 18.5, 15.5; B (6-9 in.) 82, 24, 24.5, 20.5; C (9-15 in.) 53, 16, 42.7, 35.8; D (15-21 in.) 17, 5, 18, 15; E (21-27 in.) 5, 1, 15.5, 14. Shrub stems/acre 8167; ground cover 41%; canopy cover 77%; average canopy height 86 ft (range 75-103). **Edge:** Similar forest in all directions. **Topography:** Wooded hillside with a parallel ravine and small stream. **Elevation:** 850-900 ft. **Weather:** Cool and damp with intermittent sunlight. **Coverage:** May 21-25; between dawn and 0800. Total party-hours: 9. **Census:** Red-eyed Vireo, 6 (99, 40); Acadian Flycatcher, 4 (66, 27); Ovenbird, 4; Black-and-white Warbler, 3 (49, 20); Cerulean Warbler, 3; Hooded Warbler, 3; Blue-gray Gnatcatcher, 2; Wood Thrush, 2; Worm-eating Warbler, 2; N. Parula, 2; Kentucky Warbler, 2; E. Phoebe, 1; Swainson's Warbler, 1; Louisiana Waterthrush, 1; Scarlet Tanager, 1; Indigo Bunting, 1; E. Wood Pewee, 0.5; Yellow-throated Vireo, 0.5; Ruffed Grouse, +; Yellow-billed Cuckoo, +; Cardinal, +. **Total:** 21 species; 39 territorial males (642/km<sup>2</sup>, 260/100 acres). **Visitors:** Downy Woodpecker, Com. Crow, Carolina Chickadee, Tufted Titmouse. **Remarks:** The plot started about 100 ft from the horse corral at Camp Camelot on Blue Creek, followed a hillside bridle path and ended beside a small stream on a level area of second growth woodland. The diversified habitat probably contributed to the variety of birds. Census participants: K. Anderson, A. Pyle, W. Smith, E. Williams. Assisting with the vegetation survey: K. Anderson, H. Boecker, D. Broemson, R. DeGarmo, M. Ford, G. Koch, G. Phillips, and W. Smith.—*E.R. and E.D. CHANDLER*, (compilers), *Brooks Bird Club*, 707 Warwood Avenue, Wheeling, W. Va. 26003.

**20. TULIP-TREE-BEECH-OAK FOREST.**—**Location:** West Virginia; Kanawha Co., 4 mi SW of Glen;  $38^{\circ}21'36''N$ ,

$81^{\circ}17'45''W$ , Mammoth Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 x 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Wooded ravine with a small stream and steep hillsides. The dominant canopy trees are Tulip-tree (*Liriodendron tulipifera*), Am. Beech (*Fagus grandiflora*) and oak species. Most prominent in the understory are *Rhododendron maximum*, Spicebush (*Lindera benzoin*), and Maple-leaved Viburnum (*Viburnum acerifolium*). The ground cover is primarily *Meehania cordata* and Wood Nettle (*Laportea canadensis*) with many ferns. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 180/acre; total basal area 153.9 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Tulip-tree 40, 22, 30, 100; Am. Beech, 27, 15, 29, 83; White Oak (*Quercus alba*), 15, 8, 6, 50; Red Oak (*Q. rubra*), 12, 6, 12, 50; Red Maple (*Acer rubrum*), 27, 15, 19, 83; Hemlock (*Tsuga canadensis*), 5, 3, 9, 50; Black Birch (*Betula lenta*), 13, 7, 3, 50; Dogwood (*Cornus florida*), 18, 10, 2, 67; Basswood (*Tilia americana*), 10, 6, 4, 17; dead trees, 12, 6, 1, 67. Trees by diameter size class: A (3-6 in.) 63, 35, 6.3, 4; B (6-9 in.) 30, 17, 9, 6; C (9-15 in.) 47, 26, 37, 24; D (15-21 in.) 20, 11, 36, 23; E (21-27 in.) 18, 10, 57, 37; F (27-33 in.) 2, 1, 8, 5. Shrub stems/acre 10,900; ground cover 37%; canopy cover 84%; average canopy height 89 ft (range 74-110). **Edge:** Bordered on all sides by similar forest. **Topography:** A ravine, the left fork of Coral Run. Average rise of 60 ft on each side from center line. **Elevation:** 860-1060 ft. **Weather:** Cool; rain on May 23 and 25. **Coverage:** May 22-25; between dawn and 1200 hours. Total hours: 31. **Census:** Red-eyed Vireo, 8 (132, 53); Acadian Flycatcher, 6 (99, 40); Blue-gray Gnatcatcher, 5 (82, 33); Black-and-white Warbler, 3 (49, 20); Ovenbird, 3; Am. Redstart, 3; Worm-eating Warbler, 2; Louisiana Waterthrush, 2; Carolina Chickadee, 1.5; Wood Thrush, 1.5; Tufted Titmouse, 1; Hooded Warbler, 1; Blue Jay, 1; Black-throated Green Warbler, 1; Cardinal, 1; Yellow-throated Vireo, +; Cerulean Warbler, +. **Total:** 17 species; 40 territorial males or females (659/km<sup>2</sup>, 267/100 acres). **Visitors:** Ruffed Grouse, Red-bellied Woodpecker, E. Wood Pewee, Com. Crow, N. Parula. **Remarks:** Census by members of the Brooks Bird Club.—*GEORGE F. HURLEY*, 920 Hughes Drive, St. Albans, W. Va. 25177.

**21. 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;  $37^{\circ}33'N$ ,  $79^{\circ}04'W$ , Amherst Quadrangle, USGS. **Continuity:** Established 1978; 2 intermittent years. **Size:** 13.55 ha = 33.48 acres. **Description of Plot:** See AB 33:61 (1979). **Coverage:** May 26, 28, 30; June 4, 6, 17, 22-24; July 3, 9, 18; 0630-1130 and 1830-2000. Total hours: 28.5. **Weather:** Mostly clear in May and June; partly cloudy to cloudy in July. Temperature 65-88°F. No rain. **Census:** Wood Thrush, 28.5 (210, 85); Tufted Titmouse, 8 (59, 24); Brown-headed Cowbird, 4 (30, 12); Red-eyed Vireo, 3.5 (26, 10); Acadian Flycatcher, 3 (22, 9); Scarlet Tanager, 2.5; Yellow-billed Cuckoo, 2; E. Wood Pewee, 1.5; White-breasted Nuthatch, 1.5;

Yellow-throated Vireo, 1.5; Red-tailed Hawk, 1; Pileated Woodpecker, 1; Red-bellied Woodpecker 1; Great Crested Flycatcher, 1; Blue Jay, 1; Carolina Chickadee, 1; Louisiana Waterthrush, 1; Cardinal, 1; Ruby-throated Hummingbird, 0.5; Am Robin, 0.5. **Total:** 20 species; 65 territorial males or females (480/km<sup>2</sup>, 194/100 acres) **Visitors:** Com. Flicker, Downy Woodpecker, Com. Crow, Carolina Wren, Gray Catbird, E. Bluebird, Blue-gray Gnatcatcher, Cerulean Warbler, Com. Grackle, Indigo Bunting. **Remarks:** Nests found (4); Wood Thrush, 3; Ruby-throated Hummingbird, 1. Two cowbird eggs were found in one of the Wood Thrush nests. Total species and the number of individuals both increased from previous years. The increase in individuals resulted primarily from a large increase in the number of Wood Thrushes. Cowbird numbers were also up, possibly corresponding to the increased availability of Wood Thrush hosts.—*C. RAY CHANDLER* (compiler), *ERNEST P. EDWARDS*, *C MICHAEL STINSON*, Route 4 Box 18, Amherst, Va. 24521.

**22. RED MAPLE-BLACK GUM MIXED HARDWOODS.**—**Location:** Virginia; Nansemond Co., Great Dismal Swamp Nat'l Wildlife Refuge, on W side of Brown's Ditch 0.5 mi S of intersection with Jericho Ditch Road, City of Suffolk. **Continuity:** Established 1978; 3 consecutive years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AB 33:61-62 (1979). **Coverage:** May 1, 4, 6, 14, 18, 24; June 1, 6, 8, 15; 0530-0900. Total hours 35. **Census:** Prothonotary Warbler, 11 (109, 44); Ovenbird, 7 (69, 28); Wood Thrush, 6 (59, 24); Com. Yellowthroat, 6; Hooded Warbler, 5 (49, 20); Great Crested Flycatcher, 4 (40, 16); Louisiana Waterthrush, 4, E. Wood Pewee, 3 (30, 12); Carolina Chickadee, 3; Carolina Wren, 3; Red-eyed Vireo, 3; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; White-eyed Vireo, 2; Mourning Dove, 1; Barred Owl, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Rufous-sided Towhee, +. **Total:** 19 species; 62 territorial males or females (613/km<sup>2</sup>, 248/100 acres). **Visitors:** Blue Jay, Tufted Titmouse, Warbling Vireo, N. Parula, Com. Grackle **Remarks:** Nests found: Prothonotary Warbler (3). Ovenbird (2), Com. Yellowthroat (2), Hooded Warbler 1; one of the Com. Yellowthroat nests was occupied by a single, young Brown-headed Cowbird. The swamp was much drier than the two previous years with less than 2 in. of rain during the census period, resulting in the loss of all standing water within the plot. There was another forest caterpillar eruption during the census resulting in the defoliation of many Red Maple (*Acer rubrum*) and Sweet Gum (*Liquidambar styraciflua*) and an abundance of food for the insect feeders. The weather was warm and humid with an average temperature of 75°F.—*TOM GWYNN*, 1420-D Meads Rd., Norfolk, Va. 23505.

**23. UPLAND OAK-HICKORY FOREST.**—**Location:** Virginia; Dranesville District Park, McLean, Fairfax Co., along Route 193 (Old Georgetown Pike), approximately  $\frac{1}{4}$  mi W of old Exit 13, Capital Beltway (Interstate 495);  $38^{\circ}57'N$ ,  $77^{\circ}12'W$ , Falls Church Quadrangle, USGS. **Continuity:** Established

1973, 8 consecutive years. **Size:** 11.0 ha = 27 2 acres. **Description of Plot:** See AB 25 636 (1971). **Weather:** Generally clear; light rain on one trip; temperatures between 38-80°F. **Coverage:** Mar. 23; Apr. 11-12, 19, 20, 24-25; May 3-4, 11, 17, 24, 31; June 10, 17, 21, 23; July 7, 28; between 0530 and 1015 EDT. Total hours: 37.6. **Census:** Red-eyed Vireo, 13 (118, 48); Wood Thrush, 9 (82, 33); Brown-headed Cowbird, 7 (64, 26); Carolina Chickadee, 5.5 (50, 20); Red-bellied Woodpecker, 4 (36, 15); Acadian Flycatcher, 4; Blue Jay, 4; Tufted Titmouse, 4; Cardinal, 3 5 (32, 13); Mourning Dove, 3 (27, 11); Downy Woodpecker, 3; White-breasted Nuthatch, 3; Scarlet Tanager, 3; Ovenbird, 2.5; Great Crested Flycatcher, 2; E. Wood Pewee, 2; Pileated Woodpecker, 1.5; Hairy Woodpecker, 1.5; Brown Creeper, 1; Blue-gray Gnatcatcher, 1; Worm-eating Warbler, 1; Louisiana Waterthrush, 1. **Total:** 22 species; 79 5 territorial males ( $722/\text{km}^2$ , 292/100 acres). **Visitors:** Wood Duck, Red-shouldered Hawk, Broad-winged Hawk, Yellow-billed Cuckoo, Com. Flicker, Com. Crow, Fish Crow, Carolina Wren, Am. Robin, Veery, White-eyed Vireo, Black-and-white Warbler, N Parula, Pine Warbler, Kentucky Warbler, Com. Yellowthroat, Am. Redstart, Com. Grackle, Summer Tanager, House Finch, Am Goldfinch. Nests found: Blue Jay 3, Red-bellied Woodpecker 2.—*G. H. ESPEN-SHADE, C.W. PER-LEE, JR. (co-compiler), MARK T. STRONG, ROBERT J. WATSON (compiler) 2636 Marcey Road, Arlington, Va. 22207.*

**24. UPLAND TULIP-TREE - OAK FOREST.—Location:** Virginia; Fairfax Co., USGS Nat'l Center, Reston;  $38^\circ 56' 45''\text{N}$ ,  $77^\circ 21' 50''\text{W}$ , Vienna Quadrangle, USGS. **Continuity:** Established 1974; 7 consecutive years. **Size:** 20.6 ha = 50.9 acres. **Description of Plot:** See AB 28:701-2, 1003-4 (1974) and 34 49 (1980). **Weather:** Temperatures averaged near normal in March, above average in April and May, and slightly below normal in June. Rainfall was 0.41 inches above normal from March through June. **Coverage:** Apr. 12, 20, 29; May 9, 22, 29, 31; June 3-4, 12, 18, 22, 27; July 6. Total hours: 22.1. **Census:** Blue Jay, 7 (34, 14); Wood Thrush, 7; Tufted Titmouse, 5 (24, 10); Red-eyed Vireo, 5; E. Wood Pewee, 4 (19, 8); Carolina Chickadee, 4; Starling, 4; Cardinal, 4; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Gray Catbird, 2; Am. Robin, 2; E. Bluebird, 2; Worm-eating Warbler, 2; Scarlet Tanager, 2; Yellow-billed Cuckoo, 1; Com. Flicker, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Ovenbird, 1; Brown-headed Cowbird, 1. **Total:** 22 species; 62 territorial males ( $301/\text{km}^2$ , 122/100 acres). **Remarks:** Nests found: Downy Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; Gray Catbird, 2; Wood Thrush, 1; E. Bluebird, 2; Starling, 4. The Starlings nested in metal hoods covering lights along the westernmost paved pathway. A Carolina Wren was seen on June 12. The bluebirds nested in boxes erected along the wood edge. One of the pairs foraged commonly within the plot. Correction one pair of bluebirds should be added to the 1976-77-78 censuses.—*PAUL W. and JOAN C. WOODWARD, 4117 Virginia St.,*

#### Fairfax, Va. 22030.

**25. OAK-MAPLE FOREST.—Location:** Tennessee, Campbell Co., 4 mi NW intersection of State Highway 63 and I-75 at Caryville;  $36^\circ 19' 30''\text{N}$ ,  $84^\circ 19' 30''\text{W}$ , Block, Tenn. 7.5' Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (roughly rectangular, surveyed, gridded). **Description of Plot:** The dominant canopy trees are Chestnut Oak (*Quercus prinus*), N. Red Oak (*Q. rubra*), and Red Maple (*Acer rubrum*). Chestnut Oak and Red Maple are also important codominant trees. Most prominent in the understory are seedlings of Flowering Dogwood (*Cornus florida*), Red Maple, and Black Gum (*Nyssa sylvatica*). Ground cover is primarily *Eupatorium* sp., *Desmodium* sp., *Aster* sp., various ferns (predominantly *Athyrium asplenoides*), Poison Ivy (*Rhus radicans*), and various woody tree sprouts. A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over based on 10 0.1-acre circular plots, 245/acre; total basal area  $114 \text{ ft}^2/\text{acre}$ . Species constituting 99% of the total number of trees: Red Maple, 66, 27, 15, 100; Chestnut Oak, 51, 22, 25, 60; Black Gum, 22, 10, 8, 50; Sugar Maple, 22, 10, 4, 70; Red Maple (*A. rubrum*), 19, 8, 5, 50; N. Red Oak, 17, 8, 9, 70; Sassafras, 17, 8, 3, 60; Shagbark Hickory (*Carya ovata*), 14, 6, 7, 70; White Oak, 12, 5, 13, 70; Mockernut Hickory (*C. tomentosa*), 10, 4, 7, 70; Black Locust (*Robinia pseudoacacia*), 10, 4, 4, 50; Flowering Dogwood (*Cornus florida*), 9, 4, 1, 50; Black Oak (*Q. velutina*), 9, 4, 4, 50; Tulip-tree, 10, 4, 9, 50. Trees by diameter size class: A (3-6 in.) 109, 48, 11, 12; B (6-9 in.) 52, 23, 16, 17; C (9-15 in.) 56, 24, 45, 48; D (15-21 in.) 10, 4, 18, 19; E (21-27 in.) 1, 1, 3, 3. Shrub stems/acre 3935; ground cover 45%; canopy cover 85%; average canopy height, 80 ft (range 70-91 ft). **Edge:** Bordered on all sides by similar forest. Old logging roads (canopy almost closed) border two sides of the study site. Reclaimed back-to-contour strip mine areas in predominantly grassland and low shrubs approximately 0.1 mi from lower boundary. **Topography:** E facing slope, moderately sloping to gently rolling terrain. **Elevation:** 2850 ft. **Coverage:** May 28, 30; June 3, 5, 9, 11-13, 16, 19; 0630-1030. Total hours: 40. **Weather:** Variable; clear to overcast. Temperatures 62-74°F. **Census:** Ovenbird, 7 (86, 35); Red-eyed Vireo, 5 (62, 25); Cerulean Warbler, 3 (37, 15); Hooded Warbler, 3; Am. Redstart, 3; Downy Woodpecker, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Yellow-throated Vireo, 1; Black-and-white Warbler, 1; Worm-eating Warbler, 1; Kentucky Warbler, 1; Scarlet Tanager, 1; Rufous-sided Towhee, 1; Yellow-billed Cuckoo, +; E. Wood Pewee, +; Carolina Chickadee, +; Tufted Titmouse, +; Brown-headed Cowbird, +. **Total:** 19 species; 30 territorial males ( $371/\text{km}^2$ , 150/100 acres). **Visitors:** Turkey, Pileated Woodpecker, Blue Jay, Blue-gray Gnatcatcher, Chestnut-sided Warbler, Blackburnian Warbler, Com. Grackle. **Remarks:** This work was conducted in cooperation with the Eastern Energy and Land Use Team of the U.S. Fish and Wildlife Service.—*LINDA J. TURNER and DALE K. FOWLER, Div. of Land and Forest Resources, Tennessee Valley Authority, Norris, Tenn. 37828.*

**26. OAK-MAPLE FOREST.—Location:** Tennessee, Campbell Co., 5.7 mi W of State Highway 63 and I-75 intersection at Caryville;  $36^\circ 17' 30''\text{N}$ ,  $84^\circ 19' 30''\text{W}$ , Block, Tenn. 7.5' Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (roughly rectangular, surveyed, gridded). **Description of Plot:** The dominant canopy trees are Chestnut Oak (*Quercus prinus*), N. Red Oak (*Q. rubra*), and Red Maple (*Acer rubrum*). Chestnut Oak and Red Maple are also important codominant trees. Most prominent in the understory are seedlings of Flowering Dogwood (*Cornus florida*), Red Maple, and Black Gum (*Nyssa sylvatica*). Ground cover is primarily *Eupatorium* sp., *Desmodium* sp., *Aster* sp., various ferns (predominantly *Athyrium asplenoides*), Poison Ivy (*Rhus radicans*), and various woody tree sprouts. A quantitative survey of the vegetation gave the following results: trees 3 in. in diameter and over based on 10 0.1-acre circular plots, 245/acre; total basal area  $114 \text{ ft}^2/\text{acre}$ . Species constituting 99% of the total number of trees: Red Maple, 66, 27, 15, 100; Chestnut Oak, 58, 24, 35, 90; N. Red Oak, 18, 7, 15, 80; White Oak (*Q. alba*) 18, 7, 7, 40; Sourwood (*Oxydendrum arboreum*), 14, 6, 3, 60; Black Oak (*Q. velutina*) 13, 5, 8, 70; Flowering Dogwood, 12, 5, 1, 60; Sugar Maple (*A. saccharum*) 9, 4, 2, 20; Mockernut Hickory (*Carya tomentosa*) 9, 4, 5, 60; Black Gum, 8, 3, 1, 50; Black Locust (*Robinia pseudoacacia*) 6, 2, 3, 40; Shagbark Hickory (*C. ovata*) 5, 2, 2, 30; Slippery Elm (*Ulmus rubra*) 3, 1, 0, 10; Black Walnut (*Juglans nigra*) 2, 1, 0, 20; Tulip-tree (*Liriodendron tulipifera*) 2, 1, 2, 20. Trees by diameter size class: A (3-6 in.) 118, 48, 12, 10; B (6-9 in.) 54, 22, 17, 15; C (9-15 in.) 53, 22, 42, 37; D (15-21 in.) 16, 7, 29, 25; E (21-27 in.) 3, 1, 9, 8; F (27-33 in.) 1, 0, 5, 4. Shrub stems/acre 2735; ground cover, 39%; canopy cover, 85%; average canopy height, 77 ft (range 68-100 ft). **Edge:** All sides bordered by similar forest. Old logging roads traverse parts of the site (canopy nearly closed). Reclaimed strip mine area approximately 0.1 m NE of plot boundary. **Topography:** South-facing slope, steeply sloping terrain dissected by rugged ravines. Wet weather stream bisects study site. **Elevation:** 2500 ft. **Coverage:** May 29; June 2, 4, 6, 10-13, 16, 19; 0630-1030 hours. Total hours: 40. **Weather:** Variable, clear to overcast. Temperatures 62-74°F. **Census:** Ovenbird, 5.5 (68, 28); Worm-eating Warbler, 3 (37, 15); Red-eyed Vireo, 2; Hooded Warbler, 2; Am. Redstart, 2; White-breasted Nuthatch, 1; Wood Thrush, 1; Yellow-throated Vireo, 1; Solitary Vireo, 1; Black-and-white Warbler, 1; Cerulean Warbler, 1; Kentucky Warbler, 1; Scarlet Tanager, 1; Pileated Woodpecker, 0.5; Ruffed Grouse, +; Tufted Titmouse, +. **Total:** 16 species; 23 territorial males ( $284/\text{km}^2$ , 115/100 acres). **Visitors:** Downy Woodpecker, Blue Jay, Com. Crow, Carolina Chickadee, Black-throated Green Warbler, Brown-headed Cowbird, Cardinal **Remarks:** This work was conducted in cooperation with the Eastern Energy and Land Use Team of the U.S. Fish and Wildlife Service.—*LINDA J. TURNER and DALE K. FOWLER, Div. of Land and Forest Resources, Tennessee Valley Authority, Norris, Tenn. 37828.*

**27. FLOODPLAIN FOREST.**—**Location:** North Carolina; Orange Co., within the Univ. of N.C. Mason Farm Reserve, locally known as 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; 4 consecutive years. **Size:** 13 ha = 32.1 acres. **Description of Plot:** See AB 32:63 (1978). **Coverage:** 9 visits between Apr. 23 and June 9. Total party-hours: 25. **Census:** Red-eyed Vireo, 15.5 (119, 48); Acadian Flycatcher, 7.5 (58, 23); Wood Thrush, 7.5; Tufted Titmouse, 6 (46, 19); Blue-gray Gnatcatcher, 6; Scarlet Tanager, 3.5 (27, 11); Cardinal, 3.5; Kentucky Warbler, 3 (23, 9); Hooded Warbler, 3; Yellow-throated Vireo, 2.5; Ovenbird, 2.5; Yellow-billed Cuckoo, 2; Ruby-throated Hummingbird, 2; Red-bellied Woodpecker, 2; Carolina Chickadee, 2; Carolina Wren, 2; Hairy Woodpecker, 1.5; Downy Woodpecker, 1.5; Great Crested Flycatcher, 1; N. Parula, 1; Louisiana Waterthrush, 1; White-breasted Nuthatch, 0.5; Red-shouldered Hawk, +; Am. Woodcock, +; Barred Owl, +; Pileated Woodpecker, +; Blue Jay, +; Brown-headed Cowbird, +. **Total:** 28 species; 77 territorial males (593/km<sup>2</sup>, 240/100 acres). **Visitors:** Wood Duck, Bobwhite, Com. Flicker, Com. Grackle. **Remarks:** We are convinced Red-shouldered Hawks nested but we did not climb the tree. Newly fledged Barred Owls were seen, and the nest was almost certainly on the plot. A Tufted Titmouse family with dependent young was seen.—*R. BELL, M. CROTEAU, M. EISDORFER, T. GIDUZ, S. HALL* (co-compiler), *C. JONES, C. LEHRER, A. LINDSEY, A. McCRAE, L. MEHRHOFF, H. MUELLER* (co-compiler), *P. NADER, H. WILEY, Dept. of Zoology, Univ. of North Carolina, Chapel Hill, N. C. 27514.*

**28. MIXED DECIDUOUS FOREST.**—**Location:** North Carolina, Orange Co., 4.5 mi N of Chapel Hill on N.C. Highway 86; Duke Forest Natural Area; 35°59'N, 79°04'W, Chapel Hill Quadrangle, USGS. **Continuity:** Established 1973; 7 intermittent years. **Size:** 8.8 ha = 21.8 acres. **Description of Plot:** See AB 27:1018-1019 (1973). **Weather:** Average conditions. **Coverage:** Apr. 19, 25; May 1, 10, 17, 27, 29; June 1; 0640-1000, and 1630-1715. Total hours: 40. **Census:** Red-eyed Vireo, 13 (147, 60); Acadian Flycatcher, 5 (57, 23); Ovenbird, 4 (45, 18); Tufted Titmouse, 3 (34, 14); Scarlet Tanager, 3; Red-bellied Woodpecker, 2.5; Louisiana Waterthrush, 2.5; Wood Thrush, 2, Blue-gray Gnatcatcher, 1.5; Hairy Woodpecker, 1; Downy Woodpecker, 1; Carolina Wren, 1; N. Parula, 1; Blue Jay, +; Carolina Chickadee, +; Yellow-throated Warbler, +; Cardinal, +. **Total:** 17 species, 40.5 territorial males or females (459/km<sup>2</sup>, 186/100 acres). **Visitors:** Yellow-billed Cuckoo, Ruby-throated Hummingbird, Belted Kingfisher, White-eyed Vireo, Pine Warbler, Hooded Warbler, Brown-headed Cowbird. **Remarks:** Nests found (7): Red-bellied Woodpecker, Hairy Woodpecker, Downy Woodpecker, Acadian Flycatcher, Tufted Titmouse, Wood Thrush, Louisiana Waterthrush. Cuckoos came late to the plot and could be breeders. The total breeding population is lower than in previous years, but we have no obvious explanations.—*ERIC GARNER, DANIEL*

*KAPLAN, JAMES McCONNELL, MATTHEW SPENCER, NORMAN BUDNITZ* (compiler), *Route 1, Box 76A, Durham, N.C. 27705.*

**29. 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; 5 consecutive years. **Size:** 12.55 ha = 31 acres. **Description of Plot:** See AB 31:41 (1977). **Coverage:** 10 visits between Apr. 23 and June 9. Total party-hours: 25. **Census:** Red-eyed Vireo, 14 (112, 45); Tufted Titmouse, 8.5 (68, 27); Wood Thrush, 7 (56, 23); Blue-gray Gnatcatcher, 6 (48, 19); Ovenbird, 4 (32, 13); Downy Woodpecker, 3 (24, 10); Acadian Flycatcher, 3; Carolina Chickadee, 3; Scarlet Tanager, 3; Cardinal, 3; Carolina Wren, 2.5; Ruby-throated Hummingbird, 2; Red-bellied Woodpecker, 2; Kentucky Warbler, 2; Summer Tanager, 2; Yellow-billed Cuckoo, 1; Whip-poor-will, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; White-breasted Nuthatch, 1; Pine Warbler, 1; Hooded Warbler, 1; Yellow-throated Vireo, 0.5; Wood Duck, +; Red-tailed Hawk, +; Great Horned Owl, +; Pileated Woodpecker, +; Blue Jay, +; Com. Crow, +. **Total:** 29 species; 72.5 territorial males or females (578/km<sup>2</sup>, 234/100 acres). **Visitors:** Mourning Dove, Screech Owl, Com. Flicker, E. Wood Pewee, Gray Catbird, Prairie Warbler (2 males were on territory for 2 weeks in early May), Louisiana Waterthrush, Brown-headed Cowbird, Indigo Bunting. **Remarks:** Nests found (1 each): Wood Duck, Wood Thrush, Cardinal. Two recently fledged families of Ovenbirds were seen. A female Scarlet Tanager was seen carrying nesting material.—*K. CHRISTENSEN, C. DAL MOLIN, S. HALL* (co-compiler), *E. HONORÉ, C. JONES, C. LEHRER, K. MEYER, H. MUELLER* (co-compiler), *B. SIMPSON, H. WILEY, Dept. of Zoology, Univ. of North Carolina, Chapel Hill, N. C. 27514.*

**30. VIRGIN HARDWOOD BOTTOM-LAND SWAMP FOREST.**—**Location:** South Carolina; 33°48'N, 80°49'W, Gadsden Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (836 x 1045 ft, steel tape and compass). Dominant canopy trees are Sweet Gum (*Liquidambar styraciflua*) and Green Ash (*Fraxinus pennsylvanica*). Understory very sparse and consists of small patches of Switch Cone (*Arundinaria gigantea*) and Pawpaw (*Asimina triloba*). Ground cover also sparse with patches of sedge (*Carex* sp.), Lizard's Tail (*Saururus cernuus*), and greenbriar (*Smilax* sp.) predominating. Six 0.1 acre circular plots gave following results: trees 3-in. diameter and greater, 205/acre; total basal area 208.8 ft<sup>2</sup>/acre. Species comprising 91% of total trees: Ironwood (*Carpinus caroliniana*), 48, 23, 4, 100; Sweet Gum, 37, 18, 40, 100; Am. Holly (*Ilex opaca*), 26, 12, 2, 33; Green Ash, 19, 10, 26, 100; Am. Elm (*Ulmus americana*), 19, 10, 3, 83; Hackberry (*Celtis laevigata*), 13, 6, 5, 67; dead trees, 13, 6, 6, 67; Bald Cypress (*Taxodium distichum*), 6, 3, 8, 17; Swamp Chestnut Oak (*Quercus michauxii*), 6, 3, 1, 67. Trees by diameter size classes: A

(3-6 in.) 82, 40, 8, 2, 4, B (6-9 in.) 46, 23, 13, 9, 7; C (9-15 in.) 37, 18, 29, 4, 14; D (15-21 in.) 13, 6, 23, 11; E (21-27 in.) 11, 5, 34, 7, 17, F (27-33 in.) 6, 3, 31, 4, 15; G (33-40 in.) 9, 5, 68, 2, 32. Shrub stems/acre 2500; ground cover 10%; canopy coverage 84%; average canopy height 120 ft (range 110-130). **Edge:** Bordered on all sides by similar forest. **Topography:** Flat. **Elevation:** 100 ft. **Weather:** Warm and dry throughout period. **Coverage:** Apr. 24, 28; May 2, 8, 12, 15, 25, 28; June 5, between 0530 and 1000, EST. Total hours 32. **Census:** N. Parula, 25 (309, 125); Red-eyed Vireo, 7.5 (93, 38); Acadian Flycatcher, 4.5 (56, 23); Tufted Titmouse, 4 (49, 20); Carolina Wren, 4; Cardinal, 4; Yellow-billed Cuckoo, 3 (37, 15); Yellow-throated Warbler, 3; White-breasted Nuthatch, 2.5, Hairy Woodpecker, 2; Great Crested Flycatcher, 2; Carolina Chickadee, 2; Blue-gray Gnatcatcher, 2; Red-bellied Woodpecker, 1.5; Prothonotary Warbler, 1.5; Red-shouldered Hawk, 1; Barred Owl, 1; Pileated Woodpecker, 1; Wood Thrush, 1; White-eyed Vireo, 1; Yellow-throated Vireo, 1; Summer Tanager, 1; Hooded Warbler, +. **Total:** 23 species; 75.5 territorial males (933/km<sup>2</sup>, 378/100 acres). **Visitors:** Yellow-crowned Night Heron, Wood Duck, Chimney Swift, Ruby-throated Hummingbird, Blue Jay, Fish Crow, Am. Redstart, Com. Grackle, and Brown-headed Cowbird. **Remarks:** Plot is a representative sample of the 15,000 acre Congaree Swamp Nat'l Mon., most of which is virgin except for some cypress cut at the turn of the century. It is a "red river" bottomland averaging 3 mi in width which floods periodically 10-12 times per year. A dense canopy and midstory, along with periodic flooding, precludes establishment of an understory along with ground-nesting birds. Seven openings in the forest canopy, created by fallen old growth timber, support the brushy undergrowth where Carolina Wrens, White-eyed Vireo, and Cardinals were found. These "holes" were scattered throughout the plot and averaged 30 x 40 ft. Hooded Warblers are regular breeders in this bottomland but are associated with cane thickets. Cane (averaged 3.5 ft tall) was sparse which probably accounted for the "+" recording for Hooded Warbler. No nests were found for the Pileated Woodpecker, Barred Owl, or Red-shouldered Hawk but each species was recorded during every visit and the plot was considered a significant portion of their breeding territory. Thanks to Robert McDaniel, Congaree Swamp Nat'l Mon., for permission to conduct this study.—*JOHN EMMETT CELY and JAMES A. SORROW, Nongame-Endangered Species Section, S.C. Wildlife and Marine Resources Dept. P.O. Box 167, Columbia, S.C. 29202.*

**31. VIRGIN HARDWOOD SWAMP FOREST.**—**Location:** South Carolina; Dorchester and Berkeley Cos., 6.5 mi E of Harleyville, in National Audubon Society's Francis Beidler Forest; 33°00'N, 80°15'W, Ridgeville Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 8.9 ha = 22 acres. **Description of Plot:** See AB 34:50 (1980). **Weather:** Mostly clear, calm and mild. Temperatures 50-88°F. **Coverage:** Apr 18, 30; May 7, 16, 20, 29; June 4, 13; dawn-1015 or 1630-dusk. Total party-hours: 19. **Census:**

Blue-gray Gnatcatcher, 18 (202, 82), N Parula, 15.5 (174, 70); Red-eyed Vireo, 14.5 (163, 66); Acadian Flycatcher, 8.5 (95, 39); Great Crested Flycatcher, 7.5 (84, 34); Tufted Titmouse, 7.5; Yellow-throated Warbler, 7 (79, 32); White-eyed Vireo, 6 (67, 27); Prothonotary Warbler, 6; Carolina Wren, 4.5 (51, 20); Yellow-billed Cuckoo, 4 (45, 18); Red-bellied Woodpecker, 3.5 (39, 16); Summer Tanager, 3.5; Carolina Chickadee, 3 (34, 14); Hooded Warbler, 2.5; Pileated Woodpecker, 2; Chimney Swift, 1; Wood Duck, 0.5; White-breasted Nuthatch, 0.5; Wood Thrush, 0.5; Cardinal, 0.5; Hairy Woodpecker, +; Downy Woodpecker, +; Brown-headed Cowbird, +. **Total:** 24 species; 116.5 territorial males ( $1309/\text{km}^2$ , 530/100 acres). **Visitors:** White Ibis, Red-shouldered Hawk, Bobwhite, Mourning Dove, Barred Owl, Blue Jay, Com. Crow, Gray Catbird, Com. Grackle. **Remarks:** This year's census showed declines in both the number of nesting species (14%) and the total number of territorial males (20%); however, some species did show significant increases. Of the 5 most abundant species, noticeable declines were exhibited by N Parula (53%) and Great Crested Flycatcher (42%), and noticeable increases by Red-eyed Vireo (45%) and Acadian Flycatcher (55%), while the Blue-gray Gnatcatcher population remained nearly constant. In spite of these fluctuations, the identities of 5 out of the 6 most abundant species for both years were the same. Future censuses will help to determine whether or not these changes are within the normal range of fluctuation for this fairly dense breeding population. As might be expected, Prothonotary Warbler territories were situated in the wettest habitats, dominated by Bald Cypress and Tupelo Gum trees. Yellow-throated Warblers were associated with the tallest stands of pines or bald cypress. White-eyed Vireos were observed mostly around forest openings created by fallen trees.—KENNETH STROM (compiler), NORMAN BRUNSWIG, WILLIAM HUSSEY, MICHAEL DAWSON, Route 1, Box 114, Harleyville, S C 29448.

**32. MATURE BEECH - MAGNOLIA FOREST.**—**Location:** Florida; Leon Co., Tall Timbers Research Station, Woodyard Hammock, 22 mi N of Tallahassee;  $30^\circ 40' \text{N}$ ,  $84^\circ 15' \text{W}$ . Beachtion Quadrangle, USGS. **Continuity:** New. **Size:** 15.75 ha = 38.9 acres (rectangular, 700 x 225 m, surveyed with tape measure and compass). **Description of Plot:** A mesic hammock. Although there are a few old stumps from selective cutting, the forest has not been disturbed for many years. An intermittent creek runs through the plot and a small (0.25 ha) gum swamp is located near the center. Light gaps caused by natural treefalls support dense undergrowth and create structural heterogeneity in the forest. A quantitative survey of the vegetation gave: trees 3 in diameter and over based on 25 0.1-acre circular samples 237.6/acre; total basal area 153.8  $\text{ft}^2/\text{acre}$ . Species comprising 91% of the total number of trees: Am. Holly (*Ilex opaca*), 27, 11, 5, 96; E. Hophornbeam (*Ostrya virginiana*), 27, 11, 4, 80; Flowering Dogwood (*Cornus florida*), 24, 10, 2, 52; Sweet Gum (*Liquidambar styraciflua*), 23.2, 10, 8, 60; Am. Beech (*Fagus grandifolia*), 22.8, 10, 22, 80; S. Magnolia, (*Magnolia*

*grandiflora*), 16.8, 7, 22, 64; Pignut Hickory (*Carya glabra*), 14.8, 6, 4, 76; Spruce Pine (*Pinus glabra*), 14.4, 6, 9, 40; Swamp Chestnut Oak (*Quercus michauxii*), 12.8, 5, 3, 44; Am. Hornbeam (*Carpinus caroliniana*), 11.8, 5, 2, 36; dead trees, 10, 4, 2, 68; Sourwood (*Oxydendrum arboreum*), 8.4, 4, 2, 44; Black Tupelo (*Nyssa sylvatica*), 5.2, 2, 4, 24. Trees by diameter size class: A (3-6 in.) 105.4, 44, 26.3, 7; B (6-9 in.) 56.8, 24, 42.6, 11; C (9-15 in.) 37.6, 16, 75.2, 20; D (15-21 in.) 25.6, 11, 115.2, 30; E (21-27 in.) 7.2, 3, 55.8, 15; F (27-33 in.) 4, 2, 49, 13; G (33-40 in.) 1.2, 1, 21.3, 6. Shrub stems/acre 474; ground cover 55%; canopy cover 96%; average canopy height 27 m (range 15-32). **Edge:** At least a 25 m buffer of similar habitat on all sides. **Topography:** The S half is low and flat and the N half is gradually sloping and drier. **Elevation:** 46-61 m. **Weather:** Average low, 16.8°C; average high, 23.7°. Little wind. **Coverage:** Apr. 9, 21; May 7-8, 13, 18, 24, 31; 8 trips starting within 20 min of sunrise. Average of 189 min/census. Total hours: 25. **Census:** N. Parula, 19.5 (124, 50); Acadian Flycatcher, 15.5 (98, 40); Red-eyed Vireo, 11.5 (73, 30); White-eyed Vireo, 10 (64, 26); Blue-gray Gnatcatcher, 8 (51, 21); Tufted Titmouse, 7 (44, 18); Cardinal, 6.5 (41, 17); Hooded Warbler, 5 (32, 13); Carolina Wren, 4 (25, 10); Great Crested Flycatcher, 3.5 (22, 9); Red-bellied Woodpecker, 2.5; Carolina Chickadee, 2.5; Yellow-billed Cuckoo, 2; Blue Jay, 2; Yellow-throated Vireo, 1.5; Louisiana Waterthrush, 1.5; Brown-headed Cowbird, 1.5; Summer Tanager, 1.5; Barred Owl, 1; Pileated Woodpecker, 1; Downy Woodpecker, 1; Prothonotary Warbler, 1; Red-shouldered Hawk, +; Com. Crow, +; Wood Thrush, +. **Total:** 25 species; 109.5 territorial males ( $695/\text{km}^2$ , 281/100 acres). **Visitors:** Wood Duck, Pine Warbler. **Remarks:** The Louisiana Waterthrush could have remained on the plot because there was an unusually high amount of rainfall which kept the creek flowing throughout the season. There is no certain breeding record for this species in the area. Thanks to Patty Blair and Mary Tebo for help with the vegetation sampling. Frances James and Jerry Niemi for advice and support and Tall Timbers Research Station for permission to work on the study site.—TODD ENGSTROM, Dept. of Biological Sciences, Conradi Building, Florida State Univ., Tallahassee, Fla. 32306.

**33. WOODED CITY RAVINE.**—**Location:** Ontario; York Co., Toronto, Moore Park Ravine, between Moore Ave. and Chorley Park;  $43^\circ 41' \text{N}$ ,  $79^\circ 22' 30'' \text{W}$ . **Continuity:** Established 1966; 11 intermittent years. **Size:** 20 ha = 49.4 acres. **Description of Plot:** See AB 25:993 (1971). **Coverage:** Apr. 26; May 4, 10, 23, 28; June 4, 12, 14, 19, 21, 26; 0630-0900. Total hours: 19. **Weather:** 6 sunny days, 5 days cool and cloudy. Average temperature: 58.9°F, low 43°, high 72°. June was colder than usual. **Census:** Cardinal, 6, (30, 12); Am. Robin, 5 (25, 10); Downy Woodpecker, 4 (20, 8); Great Crested Flycatcher, 3 (15, 6); E. Wood Pewee, 3; Blue Jay, 3; Starling, 3; Wood Thrush, 2; N. Oriole, 2; Com. Grackle, 2; Mourning Dove, 1; Com. Flicker, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Red-eyed Vireo, 1; Red-winged Blackbird, 1; Rose-breasted Grosbeak, 1; Am. Goldfinch, 1; Song Spar-

row, 1. Gray Catbird, +, House Sparrow, +. **Total:** 21 species; 42 territorial males ( $210/\text{km}^2$ , 85/100 acres). **Remarks:** The very cool weather in mid-June seems to have reduced the numbers of Wood Thrush. The catbird has declined from 4 in 1971, to none this year. Breeding as they do in edge growth makes them vulnerable to periodic disturbance, the latest being the heavy use of the area by joggers. The N. Oriole abandoned one territory occupied for 8 out of 10 years, the only change this year being dieback in the 70-ft poplars it used formerly. I plotted the Indigo Bunting's 10-year record against that of the cowbird and find a close relationship between their common high in 1974 and their decline to this year's absence as territorial males (and females).—ERIC NASMITH, 28 Donwoods Drive, Toronto, Ontario, Canada M4N 2G1.

**34. ELM-ASH-BIRCH FOREST.**—**Location:** Minnesota; Clearwater Co., Univ. of Minn., Forestry and Biological Station, Itasca State Park;  $47^\circ 10' \text{N}$ ,  $95^\circ 12' \text{W}$ . Lake Itasca Quadrangle, USGS. **Continuity:** New. **Size:** 8.7 ha = 21.5 acres (surveyed). **Description of Plot:** The dominant canopy trees are Am. Elm (*Ulmus americana*) and Black Ash (*Fraxinus nigra*). Dominant in the understory are Am. Elm, Basswood (*Tilia americana*), and Black Ash. The ground cover consists of Ostrich Fern (*Matteuccia struthiopteris*), Blue Cohosh (*Caulophyllum thalictroides*), and Meadow Rue (*Thalictrum dioicum*). A quantitative survey of the vegetation gave the following results: trees 3-in. diameter and over, based on ten 0.1-acre circular samples, 276 trees/acre; total basal area 135.4  $\text{ft}^2/\text{acre}$ . Species comprising the total number of trees: Am. Elm, 88, 32, 25, 100; Black Ash, 61, 22, 29, 100; Paper Birch (*Betula papyrifera*), 36, 13, 25, 80; dead trees, 30, 11, 11, 70; Basswood, 19, 7, 4, 80; White Spruce (*Picea glauca*), 17, 6, 2, 10; Balsam Fir (*Abies balsamea*), 15, 5, 3, 20; Ironwood (*Ostrya virginiana*), 7, 3, 1, 10; Mountain Maple (*Acer spicatum*), 3, 1, 1, 20. Trees by diameter size class: A (3-6 in.) 93, 34, 9, 7; B (6-9 in.) 75, 27, 23, 17; C (9-15 in.) 91, 33, 68, 50; D (15-21 in.) 13, 5, 23, 17; E (21-27 in.) 4, 1, 12, 9. Shrub cover 50%; ground cover 79%; canopy cover 78%; average canopy height 70 ft. **Edge:** To the W side is upland, to the S and E are lowland and marsh. **Topography:** Mostly flat with a slight eastward slope. **Elevation:** 1457 ft. **Weather:** Mostly clear and calm with one slight shower. **Coverage:** July 1-13; 0500-1000, 1330-1530, and 1900-2030 hours. Total hours: 24. **Census:** Red-eyed Vireo, 20 (230, 93); Ovenbird, 12 (138, 56); Least Flycatcher, 6 (69, 28); Great Crested Flycatcher, 5 (57, 23); Black-throated Green Warbler, 5; Blackburnian Warbler, 5; Am. Redstart, 4 (46, 19); Winter Wren, 3 (34, 14); Yellow-bellied Sapsucker, 2.5 (29, 12); Com. Yellowthroat, 2.5; Com. Flicker, 2; Hairy Woodpecker, 2; White-breasted Nuthatch, 2; Veery, 2; Tennessee Warbler, 2; N. Oriole, 2; Am. Robin, 1.5; Broad-winged Hawk, 1; Barred Owl, 1; Downy Woodpecker, 1; Black-and-white Warbler, 1; Yellow Warbler, 1; Chestnut-sided Warbler, 1. **Total:** 23 species; 84.5 territorial males ( $971/\text{km}^2$ , 393/100 acres). **Visitors:** Ruby-throated Hummingbird, Com. Crow, Cedar Waxwing, Pine Warbler,

Evening Grosbeak, and Purple Finch. **Remarks:** Broad-winged Hawk nest sighted. Special thanks to J. D. Fry and Frances C. James for assistance with field identification.—*BARBARA BELL and MARY CANDEE*, 240 S. Rolland Road, Brookfield, Wisc. 53005.

**35. UPLAND MAPLE-OAK FOREST.**—**Location:** Wisconsin; Waukesha Co., Falk Woods Nature Conservancy Area, 3 mi S of Waukesha, 2.5 mi S of intersection of County Highways A and F; 42°56'N, 88°14'W, Muskego Quadrangle, USGS. **Continuity:** Established 1977; 4 consecutive years. **Size:** 5.4 ha = 13.3 acres. **Description of Plot:** See AB 32:66 (1978). **Weather:** Above normal temperatures; below normal rainfall; woods unusually dry. **Coverage:** May 26; June 9, 23, 27; 0600-1015. Total hours: 9. **Census:** Red-eyed Vireo, 3 (56, 23); Com. Flicker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; E. Wood Pewee, 1; Blue Jay, 1; Gray Catbird, 1; Am. Robin, 1; Wood Thrush, 1; Ovenbird, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Starling, 0.5; Rufous-sided Towhee, 0.5. **Total:** 14 species; 15 territorial males (279/km<sup>2</sup>, 113/100 acres). **Visitors:** Cooper's Hawk, E. Kingbird, Black-capped Chickadee, White-breasted Nuthatch, Brown Thrasher, Scarlet Tanager.—*VERN AUNE*, S. 13 W. 22167 Ridge Road, Waukesha, Wis. 53186.

**36. MATURE MIXED HARDWOOD FOREST.**—**Location:** Michigan; Oakland Co., Southfield Civic Center Nature Area; 42°30'N, 83°15'W, Royal Oak Quadrangle, USGS. **Continuity:** Established 1974; 7 consecutive years. **Size:** 9.3 ha = 23 acres. **Description of Plot:** See AB 28:1005-1006 (1974). **Weather:** Temperatures 30-68°F. Overcast on 4 trips, otherwise clear. Max. wind 17 mph. **Coverage:** Apr. 16-18, 23, 25; May 2, 7-8, 19-20, 30-31; June 4, 12-13, 18, 20; 0545-0900, EDT. Total hours: 20. **Census:** Starling, 9.5 (102, 41); Com. Flicker, 8 (86, 35); Cardinal, 8; Downy Woodpecker, 6 (64, 26); Am. Robin, 5 (54, 22); Ring-necked Pheasant, 4.5 (48, 20); Red-headed Woodpecker, 4 (43, 17); Blue Jay, 4; Song Sparrow, 3.5 (38, 15); Great Crested Flycatcher, 3 (32, 13); Red-winged Blackbird, 3; Mallard, 2; E. Wood Pewee, 2; Black-capped Chickadee, 2; Gray Catbird, 2; Am. Goldfinch, 2; Am. Kestrel, 1; Com. Crow, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Red-eyed Vireo, 1; Com. Yellowthroat, 1; Com. Grackle, 1. **Total:** 23 species; 75.5 territorial males (811/km<sup>2</sup>, 328/100 acres). **Visitors:** Black-billed Cuckoo, Chimney Swift, E. Kingbird, Cedar Waxwing, Savannah Sparrow. **Remarks:** Canada Goose and Hairy Woodpecker were not counted as nesting species for the first time in 7 years; this brought the total down to the lowest yet. However, the number of territorial males increased, many species numbers were maintained and a few exceeded 1979. Nests found: Com. Crow, 1; White-breasted Nuthatch, 1; Starling, 3. Young seen included Mallard, Red-headed Woodpecker, Tufted Titmouse, Am. Robin and Cardinal.—*BETTY CHALLIS*, Oakland Audubon Society, 2335 Pontiac Lk. Rd., Pontiac, Mich. 48054.

**37. ASPEN CLEARCUT (1ST YEAR).**—

**Location:** Michigan, Ontonagon Co., NE 1/4, Sec. 18, T49N, R39W; 46°40'N, 89°10'W; Rockland Quadrangle, USGS. **Continuity:** Part of the area was censused in 1978 as a 50-year aspen forest (AB 33:64, 1979). **Size:** 9 ha = 22.2 acres. **Description of Plot:** Very little regeneration at time of census (clearcut in winter 1980). Scattered patches of aspen shoots 1-2 ft high. Much slash and bareground present with scattered wet areas in tracks of logging vehicles. **Edge:** Bordered on the N by same-age clearcut, on the E, S, and W by mature aspen-maple forest. **Topography:** Essentially flat. **Elevation:** Approximately 1120 ft. **Weather:** Generally clear skies, 55-65°F; calm first 4 censuses, cloudy and cooler final 2. **Coverage:** May 30; June, 1, 13, 15, 27, 29; 0530-1030. Total hours: 9. **Census:** Song Sparrow, 3 (33, 14); White-throated Sparrow, 2; Am. Robin, 1; Brown-headed Cowbird, 1; Killdeer, 0.5; Com. Snipe, +; Spotted Sandpiper, +; Com. Flicker, +; Mourning Warbler, +; Com. Grackle, +; Indigo Bunting, +; Am. Goldfinch, +. **Total:** 12 species; 7.5 territorial males (83/km<sup>2</sup>, 34/100 acres).—*DON RAKSTAD and JOHN PROBST*, North Central Forest Experiment Station, U.S.D.A. Forest Service, St. Paul, Minn. 55108.

**38. ASPEN CLEARCUT (4TH YEAR).**—**Location:** Michigan; Ontonagon Co., SE 1/4, Sec. 8, T49N, R39W, 46°40'; 89°10'W; Rockland Quadrangle, USGS. **Continuity:** Expansion of plot censused in 1978. **Size:** 18.5 ha = 45.6 acres. **Description of Plot:** See AB 33:77 (1979). Average height of aspens now 10 ft (3-16). Not as wet this year. Logging roads still largely open. **Weather:** Generally clear skies, 55-70°F. Calm first 4 censuses; cloudy and cooler last 2. **Coverage:** June 1, 3, 13, 15, 27, 29; 0530-1000. Total hours: 19. **Census:** Alder Flycatcher, 8 (43, 18); Song Sparrow, 6 (33, 13); Chestnut-sided Warbler, 4.5 (24, 10); Indigo Bunting, 4 (22, 9); Mourning Warbler, 3.5 (19, 8); Am. Woodcock, 2; White-throated Sparrow, 2; Black-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Least Flycatcher, 1; Olive-sided Flycatcher, 1; Rose-breasted Grosbeak, 1; Killdeer, 0.5; Com. Flicker, 0.5; Am. Robin, 0.5; Cedar Waxwing, 0.5; Am. Goldfinch, 0.5; Veery, +; Red-eyed Vireo, +; Golden-winged Warbler, +; Am. Redstart, +; Brown-headed Cowbird, +; Purple Finch, +. **Total:** 23 species; 37.5 territorial males (203/km<sup>2</sup>, 82/100 acres).—*DON RAKSTAD and JOHN R. PROBST*, North Central Forest Experiment Station, U.S.D.A. Forest Service, St. Paul, Minn. 55108.

**39. FLOODPLAIN FOREST.**—**Location:** Illinois; Wayne Co., 4 km N of Golden Gate, along the Little Wabash River; 38°23'N, 88°13'W; Albion NW Quadrangle, USGS. **Continuity:** New. **Size:** 7.7 ha = 19 acres (polygonal, paced). **Description of Plot:** A level, lowland, floodplain forest with many openings resulting from selective timber cutting in approximately 1970. The plot follows the river for 289 m along the S border and 151 m along the W border. Two sloughs form the N border, with a small slough occurring in the center of the plot. An unused road and oil platform are the E border. The site is surrounded on all sides by a continuation of the floodplain forest. Canopy trees (327 trees/

ha), ranked according to importance value (a composite measure of relative frequency, relative density, and relative dominance), were Silver Maple (*Acer saccharinum*), 71.8, Slippery Elm (*Ulmus rubra*), 37.4; Hackberry (*Celtis occidentalis*), 32.8; Shagbark Hickory (*Carya ovata*), 27.4; Bitternut Hickory (*C. cordiformis*), 24.1; White Ash (*Fraxinus americana*), 20.8; Mockernut Hickory (*C. tomentosa*), 19.4; River Birch (*Betula nigra*), 12.1; Sweet Gum (*Liquidambar styraciflua*), 8.3; Boxelder (*A. negundo*), 7.2; Sycamore (*Platanus occidentalis*), 6.8. Other species include Bur Oak (*Quercus macrocarpa*), Butternut (*Juglans cinerea*), Pecan (*C. illinoensis*), Persimmon (*Diospyros virginiana*), Red Ash (*F. pennsylvanica*), Cottonwood (*Populus deltoides*), Blue Beech (*Carpinus caroliniana*) and Pin Oak (*Q. palustris*). The most common understory plants were River Birch, Silver Maple, Poison Ivy (*Rhus radicans*), and Greenbriar (*Smilax glauca*). **Weather:** Temperatures, 56-90°F. Winds varied from calm to about 10 mph. Sky was clear on 6 trips, very hazy 1 trip, and with scattered clouds 1 trip. **Coverage:** May 14, 19, 21, 26, 28; June 4, 17; July 23; 0600-1100 (6 trips), 1615-1800 and 1800-2000. Total hours 15. **Census:** Yellow-billed Cuckoo, 4.5 (59, 24), Red-winged Blackbird, 4 (52, 21); Gray Catbird, 3.5 (46, 18); Cardinal, 3.5; Great Crested Flycatcher, 3 (39, 16); Blue-gray Gnatcatcher, 3; Brown-headed Cowbird, 3 (females); Indigo Bunting, 3; E. Wood Pewee, 2.5; Willow Flycatcher, 2; Com. Yellowthroat, 2; Yellow-breasted Chat, 2; Wood Duck, 1; Ruby-throated Hummingbird, 1 (female observed); Red-bellied Woodpecker, 1, Red-headed Woodpecker, 1; White-breasted Nuthatch, 1; Am. Redstart, 1; Com. Grackle, 1; Wood Thrush, +; Prothonotary Warbler, +; Yellow Warbler, +. **Total:** 22 species, 43 territorial males or females (559/km<sup>2</sup>, 226/100 acres). **Visitors:** Great Blue Heron, Green Heron, Turkey Vulture, Mourning Dove, Barred Owl, Com. Flicker, Pileated Woodpecker, Blue Jay, Carolina Chickadee, Tufted Titmouse, Brown Thrasher, White-eyed Vireo, Red-eyed Vireo. **Remarks:** Nests found (4): Yellow-billed Cuckoo, Com. Yellowthroat, Yellow-breasted Chat, Cardinal Fledglings sighted: Wood Duck, Red-bellied Woodpecker, Red-headed Woodpecker, White-breasted Nuthatch. Thanks to John and Jeff Keener for help in censusing.—*VALERIE KEENER*, Dept. of Zoology, E Illinois Univ., Charleston, Ill. 61920.

**40. OAK-HICKORY-MAPLE FOREST.**—**Location:** Illinois, McLean Co., Moraine View State Park, 3 mi S Ellsworth; T22N, R4E, SE 1/4, Sec 34, Arrowsmith Quadrangle, USGS. **Continuity:** Established 1976; 5 consecutive years. **Size:** 13 ha = 32 acres. **Description of Plot:** See AB 31:43 (1977) **Coverage:** June 7, 9, 13-14, 22-23, 28; July 1, 3; 0600-0800 and 1900-2200. Total hours 16. **Census:** E. Wood Pewee, 5 (39, 16); House Wren, 5; Wood Thrush, 5; Red-eyed Vireo, 3 (23, 9); Red-bellied Woodpecker, 2; Am. Robin, 2; Veery, 2; Scarlet Tanager, 2; Yellow-billed Cuckoo, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Acadian Flycatcher, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Kentucky Warbler, 1; Cardinal, 1; Rose-

breasted Grosbeak, 1; Indigo Bunting, 1; Rufous-sided Towhee, 1; Com. Flicker, +; Com. Crow, +; Blue Jay, +; Brown-headed Cowbird, +. **Total:** 25 species; 39 territorial males ( $301/\text{km}^2$ , 122/100 acres). **Remarks:** Significant changes include the presence of 2 Veeries (including one pair) on territory throughout the period. Their presence coincides with a range expansion of this species into central Illinois the past 2 years. The density of E. Wood Pewee and Wood Thrush was the highest since the censuses began. House Wrens remained at their high reached last year after a low of 2 in 1977.—DALE E. BIRKENHOLZ, Ill. State Univ., Normal, Ill. 61761.

**41. RIPARIAN OAK-HICKORY FOREST.**—**Location:** Illinois; Wayne Co., 8 km N of Golden Gate, along the Little Wabash River;  $38^\circ26'N$ ,  $88^\circ12'W$ ; Albion NW Quadrangle, USGS. **Continuity:** New. **Size:** 8.09 ha = 20 acres (rectangular, paced). **Description of Plot:** An oak-hickory forest that gradually slopes to a narrow strip of floodplain forest. The floodplain strip, which is continuous with floodplain forests on the N and S, was selectively cut for timber in 1970. The remainder of the plot is surrounded by cultivated fields. Two small streams, oriented E and W, occur in the site. The northern stream contained small amounts of water throughout the study period, while the southern stream held water only immediately following rain. Canopy trees (464 trees/ha) ranked according to importance value (a composite measure of relative frequency, relative density, and relative dominance): White Oak (*Quercus alba*), 54.4; Black Oak (*Q. velutina*), 31.6; Shagbark Hickory (*Carya ovata*), 29.6; Red Oak (*Q. rubra*), 21.6; Mockernut Hickory (*C. tomentosa*), 21.3; Butternut Hickory (*C. cordiformis*), 20.7; Slippery Elm (*Ulmus rubra*), 19.9; Black Walnut (*Juglans nigra*), 17.2; Sassafras albidum, 12.9; Persimmon (*Diospyros virginiana*), 9.6; River Birch (*Betula nigra*), 7.2; Sycamore (*Platanus occidentalis*), 6.6. Other species include Basswood (*Tilia americana*), White Ash (*Fraxinus americana*), Blue Beech (*Carpinus caroliniana*), Black Locust (*Rubus pseudoacacia*), Cottonwood (*Populus deltoides*), N. Catalpa (*Catalpa speciosa*), Red Ash (*F. pennsylvanica*), Wild Black Cherry (*Prunus serotina*), Silver Maple (*Acer saccharinum*), Honey Locust (*Gleditsia triacanthos*), Pin Oak (*Q. palustris*), Hackberry (*Celtis occidentalis*), Sweet Gum (*Liquidambar styraciflua*), Flowering Dogwood (*Cornus florida*), Post Oak (*Q. stellata*), Redbud (*Cercis canadensis*), Box-elder (*A. negundo*). **Weather:** Temperature,  $47\text{-}85^\circ\text{F}$ . Winds varied from calm to about 10 mph. Sky was clear on 7 trips, scattered clouds on 1 trip. **Coverage:** May 14, 19, 21, 26, 28, 30; June 17, July 28; 0600-1100 (7 trips) and 1800-1930 Total hours: 17. **Census:** Yellow-billed Cuckoo, 5 (62, 25); Cardinal, 4.5 (56, 23); E. Wood Pewee, 4 (49, 20); Brown-headed Cowbird, 4 (females); Indigo Bunting, 3 (37, 15); Great Crested Flycatcher, 2; Willow Flycatcher, 2; Wood Thrush, 2; Kentucky Warbler, 2; Ruby-throated Hummingbird, 1 (#); Com. Flicker, 1; Red-bellied Woodpecker, 1; Red-headed Woodpecker, 1; Blue Jay, 1; Gray Catbird, 1; Yellow-breasted Chat, 1; Red-winged Blackbird, 1; Red-eyed Vireo,

+; Scarlet Tanager, +. **Total:** 19 species, 36.5 territorial males or females ( $451/\text{km}^2$ , 183/100 acres). **Visitors:** Wood Duck, Bobwhite, Hairy Woodpecker, Downy Woodpecker, Com. Crow, Carolina Chickadee, Tufted Titmouse, White-breasted Nuthatch, House Wren, Am. Robin, House Sparrow, Com. Grackle, Field Sparrow. **Remarks:** Nests located: Cardinal, 1; Wood Thrush, 1. Fledglings noted: Com. Flicker, Red-bellied Woodpecker, Red-headed Woodpecker. Thanks to Jeff and John Keener for help in censusing.—VALERIE KEENER, Dept. of Zoology, Eastern Illinois Univ., Charleston, Ill. 61920.

#### 42. 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;  $41^\circ39'N$ ,  $87^\circ02'W$ , Dune Acres Quadrangle, USGS. **Continuity:** Established 1974; 7 consecutive years. **Size:** 22.22 ha = 54.9 acres. **Description of Plot:** Wooded dune and sand prairie area burned in 1971. Dense sucker growth and downed trees make areas impenetrable. See AB 28:1007 (1974). **Weather:** June dry; 2 tornado-like storms ripped through area July 5 and 10. **Coverage:** Apr. 5-July 20; 28 early morning trips. Total hours: 56. **Census:** Rufous-sided Towhee, 10 (54, 18); Field Sparrow, 7 (32, 13); Com. Flicker, 3 (14, 5); Gray Catbird, 2; Brown Thrasher, 2; Blue-winged Warbler, 2; Indigo Bunting, 2; Mourning Dove, 1; House Wren, 1; Am. Robin, 1; Veery, 1; Com. Yellowthroat, 1; Yellow Warbler, 1; N. Oriole, 1; Cardinal, 1. **Total:** 15 species; 36 territorial males ( $162/\text{km}^2$ , 66/100 acres). **Remarks:** Absence of catbirds puzzling; 4 fewer pairs than last year. Ten kingfisher sightings between May 9 and July 12 also puzzling. Robins not apparent in April and May, but present in large numbers after June 20 when blueberries ripened.—EMMA B. PITCHER, 1159 E. 56th St., Chicago, Ill. 60637.

#### 43. MIXED HARDWOOD REGENERATING.

—**Location:** Ohio; Fairfield Co., Berne Township, 1 mi W of Sugar Grove and 6 mi S of Lancaster;  $39^\circ37'30"N$ ,  $82^\circ30'W$ , NE  $\frac{1}{4}$  Lancaster Quadrangle, USGS. **Continuity:** Established 1976; 5 consecutive years. **Size:** 20.2 ha = 50 acres. **Description of Plot:** See AB 31:45 (1977). **Weather:** Cool,  $53\text{-}72^\circ\text{F}$ . **Coverage:** May 15-June 12; 9 trips; majority 0700-0930. Total hours: 20. **Census:** Acadian Flycatcher, 6 (30, 12); Ovenbird, 5 (25, 10); E. Wood Pewee, 4 (20, 8); Wood Thrush, 4; Red-eyed Vireo, 4; Worm-eating Warbler, 3 (15, 6); Scarlet Tanager, 3; Red-bellied Woodpecker, 2; Kentucky Warbler, 2; Com. Grackle, 2; Cardinal, 2; Yellow-billed Cuckoo, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Cerulean Warbler, 1; Louisiana Waterthrush, 1; Hooded Warbler, 1; Ruffed Grouse, +; Ruby-throated Hummingbird, +; Com. Crow, +; Black-and-white Warbler, +; Brown-headed Cowbird, +; Am. Goldfinch, +; Rufous-sided Towhee, +. **Total:** 29 species, 48 territorial males ( $237/\text{km}^2$ , 96/100 acres). **Remarks:** Nests found: 1 Downy Woodpecker; 3 Acadian Flycatcher; 1

White-breasted Nuthatch; 4 Wood Thrush, 1 Red-eyed Vireo; 1 Louisiana Waterthrush.—ANN BINGAMAN (compiler), DALE EICHER, and ROBERT GLOTZHOBER, Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio 43211.

#### 44. NEOTOMA VALLEY.

—**Location:** Ohio, Hocking Co., Good Hope Township, NW  $\frac{1}{4}$ , Sec. 16, T13N, R18W; approximately  $39^\circ36'N$ ,  $82^\circ34'W$ , Rockbridge Quadrangle, USGS. **Continuity:** Established 1978, 3 consecutive years. **Size:** Approximately 20.2 ha = 50 acres. **Description of Plot:** See AB 33:37-38 (1979). **Weather:** No unusual patterns; the early periods of strong winds and/or heavy rain, evident elsewhere in central Ohio, caused only minor windfall or damage to early nests. **Coverage:** June 7-9. Total hours: approximately 120 (members of the Wheaton Club and guests). **Census:** Red-eyed Vireo, 11 (54, 22); Wood Thrush, 9 (44, 18); Scarlet Tanager, 8 (40, 16); Acadian Flycatcher, 6 (30, 12); E. Wood Pewee, 5 (25, 10); Cerulean Warbler, 5; Ovenbird, 4 (20, 8); Downy Woodpecker, 3 (15, 6); Great Crested Flycatcher, 3; Tufted Titmouse, 3; White-breasted Nuthatch, 3; Black-and-white Warbler, 3; Worm-eating Warbler, 3; Kentucky Warbler, 3; Cardinal, 3; Yellow-billed Cuckoo, 2; Red-bellied Woodpecker, 2; Blue Jay, 2; Yellow-throated Vireo, 2; Brown-headed Cowbird, 2; Ruffed Grouse, 1; Whippoor-will, 1; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Carolina Chickadee, 1; Gray Catbird, 1; White-eyed Vireo, 1; Louisiana Waterthrush, 1; Com. Yellowthroat, 1; Hooded Warbler, 1; Summer Tanager, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 1. **Total:** 35 species; 97 territorial males or females ( $479/\text{km}^2$ , 194/100 acres). **Remarks:** Thirteen nests of 7 species were located. The encroachment of the forest upon the more open spaces seems to have reached or passed a critical stage for some of the birds more partial to a brushy habitat. Adjacent pairs of these birds used the S edge of the plot. One of these edge species was a lone Carolina Wren, possibly a survivor of two very cold, snowy winters.—A. H CLAUGUS (compiler), 228 S. Lake St., Carey, Ohio 43316.

#### 45. RIVER BOTTOM FOREST.

—**Location:** Manitoba; Headingly, 3 mi SW of village and 800 m N of Hwy 241 (4 mi W of jcts. of Hwys 241 and 334);  $49^\circ52'N$ ,  $97^\circ30'W$ , Winnipeg 62 H/14. **Continuity:** Established 1977; 4 consecutive years. **Size:** 14 ha = 34.6 acres. **Description of Plot:** See AB 33:64 (1978). **Weather:** Warm, very dry, calm. **Coverage:** June 2-7, 9, 11-13, 26; 0500-0800 hours. Total hours: 26. **Census:** Least Flycatcher, 17 (121, 49); N. Oriole, 15 (107, 43); Rose-breasted Grosbeak, 12 (86, 35); Red-eyed Vireo, 5 (36, 14); Am. Robin, 2.5; Great Crested Flycatcher, 2.5; E. Wood Pewee, 2.5; Warbling Vireo, 2; Yellow-throated Vireo, 2; Willow Flycatcher, 1.5; House Wren, 1; Mourning Dove, +; Black-billed Cuckoo, +; Hairy Woodpecker, +; E. Phoebe, +; Blue Jay, +; Black-capped Chickadee, +; White-breasted Nuthatch, +; Wood Thrush, +; Yellow Warbler, +; N. Waterthrush, +; Brown-headed Cowbird, +. **Total:** 22 species; 63 territorial males ( $450/\text{km}^2$ , 182/100

acres) **Visitors:** Red-tailed Hawk, Great Horned Owl, Com. Crow, Brown Thrasher, Scarlet Tanager. **Remarks:** Nests found: Am. Robin. Spring was extremely early. Weather conditions were dry; singing often subsided by 0700.—*D. KYLE, Dept. of Natural Resources, 1495 St. James St., Winnipeg, Manitoba, Canada R3H 0W9.*

**46. OAK - HICKORY FOREST.**—**Location:** Kansas; Jefferson Co., on the Univ. of Kansas Rockefeller Experimental Tract and the Nelson Environmental Studies Area. Predominantly on the SW ¼ NW ¼, Section 3, T-11S, R-20E; 39°00'N, 95°01'W, Midland Quadrangle, USGS. **Continuity:** Established 1974; 4 intermittent years. **Size:** 9.4 ha = 23.2 acres. **Description of Plot:** See *AB* 28:1010-1011 (1974). **1979: Weather:** (June) Average high, 28.7°C; average low 17.4°; precipitation, 16.9 cm. **Coverage:** Almost daily, Apr. 24 through Aug. 23; 0700-1200, CDT. Total hours: 400. **Census:** Black-capped Chickadee, 10 (107, 43); Downy Woodpecker, 8 (85, 34); Tufted Titmouse, 7 (75, 30); White-breasted Nuthatch, 7; Brown-headed Cowbird, 7; Rose-breasted Grosbeak, 7; Yellow-billed Cuckoo, 6 (64, 26); Great Crested Flycatcher, 6; Cardinal, 6; N. Oriole, 5 (53, 22); Rufous-sided Towhee, 5; Mourning Dove, 4 (43, 17); Blue Jay, 4; Red-eyed Vireo, 4; Indigo Bunting, 4; Field Sparrow, 4; Com. Flicker, 3 (32, 13); Red-bellied Woodpecker, 3; Red-headed Woodpecker, 3; E. Wood Pewee, 3; Brown Thrasher, 3; Wood Thrush, 3; Chuck-will's-widow, 2; Kentucky Warbler, 2; Scarlet Tanager, 2; Summer Tanager, 2; Great Horned Owl, 1; N. Parula, +. **Total:** 28 species; 121 territorial males (1289/km<sup>2</sup>, 522/100 acres). **Remarks:** Nests included Mourning Dove, 2; Great Horned Owl, 1; Chuck-will's-widow, 1; Yellow-billed Cuckoo, 1; Kentucky Warbler, 1; Cardinal, 1; Rufous-sided Towhee, 1. Visitors included Ruby-throated Hummingbird, 1; Grasshopper Sparrow, 1. **1980: Weather:** (May through July) Average high, 32.6°C; average low 18.4°; average monthly precipitation, 7.36 cm. **Coverage:** almost daily, May 12 through July 30; 0700-1200, CDT. Total hours: 300. **Census:** Black-capped Chickadee, 11 (117, 47); Downy Woodpecker, 9 (96, 39); White-breasted Nuthatch, 7 (75, 30); Great Crested Flycatcher, 6 (64, 26); Tufted Titmouse, 6; Cardinal, 6; Rose-breasted Grosbeak, 5 (53, 22); Yellow-billed Cuckoo, 4 (43, 17); Blue Jay, 4; Red-bellied Woodpecker, 3 (32, 13); Red-headed Woodpecker, 3; Wood Thrush, 3; Rufous-sided Towhee, 3; Field Sparrow, 3; Chuck-will's-widow, 2; E. Wood Pewee, 2; Brown Thrasher, 2; Kentucky Warbler, 2; Com. Flicker, 1; Red-eyed Vireo, 1; Scarlet Tanager, 1; Summer Tanager, 1; Indigo Bunting, 1. **Total:** 23 species; 88 territorial males (937/km<sup>2</sup>, 379/100 acres). **Remarks:** Nests included Wood Thrush, 1; N. Oriole, 1; Rose-breasted Grosbeak, 1; Field Sparrow, 1. Visitors included Com. Grackle, 2; E. Phoebe, 1; Lark Sparrow, 1. Extreme heat and drought in 1980 may have caused bird abundance and species richness to decline slightly from 1979.—*JAMES L. RAKESTRAW, Museum of Natural History, Lawrence, Kans. 66045.*

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

The following 6 breeding bird censuses represent the third consecutive summer of data gathered from representative stands of oak-hickory forest covering the escarpment along the S side of the Wakarusa River Valley of southern Douglas County, Kansas (see *AB* 33:66-67, 1979 for a description of vegetation and topography).

Weather data from a climatological station at the Univ. of Kansas at Lawrence, 12 mi NW of the study areas, show that temperatures and precipitation were near normal for the last half of May. June, however, was warmer than normal with a mean low of 68°F and a mean high of 89°. June was much drier than May, with only 1.25 inches of precipitation (norm 6 in.) scattered over 4 days instead of the usual 11 days.

Although numbers of species per plot have remained fairly constant, this year the density of birds dropped from the high levels of 1979; in some cases only slightly but in one plot to less than half the number last year. The reasons for this decline are unknown but may have been related to the drought. Conspicuous by their absence were Ovenbirds which occurred on 5 of the 6 plots last year but were found on only 2 this year.

Our thanks to the Field Research Committee, Division of Biological Sciences, at the University 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 and ROGER L. BOYD, Biology Dept., Baker Univ., Baldwin City, Kan. 66006.*

**47. OAK - HICKORY FOREST I.**—**Location:** Kansas; Douglas Co., on the Univ. of Kansas Wall Biological Reserve. Predominantly on the NW ¼, SW ¼, Section 28, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** June 5, 9, 13, 17, 24, 25; 5 trips 0545-0930 and one 1530-1710. Total hours: 12. **Census:** Great Crested Flycatcher, 4 (49, 20); Blue Jay, 3.5 (43, 18); Rose-breasted Grosbeak, 3 (37, 15); White-breasted Nuthatch, 2.5; Yellow-billed Cuckoo, 2; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; Black-capped Chickadee, 2; Tufted Titmouse, 2; Summer Tanager, 2; Red-headed Woodpecker, 1.5; Cardinal, 1.5; Whip-poor-will, 1; Com. Flicker, 1; Hairy Woodpecker, 1; Wood Thrush, 1; Black-and-white Warbler, 1; Louisiana Waterthrush, 1; Scarlet Tanager, 1; Summer Tanager, 1; Com. Flicker, +; E. Phoebe, +; Blue-gray Gnatcatcher, +; Indigo Bunting, +. **Total:** 31 species; 52 territorial males (642/km<sup>2</sup>, 260/100 acres). **Visitors:** Red-tailed Hawk, Great Horned Owl, Com Nighthawk, Red-winged Blackbird, N Oriole, Com. Grackle. **Remarks:** Breeding activity observed: Yellow-billed Cuckoo (nest), Chuck-will's-widow (adults with young), Red-headed Woodpecker (nest), Downy Woodpecker (adults with fledged young), Brown Thrasher (nest), Black-and-white Warbler, Kentucky Warbler (fledged young), Rose-breasted Grosbeak (nest).

**48. 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 NE ¼, NW ¼, Section 28, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** June 4-6, 13, 18, 27; 5 trips 0550-1130 and one 1825-2010 Total hours: 11. **Census:** Downy Woodpecker, 2.5; Mourning Dove, 2; Yellow-billed Cuckoo, 2; Blue Jay, 2; Black-capped Chickadee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 1.5; Red-tailed Hawk, 1; Chuck-will's-widow, 1; Whip-poor-will, 1; Red-bellied Woodpecker, 1; Com. Crow, 1; Kentucky Warbler, 1; Cardinal, 1; Indigo Bunting, 1; Great Crested Flycatcher, +, E Phoebe, +; Wood Thrush, +; Louisiana Waterthrush, +; Rufous-sided Towhee, + **Total:** 20 species; 22 territorial males (272/km<sup>2</sup>, 110/100 acres). **Visitors:** Turkey Vulture, E. Wood Pewee, Red-eyed Vireo, Carolina Wren, Com. Grackle, Scarlet Tanager, Summer Tanager, Rose-breasted Grosbeak, Am. Goldfinch. **Remarks:** Breeding activity observed: Mourning Dove (nest), Kentucky Warbler (adult feeding fledged young).

**49. OAK - HICKORY FOREST III.**—**Location:** Kansas; Douglas Co., on the Univ of Kansas Breidenthal Biological Reserve. Predominantly on the NE ¼, NE ¼, Section 28, T-14S, R-20E; 38°48'N, 95°11'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 8.1 ha = 20 acres. **Coverage:** June 2, 10-13, 26, 4 trips 0530-0950 and one 1825-2045. Total hours: 16. **Census:** Yellow-billed Cuckoo, 4 (49, 20); Downy Woodpecker, 4; White-breasted Nuthatch, 4; Blue Jay, 3 (37, 15), Tufted Titmouse, 3; Cardinal, 3; Rose-breasted Grosbeak, 3; Red-bellied Woodpecker, 2; Great Crested Flycatcher, 2, E Wood Pewee, 2; Black-capped Chickadee, 2, Red-eyed Vireo, 2; N. Parula, 2; Kentucky Warbler, 2; Brown-headed Cowbird, 2, Chuck-will's-widow, 1; Whip-poor-will, 1; Ruby-throated Hummingbird, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; Com Crow, 1; Brown Thrasher, 1; Wood Thrush, 1; Black-and-white Warbler, 1; Louisiana Waterthrush, 1; Scarlet Tanager, 1; Summer Tanager, 1; Com. Flicker, +; E. Phoebe, +; Blue-gray Gnatcatcher, +; Indigo Bunting, +. **Total:** 31 species; 52 territorial males (642/km<sup>2</sup>, 260/100 acres). **Visitors:** Red-tailed Hawk, Great Horned Owl, Com Nighthawk, Red-winged Blackbird, N Oriole, Com. Grackle. **Remarks:** Breeding activity observed: Yellow-billed Cuckoo (nest), Chuck-will's-widow (adults with young), Red-headed Woodpecker (nest), Downy Woodpecker (adults with fledged young), Brown Thrasher (nest), Black-and-white Warbler, Kentucky Warbler (fledged young), Rose-breasted Grosbeak (nest).

**50. OAK - HICKORY FOREST IV.**—**Location:** Kansas; Douglas Co., Sturdy's Woods Predominantly on the NE ¼, NE ¼, Section 27 T-14N, R-20E; 38°48'N, 95°10'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 8.1

ha = 20 acres **Coverage:** May 20, 22, 27, June 4-5, 9, 17, 20, 24, 28; 0630-1130. Total hours: 20. **Census:** Red-eyed Vireo, 6 (74, continued on page 112

**51. OAK-HICKORY FOREST V.**—**Location:** Kansas; Douglas Co., East Beisecker Woods. Predominantly on the NE ¼, NE ¼, Section 35, T-14S, R-20E; 38°48'N, 95°09'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years **Size:** 8.1 ha = 20 acres. **Coverage:** May, 21, 23, 28; June 3, 5, 10, 14, 28; 0630-1230. Total hours: 24. **Census:** Red-eyed Vireo, 5 (62, 25); Blue Jay, 4 (49, 20); Yellow-billed Cuckoo, 3 (37, 15); Great Crested Flycatcher, 3; Wood Thrush, 3; Ovenbird, 3; Kentucky Warbler, 3; Whippoor-will, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; Black-capped Chickadee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; N. Oriole, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Cardinal, 2; Rose-breasted Grosbeak, 2; Chuck-will's-widow, 1; Red-headed Woodpecker, 1; Willow Flycatcher, 1; N. Parula, 1; Louisiana Waterthrush, 1; Scarlet Tanager, 1; Indigo Bunting, 1; Mourning Dove, +; Com. Flicker, +; Red-bellied Woodpecker, +. **Total:** 28 species, 53 territorial males (655/km<sup>2</sup>, 265/100 acres). **Visitors:** Turkey Vulture, Rough-winged Swallow, Gray Catbird, Am. Redstart, Com. Yellowthroat, Am. Goldfinch. **Remarks:** Nests found: Whippoor-will (2), Downy Woodpecker, Kentucky Warbler (2), Cardinal, Rose-breasted Grosbeak.

**52. OAK-HICKORY FOREST VI.**—**Location:** Kansas; Douglas Co., West Beisecker Woods. Predominantly on the SW ¼, NE ¼, Section 35, T-14S, R-30E; 38°48'N, 95°09'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years **Size:** 8.1 ha = 20 acres. **Coverage:** May 21, 23, 28; June 3, 5, 10, 14, 24, 28; 0630-1330. Total hours: 24. **Census:** Blue Jay, 4 (49, 20); E. Wood Pewee, 3 (37, 15); Red-eyed Vireo, 3; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; Black-capped Chickadee, 2; Ovenbird, 2; Kentucky Warbler, 2; Summer Tanager, 2; Mourning Dove, 1; Chuck-will's-widow, 1; Whippoor-will, 1; Red-bellied Woodpecker, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; N. Oriole, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Cardinal, 1; Rufous-sided Towhee, 1; Great Horned Owl, +; Com. Flicker, +; Hairy Woodpecker, +. **Total:** 25 species; 35 territorial males (432/km<sup>2</sup>, 175/100 acres). **Visitors:** Red-tailed Hawk, Com. Crow, Am. Robin, Red-winged Blackbird, Am. Goldfinch. **Remarks:** Nests found: Yellow-billed Cuckoo, Chuck-will's-widow, Downy Woodpecker, Red-eyed Vireo, Ovenbird, Cardinal.

**53. 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:** New. **Size:** 7.85 ha = 19.4 acres. **Description of Plot:** (See AB 35 00). Tyson Research Center, a fenced 810 ha (= 2000 acre) tract of second growth oak-hickory forest, established in 1963; the former owner, the U.S. Army, held the site in

protective custody from 1941. Census plot is along either side of a fire trail through uniform woodlands. An old field is located 400 ft S of the S edge; two small ponds are located 600 ft NE of the E end of the strip. **Weather:** Generally clear, occasional high or scattered clouds; temperatures, 50-82°F. No significant winds or unusual features. **Coverage:** June 9-18, 22; 0518-0840 and (2 visits) 2035-2235, CDT. Total hours: 26. **Census:** Indigo Bunting, 8 (102, 41); unidentified (probably mostly Carolina) chickadee, 6 (76, 31); Tufted Titmouse, 5 (64, 26); Red-bellied Woodpecker, 4.5 (57, 23); Downy Woodpecker, 4 (51, 21); Blue Jay, 4; Cardinal, 4; Red-eyed Vireo, 3.5 (45, 18); Worm-eating Warbler, 3.5; Great Crested Flycatcher, 3 (38, 15); Wood Thrush, 3; Blue-gray Gnatcatcher, 3; Summer Tanager, 3; Yellow-billed Cuckoo, 2.5; Chuck-will's-widow, 2; White-breasted Nuthatch, 2; Com. Grackle, 2; Whippoor-will, 1.5; E. Wood Pewee, 1; N. Parula, 1; Com. Flicker, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Am. Robin, +; Red-winged Blackbird, +. **Total:** 25 species; 66.5 territorial males (847/km<sup>2</sup>, 343/100 acres) **Visitors:** Red-tailed Hawk, Turkey, Chimney Swift, Com. Crow, Starling, Yellow-throated Vireo, Ovenbird, Kentucky Warbler, Brown-headed Cowbird, Scarlet Tanager, Rufous-sided Towhee.—**RICHARD W. COLES** (compiler) **ROSE ANN BODMAN, JEAN COOK, MARY FRANCIS GOODLOE, VI HALLETT, SYLVIA HOSLER, EUGENIA LARSON, CARMEN PATTERSON, BILL RUDDEN, CLAUDIA SPENER,** (co-compiler), Webster Groves Nature Study Society, Tyson Research Center, P.O. Box 258, Eureka, Mo. 63025.

**54. DECIDUOUS FLOODPLAIN FOREST.**—**Location:** Oklahoma; Delaware Co., 4 mi S of Jay; 36°21'N, 94°48'W, Lake Eucha East Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 6.7 ha = 16.6 acres. **Description of Plot:** See AB 34:55. **Weather:** The temperature during April and May was slightly below normal. Temperatures soared in June and July. The average temperature in July was more than 8°F higher than the average for any previous July. Water levels in Brush Creek were low most of the winter and spring. A very severe drought in late June and July resulted in a completely dry creek bed except for 1 water hole. **Coverage:** Apr. 25; May 5, 13; June 2, 11, 13, 22; July 3; 0500-1200. Total hours: 25. **Census:** Blue-gray Gnatcatcher, 6 (89, 36); N. Parula, 5 (74, 30); Cardinal, 5; Indigo Bunting, 5; Yellow-billed Cuckoo, 4.5 (67, 27); Acadian Flycatcher, 4 (60, 24); Tufted Titmouse, 4; Louisiana Waterthrush, 4; Great Crested Flycatcher, 3 (45, 18); Carolina Chickadee, 3; Kentucky Warbler, 3; Brown-headed Cowbird, 3; Downy Woodpecker, 2; White-eyed Vireo, 2; Red-eyed Vireo, 2; Ruby-throated Hummingbird, 1; E. Phoebe, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Carolina Wren, 1; Black-and-white Warbler, 1; Prothonotary Warbler, 1; Turkey Vulture, 0.5; Red-shouldered Hawk, 0.5; Pileated Woodpecker, 0.5; Blue Jay, 0.5. **Total:** 26 species; 64.5 territorial males (960/km<sup>2</sup>, 389/100 acres). **Visitors:** Red-bellied Woodpecker, Wood Thrush, E. Bluebird, Com. Yellowthroat. **Remarks:** A Turkey Vulture nest was

found on the plot and two Red-shouldered Hawk nests were located close by.—**FREDERICK M. BAUMGARTNER and ELIZABETH W. MCKAY**, Little Lewis Whirlwind Nature School and Sanctuary, Rte. 2, Jay, Okla. 74346.

### 55. MATURE BALSAM FIR FOREST WITH ALDER THICKETS AND TREED BOG.—

**Location:** Newfoundland; Ochre Hill, Terra Nova Nat'l Park, 3 km E of the intersection of the Ochre Hill Firetower road and the Trans-Canada Highway, Route 1, 48°30'N, 53°58'W, Terra Nova Nat'l Park, MCR 214. **Continuity:** New. **Size:** 9.0 ha = 22.22 acres (square, surveyed by compass and 15 m tape). **Description of Plot:** The dominant canopy tree is Balsam Fir (*Abies balsamea*) with stands of Black Spruce (*Picea mariana*) in the boggy northern edges. Isolated and overmature White Birch (*Betula papyrifera*) and Red Maple (*Acer rubrum*) occur and there are dense thickets of Speckled Alder (*Alnus rugosa*) and budworm-defoliated young Balsam Fir in the northern part. Understory is limited in the Balsam Fir forest with a ground cover of Bunchberry (*Cornus canadensis*), Corn-Lily (*Clintonia borealis*), Canada Lily-of-the-Valley (*Maianthemum canadense*), Twinflower (*Linnaea borealis*), Heartleaf Twayblade (*Listera cordata*), One-leaf Rein-orchis (*Habenaria obtusata*) and Partridgeberry (*Vaccinium vitis-idaea*). Cinnamon Fern (*Osmunda cinnamomea*) and Three-leaved False Solomon's Seal (*Smilacina trifolia*) occur with Pitcher Plant (*Sarracenia purpurea*), Sphagnum mosses and sedges (*Carex* sp.) in the boggy areas at the N of the plot. Usually intermittent streams were active this summer and kept the woods wetter than usual. A hiking trail bisects the plot in the east and there several old trails associated with the logging that took place some 40 or 50 years ago. **Edge:** Bordered on the N by a treed and open bog and on the S by a ridge of outcropping bedrock that forms part of the Ochre Hill heights; other borders are of similar forest to that described. **Topography:** Sloping steeply down to the northern bog and from the Ochre Hill highlands. **Elevation:** 400 ft. **Weather:** Cool and extremely wet with very few sunny and dry days. **Coverage:** May 20, 22; June 1, 10, 17; July 7, 22, 25; between dawn and 0720 or 1700-2015 hours. Total hours: 17. **Census:** Yellow-rumped Warbler, 8 (89, 36); Ruby-crowned Kinglet, 3 (33, 14); N. Waterthrush, 2; Dark-eyed Junco, 2; White-throated Sparrow, 2; Black-backed Three-toed Woodpecker, 1.5; Hermit Thrush, 1.5; Ruffed Grouse, 1; Yellow-bellied Flycatcher, 1; Gray Jay, 1; Boreal Chickadee, 1; Am. Robin, 1; Lincoln's Sparrow, 1; Black-capped Chickadee, 0.5; Tree Swallow, +; Golden-crowned Kinglet, +; Pine Siskin, +. **Total:** 17 species; 26.5 territorial males (295/km<sup>2</sup>, 119/100 acres). **Visitors:** Merlin, N. Three-toed Woodpecker, Swainson's Thrush, Black-and-white Warbler, Red Crossbill, Fox Sparrow. **Remarks:** The wetness of the summer might account for the low number of breeding birds, but the lack of an understory and severe defoliation of the Balsam Fir by spruce budworm in previous years are more probable explanations. Apart from Yellow-rumped Warblers, no species made use of the extensive Balsam Fir forest. A killing post used by a Goshawk

in winter was noted along the eastern edge of the plot but no summer evidence was found. This survey was undertaken as part of my summer duties as Park Interpreter at Terra Nova Nat'l Park.—*ROGER T. BURROWS, P.O. Box 73, Glovertown, Newfoundland, A0G 2L0.*

### **56. MATURE BLACK SPRUCE AND BALSAM FIR FOREST WITH ALDER AND TAMARACK THICKETS.—Location:**

Newfoundland; Tidewaters, Terra Nova Nat'l Park, 16 km N of Port Blandford on Trans-Canada Highway, Route 1; 48°25'N, 54°07'W, Terra Nova Nat'l Park, MCR 214. **Continuity:** New. **Size:** 6.3 ha = 15.57 acres (rectangular, surveyed by compass and 15 m tape). **Description of Plot:** The dominant canopy trees are Black Spruce (*Picea mariana*) and Balsam Fir (*Abies balsamea*) with widespread overmature White Birch (*Betula papyrifera*). Except for occasional patches of Speckled Alder (*Alnus rugosa*) an understory is generally absent in the mature softwood forest and the ground cover varies according to the slope and dominant canopy species. Mosses of several species dominate the hummocky ground and wet areas favoured by Balsam Fir, while a ground cover of Bunchberry (*Cornus canadensis*), Corn-Lily (*Clintonia borealis*), Twinflower (*Linnaea borealis*) and Canada Lily-of-the-Valley (*Maianthemum canadense*) with Sheep Laurel (*Kalmia angustifolia*) is typical of the Black Spruce dominated forest. Bracken (*Pteridium aquilinum*) is common on the drier mixed wood sections, while Cinnamon Fern (*Osmunda cinnamomea*) occupies wetter areas. The center consists of an open glade rapidly being taken over by Black Spruce and Speckled Alder, while the SW and NW edges are occupied by a dense growth of Speckled Alder or Black Spruce with Larch (*Larix laricina*) and Red Elderberry (*Sambucus pubens*). A small pond along the W edge is the only standing water, although the wet summer left more water than usual along the spongy S edge. **Edge:** Bordered on the N by the Trans-Canada Highway and on the S by the salt waters of Clode Sound and elsewhere by forest similar to that described. **Topography:** Essentially flat along the N edge but sloping gently to the shores of Clode Sound elsewhere. Old ridges have determined forest vegetation in places and left discrete boundaries in ground cover. **Elevation:** 50 ft. **Weather:** Cool and extremely wet with very few sunny and dry days. **Coverage:** May 2, 6, 8, 30; June 8, 17; July 11, 15, 24; between dawn and 0830 or 1630-2015 hours. Total hours: 16. **Census:** Ruby-crowned Kinglet, 10.5 (167, 67); Yellow-rumped Warbler, 10 (159, 64); White-throated Sparrow, 3.5 (56, 22); Am. Robin, 3 (48, 19); Black-and-white Warbler, 3; Tennessee Warbler, 3; Hermit Thrush, 2.5; Black-throated Green Warbler, 2.5; Yellow-bellied Flycatcher, 2; Ovenbird, 2; Swainson's Thrush, 1.5; Golden-crowned Kinglet, 1.5; N. Waterthrush, 1.5; Ruffed Grouse, 1; Com. Flicker, 1; Gray Jay, 1; Boreal Chickadee, 1; Magnolia Warbler, 1; Pine Siskin, 1; Black-capped Chickadee, 0.5; Red Crossbill, 0.5; Fox Sparrow, 0.5; **Total:** 22 species, 54 territorial males (857/km<sup>2</sup>, 347/100 acres). **Visitors:** Osprey, Downy Woodpecker, Winter Wren. **Remarks:** Despite its closeness to a well-travelled

highway, this area is representative of the main forest cover of Terra Nova Nat'l Park. While the highest concentration of birds was in the vicinity of alder thickets and alongside the pond, many of the warblers and kinglets fed in the mature forests. Spruce budworm defoliation of Balsam Fir is severe in places but Yellow-rumped and Black-throated Green Warblers were seen feeding on eggs and larvae in Balsam Fir as well as on other insect pests in Black Spruce, Larch and White Birch. Human disturbance of the area is minimal, although old trails exist throughout the plot. This survey was undertaken as part of my summer duties as Park Interpreter at Terra Nova Nat'l Park.—*ROGER T. BURROWS, P.O. Box 73, Glovertown, Newfoundland, A0G 2L0.*

### **57. SECOND-GROWTH HARDWOOD FOREST WITH SOFTWOOD REMNANTS.—Location:**

Newfoundland; Loul Hills, Terra Nova Nat'l Park, 2 km E of the intersection of the Eastport Peninsula road, Route 310, and the Trans-Canada Highway, Route 1; 48°39'N, 53°56'W, Terra Nova Nat'l Park, MCR 214. **Continuity:** New. **Size:** 6.3 ha = 15.57 acres (rectangular, surveyed by compass and 15 m tape). **Description of Plot:** This area was burned over in the 1940s and the present cover originates from that time. The S and E sections are dominated by a mixture of dense Speckled Alder (*Alnus rugosa*), White Birch (*Betula papyrifera*) and Red Maple (*Acer rubrum*) with isolated stands of Quaking Aspen (*Populus tremuloides*), Black Spruce (*Picea mariana*) and Balsam Fir (*Abies balsamea*). Most prominent in the understory are Am. Mountain-Ash (*Sorbus americana*), N. Wild Raisin (*Viburnum cassinoides*) and Sheep Laurel (*Kalmia angustifolia*), while the ground cover is primarily Cinnamon Fern (*Osmunda cinnamomea*) in the wetter areas, woodferns (*Dryopteris* sp.) among the rockpiles and the prevalent cover of Bunchberry (*Cornus canadensis*), Corn-Lily (*Clintonia borealis*), Canada Lily-of-the-Valley (*Maianthemum canadense*) elsewhere. The N and W sections are composed mainly of the original forest of Black Spruce and Balsam Fir with isolated stands of White Birch and a dense undergrowth of Sheep Laurel and some areas with the ground cover typical of the hardwood sections. Glacial erratic and stream-carried boulders impede drainage and prevent regeneration, and the plot is bisected by a small stream, normally intermittent but in full flow this summer. **Edge:** Bordered on the W and E by forest similar to that described above, the N by a seasonal stream with dense Speckled Alder growth and to the S by the Eastport Peninsula road. **Topography:** Essentially flat in the S part and sloping to the N elsewhere. **Elevation:** 300 ft. **Weather:** Cool and extremely wet with very few sunny and dry days. **Coverage:** Apr. 29; May 2, 27; June 7, 14, 18; July 6, 14; between dawn and 0740 or 1630-2015 hours. Total hours: 18. **Census:** Ovenbird, 14 (222, 90); Fox Sparrow, 13.5 (214, 87); Ruby-crowned Kinglet, 9 (143, 58); Yellow-bellied Flycatcher, 8.5 (135, 55); White-throated Sparrow, 8.5; Am. Robin, 8 (127, 51); Black-throated Green Warbler, 8; Blackpoll Warbler, 6 (95, 39); Yellow-rumped Warbler, 5 (79, 32); Swainson's Thrush, 4 (63, 26); Mourning Warbler,

3 (48, 19), Am. Redstart, 3; Black-and-white Warbler, 2; N. Waterthrush, 2; Pine Siskin, 1.5; Black-capped Chickadee, 1; Gray-cheeked Thrush, 1; Wilson's Warbler, 1; Purple Finch, 1; Ruffed Grouse, +; Com. Redpoll, +. **Total:** 21 species; 100 territorial males (1587/km<sup>2</sup>, 642/100 acres). **Visitors:** Com. Raven, Com. Crow, Boreal Chickadee, Golden-crowned Kinglet. **Remarks:** Nests located: Am. Robin, 2; Swainson's Thrush, 1. The denseness of the cover and the wetness of the understory and ground cover made each census a struggle against the elements and the high number of biting insects in the July surveys. However, the high number of breeding birds is probably typical of the area, which is one of the richest avifaunal habitats in Terra Nova National Park. The wet summer, combined with the late arrival of many species and a late hatch of forest insects, severely restricted breeding success of all species and very few young birds were noted in July. The area is rapidly reverting to the original coniferous and mixed forest cover and some species may well disappear in future years. This survey was undertaken as part of my summer duties as Park Interpreter at Terra Nova Nat'l Park.—*ROGER T BURROWS, P.O. Box 73, Glovertown, Newfoundland, A0G 2L0.*

### **58. MAPLE - PINE - OAK SECOND-GROWTH FOREST.—Location:**

Massachusetts; Norfolk Co., Town of Foxboro conservation land, off Willow and East Streets, 42°04'N, 71°11'30"W, Mansfield Quadrangle, USGS. **Continuity:** Established 1976; 5 consecutive years. **Size:** 11.8 ha = 29.2 acres. **Description of Plot:** See AB 31:50-51 (1977). **Weather:** In nearby Boston the temperature for May was 0.8°F above normal, for June 1.7°F below; rainfall in May was 1.17 in. below normal, in June 0.14 in. below. **Coverage:** Apr. 19; May 4, 11, 13, 15, 19-21, 24, 26, 28, 31; June 2-3, 5, 10; July 2, 5; 0535-1115. Total hours: 26. **Census:** Ovenbird, 5 (42, 17); Rufous-sided Towhee, 4.5 (38, 15); Blue Jay, 3 (25, 10); Gray Catbird, 3; Veery, 3; Black-capped Chickadee, 2; Tufted Titmouse, 2; Scarlet Tanager, 2; Ruffed Grouse, 1.5; Com. Crow, 1.5; Com. Yellowthroat, 1.5; Cardinal, 1+; Great Crested Flycatcher, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Starling, 1; Black-and-white Warbler, 1; Golden-winged Warbler, 1; Blue-winged Warbler, 1; Field Sparrow, 1; Yellow-billed Cuckoo, +; N. Oriole, +; Com. Grackle, +. **Total:** 27 species; 38 territorial males or females (322/km<sup>2</sup>, 130/100 acres). **Visitors:** E Kingbird, Rose-breasted Grosbeak **Remarks:** Nests found: Blue Jay, crow, chickadee, Starling, Ovenbird, towhee, Field Sparrow, 1 each. The nesting of crows correlates with the disappearance of Broad-winged Hawks, which were reported by another observer as probably nesting several hundred yards from the plot, but not observed on any of the census runs. The reduced presence of cuckoos correlates with the virtual collapse of the Gypsy Moth population. An infestation of Oak Webworm (*Archips fervidanus*) drew many avian visitors. For example on May 28 grackles, Starlings, robins, jays, towhee and kingbird fed in the plot and at the edge jays, Starlings, House Sparrows, catbirds, Great Crested Flycatcher and Cedar

Waxwings—*WILLIAM E. DAVIS, JR.*,  
College of Basic Studies, Boston Univ.,  
Boston, Mass. 02215.

**59. 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, 14 intermittent years. **Size:** 10.52 ha = 26 acres. **Description of Plot:** See *AFN* 19 594-595 (1965). **Coverage:** May 6; June 3, 10-12. Total hours: 14. **Census:** Blackburnian Warbler, 15 (143, 58); Veery, 12 (114, 46) Ovenbird, 12; Brown Creeper, 6 (57, 23); Black-capped Chickadee, 5 (48, 19); Solitary Vireo, 5; Black-and-white Warbler, 5; Black-throated Green Warbler, 5; Scarlet Tanager, 4.5 (43, 17); Am. Robin, 3 (29, 12); Red-eyed Vireo, 3; Com. Yellowthroat, 2.5; Great Crested Flycatcher, 2; Blue Jay, 2; Red-breasted Nuthatch, 2; Yellow-rumped Warbler, 2; Purple Finch, 2; Barred Owl, 1; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; Magnolia Warbler, 1; Canada Warbler, 1; Brown-headed Cowbird, 1; White-throated Sparrow, 1; N. Oriole, 0.5; Com. Grackle, 0.5, Broad-winged Hawk, +; Great Horned Owl, +; Pileated Woodpecker, +; Pine Warbler, +; Chipping Sparrow, +; Song Sparrow, +. **Total:** 37 species, 101 territorial males (960/km<sup>2</sup>, 388/100 acres). **Remarks:** No significant changes. Rufous-sided Towhee finally dropped out following a slow decline. Canada Warbler (1) returned after several years' absence. Magnolia Warbler (1) was new. Thanks to Jim Cavanaugh.—*ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.*

**60. BEECH-SPRUCE-HEMLOCK FOREST.**—**Location:** New York; Hamilton Co., along with W shore of Catlin Lake; 44°N, 74°15'W, Long Lake Quadrangle, USGS. **Continuity:** New. **Size:** 20.4 ha = 50.4 acres (350 x 700 m with one corner excluded; complete 50 m, partial 25 m grid). **Description of Plot:** The dominant canopy trees are Am. Beech (*Fagus grandifolia*), Red Spruce (*Picea rubens*), Hemlock (*Tsuga canadensis*), and Yellow Birch (*Betula lutea*). Most prominent in the understory are Beech and Red Spruce. The ground cover is primarily Witch Hobble (*Viburnum alnifolium*), woodfern (*Dryopteris* spp.) and *Lycopodium* spp. A quantitative survey of the vegetation gave the following: Trees 3 cm diameter and over, based on 41 0.1-acre circular samples, 444/acre; total basal area 208.4 ft<sup>2</sup>/acre. Species comprising at least 90% of the total number of trees: Beech 155, 35, 12, 93; Red Spruce 99, 22, 13, 100; dead trees, 68, 15, 16, 100, Hemlock 46, 10, 22, 93; Yellow Birch 41, 9, 23, 85. Trees by diameter size class: S (3-8 cm) 201, 45, 5.2, 2; A (8-15 cm) 81, 18, 8, 1, 4; B (15-23 cm) 43, 10, 12.8, 6; C (23-38 cm) 62, 14, 49.8, 24; D (38-53 cm) 37, 8, 64.5, 31, E (53-69 cm) 15, 3, 46.9, 23; F (69-84 cm) 4, 1, 19.3, 9; G (84-102 cm) 1, 0.2, 1.8, 1. Shrub stems/acre 430; ground cover 40%; canopy cover 91%; average canopy height 19.2 m; range 8-31 m. **Edge:** Bordered on 3 sides by similar forest which had not been sprayed by herbicide; 1 side is bordered

(within 100 m) by Catlin Lake. **Topography:** Gentle slope. **Elevation:** 490-550 m. **Weather:** Cool and moist throughout period. **Coverage:** June 10-11, 15, 18, 23, 27; July 2, 4; between dawn and 1130. Total hours: 68. **Census:** Blackburnian Warbler, 20 (98, 40); Red-eyed Vireo, 13.5 (66, 27); Black-throated Green Warbler, 9.5 (47, 19); Am. Redstart, 9 (44, 18); Swainson's Thrush, 8.5 (42, 17); Black-throated Blue Warbler, 8 (39, 16); Solitary Vireo, 7 (34, 14); Golden-crowned Kinglet, 6 (29, 12); Black-capped Chickadee, 4.5 (22, 9); Yellow-rumped Warbler, 4.5; Magnolia Warbler, 4.5; Least Flycatcher, 3 (15, 6); Brown Creeper, 3; Ovenbird, 2.5; Yellow-bellied Sapsucker, 1.5; Winter Wren, 1.5; White-breasted Nuthatch, 1.5; N. Parula, 1.5; Hairy Woodpecker, 1; Scarlet Tanager, 0.5; Red-breasted Nuthatch, +; Veery, +. **Total:** 22 species; 111 territorial males (544/km<sup>2</sup>, 220/100 acres). **Visitors:** Broad-winged Hawk, Barred Owl, Great Crested Flycatcher, Blue Jay, Hermit Thrush, Cedar Waxwing, Black-and-white Warbler, Chestnut-sided Warbler, Rose-breasted Grosbeak, Pine Siskin. **Remarks:** Nests found: Hairy Woodpecker and Black-throated Green Warbler. This plot is being studied as a control to a neighboring disturbed plot (Census 61) which had been sprayed with herbicide in 1978 to remove the deciduous understory. This research was conducted at the Adirondack Ecological Center, SUNY College of Environmental Science and Forestry, Newcomb, NY.—*SAM DROEGE and BARRY R. NOON, Migratory Bird and Habitat Research Laboratory, U.S. Fish and Wildlife Service, Laurel, Md. 20811.*

**61. 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:** New. **Size:** 19.4 ha = 47.9 acres (irregular, complete 50 m, partial 25 m grid). **Description of Plot:** The dominant canopy trees are Am. Beech (*Fagus grandifolia*), Red Spruce (*Picea rubens*), and Sugar Maple (*Acer saccharum*). Most prominent in the understory is Red Spruce; the deciduous component of the understory (primarily Beech) has been killed by herbicide application in 1978. The ground cover is primarily Witch Hobble (*Viburnum alnifolium*), woodfern (*Dryopteris* spp.), Sensitive Fern (*Onoclea sensibilis*) and *Lycopodium* spp. A quantitative survey of the vegetation gave the following: trees 3 cm diameter and over, based on 40 0.1-acre circular samples, 448/acre; total basal area 164.3 ft<sup>2</sup>/acre. Species comprising at least 90% of the total number of trees: dead trees, 146, 33, 17, 100; Beech 124, 28, 15, 97; Red Spruce 73, 16, 10, 92; Sugar Maple 49, 11, 33, 97; Balsam Fir (*Abies balsamea*) 11, 2, 2, 52; White Ash (*Fraxinus americana*) 10, 2, 4, 38. Trees by diameter size class: S (3-8 cm) 223, 50, 5.8, 4; A (8-15 cm) 87, 19, 8.7, 5; B (15-23 cm) 43, 10, 12.8, 8; C (23-38 cm) 52, 12, 42, 26; D (38-53 cm) 32, 7, 56.4, 34; E (53-69 cm) 9, 2, 29.1, 18; F (69-84 cm) 1, 0.1, 3.7, 2; G (84-102 cm) 0.5, 0.1, 3.6, 2; H (>102 cm) 0.5, 0.1, 2.2, 1. Shrub stems/acre 331; ground cover 37%; canopy cover 79%; average canopy height 19.2 m; range 8-31 m. **Edge:** Bordered on 2 sides by similar forest which had not been sprayed by herbicide; 1 side is bordered

within 50 m by a large logged area. The remaining border is similar in that it has been herbicided to remove the deciduous understory. **Topography:** Gentle slope. **Elevation:** 1900-2000 ft. **Weather:** Cool and moist throughout period. **Coverage:** June 13, 17, 19, 24, 26; July 1, 3-4; between dawn and 1130. Total hours: 73. **Census:** Red-eyed Vireo, 17.5 (90, 37); Least Flycatcher, 10 (52, 21); Am. Redstart, 10; Black-throated Green Warbler, 9 (46, 19); Blackburnian Warbler, 9; Swainson's Thrush, 7 (36, 15); Solitary Vireo, 6.5 (34, 14); Black-capped Chickadee, 5 (26, 10); White-breasted Nuthatch, 4.5 (23, 9); Black-throated Blue Warbler, 4.5; Ovenbird, 2.5; Yellow-bellied Sapsucker, 2; Hairy Woodpecker, 2; Downy Woodpecker, 2; Hermit Thrush, 2; Brown Creeper, 1; Winter Wren, 1; Golden-crowned Kinglet, 1; Yellow-rumped Warbler, 1; Rose-breasted Grosbeak, 1; Evening Grosbeak, 1; Purple Finch, 1; Dary-eyed Junco, 1; E. Wood Pewee, 0.5; Red-breasted Nuthatch, 0.5; Veery, 0.5; Scarlet Tanager, 0.5. **Total:** 27 species, 103.5 territorial males (534/km<sup>2</sup>, 216/100 acres). **Visitors:** Ruby-throated Hummingbird, Com. Flicker, Pileated Woodpecker, Great Crested Flycatcher, Blue Jay, Wood Thrush, Black-and-white Warbler, Magnolia Warbler, Chestnut-sided Warbler, White-throated Sparrow. **Remarks:** Nests found (12): Yellow-bellied Sapsucker, 2; Least Flycatcher, 2; White-breasted Nuthatch, 1, Red-breasted Nuthatch, 1; Swainson's Thrush, 4; Red-eyed Vireo, 1; Am. Redstart, 1. The Beech dominance arises because of selective avoidance of Beech seedlings by grazing deer. The herbicide treatment is the first stage of a forest management strategy which is followed by a shelter wood cut leaving mostly hardwood species (except Beech) as seed trees. Seed dispersal by these overstory trees results in the regeneration of an even-aged forest. This plot is being studied in conjunction with Census 60 to look at the effects of a specific habitat alteration on bird species composition and community structure. This research was conducted at the Adirondack Ecological Center, SUNY College of Environmental Science and Forestry, Newcomb, NY.—*BARRY R. NOON and SAM DROEGE, Migratory Bird and Habitat Research Laboratory, U.S. Fish and Wildlife Service, Laurel, Md. 20811.*

**62. PITCH PINE-SCRUB OAK BARRENS.**—**Location:** New York; Suffolk Co., Westhampton, 0.6 mi S of State Road 27 and 0.9 mi W of County Road 31; 40°51'23"N, 72°39'46"W, Eastport Quadrangle, USGS. **Continuity:** Established 1977; 4 consecutive years. **Size:** 9.67 ha = 23.9 acres. **Description of Plot:** See *AB* 33:68 (1979). **Weather:** See Census 63. **Coverage:** May 23, 28; June 5, 12, 21, 23-24, 28; 0450-0830, EST. Total hours 15. **Census:** Prairie Warbler, 16 (165, 67), Rufous-sided Towhee, 9.5 (98, 40); Field Sparrow, 6 (62, 25); Brown Thrasher, 2, Com. Yellowthroat, 1. **Total:** 5 species; 34.5 territorial males (357/km<sup>2</sup>, 144/100 acres). **Visitors:** Marsh Hawk, Mourning Dove, Yellow-billed Cuckoo, Black-billed Cuckoo, Blue Jay, Black-capped Chickadee, Mockingbird, Am. Robin, Com. Grackle, Brown-headed Cowbird, Chipping Sparrow. **Remarks:** No significant population changes or trends have occurred during the 4-year

period —ROBERT ADAMO, EDWARD KEMNITZER (compiler) and GILBERT RAYNOR, Moriches Bay Audubon Society, Box 802, Center Moriches, N.Y. 11934.

**63. SECOND-GROWTH OAK - PITCH PINE FOREST.**—**Location:** New York: Suffolk Co., Upton, near NE corner of Brookhaven National Laboratory property, 6000 ft S of State Rd 25; 40°53'16"N, 72°51'53"W, Wading River Quadrangle, USGS. **Continuity:** Established 1977; 4 consecutive years. **Size:** 9.3 ha = 22.97 acres. **Description of Plot:** See AB 33:69 (1979). **Weather:** May was warmer and drier than normal (mean temperature 59.2°F, 25-year average 55.6°F. Precipitation 1.52 in., 25-year average 3.83 in.). June had near normal temperatures and above average precipitation (64.1°F vs 65.4°F and 3.60 in. vs 2.72 in.). Weather on count days varied from clear to overcast but without precipitation, temperatures 39-78° and wind speeds 0-5.5m/s but mostly light. **Coverage:** May 27; June 5, 10, 12, 17, 19, 21, 24, 29; July 1, 5; 0430-0830, EST. Total hours: 25. **Census:** Rufous-sided Towhee, 17.5 (188, 76); Ovenbird, 4 (43, 17); Brown Thrasher, 2.5; Black-capped Chickadee, 2; Blue Jay, 1.5; Great Crested Flycatcher, 1; Hermit Thrush, 1; N. Oriole, 1. **Total:** 8 species; 30.5 territorial males (328/km<sup>2</sup>, 133/100 acres). **Visitors:** Com. Flicker, Hairy Woodpecker, Downy Woodpecker, E. Wood Pewee, Tufted Titmouse, White-breasted Nuthatch, Am. Robin, Veery, Black-and-white Warbler, Pine Warbler, Com. Yellowthroat, Scarlet Tanager, Red-winged Blackbird, Com. Grackle. **Remarks:** Nest found: towhee. The number of breeding species and number of territorial males have shown a progressive decline since 1977 (18 to 8 and 45 to 30.5) with no noticeable habitat change within or near the plot.—JAMES CLINTON (compiler), CLEVELAND DODGE and KATHLEEN TOUHY, Moriches Bay Audubon Society, Box 802, Center Moriches, N.Y. 11934.

**64. UPLAND MIXED PINE-SPRUCE-HARDWOOD PLANTATION.**—**Location:** New York; Allegany Co., on the S side of Brown Rd. in the town of Ward, 3.5 mi W of Alfred, 42°7'30"N, 77°45'W; Andover Quadrangle, USGS. **Continuity:** Established 1974; 7 consecutive years. **Size:** 16.6 ha = 41 acres. **Description of Plot:** See AB 28:699 (1974). **Weather:** Data furnished by the Alfred Cooperative Weather Station indicated that May was drier and warmer than average but precipitation and average daily temperature in June was near normal. A cold, wet spell in early June may have had an adverse effect on nesting success. **Coverage:** May 5, 16, 24, 31; June 6, 15, 25; July 3, 17; Aug. 2; 0620-2020, EDT. Total hours: 16. **Census:** Black-throated Green Warbler, 15 (90, 37); Blackburnian Warbler, 11; (66, 27); Magnolia Warbler, 9 (54, 22); Dark-eyed Junco, 6 (36, 15); Blue Jay, 5 (30, 12); Black-capped Chickadee, 5; Golden-crowned Kinglet, 5; Yellow-rumped Warbler, 5; Am. Robin, 4 (24, 10); Red-breasted Nuthatch, 3 (18, 7); Solitary Vireo, 3; Com. Yellowthroat, 2.5; Brown Creeper, 2; Ovenbird, 2; Purple Finch, 2; Chipping Sparrow, 2; Indigo Bunting, 1.5; Song Sparrow, 1.5; Broad-winged Hawk, 1; Ruffed Grouse, 1; Mourning

Dove, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; House Wren, 1; Com. Crow, 1; Wood Thrush, 1; Veery, 1; Cedar Waxwing, 1; Brown-headed Cowbird (female), 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; White-throated Sparrow, 1; Red-shouldered Hawk, +; Great Horned Owl, +; Pileated Woodpecker, +; Great Crested Flycatcher, +; White-breasted Nuthatch, +; Gray Catbird, +. **Total:** 38 species; 98.5 territorial males (594/km<sup>2</sup>, 240/100 acres), 240/100 acres). **Visitors:** Barred Owl, Am. Goldfinch. **Remarks:** A pair of chickadees successfully fledged 5 young. A Broad-winged Hawk completed building a nest but was killed by a Great Horned Owl. Canada Warbler was absent for the first time while Mourning Dove was new. There was no lumbering activity during the past 12 months, possibly a contributing factor in the steady increase in territorial males since a sudden low in 1978. Raptors were actively hunting in the plot and may have been responsible for some population disruption. Thanks to Gaylord Rough for weather data.—ELIZABETH W. BROOKS, 1435 Waterwells Rd., Alfred Station, N.Y. 14803.

**65. 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; 4 consecutive years. **Size:** 6 ha = 14.8 acres. **Description of Plot:** See AB 33:70 (1979). **Weather:** Variable, ranging from overcast to clear. Temperatures 4.5-20°C (average, 12°). Winds calm. **Coverage:** May 2, 8, 20, 30; June 9, 17, 24; July 10; 0530-0930, EST. Total hours: 31. **Census:** Red-eyed Vireo, 3.5 (58, 24); Brown-headed Cowbird, 3.5; Black-capped Chickadee, 3 (50, 20); Wood Thrush, 2.5; Scarlet Tanager, 2.5; Great Crested Flycatcher, 2; Blue Jay, 2; Ovenbird, 2; Broad-winged Hawk, 1; Yellow-billed Cuckoo, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Black-and-white Warbler, 1; Hairy Woodpecker, 0.5; E. Wood Pewee, 0.5; Worm-eating Warbler, 0.5; Ruffed Grouse, +; Pileated Woodpecker, +; Downy Woodpecker, +; Blue-gray Gnatcatcher, +; Am. Robin, +; Hermit Thrush, +; Chestnut-sided Warbler, +; Rose-breasted Grosbeak, +; Indigo Bunting, +; Rufous-sided Towhee, +. **Total:** 26 species; 27.5 territories (459/km<sup>2</sup>, 186/100 acres). **Visitors:** Cooper's Hawk, Chimney Swift, Com. Flicker, Solitary Vireo, Chipping Sparrow. **Remarks:** Nests found: 1 Broad-winged Hawk, 1 Great Crested Flycatcher, 2 Blue Jay, 1 Wood Thrush, 1 Scarlet Tanager. Known Brown-headed Cowbird hosts: Black-capped Chickadee and Chipping Sparrow. Indigo Bunting, Rufous-sided Towhee, and Chestnut-sided Warbler, a new breeding species, were spillovers from a transmission corridor. Ovenbird territories down to 2 from previous low of 4.5 in 1979. Both of the important ground-foraging species, Wood Thrush and Ovenbird, have much lower populations than in 1977. Thanks to D.G. Richie for assistance. This census is part of a study supported by Pennsylvania Power and Light Company.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R.D. 1, Berwick, Pa. 18603.

**66. 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; 4 consecutive years. **Size:** 11.05 ha = 27.3 acres. **Description of Plot:** See AB 33:70 (1979). **Weather:** Variable, ranging from foggy to clear. Temperatures 7-18°C (average, 13°). Winds calm. **Coverage:** May 5, 14, 23, 29; June 6, 13, 23; July 9, 0530-0945, EST. Total hours: 38. **Census:** Wood Thrush, 5.5 (50, 20); Brown-headed Cowbird, 5 (45, 18); Black-capped Chickadee, 3 (27, 11); Red-eyed Vireo, 3; Scarlet Tanager, 3; Rose-breasted Grosbeak, 3; Blue Jay, 2.5; Gray Catbird, 2.5; Ovenbird, 2.5; Downy Woodpecker, 2; Cardinal, 2; Rufous-sided Towhee, 2; Black-and-white Warbler, 1.5; Red-tailed Hawk, 1; Com. Flicker, 1; E. Wood Pewee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Brown Creeper, 1; Am. Robin, 1; Worm-eating Warbler, 1; Pine Warbler, 1; Com. Yellowthroat, 1; Hooded Warbler, 1; N. Oriole, 1; Great Crested Flycatcher, 0.5; Veery, 0.5; Chestnut-sided Warbler, 0.5; Hairy Woodpecker, +; House Wren, +; Am. Redstart, +; Indigo Bunting, +. **Total:** 32 species; 51 territories (462/km<sup>2</sup>, 187/100 acres). **Visitors:** Sharp-shinned Hawk, Ruffed Grouse, Mourning Dove, Black-billed Cuckoo, Barn Swallow, Cedar Waxwing, Am. Goldfinch. **Remarks:** Nests found: 1 Red-tailed Hawk, 2 Downy Woodpecker, 2 Blue Jay, 5 Wood Thrush, 1 Hooded Warbler, 1 Rose-breasted Grosbeak. Red-tailed Hawks successfully raised one fledgling. Hooded Warbler abandoned first nest apparently because of cowbird parasitism. For the third straight year, the total breeding bird density and number of species have increased. Red-tailed Hawk, Hairy Woodpecker, Brown Creeper, Chestnut-sided Warbler, and Hooded Warbler are new species. Natural windfalls that occurred in 1977 or earlier and a spillover effect from nearby transmission line corridors have contributed to the number of shrub-layer species. Thanks to D.G. Richie for assistance. This census is part of a study supported by Pennsylvania Power and Light Company.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R.D. 1, Berwick, Pa. 18603.

**67. CENTRAL HARDWOOD FOREST WITH SCATTERED PINE.**—**Location:** Washington, D.C., Rock Creek Park, lying S of Military Road and W of Rock Creek. **Continuity:** Established 1948; 21 intermittent years. **Size:** 26.3 ha = 65 acres. **Description of Plot:** See AFN 2:153-154 (1948). **Weather:** Temperatures averaged: May, 70°F; June, 64°; July, 77°. June and July were very dry, with July setting a heat record. **Coverage:** Apr. 20; May 28; June 4, 9, 16, 20, 26-27, July 1, 11, 16, 0600-1020 and 1630-1930, EST. Total hours: 18. **Census:** Red-eyed Vireo, 5 (19, 8); Blue Jay, 2.5; Downy Woodpecker, 2; E. Wood Pewee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Carolina Chickadee, 1.5; Wood Thrush, 1.5; Scarlet Tanager, 1.5; Red-bellied Woodpecker, 1; E. Phoebe, 1; Ovenbird, 1; Brown-headed Cowbird, 1; Broad-winged Hawk, 0.5; Pileated Woodpecker, 0.5; Cardinal, 0.5; Com. Flicker, +; Acadian Flycatcher, +; Great Crested Flycatcher, +; Carolina Wren,

+ Veery, + Total: 21 species, 25 5 territorial males or females ( $97 \text{ km}^2$ , 39/100 acres). **Visitors:** Yellow-billed Cuckoo, Hairy Woodpecker, Com. Crow, Am. Robin, Louisiana Waterthrush, House Sparrow, Com. Grackle, Rufous-sided Towhee. **Remarks:** Nests found: Pileated Woodpecker, Blue Jay, E Phoebe, one each. The 21 species, is only 1 below 1979 but continues to reflect the loss of species since the 1948 high of 29. This year, for instance, the Veery was reduced to a “+” from a high of 7 in 1963, the year before the downward trend of population began to be apparent in this census area. The total number of territories, 25.5, is far below the 61 for last year. This decrease is, as reported in previous years, in large part a continuing loss of neotropical forest interior migrants including vireos, warblers, and flycatchers. In this plot, there has also been a radical loss of Wood Thrushes and Veeries.—ROBERT FORD, JOAN CRISWELL (compiler), 3519 Jermantown Road, Fairfax, Va. 22030.

**68. SLASH PINE-TURKEY OAK FOREST.**—**Location:** Florida; Leon Co., 2 mi W of the intersection of Springhill Road and Dog Lake Tower Road;  $30^\circ 22' \text{N}$ ,  $84^\circ 23' \text{W}$ ; Hilliardville Quadrangle, USGS. **Continuity:** New. **Size:** 16 ha = 39.54 acres (square plot, 400 x 400m, measured with 50 m rope and compass). **Description of Plot:** Clear-cut in 1959-60, and replanted in Slash Pine (*Pinus elliottii*). Other dominant trees include Longleaf Pine (*P. palustris*) and Turkey Oak (*Quercus laevis*). The dense understory consists primarily of small oaks, including Turkey Oak, Bluejack Oak (*Q. incana*) and Laurel Oak (*Q. hemisphaerica*). The ground-cover is mainly Bracken (*Pteridium aquilinum*) and blackberry (*Rubus spp.*). A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over, based on 12 0.1-acre circular samples, 446 per acre; total basal area, 92 ft<sup>2</sup> per acre. Species comprising 90% of the total number of trees: Slash Pine, 338, 76, 78, 75; Turkey Oak, 81, 18, 13, 56. Trees by diameter size class: A (3-6 in.), 247, 55, 25, 27; B (6-9 in.), 184, 41, 55, 60; C (9-15 in.), 15, 3.4, 12, 13. Shrub stems per acre 950; ground cover 47%; canopy cover 63%; canopy height 40 ft (range 20-50 ft). **Edge:** The habitat is similar on all sides. **Topography:** Essentially flat terrain on sandy soil. **Elevation:** 100 ft. **Weather:** Warm, humid and calm during all censuses, with temperatures 65-80°F. No precipitation. **Coverage:** May 12, 15, 18, 23, 28, June 6, 8, 16; between 0700-1030, EDT. Total hours: 19. **Census:** Pine Warbler, 2.5; Tufted Titmouse, 1.5; Blue-gray Gnatcatcher, 1.5; Cardinal, 1.5; Chuck-will's-widow, 1; Great Crested Flycatcher, 1; Carolina Wren, 1; Summer Tanager, 1; Red-bellied Woodpecker, 0.5; Brown Thrasher, 0.5, Red-eyed Vireo, 0.5. **Total:** 11 species; 12.5 territorial males ( $78/\text{km}^2$ , 32/100 acres). **Visitors:** Bobwhite, Yellow-billed Cuckoo, Com. Flicker, Pileated Woodpecker, Downy Woodpecker, Blue Jay, Com. Crow, Rufous-sided Towhee. **Remarks:** Thanks to Patty Blair and Stan Faeth for help with measuring the plot, to Debbie Wallace for help with vegetation sampling, and to Todd Engstrom, Gerald Niemi and Frances James for support and advice.—C. DEAN LITTLE, Dept. of

*Biological Science, Florida State Univ., Tallahassee, Fla. 32306.*

**69. MIXED CONIFER-HARDWOOD FOREST.**—**Location:** Michigan; Houghton Co., NE  $\frac{1}{4}$ , Sec. 2, T47N, R37W;  $46^\circ 30' \text{N}$ ,  $88^\circ 54' \text{W}$ , Rousseau Quadrangle, USGS. **Continuity:** New. **Size:** 13.9 ha = 34.4 acres. **Description of Plot:** Cut in 1914. The dominant canopy trees are Hemlock (*Tsuga canadensis*), Sugar Maple (*Acer saccharum*), Red Maple (*A. rubrum*), and Red Oak (*Quercus rubra*) with scattered Yellow Birch (*Betula lutea*), White Birch (*B. alba*), and Hornbeam (*Ostrya virginiana*). The understory consisted of saplings of the canopy trees and some Balsam Firs (*Abies balsamea*) and White Cedars (*Thuja occidentalis*). Ground cover consists primarily of seedlings of the above species with scattered patches of ferns and grasses in open areas along old trails. Average height of canopy about 60 ft. **Edge:** Bordered on E by paved road; S by similar habitat; W by younger hardwoods; N by open field/scrub. **Topography:** Basically flat, gradual incline W to E. **Elevation:** 1260-1300 ft. **Weather:** Generally clear to partly cloudy; no precipitation on census days. **Coverage:** May 31; June 2, 12, 14, 26, 28. Total hours: 16. **Census:** Ovenbird, 6.5 (47, 19), Black-throated Green Warbler, 5.5 (40, 16); Red-eyed Vireo, 5 (36, 15); Yellow-bellied Sapsucker, 1; Great Crested Flycatcher, 1; Least Flycatcher, 1; Black-capped Chickadee, 1; Yellow-rumped Warbler, 1; Scarlet Tanager, 1; E. Wood Pewee, 0.5; Hermit Thrush, 0.5; Broad-winged Hawk, +; Cedar Waxwing, +; Blackburnian Warbler, +; Rose-breasted Grosbeak, +; Evening Grosbeak, +. **Total:** 16 species; 24 territorial males ( $172/\text{km}^2$ , 70/100 acres).—DON RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, Minn. 55108.

**70. MATURE PINE-FIR-BIRCH FOREST.**—**Location:** Minnesota; Clearwater Co., Univ. of Minn. Forestry and Biological Station, Itasca State Park Wilderness Sanctuary;  $47^\circ 13' \text{N}$ ,  $95^\circ 12' \text{W}$ , Itasca State Park Quadrangle, USGS. **Continuity:** New. **Size:** 12.75 ha = 31.5 acres (250 x 550 m rectangle minus 100 x 100 m of NW corner, surveyed). **Description of Plot:** The dominant canopy tree is Red Pine (*Pinus resinosa*). Most prominent in the understory are Balsam Fir (*Abies balsamea*) and White Birch (*Betula papyrifera*). The ground cover is primarily Beaked Hazelnut (*Corylus cornuta*), Early Meadow Rue (*Thalictrum dioicum*), Bracken (*Pteridium aquilinum*), Wild Lily-of-the-valley (*Maianthemum canadense*) and Large-leaved Aster (*Aster macrophyllus*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on ten 0.1-acre circular samples, 263/acre; total basal area 242.2 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Red Pine, 142, 53, 80, 100; dead trees, 52, 19.7, 6.6, 100; Balsam Fir, 34, 12.9, 3.4, 90; White Birch, 20, 7.6, 2, 90. Trees by diameter size class: A (3-6in.) 57, 21.6, 5.7, 2.3; B (6-9in.) 52, 19.7, 15.6, 6.4, C (9-15in.) 79, 30, 59.7, 24.6; D (15-21in.) 59, 2.2, 106.2, 43.8; E (21-27in.) 13, 4.9, 40.3, 16.6; F (27-33in.) 3, 1.1, 14.7, 6. Shrub cover, 48.5%

(shrub stem count not taken), ground cover 79.3%; canopy cover 64.5%; average canopy height 80 ft (range 45-110 ft); average shrub height 6.8 ft. **Edge:** Bordered on all sides by similar forest except for a 100 m bog on the NW portion. **Topography:** One small rise of approximately 25 ft at NE end. **Elevation:** 1475 ft. **Weather:** 81-93°F. Wind, Beaufort 0-10 mph. Clear to overcast, no precipitation. **Coverage:** June 29-30; July 2-3, 5, 9-11, 0500-0900 and 1830-2130 hours. Total hours 26. **Census:** Ovenbird, 25 (196, 79); Red-eyed Vireo, 13 (101, 41); Black-throated Green Warbler, 10 (78, 32); Pine Warbler, 9 (70, 28); Black-capped Chickadee, 8 (63, 25); Hermit Thrush, 6 (47, 19); E. Wood Pewee, 5 (39, 16); Red-breasted Nuthatch, 5; Brown Creeper, 4 (31, 12); Yellow-bellied Sapsucker, 3 (23, 9); Gray Jay, 3; White-breasted Nuthatch, 3; Hairy Woodpecker, 2.5; Blue Jay, 2; Veery, 2; N. Parula, 2; Chestnut-sided Warbler, 2; Scarlet Tanager, 2; Goshawk, 1, Ruffed Grouse, 1; Black-backed Three-toed Woodpecker, 1; Winter Wren, 1; Swainson's Thrush, 1; Com. Yellowthroat, 1; Red Crossbill, 1; Pileated Woodpecker, 0.5. **Total:** 26 species; 114 territorial males ( $894/\text{km}^2$ , 361/100 acres). **Visitors:** Bald Eagle, Broad-winged Hawk, Com. Raven, Evening Grosbeak. **Remarks:** Many birds had finished nesting and territorial boundaries were breaking down. The following species were feeding fledged young: Goshawk, Yellow-bellied Sapsucker, Hairy Woodpecker, Gray Jay, Red-breasted Nuthatch, Chestnut-sided Warbler. High percentage of ground and shrub cover and complete lack of pine seedlings indicate succession to a hardwood forest. Most of the dead trees were young Balsam Firs with diameters less than 10 in. Special thanks to Barb Bell, Mary Candee, Laura Greffenuis, Roberta Sorensen and Mindy Bell for assistance in surveying and habitat description.—PAUL J. MILLS, 6800 16th Ave. S, Richfield, Minn. 55423.

**71. MIXED SUCCESSIONAL ASPEN-OAK-CONIFER FOREST.**—**Location:** Minnesota, Clearwater Co., 3.5 mi NW of intersection of state highway 200 and U.S. highway 71; 0.25 mi E of University of Minnesota Forestry and Biological station, Itasca State Park;  $47^\circ 10' \text{N}$ ,  $95^\circ 12' \text{W}$ , Lake Itasca Quadrangle, USGS. **Continuity:** New. **Size:** 8.93 ha = 22.07 acres (rectangular, 366 x 244 m, measured by pacing with a hand compass). **Description of Plot:** An extremely heterogeneous area consisting of 5 smaller sub-habitats. (1) Aspen (*Populus tremuloides*)-Bur Oak (*Quercus macrocarpa*); (2) Mixed Coniferous: major species; Balsam Fir (*Abies balsamea*) and White Spruce (*Picea glauca*); (3) Sedge Meadow, dominated by Sedge (*Carex spp.*) and Alder (*Alnus spp.*), (4) Open Field, dominated by Timothy (*Phleum pratense*); and (5) Brushy powerline, dominated by Bracken (*Pteridium aquilinum*). Of the forested areas, most prominent in the understory are Beaked Hazelnut (*Corylus cornuta*) and Black Cherry (*Prunus serotina*); most prominent ground cover plants are Bracken, Early Meadow Rue (*Thalictrum dioicum*), Large-flowered Bellwort (*Uvularia grandiflora*) and Big-leaved Aster (*Aster macrophyllus*). Also within the plot is a small pond, 30 x 25m. A

quantitative survey of the vegetation gave the following results: Trees 3-inches in diameter and over, based on tenth-acre circular plots, 432/acre; total basal area 119.4 ft<sup>2</sup>/acre. Species comprising 91% of the total number of trees: Quaking Aspen, 233, 54, 58, 49; Bur Oak, 55, 13, 22, 18; White Spruce, 44, 10, 10, 8; Paper Birch, (*Betula papyrifera*), 26, 6, 9, 7; dead, 36, 8, 8, 6. Trees by diameter size class: A (3-6 in.) 71, 16, 48, 39; D (15-21 in.) 7, 2, 13, 10; E (21-27 in.) 1, 0.2, 3, 2. Shrubs 58%; ground cover 86%; canopy cover 53%; canopy cover 53%; average canopy height in all ten circles 17m; average canopy height with three non-forested circles excluded 23m (range 0-28m). Bordered on all sides by similar habitat except on SE where it is bordered by mature pine. **Topography:** Predominately level with one low area consisting of an abandoned gravel pit. **Elevation:** 1475 ft. **Weather:** Beginning near normal, the last 3-4 censuses during abnormally hot weather. **Coverage:** July 3, 5-7, 9-12; 0500-0830 and 1730-2030. Total man-hours: 26.5. **Census:** Ovenbird, 14 (157, 63); Chestnut-sided Warbler, 9.5 (106, 43); Com. Yellowthroat, 7 (78, 32); Mourning Warbler, 6 (67, 27); Yellow-bellied Sapsucker, 6; Veery, 5 (56, 22); Black-capped Chickadee, 4.5 (50, 20); Red-eyed Vireo, 3 (34, 14); Chipping Sparrow, 3; Great Crested Flycatcher, 2; Com. Crow, 2; E. Phoebe, 2; Indigo Bunting, 1; Broad-winged Hawk, 1; Swamp Sparrow, 1; Com. Flicker, 1; Black-billed Cuckoo, 1; Hairy Woodpecker, 1; Red-breasted Nuthatch, 1; Belted Kingfisher, 0.5; Ruffed Grouse, +; Pileated Woodpecker, +. **Total:** 22 species; 71.5 territorial males (801/km<sup>2</sup>, 324/100 acres). **Visitors:** Cooper's or Sharp-shinned Hawk, Com. Snipe, Ruby-throated Hummingbird, Downy Woodpecker, E. Wood Pewee, Blue Jay, White-breasted Nuthatch, Brown Creeper, Gray Catbird, Am. Robin, Cedar Waxwing, Black-and-white Warbler, Parula, Yellow Warbler, Yellow-rumped Wabler, Black-throated Green Warbler, Blackburnian Warbler, Redstart, Red-winged Blackbird, Oriole, Com. Grackle, Brown-headed Cowbird, Scarlet Tanager, Evening Grosbeak, Am. Goldfinch. **Remarks:** Nests located (5): Indigo Bunting; Broad-winged Hawk; Mourning Warbler; Yellow-bellied Sapsucker; Black-billed Cuckoo. A brood of Ruffed Grouse was observed the day before censusing began. Due to an early spring and a late start censusing, many early nesting birds are believed to have already fledged previous to the beginning of the census. Males also seemed to have decreased their singing as the census progressed, thus biasing the number of territorial males estimated downward. With the diversity of habitat, several species preferences were noted: Chestnut-sided Warblers remained entirely within an area of high brush and middle aged Bur Oak even though other non-oak bushy areas were available. Excluding the Chestnut-sided Warblers, the Bur Oak had few other birds utilizing it, both in number and diversity. Sincere thanks to David F. Parmelee, Frances C. James and Peter Harris for assistance in the study.—JEB BARZEN, 18 Circle West, Edina, Minn. 55436.

## 72. MATURE MIXED HARDWOOD-RELICT HEMLOCK FOREST.—Location:

Indiana, Putnam Co., on the Nature Conservancy's Big Walnut Nature Preserve 2 mi NE of Bainbridge; 39°46'45"N, 86°46'50"W, Roachdale Quadrangle, USGS. **Continuity:** New. **Size:** 5 ha = 12.36 acres (rectangular, 250 by 200 m with 50 m grid; compass and measured rope). **Description of Plot:** Dominant canopy species on the S three-quarters and NE corner are White Oak (*Quercus alba*), N. Red Oak (*Q. rubra*), and Sugar Maple (*Acer saccharum*). Less widespread canopy species include Shagbark Hickory (*Carya ovata*), Pignut Hickory (*C. glabra*), Tulip-tree (*Liriodendron tulipifera*), and Am. Beech (*Fagus grandifolia*). The subcanopy is composed mainly of Sugar Maple with scattered Am. Hornbeam (*Carpinus caroliniana*), Shagbark Hickory, Pignut Hickory, Am. Beech, and *Sassafras albidum*. The understory consists of Sugar Maple, Am. Beech, Am. Hornbeam, and *Carya* sp. saplings as well as Flowering Dogwood (*Cornus florida*), Com. Spicebush (*Lindera benzoin*), *Ribes* sp., and *Smilax* sp. The herb layer is dominated by Wild Ginger (*Asarum canadense*) and May-apple (*Podophyllum peltatum*). The dominant canopy species on the N quarter and extreme SW corner is E. Hemlock (*Tsuga canadensis*). Am. Beech and Sugar Maple dominate the canopy adjacent to the E. Hemlock stands. Scattered Am. Yew (*Taxus canadensis*) and E. Hemlock saplings form the sparse understory. Partridgeberry (*Mitchella repens*) occurs in the herb layer, which is extremely sparse. **Edge:** Mature Mixed Hardwood forest extends to the S and E, grading into Young Mixed Hardwood forest on the E after 50 m. Relict E. Hemlock stands extend to the SW and W for about 100 m. Bordering the plot on the N is a 5-30 m strip of herbaceous vegetation on the S floodplain of Big Walnut Creek. To the N of the creek is a 10-20 m strip of Lowland Hardwood forest bordered on the N by an oldfield. **Topography:** A W-facing slope dissected by a steep E-W ravine located 20-30 m N of the centerline, with a steep N-facing slope descending toward Big Walnut Creek along the N quarter of the plot. **Elevation:** 770-870 ft. **Weather:** About average in May and June with severe drought in July; temperatures 56-85°F; sky clear or mostly clear during 3 counts, changing from overcast to mostly clear during 2 counts, partly to mostly cloudy during 1 count, overcast once with a light rain falling for 60 min; little or no wind on most counts. **Coverage:** May 24, 26; June 7, 28-29; July 6, 13; 0745-1100, EST. Total hours: 21.5. **Census:** Red-eyed Vireo, 6.5 (130, 53); Acadian Flycatcher, 5 (100, 40); Brown-headed Cowbird, 3 (60, 24); Cerulean Warbler, 2.5; E. Wood Pewee, 2; Tufted Titmouse, 2; Ruby-throated Hummingbird, 1.5; Downy Woodpecker, 1.5; Blue-gray Gnatcatcher, 1; Ovenbird, 1; Am. Redstart, 1; Cardinal, 1; Yellow-billed Cuckoo, 0.5; Red-bellied Woodpecker, 0.5; Carolina Chickadee, 0.5; White-breasted Nuthatch, 0.5; Veery, 0.5; Kentucky Warbler, 0.5; Scarlet Tanager, 0.5; Indigo Bunting, 0.5; Blue Jay, +. **Total:** 21 species; 32 territorial males or females (640/km<sup>2</sup>, 259/100 acres). **Visitors:** Red-tailed Hawk, Chimney Swift, Hairy Woodpecker, Great Crested Flycatcher, Purple Martin, Com. Crow, Am. Robin, Wood Thrush, Yellow-throated Warbler, Com. Grackle, Am. Goldfinch. **Remarks:** Nests

found 1 Acadian Flycatcher, 1 Veery. The Veery nest contained 2 Veery eggs and 2 Brown-headed Cowbird eggs. This apparently is the first verified Veery nesting record in central Indiana; we obtained photographs of the nest and eggs. Fledglings observed: Ruby-throated Hummingbird, Carolina Chickadee—MARY ANN CINCOTTA and DAVID C ZUMETA, 6760 McFarland Rd., Indianapolis, Ind. 46227.

## 73. MIXED HARDWOOD AND HEMLOCK RAVINES.—Location:

Ohio; Jackson Co., Jackson Township, Section 23, Leo Petroglyph State Memorial; 39°07'30"N, 82°37'30"W, NW/4 Jackson Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 4.86 ha = 12 acres **Description of Plot:** See AB 33:71 (1978) **Weather:** Cool spring, 56-75°F. **Coverage:** May 14-June 25; 7 trips. Total hours 17 **Census:** E. Phoebe, 4 (82, 33); Acadian Flycatcher, 4; Am. Robin, 3 (62, 25); Red-eyed Vireo, 3; E. Wood Pewee, 2; White-breasted Nuthatch, 2; Wood Thrush, 2, Indigo Bunting, 2; Chipping Sparrow, 2, Yellow-billed Cuckoo, 1; Screech Owl, 1, Ruby-throated Hummingbird, 1; Com Flicker, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Com. Crow, 1, Carolina Chickadee, 1; Tufted Titmouse, 1, E. Bluebird, 1; Yellow-throated Vireo, 1, Ovenbird, 1; Com. Grackle, 1; Scarlet Tanager, 1; Cardinal, 1; Worm-eating Warbler, +. **Total:** 27 species; 41 territorial males (844/km<sup>2</sup>, 342/100 acres). **Remarks:** Nests found (12): 1 Com. Flicker, 1 Downy Woodpecker, 1 Great Crested Flycatcher, 3 E. Phoebe, 2 Acadian Flycatcher, 1 nuthatch, 1 Wood Thrush, 1 Yellow-throated Vireo, 1 Chipping Sparrow. Two Screech Owls with 3 young were in the same hemlock for almost 3 weeks. E. Bluebirds were seen and heard on the property feeding young a number of times. The Yellow-throated Vireo was not seen or heard until June 25 when it was singing and feeding a female on the nest. The surrounding habitat not included in the census area is wheat, grass, corn fields, and grazing land.—ANN BINGAMAN (compiler), and ROBERT GLOTZHOBER, Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio 43211.

## 74. SPRUCE-CEDAR FOREST.—Location:

New Brunswick; Deer Island, Lord's Cove, Southwest Cove, E of Richardson Scenic Road; 45°00'N, 66°57'W, Calais to West Quoddy Head, U.S. NOAA, NOS **Continuity:** New. **Size:** 4.32 ha = 10.67 acres. **Description of Plot:** Dense, mature stand of Red Spruce (*Picea rubens*) with little or no understory in E boundary. Gradual incline with younger spruce and E. White Cedar (*Thuja occidentalis*), Leatherleaf (*Chamaedaphne calyculata*) and some Labrador-tea (*Ledum groenlandicum*) as dense ground cover. Trees, 3-in. diameter and over based on five 0.1 acre circular samples, 712/acre; total basal area 123 ft<sup>2</sup>/acre. Species comprising 99% of total number of trees: Red Spruce 712, 78, 84, 100, E. White Cedar 168, 21, 16, 100. Trees by diameter size class: A (3-6 in.) 434, 55, 43 4, 18; B (6-9 in.) 210, 27, 63, 26; C (9-15 in.) 120, 15, 96, 39; D (15-21 in.) 24, 3, 43.2, 18

Shrub stems/acre, 640, ground cover 79%, canopy cover 53%; avg. canopy height 32.8 ft range 25-60 ft. Shrub species Red Spruce, E White Cedar, White Birch. **Edge:** A small dirt road borders E edge of plot; the N and W edges are bordered by contiguous habitat. The S edge is bordered by a small gulley with dense Speckled Alder (*Alnus rugosa*). **Topography:** Gradual incline from 20 to 100 ft. **Weather:** Foggy and raining throughout census period. **Coverage:** June 11-13, 21, 25, 27-28; July 5, 29; 0700-1000. Total hours: 16. **Census:** Tennessee Warbler, 11 (255, 103); White-throated Sparrow, 8 (185, 75); Black-throated Green Warbler, 7 (162, 66); Nashville Warbler, 4 (93, 37); Black-and-white Warbler, 2.5; Yellow-rumped Warbler, 2.5, Swainson's Thrush, 2; Magnolia Warbler, 1; Downy Woodpecker, +; Yellow-bellied Flycatcher, +; Boreal Chickadee, +; Brown Creeper, +; Magnolia Warbler, +; Blackburnian Warbler, +; Dark-eyed Junco, +. **Total:** 15 species; 38 territorial males (880/km<sup>2</sup>, 356/100 acres). **Visitors:** Tree Swallow, Blue Jay, Com. Crow, Am. Robin, Cedar Waxwing, N. Parula, Bay-breasted Warbler, Am. Redstart, Am. Goldfinch. **Remarks:** Nests located: White-throated Sparrow, 2; Yellow-rumped Warbler, 1. Fledglings seen: Swainson's Thrush, Nashville Warbler, Yellow-rumped Warbler, White-throated Sparrow. Thanks are extended to Ann Rivers, who assisted, and to Peter Watts, who helped with the vegetation sampling.—ERICA NOL, 151 Ruggles Ave., Richmond Hill, Ontario L4C 1Y3.

**75. YOUNG SPRUCE FOREST.**—**Location:** Maine; Hancock Co., Deer Isle, 0.35 mi N of Stinson Point, 44°10'N, 68°43'W, Deer Isle Quadrangle, USGS. **Continuity:** Established 1977; 3 intermittent years. **Size:** 4.05 ha = 10 acres. **Description of Plot:** See AB 32:72 (1978). **Weather:** Warm and dry throughout nesting season. Temperature 58-85°F. **Coverage:** July 3-8; 0445-2050, EST Total hours: 9. **Census:** Magnolia Warbler, 10 (247, 100); Am. Redstart, 8 (198, 80), Black-throated Green Warbler, 4.5 (111, 45), White-throated Sparrow, 3.5 (86, 35); Swainson's Thrush, 2; Black-and-white Warbler, 2; Dark-eyed Junco, 2; Boreal Chickadee, 1.5; Winter Wren, 1.5; Mourning Dove, 1; Downy Woodpecker, 1; Black-capped Chickadee, 1; Gray Catbird, 1; Am. Robin, 1; Cedar Waxwing, 1; Yellow-rumped Warbler, 1; Purple Finch, 1; Brown-headed Cowbird, +. **Total:** 18 species; 43 territorial males (1063/ha; 430/100 acres). **Visitors:** Com. Flicker, Com. Crow, Starling, N. Parula, Am. Goldfinch.—KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, N.Y. 13617.

**76. RED PINE PLANTATION.**—**Location:** Connecticut; Litchfield Co., White Memorial Foundation, Morris; 41°42'30"N, 73°10'W, Litchfield Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AB 33:72 (1979). **Coverage:** May 6; June 4-5, 10, 12. Total hours: 13.5. **Census:** Com. Yellowthroat, 10 (118, 48); Rufous-sided Towhee, 6 (71, 29); Blue-winged Warbler, 5 (59, 24); Veery, 4.5 (53, 21); House Wren, 3.5 (41, 17); Gray Catbird, 3 (35, 14);

N Oriole, 3, Song Sparrow, 3, Great Crested Flycatcher, 2; Blue Jay, 2; Black-capped Chickadee, 2; Am. Robin 2; Chestnut-sided Warbler, 2; Brown-headed Cowbird, 2; Scarlet Tanager, 2; Rose-breasted Grosbeak, 2; White-throated Sparrow, 2; Black-and-white Warbler, 1.5; Am. Woodcock, 1; E. Phoebe, 1; Yellow-throated Vireo, 1; Ovenbird, 1; Am. Redstart, 1; Broad-winged Hawk, 0.5; Barred Owl, 0.5; Com. Flicker, 0.5; Hairy Woodpecker, 0.5; Downy Woodpecker, 0.5; Wood Thrush, 0.5. Red-eyed Vireo, 0.5; Louisiana Waterthrush, 0.5; Red-tailed Hawk, +; Yellow-billed Cuckoo, +; Black-billed Cuckoo, +; Great Horned Owl, +; Com. Crow, +; White-breasted Nuthatch, +; Hermit Thrush, +; Solitary Vireo, +. **Total:** 39 species, 66.5 territorial males (782/km<sup>2</sup>, 317/100 acres). **Remarks:** The number of nesting species, which had dropped from 34 to 31, following the removal of all but a quarter-acre of Red Pine during the winter of 1978-79, rose to 39. The number of territorial males which had dropped from 87.5 to 42.5 rose to 66.5. With hardwood sprouts and saplings replacing the Red Pine, a new association of birds is replacing those that have declined. Yellowthroats increased from 3 (1978) to 10 (1980) and towhees from 3 to 6 while Ovenbirds dropped from 15 to 1 and Red-eyed Vireos from 6 to 0.5. The Veery (7 to 4.5) appears to be more successful in adapting to the new conditions than its close relative the Wood Thrush (5 to 0.5). Thanks to Jim Cavanaugh.—ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.

**77. 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; 12 consecutive years. **Size:** Approximately 9.3 ha = 23 acres. **Description of Plot:** See AFN 23: 743-744 (1969). **Weather:** See Census 64. **Coverage:** Apr. 30; May 17, 25; June 1, 10, 16, 26; July 2, 10, 16, 24; Aug. 1; 0815-2100, EDT. Total hours: 20. **Census:** Song Sparrow, 18 (193, 78); Chipping Sparrow, 16 (172, 70); Com. Yellowthroat, 8 (86, 35); Field Sparrow, 6 (64, 26); Cedar Waxwing, 5 (54, 22); Purple Finch, 4 (43, 17); Am. Robin, 3 (32, 13); Yellow-rumped Warbler, 3; Rufous-sided Towhee, 3; Am. Woodcock, 2; Alder Flycatcher, 2; Brown-headed Cowbird (females), 2; Indigo Bunting, 2; Gray Catbird, 1.5; Mallard, 1; Mourning Dove, 1; Tree Swallow, 1; Brown Thrasher, 1; Am. Goldfinch, 1; Magnolia Warbler, +; Black-throated Green Warbler, +. **Total:** 21 species; 80.5 territorial males (865/km<sup>2</sup>, 350/100 acres). **Visitors:** Red-shouldered Hawk, Blue Jay, Com. Crow, Black-capped Chickadee, Red-eyed Vireo, Nashville Warbler. **Remarks:** Nests found: Mallard, 1; Mourning Dove, 1; Alder Flycatcher, 1; Tree Swallow, 1 (nest box); Gray Catbird, 1; Am. Robin, 4; Cedar Waxwing, 7; Yellow-rumped Warbler, 1; Indigo Bunting, 1; Purple Finch, 6; Am. Goldfinch, 1; Chipping Sparrow, 4; Field Sparrow, 3; Song Sparrow, 6. Total nests found: 38. A Yellow-rumped Warbler and a Song Sparrow nest were parasitized by cowbirds. Total territorial males has shown a

slight increase after 3 years of decline. No nests were found in the mature Scotch Pine. Mourning Dove was new to the survey as was goldfinch, although the latter's presence may be because of the extension of surveys into August. Appreciation is extended to Gaylord Rough for weather data and to Cynthia Clements and Phillips Foster for permission to conduct the survey on their land.—ELIZABETH W. BROOKS, 1435 Waterwells Road, Alfred Station, N.Y. 14803.

**78. ATLANTIC WHITE CEDAR.**—**Location:** Virginia; Nansemond Co., Great Dismal Swamp N.W.R., 300 yds N of Camp Ditch Road, 0.7 mi E of intersection with Jericho Ditch Road, City of Suffolk, 36°40'35"N, 76°28'30"W. **Continuity:** New. **Size:** 7 ha = 17.5 acres (rectangular, 330 X 250 yds, surveyed). **Description of Plot:** Remnant, century-old stand of Atlantic White Cedar (*Chamaecyparis thyoides*) remaining after heavy logging. A quantitative survey of the vegetation revealed the following: Trees 3 in. in diameter and over, based on 10 0.1 acre circular samples, 478/acre; basal area 319 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Atlantic White Cedar, 416, 87, 97, 100; Red Maple (*Acer rubrum*), 26, 5.4, 1.6, 90; Black Gum (*Nyssa sylvatica*), 35, 7.3, 1.2, 90; Red Bay (*Persea borbonia*), 1, 0.2, 0.1, 10. Trees by diameter size class: A (3-6 in.) 66, 14, 6.6, 2; B (6-9 in.) 99, 20, 29.7, 9; C (9-15 in.) 280, 58, 224, 70; D (15-21 in.) 33, 7, 59.4, 19. Shrub stems/acre 21,900, ground cover 68%; canopy cover 81%; average canopy height 75 ft (range 72.5-80)

**Edge:** This dense cedar stand represents a coniferous island surrounded on all sides by an evergreen shrub community. **Topography:** A flat, hummocky area. **Elevation:** 20 ft. **Weather:** Warm and mostly sunny and dry. Three rains occurred during the census period. **Coverage:** Apr. 1, 7, 11, 20, 25; May 5, 12, 15-16, 22-23, 29; June 3, 10, 12, 16. Total hours: 64. **Census:** Prairie Warbler, 18 (252, 102); Prothonotary Warbler, 18; Ovenbird, 8 (116, 42); Hooded Warbler, 5 (70, 29); Worm-eating Warbler, 5; Tufted Titmouse, 3 (42, 17); Carolina Chickadee, 3; Red-eyed Vireo, 3; Com. Yellowthroat, 3; Mourning Dove, 2; Great Crested Flycatcher, 2; Wood Thrush, 2; White-eyed Vireo, 2; Pileated Woodpecker, 1; Acadian Flycatcher, 1; Blue Jay, 1; Gray Catbird, 1; Swainson's Warbler, 1; Cardinal, 1; Red-shouldered Hawk, +; E. Wood Pewee, +; Carolina Wren, +; Rufous-sided Towhee, +. **Total:** 23 species; 80 territorial males or females (1256/km<sup>2</sup>, 508/100 acres). **Visitors:** Yellow-billed Cuckoo, Downy Woodpecker, Com. Crow, White-breasted Nuthatch, Am. Redstart, N. Parula, Yellow-rumped Warbler, Black-throated Green Warbler, Scarlet Tanager

**Remarks:** Nests found: Pileated Woodpecker, Prothonotary Warbler, Hooded Warbler, and Worm-eating Warbler. The breeding season coincided with an outbreak of forest tent caterpillars (peak in the first of May). The dense understory seemed to support a high density of low nesting warblers while the availability of small cavities might have supported the Prothonotary population in the decaying cedar. The majority of territories were located nearer the edge of the stand than the center. Bobwhite were heard

calling from the surrounding habitat.—*KAREN TERWILLIGER, 1616 Ward Tr., Portsmouth, Va. 23704.*

**79. ATLANTIC WHITE CEDAR STAND.**—**Location:** North Carolina, Camden Co., N.C. State Park land, 300 yd E of Forest line Rd., 0.5 mi S of intersection with Corapeake Rd., Town of Corapeake. 36°31'43"N, 76°27'30"W; Lake Drummond, Va.—N.C., USGS. **Continuity:** New. **Size:** 7 ha = 17.5 acres (330 x 250 yds, surveyed). **Description of Plot:** A large, 70-yr old Atlantic White Cedar stand. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 10 0.1 acre circular samples, 834/acre; total basal area 311 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Atlantic White Cedar (*Chamaecyparis thyoides*), 813, 97, 98.6, 100; Red Maple (*Acer rubrum*), 10, 1, 0.5, 60; Black Gum (*Nyssa sylvatica*), 6, 1, 0.7, 60; Red Bay (*Persea borbonia*), 5, 1, 0.2, 40. Trees by diameter size class: A (3-6 in.) 171, 20, 17.1, 5.5; B (6-9 in.), 476, 57, 144.6, 46.5; C (9-15 in.), 187, 22, 149.6, 48. Shrub stems/acre 15,860; ground cover 69.5%; canopy cover 81.5%; average canopy height 60.5 ft (range 60-62.5). **Edge:** Surrounded on all sides by contiguous cedar stand. The W side was 300 yds from a road. **Topography:** Flat, hummocky area, elevation 20 ft. **Weather:** Warm with mostly sunny, dry days. Several light rains occurred during the period. **Coverage:** Mar. 31; Apr. 8, 14-15, 21, 24, 29; May 1, 7, 13, 19, 28, 30; June 4, 13, 18. Total hours: 64. **Census:** Prairie Warbler, 19 (268, 108); Com. Yellowthroat, 19; Hooded Warbler, 12 (169, 68); Ovenbird, 11 (155, 63); Wood Thrush, 5 (70, 29); Worm-eating Warbler, 5; Carolina Chickadee, 4 (56, 23); Prothonotary Warbler, 4; Rufous-sided Towhee, 4; Great Crested Flycatcher, 3 (42, 17); Gray Catbird, 3, Blue Jay, 2, Tufted Titmouse, 2; Com. Flicker, 1; Carolina Wren, 1; Mourning Dove, +; Pileated Woodpecker, +. **Total:** 17 species; 95 territorial males or females (1369/km<sup>2</sup>, 554/100 acres). **Visitors:** Red-shouldered Hawk, Yellow-billed Cuckoo, Downy Woodpecker, Acadian Flycatcher, Com. Crow, Red-eyed Vireo, Yellow-rumped Warbler, Com. Grackle. **Remarks:** Nests found (3): Com. Flicker, Wood Thrush, and Com. Yellowthroat. The dense understory supported a heavy warbler population and made it difficult to find nests. Bobwhite were heard calling from the perimeter of the stand, along the roadside. An old ditch created a small, linear opening where a pair of catbirds and Wood Thrushes localized their activity.—*KAREN TERWILLIGER, 1616 Ward Tr., Portsmouth, Va. 23704.*

**80. MATURE LONGLEAF PINE FOREST.**—**Location:** Georgia; Thomas Co., Arcadia Plantation, 4 mi SE of the junction of Routes 319 and 212; 30°45'N, 84°00'W, Pine Park and Thomasville Quadrangles, USGS. **Continuity:** New. A BBC was conducted in 1979 over a larger area at this location (AB 34:61). **Size:** 20 ha = 49.4 acres. **Description of Plot:** See AB 34:29-30 (1980). The plot for the present BBC does not include the titi stringer of last year's study. A quantitative survey of the vegetation gave: Trees 3-in. in diameter and over based on 30

0 1-acre circular samples, 58 3/acre, total basal area 49.3 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Longleaf Pine (*Pinus palustris*), 58.3, 100, 100, 83. Additional tree species were: Turkey Oak (*Quercus laevis*), Bluejack Oak (*Q. incana*), and Sand Post Oak (*Q. margarettae*). Trees by diameter class: A (3-6 in.) 23, 39, 2.3, 5; B (6-9 in.) 10, 17, 3, 6; C (9-15 in.) 9.3, 16, 7.5, 15; D (15-21 in.) 11, 19, 19.8, 40; E (21-27 in.) 4.3, 7, 13.4, 27; F (27-33 in.) 0.7, 1, 3.3, 7. Shrub stems/acre 183; ground cover 100%; canopy cover 25%; average canopy height 82 ft (range 29-115). **Edge:** Similar habitat on all sides. **Topography:** Slightly rolling. **Elevation:** 210-240 ft. **Weather:** Mostly fair; 40-78°F. **Coverage:** Apr. 10, 15, 22, 28; May 11-12, 19, 25. Total hours: 24.5. **Census:** Rufous-sided Towhee, 11 (55, 22); Bachman's Sparrow, 8 (40, 16); Pine Warbler, 6.5 (33, 13); Indigo Bunting, 6.5; E. Wood Pewee, 4.5 (23, 9); Brown-headed Nuthatch, 4.5; Com. Yellowthroat, 4.5; Great Crested Flycatcher, 4 (20, 8); Brown-headed Cowbird, 4; Red-bellied Woodpecker, 3.5 (18, 7); Red-headed Woodpecker, 3.5; Blue Grosbeak, 3.5; Mourning Dove, 3 (15, 6); E. Meadowlark, 3; Bobwhite, 2.5; White-breasted Nuthatch, 2.5; Carolina Wren, 2.5; Yellow-breasted Chat, 2.5; Wood Duck, 2; Blue Jay, 2; E. Bluebird, 2; Com. Flicker, 1.5; Red-cockaded Woodpecker, 1.5; Summer Tanager, 1.5; Hairy Woodpecker, 1; Tufted Titmouse, 1; Brown Thrasher, 1; Orchard Oriole, 1; Pileated Woodpecker, +; Downy Woodpecker, +; E. Kingbird, +; Loggerhead Shrike, +; Yellow-throated Vireo, +. **Total:** 33 species, 94.5 territorial males (473/km<sup>2</sup>, 191/100 acres). **Visitors:** Turkey Vulture, Red-tailed Hawk, Yellow-billed Cuckoo, Com. Nighthawk, Chimney Swift, Com. Crow, Fish Crow, Com. Grackle, Red-winged Blackbird. **Remarks:** Nests found: Wood Duck, Red-headed Woodpecker, Orchard Oriole, Rufous-sided Towhee. The Red-cockaded Woodpecker is listed in terms of clans, each of which have one breeding pair. Thanks to Patty Blair and Mary Tebo for help with the vegetation sampling, Frances James and Jerry Niemi for advice and support and Tall Timbers Research Station for permission to work on the study site.—*TODD ENGSTROM, Dept. of Biological Sciences, Conradi Building, Florida State Univ., Tallahassee, Fla. 32306.*

**81. LONGLEAF PINE FOREST.**—**Location:** Florida; Leon Co., 5 mi SW of Tallahassee in Timber Compartment 224, Appalachian National Forest; T15, R1W, Sec. 32; 30°20'N, 84°20'W, Lake Munson Quadrangle, USGS. **Continuity:** New. **Size:** 20 ha = 49.4 acres (rectangular, 400 x 500 m measured with 50 m rope and compass). **Description of Plot:** The plot was thinned of Longleaf Pine (*Pinus palustris*) during the winter of 1979-80. Prior to this disturbance, it was reforested following clearcutting in the late 1920s or early 1930s and maintained by regular burning of the understory vegetation. The remaining dominant tree is Longleaf Pine with a few scattered oaks. Most prominent in the sparse understory are Bluejack Oak (*Quercus incana*), Winged Sumac (*Rhus copallina*), and Black Cherry (*Prunus serotina*). The ground cover is mainly Bracken (*Pteridium aquilinum*), Wiregrass (*Aristida stricta*),

and Bluejack Oak. A quantitative survey of the vegetation gave the following results Tree 3 in. in diameter and over, based on twenty 0.1 acre circular samples, 92/acre, total basal area 56 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Longleaf Pine, 68, 74, 89, 100; Bluejack Oak, 19, 21, 7, 75. Trees by diameter size class: (A 3-6 in.) 45, 49, 4.5, 8; B (6-9 in.) 8, 9, 2.4, 4, C (9-15 in.) 19, 21, 15.2, 27; D (15-21 in.) 18, 20, 32.4, 58; E (21-27 in.) 1, 1, 1.6, 3. Shrub stems per acre: 173; ground cover 46%, canopy cover 38%; average canopy height 74 ft (range 53-93). **Edge:** Similar habitat on all sides, the nearest edge being a U.S. Forest Service unpaved road located 75 m from the N edge. **Topography:** Gently rolling terrain on sandy soil. **Elevation:** 65 ft (20 m) **Weather:** Temperatures 50-80°F, the upper 60's and low 70's. Wind speed never exceeded Beaufort 1; most with no wind. No precipitation occurred while censusing. **Coverage:** Apr. 11, 18, 28; May 5, 10, 14, 24, 28, 0625-1015, EDT. Total hours: 23. **Census:** Pine Warbler, 7 (35, 14); Brown-headed Cowbird, 5 (25, 10); Bachman's Sparrow, 4 (20, 8); Great Crested Flycatcher, 2.5; Tufted Titmouse, 2.5; Blue Jay, 2; Brown-headed Nuthatch, 2; Summer Tanager, 2; Bobwhite, 1; Red-bellied Woodpecker, 1; Red-headed Woodpecker, 1; Red-cockaded Woodpecker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Carolina Chickadee, 1; Blue-gray Gnatcatcher, 1; Yellow-throated Vireo, 1; Rufous-sided Towhee, 1. **Total:** 18 species; 37 territorial males (185/km<sup>2</sup>, 75/100 acres) **Visitors:** Sharp-shinned Hawk, Red-shouldered Hawk, Yellow-billed Cuckoo, Barred Owl, Com. Nighthawk, Com. Flicker, Wood Thrush, Palm Warbler, E. Meadowlark, Cardinal, Blue Grosbeak. **Remarks:** Nest found. Tufted Titmouse (1). Although Red-cockaded Woodpeckers were observed frequently enough to be considered territorial, the individuals observed were probably from a clan with a known nest tree approximately 200 m NE of the plot. The plot lies approximately 5 km S of the Tallahassee Municipal Airport and nearly on a direct line with one runway, thus, air traffic activity and ambient noise was often noticeable. Depending on what runway was being used, the air traffic varied from null to an average of five planes passing over during a 3-hour census. It is not clear what impact this activity had on bird species composition or censusing efficiency. Thanks to Bonnie Niemi and Todd Engstrom for help in measuring vegetation, and Frances James for support and advice.—*GERALD J. NIEMI, Dept. of Biological Sciences, Florida State Univ., Tallahassee, Fla. 32306.*

**82. CUTOVER SUBTROPICAL SLASH PINE FOREST.**—**Location:** Florida; Dade Co., Everglades National Park, western Long Pine Key, Pine Block E, about 150 m E of fire ecology long-term plot E6; 25°25'N, 80°41'30"W, Long Pine Key Quadrangle, USGS. **Continuity:** New. **Size:** 20.24 ha = 50 acres (square, 1476 x 1476 ft, measured). **Description of Plot:** Remnant of the cutover subtropical Slash Pine forest which once covered a 50-mile arc from Miami SW along the coastal limestone ridge but now restricted primarily to the Long Pine Key region of Everglades N.P. The overstory, composed

entirely of Slash Pine (*Pinus elliottii* var. *densa*), is still recovering from logging before 1947. The understory is made up mainly of hardwoods and palmetto in a shrubby fire-maintained sub-climax condition. Many of the understory species are of West Indian origin and include Rough-leaf Velvetseed (*Guettarda scabra*), Varnishleaf (*Dodonea viscosa*), Saw Palmetto (*Serenoa repens*), Willow Bustic (*Dipholis salicifolia*), Cabbage Palmetto (*Sabal palmetto*) and *Myrsine guianensis*. Ground cover is composed of Beard Grass (*Andropogon cabanisii*), Snowberry (*Chiococca pinetorum*), *Cassia deeriniana*, *Jacquemontia curtissii* and Diamond Flowers (*Hedyotis nigricans*). Physiognomy of the understory shrub and herbaceous layers varies markedly with the amount of time post-fire. Since the early 1950s, Pine Block E has burned in January 1959, April 1969, and January 1975. The Miami oolite limestone substrate is exposed at the surface or covered with one to several inches of decomposed organic material. Numerous solution holes, generally less than 1 m<sup>2</sup>, hold water from late spring to early winter but otherwise are mostly dry. Larger solution holes provide microhabitats suitable to plants such as Coastalplain Willow (*Salix caroliniana*) and Sawgrass (*Cladium jamaicensis*). A quantitative survey of the vegetation gave the following results: Slash Pines, 6-ft height and over, based on eight 0.1 acre rectangular plots, 288/acre; total basal area 543.8 ft<sup>2</sup>/acre. Pine trees by diameter size-class: S (0-3 in.) 24, 8, 9.8, 2; A (3-6 in.) 179, 62, 245, 3, 45; B (6-9 in.) 80, 28, 258.0, 47; C (9-12 in.) 5, 2, 30.7, 6. Understory hardwoods and shrubs, 3904 stems/acre. Same by height class (figures after each class show number of stems/acre, relative density (%), number of species comprising height class): A (3-5 ft) 3045, 78, 33; B (5-10 ft) 769, 20, 23; C (> than 10 ft) 89, 2, 9. Average tree canopy height 27 ft. Edge: Similar habitat on all sides. Topography: Flat. Elevation: 1 to 2 m. Weather: Five of the 11 days were clear; mean cloud presence 31%, range 0-100%; wind speed less than about 2 km/h for all trips, appreciable dew was present on ground cover and understory foliage for 7 trips and on neither for the remaining 4; no precipitation occurred. Coverage: Apr. 11, 14-18, 21-22, 24; May 22, 25; generally 0600-0930, EST Total hours: 38. Census: Pine Warbler, 7 (35, 14); Red-bellied Woodpecker, 5 (25, 10), Downy Woodpecker, 2; Blue Jay, 2; Carolina Wren, 0.5; White-eyed Vireo, 0.5; Bobwhite, +; Chuck-will's-widow, +; Com. Nighthawk, +; Pileated Woodpecker, +; Great Crested Flycatcher, +; Cardinal, +; Rufous-sided Towhee, +. Total: 13 species; 17 territorial males (84/km<sup>2</sup>, 34/100 acres). Visitors: Red-tailed Hawk, Swallow-tailed Kite, Com. Flicker. Remarks: Nests found: Red-bellied Woodpecker, 1; Downy Woodpecker, 2; Chuck-will's-widow, 1; Com. Nighthawk, 1; Blue Jay, 1.—KENNETH VERNICK and DALE L. TAYLOR, National Park Service, South Florida Research Center, Homestead, Fla. 33030.

### 83. VIRGIN SUBTROPICAL SLASH PINE FOREST.—Location: Florida; Collier Co., Big Cypress National Preserve, Sec. 32-34, T51S, R34E, 25°28'N, 81°55'W, N of

Fifty-mile Bend Quadrangle, USGS Continuity: New. Size: 16.6 ha = 41 acres (7 transects totaling 3400 m, 160' strip; measured with compass and tape). Description of Plot: Seven adjoining pine islands located within a pine forest habitat characterized by a mosaic pattern of interspersed cypress domes and cypress prairies. Quantitative analysis of the pine forest, based on four 0.06 ha rectangular plots, yielded: for trees 2.54 cm dbh and greater, 437 trees/ha. Species comprising 100% of the total number of trees: Slash Pine (*Pinus elliottii* var. *densa*) 404, 92, 97, 90; Pond Cypress (*Taxodium ascendens*) 33, 76, 32, 10. Canopy cover was estimated at 35%, mean canopy height 12.5 m (range 4-21 m). Shrubs covered 22% of the ground area; mean height 1.5 m. Dominant species (followed by importance value) were *Serenoa repens* (106) and *Sabal palmetto* (63). Understory species covered 80% of the ground area; mean height 50 cm. Major species were *Schizachyrium rhizomatum*, *Dichanthelium dichotomum*, and *Andropogon* sp. Edge: Similar habitat on all sides. Topography: Flat. Elevation: 3-4 m. Weather: Sky cover: mean 2/10, range 1/10 - 9/10 (fraction-cloud cover). Wind: Calm to light breezes. Temperature 60-75°F. Precipitation: None during visits (9.9 cm recorded for the census period at Oasis Ranger Station located within the Preserve). Coverage: Apr. 11, 18, 20, 25, 29; May 2, 5-6, 8-9; 0530-0800, EST. Total hours: 19. Census: Great Crested Flycatcher, 7 (42, 17); Carolina Wren, 7; Pine Warbler, 6 (36, 15); Bobwhite, 5 (30, 12); Red-bellied Woodpecker, 5; Cardinal, 5; Rufous-sided Towhee, 5; Brown-headed Nuthatch, 4 (24, 10); Blue-gray Gnatcatcher, 4; Downy Woodpecker, 3 (18, 7); Red-shouldered Hawk, 2; Com. Flicker, 2; Pileated Woodpecker, 2; E. Bluebird, 2; Com. Yellowthroat, 2; Swallow-tailed Kite, +; Hairy Woodpecker, +; Red-cockaded Woodpecker, +; Com. Crow, +; Tufted Titmouse, +; Summer Tanager, +. Total: 21 species; 61 territorial males (368/km<sup>2</sup>, 149/100 acres). Visitors: Double-crested Cormorant, Great Egret, Little Blue Heron, Louisiana Heron, White Ibis, Wood Duck, Mourning Dove, Barred Owl, Barn Swallow, White-eyed Vireo, E. Meadowlark, Boat-tailed Grackle, Com. Grackle. Remarks: Nests found: Swallow-tailed Kite, Red-shouldered Hawk, Com. Flicker, Red-bellied Woodpecker, Brown-headed Nuthatch, and Cardinal. The pine islands are part of a prescribed burn study. Burns will be conducted during summer, fall, and winter.—WILLIAM R. MAYNARD, DALE L. TAYLOR, and REGINA ROCHEFORT, National Park Service, South Florida Research Center, Homestead, Fla. 33030.

84. JACK PINE FOREST.—Location: Michigan; Houghton Co., SW 1/4, Sec. 1, T48N, R37W; 46°35'N, 88°55'W. Continuity: New. Size: 14.3 ha = 35.3 acres. Description of Plot: Area cut in 1935. Nearly continuous Jack Pine (*Pinus banksiana*) canopy with scattered Red Oak (*Quercus rubra*) and Red Maple (*Acer rubrum*). The understory consisted of saplings of the canopy trees with scattered saplings of *Populus grandidentata*, *P. tremuloides*, and a few Red Pine (*Pinus resinosa*). Bracken (*Pteridium aquilinum*) covered 75% of the ground. Edge: Bordered on W by paved road; S and SE by similar

habitat, E by open birch woods, N by clear-cut with scattered pines. Topography: Essentially level, with a gully on SW corner. Elevation: 1400 ft. Weather: Generally clear to partly cloudy. No precipitation on census days. Mild. Coverage: May 31; June 2, 12, 14, 17, 26, 28; 0530-1200. Total hours: 18. Census: Ovenbird, 8 (56, 23); Blackburnian Warbler, 2.5; Least Flycatcher, 2; Chipping Sparrow, 2; Black-capped Chickadee, 1; Red-breasted Nuthatch, 1; Red-eyed Vireo, 1; Nashville Warbler, 1; Yellow-rumped Warbler, 1; Dark-eyed Junco, 1; E. Wood Pewee, 0.5; Hermit Thrush, 0.5; Brown-headed Cowbird, 0.5; Hairy Woodpecker, +; Am. Robin, +; Veery, +; Am. Redstart, +; Scarlet Tanager, +; Rose-breasted Grosbeak, +; Purple Finch, +. Total: 20 species, 22 territorial males (154/km<sup>2</sup>, 62/100 acres).—DON RAKSTAD and JOHN R PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, Minn. 55108.

85. JACK PINE - BLACK SPRUCE FOREST.—Location: Michigan; Schoolcraft Co., 7 mi E of Shingleton, 1.0 mi S of M-28, 46°19'55"N, 86°18'25"W, Shingleton Quadrangle, USGS. Continuity: New. Size: 17.5 ha = 43.24 acres (250 x 700 m, with 25 m grid; staff compass and 50 m measuring tape). Description of Plot: The dominant canopy trees are Jack Pine (*Pinus banksiana*) and Black Spruce (*Picea mariana*) approximately 55 years old. A narrow grass/shrub opening bordered by Quaking Aspen (*Populus tremuloides*) extends for most of the length of the plot in the E half. Wild Raisin (*Viburnum cassinoides*), Black Chokeberry (*Aronia melanocarpa*), and young Black Spruce are the most common understory species. The ground cover consists primarily of *Sphagnum*, Bunchberry (*Cornus canadensis*), False Lily-of-the-Valley (*Maianthemum canadense*), and blueberry (*Vaccinium* spp.) interspersed with small patches of Leatherleaf (*Chamaedaphne calyculata*) and Labrador Tea (*Ledum groenlandicum*). A quantitative survey of the vegetation gave the following results: Trees 3 cm diameter and over, based on 80 0.1-acre circular samples, 538/acre; total basal area 101.9 ft<sup>2</sup>/acre. Species comprising 98% of the total number of trees: Jack Pine, 232, 43, 69, 100, Black Spruce, 173, 32, 19, 91; dead trees, 123, 23, 11, 96. Trees by diameter size class: S (3-8 cm) 132, 24, 3.4, 3; A (8-15 cm) 219, 41, 21.9, 21; B (15-23 cm) 145, 27, 43.6, 43; C (23-38 cm) 41, 8, 32.6, 32; D (38-53 cm) 1, 0.2, 0.4, 0.4. Shrub stems/acre 1534; ground cover 84%; canopy cover 42%; average canopy height 14.2 m; range 8-20.5 m. Edge: Surrounded by similar forest. A seldom-used dirt road parallels the W edge at a distance of 50 m. Small logged areas which have regenerated in young Jack Pine are located near the E and S edges. Topography: Essentially flat Elevation: 787 ft. Weather: Somewhat colder than normal in mid-June. Sub-freezing temperatures (low 27°F) were recorded on a number of mornings during this period. Rainfall far below normal, with severe drought conditions in spring and early June. Coverage: June 4-5, 8, 10-12, 14-16, 22-25, 29; July 2; 0520-1000 and (once) 2050-2200. Total hours: 82. Census: Golden-crowned Kinglet, 7 (40, 16); Nashville Warbler, 6.5

(37, 15), Ovenbird, 6 (34, 14) White-throated Sparrow, 6; Yellow-rumped Warbler, 3 (17, 7); Dark-eyed Junco, 3; Hermit Thrush, 2.5; Chipping Sparrow, 2; Yellow-bellied Flycatcher, 1; Boreal Chickadee, 1; Red-breasted Nuthatch, 1; Brown Creeper, 1; Solitary Vireo, 1; Com. Yellowthroat, 1; Lincoln's Sparrow, 1; Sharp-shinned Hawk, +; Broad-winged Hawk, +; Spruce Grouse, +; Hairy Woodpecker, +; Ruby-crowned Kinglet, +; Magnolia Warbler, +. **Total:** 21 species; 43 territories (246/km<sup>2</sup>, 99/100 acres). **Visitors:** Black-billed Cuckoo, Blue Jay, Gray Jay, Black-capped Chickadee, Winter Wren, Cedar Waxwing, Cape May Warbler, Black-throated Green Warbler, Chestnut-sided Warbler, Evening Grosbeak, Purple Finch. **Remarks:** Nests found (2): White-throated Sparrow and Boreal Chickadee. Populations of black flies and mosquitoes were significantly lower than normal in June, probably because of drought conditions.—DEANNA DAWSON and MARIANNE WALCH, Migratory Bird and Habitat Research Laboratory, U.S. Fish and Wildlife Service, Laurel, Md. 20811.

**86. MAPLE - BIRCH FOREST - 5 YEAR CLEAR-CUT.**—**Location:** Nova Scotia, Kings Co., 44°50'N, 64°44'W. **Continuity:** New. **Size:** 10.9 ha = 26.9 acres. **Description of Plot:** A hardwood forest from which the original stand [(White Birch (*Betula papyrifera*), 190/acre; Red Maple (*Acer rubrum*), 167; Sugar Maple (*A. saccharum*), 107; Yellow Birch (*Betula alleghaniensis*), 82; Am. Beech (*Fagus grandifolia*), 20; White Ash (*Fraxinus americana*), 11; dead trees, 88; total density 685/acre; total basal area 113 ft<sup>2</sup>/acre)] was clearcut in 1975, leaving almost no mature trees standing. The generally shrub-dominated habitat has 67% closure between 0 and 1 m, 41% between 1 and 2 m, 27% between 2 and 3 m, and 16% between 3 and 4 m. The shrub layer is dominated by stump sprouts of Red Maple, White Birch, Sugar Maple, and White Ash, and by sprouts or seedlings of Quaking Aspen (*Populus tremuloides*), Speckled Alder (*Alnus rugosa*), Witherod (*Viburnum cassinoides*), and Pin Cherry (*Prunus pensylvanica*) totalling 12,000 stems/acre. The ground cover is primarily Wood Fern (*Dryopteris spinulosa*), Hay-scented Fern (*Dennstaedtia punctilobula*), Bracken (*Pteridium aquilinum*), Wild Raspberry and Wild Blackberry (*Rubus strigosus*, *R. hispida*, *R. allegheniensis*), and Blueberry (*Vaccinium angustifolium*), with a combined ground cover of 130%. **Edge:** Bordered on all sides by a buffer strip of similar habitat, at least 30 m wide. **Topography:** Essentially flat. **Elevation:** 600 ft. **Weather:** Hot and dry over most of the census period. **Coverage:** May 29-July 9; between dawn and 1130 or 1900 and 2150. Total hours: 44. **Census:** Com. Yellowthroat, 15.5 (142, 58); White-throated Sparrow, 13.5 (124, 50); Chestnut-sided Warbler, 12 (110, 45); Song Sparrow, 6 (55, 22); Dark-eyed Junco, 5.5 (51, 20); Mourning Warbler, 3 (28, 11); Ruby-throated Hummingbird, 2.5; Com. Snipe, 1; Alder Flycatcher, 1; Solitary Vireo, 1; Rusty Blackbird, 1; Tree Swallow, 0.5; Am. Robin, 0.5; Red-tailed Hawk, +; Ruffed Grouse, +; Com. Nighthawk, +; Com. Flicker, +; Yellow-bellied Sapsucker, +; Black-capped Chickadee, +; Gray Cat-

bird, +, Am Redstart, + **Total:** 21 species, 63 territorial males (578/km<sup>2</sup>, 234/100 acres). **Visitors:** Hairy Woodpecker, Least Flycatcher, E. Wood Pewee, Olive-sided Flycatcher, Blue Jay, Hermit Thrush, Veery, Red-eyed Vireo, Black-and-white Warbler, N. Parula, Magnolia Warbler, Yellow-rumped Warbler, Ovenbird, Rose-breasted Grosbeak, Purple Finch. **Remarks:** This work was funded by the Canadian National Sportsmen's Fund and the Natural Sciences and Engineering Research Council of Canada, and is part of a larger study of the impacts of forestry operations on populations of breeding birds and small mammals.—B. FREEDMAN, C. BEAUCHAMP, I.A. McLAREN, and S. TINGLEY, Dept. of Biology, Dalhousie Univ., Halifax, Nova Scotia, B3H 4J1.

**87. ABANDONED PASTURE - YOUNG MIXED FOREST.**—**Location:** New York; St. Lawrence Co., 0.25 mi E of Howardsville Rd., 0.25 mi SW of Rte 68; 44°33'N, 75°03'W, Pierrepont Quadrangle, USGS. **Continuity:** Established 1976; 4 intermittent years. **Size:** 4.4 ha = 10.8 acres. **Description of Plot:** See AB 32:74 (1978). **Weather:** Slightly warmer and considerably drier than usual. Mean temp.: May 4.6°C, June 13.4°; mean max temp.: May 17.7°, June 25.8°; rain: May 2.89 in. (7.34 cm), June 2.36 in. (6.07 cm). **Coverage:** May 17, 20, 23-24; June 3, 5-6, 18, 26-27; 0445-2100, EST. Total hours: 11. **Census:** Nashville Warbler, 3 (69, 28); Am. Robin, 2.5; Rufous-sided Towhee, 2.5; Black-and-white Warbler, 2; Rose-breasted Grosbeak, 2; White-throated Sparrow, 2; Black-capped Chickadee, 1.5; Veery, 1.5; Golden-winged Warbler, 1.5; Field Sparrow, 1.5; Ruffed Grouse, 1; Whip-poor-will, 1; Blue Jay, 1; Gray Catbird, 1; Wood Thrush, 1; Com. Yellowthroat, 1; N. Oriole, 1; Chipping Sparrow, 1; Com. Flicker, 0.5; Red-eyed Vireo, 0.5; Chestnut-sided Warbler, 0.5; Song Sparrow, 0.5; Downy Woodpecker, +; Com. Grackle, +. **Total:** 24 species; 30 territorial males (686/km<sup>2</sup>, 278/100 acres). **Visitors:** Black-billed Cuckoo, Great Crested Flycatcher, White-breasted Nuthatch, Cedar Waxwing, Yellow Warbler, Indigo Bunting, Am. Goldfinch. **Remarks:** Alder Flycatcher and Swamp Sparrow nest in adjoining habitat. Nests were found for robin, Wood Thrush and White-throated Sparrow; parents with young were observed for Ruffed Grouse and Rose-breasted Grosbeak. Marnie Reed Crowell and Thomas L. Crowell assisted.—KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, N.Y. 13617.

**88. MATURE UPLAND FOREST AND SHRUB SWAMP.**—**Location:** Connecticut; Fairfield Co., Greenwich. Approximately 6 mi N of Merritt Parkway; 41°06'45"N, 73°38'00"W; Glenville Quadrangle, USGS. **Continuity:** New. **Size:** 12.61 ha = 31.15 acres (rectangular, surveyed). **Description of Plot:** Approximately 55% mature upland forest, 30% shrub and Phragmites swamp, and 15% Red Maple swamp. The dominant upland canopy trees are: Red Maple (*Acer rubrum*), Yellow Birch (*Betula alleghaniensis*), Black Birch (*B. lenta*), Red Oak (*Quercus rubra*), and Tulip-tree (*Liriodendron tulipifera*). The most common forest shrubs are: Flowering Dogwood (*Cornus florida*),

Catbrier (*Smilax rotundifolia*), blackberry (*Rubus* sp.), and Barberry (*Berberis vulgaris*). The shrub and cat-tail swamp is dominated by Barberry, *Phragmites* sp *Rhododendron viscosum*, Skunk Cabbage (*Symplocarpus foetidus*), tussock sedge (*Carex* sp.) and Silky Dogwood (*C. amomum*). The Red Maple swamp is dominated by an overstory of Red Maple and Yellow Birch with an understory of Skunk Cabbage, Sweet Pepperbrush (*Clethra alnifolia*), Highbush Blueberry (*Vaccinium corymbosum*), Com. Spicebush (*Lindera benzoin*), and Swamp Azalea (*Rhododendron* sp.). An analysis of the vegetation revealed the following: Trees 4 cm dbh and over based on five 1/10 acre rectangular samples, 232 trees per acre, total basal area 135.9 ft<sup>2</sup> per acre. Species comprising a majority of the total number of trees: Red Maple, 76, 33, 8.84, 100; Black Birch, 44, 19, 2, 80; Yellow Birch, 40, 17, 1.63, 60; Tulip-tree, 16, 7, 1.14, 80; dead trees, 14, 6, 0.42, 100; Red Oak, 12, 5, 0.51, 60; White Ash (*Fraxinus americana*), 12, 5, 0.27, 20, Flowering Dogwood, 6, 3, 0.004, 20; Am. Beech (*Fagus grandifolia*), 12, 3, 0.03, 60, White Oak (*Q. alba*), 2, 1, 0.07, 20; Pignut Hickory (*Carya glabra*), 2, 1, 0.004, 20, Black Oak (*Q. velutina*), 2, 1, 0.05, 20 Ground cover somewhat light because of heavy deer browsing, canopy cover light from gypsy moth caterpillar invasion; average canopy height upland areas 26.5m, average canopy height Red Maple swamp 18m. **Edge:** Similar undeveloped forest and swampland continues for more than a mile N, W and S A large 150+ acre reservoir is 0.75 mi S Eastern edge parallels North St. with low density residential housing. **Topography:** Upland areas are hilly with exposed bedrock common. Slopes are moderate, up to 17% and generally facing E and W. Swamplands are flat with watercourse entering from the N and flowing S. **Weather:** Somewhat dry **Coverage:** May 3, 14, 31; June 7, 11, 22; July 1, 12; between dawn and 1000 hrs. One night visit for owls. Total hours: 20. **Census:** Rufous-sided Towhee, 8 (63, 26); Ovenbird, 5 (40, 16); Yellow Warbler, 4 (32, 13), Red-winged Blackbird, 4; Black-and-white Warbler, 3.5 (28, 11); Downy Woodpecker, 3 (24, 10); Gray Catbird, 3; Wood Thrush, 3, Com. Yellowthroat, 3; Great Crested Flycatcher, 3; Blue Jay, 2; Black-capped Chickadee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Veery, 2; Rose-breasted Grosbeak, 2; Song Sparrow, 2, E Wood Pewee, 1.5; Yellow-billed Cuckoo, 1, Com. Flicker, 1; Am. Robin, 1; Louisiana Waterthrush, 1; Hooded Warbler, 1, N Oriole, 1; Cardinal, 1; Pileated Woodpecker, +; Red-bellied Woodpecker, +, E Kingbird, +; Acadian Flycatcher, +; Com. Crow, +; Com. Grackle, +; Brown-headed Cowbird, +; Scarlet Tanager, +. **Total:** 33 species; 60 territorial males (476/km<sup>2</sup>, 193/100 acres). **Visitors:** Brown Creeper, Kentucky Warbler. **Remarks:** Vegetation analysis extrapolated from a botanical survey of the area conducted by Virginia Burkhardt and Regina Rochefort. The plot is within a 297-acre municipal parkland. This study was made possible with contributions from the Greenwich Audubon Society and the Greenwich Conservation Commission.—THOMAS R. BAPTIST, 41 Westview Place, Riverside, Conn. 06878.

**89 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, 13 consecutive years. **Size:** 14.17 ha = 35 acres. **Description of Plot:** See AFN 22 714-715 (1968). **Coverage:** May 29; June 4, 11, 17, 25; 0800-1300, EDT. Total hours: 11. **Census:** Ovenbird, 3 (21, 9); Blue Jay, 2; Black-capped Chickadee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; House Wren, 2; Gray Catbird, 2; Am. Robin, 2; Wood Thrush, 2; Veery, 2; Cardinal, 2; Rose-breasted Grosbeak, 2; Rufous-sided Towhee, 2; Mourning Dove, 1; Chimney Swift, 1; Com. Flicker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; E. Phoebe, 1; E. Wood Pewee, 1; Brown Thrasher, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Blue-winged Warbler, 1; Com. Yellowthroat, 1; Com. Grackle, 1; Scarlet Tanager, 1; Indigo Bunting, 1; Field Sparrow, 1; Song Sparrow, 1; Ruffed Grouse, +; Yellow-billed Cuckoo, +; Hermit Thrush, +; Starling, +; Prairie Warbler, +; Canada Warbler, +; Brown-headed Cowbird, +; N. Oriole, +. **Total:** 39 species; 45 territorial males (318/km<sup>2</sup>, 129/100 acres). **Visitors:** Red-tailed Hawk, Black-billed Cuckoo, Tree Swallow, Com. Crow, House Finch, Am. Goldfinch. **Remarks:** A total of 39 species was seen including the Hermit Thrush, and the territorial males were up by ten.—*LEON L. BARKMAN and POLLY BRODY, Western Connecticut Bird Club, P.O. Box 542, Woodbury, Conn. 06798.*

**90. UPLAND BRUSHY PASTURE.**—**Location:** Connecticut; Litchfield Co., White Memorial Foundation, Litchfield; 41°42'N, 73°13'28"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965; 14 intermittent years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AFN 19:609-610 (1965). **Coverage:** May 6; June 1, 4-5, 12. Total hours: 15. **Census:** Gray Catbird, 22 (259, 105); Blue-winged Warbler, 10 (118, 48); Com. Yellowthroat, 8 (94, 38); Red-eyed Vireo, 6 (71, 29); Nashville Warbler, 6; Rufous-sided Towhee, 6; Cedar Waxwing, 4 (47, 19); Am. Goldfinch, 4; Black-and-white Warbler, 3 (35, 14); Ruffed Grouse, 2; Am. Woodcock, 2; Blue Jay, 2; Black-capped Chickadee, 2; Chestnut-sided Warbler, 2; Brown-headed Cowbird, 2; Field Sparrow, 2; Am. Robin, 1.5; Ovenbird, 1.5; Cardinal, 1.5; Turkey, 1; Black-billed Cuckoo, 1; E. Phoebe, 1; Brown Thrasher, 1; Wood Thrush, 1; Veery, 1; Golden-winged Warbler, 1; Yellow Warbler, 1; Am. Redstart, 1; Rose-breasted Grosbeak, 1; Com. Flicker, 0.5; House Wren, 0.5; Song Sparrow, 0.5; Broad-winged Hawk, +; Ring-necked Pheasant, +; Great Horned Owl, +; Barred Owl, +; Great Crested Flycatcher, +; E. Wood Pewee, +; Com. Crow, +; Tufted Titmouse, +. **Total:** 40 species; 99 territorial males (1164/km<sup>2</sup>, 471/100 acres). **Remarks:** Growth of vegetation is significant every year. Gray Catbird gained by 5. Total number of territorial males declined by 3.5 Turkey was new. Thanks to Jim Cavanaugh.—*ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.*

**91. DECIDUOUS FOREST WITH POND AND BROOK.**—**Location:** New Jersey, Bergen Co.; Mahwah; Campgaw Mountain Reservation. **Continuity:** Established 1964; 17 consecutive years. **Size:** Approximately 16.2 ha = 40 acres. **Description of Plot:** See AFN 19:623-624 (1965). **Coverage:** May 20, 22, 27, 29; June 3, 5, 10, 12, 17; 0530-0700. Total hours: 12. **Census:** Veery, 4 (25, 10); Starling, 4; Tufted Titmouse, 3 (19, 8); Gray Catbird, 3; Wood Thrush, 3; Yellow-billed Cuckoo, 2; Com. Flicker, 2; Tree Swallow, 2; Blue Jay, 2; Black-capped Chickadee, 2; Red-eyed Vireo, 2; Ovenbird, 2; Louisiana Waterthrush, 2; Cardinal, 2; Red-bellied Woodpecker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; E. Wood Pewee, 1; White-breasted Nuthatch, 1; Am. Robin, 1; Chestnut-sided Warbler, 1; Com. Yellowthroat, 1; Red-winged Blackbird, 1; N. Oriole, 1; Com. Grackle, 1; Scarlet Tanager, 1; Indigo Bunting, 1; Song Sparrow, 1. **Total:** 28 species; 49 territorial males (303/km<sup>2</sup>, 123/100 acres).—*J. and N. BRISTOW, L. GRIGGS, M. LANCHANTIN, J. MOFFAT, K. SJOLANDER, T. SUDNIK, J. WORRALL and J. BROTHERTON (compiler), Fyke Nature Assoc., 249 E. Crescent Ave., Mahwah, N.J. 07430.*

**92. OLD FIELD HABITAT.**—**Location:** New Jersey; Morris Co., Great Swamp N.W.R. 1 mi E of Basking Ridge. **Continuity:** New. **Size:** 7.3 ha = 1.81 acres (rectangular, 750 x 1050 ft, surveyed by tape and compass). **Description of Plot:** Old field habitat consisting of various shrubs and herbs with scattered Red Cedars (*Juniperus virginiana*). A total of 6 sample plots 0.01 acre in size were used to determine species, frequency and relative density of shrubs. The numbers following each species indicate the number of stems per acre, relative density and frequency in that order. Dogwoods (*Cornus spp.*), 19,489, 76.9, 100; blackberry (*Rubus spp.*), 4175, 16.9, 83; Arrowwood (*Viburnum recognitum*), 1086, 3.9, 67; Pin Oak (*Quercus palustris*), 267, 1, 83; Swamp Rose (*Rosa palustris*), 200, 0.7, 67; Red Maple (*Acer rubrum*), 67, 0.2, 17; hawthorn (*Crataegus spp.*), 50, 0.2, 33; Choke Cherry (*Prunus virginiana*), 17, 0.1, 16.7; blueberry (*Vaccinium*), 17, 0.1, 17. Total 25,367 stems per acre. Five sample plots, each 1 meter square were used to determine species and frequency of ground cover. Grasses, 100; goldenrods (*Solidago spp.*), 100; mosses, 60; Steeplebush, *Spiraea spp.* 60; Dogbane (*Apocynum spp.*) 20; Beardtongue, (*Pentstemon spp.*) 20; Tearthumb (*Polygonum spp.*) 20. **Edge:** bounded on N side by a woodlot, on W side by a marsh and on remaining sides by similar habitat. **Topography:** Flat; elevation 228-232 ft. **Coverage:** May 20, 23, 27, 29; June 5, 12-14; 0530-0800. Total: 13.5 hours. **Census:** Yellow Warbler, 15 (205, 83); Song Sparrow, 13 (177, 72); Com. Yellowthroat, 12 (164, 66); Swamp Sparrow, 4.5 (61, 25); Willow Flycatcher, 4 (55, 22); Gray Catbird, 4; Yellow-breasted Chat, 1; Red-winged Blackbird, 1; Rufous-sided Towhee, 1. **Total:** 9 species; 55.5 territorial males (757/km<sup>2</sup>, 307/100 acres).—*JOANNE LASKOWSKI, Great Swamp N.W.R., USDI, Fish and Wildlife Service, R.D.#1, Box 148, Basking Ridge, N.J. 07920.*

**93. BRUSHY FIELD AND WOODED EDGE.**—**Location:** Pennsylvania, Cumberland Co., 1 mi NE of Carlisle, 0.3 mi NNW of US Rte. 11, off Cavalry Road on National Guard property; 40°12'N, 77°10'W, Carlisle Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 7.54 ha = 18.62 acres. **Description of Plot:** See AB 33:74 (1979). **Weather:** Slightly drier than usual; normal temperatures. **Coverage:** May 24, 28; June 9, 12, 15, 25; July 1, 6, 14, 0530-0830. Total hours: 13.6 **Census:** Gray Catbird, 8.5 (116, 47); Song Sparrow, 7 (96, 39); Am. Robin, 4 (55, 22); Com. Yellowthroat, 4; Field Sparrow, 3 (41, 17); Cardinal, 2.5; Willow Flycatcher, 2; House Wren, 2; Wood Thrush, 2; Starling, 2; Yellow Warbler, 2; Yellow-billed Cuckoo, 1; Com. Flicker, 1; Blue Jay, 1; Brown Thrasher, 1; Yellow-breasted Chat, 1; Brown-headed Cowbird, 1; N. Oriole, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Downy Woodpecker, 0.5; House Finch, 0.5; Com. Crow, +. **Total:** 23 species; 49 territorial males or females (669/km<sup>2</sup>, 271/100 acres). **Visitors:** Mallard, Ring-necked Pheasant, Killdeer, Rock Dove, Mourning Dove, Chimney Swift, Great Crested Flycatcher, Barn Swallow, Carolina Wren, Mockingbird, Cedar Waxwing, E Meadowlark, Red-winged Blackbird, Com. Grackle. **Remarks:** Nests found: Com. Flicker, 1; House Wren, 1. Fledglings seen with adults: Brown Thrasher, Am. Robin, Wood Thrush, N. Oriole, Cardinal, Field Sparrow, Song Sparrow.—*BRIAN F. ROLLFINKE, 1013 Harriet St., Carlisle, Pa. 17013*

**94. MIXED UPLAND HABITAT.**—**Location:** Pennsylvania; Montgomery Co., St Charles Seminary, 0.4 mi SW of Philadelphia city limits on US 30; 40° 00'N, 75°15'W, Lansdowne Quadrangle, USGS. **Continuity:** Established 1977; 4 consecutive years. **Size:** 7.77 ha = 19.2 acres. **Description of Plot:** See AB 32:74-75 (1978). The area cleared in 1978 is now completely colonized with grasses and a succession of herbaceous plants. **Weather:** Normal temperatures (52-90°F) and precipitation. **Coverage:** Apr 3, 6, 12, 20, 26; May 1, 4, 10, 17, 23-29; June 1, 3-4, 11, 15, 17, 19, 22, 28; July 2, 6; Aug 8; 28 trips, mostly 0800-1130, occasionally 1500-2000. Total hours: 26.3 **Census:** Gray Catbird, 16 (206, 83); Am. Robin, 11 (142, 57); Cardinal, 11; Song Sparrow, 9 (116, 47); Com. Yellowthroat, 7 (90, 36); Ring-necked Pheasant, 5 (64, 26); Wood Thrush, 5, Rufous-sided Towhee, 5; Red-eyed Vireo, 4 (51, 21); Red-winged Blackbird, 4; Mourning Dove, 3 (39, 16); Mockingbird, 3; Com. Grackle, 3; House Finch, 3; Mallard, 2; Com. Flicker, 2; Blue Jay, 2; House Wren, 2; Am. Goldfinch, 2; Downy Woodpecker, 1; E. Wood Pewee, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Starling, 1; White-eyed Vireo, 1; Am. Redstart, 1; N. Oriole, 1; Indigo Bunting, 1; Field Sparrow, 1. **Total:** 29 species; 109 territorial males or females (1402/km<sup>2</sup>, 568/100 acres). **Visitors:** Great Blue Heron, Canada Goose, Broad-winged Hawk, Barn Swallow, Com. Crow, House Sparrow. **Remarks:** Nests located: Am. Robin, 2; Com. Flicker, 2; Downy Woodpecker, 1; Starling, 1. Ring-necked Pheasant, Downy Woodpecker, Carolina Chickadee, and Tufted Titmouse were seen with fledglings. The 2-year-old clear-cutting (15% of

total acreage) has had little effect upon the ability of the habitat to support nesting populations. In fact, the census data show that this small degree of woodland clearing may in time increase nesting populations. In the first census year following the clear-cutting, the density of territorial males decreased 10.4%. This year, however, the territorial male density rebounded, making up for last year's drop and even surpassing (by 8.5%) the highest density recorded prior to clear-cutting.—DAVID M. WRIGHT, 527 Rock Glen Dr., Wynnewood, Pa. 19096.

#### 95. OLD FIELD - MEADOW AND PRIMARY DECIDUOUS THICKETS.—

**Location:** Pennsylvania; Butler Co., Buffalo Township, 1 mi S of intersection of State Route 228 and Kepple Road on Todd Sanctuary, 40°44'N, 79°42'W, Freeport Quadrangle, USGS. **Continuity:** Established 1974; 6 intermittent years. **Size:** 10.1 ha = 25 acres (measured with line and compass). **Description of Plot:** See AB 28:1025-1026 (1974). About 3 acres of Crabapples (*Pyrus coronaria*) were cleared and some selective cutting of Red Maples (*Acer rubrum*) was undertaken (1976). Much of the vegetation in the meadow area is grown up into saplings and deerberry (*Vaccinium* sp.) less than 1.5 m **Weather:** Usually cool, averaging 40-45°F with rainfall on 4 days. **Coverage:** June 5-6, 13, 15-16, 19-20, 22, 28, 30; 0500-0730. Total hours: 25. **Census:** Cardinal, 4 (40, 16); Field Sparrow, 4; Rufous-sided Towhee, 3.5 (35, 14); Com. Yellowthroat, 3 (30, 12); Indigo Bunting, 2; Black-capped Chickadee, 1; Gray Catbird, 1; Red-eyed Vireo, 1; Prairie Warbler, 1; Yellow-breasted Chat, 1; Am. Goldfinch, 1; Chipping Sparrow, 1; Song Sparrow, 1; Great Horned Owl, +; Downy Woodpecker, +; Hooded Warbler, +. **Total:** 16 species; 24.5 territorial males (242/km<sup>2</sup>, 98/100 acres). **Visitors:** Mallard, Solitary Sandpiper, Worm-eating Warbler, Ovenbird. **Remarks:** Nests located: Field Sparrow, 2; Chipping Sparrow, 1. Number of species and individuals this year are decreasing. Another meadow management project is needed to sustain the bird populations. Special thanks to George Reese and Beth Holland. This research was funded by a grant from the Audubon Society of Western Pennsylvania.—GREG KOJADINOVICH, 209 Edgewood Dr., Sarver, Pa. 16055.

#### 96. MIXED PASTURE AND DECIDUOUS WOODLAND.—

**Location:** Virginia; Rockingham Co., 3 mi SW of Broadway adjacent to County Road 809; 38°35'30"N, 78°50'36"W, Broadway Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (roughly rectangular, 110 x 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** The area is lightly grazed pasture in various stages of succession, irregularly interspersed with small stands of more mature oak forest. Less than one-half the area is forested. The dominant trees are Black Oak (*Quercus velutina*) and Black Locust (*Robinia pseudoacacia*). Small trees and shrubs are scattered throughout the open areas and especially along the edges of the wooded areas. These include (in rapidly descending order of importance): Red Cedar

(*Juniperus virginiana*), Tree-of-Heaven (*Ailanthus altissima*), Coralberry (*Symporicarpus orbiculatus*), Black Haw (*Viburnum prunifolium*), hawthorn (*Crataegus* sp.), and wild rose (*Rosa* sp.). The open areas were seeded with Kentucky Fescue (*Festuca* sp.) 20+ years ago and are grazed annually. Also present are other grasses, such as Orchard Grass (*Dactylis glomerata*) and many successional weeds including: Japanese Honeysuckle (*Lonicera japonica*), Spotted Knapweed (*Centaurea maculosa*), thistles (*Cirsium* spp.), Feverwort (*Triosteum perfoliatum*), and Ironweed (*Veronica noveboracensis*). A quantitative survey of the vegetation gave the following results: Trees 3+ in. diameter, based on 6 circular samples, 66/acre; total basal area 67ft<sup>2</sup>/acre. Species comprising 91% of the total number of trees: Black Oak, 12, 11, 27, 33; Black Locust, 15, 14, 20, 67; Black Walnut (*Juglans nigra*), 7, 6, 13, 33; dead trees, 10, 9, 12, 50; White Oak (*Q. alba*), 2, 2, 8, 17; Tree-of-Heaven, 33, 30, 6, 17; Red Cedar, 18, 17, 5, 67; Black Cherry (*Prunus serotina*), 2, 2, 4.5, 17; Chestnut Oak (*Q. prinus*), 2, 2, 2, 17. Trees by diameter size class: A (3-6 in.) 52, 47, 4.7, 7; B (6-9 in.) 15, 14, 4.5, 7; C (9-15 in.) 32, 29, 25.3, 38; D (15-21 in.) 8, 8, 15, 23; E (21-27 in.) 2, 2, 5.2, 8; F (27-33 in.) 0; G (33-40 in.) 2, 2, 11.8, 18. Shrub stems/acre 2175; ground cover 90%; canopy cover 33%; average canopy height 39 ft (range 13-54). **Topography and Edge:** The plot lies on the summit and gentle, east-facing slope of a low ridge on the W edge of the Shenandoah Valley. The plot is a central portion of a strip of similar habitat about 2 miles long and 3/8 -1/2 mi wide. Various types of farmland surround this strip. **Elevation:** 1360 ft. **Weather:** Near normal temperatures, mostly clear, with lower than normal rainfall during the observation period. **Coverage:** May 28-29; June 1-2, 4-5, 7, 10, 12; between dawn and 0900; one 0830-1230. Total hours: 18.5. **Census:** Field Sparrow, 7.5 (124, 50); Indigo Bunting, 6 (99, 40); Mourning Dove, 5.5 (91, 37); Cardinal, 5 (82, 33); Rufous-sided Towhee, 4 (66, 27); Great Crested Flycatcher, 3 (49, 20); Yellow-billed Cuckoo, 2.5; Carolina Wren, 2.5; Carolina Chickadee, 2; Tufted Titmouse, 2; Blue-gray Gnatcatcher, 2; Brown-headed Cowbird (females), 2; E. Wood Pewee, 1; Blue Jay, 1; Brown Thrasher, 1; Chipping Sparrow, 1; E. Meadowlark, 0.5; Bobwhite, +; Com. Flicker, +; Red-bellied Woodpecker, +; Downy Woodpecker, +; Mockingbird, +. **Total:** 22 species; 48.5 territorial males or females (799/km<sup>2</sup>, 323/100 acres). **Visitors:** Green Heron, Red-tailed Hawk, Chimney Swift, Belted Kingfisher, Pileated Woodpecker, Com. Crow, Fish Crow, Gray Catbird, Am. Robin, E. Bluebird, Blue Grosbeak, Am. Goldfinch, Grasshopper Sparrow. **Remarks:** Nest found: Yellow-billed Cuckoo. This habitat was chosen because it is representative of a significant portion of the man-managed habitat of the Ridge and Valley Province. The wide diversity of habitats provided an expected high diversity and density of birds. We owe special thanks to Randall Shank on whose property the plot lies and Kathleen and Mike Finnegan for setting up the plot and helping with the vegetation analysis.—A. CLAIR MELLINGER and ELLEN J. GOETZ, U.S. Forest Service, Harrisonburg, Va. 22801.

**97. SURFACE MINE.—****Location:** West Virginia; Lewis Co., 5 mi W of Jackson's Mill State 4-H Camp. The centerline starts at 38°05'19"N, 80°33'25"W, Camden Quadrangle, USGS and extends S. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 x 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The centerline follows the almost level contour of an area strip-mined at least 15-20 years ago (no records could be located). The plot had not been restored to original slope but some Black Locust (*Robinia pseudoacacia*) and alder (*Alnus* sp.) had been planted on the spoil banks. The locust trees had nearly all died after reaching about 3 in. dbh, but the alder were doing fairly well in the wet bases of the spoil banks. Other plants growing on the plot include: Kentucky Blue Grass (*Poa pratensis*), Canada Blue Grass (*P. compressa*), Slender Foxtail (*Alopecurus myosuroides*), Japan Bushclover (*Lespedeza striata*), Candlestick Rush (*Juncus effusus*), Path Rush (*J. tenuis*), Cheat Grass (*Bromus secalinus*) and Bracted Plantain (*Plantago aristata*). **Edge:** The 2 end borders are extensions of the strip contour while the upper border is undisturbed pasture. Part of the lower side border is pasture and about half follows a ravine. **Topography:** The plot includes two levels from which coal has been removed, the "highwall" left by the upper excavation and the debris from the lower. The original slope approached 40 degrees. **Elevation:** 1180 ft. **Weather:** Warm and rainy. **Coverage:** June 1-4, between dawn and 0720, EDT. Total hours: 6. **Census:** Indigo Bunting, 5 (82, 33); Red-winged Blackbird, 2.5; Yellow-breasted Chat, 1.5; Gray Catbird, 1; White-eyed Vireo, 1; Rufous-sided Towhee, 1; Field Sparrow, 1; Brown Thrasher, 0.5; Blue-gray Gnatcatcher, 0.5, E Meadowlark, 0.5; Turkey Vulture, +; Am Kestrel, +; Downy Woodpecker, +; Barn Swallow, +; Blue Jay, +; Com. Crow, +, Carolina Chickadee, +; Mockingbird, +, E Bluebird, +; Starling, +; Am. Goldfinch, +; **Total:** 21 species; 14.5 territorial males (239/km<sup>2</sup>, 97/100 acres). **Visitors:** Yellow-billed Cuckoo, Com. Flicker, Great Crested Flycatcher, Rough-winged Swallow, Am Robin, Yellow Warbler, Com. Yellowthroat, Com. Grackle, Scarlet Tanager. **Remarks:** This land has been returned to the owner and is being used actively for pasture. The mining was done several years ago before it was mandatory to regrade to original slope. We wish to thank Mr. Harold Hull for permission to study the plot.—A.R. BUCKELOW, L HARPER, H. and M. HOOKER, V. JOHNSON, C. PIERCE, G. PHILLIPS (compiler), J. PHILLIPS, R. RINE and C. RUDDLE, Brooks Bird Club, 707 Warwood Ave Wheeling, W. Va. 26003.

**98. VARIED HABITAT.—****Location:** West Virginia; Lewis Co., 2.5 mi N of intersection of U.S. 19 and County Rd 12; 39°06'01"N, 80°27'50"W, Weston Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 X 660 yards, measured longitudinally and estimated laterally). **Description of Plot:** The center line is along a railroad track through a varied habitat typical of much of Lewis County. It consists of 20% old quarry containing water with

sedges (*Carex* sp.), rushes (*Juncus* sp.), and woolgrass (*Scirpus* sp.); 20% pasture of forage grasses; 20% brushy plants of Multi-flora Rose (*Rosa multiflora*), honeysuckle (*Lonicera* sp.), Staghorn Sumac (*Rhus typhina*), and blackberry (*Rubus* sp.). The remaining 40% had a steep hillside with Wild Hydrangea (*Hydrangea arborescens*) and blackberry (*Rubus* sp.) near the tracks, and mature oaks (*Quercus alba* and *Q. rubra*) and White Basswood (*Tilia americana*) beginning at a height of about 40 ft. On the lowest side were Black Locust (*Robinia pseudo-acacia*), ashes (*Fraxinus* sp.), Tulip-tree (*Liriodendron tulipifera*), Red Elm (*Ulmus rubra*), box-elder (*Acer negundo*), plus Sycamores (*Platanus occidentalis*) along the dirt road and West Fork River. **Edge:** Bordered on 3 sides by similar habitat, and on 1 side by road and river. **Topography:** Gradual slope to river bank with 1 ravine. Average slope of 50 ft from right to left. **Elevation:** 1040 ft. **Weather:** Mostly cloudy with rain; clearing on last 2 days. **Coverage:** June 1-5; between dawn and 0745 hours; 0830-1200 hours; and 1810 and dusk. Total hours: 18. **Census:** Indigo Bunting, 4 (66, 27); Red-winged Blackbird, 3 (49, 20); Cardinal, 3; Song Sparrow, 3, Rufous-sided Towhee, 2; Phoebe, 1.5; Acadian Flycatcher, 1.5; White-eyed Vireo, 1.5, Red-eyed Vireo, 1.5; Field Sparrow, 1.5; Mockingbird, 1; Gray Catbird, 1; Blue-gray Gnatcatcher, 1; Blue-winged Warbler, 1; Yellow Warbler, 1; Kentucky Warbler, 1; Com. Yellowthroat, 1; Yellow-breasted Chat, 1; Wood Pewee, 0.5; Summer Tanager, 0.5, Red-tailed Hawk, +; Yellow-billed Cuckoo, +; Black-billed Cuckoo, +; Chimney Swift, +; Ruby-throated Hummingbird, +, Pileated Woodpecker, +; Red-bellied Woodpecker, +; Com. Crow, +; Carolina Chickadee, +; Tufted Titmouse, +; Wood Thrush, +; Cedar Waxwing, +; Cerulean Warbler, +; Louisiana Waterthrush, +; Brown-headed Cowbird, +; Scarlet Tanager, +, Chipping Sparrow, +. **Total:** 37 species; 31.5 territorial males (519/km<sup>2</sup>, 210/100 acres). **Visitors:** Downy Woodpecker, Great Crested Flycatcher, Willow Flycatcher, Winter Wren, Am. Robin, Black-and-white Warbler, Am. Goldfinch. **Remarks:** This varied habitat was chosen specifically to represent extensive areas in Lewis County, W Va. subjected to strip mining, quarrying, and farming. The land is divided into many units of personal and public ownership. Thus the land is a patchwork of repetitive varying habitat. Nests located: Red-winged Blackbird, (2), Field Sparrow, (2). Special thanks to Glen Phillips for general assistance and guidance, and E.R. Chandler for assistance with vegetative study. Also our thanks to all others from the Brooks Bird Club Foray who contributed to the study.—ROBERT R. DEGARMO, 239 Virginia Ave., Chester, W. Va. 26034 and PETE J. HARRISON, N95W16587 Richmond Dr., Menomonee Falls, Wisc. 53051.

**99. BIRCH-OAK SAVANNAH AND WETLAND.**—**Location:** Ontario; Halton Regional Municipality, Port Rowan; 5.9 mi W of the Long Point Light-house; 42°32'N, 80°07'W; Little Creek Ridges, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** Established

1978, 2 intermittent years. **Size:** 5.85 ha = 14.46 acres. **Description of Plot:** See AB 33:75-6 (1979). **Weather:** Overcast and cool during first 4 censuses, clear and warm for the remainder, winds 5-10 mph. **Coverage:** June 3, 5-7, 12-14, 17-19, 23; 0500-0815 and 1730-2000, EST. Total hours: 29. **Census:** Tree Swallow, 17.5 (299, 121); E. Wood Pewee, 11.5 (196, 80); Yellow Warbler, 5.5 (94, 38); Com. Yellowthroat, 5 (85, 35); Red-winged Blackbird, 5; Great Crested Flycatcher, 4 (68, 28); N. Oriole, 4; Com. Flicker, 3.5 (60, 24); E. Kingbird, 3.5; House Wren, 3.5; Yellow-billed Cuckoo, 3 (51, 21); Com. Grackle, 3; Gray Catbird, 1.5; Hairy Wood-pecker, 1; Downy Woodpecker, 1; Blue-gray Gnatcatcher, 1; Starling, 1; Brown-headed Cowbird, 1; Red-tailed Hawk, +. **Total:** 19 species; 75.5 territorial males (1290/km<sup>2</sup>, 522/100 acres). **Remarks:** 33 nests located: Tree Swallow, 16; Red-winged Blackbird, 4; E. Wood Pewee, 3; Com. Flicker, 2; E. Kingbird, 2; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; House Wren, 1; Blue-gray Gnatcatcher, 1; Yellow Warbler, 1; N. Oriole, 1. A Green Heron and a Belted Kingfisher from an adjacent area were observed feeding in various ponds within the plot. Of note was the increase in Yellow Warblers from 0.5 in 1978 to 5.5, and the absence of Red-eyed Vireos this year from 3 in 1978.—PETER VERBURG (compiler) and JEFFREY SKEVINGTON, Long Point Bird Observatory, Port Rowan, Ont., Can. NOE IMO.

**100. CITY RAVINE.**—**Location:** Ontario; Toronto, Wigmore Park ravine, East Don River valley, N of Eglinton Ave., 43°55'N, 79°20'W. **Continuity:** New. **Size:** Approximately 34.0 ha = 84 acres (estimated from municipal maps). **Description of Plot:** Vegetation is patchy and diverse. In places the riverbank is high, steep, eroded and bare, elsewhere it is lined with a fringe of Box-elder (*Acer negundo*) and Crack, Black, and Sandbar Willows (*Salix fragilis*, *S. nigra*, *S. interior*). Water-logged bottomland areas are dominated by wet-meadow plants such as Cat-tails (*Typha* spp.), rushes, Jewelweed (*Impatiens biflora*), Joe-Pye-Weed (*Eupatorium maculatum*), etc., with thickets of White Cedar (*Thuja occidentalis*) and High-bush Cranberry (*Viburnum opulus*). Most of the ravine consists of old apple orchard, with Apple (*Pyrus malus*), Hawthorn (*Crataegus* spp.) and Viburnum scattered in “old-field” dominated by Black Swallowwort (*Cynanchum nigrum*). Some relatively undisturbed forest exists, primarily on the steeper slopes. On the south-facing slopes, Sugar Maple (*Acer saccharum*), White Ash (*Fraxinus americana*), Basswood (*Tilia americana*), and Beech (*Fagus grandifolia*) prevail; the north-facing slopes are dominated by E. Hemlock (*Tsuga canadensis*), White Pine (*Pinus strobus*), White Birch (*Betula papyrifera*), White Cedar, and Black Cherry (*Prunus serotina*). One extensive upper field is maintained as a mowed lawn. The present vegetation can best be regarded as a pattern of “edges”, and is too heterogeneous to warrant quantitative analysis. **Edge:** The ends of the ravine section used as the census tract are at narrowing points of the valley, but are otherwise arbitrary; similar habitat extends along the river for some distance in both directions. There is

a high-rise apartment building complex on the south lip of the ravine. On the other side it is surrounded by a 20-year old suburban single-family house tract. **Topography:** The ravine, which varies from 750 to 1400 ft in width, drops in an irregular series of slopes and terraces about 120 ft from the level of the surrounding till plain to the meandering river. River elevation is 330 ft. **Weather:** Temperature 7-24°C; 5 overcast days and 7 clear days. **Coverage:** May 15, 20, 22, 28, June 3-6, 11, 13, 27, 30; 0500-1000. Total hours: 35. **Census:** Red-winged Blackbird, 16 (47, 19); Bank Swallow, 15 (44, 18); N. Oriole, 14 (41, 17); Cardinal, 10 (29, 12); Gray Catbird, 9 (26, 11); Starling, 7 (21, 8); Blue Jay, 6 (18, 7); Am. Robin, 5.5 (16, 7), Mourning Dove, 5 (15, 6); Com. Flicker, 4.5 (13, 5); Com. Grackle, 3 (9, 4); Song Sparrow, 3; Great Crested Flycatcher, 2.5; Black-capped Chickadee, 2.5; Ring-necked Pheasant, 2; Indigo Bunting, 2; Mallard, 1; E. Wood Pewee, 1; Com. Crow, 1; House Wren, 1; Rose-breasted Grosbeak, 1; Belted Kingfisher, 0.5; Brown Thrasher, 0.5; Killdeer, +; Chimney Swift, +; Downy Woodpecker, +; Barn Swallow, +; Cedar Waxwing, +; Red-eyed Vireo, +; House Sparrow, +; Brown-headed Cowbird, +; Am. Goldfinch, +. **Total:** 32 species; 106 territorial males (312/km<sup>2</sup>, 126/100 acres). **Visitors:** Am. Kestrel, Ring-billed Gull, Rock Dove, Com. Yellowthroat, Field Sparrow. **Remarks:** Since Starlings are non-territorial, and Blue Jays had largely ceased to be territorial by the beginning of coverage on May 15, the numbers given for these species are conservative estimates. Large flocks of grackles foraged in the ravine from late May on, but it was difficult to estimate the number that actually nested there. Only one grackle nest was found. House Sparrows, Cedar Waxwings, and Am. Goldfinches certainly nested in the plot, but numbers were impossible to arrive at (in the latter case, because the species did not become territorial until coverage had ended). Northern Orioles were exceptionally abundant this year, but E. Kingbirds were absent and the number of Brown Thrashers was unusually low.—ALLAN GREENBAUM, 45 Anewen Dr., Toronto, Ontario M4A 1R9.

**101. MARSH WITH BUSHY FIELD.**—**Location:** Ontario; Durham Region, Whitchurch Township, Lot 19, Con. 1&2; 43°50'N, 78°53'W. **Continuity:** New. **Size:** 16.6 ha = 41 acres (approximately rectangular, 3000 x 500-700 ft, by map and grid). **Description of Plot:** A shallow, marshy pond with a paved road running E-W through the middle (drainage through culverts). South of the road, the marsh is surrounded by cat-tails and sedge, while to the N it is surrounded by cat-tails, bushes, small trees and weedy fields. Water comprises 60% of the area. Trees (3 in. dbh and over) about 3/acre, bushes about 6/acre. Average height of trees is 16 ft (range: 6-55 ft). Species comprising 90% of the total, followed by relative dominance by basal area, and by percentage of total number of trees Round-leaf Serviceberry (*Amelanchier sanguinea*), 44, 40; Black Willow (*Salix nigra*), 11, 15; Am. Mountain Ash (*Sorbus americana*), 11, 13; dead trees (mostly elm), 11, 4, Choke Cherry (*Prunus virginiana*), 9, 11, Silver Maple (*Acer saccharinum*), 6, 2; Com.

Apple (*Malus pumila*), 3, 1, E. White Cedar (*Thuja occidentalis*), 2, 4. Other trees, in order of dominance: Peachleaf Willow (*S. amygdaloidea*), Bigtooth Aspen (*Populus grandidentata*), Red Pine (*Pinus resinosa*), E. Cottonwood (*Populus deltoides*), One-seed Hawthorn (*Crataegus monogyna*), Pin Cherry (*Prunus pensylvanica*) and Quaking Aspen (*P. tremuloides*). The shrub layer is dominated by Poison Sumac (*Toxicodendron vernix*), with much smaller amounts of Pussy Willow (*S. discolor*), Box-elder (*Acer negundo*) and Red-osier Dogwood (*Cornus stolonifera*). Also noteworthy is a single Black Gum (*Nyssa sylvatica*) which occurs as a 5 ft shrub and must be among the most northerly specimens of the species. Ground cover is dominated by (in order of importance): Com. Cat-tail (*Typha latifolia*), sedge (*Carex sp.*), Field Horsetail (*Equisetum arvense*) and Kentucky Blue Grass (*Poa pratensis*). Small numbers of various wildflowers and weeds also occur. **Edge:** Bounded to the S by an unpaved road; S of the main road it is bordered on by a steep hill to the E, and old homes and gardens to the W; N of the road by gardens (with some mature trees) to the E, to the N by grassy fields and to the W by an apartment building and weedy fields. **Topography:** Gently slopes upward from the marsh. **Elevation:** About 330-342 ft. **Weather:** Apr., 2.1°F warmer than normal; May, +5.4°, June (21 days), -44°. Rainfall in Apr. was 2.18 in. above normal, May -0.97 in., and June +0.89 in. over first 21 days. Temperature range 22°-90°F. Most counts under clear skies, light winds; occasionally under cloudy skies, with winds up to 30 mph. **Coverage:** Apr. 10, 20, 23, 25; May 5, 9, 14-15, 20, 23-29, 31; June 11-12, 14, 16-17, 19, 21; 0930-2030, mainly late p.m. Total hours: 26.5. **Census:** Red-winged Blackbird, 16 (96, 39), Barn Swallow, 14 (84, 34); Bank Swallow, 13 (78, 32); Mallard, 8 (48, 20) Tree Swallow, 8; Com. Grackle, 7 (42, 17); Song Sparrow, 6 (36, 15); Gadwall, 5 (30, 12); Blue-winged Teal, 5; Green-winged Teal, 4 (24, 10); Killdeer, 4; Starling, 3 (18, 7); House Sparrow, 3; Am. Goldfinch, 3; Savannah Sparrow, 3; Spotted Sandpiper, 2; Chimney Swift, 2; Rough-winged Swallow, 2; Am. Robin, 2; Yellow Warbler, 2; Am. Coot, 1.5; Green Heron, 1; Canada Goose, 1; Am. Wigeon, 1; Black Tern, 1; Mourning Dove, 1; Belted Kingfisher, 1; E. Kingbird, 1; Purple Martin, 1; Com. Crow, 1; Warbling Vireo, 1; Brown-headed Cowbird, 1; Com. Flicker, 0.5; Black-capped Chickadee, 0.5; Gray Catbird, 0.5; Cedar Waxwing, 0.5; Com. Yellowthroat, 0.5; Bobolink, 0.5; E. Meadowlark, 0.5; Pintail, +; Wood Duck, +; Sora, +; Com. Snipe, +; Willow Flycatcher, +; Least Flycatcher, +; N. Oriole, +; Chipping Sparrow, +. **Total:** 47 species; 128 territorial males or females ( $771/\text{km}^2$ , 312/100 acres). **Remarks:** Nests found (24): Canada Goose (1), Mallard (7); Gadwall (5); Am. Wigeon (1), Green-winged Teal (2); Blue-winged Teal (2), Am. Coot (2); E. Kingbird (1); Bank Swallow (1); House Sparrow (2). Water levels were high until mid-May, some mudflats developed late in May. Notably absent this year was Com. Gallinule; Black Tern down 90% because of road put over ex-colony. However, a good year for ducks and all migrants. Scott's Marsh continues to thrive despite man's encroachment.—DAVE RUCH, 907

Hutchison Ave., Whitby, Ontario, Canada L1N 2A3.

**102. 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. **Size:** 6.07 ha = 15 acres. **Description of Plot:** See AB 34:65-66 (1980). **Weather:** Unseasonably cool and wet in June, with light frost the mornings of June 11 and 16. **Coverage:** June 2, 4, 6, 9, 11, 16, 18, 21, 25, 30; July 18; 0430-0840, EST. Total hours: 87. **Census:** Yellow Warbler, 13 (214, 87); Am. Redstart, 11 (181, 73); Black-capped Chickadee, 5 (82, 33); Song Sparrow, 4 (66, 27); Gray Catbird, 3.5 (58, 23); Am. Robin, 3.5; Rose-breasted Grosbeak, 3.5; Cedar Waxwing, 3 (49, 20); Blue-winged Teal, 2 (females); Great Crested Flycatcher, 2; Brown-headed Cowbird, 2; E. Kingbird, 1.5; Red-winged Blackbird, 1.5; N. Oriole, 1.5; Com. Snipe, 1; Com. Flicker, 1; Downy Woodpecker, 1; E. Phoebe, 1; Alder Flycatcher, 1; Tree Swallow, 1; Red-breasted Nuthatch, 1; Brown Thrasher, 1; Veery, 1; Warbling Vireo, 1; Black-and-white Warbler, 1; Com. Yellowthroat, 1; Bobolink, 1; E. Meadowlark, 1; Indigo Bunting, 1; Am. Woodcock, 0.5; Com. Grackle, 0.5; Mourning Dove, +. **Total:** 32 species, 73 territorial and non-territorial males ( $1203/\text{km}^2$ , 487/100 acres). **Visitors:** Green Heron, Mallard, Am. Kestrel, Ruffed Grouse, Killdeer, Black-billed Cuckoo, Ruby-throated Hummingbird, Hairy Woodpecker, E. Wood Pewee, Barn Swallow, Blue Jay, Starling, Am. Goldfinch. **Remarks:** Nests located: 19. Blue-winged Teal (2); Am. Woodcock (1); E. Kingbird (1); Brown Thrasher (1); Am. Robin (2); Cedar Waxwing (3); Yellow Warbler (4); Am. Redstart (1); E. Meadowlark (1); Rose-breasted Grosbeak (3). Nests of the following species were located just outside the plot, their territories being partially included: Mallard (1); Com. Flicker (1); Yellow Warbler (1); Red-winged Blackbird (2); Com. Grackle (1). Tree Swallows had several nests in boxes just outside the plot. In addition breeding evidence was found for Am. Kestrel, Ruffed Grouse, Com. Snipe, Downy Woodpecker, E. Phoebe, and Black-capped Chickadee. The following populations showed substantial increases: Black-capped Chickadee (2-5); Am. Redstart (7.5-11); and Song Sparrow (1-4). These increases may have resulted from an earlier starting date for this year's census (June 2 vs. June 18). The Red-winged Blackbird population showed a decrease from 5.25 to 1.5. There was a 12% increase in the total density of breeding males of all species. New species recorded were: Blue-winged Teal, E. Phoebe, Alder Flycatcher, Com. Yellowthroat, and Indigo Bunting. No breeding evidence was observed for Am. Bittern. American Goldfinch territories were not recorded as visits were concentrated in the month of June, prior to nesting. One Yellow Warbler nest was parasitized by a Brown-headed Cowbird. Special thanks to the staff of the Wye Marsh Wildlife Interpretation Centre, and especially to Robert Whittam, Mike Elliott, Kevin Lockau, and Lynne Kozina for

their advice and assistance.—BRENDA K BROBST and DANIEL J. SCHNEIDER, Wye Marsh Wildlife Interpretation Center, Box 100, Midland, Ontario, Canada, L4R 4K6.

**103. MIXED WETLAND WITH TAMARACK AND ASPEN GROVES, SHRUBLAND AND FEN.**—**Location:** Wisconsin, Waukesha Co., Falk Woods Nature Conservancy Area, 3 mi S of intersection of County Highways A and F; 42°56'N, 88°14'W, Muskego Quadrangle, USGS. **Continuity:** Established 1977; 4 consecutive years. **Size:** 16.9 ha = 41.7 acres. **Description of Plot:** See AB 32:79-80 (1978). **Weather:** Above normal temperatures; below normal rainfall, swamp unusually dry. **Coverage:** May 26, June 9, 21, 23, 27; 0600-1015. Total hours 13. **Census:** Yellow Warbler, 17 (101, 41), Red-winged Blackbird, 14 (83, 34); Com. Yellowthroat, 9 (53, 22); Gray Catbird, 7 (41, 17); Song Sparrow, 7; Am. Goldfinch, 6 (36, 14); Veery, 5 (30, 12); House Wren, 4 (24, 10); Am. Robin, 4; Cedar Waxwing, 4, Swamp Sparrow, 4; Least Flycatcher, 3 (18, 7); Mourning Dove, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Black-capped Chickadee, 2; Red-eyed Vireo, 2; Brown-headed Cowbird (female), 2; Cardinal, 2; Indigo Bunting, 2; Com. Flicker, 1.5; Willow Flycatcher, 1.5; Ring-necked Pheasant, 1, Black-billed Cuckoo, 1; Hairy Woodpecker, 1; Alder Flycatcher, 1; Com. Crow, 1; Wood Thrush, 1; Golden-winged Warbler, 1; Blue-winged Warbler, 1; Kentucky Warbler, 1; Mourning Warbler, 1; Com. Grackle, 1; Rose-breasted Grosbeak, 1; Rufous-sided Towhee, 1; Am. Woodcock, 0.5; Blue Jay, 0.5; Scarlet Tanager, 0.5. **Total:** 38 species, 117.5 territorial males or females ( $696/\text{km}^2$ , 282/100 acres). **Visitors:** Yellow-billed Cuckoo, Ruby-throated Hummingbird, E Kingbird, Chestnut-sided Warbler, N Oriole, Field Sparrow.—VERNAUNE, S 13 W.22167 Ridge Road, Waukesha, Wis 53186.

**104. TAMARACK BOG AND HARDWOOD.**—**Location:** Michigan; Berrien Co., 1 mi SW of Stevensville in Grand Mere St Park; 0.5 mi N of Willow Drive on Wishart Road; 41°59'30"N, 86°33'W, Bridgman Quadrangle. **Continuity:** Established 1976, 5 consecutive years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AB 30:1049 (1976). **Weather:** Above normal. **Coverage:** May 30, June 3, 10-11, 19, 28-29; July 5; 0600-2300 hours. Total hours: 8. **Census:** Veery, 3 (35, 14); E. Wood Pewee, 2; Blue Jay, 2; Wood Thrush, 2; Red-eyed Vireo, 2; Canada Warbler, 2; Whip-poor-will, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1, Am. Robin, 1; Ovenbird, 1; Com. Yellowthroat, 1; Scarlet Tanager, 1; Yellow-billed Cuckoo, 0.5; Cardinal, 0.5; Mourning Dove, +; Com. Flicker, +. **Total:** 19 species, 23 territorial males ( $271/\text{km}^2$ , 110/100 acres). **Visitors:** Red-winged Blackbird, Com. Grackle. **Remarks:** There was no great change in the bird populations. There were 3 abandoned nests (2 Wood Thrush, 1 Am Robin) after 2 storms during the first week of June.—ALBERT MORSE, JAMES MULINS (compiler), 2558 Locust Lane, Stevensville, Mich. 49127.

**105. DISTURBED OAK - HICKORY FOREST, PINE STAND, EDGE, AND POND.**—**Location:** Ohio; Licking Co., Eden Township, Camp Falling Rock, 1.2 mi NNE of the intersection of County Road 210 and State Route 79; 40°11'N, 82°18.5'W, Newark Quadrangle, USGS. **Continuity:** Established 1937; 42 intermittent years. **Size:** 14.16 ha = about 35 acres. **Description of Plot:** See *Bird-Lore* 39:379-80 (1937). **Habitat Changes:** More than a normal loss of trees took place. Eight species of wind-blown trees and one which was cut were lost, ranging from 3 in. White Oak (*Quercus alba*) to a 4 ft. Tulip-tree (*Liriodendron tulipifera*). **Weather:** The severe spring storms which caused the windfall of trees damaged some early nests, such as the robin's and might have caused other disturbances in the nesting cycles. **Coverage:** June 7, 11. Total hours: 14. **Census:** Red-eyed Vireo, 8 (56, 23); Acadian Flycatcher, 7 (49, 20); Wood Thrush, 6 (42, 17); 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; Kentucky Warbler, 3; Cardinal, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Yellow-throated Vireo, 2; Ovenbird, 2; Brown-headed Cowbird, 2; Chipping Sparrow, 2; Mourning Dove, 1; Yellow-billed Cuckoo, 1; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; E Phoebe, 1; Blue Jay, 1; Com. Crow, 1; Carolina Chickadee, 1; Blue-gray Gnatcatcher, 1; Cedar Waxwing, 1; Warbling Vireo, 1; Louisiana Waterthrush, 1; Am. Redstart, 1; N. Oriole, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Am. Goldfinch, 1; Song Sparrow, 1. **Total:** 39 species; 87 pairs, (614/km<sup>2</sup>, 249/100 acres). The reduced man-hours of this census makes it less reliable than those prior to 1979.—A.H. CLAUGUS, 228 S Lake St., Carey, Ohio 43316.

**106. DECIDUOUS CLEARCUT (6 yr).**—**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; 6 consecutive years. **Size:** 20.23 ha = 50 acres. **Description of Plot:** See *AB* 29:1117-8 (1975). Tree regrowth now averages about 12 ft high. **Weather:** Clear, very dry. **Coverage:** May 24-26, 31; June 1, 3-4, 8, 28; July 26; Aug. 16, 0530-1100, EDT. Total hours: 31. **Census:** Rufous-sided Towhee, 26 (128, 52); Yellow-breasted Chat, 16 (79, 32); Hooded Warbler, 13.5 (67, 27); Ruby-throated Hummingbird, 6 (30, 12); White-eyed Vireo, 6; Kentucky Warbler, 4 (20, 8); Cardinal, 4; Red-eyed Vireo, 3 (15, 6); Indigo Bunting, 3; Carolina Chickadee, 2; Am. Goldfinch, 2; Whip-poor-will, 1; Gray Catbird, 1; Blue-gray Gnatcatcher, 1; Worm-eating Warbler, 1; Brown-headed Cowbird, 1; Sharp-shinned Hawk, +; Pileated Woodpecker, +; Downy Woodpecker, +; Yellow-throated Vireo, +; Black-and-white Warbler, +. **Total:** 21 species, 90.5 territorial males or females (447/km<sup>2</sup>, 181/100 acres). **Remarks:** Total males for the last 6 years (33, 32, 53, 61, 79.5, 90.5) show how rapidly breeding populations are changing in this changing habitat. Four new species this year: Sharp-shinned Hawk, Whip-poor-will, Yellow-throated Vireo, and

Worm-eating Warbler. A species showing a remarkable increase this year was the Rufous-sided Towhee (14 to 26) after a previous 5-year average of 9.2. Other notable increases include Hooded Warbler (7.5 to 13.5) and Yellow-breasted Chat (10 to 16). The Indigo Bunting population crashed this year (10 to 3) after a previous 5-year average of 9.6. A visiting Carolina Wren seen in July was the first observed since 1976 when this species had 5 territories. The nest of the Sharp-shinned Hawk was not found but was believed to have been just beyond the middle of the SE border. This hawk was heard calling from and seen going to the spot throughout the census. On July 26, two immatures were observed near the presumed nesting spot while two adults flew overhead.—RICHARD LEWIS, Rt. 3, Box 5, Bristol, Tenn. 37620.

**107. DECIDUOUS CLEARCUT (2-yr.).**—**Location:** Tennessee; Sullivan Co., Dogwood Bench; about 17 mi E of Bristol on Hwy 421; 32°30'N, 82°58'W, Shady Valley Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres. **Description of Plot:** The area appears to have been clear cut in 1978. Except for about 20 scattered trees in the S corner, there are no standing trees on the plot. A dirt road forms the SE border. Vegetation consists mainly of stump sprouts. Shrub stems per acre, 27,140; ground cover 64%; estimated average shrub height 3 ft. Relative densities of stump sprouts and seedlings: Red Maple (*Acer rubrum*), 25%; *Sassafras albidum*, 25%; Sourwood (*Oxydendrum arboreum*), 15%; Am. Chestnut (*Castanea dentata*), 15%; Chestnut Oak (*Quercus prinus*), 10%. The main shrubs are Mountain Laurel (*Kalmia latifolia*) and Rosebay Rhododendron (*Rhododendron catawbiense*). **Edge:** Surrounded by mature hardwood forest. **Topography:** On the SE slope of a ridge. **Elevation:** 2800 ft. **Weather:** Clear, dry. **Coverage:** May 29-30; June 12, 14-15, 21; July 19; Aug. 9; 0540-0900. Total hours: 12. **Census:** Rufous-sided Towhee, 11 (136, 55); Indigo Bunting, 4 (49, 20); Gray Catbird, 1; Worm-eating Warbler, 1. **Total:** 4 species; 17 territorial males (210/km<sup>2</sup>, 85/100 acres).—RICHARD LEWIS, Rt. 3, Box 5, Bristol, Tenn. 37620.

**108. 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; 4 consecutive years. **Size:** 30 ha = 74 acres. **Description of Plot:** See *AB* 32:80 (1978) and 33:79 (1979). **Changes:** Lumbering from March to May affected about 10 ha N of plot and about 25 ha (or more) E of plot; bulldozing in April and May along the bottomland dirt road did some damage to adjacent vegetation; lumbering only immediately adjacent to NE border. In addition, about 20 trees over 6 in. dbh were cut. Weeds occupied most of the field cultivated in 1979. **Weather:** Drier than normal; summer hotter than normal, with drought conditions by mid-July that killed or injured many saplings, especially Tulip-trees (*Liriodendron*). Rain in late July eased the drought. Temperature extremes 0-39°C for the season; 5-25° during census. **Coverage:** Apr. 17, 20, 22, 24; May 1, 3-4,

11, 15, 21, 24, 26, June 1, 5, 7, 14-15, 22, 23, 0500-2030 hours, CDT. Total hours: 38+. **Census:** Red-eyed Vireo, 17 (57, 23); Prairie Warbler, 6.5 (22, 9); Yellow-breasted Chat, 6 (20, 8); Indigo Bunting, 5.5 (18, 7); Blue-gray Gnatcatcher, 5 (17, 7); White-eyed Vireo, 5; Field Sparrow, 5; Com. Yellowthroat, 4 (13, 5); Cardinal, 4; Acadian Flycatcher, 3 (10, 4); Rufous-sided Towhee, 3; Yellow-throated Vireo, 2.5; Yellow-billed Cuckoo, 2; Tufted Titmouse, 2; Wood Thrush, 2; Kentucky Warbler, 2; E. Phoebe, 1.5; Carolina Chickadee, 1.5; Cerulean Warbler, 1.5; Ovenbird, 1.5; Hooded Warbler, 1.5; Whippoor-will, 1; Ruby-throated Hummingbird, 1; Downy Woodpecker, 1; Blue Jay, 1; White-breasted Nuthatch, 1; Black-and-white Warbler, 1; Worm-eating Warbler, 1; Brown-headed Cowbird, 1+; Scarlet Tanager, 1; Summer Tanager, 1+; Broad-winged Hawk, 0.5; Mourning Dove, 0.5; Screech Owl, 0.5; Pileated Woodpecker, 0.5; Red-bellied Woodpecker, 0.5; Hairy Woodpecker, 0.5; Blue Grosbeak, 0.5; Am. Goldfinch, 0.5; Bobwhite, +; E. Wood Pewee, +. **Total:** 41 species; 96 territorial males or females (321/km<sup>2</sup>, 130/100 acres). **Visitors:** Turkey Vulture, Red-tailed Hawk, Chimney Swift, Barn Swallow, Purple Martin, Com. Crow, Gray Catbird, Brown Thrasher, Blue-winged Warbler, Red-winged Blackbird, Chipping Sparrow. **Remarks:** Active nests located: E Phoebe, (1), Blue-gray Gnatcatcher (1) Declines in species such as Acadian Flycatcher, Blue-gray Gnatcatcher, Red-eyed Vireo, Kentucky Warbler, and Indigo Bunting so far appear balanced by gains in other species as Prairie Warbler, Com Yellowthroat, Yellow-breasted Chat and Field Sparrow. The nearby lumbering may have affected Black-and-white and Cerulean warblers, which were known to occur E of the plot in years past; these species appear territorial but probably did not breed.—RICHARD W. SIMMERS, JR., Route 6, Box 170, Cookeville, Tenn. 38501

**109. DECIDUOUS CLEARCUT.**—**Location:** Georgia; Rabun Co., Chattahoochee Nat'l Forest, 5 mi SE of Clayton; 34°48'N, 83°24'W, Tiger Quadrangle, USGS. **Continuity:** Established 1977; 4 consecutive years. **Size:** 6.88 ha = 17 acres. **Description of Plot:** See *AB* 32:80-1 (1978). **Weather:** Sunny and cool. **Coverage:** May 5-8, 11, 19, 26, 0700-1000. Total hours: 10. **Census:** Rufous-sided Towhee, 16 (233, 94); Indigo Bunting, 3 (44, 18); Prairie Warbler, 3; Carolina Chickadee, 1; Carolina Wren, 1; Brown Thrasher, 1; Yellow-breasted Chat, 1; Cardinal, 1; Chipping Sparrow, 1. **Total:** 9 species; 28 territorial males (407/km<sup>2</sup>, 165/100 acres). **Visitors:** Great Crested Flycatcher, E. Phoebe, Blue-gray Gnatcatcher, Red-eyed Vireo, Hooded Warbler, Pine Warbler, Scarlet Tanager, Am. Goldfinch. Nest found: Rufous-sided Towhee.—LOUIS W. SCHWEIZER, 2573 Tilson Dr. SE, Atlanta, Ga. 30317.

**110. 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. **Size:** 9.11 ha = 22.5 acres. **Description of Plot:** See *AB* 34:70-71 (1980). **Weather:** See Census 54. **Coverage:** May 3, 6, 13; June 14, 16, 28; July 5,

0420-1030. Total hours. 18. **Census:** Indigo Bunting, 7 (77, 31); Field Sparrow, 6 (66, 27); Cardinal, 5 (55, 22); Great Crested Flycatcher, 4 (44, 18); Summer Tanager, 4; Yellow-billed Cuckoo, 3 (33, 13); Tufted Titmouse, 3, Brown-headed Cowbird, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; Carolina Chickadee, 2; White-breasted Nuthatch, 2; Yellow-throated Warbler, 2; E. Meadowlark, 2; Chipping Sparrow, 2; Prairie Warbler, 1.5; E. Kingbird, 1; Blue Jay, 1; E. Bluebird, 1; Blue-gray Gnatcatcher, 1; Starling, 1; Red-eyed Vireo, 1; N. Parula, 1; Blue Grosbeak, 1. **Total:** 25 species; 60.5 territorial males ( $664/\text{km}^2$ , 269/100 acres). **Visitors:** Mourning Dove, Pileated Woodpecker, Hairy Woodpecker, Purple Martin, Am. Robin, Pine Warbler, Com. Grackle. **Remarks:** The combination of the very severe drought and heavy overgrazing by cattle apparently reduced the carrying capacity of this habitat for birds.—*FREDERICK M. BAUMGARTNER and ELIZABETH W. MCKAY, Little Lewis Whirlwind Nature School and Sanctuary, Rte. 2, Jay, Okla. 74346.*

**111. MIXED PRAIRIE I.—Location:** North Dakota; Billings Co., 3 mi W Medora, SE 1/4, SE 1/4, Sec. 19, T14ON, R102W;  $46^\circ 55' \text{N}$ ,  $103^\circ 36' \text{W}$ , Medora Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 4.05 ha = 10 acres. **Description of Plot:** See AB 34:69 (1980). **Weather:** Skies clear to overcast. Temperatures  $45^\circ$ - $74^\circ \text{F}$ . Winds calm to 25 mph. **Coverage:** Apr. 25; May 10, 23, 30; June 3, 10, 17, 20-21; 0425-0830 and 2025-2045, MDT. Total hours: 7.5. **Census:** W. Meadowlark, 2; Mourning Dove, 1; Vesper Sparrow, 1. **Total:** 3 species; 4 territorial males or females ( $99/\text{km}^2$ , 40/100 acres). **Visitors:** Marsh Hawk, Sharp-tailed Grouse, Killdeer, Brown-headed Cowbird, Grasshopper Sparrow, Clay-colored Sparrow, Field Sparrow. **Remarks:** One Mourning Dove nest located. This site is located within the Little Missouri Nat'l Grasslands and is grazed. Thanks to Farron Wallace for assistance in censusing.—*MICHAEL D. SCHWARTZ and RICK HOPKINS, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**112. MIXED PRAIRIE II.—Location:** North Dakota; Billings Co., 10 mi S Medora SW 1/4, NE 1/4, Sec. 13, T138N, R102W;  $46^\circ 45' \text{N}$ ,  $103^\circ 30' \text{W}$ , U.S. Forest Service Nat'l Grasslands Map. **Continuity:** New. **Size:** 10.1 ha = 25 acres (rectangular size determined by compass and tape). **Description of Plot:** The predominant grasses include Needle-and-thread (*Stipa comata*), W. Wheat Grass (*Agropyron smithii*), and Blue Grama (*Bouteloua gracilis*). Locally abundant grasses were Little Bluestem (*Andropogon scoparius*) and Prairie Sandreed (*Calamovilfa longifolia*). Threadleaf Sedge (*Carex filifolia*) was also abundant. A patch of Wolfberry (*Symphoricarpos occidentalis*) was located near the center of the plot. A few scattered Silver Sage (*Artemisia cana*) were found. Because of drought conditions the vegetation was poorly developed. **Edge:** Bordered on all sides by similar grasslands. There is a brushy draw near the S boundary and a hardwood draw a short distance from the N boundary.

**Topography:** Gently rolling prairie, sloping slightly E. **Elevation:** 2926 ft. **Weather:** Skies clear to overcast. Winds calm to 15 mph. Temperatures  $33$ - $65^\circ \text{F}$ . **Coverage:** Apr. 29; May 12, 27; June 1, 5, 11, 18, 22; 0420-0745, MDT. Total hours: 6.6. **Census:** W. Meadowlark, 2; Brewer's Blackbird, 1. **Total:** 2 species; 3 territorial males or females ( $30/\text{km}^2$ , 12/100 acres). **Visitors:** Sharp-tailed Grouse, Gray Partridge, Long-billed Curlew, Upland Plover, Mourning Dove, Horned Lark, Black-billed Magpie, Com. Crow, Vesper Sparrow. **Remarks:** This grassland is located within the Little Missouri Nat'l Grasslands and is grazed by cattle—*MICHAEL D. SCHWARTZ and RICK HOPKINS, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**STEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105**

**114. MIXED PRAIRIE IV.—Location:** North Dakota; Oliver Co., 1 mi E of Fort Clark, NW 1/4, Sec. 5, T143N, R83W,  $47^\circ 14' \text{N}$ ,  $101^\circ 13' \text{W}$ , Fort Clark Quadrangle, USGS. **Continuity:** New. **Size:** 4.1 ha = 10.1 acres (triangular, measured by planimeter from aerial photos). **Description of Plot:** Predominantly grassland, S aspect, dominated by W. Wheat Grass (*Agropyron smithii*) and Blue Grama (*Bouteloua gracilis*). Several small depressions and one small ravine are dominated by Wolfberry (*Symphoricarpos occidentalis*), Buffaloberry (*Shepherdia argentea*), Silverberry (*Elaeagnus argentea*) and W. Wild Rose (*Rosa woodsii*). Several Green Ash (*Fraxinus pennsylvanica*) have become established. The S edge is bordered by W. Lake Arroda. Large stands of Cat-tails (*Typha* sp.) occur on the S edge. A quantitative survey of  $100 \text{ m}^2$  quadrats revealed the following relative cover and importance values respectively: W. Wheat Grass 27.4%, 21.2; Blue Grama 31%, 20.17; Fringed Sage (*Artemesia frigida*) 3.4%, 7.8; Plains Muhly (*Muhlenbergia cuspidata*) 8.4%, 6.3, Thread-leaved Sedge (*Carex filifolia*) 3.3%, 3.9; Red Mallow (*Sphaeralcea coccinea*) 1%, 3.8; Saltgrass (*Distichlis stricta*) 2.4%, 3.1, Stiff Goldenrod (*Solidago rigida*) 2.1%, 3.1, and Mat Muhly (*M. richardsonis*) 3%, 2.8. A coulee on the S portion of the site contains nine Green Ash. Trees by diameter size class A (3-6 in.) 5; B (6-9 in.) 1; C (9-15 in.) 3. Average canopy height is 26.6 ft (range 23-32); average crown diameter 20 ft (range 12.4-24.6). There are 145 ash sapling stems within a 100 ft radius with an average height of 3.5 ft. The site is divided in half by a barbed wire fence. The E half is an established recreation area with a gravel road in a circle drive. **Edge:** Bordered on the N by two butte formations with similar prairie vegetation. The E and S edge is formed by the shore of W. Lake Arroda. The W edge is formed by a ravine dominated by Green Ash. **Elevation:** 535-550 m (1810-1980 ft). **Weather:** See Census 134. **Coverage:** May 7, 17; June 2, 9, 12, 17, 22; between dawn and 1200. Total hours 18. **Census:** Red-winged Blackbird, 5 (122, 50); Brown-headed Cowbird, 3 (73, 30), E. Kingbird, 2; W. Meadowlark, 2; Killdeer, 1, Mourning Dove, 1; Tree Swallow, 1; Gray Catbird, 1; Yellow Warbler, 1; Com. Yellow-throat, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 1; Mallard, 0.5; Belted Kingfisher, 0.5. **Total:** 14 species, 21 territorial males ( $514/\text{km}^2$ , 208/100 acres). **Visitors:** Blue-winged Teal, Red-tailed Hawk, Sharp-tailed Grouse, Gray Partridge, Am. Coot, Ring-billed Gull, Bank Swallow, Rough-winged Swallow, Barn Swallow, Brown Thrasher, Cedar Waxwing, Bobolink, Com. Grackle, Lazuli Bunting, Grasshopper Sparrow, Vesper Sparrow, Lark Sparrow, Clay-colored Sparrow, Field Sparrow, White-crowned Sparrow. **Remarks:** 2 nests, E. Kingbird and Tree Swallow. The site received occasional weekend party and fishing use. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105*

**115. MIXED PRAIRIE V.**—**Location:** North Dakota; Oliver Co., 6 miles SE of Stanton, NW 1/4 of Sec. 3, T143N, R84W; 47°14'N, 101°19'W, Hanover Northeast Quadrangle, USGS. **Continuity:** New. **Size:** 13 1 ha = 32.3 acres. **Description of Plot:** Rolling grassland, tending to slope to the N. A small stock dam and pond is situated in a small ravine (coulee) midway in the site. The dominant herbs are Blue Grama Grass (*Bouteloua gracilis*), Prairie June Grass (*Koeleria cristata*), Thread-leaved Sedge (*Carex filifolia*), W. Wheat Grass (*Agropyron smithii*), and Fringed Sage (*Artemesia frigida*). A quantitative survey of 100 m<sup>2</sup> quadrats revealed the following relative cover and importance values respectively: Blue Grama, 50%, 32.5; Prairie June Grass, 14%, 13.8, Thread-leaved Sage, 9.7%, 11.1; W. Wheat Grass, 7.9%, 10.8; and Fringed Sage, 6.9%, 9.7. Ground cover, 60.2%; litter, 38.7%; bare ground, 1.1%. Average height of standing material on June 13 was 16.4 cm. Average depth of litter was 0.6 cm; average slope 8%. Grazing pressure in the past has typically been heavy. A barbed wire fence forms the N, W and S boundaries. **Edge:** Bordered on the N, S and E by similar prairie habitat. A coal mine haul runs 30 m to the W. **Topography:** Rolling. An intermittent stream crosses the site; a stock pond is near the N edge. **Elevation:** 550-565 m (1810-1880 ft). **Weather:** See Census, 134. **Coverage:** May 2, 9, 30; June 6, 18, 22, 25; between dawn and 1000 Total hours: 11. **Census:** W. Meadowlark, 3 (23, 9); Horned Lark, 2; Chestnut-collared Longspur, 1.5; Killdeer, 1. **Total:** 4 species; 7.5 territorial males (57/km<sup>2</sup>, 23/100 acres). **Visitors:** Am. Kestrel, E. Kingbird, W. Kingbird, Barn Swallow, Loggerhead Shrike, Red-winged Blackbird, Brewer's Blackbird, Com. Grackle, Brown-headed Cowbird, Song Sparrow. **Remarks:** A pair of Burrowing Owls was on the site for two days between censuses. The site was lightly grazed for two weeks in mid-May. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**116. KENTUCKY BLUE GRASS PRAIRIE.**—**Location:** North Dakota, Stutsman Co., NE quarter of Sect. 12, T142N, R68W; 48°8'N, 99°14'W, Goldwin Quadrangle, USGS. **Continuity:** Established 1972; 9 consecutive years. **Size:** 4.86 ha = 12 acres. **Description of Plot:** See AB 26:972 (1972). This plot was last subjected to a prescribed burn in spring, 1977. **Weather:** The preceding fall and winter were relatively dry and by spring the wetlands on the Woodworth Station were in relatively poor condition. Precipitation in May and June was about normal, with monthly totals of 2.56 and 3.39 in., respectively. Temperatures in May were 5-10° above normal, with average extremes of 38° and 68°F. June temperatures were slightly above normal; the mean low was 50°, the mean high 75°. The warm, dry conditions caused further reductions in the wetlands. **Coverage:** May 30; June 3, 9, 12, 17, 19, 0600-1000, CDT. Total hours: 2.3. **Census:** Bobolink, 1.5; Blue-winged Teal, 1; W. Meadowlark, 1; Red-winged Blackbird, 1; Brown-headed Cowbird, 1 (female); Grasshopper Sparrow, 1; E. Kingbird, 0.5; Upland

Sandpiper, +. **Total:** 8 species, 7 territorial males or females (144/km<sup>2</sup>, 58/100 acres). **Visitors:** Mallard, Pintail, Sharp-tailed Grouse, Tree Swallow, Com. Grackle. —*DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.*

**117. 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; 9 consecutive years. **Size:** 10 ha = 24.7 acres. **Description of Plot:** See AB 26:972 (1972). Most wetlands were nearly dry throughout the census period. **Weather:** See Census 116. **Coverage:** May 30; June 5, 9, 11, 16, 17; July 1; 0530-0940, CDT. Total hours: 4.5. **Census:** Clay-colored Sparrow, 4.5 (45, 18); Brown-headed Cowbird, 3 (30, 12); Com. Yellowthroat, 2.5; E. Kingbird, 1; Willow Flycatcher, 1; Bobolink, 1; W. Meadowlark, 1; Yellow Warbler, 1; Grasshopper Sparrow, 0.5; Gray Catbird, +; Orchard Oriole, +; Am. Goldfinch, +. **Total:** 12 species; 15.5 territorial males or females (155/km<sup>2</sup>, 63/100 acres). **Visitors:** Gadwall, Blue-winged Teal, Com. Snipe, Upland Sandpiper, Black-billed Cuckoo, Com. Flicker, Least Flycatcher, Com. Grackle, Savannah Sparrow. —*DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.*

**118. 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, 9 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:972-973 (1972) and AB 32:81-82 (1978). This plot was burned in fall 1971, spring 1976, and spring 1979. **Coverage:** May 30; June 5, 10, 16-17, 19; July 1; 0630-0935, CDT. Total hours: 3.5. **Census:** Bobolink, 2; W. Meadowlark, 1; Red-winged Blackbird, 1; Brown-headed Cowbird, 1 (female); Grasshopper Sparrow, 0.5; Blue-winged Teal, +; Killdeer, +; E. Kingbird, +. **Total:** 8 species; 5.5 territorial males or females (90/km<sup>2</sup>, 37/100 acres). **Visitors:** Mallard, Mourning Dove, Com. Nighthawk, Barn Swallow, Yellow-headed Blackbird, Com. Grackle. —*DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.*

**119. 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; 9 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:973 (1972) and 33:80 (1979). **Weather:** See Census 116. **Coverage:** May 30; June 4-5, 11, 17, 19; 0610-1020 hours, CDT. Total hours: 2.5. **Census:** Grasshopper Sparrow, 2.5; Bobolink, 1; W. Meadowlark, 0.5; Brown-headed Cowbird, 0.5 (female); E. Kingbird, +; Clay-colored Sparrow, +. **Total:** 6 species, 4.5 territorial males or females (74/km<sup>2</sup>, 30/100 acres). **Visitors:** Com. Snipe, Yellow-headed

Blackbird. —*DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.*

**120. 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; 9 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:973-974 (1972). This plot was last burned in spring 1979. All wetlands on the plot contained little water. **Weather:** See Census 116. **Coverage:** June 9-10, 12, 17, 25; 0620-0800, CDT. Total hours: 2.3. **Census:** Grasshopper Sparrow, 2; Bobolink, 1; Brown-headed Cowbird, 1 (female); W. Meadowlark, 0.5; Com. Yellowthroat, 0.5; Clay-colored Sparrow, 0.5; Willet, +. **Total:** 7 species; 5.5 territorial males or females (90/km<sup>2</sup>, 37/100 acres). **Visitors:** Gadwall, Sharp-tailed Grouse, Killdeer, Upland Sandpiper, Marbled Godwit, E. Kingbird. —*DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.*

**121. 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; 9 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:974 (1972) and AB 32:82 (1978). **Weather:** See Census 116. **Coverage:** June 4, 9, 12, 16-17, 25; 0615-0910, CDT. Total hours: 3. **Census:** Grasshopper Sparrow, 3 (49, 20); Bobolink, 0.5; Brown-headed Cowbird, 0.5 (female); Upland Sandpiper, +; E. Kingbird, +; Brown Thrasher, +; W. Meadowlark, +; Lark Bunting, +; Clay-colored Sparrow, +. **Total:** 9 species; 4 territorial males or females (66/km<sup>2</sup>, 27/100 acres). **Visitors:** Barn Swallow, Orchard Oriole, Com. Grackle. **Remarks:** A Sharp-tailed Grouse nest containing 11 eggs was destroyed. —*DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.*

**122. 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; 5 intermittent years. **Size:** 8.7 ha = 21.5 acres. **Description of Plot:** See AB 27:990 (1973) and AB 32:82 (1978). Seven seasonal wetlands partially or entirely within the plot were nearly dry throughout the census period. **Weather:** See Census 116. **Coverage:** May 30; June 4, 9, 11, 16-17, 26, 0600-1055, CDT. Total hours: 4. **Census:** Grasshopper Sparrow, 3.5 (40, 16); Red-winged Blackbird, 3 (34, 14); Blue-winged Teal, 1; Bobolink, 1; W. Meadowlark, 1; Killdeer, 0.5; Upland Sandpiper, 0.5; E. Kingbird, 0.5; Gadwall, +; Com. Snipe, +; Willet, +; Sharp-tailed Grouse, +; Com. Yellowthroat, +; Clay-colored Sparrow, +. **Total:** 15 species, 12 territorial males or females (138/km<sup>2</sup>, 56/100 acres). **Visitors:** Mallard, Pintail, Marbled Godwit, Black Tern, W. Kingbird, Baird's Sparrow. —*DOUGLAS H.*

JOHNSON and J. MICHAEL CALLOW,  
Northern Prairie Wildlife Research Center,  
Jamestown, N.D. 58401.

**123. FLOODPLAIN TALLGRASS PRAIRIE.**—**Location:** Kansas; Douglas Co., portion of Baker Wetlands Research Area (Baker Univ., Baldwin). It occupies much of the NW quarter of the SW quarter of Sec. 18, T13N, R20E, 33°55'N, 95°14'W, Lawrence East Quadrangle, USGS. **Continuity:** Established 1974; 7 consecutive years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AB 28 1031-1032 (1974). **Weather:** For June, mean high 33°C, mean low 19°; total precipitation 8.4 cm. **Coverage:** May 14, 19, 29; June 4, 6, 17; July 1, 10; generally 1000-1200. Total hours: 9. **Census:** Dickcissel, 15 (148, 60), Red-winged Blackbird, 5 (49, 20); Com. Yellowthroat, 3 (30, 12); E. Meadowlark, 1. **Total:** 4 species; 24 territorial males (237/km<sup>2</sup>, 96/100 acres). **Remarks:** Visitors and aerial foragers included: Green Heron, Sora, Mourning Dove, Barn Swallow, Com. Grackle, Am. Goldfinch. The whole area was burned in April as part of its management and vigorous new prairie growth noted. The burn killed back the row of Cottonwoods growing across the plot and the Buttonbush along the N bordering drainage ditch. Heights of vegetation: 30 cm on May 14, 50 cm on June 4, 100 cm on July 1. For 27 days beginning June 25, temperatures were 36-41°C. This heat wave and lack of rain caused much nesting mortality. Only 2 of 34 Red-winged Blackbird nests in or bordering the plot produced young. Dickcissels and Red-wings seemed to abandon the area by July—only 3 pairs of Dickcissels were found then. The site was mowed late July and afterward only 1 yellowthroat was heard. The census data below for 1976 and 1977 are from Calvin Cink (Dept. Biol., Baker Univ., Baldwin, Kans. 66006) and provide continuous published account of this site in AB. **Census for 1976:** Dickcissel, 15 (148, 60); Com. Yellowthroat, 5 (49, 20); Red-winged Blackbird, 5; E. Meadowlark, 4 (40, 16). **Total:** 4 species; 29 territorial males (281/km<sup>2</sup>, 116/100 acres). **Census for 1977:** Dickcissel, 18 (178, 72); Red-winged Blackbird, 6 (59, 24), Com. Yellowthroat, 5 (49, 20); E. Meadowlark, 3 (30, 12). **Total:** 4 species; 32 territorial males (316/km<sup>2</sup>, 128/100 acres).—PETER E. LOWTHER, Museum of Natural History, Univ. of Kansas, Lawrence, Kans. 66045.

## AVIAN COMMUNITY STUDIES IN NORTH DAKOTA

Renewed and increasing interest in exploiting the vast lignite reserves in North Dakota is motivating serious concern about the environmental impact of strip mining. Special attention is being given to the problems arising from the possible destruction and the legally required reclamation of "woody draws." Wooded habitats in the grassland biome are usually restricted to floodplains and to steeper drainage courses known locally as draws. In these draws, trees (*Fraxinus*, *Ulmus*, *Populus*), seldom over 50 ft tall, are interspersed with tall shrubs (*Prunus*, *Crataegus*, *Shepherdia*, *Amelanchier*, *Elaeagnus*), short shrubs (*Symporicarpos*, *Rosa*, *Artemisia*), and/or extensions of

prairie grassland. Many draws have no woody vegetation or only shrubs. Hence, patchy dispersion and islands of woody growth are typical. The fragile nature of the badlands and the relative scarcity of natural wooded areas make the preservation of an adequate number of them essential to retaining the integrity of the ecology of the northern plains.

The following counts, and others included under the appropriate habitat classes, record some of the data derived from studies in central North Dakota on the Glenharold Mine area near Stanton supported by Consolidation Coal Company in response to questions from N.D. Public Service Commission. Reports by John Fleckenstein and Steve Mack cover this area. In the SW part of the state, studies by Greg Hiemenz and Farron Wallace report on birds in natural, planted, and reclamation wooded areas done as part of a study by the North Dakota Game and Fish Department in cooperation with and supported by the Bureau of Land Management. Other natural wooded areas in the badlands area were studied by John Wiehe, Farron Wallace and others in 1979 and by Rick Hopkins and Michael Schwartz in 1980, supported by the Forest Service. All are working under grants by the various agencies to North Dakota State University.—J. FRANK CASSEL, Zoology Dept., N.D.S.U., Fargo, N.D. 58105.

**124. ASH-BOX-ELDER-ELM HARDWOOD DRAW.**—**Location:** North Dakota; Golden Valley Co., 12 mi NNE Beach; E 1/2, SE 1/4, Sec. 22, T142N, R99W. **Continuity:** New (1979). **Size:** 4.73 ha = 11.7 acres (irregular shape, measured from aerial photograph). **Description of Plot:** Mature hardwood draw. Long and narrow, not more than 50 m wide at any point. Dominant canopy trees are Green Ash (*Fraxinus pennsylvanica*), Box-elder (*Acer negundo*), and Am. Elm (*Ulmus americana*). Prominent shrubs are Buckbrush (*Symporicarpos occidentalis*) and Choke Cherry (*Prunus virginiana*). Major grasses are Smooth Brome (*Bromus inermis*), W. Wheat Grass (*Agropyron smithii*), Kentucky Blue Grass (*Poa pratensis*), and Little Bluestem (*Andropogon scoparius*). Major forbs are Goldenrod (*Solidago nemoralis*), Tall Nettle (*Urtica procera*), N. Bedstraw (*Galium boreale*), and White Sage (*Artemesia ludoviciana*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and larger based on 30 points from point-center method, 227.4/acre (562/ha); total basal area 67.3 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Green Ash, 189.5, 83.3, 82.8, 100; Box-elder, 26.5, 11.7, 11.6, 36.7; Am. Elm, 5.7, 2.5, 2, 10; dead trees, 5.7, 2.5, 3.7, 10. Trees by diameter size class: A (3-6 in.) 94.7, 41.7, 11.4, 16.9; B (6.1-9 in.) 90.9, 40, 28.7, 42.7; C (9.1-15 in.) 41.7, 18.3, 27.2, 40.4 Ground cover 20%. Grasses comprise 55% of ground cover, forbs 20%, and shrubs 25%. Canopy cover 34%. **Edge:** Bounded on N by similar habitat, on E by upland prairie, on S by a gravel road, and on W by upland prairie and a wheat field. **Topography:** Very gently sloping from S to N. **Weather (1979):** Fairly dry throughout period. Skies mostly clear; no precipitation. Temperatures 50-65°F; (1980): Very dry. Skies mostly clear. Temperatures

50-68°F. **Coverage (1979):** June 6, 10, 13, 17, 21, 25, 29; July 1; 0445-0920, MDT. Total hours: 16.8; (1980): May 31; June 4, 6, 9, 11, 17, 23, 25; 0435-1000, MDT. Total hours 14.4. **Census (1979):** House Wren, 8 (169, 68); Yellow Warbler, 7 (148, 60); Com. Yellowthroat, 7; Gray Catbird, 6 (127, 51), Mourning Dove, 4 (84, 34); Black-billed Cuckoo, 3 (63, 26); Brown-headed Cowbird, 3 (females); Rufous-sided Towhee, 3; Am. Robin, 2; Red-winged Blackbird, 2; Am. Goldfinch, 2; E. Kingbird, 1; Least Flycatcher, 1; Brown Thrasher, 1. **Total:** 14 species; 50 territorial males or females (1056/km<sup>2</sup>, 427/100 acres). **Visitors:** Marsh Hawk, Am. Kestrel, Sharp-tailed Grouse, Ring-necked Pheasant, Short-eared Owl, Com. Flicker, Barn Swallow, Cedar Waxwing, Red-eyed Vireo, W. Meadowlark, Com. Grackle, Black-headed Grosbeak, Vesper Sparrow, Lark Sparrow, Clay-colored Sparrow, Field Sparrow, Song Sparrow. **Remarks:** Nests located (5): E. Kingbird, House Wren, Brown Thrasher, Com. Yellowthroat, Red-winged Blackbird. **Census (1980):** Yellow Warbler, 15 (317, 128); House Wren, 13 (275, 111); Gray Catbird, 8 (169, 68), Rufous-sided Towhee, 6 (127, 51); Mourning Dove, 5 (106, 43); Brown-headed Cowbird, 5 (females); Brown Thrasher, 3 (63, 26); Com Yellowthroat, 3; Am. Goldfinch, 3; Am. Robin, 2; Lark Sparrow, 1.5; Ring-necked Pheasant, 1; Black-billed Cuckoo, 1; Com Flicker, 1; E. Kingbird, 1; Black-capped Chickadee, 1; Red-eyed Vireo, 1; Red-winged Blackbird, 1; Black-headed Grosbeak, 1, Clay-colored Sparrow, 1; Field Sparrow, 1. **Total:** 21 species; 74.5 territorial males or females (1573/km<sup>2</sup>, 637/100 acres). **Visitors:** Sharp-shinned Hawk, Cooper's Hawk, Sharp-tailed Grouse, Com. Nighthawk, Least Flycatcher, Barn Swallow, Yellow-breasted Chat, Am. Redstart, W. Meadowlark, Com Grackle, Lazuli Bunting, Vesper Sparrow, Chipping Sparrow, Song Sparrow. **Remarks:** Nests located (2): Yellow Warbler, Lark Sparrow. Cattle wintered in this draw, but it was not grazed during the breeding season. Thanks to Richard Williams for assistance.—GREG HIEMENZ and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**125. ASH-COTTONWOOD DRAW.**—**Location:** North Dakota; Billings Co., 9 mi S Medora; SE 1/4, SW 1/4, Sec. 12, T138N, R102W; 46°47'N, 103°30'W, Tracy Mountain Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 3 ha = 7.4 acres. **Description of Plot:** See AB 34:42 (1980). **Weather:** Skies clear to overcast. Light rain during one count. Temperatures between 35-82°. Winds calm to 20 mph. **Coverage:** Apr. 29; May 12, 29; June 1, 5, 11, 18, 22, 24-25; 0430-0940 and 1910-2025, MDT. Total hours: 15.25. **Census:** Rufous-sided Towhee, 8 (267, 108); Ovenbird, 5 (167, 68); Mourning Dove, 3 (100, 41); Black-and-white Warbler, 3; Am. Redstart, 3; Chipping Sparrow, 3, Com. Flicker, 2; Am. Robin, 2; Red-eyed Vireo, 2; Black-capped Chickadee, 1; Lazuli Bunting, 1. **Total:** 11 species; 33 territorial males or females (1102/km<sup>2</sup>, 446/100 acres). **Visitors:** Marsh Hawk, Am. Kestrel, Turkey, Com. Crow, House Wren, Gray Catbird, Brown Thrasher, W. Meadowlark, Vesper Sparrow, Field Sparrow. **Remarks:** Nests

found (3), Mourning Dove, 1, Com. Flicker, 2 Heavy cattle use of the area has resulted in sparse ground cover. Thanks to Farron Wallace for assistance in censusing.—**RICK HOPKINS** and **MICHAEL D. SCHWARTZ**, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**126. ASH - ELM HARDWOOD DRAW,**  
**II.**—**Location:** North Dakota; Billings Co., 10 mi S Medora (SE 1/4, NW 1/4, Sec. 13, T138N, R102W); 46°46' N, 103°30' W, Tracy Mountain Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 2.87 ha = 7.1 acres. **Description of Plot:** See AB 34:55 (1980). **Weather:** Skies clear to overcast. Light rain during 1 count. Temperatures 24-82°F. Winds calm to 20 mph. **Coverage:** Apr. 26; May 8, 27, 29; June 1, 5, 11, 22, 24-25; 0430-0955 and 1910-2025, MDT. Total hours: 15.75. **Census:** Rufous-sided Towhee, 16 (557, 225); Chipping Sparrow, 4 (139, 56); Red-eyed Vireo, 3 (104, 42); Black-and-white Warbler, 3; Field Sparrow, 2.5; Am. Redstart, 2; Lark Sparrow, 2; Turkey, 1; Black-capped Chickadee, 1; Am. Goldfinch, 1; Lazuli Bunting, 1; Vesper Sparrow, 1. **Total:** 12 species; 37.5 territorial males or females ( $1305/\text{km}^2$ , 528/100 acres). **Visitors:** Swainson's Hawk, Sharp-tailed Grouse, Com. Crow, House Wren, Brown Thrasher, Am. Robin, Mountain Bluebird, Yellow Warbler, Ovenbird, Com. Yellowthroat, Com. Grackle, Brown-headed Cowbird, Song Sparrow. **Remarks:** Nests located (2): Rufous-sided Towhee, Field Sparrow. Approximately 15 young Turkeys were seen on the plot. Rufous-sided Towhees showed a substantial increase from 8 to 16. Black-and-white Warblers increased from 1 to 3. House Wrens decreased from 3.5 to 0 and Yellow-breasted Chats decreased from 2 to 0. There is heavy cattle use along the bottom of this draw. Thanks to Farron Wallace for assistance in censusing.—**MICHAEL D. SCHWARTZ** and **RICK HOPKINS**, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**127. ASH - ELM HARDWOOD DRAW**  
**II.**—**Location:** North Dakota; Billings Co., 6 mi N Fairfield; SW 1/4, NW 1/4, Sec. 11, T143N, R99W, Fairfield Quadrangle, USGS. **Continuity:** New (1979). **Size:** 5.38 ha = 13.3 acres (irregular shape, measured from aerial photograph). **Description of Plot:** Mature ash-elm hardwood draw. Canopy dominated by Green Ash (*Fraxinus pennsylvanica*) and Am Elm (*Ulmus americana*). Prominent shrubs are Buckbrush (*Symphoricarpos occidentalis*), Choke Cherry (*Prunus virginiana*), Hawthorn (*Crataegus chrysocarpa*), W Wild Rose (*Rosa woodsii*), Juneberry (*Amelanchier alnifolia*), Buffaloberry (*Shepherdia argentea*), and Wild Plum (*Prunus americana*). Major grasses and forbs are Fowl Blue Grass (*Poa palustris*), Long-beaked Sedge (*Carex sprengelei*), Kentucky Blue Grass (*Poa pratensis*), Heavy Sedge (*C. gravida*), Wild Licorice (*Glycyrrhiza lepidota*), N Bedstraw (*Galium boreale*), Yellow Avens (*Geum aleppicum*), and Little Rattlepod (*Astragalus canadensis*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 30 points from point-center method, 163.9/acre (405/ha); total basal area

57.2 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Green Ash, 125.7, 76.7, 74.7, 100; Am. Elm, 36.9, 22.5, 24.6, 70; Box-elder (*Acer negundo*), 1.4, 0.8, 0.7, 3.3. Trees by diameter size class: A (3-6 in.) 38.2, 23.3, 5.1, 8.9; B (6.1-9 in.) 87.4, 53.3, 27.8, 48.6; C (9.1-15 in.) 36.9, 22.5, 22.4, 39.1; D (15.1-21 in.) 1.4, 0.8, 1.9, 3.4. Ground cover: 35%. Grasses comprise 15% of ground cover, forbs 20%, and shrubs 65%. Canopy cover 39%. **Edge:** Bounded on the N, E, and W by upland prairie, on S by a shrubby transition zone. A stock pond abuts the SE corner. **Elevation:** 2700-2750 ft. **Topography:** Gradually sloping toward the S. **Weather (1979):** Fairly dry throughout period. Skies mostly clear to partly cloudy. Temperatures 40-60°F; **(1980):** Very dry. Skies mostly clear. Temperatures 50-75°F. **Coverage (1979):** May 19, 21, 25, 31; June 1, 9, 15, 19, 24, 28; 0450-1200, MDT. Total hours: 19.6. **(1980):** May 28; June 2, 5, 10, 12, 18, 22, 27. Total hours: 15.75. **Census (1979):** House Wren, 15 (279, 113); Mourning Dove, 9 (167, 68); Yellow Warbler, 8 (149, 60); Rufous-sided Towhee, 7 (130, 53); Gray Catbird, 6 (111, 45); Black-billed Cuckoo, 4 (74, 30); Red-eyed Vireo, 3 (56, 23); Brown-headed Cowbird, 3 (females); Am. Goldfinch, 3; Com. Flicker, 2; E. Kingbird, 2; Least Flycatcher, 2; Brown Thrasher, 2; Am. Robin, 2; Com. Yellowthroat, 2; Mallard, 1; Am. Redstart, 1; Field Sparrow, +. **Total:** 18 species; 72 territorial males or females ( $1338/\text{km}^2$ , 541/100 acres). **Visitors:** Cooper's Hawk, Swainson's Hawk, Great Horned Owl, Com. Nighthawk, Red-headed Woodpecker, Say's Phoebe, Rough-winged Swallow, Blue Jay, Black-capped Chickadee, Black-and-white Warbler, Yellow-breasted Chat, Red-winged Blackbird, N. Oriole, Com. Grackle, Black-headed Grosbeak, Lazuli Bunting, Vesper Sparrow, Lark Sparrow, Clay-colored Sparrow, Song Sparrow. **Remarks:** Nests located (7): Mourning Dove, 4; Mallard, 1; House Wren, 1; Rufous-sided Towhee, 1. **Census (1980):** Yellow Warbler, 11; (204, 83); Rufous-sided Towhee, 9 (167, 68); House Wren, 8 (149, 60); Mourning Dove, 6 (111, 45); Gray Catbird, 6; Brown-headed Cowbird, 5 (females, 93, 38); Brown Thrasher, 4 (74, 30); Least Flycatcher, 3 (56, 23); Am. Robin, 3; Com. Yellowthroat, 3; Am. Goldfinch, 3; Red-eyed Vireo, 2 (37, 15); Black-headed Grosbeak, 2; Field Sparrow, 2; Black-billed Cuckoo, 1; E. Kingbird, 1; Black-capped Chickadee, 1; Bell's Vireo, 1; Black-and-white Warbler, 1; Ovenbird, 1; Yellow-breasted Chat, 1. **Total:** 21 species; 74 territorial males or females ( $1375/\text{km}^2$ , 556/100 acres). **Visitors:** Sharp-shinned Hawk, Ring-necked Pheasant, Yellow-billed Cuckoo, Belted Kingfisher, Com. Flicker, Downy Woodpecker, Blue Jay, Com. Crow, Am. Redstart, W. Meadowlark, Red-winged Blackbird, Com. Grackle, Clay-colored Sparrow. **Remarks:** Nests located (4): Mourning Dove, 2; House Wren, 2. Thanks to Farron Wallace and Richard Williams for assistance.—**GREG HIEMENZ**, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**128. ASH - ELM HARDWOOD DRAW**  
**III.**—**Location:** North Dakota; Mercer Co., 2 mi SW of Stanton, NE 1/4, Sec. 23, T144N, R85W; 47°17' N, 101°25' W, Stanton Quadrangle, USGS. **Continuity:** New. **Size:**

9.87 ha = 24.4 acres (irregular, determined by planimetric measurement from aerial photos). **Description of Plot:** Mature ash-elm hardwood ravine. Dominant canopy trees are Green Ash (*Fraxinus pennsylvanica*), Am Elm (*Ulmus americana*), and Quaking Aspen (*Populus tremuloides*). Most prominent in the understory are Round-leaved Hawthorn (*Crataegus rotundifolia*), Juneberry (*Amelanchier alnifolia*), Choke Cherry (*Prunus virginiana*), and W. Wild Rose (*Rosa woodsii*). The ground cover is predominantly Kentucky Blue Grass (*Poa pratensis*). A quantitative survey of the vegetation provided the following data: Trees 3-in. diameter and larger, based on twelve 0.01 acre quadrats, 350.8/acre; total basal area 120.1 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Green Ash 239.5, 68.3, 66.9, 100; Am. Elm 70.8, 20.2, 29.2, 30.8, aspen 16.9, 4.8, 1.7, 23.1; Choke Cherry 10.1, 2.9, 0.8, 23.1; Peach-leaved Willow (*Salix amygdaloidea*) 10.1, 2.9, 0.8, 16.2, 7.7, Red Cedar (*Juniperus scopulorum*) 3.4, 1, 0.8, 7.7. Trees by diameter size class: A (3-6 in.) 161.9, 46.2, 16.2, 13.5; B (6.1-9 in.) 101.2 28.8, 30.4, 25.3; C (9.1-15 in.) 84.3, 24, 67.4, 56.1; D (15.1-21 in.) 3.4, 1, 16.1, 5.1. Shrub stems/acre: Choke Cherry 2257, aspen 2024, W. Wild Rose 1790, Juneberry 3581, hawthorn 700, elm 311. Ground cover 90% Grasses and sedges comprise 40%, forbs 20%, and shrubs 40%. Canopy cover 73.5%, canopy height from 14-58 ft, average height 34.7 ft. Trees in this ravine occupy principally the sides of the intermittent meandering stream, which follows the base of the ravine. Few scattered trees occupy abandoned beach lines of the eroded valley. **Edge:** Bordered E and W sides by grazed prairie, wooded stream valley continues N and S from the site. **Topography:** Steep-sided valley, 10-15 m deep, bottom up to 30 m wide. Stream flow is intermittent, but some water stood in channel through entire season. **Elevation:** 560-585 m (1840-1920 ft). **Weather:** See Census. 134 **Coverage:** Apr. 30; May 7, 30; June 9, 13, 19, 21; July 2; between dawn and 1100 and 2000 and 2200. Total hours: 36. **Census:** House Wren, 9 (91, 37); Least Flycatcher, 8 (81, 33), Yellow Warbler, 5.5 (56, 23); Brown-headed Cowbird, 4 (41, 16); E. Kingbird, 3.5 (35, 14); Mourning Dove, 2; Gray Catbird, 2, Am. Robin, 2; Com. Yellowthroat, 2; Red-winged Blackbird, 2; Am. Goldfinch, 2; W Meadowlark, 1.5; Great Horned Owl, 1, Com. Flicker, 1; Downy Woodpecker, 1; W Kingbird, 1; Willow Flycatcher, 1; Brown Thrasher, 1; N. Oriole, 1; Lazuli Bunting, 1, Rufous-sided Towhee, 1; Grasshopper Sparrow, 1; Field Sparrow, 1; Song Sparrow, 1, Black-capped Chickadee, 0.5; Orchard Oriole, 0.5; Vesper Sparrow, 0.5. **Total:** 27 species; 57 territorial males ( $577/\text{km}^2$ , 234/100 acres). **Visitors:** Mallard, Turkey Vulture, Swainson's Hawk, Sharp-tailed Grouse, Killdeer, Com. Nighthawk, E. Wood Pewee, Rough-winged Swallow, Barn Swallow, Cedar Waxwing, Philadelphia Vireo, Yellow-rumped Warbler, Yellow-breasted Chat, Com. Grackle, Black-headed Grosbeak, Lark Sparrow, Clay-colored Sparrow. **Remarks:** 10 nests; Mourning Dove, 3, Least Flycatcher, 2; Red-winged Blackbird, 2; Great Horned Owl, 1; Downy Woodpecker, 1; Grasshopper Sparrow, 1. Cattle were occasionally present on the site after

June 1. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—**JOHN FLECKENSTEIN** and **STEVEN MACK**, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

#### 129. ASH - ELM HARDWOOD DRAW

**IV.—Location:** North Dakota; Oliver Co. 6 mi SE of Stanton, SW 1/4 of Sec. 5, T143N, R84W; 47°14'N, 101°22'W, Hanover NE Quadrangle, USGS. **Continuity:** New. **Size:** 16.15 ha = 39.9 acres (irregular, determined by planimetric measurement from aerial photos). **Description of Plot:** Mature ash-elm hardwood ravine. Dominant canopy trees are Green Ash (*Fraxinus pennsylvanica*), and Am. Elm (*Ulmus americana*). Most prominent understory are Choke Cherry (*Prunus virginiana*), Juneberry (*Amelanchier alnifolia*), Wolfberry (*Symporicarpos occidentalis*), and Green Ash seedlings. The ground cover is predominantly Long-beaked Sedge (*Carex spengelii*) and N. Bedstraw (*Galium boreale*). A quantitative survey of the vegetation provided the following data: Tree 3 in. diameter and larger, based on twelve 0.01 acre quadrats, 398 trees/acre; total basal area 88 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Green Ash 236.1, 59.3, 66.3, 83; Am. Elm 158.5, 39.8, 30.6, 58; Box-elder (*Acer negundo*) 3.4, 0.9, 3.1, 8. Trees by diameter size class: A (3-6 in.) 236.2, 59.3, 23.6, 27.6; B (6.1-9 in.) 134.8, 33.9, 40.4, 47.2; C (9.1-15 in.) 27.6, 6.8, 21.6, 25.2. Shrub stems/acre: Wolfberry 2345.7, Choke Cherry 780.1, Poison Ivy (*Rhus radicans*) 332.1, Juneberry 231.9, and W. Wild Rose (*Rosa woodsii*) 163.4. Ground cover 85%. Grasses and sedges comprise 40%, forbs 20% and shrubs 40%. Canopy cover 78%; canopy height from 12-50 ft, average 30.8 ft. An intermittent stream at the bottom of the ravine rarely had water in it. The S portion of this ravine had a denser stand of trees, while the N portion tended to be patchy, with some patches of brush being common. **Edge:** Bounded on both ends by continuation of the wood ravine, on E by prairie and strip mine area, on W by grazed prairie. **Topography:** The E facing slope of a ravine, the other side being prairie. Woody vegetation continues up and down the ravine from the site. The slope is 20-30° and 20 m high. **Elevation:** 600-620 m (1940-2000 ft). **Weather:** See Census 134. **Coverage:** May 1, 6, June 1, 10, 12, 18, 26; July 9; between dawn and 1100 and 2000-2200. Total hours: 30. **Census:** Brown-headed Cowbird, 7 (43, 18), House Wren, 5 (31, 13); Rufous-sided Towhee, 5; Brown Thrasher, 4 (25, 10); E. Kingbird, 3 (19, 8); Gray Catbird, 2.5; Mourning Dove, 2; Am. Robin, 2; Yellow Warbler, 2; Black-headed Grosbeak, 2; Am. Goldfinch, 2; Field Sparrow, 2; Song Sparrow, 2; W. Meadowlark, 1.5; Least Flycatcher, 1; Black-capped Chickadee, 1; Red-eyed Vireo, 1; Com. Yellowthroat, 1; Yellow-breasted Chat, 1; Vesper Sparrow, 0.5; Lark Sparrow, 0.5. **Total:** 21 species; 48 territorial males (297/km<sup>2</sup>, 120/100 acres). **Visitors:** Mallard, Marsh Hawk, Ring-necked Pheasant, Killdeer, Upland Sandpiper, Com. Nighthawk, W. Kingbird, Willow Flycatcher, Barn Swallow, Black-and-white Warbler, Yellow-rumped Warbler, Yellow-headed Blackbird, Red-winged Blackbird, Orchard Oriole, Lazuli Bunting, Grasshopper Spar-

row. **Remarks:** Heavy pre-mining activity, drilling and surveying, occurred on the E edge of the site. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—**JOHN FLECKENSTEIN** and **STEVEN MACK**, Zool. Dept., N.D. State Univ., Fargo, N.D. 58105.

#### 130. ASPEN DRAW.—Location:

North Dakota; Mercer Co, 3 mi S of Stanton, NE 1/4 of Sec. 24, T144N, R85W; 47°17'N, 101°24'W, Stanton Quadrangle, USGS. **Continuity:** New. **Size:** 5.58 ha = 13.8 acres (irregular, determined by planimetric measurement from aerial photos). **Description of Plot:** The dominant canopy trees are Quaking Aspen (*Populus tremuloides*) and Green Ash (*Fraxinus pennsylvanica*). Most prominent understory are Choke Cherry (*Prunus virginiana*), Juneberry (*Amelanchier alnifolia*), and Silverberry (*Elaeagnus argentea*). The ground cover is primarily Long-beaked Sedge (*Carex spengelii*). Trees 3 in. diameter and over based on two 100 m<sup>2</sup> quadrats, 951/acre; total basal area 112 ft<sup>2</sup>/acre. Species comprising 80% of the total number of trees: Aspen 951, 100, 100, 100. Mean dbh ± S.D. in in. 4.7±2. Shrub stems/acre: Wolfberry (*Symporicarpos occidentalis*) 9109, Choke Cherry 3416, aspen 2024, Juneberry 1518, Virginia Creeper (*Parthenocissus inserta*) 506. Ground cover 72%, grasses comprise 10% of cover, forbs 30%, and shrubs 60%. Canopy cover 88%; canopy height 26-46 ft, average height 40 ft. **Edge:** Bordered E and S by prairie, W by alfalfa field, and N by mining road. **Topography:** In the center of this site is a pit 10 m deep by 20 m diameter, the remains of an abandoned coal mine. The remainder of this site slopes at about 15° down to this pit. **Elevation:** 1840-1900 ft. **Weather:** See Census 134. **Coverage:** Apr. 30; May 8, 30; June 9, 12, 19, 21; July 3; between dawn and 1200 and 2000-2200. Total hours: 28. **Census:** Bank Swallow, 5 (90, 36); Mourning Dove, 2 (36, 15); E. Kingbird, 2; House Wren, 2; Yellow Warbler, 2; Brown-headed Cowbird, 2; Lazuli Bunting, 2; W. Meadowlark, 1.5; Black-billed Cuckoo, 1; Com. Flicker, 1; Gray Catbird, 1; Brown Thrasher, 1; Am. Robin, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 1; Grasshopper Sparrow, 1; Field Sparrow, 1; Blue Jay, 0.5; Yellow-breasted Chat, 0.5. **Total:** 19 species; 28.5 territorial males (510/km<sup>2</sup>, 207/100 acres). **Visitors:** Turkey Vulture, Ring-necked Pheasant, Killdeer, Hairy Woodpecker, W. Kingbird, Black-billed Magpie, Black-capped Chickadee, Red-eyed Vireo, Black-and-white Warbler, Yellow-rumped Warbler, Red-winged Blackbird, N. Oriole, Brewer's Blackbird, Com. Grackle, Vesper Sparrow, Lark Sparrow, Chipping Sparrow, Clay-colored Sparrow, White-crowned Sparrow, Song Sparrow. **Remarks:** Bank Swallows (5) nested around the abandoned excavation. The mine road received heavy, intermittent use. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—**JOHN FLECKENSTEIN** and **STEVEN MACK**, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

#### 131. BUFFALO BERRY SHRUB COMMUNITY.—Location:

North Dakota; Oliver Co., 5 mi S of Stanton, SE 1/4, Sec. 6,

T143N, R84W, 47°14'N, 101°23'W, Hanover NE Quadrangle, USGS. **Continuity:**

**New.** **Size:** 11.06 ha = 27.34 acres (irregular, determined by planimetric measurement from aerial photos). **Description of Plot:** Slope with N aspect dominated by patches of Buffaloberry (*Shepherdia argentea*), Silverberry (*Elaeagnus argentea*), Round-leaved Hawthorn (*Crataegus rotundifolia*), and Wolfberry (*Symporicarpos occidentalis*). Much of the area is covered by debris from Sweet Clover (*Melilotus alba*) from the previous year. A quantitative survey of the vegetation provided the following data (Height Class I = 0.25 m - 0.75 m; Class II = 0.76 m - 1.50 m; Class III = 1.51 m - 2.25 m, Class IV = >2.25 m): Shrub stems/acre—Wolfberry, 90,833, 4167, 0, 0; Silverberry 2292, 6667, 1875, 0; Buffaloberry 625, 5000, 2917, 1875; W. Wild Rose (*Rosa woodsii*) 2917, 0, 0, 0; hawthorn 625, 625, 0, 0. Ground cover 75%. Grasses comprise 10%, forbs 30%, shrubs 60%. Buffaloberry occurs in 26 separate patches about 100 m<sup>2</sup> each. Canopy height 6-15 ft, average height about 10 ft. **Edge:** Bounded, N, W, and S by grazed prairie and shrub land; E by ungrazed prairie. **Topography:** Shallow, N facing slope. **Elevation:** 605-615 m (1980-2010 ft). **Weather:** See Census 134. **Coverage:** May 1, 8; June 1, 10, 19, 25, 27; between dawn and 1100. Total hours: 14. **Census:** Grasshopper Sparrow, 7 (63, 26); Clay-colored Sparrow, 5 (45, 18), W. Meadowlark, 1.5; Ring-necked Pheasant, 1; E. Kingbird, 1; Gray Catbird, 1; Yellow Warbler, 1; Com. Yellowthroat, 1; Yellow-breasted Chat, 1. **Total:** 9 species; 19.5 territorial males (176/km<sup>2</sup>, 71/100 acres). **Visitors:** Marsh Hawk, Mourning Dove, Black-billed Cuckoo, Barn Swallow, Brown Thrasher, Red-winged Blackbird, Com. Grackle, Brown-headed Cowbird, Rufous-sided Towhee, Vesper Sparrow, Field Sparrow. **Remarks:** Cattle grazing in the area after May 31. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—**JOHN FLECKENSTEIN** and **STEVEN MACK**, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

#### 132. COTTONWOOD FLOODPLAIN

**I.—Location:** North Dakota; Billings Co., 1.7 mi NW Medora, NW 1/4, SW 1/4, Sec. 15, and SE 1/4, Sec. 16, T140N, R102W, 46°56'N, 103°33'W, Medora Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 19 ha = 47 acres. **Description of Plot:** See AB 34:54 (1980). **Weather:** Skies clear to overcast. Temperatures 29-84°F. Winds calm to 15 mph. **Coverage:** Apr. 28; May 11, 30; June 3-4, 9, 17, 20, 22; 0445-0925 and 1905-2120, MDT. Total hours: 35.5. **Census:** House Wren, 16 (84, 34); Mourning Dove, 15 (79, 32); Am. Robin, 12 (63, 26); Rufous-sided Towhee, 12; Chipping Sparrow, 12; Com. Flicker, 8 (42, 17); Red-eyed Vireo, 8; Ovenbird, 7 (37, 15); E. Kingbird, 5 (26, 11), Black-capped Chickadee, 4 (21, 9); Warbling Vireo, 4; Am. Kestrel, 3 (16, 6); Starling, 3, Black-headed Grosbeak, 2.5; Hairy Woodpecker, 2; Downy Woodpecker, 2; Black-and-white Warbler, 2; Com. Yellowthroat, 2; Field Sparrow, 1.5; Red-tailed Hawk, 1; Turkey, 1; Ring-necked Pheasant, 1; Red-headed Woodpecker, 1; Blue Jay, 1; White-breasted Nuthatch, 1, Yellow Warbler, 1; N. (Baltimore) Oriole, 1,

N (Bullock's) Oriole, 1, Lazuli Bunting, 0.5. **Total:** 28 species (29 forms); 130.5 territorial males or females ( $686/\text{km}^2$ , 278/100 acres). **Visitors:** Mallard, Com. Nighthawk, Belted Kingfisher, *Empidonax* sp., Black-billed Magpie, Brown Thrasher, W. Meadowlark, Am. Redstart, Red-winged Blackbird, Orchard Oriole, Brown-headed Cowbird, Am. Goldfinch, Red Crossbill. **Remarks:** Nests located (21): Red-tailed Hawk, 1; Turkey, 1; Mourning Dove, 5; Com. Flicker, 3; E. Kingbird, 2; House Wren, 1; Am. Robin, 3; Starling, 3; Black-headed Grosbeak, 2. Species showing substantial decreases were: Great Horned Owl, 2 to 0; House Wren, 23 to 16; Red-eyed Vireo, 18 to 8; Black-headed Grosbeak, 6.5 to 2.5. Species showing increases were: Am. Kestrel, + to 3; Mourning Dove, 11 to 15; Chipping Sparrow, 8 to 12. This area is located within the boundaries of Theodore Roosevelt Nat'l Park (South Unit). This site may receive some grazing from a herd of bison. Thanks to Farron Wallace for assistance in censusing.—*RICK HOPKINS* and *MICHAEL D. SCHWARTZ*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**133. COTTONWOOD FLOODPLAIN**  
**II.**—**Location:** North Dakota; Billings Co., 0.5 mi SW Medora, NW 1/4, SE 1/4, Sec. 27, T140N, R102W;  $46^\circ 54' \text{N}$ ,  $103^\circ 32' \text{W}$ , Medora Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 13 ha = 32.2 acres. **Description of Plot:** See AB 34:54 (1980). **Weather:** Skies clear to overcast. Temperatures 28–78°F. Winds calm to 20 mph. **Coverage:** Apr. 25; May 7, 22, 31; June 4, 10, 18, 21, 24; 0435–1100 and 1910–2050, MDT. Total hours: 29.5. **Census:** House Wren, 10 (77, 31); Rufous-sided Towhee, 10; Com. Flicker, 8 (61, 25); Red-eyed Vireo, 8; Ovenbird, 8; Am. Robin, 7 (54, 22); Mourning Dove, 6 (46, 19); Chipping Sparrow, 6; E. Kingbird, 3 (23, 9); Black-headed Grosbeak, 3; Red-headed Woodpecker, 2; Hairy Woodpecker, 2; Blue Jay, 2; Warbling Vireo, 2; Com. Yellowthroat, 2; Field Sparrow, 1.5; Am. Kestrel, 1; Ring-necked Pheasant, 1; Black-billed Magpie, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Starling, 1; Black-and-white Warbler, 1; Am. Redstart, 1; Yellow Warbler, 0.5; Brown-headed Cowbird, 0.5; Lazuli Bunting, 0.5. **Total:** 27 species; 90 territorial males or females ( $691/\text{km}^2$ , 280/100 acres). **Visitors:** Great Blue Heron, Mallard, Cooper's Hawk, Turkey, Com. Nighthawk, Belted Kingfisher, Downy Woodpecker, W. Wood Pewee, Com. Crow, Gray Catbird, Brown Thrasher, Yellow-breasted Chat, W. Meadowlark, N. Baltimore Oriole, N. (Bullock's) Oriole, Com. Grackle, Am. Goldfinch. **Remarks:** Nests located (10): Mourning Dove, 1; Com. Flicker, 2; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; E. Kingbird, 1; White-breasted Nuthatch, 1; Am. Robin, 1; Black-headed Grosbeak, 1; Rufous-sided Towhee, 1. Species showing substantial decreases were: Red-eyed Vireo, 16 to 8; Mourning Dove, 11 to 6; Warbling Vireo, 8 to 2; Lazuli Bunting, 4.5 to 0.5. Territorial males decreased from 115.5 to 90.—*MICHAEL D. SCHWARTZ* and *RICK HOPKINS*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**134. COTTONWOOD FLOODPLAIN**  
**III.**—**Location:** North Dakota; Oliver Co., 1 mi W of Washburn, SE 1/4 of Sec. 15, T144N, R84W;  $47^\circ 17' \text{N}$ ,  $101^\circ 3' \text{W}$ , Washburn Quadrangle, USGS. **Continuity:** New. **Size:** 15.66 ha = 38.7 acres (rectangular, paced). **Description of Plot:** Mature Cottonwood floodplain forest. A portion of extensive forests typical of Missouri River bottomlands in this area. Canopy dominated by Cottonwood (*Populus deltoides*). Prominent shrubs in the understory are Green Ash (*Fraxinus pennsylvanica*), Boxelder (*Acer negundo*), Wolfberry (*Symporicarpos occidentalis*), Silverberry (*Elaeagnus argentea*), Poison Ivy (*Rhus radicans*), and Virginia Creeper (*Pachysandra inserta*). Ground cover is essentially sparse, but some areas are densely covered with Poison Ivy. Major species include False Solomon's Seal (*Smilacina stellata*), *Anemone canadensis*, Smooth Brome (*Bromus inermis*), and Early Meadowrue (*Thalictrum venulosum*). A quantitative survey of the vegetation revealed the following: Trees 3 in. diameter and over based on five 0.01 acre quadrats, 440/acre; total basal area 328.1 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Cottonwood 340, 34.7; 94.5; 80; Green Ash 340, 34.7, 2.7; 80; Boxelder 300, 30.6, 2.8, 40. Trees by diameter size class: A (3–6 in.) 100, 21.7, 8.3, 2.5; B (6.1–9 in.) 20, 4.3, 5.9, 1.8; C (9.1–15 in.) 300, 65.2, 251.5, 76.7; D (15.1–21 in.) 40, 8.7, 62.4, 19. Shrub stems/acre: Silverberry 1215, Boxelder 1619, Green Ash 3239, Wolfberry 1012. Ground cover 93%, grasses comprise 15%, forbs 35%, shrubs 50%. Canopy cover 72%; canopy height 23–87 ft, average 53.7 ft. **Edge:** Bounded on S and W by Cottonwood floodplain forest, on E by ND Highway 200, and on N by the Missouri River. **Topography:** 2–3 m cutbank along the river, otherwise, level. **Elevation:** 510 m (1665 ft). **Weather:** The spring was hot and dry. No rain fell until May 27. Between then and mid-July thunderstorms brought 3.2–8 cm, depending on the site. Temperature range, -2–38°C. **Coverage:** May 2, 19; June 2, 10, 17, 19; July 11; between dawn and 1100 and 2000–2200. Total hours: 36. **Census:** Bank Swallow, 20 (128, 52); Least Flycatcher, 12 (77, 31); House Wren, 9 (57, 23); Yellow Warbler, 7 (45, 18); Am. Robin, 6 (38, 16); Mourning Dove, 4 (26, 10); Brown-headed Cowbird, 4; Com. Yellowthroat, 2.5; E. Kingbird, 2; Starling, 2; Red-eyed Vireo, 2; Warbling Vireo, 2; N. Oriole, 2; Black-headed Grosbeak, 2; Am. Goldfinch, 2; Com. Flicker, 1.5; Ring-necked Pheasant, 1; Hairy Woodpecker, 1; E. Wood Pewee, 1; Black-capped Chickadee, 1; Gray Catbird, 1; Brown Thrasher, 1; Cedar Waxwing, 1; Veery, 1; Ovenbird, 1; Rufous-sided Towhee, 1; Chipping Sparrow, 1; Song Sparrow, 1; Wood Duck, 0.5; Blue Jay, 0.5. **Total:** 30 species; 93 territorial males ( $594/\text{km}^2$ , 240/100 acres). **Visitors:** Mallard, Turkey, Black-billed Cuckoo, Downy Woodpecker, Rough-winged Swallow, Cliff Swallow, Yellow-rumped Warbler, Yellow-breasted Chat, W. Meadowlark, Com. Grackle. **Remarks:** 26 nests; 20 Bank Swallow nests in river bank, Mourning Dove, 2; E. Kingbird, 1; Least Flycatcher, 1; Cedar Waxwing, 1; Starling, 1. 75–100 Cliff Swallow nests were under the highway bridge just E of the site. The site re-

ceives some weekend use from area residents. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN* and *STEVEN MACK*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**135. GREEN ASH DRAW.**—**Location:** North Dakota; Oliver Co., 6 mi SE of Stanton, S 1/2, Sec. 9, T143N, R84W;  $47^\circ 13' \text{N}$ ,  $101^\circ 20' \text{W}$ , Hanover NE Quadrangle, USGS. **Continuity:** New. **Size:** 13.56 ha = 33.5 acres (irregular, determined by planimetric measurement from aerial photos). **Description of Plot:** The dominant canopy tree is Green Ash (*Fraxinus pennsylvanica*). Most prominent in the understory are Wolfberry (*Symporicarpos occidentalis*), Sand Cherry (*Prunus pumila*), Silverberry (*Elaeagnus argentea*), and Juneberry (*Amelanchier alnifolia*). The ground cover is primarily Kentucky Blue Grass (*Poa pratensis*). Trees 3-in. diameter and over, based on five 0.01 acre quadrats, 580/acre; total basal area: 55.23 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees sampled: Green Ash 480, 84, 80, 60, Boxelder (*Acer negundo*) 20, 2, 7, 20; Sand Cherry 80, 14, 13, 20. Trees by diameter size class: A (3–6 in.) 580, 100, 55.23, 100. Shrub stems/acre: Wolfberry 49,797, Silverberry 5870, Juneberry 4049, Sand Cherry 6275, W. Wild Rose (*Rosa woodsii*) 18,218. Ground cover 72%. Grasses comprise 50% of cover, forbs 10%, and shrubs 40%. Canopy cover 49%; canopy height 17 to 30 ft, average height 25.1 ft. **Edge:** Bordered on all sides by grazed prairie. **Topography:** Steep-sided, narrow stream valley, 45° slope, 10–15 m deep, 50 m wide. Intermittent stream, but springs keep valley bottom wet. Valley runs E–W. **Elevation:** 600–615 m. **Weather:** See Census 134. **Coverage:** May 6, 16, 29; June 6, 13, 17, 26; between dawn and 1100 and 2000–2200. Total hours: 20. **Census:** Brown-headed Cowbird, 7 (52, 21); E. Kingbird, 4 (30, 12); Yellow Warbler, 4; Mourning Dove, 2; Brown Thrasher, 2; W. Meadowlark, 2, Rufous-sided Towhee, 2; Field Sparrow, 2, Killdeer, 1.5; Swainson's Hawk, 1; W. Kingbird, 1; Starling, 1; Am. Goldfinch, 1; Song Sparrow, 1; Com. Flicker, 0.5; House Wren, 0.5; Yellow-breasted Chat, 0.5; Vesper Sparrow, 0.5. **Total:** 18 species; 33.5 territorial males ( $247/\text{km}^2$ , 100/100 acres). **Visitors:** Marsh Hawk, Sharp-tailed Grouse, Ring-necked Pheasant, Upland Sandpiper, Com. Nighthawk, Willow Flycatcher, Bank Swallow, Black-billed Magpie, Gray Catbird, House Sparrow, Red-winged Blackbird, Lazuli Bunting, Grasshopper Sparrow, Clay-colored Sparrow. **Remarks:** The Swainson's Hawk nest was unsuccessful. This site was heavily grazed after May 30. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN* and *STEVEN MACK*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105

**136. GREEN ASH ESCARPMENT.**—**Location:** North Dakota; Mercer Co.; 5 mi S of Stanton, SW 1/4 of Sec. 31, T144N, R84W,  $47^\circ 16' \text{N}$ ,  $101^\circ 23' \text{W}$ ; Hanover NW Quadrangle, USGS. **Continuity:** New. **Size:** 18 ha = 44.4 acres (irregular, determined by planimetric measurement from aerial photos). **Description of Plot:** The dominant canopy tree

is Green Ash (*Fraxinus pennsylvanica*). Most prominent in the understory are Wolfberry (*Symporicarpos occidentalis*), Choke Cherry (*Prunus virginiana*), Bristly Gooseberry (*Ribes setosa*), Am. Elm (*Ulmus americana*), Golden Currant (*Ribes odoratum*), and W. Wild Rose (*Rosa woodsii*). The ground cover is primarily Long-beaked Sedge (*Carex sprengelei*), Wolfberry and False Solomon's Seal (*Smilacina stellata*). Trees 3 in. diameter and over, based on five 100 m<sup>2</sup> quadrats, 656/acre; total basal area 268 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Green Ash 648, 98.8, 95, 100; Choke Cherry 8, 1.2, 5, 20. Trees by diameter size class: A (3-6 in.) 251, 38, 25.1, 15; B (6.1-9 in.) 364, 55, 109.2, 65; C (9.1-15 in.) 41, 7, 32.8, 20. Shrub stems/acre are: Wolfberry 8097, Juneberry (*Amelanchier alnifolia*) 1670, Green Ash 1062, Quaking Aspen (*Populus tremuloides*) 657, Round-leaved Hawthorn (*Crataegus rotundifolia*) 556. Ground cover 76%. Grasses and sedges comprise 35%; forbs 15% and shrubs 50%. Canopy cover 84%; canopy height 28-58 ft; average height 43.8 ft. The trees in the N section are denser than in the S section, which tend to be patchy shrub communities. **Edge:** Bordered on W by Wolfberry and prairie, on E by Wolfberry with mining operation about 1 km distant. Woody vegetation continues N and S along escarpment. **Topography:** Slope of escarpment, up to 45°, faces E. **Elevation:** 1920-2110 ft. **Weather:** See Census 134. **Coverage:** May 7, 16; June 6, 10, 16, 19, 26; July 7; between dawn and 1000 and 2000-2200. Total hours: 30. **Census:** Brown-headed Cowbird, 9 (50, 20); Yellow Warbler, 7 (39, 16); Rufous-sided Towhee, 6 (34, 14); Mourning Dove, 4 (22, 9); E. Kingbird, 4; Brown Thrasher, 4; Willow Flycatcher, 3 (17, 7); House Wren, 2; Com. Yellowthroat, 2; Am. Goldfinch, 2; Black-headed Grosbeak, 2; Clay-colored Sparrow, 2; Field Sparrow, 2; Gray Catbird, 1.5; W. Meadowlark, 1.5; Marsh Hawk, 1; Com. Flicker, 1; Blue Jay, 1; Black-capped Chickadee, 1; Am. Robin, 1; Black-and-white Warbler, 1; Yellow-breasted Chat, 1; Sharp-tailed Grouse, 0.5. **Total:** 23 species; 59.5 territorial males (331/km<sup>2</sup>, 134/100 acres). **Remarks:** 2 nests; Marsh Hawk, robin. About ½ of the site is covered by shrub growth, the rest by deciduous woods. After June 15, cattle occasionally grazed the wooded half. Thanks to A. Jody Vander Wal and Richard D Nelson for assistance in censusing.—**JOHN FLECKENSTEIN and STEVEN MACK, Zoology, Dept., N.D. State Univ., Fargo, N.D. 58105.**

**137. RED CEDAR - MIXED GRASS PRAIRIE DRAW.**—**Location:** North Dakota; Billings Co., 11 mi S Medora, SE 1/4, NW 1/4, Sec. 23, T138N, R102W; 46°45'N, 103°31'W, U.S. Forest Service, Little Missouri National Grasslands Map. **Continuity:** New (1979). **Size:** 2.6 ha = 6.4 acres (irregular shape; size determined by planimetric measurement of aerial photos, Soil Conservation Service). **Description of Plot:** A mixed grass prairie coulee with Rocky Mountain Cedar (*Juniperus scopulorum*) growing on the N-facing slope. Dominant grasses are W. Wheat Grass (*Agropyron smithii*), Blue Grama (*Bouteloua gracilis*), Big Sand Grass (*Calamovilfa longifolia*), Lit-

tle Bluestem (*Andropogon scoparius*), Plains Muhy (*Muhlenbergia cuspidata*), and Side-oats Grama (*B. curtipendula*). Dominant shrubs are Skunk Bush (*Rhus trilobata*), Dwarf Sagebrush (*Artemisia cana*), Wolfberry (*Symporicarpos occidentalis*), Buffaloberry (*Shepherdia argentea*), and Creeping Juniper (*J. horizontalis*). Ground cover 15%. Grasses comprise 50% of cover, forbs 5%, and shrubs 45%. **Edge:** Bordered on all sides by mixed grass prairie. **Topography:** Moderate eroded slopes into the coulee from surrounding rolling prairie. **Elevation:** 2450 ft. **Weather (1979):** Skies mostly clear to overcast. Temperatures 55-70°F; **(1980):** Skies clear to overcast. Light rain during 1 census count. Temperatures 25-65°. Winds calm to 15 mph. **Coverage (1979):** June 12, 14, 16, 19-22, 24, 26; between dawn and 1000 and 2000-2030. Total hours: 11.2. **(1980):** Apr. 26; May 8, 27; June 1, 5, 11, 18, 22; 0430-0810, MDT. Total hours: 7.3. **Census (1979):** Rufous-sided Towhee, 6 (232, 94); Chipping Sparrow, 4 (153, 63); Mourning Dove, 1; Vesper Sparrow, 1; W. Meadowlark, +; Field Sparrow, +. **Total:** 6 species; 12 territorial males or females (463/km<sup>2</sup>, 188/100 acres). **Visitors:** Black-billed Cuckoo, Com. Nighthawk, Barn Swallow, Black-capped Chickadee, Am. Robin, Brown-headed Cowbird, Lark Sparrow, Clay-colored Sparrow. **Remarks:** Nests located: Mourning Dove, 1; Vesper Sparrow, 1. **(1980):** Rufous-sided Towhee, 3 (116, 47); Chipping Sparrow, 2; Field Sparrow, 2; Black-billed Magpie, 1. **Total:** 4 species; 8 territorial males or females (309/km<sup>2</sup>, 125/100 acres). **Visitors:** Am. Redstart, Vesper Sparrow. **Remarks:** Nest located: Black-billed Magpie. Species showing decreases were: Rufous-sided Towhee, 6 to 3; Chipping Sparrow, 4 to 2. This site is part of the Little Missouri Nat'l Grasslands and is subject to periodic cattle grazing. J.M. Wiehe and F. Wallace, conducted vegetation analysis and census counts on this area in 1979. Thanks to F. Wallace for assistance in current years censusing.—**RICK HOPKINS and MICHAEL D. SCHWARTZ, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.**

**138. UNRECLAIMED SURFACE MINE I.**—**Location:** North Dakota; Stark Co., 5 mi NNW Belfield, SW 1/4, NE 1/4, Sec. 6, T140N, R99W; 46°58'N, 103°13'W, Belfield Quadrangle, USGS. **Continuity:** New (1979). **Size:** 5.42 ha = 13.4 acres (measured from aerial photograph, about 170 x 320 m, width variable). **Description of Plot:** Spoil piles of a uranium mine abandoned in the mid 1950s. There are two deep ponds adjacent to the spoil piles. About 20% of the surface area is barren ground, with the remainder sparsely vegetated. A few widely scattered Cottonwood (*Populus deltoides*) constitute the only trees. Near the edges of the ponds are small stands of willows (*Salix amygdaloidea* and *S. exiqua*). Major forbs are Yellow Sweet Clover (*Melilotus officinalis*) and White Sweet Clover (*M. alba*). Major grasses are Smooth Brome (*Bromus inermis*), Crested Wheat Grass (*Agropyron cristatum*), and Kentucky Blue Grass (*Poa pratensis*). Ground cover about 20%. Grasses comprise 15% of ground cover and forbs comprise 85%. **Edge:** Bordered on W, N, and E by fallow fields, and on S by an alfalfa field.

**Elevation:** 2750 ft **Topography:** Spoil piles rise about 30 ft above surrounding terrain which is gently rolling. **Weather (1979):** Fairly dry. Skies clear to partly cloudy. Temperatures 48-65°F, **(1980):** Very Dry. Skies mostly clear to partly cloudy. Temperatures 50-70°. **Coverage (1979):** June 4, 11, 16, 19, 23, 27, 30; July 3; 0435-0850, MDT. Total hours 6 **(1980):** May 29; June 3, 5, 10, 14, 22, 24, 27, 0450-0910, MDT. Total hours: 4.8. **Census (1979):** Red-winged Blackbird, 6 (111, 45), W. Meadowlark, 4 (74, 30); Vesper Sparrow, 2; Am. Wigeon, 1; Killdeer, 1; Belted Kingfisher, 1; Brown-headed Cowbird, 1. **Total:** 7 species; 16 territorial males or females (295/km<sup>2</sup>, 119/100 acres). **Visitors:** Mallard, Marsh Hawk, Mourning Dove, E. Kingbird, Horned Lark, Bank Swallow, House Sparrow, Com. Grackle, Lark Bunting, Grasshopper Sparrow. **Remarks:** Nests located (2) Am. Wigeon, Vesper Sparrow. **Census (1980):** Red-winged Blackbird, 6 (111, 45), Killdeer, 2; W. Meadowlark, 2; Brown-headed Cowbird, 2; E. Kingbird, 1; Vesper Sparrow, 1. **Total:** 6 species; 14 territorial males or females (259/km<sup>2</sup>, 104/100 acres) **Visitors:** Mallard, Blue-winged Teal, Am Wigeon, Gray Partridge, Spotted Sandpiper, Mourning Dove, Belted Kingfisher, Bank Swallow, Am. Robin, House Sparrow, Com Grackle, Lark Bunting, Grasshopper Sparrow. **Remarks:** Nest located: E. Kingbird Bank Swallows nested in eroded banks along the pond. Thanks to Richard Williams for assistance.—**GREG HIEMENZ and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.**

**139. UNRECLAIMED SURFACE MINE II.**—**Location:** North Dakota; Billings Co., 2 mi S Fairfield, NW 1/4, NE 1/4, Sec. 26, T142N, R99W; 47°5'N, 103°11'W, Rattlesnake Butte Quadrangle, USGS. **Continuity:** New (1979). **Size:** 16.2 ha = 40 acres (irregular shape, measured from aerial photograph). **Description of Plot:** Spoil piles of a uranium mine abandoned in the late 1950s. Scattered small stands of Cottonwood (*Populus deltoides*) throughout the site (50 trees/acre). There is an immature, poorly developed 10-row shelterbelt on the SW corner of the mine spoils consisting of Siberian Elm (*Ulmus pumila*), Green Ash (*Fraxinus pennsylvanica*), Russian Olive (*Elaeagnus angustifolia*), Buffaloberry (*Shepherdia argentea*), and *Caragana arborescens*. Mean diameter of all trees in the shelterbelt is less than 3 in. Small stands of Willow (*Salix exiqua*) occur along the edges of the excavated areas. Major forbs are Yellow Sweet Clover (*Melilotus officinalis*), Golden Aster (*Chrysopsis villosa*), and White Sage (*Artemesia ludoviciana*). Major grasses are Crested Wheat Grass (*Agropyron cristatum*) and Smooth Brome (*Bromus inermis*). Ground cover about 20%. Grasses comprise 35% of ground cover and forbs comprise 65%. **Edge:** Bordered on N by similar habitat, on W and S by wheat fields, and on E by a shallow wetland which covers most of the excavated area. **Elevation:** 2700 ft **Topography:** Spoil piles rise about 50 ft above surrounding terrain which is gently rolling. **Weather (1979):** Fairly dry. Skies mostly clear to partly cloudy. Temperatures 50-65°F, **(1980):** Very dry. Skies mostly clear to partly cloudy. Temperatures 50-68°F. **Coverage**

(1979): June 4, 9, 16, 18, 23, 27, 30, July 3, 0400-1000, MDT. Total hours: 12.6. (1980): May 30, June 2, 5, 10, 12, 18, 22, 27; 0450-0810, MDT. Total hours: 12.8. **Census** (1979): W. Meadowlark, 11 (68, 28); Killdeer, 3 (19, 8); Vesper Sparrow, 3; Clay-colored Sparrow, 3; Mourning Dove, 2; Com. Yellowthroat, 2; E. Kingbird, 1; Am. Robin, 1; Loggerhead Shrike, 1; Brown-headed Cowbird, 1. **Total:** 10 species; 28 territorial males or females ( $173/\text{km}^2$ , 70/100 acres). **Visitors:** Marsh Hawk, Spotted Sandpiper, Belted Kingfisher, Bank Swallow, Red-winged Blackbird, Lark Bunting, Grasshopper Sparrow, Chipping Sparrow, Song Sparrow. **Remarks:** Nests located (5): Mourning Dove, 2; Killdeer, 1; Am. Robin, 1; Loggerhead Shrike, 1. Red-winged Blackbirds nested in the wetlands adjacent to the spoil piles. Bank Swallows nested in the eroded banks surrounding the excavations. **Census** (1980): W. Meadowlark, 7 (43, 18); Clay-colored Sparrow, 6 (37, 15); Mourning Dove, 5 (31, 13); Vesper Sparrow, 4 (25, 10); Brown-headed Cowbird, 3 (19, 8); E. Kingbird, 2; Brown Thrasher, 2; Com. Yellowthroat, 1; Killdeer, 1. **Total:** 9 species, 31 territorial males or females ( $192/\text{km}^2$ , 78/100 acres). **Visitors:** Mallard, Am. Kestrel, Bank Swallow, Am. Robin, Red-winged Blackbird, Com. Grackle, Lark Bunting, Grasshopper Sparrow, Song Sparrow. **Remarks:** Nests located (5) Mourning Dove, 3; E. Kingbird, 1; Vesper Sparrow, 1. Red-winged Blackbirds nested in the wetlands adjacent to the spoil piles. Bank Swallows nested in the eroded banks surrounding the excavations. Thanks to Richard Williams for assistance.—**GREG HIEMENZ and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.**

**140. 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;  $36^\circ 48' \text{N}$ ,  $95^\circ 58' \text{W}$ , Tulsa Quadrangle, USGS. **Continuity:** Established 1972; 9 consecutive years. **Size:** 40.47 ha = 100 acres. **Description of Plot:** See AB 26 976-977 (1972). **Weather:** Mild to mid-June, a late spring. Temperature extremes on count days 42-85°F. **Coverage:** Apr. 1-2, 9, 23, May 2, 12, 20, 26; June 4, 9, 14; 0630-1050 Total hours: 34.5. **Census:** Blue-gray Gnatcatcher, 18 (44, 18); Indigo Bunting, 13 (32, 13); Red-winged Blackbird, 12 (30, 12); Cardinal, 8 (20, 8); Yellow-billed Cuckoo, 7 (17, 7); Ruby-throated Hummingbird, 7; Com. Yellowthroat, 5.5 (14, 6); Dickcissel, 5.5; Field Sparrow, 5.5; Brown-headed Cowbird, 5 (12, 5); E. Wood Pewee, 4 (10, 4); Carolina Chickadee, 4; Yellow-breasted Chat, 3.5 (9, 4); Red-bellied Woodpecker, 3 (7, 3); Downy Woodpecker, 3; Blue Jay, 3; Red-eyed Vireo, 3; Am. Goldfinch, 3; Red-headed Woodpecker, 2.5; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Brown Thrasher, 2; N. Parula, 2; Painted Bunting, 2; Great Crested Flycatcher, 1.5; Prothonotary Warbler, 1.5; Green Heron, 1; Killdeer, 1; Pileated Woodpecker, 1; E. Phoebe, 1; Acadian Flycatcher, 1; Rough-winged Swallow, 1; E. Bluebird, 1; Kentucky Warbler, 1; Orchard Oriole, 1; Summer Tanager, 1; Blue Grosbeak, 1; Barred Owl, 0.5; Com. Grackle, 0.5; Red-shouldered

Hawk, +, E Kingbird, +, E Meadowlark, +. **Total:** 42 species; 140.5 territorial males ( $347/\text{km}^2$ , 141/100 acres). **Remarks:** A pewee, 3 gnatcatcher and 1 Kentucky Warbler nests were located.—**ELLA DELAP, 409 N. Wyandotte, Dewey, Okla. 74029.**

**141. 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 East Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 7.4 ha = 18.3 acres. **Description of Plot:** See AB 34:71. **Weather:** See Census 54. **Coverage:** May 4, 10, 13, 25, 27; June 15, 23; July 14; 0500-1050. Total hours: 21. **Census:** Indigo Bunting, 7.5 (101, 41); Yellow-billed Cuckoo, 6 (81, 33); Tufted Titmouse, 6; Brown-headed Cowbird, 6; Summer Tanager, 5 (68, 27); Carolina Chickadee, 4 (54, 22); Kentucky Warbler, 4; Cardinal, 4; Blue Jay, 3 (41, 16); Blue-gray Gnatcatcher, 3; Black-and-white Warbler, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; White-breasted Nuthatch, 2; N. Parula, 2; Great Crested Flycatcher, 1.5; Chuck-will's-widow, 1; Whip-poor-will, 1; Com. Crow, 1; White-eyed Vireo, 1. **Total:** 20 species; 65 territorial males ( $878/\text{km}^2$ , 355/100 acres). **Visitors:** Ruby-throated Hummingbird, Com. Flicker, Pileated Woodpecker, Hairy Woodpecker, E. Phoebe, Com. Yellowthroat. **Remarks:** Drought probably reduced populations. Very limited nesting in late June and July.—**FREDERICK M. BAUMGARTNER and ELIZABETH W. MCKAY, Little Lewis Whirlwind Nature School and Sanctuary, Rte 2, Jay, Okla. 74346.**

**142. PONDEROSA PINE I.**—**Location:** North Dakota; Slope Co., 11 mi NW Amidon, NW 1/4, NW 1/4, Sec. 21, T136N, R102W;  $46^\circ 35' \text{N}$ ,  $103^\circ 30' \text{W}$ , U.S. Forest Service, Little Missouri Nat'l Grasslands Map. **Continuity:** Established 1979. **Size:** 20.23 ha = 50 acres. **Description of Plot:** See AB 34:75 (1980). **Weather:** Skies clear to overcast. Temperatures 34-65°F. Winds calm to 20 mph. **Coverage:** Apr. 30; May 13, 29; June 2, 6, 12, 16, 18-19; 0435-0905 and 1900-2045, MDT. Total hours: 27.6. **Census:** Chipping Sparrow, 24.5 (121, 49); Rufous-sided Towhee, 11.5 (57, 23); Ovenbird, 9.5 (47, 19); Com. Yellowthroat, 8 (40, 16); Black-capped Chickadee, 5.5 (27, 11); Black-and-white Warbler, 5 (25, 10); Mourning Dove, 4.5 (22, 9); Red-breasted Nuthatch, 3.5 (17, 7); Yellow-rumped Warbler, 3.5; Am. Kestrel, 1; Turkey, 1; Red-eyed Vireo, 1; Ring-necked Pheasant, +. **Total:** 13 species, 78.5 territorial males or females ( $388/\text{km}^2$ , 157/100 acres). **Visitors:** W. Kingbird, Com. Crow, White-breasted Nuthatch, House Wren, Am. Robin, Mountain Bluebird, Yellow Warbler, Bay-breasted Warbler, Com. Grackle, Brown-headed Cowbird, Red Crossbill, Clay-colored Sparrow. **Remarks:** Nests located (2): Mourning Dove, Chipping Sparrow. Five immature Turkeys were seen. The following species showed substantial increases: Com. Yellowthroat, 3 to 8; Rufous-sided Towhee, 6.5 to 11.5; Chipping Sparrow, 18 to 24.5. Territorial males increased from 53 to 78.5. Thanks to Farron Wallace for assistance in censusing.—**MICHAEL D.**

**SCHWARTZ and RICK HOPKINS, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.**

**143. PONDEROSA PINE II.**—**Location:** North Dakota; Slope Co., 9.5 mi NW Amidon, NE 1/4, SW 1/4, Sec. 14, T136N, R102W,  $46^\circ 35' \text{N}$ ,  $103^\circ 28' \text{W}$ , Rocky Ridge Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 4.05 ha = 10 acres. **Description of Plot:** See AB 34:75 (1980). **Weather:** Clear to mostly cloudy. Temperatures 33-67°F. Winds calm to 20 mph. **Coverage:** Apr. 27; May 9, 29; June 2, 6, 12, 16, 18-19; 0425-0820 and 1905-1955, MDT. Total hours: 11. **Census:** Chipping Sparrow, 5 (124, 50); Rufous-sided Towhee, 3 (74, 30); Turkey, 1; Black-capped Chickadee, 1; Yellow-rumped Warbler, 1. **Total:** 5 species; 11 territorial males or females ( $272/\text{km}^2$ , 110/100 acres). **Visitors:** Mourning Dove, Black-billed Magpie, White-breasted Nuthatch, Ovenbird, Com. Yellowthroat, Red Crossbill, Field Sparrow. **Remarks:** Nest located: Turkey. Chipping Sparrows increased from 3.5 to 5. New nesting species were: Turkey, Black-capped Chickadee, Yellow-rumped Warbler. Territorial males increased from 6 to 11. Thanks to Farron Wallace for assistance in censusing.—**RICK HOPKINS and MICHAEL D. SCHWARTZ, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105**

**144. RED CEDAR COULEE.**—**Location:** North Dakota; Billings Co., 1.5 mi NW Medora, SW 1/4, SE 1/4, Sec. 15, T140N, R102W;  $46^\circ 56' \text{N}$ ,  $103^\circ 33' \text{W}$ , Medora Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 1.54 ha = 3.8 acres. **Description of Plot:** See AB 34:62 (1980). **Weather:** Skies mostly clear. Temperatures 26-60°F. Winds calm to 25 mph. **Coverage:** Apr. 25; May 7, 23, 30; June 3, 9, 17, 18, 20; 0425-0905 and 1930-2100, MDT. Total hours: 12.6. **Census:** Rufous-sided Towhee, 3 (195, 79); Black-billed Magpie, 2; Chipping Sparrow, 1. **Total:** 3 species; 6 territorial males or females ( $390/\text{km}^2$ , 158/100 acres). **Visitors:** Am. Kestrel, Mourning Dove, Com. Nighthawk, Com. Flicker, Am. Robin, Field Sparrow. **Remarks:** Nests located: Black-billed Magpie, 2. In addition, 5 or 6 Black-billed Magpie young were seen. This coulee lies within Theodore Roosevelt Nat'l Park (South Unit). Thanks to Farron Wallace for assistance in censusing.—**RICK HOPKINS and MICHAEL D. SCHWARTZ, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105**

#### BREEDING BIRD POPULATIONS IN MINNESOTA SHELTERBELTS

The following 7 censuses were conducted in shelterbelts at the University of Minnesota's Rosemount Agricultural Experiment Station, located in Dakota County, Minnesota. Each shelterbelt initially was censused in 1979 (see AB 34:71-73 (1980)). Mean minimum temperature during census periods was 57°F (range 42-68°); spring was extremely dry with no precipitation recorded during the census periods. Coverage of all shelterbelts was Apr 24, 30; May 1, 8, 12, 15, 21-22, 28-29; June 3-5, 10, 12, 24. Total trips per shelterbelt was 16, all between sunrise and 1130 and averaging 22-70 min per shelterbelt. Total hours

Census 145, 5 9, Census 146, 9 6, Census 147, 9.3; Census 148, 6.7; Census 149, 10.7; Census 150, 13.3; Census 151, 18.7. A total of 16 species established territories in the shelterbelts in spring 1980 compared to 17 species in spring 1979; however, the total density of all species combined per shelterbelt in 1980 ranged from 762 to 5405/km<sup>2</sup>, whereas the total density in 1979 ranged from 2780 to 9799/km<sup>2</sup>. The lower total density is attributed mainly to a 70 percent decline in the number of pairs of Com. Grackles breeding in the shelterbelts; in 1979, 142 pairs of Com. Grackles were recorded in the 7 shelterbelts as compared to 42 in 1980. Also, the number of pairs of Mourning Doves declined from 20 in 1979 to 12 in 1980. This study was supported by funds from the Agricultural Experiment Station of the Univ. of Minn., the Graduate School of the Univ. of Minn., the Nat'l Rifle Association of America, and the Max McGraw Wildlife Foundation.—RICHARD H YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.

**145. IMMATURE (1974) THREE-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., Swine Sheep Section, 0.4 mi S of County Rd 42; 44°44'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.21 ha = 0.515 acres (10.3 x 202.2 m, measured). **Description of Plot:** See AB 34:73 (1980). **Census:** Com. Grackle, 2 (960, 388); Am. Robin, 1+; Red-winged Blackbird, 1; Chipping Sparrow, 1; W. Meadowlark, +; Savannah Sparrow, +. **Total:** 6 species, 5 territorial males (2399/km<sup>2</sup>, 971/100 acres). **Visitors:** Ring-necked Pheasant, Mourning Dove, Barn Swallow, Starling, House Sparrow. **Remarks:** The number of territorial species increased from 3. Nests located (7): Am. Robin, 3; Com. Grackle, 3; Chipping Sparrow, 1.

**146. IMMATURE (1966) FOUR-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., Plant Pathology Section, 2.6 mi S of County Rd 42; 44°41'N, 93°06'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.298 ha = 0.736 acres (13 x 229.3 m, measured). **Description of Plot:** See AB 34:72-73 (1980). **Census:** Com. Grackle, 9 (3022, 1223); Mourning Dove, 3 (1007, 408); Am. Robin, 2; Chipping Sparrow, 1; Gray Catbird, +; Brown Thrasher, +. **Total:** 6 species, 15 territorial males (5036/km<sup>2</sup>, 2038/100 acres). **Visitors:** Ring-necked Pheasant, E. Kingbird, Barn Swallow, Blue Jay, Starling, Com. Yellowthroat, House Sparrow, Red-winged Blackbird, N. Oriole, Brown-headed Cowbird, Am. Goldfinch. **Remarks:** The number of Com. Grackles decreased from 13. Nests located (16): Mourning Dove, 5; Am. Robin, 3; Com. Grackle, 8.

**147. IMMATURE (1961) NINE-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., Agricultural Engineering Section, 1.5 mi S of County Rd 42; 44°43'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.787 ha = 1.94 acres (26.7 x 294.6 m, measured).

**Description of Plot:** See AB 34:72 (1980). **Census:** Com. Grackle, 2; Mourning Dove, 1; Gray Catbird, 1; Indigo Bunting, 1; Chipping Sparrow, 1; Brown Thrasher, +. **Total:** 6 species; 6 territorial males (764/km<sup>2</sup>, 309/100 acres). **Visitors:** Ring-necked Pheasant, Com. Flicker, Barn Swallow, Am. Robin, Starling, Red-eyed Vireo, Warbling Vireo, Com. Yellowthroat, House Sparrow, N. Oriole. **Remarks:** The number of Com. Grackles decreased from 20, and Mourning Doves from 4. Nests located (7): Mourning Dove, 3; Gray Catbird, 1; Com. Grackle, 2; Indigo Bunting, 1. Twenty-nine percent of the White Spruce (*Picea glauca*) in row 9 were removed by thinning, leaving a density of 32/acre.

**148. MATURE (1951) THREE-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., Forestry Section, 1.5 mi S of County Rd 42; 44°43'N, 93°06'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.32 ha = 0.80 acres (14.8 x 219.2 m, measured). **Description of Plot:** See AB 34:72 (1980). **Census:** Gray Catbird, 1; Chipping Sparrow, 1; Brown Thrasher, +. **Total:** 3 species; 2 territorial males (618/km<sup>2</sup>, 250/100 acres). **Visitors:** Mourning Dove, Barn Swallow, Am. Robin, Com. Yellowthroat, House Sparrow, Com. Grackle, Brown-headed Cowbird, Rose-breasted Grosbeak, Indigo Bunting. **Remarks:** Both the number of territorial species and the number of Com. Grackles decreased from 6. Nest located: Brown Thrasher.

**149. MATURE (1949) EIGHT-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., Sewage Section, 3.7 mi S of County Rd 42; 44°41'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.37 ha = 0.91 acre (23 x 162 m, measured). **Description of Plot:** See AB 34:72 (1980). **Census:** Com. Grackle, 11 (2987, 1209); Mourning Dove, 3 (815, 330); Am. Robin, 3; Com. Flicker, 1; Brown Thrasher, 1; Warbling Vireo, 1; E. Kingbird, +; Com. Yellowthroat, +; Chipping Sparrow, +. **Total:** 9 species, 20 territorial males (5431/km<sup>2</sup>, 2198/100 acres). **Visitors:** Ring-necked Pheasant, Great Crested Flycatcher, Least Flycatcher, E. Wood Pewee, Blue Jay, Cedar Waxwing, House Sparrow, Red-winged Blackbird, N. Oriole, Brown-headed Cowbird. **Remarks:** The number of Com. Grackles decreased from 31. Nests located (22): Mourning Dove, 7; Com. Flicker, 1; Brown Thrasher, 1; Am. Robin, 3; Com. Grackle, 10.

**150. MATURE (1948) FIVE-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., North Beef Section, 0.5 mi S of County Rd 42; 44°44'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.706 ha = 1.74 acres (21 x 336 m, measured). **Description of Plot:** See AB 34:72 (1980). **Census:** Com. Grackle, 12 (1704, 690); Mourning Dove, 3 (426, 172); Am. Robin, 3; Brown Thrasher, 1; Warbling Vireo, 1; House Sparrow, 1; Chipping Sparrow, 1. **Total:** 7 species; 22 territorial males (3124/km<sup>2</sup>, 1264/100 acres). **Visitors:** Ring-necked Pheasant, Black-billed Cuckoo, Com.

Flicker, Barn Swallow, Starling, Yellow Warbler, Com. Yellowthroat, W. Meadowlark, Red-winged Blackbird, N. Oriole, Brown-headed Cowbird, Rose-breasted Grosbeak, Indigo Bunting, Am. Goldfinch, Vesper Sparrow. **Remarks:** The number of Com. Grackles decreased from 58 Nests located (32): Mourning Dove, 6; Brown Thrasher, 1; Am. Robin, 7; House Sparrow, 1; Com. Grackle, 17. The nest of the House Sparrow in the shelterbelt was an abandoned Am. Robin nest upon which a dense mass of grass and other dead vegetation was placed to form a canopy; whereas other House Sparrows using the shelterbelt nested in proximal farm buildings.

**151. MATURE (1946) FOUR-ROW BELT.**—**Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Sta., Poultry Section, 0.8 mi S of County Rd 42; 44°43'N, 93°03'W, Coates Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 0.698 ha = 1.72 acres (14.0 x 498.4 m, measured). **Description of Plot:** See AB 34:71-72 (1980). **Census:** Com. Grackle, 6 (862, 349); Am. Robin, 3 (431, 174); Song Sparrow, 2+ (287, 116); Mourning Dove, 2, Com. Yellowthroat, 2; Chipping Sparrow, 1+; E. Kingbird, 1; Gray Catbird, 1; Brown Thrasher, 1; Brown-headed Cowbird, 1; Red-winged Blackbird, +. **Total:** 11 species; 20 territorial males (2873/km<sup>2</sup>, 1163/100 acres). **Visitors:** Ring-necked Pheasant, Com. Flicker, Downy Woodpecker, Least Flycatcher, Barn Swallow, Com. Crow, House Wren, Starling, Yellow Warbler, House Sparrow, Bobolink, W. Meadowlark, N. Oriole, Rose-breasted Grosbeak, Am. Goldfinch, Vesper Sparrow. **Remarks:** The number of Com. Grackles decreased from 11 Nests located (11): Mourning Dove, 3; Gray Catbird, 1; Am. Robin, 7.

**152. IMMATURE (1971) FIVE-ROW BELT.**—**Location:** North Dakota; Oliver Co., SW 1/4 of Sec. 10, T144N; R83W, 47°13'N, 101°19'W, Hanover NE Quadrangle, USGS. **Continuity:** New. **Size:** 0.95 ha = 2.35 acres (determined by planimetric measurements from aerial photos). **Description of Plot:** From N to S: row 1, Siberian Pea Tree (*Caragana arborescens*), average height 8 ft; row 2, Red Cedar (*Juniperus virginiana*) with 100 ft of Blue Spruce (*Picea pungens*) at the E end, average height 5.5 ft, row 3, Chinese Elm (*Ulmus pumila*), average height 19.8 ft; row 4, Green Ash (*Fraxinus pennsylvanica*), average height 13.6 ft; row 5, Currant (*Ribes sp.*) and Plum (*Prunus americana*), average height 6.7 ft. No development of undergrowth, presently plowed between the outside rows. **Edge:** Bounded S and W by mowed hay field, N by corn field, and E by grazed prairie. **Topography:** Belt runs E-W on a W facing slope **Elevation:** 575-580 m. **Weather:** See Census 134. **Coverage:** May 7, 20, 31; June 5, 12, 17, 29; between dawn and 1200. Total hours 14. **Census:** Brown-headed Cowbird, 4 (421, 170); W. Meadowlark, 2; Mourning Dove, 1, E. Kingbird, 1; Brown Thrasher, 1; Am. Robin, 1; Lark Sparrow, 1; Com. Grackle, 0.5. **Total:** 8 species; 11.5 territorial males (1209/km<sup>2</sup>, 489/100 acres). **Visitors:** Marsh Hawk, Ring-necked Pheasant, Killdeer, Rock Dove, Black-billed Cuckoo, W. Kingbird,

Least Flycatcher, Barn Swallow, Warbling Vireo, Yellow Warbler, House Sparrow, Red-winged Blackbird, Orchard Oriole, N. Oriole, Brewer's Blackbird, Lazuli Bunting, Am Goldfinch, Clay-colored Sparrow, Song Sparrow. **Remarks:** 4 nests: Mourning Dove, E. Kingbird, Brown Thrasher, Am. Robin. This shelterbelt is about 0.5 km from two farmsteads, each with extensive, mature shelterbelt plantings. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**153. MATURE (1940) EIGHT-ROW BELT.**—**Location:** North Dakota; Oliver Co., 4 mi SE of Fort Clark, SE 1/4 of Sec. 16, T143N, R83W; 47°12'N, 101°12'W, Fort Clark Quadrangle, USGS. **Continuity:** New **Size:** 1.19 ha = 2.94 acres (determined by planimetric measurements from aerial photos). **Description of Plot:** A C-shaped shelterbelt consisting of two legs with an E-W orientation and a N-S band joining the other two. The southern E-W belt seems to be somewhat younger than the others and contains 6 rows of trees. From N to S the trees in the S portion are: Row 1, Chinese Elm (*Ulmus pumila*), average height 14 ft; row 2, Chinese Elm; row 3, Box-elder (*Acer negundo*) and Siberian Pea Tree (*Caragana arborescens*), 16 ft; row 4, *Caragana*, 14 ft; row 5, *Caragana*; row 6, Chinese Elm, 14 ft. The connecting belt contains 8 rows from E to W: Row 1, Chinese Elm, average height 17 ft; row 2, Russian Olive (*Elaeagnus angustifolia*), 32 ft; row 3, Green Ash (*Fraxinus pennsylvanica*), 36 ft; row 4, Green Ash, 39 ft; row 5, Siberian Elm (*U. siberica*), 38 ft; row 6, Green Ash, 40 ft; row 7, Box-elder, 32 ft; row 8, Chinese Elm, 21 ft. The other E-W portion contains from N-S: Row 1, Chinese Elm, 23 ft; row 2, Green Ash, 33 ft, row 3, Green Ash, 35 ft; row 4, Am. Elm (*U. americana*), 41 ft; row 5, Siberian Elm, 37 ft, row 6, Green Ash, 40 ft; row 7, Green Ash, 35 ft; row 8, Russian Olive and Box-elder, 23 ft. Undergrowth throughout all sections was dense with sapling development and dead wood from downfall. Average seedlings/m<sup>2</sup> are: Chinese Elm, 2.3; Green Ash, 2.6; Wolfberry (*Symporicarpos occidentalis*), 0.76; Box-elder, 0.56; *Caraganna*, 19; Am Elm, 0.3; *Prunus* spp. 0.4. On the N and W edges of this shelterbelt, the rows of trees are essentially indistinguishable due to the rapid re-growth of *Caragana* and Chinese Elm. **Edge:** Bordered N and W by small grain fields, S and E by gravel roads. **Topography:** Level. **Elevation:** 615 m (2010 ft). **Weather:** See Census 134. **Coverage:** May 1, 8; June 2, 10, 18, 22, 30; July 11; between dawn and 1100 and 2000-2200. Total hours: 30. **Census:** Brown-headed Cowbird, 6 (504, 204); Least Flycatcher, 3 (252, 102); Yellow Warbler, 3; Mourning Dove, 2; E. Kingbird, 2; House Wren, 2; Am. Goldfinch, 2; Black-billed Cuckoo, 1; Brown Thrasher, 1; Am. Robin, 1, N Oriole, 1; Black-headed Grosbeak, 1; Gray Catbird, 0.5; W. Meadowlark, 0.5. **Total:** 14 species; 26 territorial males (2185/km<sup>2</sup>, 884/100 acres). **Visitors:** Pintail, Merlin, Com. Flicker, W. Kingbird, Willow Flycatcher, Com. Crow, Blue Jay, Black-capped Chickadee, Yellow-rumped Warbler,

Com. Yellowthroat, Yellow-headed Blackbird, Red-winged Blackbird, Com. Grackle, Lazuli Bunting. **Remarks:** A Great Horned Owl built and abandoned a nest here earlier in the season. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**154. MATURE (1953) EIGHT-ROW BELT.**—**Location:** North Dakota; Billings Co., 1 1/4 mi S Fairfield; SE 1/4, NE 1/4, Sec. 22, T142N, R99W, Rattlesnake Butte Quadrangle, USGS. **Continuity:** New (1979). **Size:** 1.78 ha = 4.4 acres (U-shaped, measured). **Description of Plot:** Row 1, Tartarian Honeysuckle (*Lonicera tatarica*), Sand Cherry (*Prunus pumila*), Ponderosa Pine (*Pinus ponderosa*); row 2, W. Red Cedar (*Juniperus scopulorum*), Golden Willow (*Salix alba*), poplar (*Populus* sp.), apple (*Malus* sp.), Plum (*Prunus americana*), Silver Maple (*Acer saccharinum*), Blue Spruce (*Picea pungens*), Ponderosa Pine; row 3, Blue Spruce, Ponderosa Pine, W. Red Cedar, Tartarian Honeysuckle; row 4, Ponderosa Pine, Box-elder (*A. negundo*), Sand Cherry, apple, Plum; row 5, Silver Maple, Am. Elm (*Ulmus americana*); row 6, Golden Willow, Green Ash (*Fraxinus pennsylvanica*); row 7, Russian Olive (*Elaeagnus angustifolia*); row 8, *Caragana arborescens*, Buckthorn (*Rhamnus davurica*). Major non-planted shrubs (including natural reproduction of planted trees and shrubs) are *Caragana*, Choke Cherry (*P. virginiana*), Box-elder, and Buckthorn. Major forbs are Sow Thistle (*Sonchus aligonosus*) and Dandelion (*Taraxacum officinale*). Major grasses are Smooth Brome (*Bromus inermis*), Kentucky Blue Grass (*Poa pratensis*), and Crested Wheat Grass (*Agropyron cristatum*). Trees 3-in. diameter and over, 153.4/acre (379/ha); total basal area 110 ft<sup>2</sup>/acre. Species comprising 98% of the total number of trees: Russian Olive, 50/acre; Ponderosa Pine, 14.8/acre; poplar, 12.5/acre; Am. Elm, 11.4/acre; Blue Spruce, 11.4/acre; Green Ash, 10.2/acre; Silver Maple, 9.1/acre; Golden Willow, 9.1/acre; Box-elder, 9.1/acre; W. Red Cedar, 9.1/acre; apple, 4.5/acre. Ground cover about 50%. Canopy cover 75%; average height about 30 ft. **Edge:** Belt surrounds a landscaped churchyard. Bordered on S and W by alfalfa fields and on N by ungrazed grassland (primarily *Bromus inermis*). A paved highway parallels the E border. A small cat-tail marsh is located near the NW corner. **Elevation:** 2660 ft. **Topography:** Essentially flat. **Weather (1979):** Fairly dry. Skies mostly clear to partly cloudy. Temperatures 45-65°F. **Coverage (1979):** May 16, 18, 20, 22, 26, 28, 30; June 12, 14, 18, 30; 0515-1115, MDT. Total hours: 14.6. **(1980):** May 28, 30; June 2, 5, 10, 12, 18, 22, 27; 0420-0900, MDT. Total hours: 6.9. **Census (1979):** Mourning Dove, 6 (337, 136); House Wren, 3 (168, 68); Am. Robin, 3; Com. Grackle, 3; Long-eared Owl, 2; Yellow Warbler, 2; Com. Yellowthroat, 2; Brown Thrasher, 1; Am. Goldfinch, 1. **Total:** 9 species; 23 territorial males or females (1292/km<sup>2</sup>, 523/100 acres, 47.1/1/2 mile). **Visitors:** Black-billed Cuckoo, Com. Flicker, W. Kingbird, Say's Phoebe, Barn Swallow, Blue Jay, Com. Crow, Gray Catbird, House Sparrow, Chipping Sparrow. **Remarks:** Nests located (30): Mourning Dove, 19; Brown Thrasher, 4; Am. Robin, 3; E. Kingbird, 2; Orchard Oriole, 1; Lark Sparrow, 1. **Census (1980):**

located (7). Mourning Dove, 3; Long-eared Owl, 2; House Wren, 2. **Census (1980):** Yellow Warbler, 7 (393, 159); Mourning Dove, 5 (281, 114); House Wren, 4 (225, 91), Am. Robin, 3 (168, 68); Com. Yellowthroat, 2; Com. Grackle, 2; Brown-headed Cowbird, 2; Am. Goldfinch, 2; Long-eared Owl, 1; E Kingbird, 1; Brown Thrasher, 1; Chipping Sparrow, 1; Clay-colored Sparrow, 0.5. **Total:** 13 species; 31.5 territorial males or females (1769/km<sup>2</sup>, 716/100 acres, 64.5/1/2 mile). **Visitors:** Black-billed Cuckoo, Barn Swallow, Blue Jay, Gray Catbird, W. Meadowlark, Red-winged Blackbird, Orchard Oriole, Black-headed Grosbeak, Lark Sparrow. Thanks to Richard Williams for assistance.—*GREG HIEMENZ and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**155. MATURE (1959) THIRTEEN-ROW BELT.**—**Location:** North Dakota; Billings Co., 8 mi NNW Belfield, E 1/2, SW 1/4, Sec 22, T141N, R99W, Rattlesnake Butte Quadrangle, USGS. **Continuity:** New. **Size:** 3.24 ha = 8 acres (68.6 x 472.4 m, measured) **Description of Plot:** The belt runs in a N-S direction. Rows 1 and 12, *Caragana arborescens*; rows, 2, 5, 6, and 7, Siberian Elm (*Ulmus pumila*); rows 3 and 11, Russian Olive (*Elaeagnus angustifolia*); rows 4 and 13, Am. Plum (*Prunus americana*); row 8, Green Ash (*Fraxinus pennsylvanica*); rows 9 and 13, Choke Cherry (*P. virginiana*); rows 10 and 13, crabapple (*Malus* sp.); row 13, Lilac (*Syringa* sp.). Dominant forbs and grasses are Yellow Sweet Clover (*Melilotus officinalis*), White Sweet Clover (*M. alba*), Dandelion (*Taraxacum officinale*), Crested Wheat Grass (*Agropyron cristatum*), Kentucky Blue Grass (*Poa pratensis*), and Slender Wheat Grass (*A. trachycaulum*). Trees 3-in diameter and larger, 82.2/acre (203/ha); total basal area 15.2 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Siberian Elm, 62.2/acre; Russian Olive, 8/acre; Green Ash, 7/acre; crabapple 5/acre. Ground cover about 20%. Grasses comprise 40% of ground cover and forbs 60%. Canopy cover 18%, average height about 25 ft. Because of heavy grazing, reproduction and growth of tree and shrub species are poor. **Edge:** Bordered on N by a stock pond, on E and S by grazed pasture, and on W by a gravel road. **Elevation:** 2550 ft. **Topography:** Essentially flat. **Weather (1979):** Fairly dry. Skies mostly clear. Temperatures 50-75°F. **(1980):** Very dry. Skies mostly clear. Temperatures 50-70° **Coverage (1979):** May 17, 20, 23, 28; June 1, 11, 16, 24; 0500-1115, MDT. Total hours: 10 **(1980):** May 29; June 3, 5, 10, 14, 22, 27, 0445-1005, MDT. Total hours: 6. **Census (1979):** Mourning Dove, 9 (278, 113); Brown Thrasher, 3 (93, 38); Am. Robin, 3; E Kingbird, 2; Com. Grackle, 2; Brown-headed Cowbird, 2 (females); Lark Sparrow, 2, Chipping Sparrow, 2; Orchard Oriole, 1, Am. Goldfinch, 1. **Total:** 10 species; 27 territorial males or females (834/km<sup>2</sup>, 338/100 acres, 46/1/2 mile). **Visitors:** Killdeer, Black-billed Cuckoo, W. Kingbird, House Sparrow, Bobolink, W. Meadowlark, Red-winged Blackbird, Grasshopper Sparrow, Clay-colored Sparrow. **Remarks:** Nests located (30): Mourning Dove, 19; Brown Thrasher, 4; Am. Robin, 3; E. Kingbird, 2; Orchard Oriole, 1; Lark Sparrow, 1. **Census (1980):**

Mourning Dove, 10 (309, 125), Am. Robin, 6 (185, 75); Com. Grackle, 6; E. Kingbird, 3 (93, 38); Brown Thrasher, 2; Orchard Oriole, 2, Brown-headed Cowbird, 2; Lark Sparrow, 2, W. Kingbird, 1; House Wren, 1. **Total:** 10 species; 35 territorial males or females ( $1081/\text{km}^2$ , 438/100 acres, 59.6/1/2 mile). **Visitors:** Sharp-tailed Grouse, Killdeer, Gray Catbird, W. Meadowlark, Red-winged Blackbird, Grasshopper Sparrow, Vesper Sparrow, Chipping Sparrow. **Remarks:** Nests located (29): Mourning Dove, 12; Com. Grackle, 6; Am. Robin, 5; E. Kingbird, 3; W. Kingbird, 1; Orchard Oriole, 1; Lark Sparrow, 1. Thanks to Farren Wallace and Richard Williams for assistance.—*GREG HIEMENZ, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**156. FLOODPLAIN COTTONWOOD FOREST.**—**Location:** Colorado; Jefferson Co., about 10 mi SW of Denver; NE/4 Sec. 14, T6S, R69W, 6th P.M.;  $39^\circ 32' \text{N}$ ,  $105^\circ 5' \text{W}$  Littleton Quadrangle, USGS. **Continuity:** Established 1971; 10 consecutive years. **Size:** 9.7 ha = 24 acres. **Description of Plot:** See AB 25:966 (1971). **Weather:** Spring snow cover in the mountains greater than usual, with a particularly heavy run-off in May; June and July dry and hot. **Coverage:** Jan. 19, Mar. 15; Apr. 27, 29; May 5, 18, 21; June 12, 17, 25; July 2, 31; 0630-1000 hours. Total hours: 20. Total hours: 20. **Census:** Great Blue Heron, 92 (947, 383); Double-crested Cormorant, 26 (268, 108); Com. Grackle, 15 (154, 63); Starling, 9 (93, 38); Tree Swallow, 7 (72, 29); E. Kingbird, 4 (41, 17); House Wren, 3 (31, 13); Yellow Warbler, 2; Black-billed Magpie, 2; N. Oriole, 2; Great Horned Owl, 1; Downy Woodpecker, 1; Brown-headed Cowbird, +. **Total:** 13 species; 164 territorial males, ( $1689/\text{km}^2$ , 683/100 acres). Excluding the colonial nesting herons and cormorants, 46 territorial males,  $474/\text{km}^2$ , 192/100 acres. **Remarks:** The study's long-expected climax will occur at the end of the summer: all the trees in the grove will have died from the permanent flooding of the study grove. The reservoir filled to cover the plot permanently in May 1979; in 1980, at time of leafing out, 15-20% of the standing trees (about a quarter of the original grove) remained alive. By the end of the summer, none will have live foliage. An unusually rapid spring runoff began in mid-May and raised the level of the water 16.5 ft above the normal reservoir level. This had no obvious effects on the plot, as most birds were not nesting close to the water or had not yet begun to nest. The flooded conditions caused the Parks Department to close the lake to boating, and much of the shoreline to public access, until about July 4. After re-opening, the Department succeeded in keeping boats out of the grove. Consequently, the nesting birds did not suffer from the people problems of last year, and until July 4, much of the shoreline offered the birds an undisturbed feeding area. After hitting a plateau last year, heron nests increased by about 30%. Cormorants, which first nested in the grove last year (and were totally unsuccessful), increased the number of nests by 520%. This year we tried to count young birds. We doubt that these numbers are conclusive because the herons, especially, and also the cormorants, stagger their nesting

times. Counts miss fledged birds and those too small to be seen from below (as well as those not yet hatched). With that disclaimer, we report counts of 107 young herons on June 25 and 123 young herons on July 9. By July 31 no more than 20 remained. The cormorants nest later than the herons. We counted 5 young cormorants on June 25, 13 on July 9, and 34, in 16 nests, on July 31. We surmise that the increase in nesting herons was not affected by the protection from boat traffic, because the herons had committed themselves to nesting before the run-off, but that fledgling success may have improved. On the other hand, cormorants are much more sensitive to disturbance, and they begin nesting later, so that the protection afforded the grove probably did assist their nesting numbers and success. The number of passerine species dropped in half this year, and those remaining declined in number, except Tree Swallows, magpies, and kingbirds. The total of non-colonial territories was only 35% of the 9-year average. Nests found (155): 92 heron, 26 cormorant, 15 grackle, 9 Starling, 6 swallow, 4 kingbird, 2 magpie, 1 owl. Our thanks to Gene Schmidt, Park Manager, and his staff for their interest and cooperation.—*FRANK and JAN JUSTICE, REED KELLEY, HUGH E. KINGERY (compiler), 869 Milwaukee St., Denver, Colo. 80206.*

**157. GAMBEL'S OAK - MOUNTAIN MAHOGANY WOODLAND.**—**Location:** Colorado; El Paso Co., T14S, R67W, SE corner of Sec. 16 and NE 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. **Size:** 18.4 ha = 45.5 acres. **Description of Plot:** See AB 34:119 (1979). **Weather:** Hot, very little rainfall. Temperatures in the upper 80s and 90s F. **Coverage:** June 6, 9, 20, 29; July 5, 11, 20; Aug. 3, 6, 10; 0630 or 1700-2000. Total hours: 20. **Census:** Rufous-sided Towhee, 12 (65, 26); Broad-tailed Hummingbird, 6 (33, 13); Am. Robin, 3 (16, 7); Scrub Jay, 2; Solitary Vireo, 2; Black-headed Grosbeak, 2; Gray Flycatcher, 1. **Total:** 7 species, 28 territorial males ( $152/\text{km}^2$ , 62/100 acres). **Visitors:** Mourning Dove, Com. Flicker, Black-billed Magpie, Com. Crow, W. Tanager. **Remarks:** Flocks of Com. Crows frequented the area from a landfill site (around 10-17 at one time). The Scrub Jay seemed less abundant than last year. More people using the trail this year could explain the decrease in the number of birds observed.—*SHERRENE ST. HELENS, 306 W. Boulder, Colo. Springs, Colo. 80905.*

**158. SCRUB OAK - MOUNTAIN MAHOGANY WOODLAND.**—**Location:** Colorado; El Paso Co., 100m W Dwire Hall, Univ. of Colo. campus, Colorado Springs;  $38^\circ 52' \text{N}$ ,  $104^\circ 47' \text{W}$ , Pikeview Quadrangle, USGS. **Continuity:** New. **Size:** 8 ha = 19.77 acres (rectangle 200 x 400 m) surveyed with compass and chain. **Description of Plot:** Dominant vegetation consists of Scrub Oak (*Quercus gambelii*) and Mountain Mahogany (*Cercocarpus montanus*) which form a shrub canopy about 1.5-2 m high and occupying approximately 40% of the ground surface. A few Ponderosa Pine (*Pinus ponderosa*), 3-4 m high, are randomly interspersed over the plot. Herbaceous growth occupies about 40%

of the ground surface. More abundant species are: Pasture Sagebrush (*Artemesia frigida*), Prairie Sage (*A. ludoviciana*), Gumweed (*Grindelia squarrosa*), Blue Grama (*Bouteloua gracilis*), Prickly Pear Cactus (*Opuntia polyacantha*), and *Yucca glauca*. **Edge:** both E and W sides of the grid are continuations of the same vegetation. The S border merges into grassland, while the N, near the top of a bluff, has rock outcroppings and a more dense stand of Ponderosa Pine. **Topography:** A S-facing slope of c.35% with sandstone outcroppings and drainage ravines about every 100 m along the face of the slope. **Elevation:** 6400-6500 ft. **Weather:** Normal spring and summer weather prevailed; fairly dry with no very heavy rains. **Coverage:** May 26, 31; June 17, 30; July 22, 25; Aug. 3-4; 0630-0800. Total hours: 14. **Census:** Rufous-sided Towhee, 6 (75, 30); Scrub Jay, 2, Mourning Dove, 1.5; Am. Robin, 1; Rock Wren, 0.5; Broad-tailed Hummingbird, +, Com. Flicker, +; Black-billed Magpie, +, Com. Crow, +; House Finch, +. **Total:** 10 species; 11 territorial males ( $137/\text{km}^2$ , 56/100 acres). **Visitors:** Red-tailed Hawk, Cooper's Hawk, Violet-green Swallow, Starling, W Meadowlark, Solitary Vireo, House Sparrow, Lesser Goldfinch, Pine Siskin, Chipping Sparrow. **Remarks:** One Mourning Dove nest found.—*DON VAN HORN, Dept. of Biology, Univ. of Colo., Colorado Springs, Colo. 80907.*

**159. COAST LIVE OAK WOODLAND.**—**Location:** California; Orange Co., approximately 20 mi E of San Juan Capistrano along the Ortega Highway (74); T6S, R5W, N $\frac{1}{4}$  sec of Sec 31 and 32,  $33^\circ 36' \text{N}$ ,  $117^\circ 27' 30'' \text{W}$ . The plot includes the lower San Juan campground and extends 200 yds N of the campground. **Continuity:** New. **Size:** Approximately 6.6 ha = 16.3 acres. Irregularly shaped, roughly 500 by 200 yds, an approximately 3.7-acre wedge-shaped portion, located near the NE corner, is excluded from the study area because it is a different habitat type. Dimensions were determined by pacing. **Description of Plot:** Typical oak woodland consisting mainly of Coast Live Oak (*Quercus agrifolia*). The vegetation is stratified, the canopy is mainly Live Oak with a cover value of 93% (the cover values were determined using the line intercept method (Brower and Zar, 1977, *Field and Laboratory Methods for General Ecology*. Wm. C. Brown Co.) Because the oaks themselves were stratified, this cover value gives the impression of more cover than there actually is for the oaks. The understory consists of Squaw Bush (*Rhus trilobata*), Sumac (*Rhus ovata*), currant (*Ribes* sp.), Toyon (*Heteromeles arbutifolia*), Poison Oak (*Toxicodendron diversiloba*), and other shrubs. The total cover for the understory was 44%. In the campground some of the understory has been removed. Flowing through the oak woodland is a stream with scattered willows (*Salix* sp.) and California Sycamore (*Platanus racemosa*). The oak woodland occurs along the stream. **Weather:** Average daily temperature 43-87°F. Some mornings with a light drizzle. **Topography:** Located where the canyon bottom is relatively flat. **Elevation:** 1800 ft. **Edge:** The surrounding vegetation is typical chaparral consisting of 28% Chamise (*Adenostoma fasciculatum*), 24% Buckwheat

(*Eriogonum fasciculatum*), 13% Black Sage (*Salvia mellifera*), 9% Deerweed (*Lotus scoparius*), and other shrubs (percents are of ground cover, total cover was 90%). **Coverage:** Between May 13 and June 1; (10 trips). Total hours: 17. **Phenology:** Most shrubs were just beginning to bloom. Most of the trees were still sending out new leaves. **Census:** House Wren, 9 (136, 55); Bushtit, 8 (121, 49); Starling, 8; Scrub Jay, 7.5 (114, 46); Song Sparrow, 6 (91, 37); Rufous-sided Towhee, 5 (76, 31); Com. Crow, 3 (45, 18); Bewick's Wren, 3; Hutton's Vireo, 2; Dark-eyed Junco, 2; Nuttall's Woodpecker, 1.5; Ash-throated Flycatcher, 1.5; Plain Titmouse, 1.5; Anna's Hummingbird, 1; Black-headed Grosbeak, 1; Brown Towhee, 1; Com Flicker, +; California Thrasher, +. **Total:** 18 species; 61 territorial males ( $925/\text{km}^2$ , 374/100 acres). In addition to the above territorial males there was one colony of Acorn Woodpeckers with at least 10 members. **Visitors:** On every visit 4-5 Band-tailed Pigeons were seen; they were apparently not breeding in the area. **Remarks:** Normally, late May would be past the peak breeding season of the area, however the phenology of the plants and the activity of the birds indicate that this study was done during the peak period. There is the possibility that some species may have already bred and left the area. The Starlings and Com Crows were confined to the campground. Song Sparrows were found only along the stream. The number of territorial Bushtits was determined by counting both pairs and family groups.—*KARLA KRAMER, 2803 Iron Hills Way, Riverside, Calif. 92506.*

**160. DECIDUOUS OAK WOODLAND.**—**Location:** California; Monterey Co., Hastings Reservation, 2.5 mi E of Jamesburg;  $36^\circ 23' \text{N}$ ,  $121^\circ 33' \text{W}$ , Rana Creek Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 5.67 ha = 14 acres. **Description of Plot:** See *AB* 33:82-83. **Weather:** See Census 175. **Coverage:** Mar. 28, Apr. 8, 10, 13, 15, 17, 22, 28; May 2, 13, 20, 0520-0915, PST. Total hours: 24. **Census:** Plain Titmouse, 3.5 (62, 25); Blue-gray Gnatcatcher, 3 (53, 21); Lesser Goldfinch, 2.5; Dark-eyed Junco, 2.5; Anna's Hummingbird, 2; W. Bluebird, 1.5; Mourning Dove, 1; Nuttall's Woodpecker, 1; Ash-throated Flycatcher, 1; Scrub Jay, 1; California Quail, 0.5; White-breasted Nuthatch, 0.5; Hutton's Vireo, 0.5; Purple Finch, 0.5; Chipping Sparrow, 0.5; House Wren, +. **Total:** 16 species; 21.5 territorial males ( $379/\text{km}^2$ , 154/100 acres). **Visitors:** White-tailed Kite, Sharp-shinned Hawk, Band-tailed Pigeon, Com. Flicker, Acorn Woodpecker, Hairy Woodpecker, W. Flycatcher, Violet-green Swallow, Com. Crow, Bewick's Wren, Orange-crowned Warbler, Black-throated Gray Warbler, N. Oriole, Black-headed Grosbeak, Lazuli Bunting, Lawrence's Goldfinch, Brown Towhee, Lark Sparrow. **Remarks:** Nests found: Plain Titmouse, 2; California Quail, 1; Blue-gray Gnatcatcher, 1. Special thanks to Pamela L. Williams for assistance and guidance.—*NANCY E. JOSTE, Hastings Reservation, Univ. of Calif., Star Route Box 80, Carmel Valley, Calif. 93924.*

**161. Sycamore - Coast Live Oak - Riparian Woodland.**—**Location:** Cal-

ifornia, San Diego Co., Kit Carson Park in Escondido;  $33^\circ 05' \text{N}$ ,  $117^\circ 03' \text{W}$ , Escondido Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 6.15 ha = 15.2 acres. **Description of Plot:** See *AB* 34:74 (1980). **Weather:** See Census 207. **Coverage:** Mar. 22, 29; Apr. 7, 12, 19, 26; May 4, 10, 24; June 1; 0430-1000, PST. Total hours: 16. **Census:** House Wren, 19.5 (317, 128); Rufous-sided Towhee, 10 (163, 66) Bushtit, 9 (146, 59); Starling, 7 (114, 46); Brown Towhee, 7; W. Flycatcher, 6 (98, 39); Mourning Dove, 5.5 (89, 36); Anna's Hummingbird, 5 females (81, 33); Bewick's Wren, 5; Scrub Jay, 4 (65, 26); Hutton's Vireo, 4; Orange-crowned Warbler, 4; Black-headed Grosbeak, 4; Black-chinned Hummingbird, 3 females (49, 20); Acorn Woodpecker, 3; Nuttall's Woodpecker, 2; Com. Flicker, 1.5; W. Wood Pewee, 1; Wrentit, 1; N. Oriole, 1; Ash-throated Flycatcher, 0.5; White-tailed Kite, +; Am. Kestrel, +; Black Phoebe, +; Plain Titmouse, +; California Thrasher, +. **Total:** 26 species; 103 territorial males and females ( $1674/\text{km}^2$ , 678/100 acres). **Visitors:** Red-shouldered Hawk, California Quail, Spotted Dove, Com. Crow, Mockingbird, Swainson's Thrush, Solitary Vireo, Warbling Vireo, Nashville Warbler, Townsend's Warbler, Wilson's Warbler, Am. Goldfinch, Lesser Goldfinch, White-crowned Sparrow, Lincoln's Sparrow. **Remarks:** Territorial males and females increased 9% from the 94.5 recorded last year. This was primarily because the census began a month earlier, which allowed observations of early nesting species, such as Anna's Hummingbird and Bushtit, prior to post-breeding dispersal. New species recorded this year were White-tailed Kite, Am. Kestrel, Anna's Hummingbird, and N. Oriole.—*KENNETH L. WEAVER, 1339 Taylor Place, Escondido, Calif. 92027.*

**162. OPEN ASPEN GROVE - SCATTERED CONIFERS.**—**Location:** Colorado; Larimer Co., Rocky Mountain Nat'l. Park, NE 1/4, Sec. 31, TSN, R73W;  $40^\circ 22' \text{N}$ ,  $105^\circ 37' \text{W}$ , Long's Peak Quadrangle, USGS. **Continuity:** Established 1976; 5 consecutive years. **Size:** 14 ha = 34.6 acres. **Description of Plot:** See *AB* 31:72-3. **Weather:** Very wet, cold spring. **Coverage:** May 30; June 14, 22, 25, 28; July 5; 0530-1000. Total hours: 28. **Census:** House Wren, 10 (71, 29); Tree Swallow, 8 (57, 23); Mountain Chickadee, 4 (29, 12); Mountain Bluebird, 4; Warbling Vireo, 4; Pygmy Nuthatch, 3 (21, 9); Am. Robin, 3; Williamson's Sapsucker, 2.5; Green-tailed Towhee, 2.5; Com. Flicker, 2; Yellow-bellied (Red-naped) Sapsucker, 2; W. Wood Pewee, 2; Pine Siskin, 2; Chipping Sparrow, 2; Lincoln's Sparrow, 2; W. Tanager, 1.5; Broad-tailed Hummingbird, 1; Hairy Woodpecker, 1; Dusky Flycatcher, 1; Ruby-crowned Kinglet, 1; Yellow-rumped Warbler, 1; Gray-headed Junco, 1; White-breasted Nuthatch, 0.5; Goshawk, +; W. Flycatcher, +; Steller's Jay, +; Com. Raven, +; Townsend's Solitaire, +; Brown-headed Cowbird, +; Red Crossbill, +. **Total:** 30 species; 61 territorial males ( $436/\text{km}^2$ , 176/100 acres). **Remarks:** Migrants arrived 2-3 weeks late; nesting population low probably because of late spring.—*PAULA L. HANSLEY, 750 S. 41st St., Boulder, Colo. 80303.*

**163. PONDEROSA PINE-SCRUB OAK**

**FOREST.**—**Location:** Colorado; El Paso Co.; U.S. Air Force Academy, 500 m W of junction of Monument Creek and West Monument Creek;  $38^\circ 57' \text{N}$ ,  $104^\circ 50' \text{W}$ , Pikeview Quadrangle, USGS. **Continuity:** New. **Size:** 11.98 ha = 29.6 acres (rectangle, measured with transit and measuring tape). **Description of Plot:** Dominant canopy vegetation is Ponderosa Pine (*Pinus ponderosa*) interspersed with clumps of Scrub Oak (*Quercus gambelii*). Prominent shrub species are Mountain Mahogany (*Cerocarpus montanus*) and Skunkbrush (*Rhus trilobata*). Ground cover includes Prickly Pear Cactus (*Opuntia compressa*) and various annual and perennial grasses. One unimproved dirt road winds through the midsection of the area. Several horse trails run through the plot. **Edge:** Bordered on all sides by similar vegetation. **Topography:** Primarily gently rolling pine-covered terrain with two moderately sloped ridges forming a shallow draw. **Elevation:** 6500 ft. **Weather:** Last official snowfall May 17. June and July drier than normal. **Temperature range:** 32-97°F. Clear to partly cloudy throughout period. **Coverage:** May 25; June 3, 10; July 8, 15, 22, 31; 0530-0730. Total hours: 14. **Census:** Pygmy Nuthatch, 4 (33, 14); W. Wood Pewee, 3.5 (29, 12); Dark-eyed Junco, 3 (25, 10); Rufous-sided Towhee, 2; Mourning Dove, 1; Great Horned Owl, 1; Com. Nighthawk, 1; Broad-tailed Hummingbird, 1; Com. Flicker, 1; Mountain Chickadee, 1; White-breasted Nuthatch, 1; Am. Robin, 1; Am. Goldfinch, 1; Pine Siskin, 1; Chipping Sparrow, 1; Yellow-rumped Warbler, +. **Total:** 16 species; 23.5 territorial males ( $196/\text{km}^2$ , 79/100 acres). **Visitors:** Downy Woodpecker, Hairy Woodpecker, Violet-green Swallow, Steller's Jay, Solitary Vireo, Brown-headed Cowbird (female), W. Tanager, Lazuli Bunting, Lesser Goldfinch, Gray-headed Junco. One Com. Nighthawk nest found; two chicks fledged. Thanks to Larry Biever and Randy Gaseor for assistance in measuring the plot and Doug Ripley for identifying plant species.—*JOSEPH E. TOOLE and CHARLES A. CHASE III, Denver Museum of Natural History, Denver, Colo. 80205.*

**164. MIXED SUB-CLIMAX RIPARIAN FOREST.**—**Location:** Washington; Snohomish Co.,  $\frac{1}{2}$  mi SW of Sultan,  $\frac{1}{2}$  mi E of "Jonkers" State Game Commission parking area along the Skykomish River, T27N, R8E;  $47^\circ 51' \text{N}$ ,  $121^\circ 49' \text{W}$ , Sultan Quadrangle, USGS. **Continuity:** New. **Size:** 8.25 ha = 20.4 acres (rectangular, 150 x 550 m; 50 m grid measured with compass and string line). **Description of Plot:** The forest comprises a sub-climax equilibrium situation maintained by periodic attrition from flood waters from the Skykomish River and blow-downs. There was limited selective logging of coniferous trees some time in the past, but little evidence of this activity remains. One creek flows through the plot, and scattered over the terrain are a number of ephemeral pools and small overflow channels from the river. The soil is composed largely of alluvial sand and silt deposition. The vegetation is structured with a canopy of medium to large Black Cottonwood (*Populus trichocarpa*), Big-leaf Maple (*Acer macrophyllum*), and Red Alder (*Alnus rubra*), with scattered coniferous species; a dense, well-developed

understory 5-15 ft in height and composed predominately of Salmonberry (*Rubus spectabilis*), Thimbleberry (*R. parviflorus*), Osoberry (*Osmaronia cerasiformis*), Red Elderberry (*Sambucus racemosa*), Snowberry (*Symporicarpus albus*), Straggly Gooseberry (*Ribes divaricatum*), W. Hazel (*Corylus cornuta*), Vine Maple (*Acer circinatum*), and Lyall Nettle (*Urtica dioica gracilis*); and a fairly sparse ground cover of mosses, ferns, and small herbs and forbs. A quantitative survey of the vegetation gave the following results: Trees, 3 in. diameter and over, based on five 0.1-acre circular samples, 416/acre; total basal area 153.5 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Big-leaf Maple, 130, 31.3, 17.5, 100; Black Cottonwood, 66, 15.9, 59.2, 100; Red Alder, 56, 13.5, 3.4, 80; Wild Cherry (*Prunus emarginata*), 50, 12, 1.9, 100; Sitka Spruce (*Picea sitchensis*), 32, 7.7, 5.7, 80; standing snags, 28, 6.7, 3.3, 80; W. Red Cedar (*Thuja plicata*), 24, 5.8, 7.4, 80. Western Hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), and Cascara (*Rhamnus purshiana*) were recorded in small numbers. Trees by diameter size class: A (3-6 in.) 174, 41.9, 17.4, 5.4; B (6-9 in.) 106, 25.5, 31.8, 9.9; C (9-15 in.) 74, 17.8, 59.2, 18.5; D (15-21 in.) 28, 6.7, 50.4, 15.8, E (21-27 in.) 8, 1.9, 24.8, 7.8; F (27-33 in.) 22, 5.3, 57.8, 33.7; G (33-40 in.) 4, 1.0, 28.4, 8.9. Shrub stems/acre: 7250; ground cover 41%; canopy cover 76%; average canopy height 128 ft (range 110-140). **Edge:** Bordered on E and W by similar forest, on S by grazed forest with a much reduced understory, and on N by the Skykomish River and associated edge habitat (not included in plot). **Topography:** Essentially flat, though dissected by permanent and ephemeral stream pathways. **Elevation:** 100 ft. **Weather:** The last week of April and the first 3 weeks of May were mostly mild and calm with much clear weather. However, the last week of May and much of June were dominated by a succession of rain systems and unseasonably cool weather. **Coverage:** Apr. 27; May 4, 7, 11, 18; June 8, 15, 30; July 2, 0510-1130 or 2100-2330. Total hours: 34. **Census:** Swainson's Thrush, 20 (242, 98); Song Sparrow, 17 (206, 83); Am. Robin, 16 (194, 78); Rufous-sided Towhee, 14 (170, 69); Brown-headed Cowbird, 11 (133, 54); W. Flycatcher, 10 (121, 49); Red-eyed Vireo, 8.5 (103, 42); Wilson's Warbler, 7.5 (91, 37); Black-throated Gray Warbler, 6.5 (79, 32); Black-capped Chickadee, 6 (73, 29); Brown Creeper, 6; Winter Wren, 6; Com. Crow, 4.5 (55, 22); Golden-crowned Kinglet, 4.5; Rufous Hummingbird, 4 (48, 20); Ruffed Grouse, 3.5 (42, 17); Downy Woodpecker, 3.5; Hammond's Flycatcher, 3.5; Chestnut-backed Chickadee, 3 (36, 15); Cedar Waxwing, 3; Hutton's Vireo, 3; Warbling Vireo, 3; Orange-crowned Warbler, 3; Bewick's Wren, 2; Townsend's Warbler, 2; W. Tanager, 1.5; Screech Owl, 1; Purple Finch, 1; Black-headed Grosbeak, 1; Willow Flycatcher, 0.5; Green Heron, +; Wood Duck, +; Band-tailed Pigeon, +. **Total:** 33 species; 176 territorial males or females 2132/km<sup>2</sup>, 863/100 acres). **Visitors:** Osprey, Great Blue Heron, Com. Nighthawk, Belted Kingfisher, Com. Flicker, Pileated Woodpecker, Barn Swallow, Violet-green Swallow, Rough-winged Swallow, Red-breasted Nuthatch, Starling, Yellow-rumped Warbler, Red-

winged Blackbird, Am. Goldfinch, Dark-eyed Junco. **Remarks:** One Downy Woodpecker nest was located. Fledglings of the following species were observed: Com. Crow, Black-capped and Chestnut-backed chickadees, Winter Wren, Am. Robin, Swainson's Thrush, and Song Sparrow. Because of the extreme density of the undergrowth, visual observation of the birds present was rather uncommon, and the location of nests was difficult. Edge effect may well have accounted for the presence of Willow Flycatchers, Bewick's Wrens, and Orange-crowned Warblers. Chestnut-backed Chickadees, Golden-crowned Kinglets, Townsend's Warblers, and, to a lesser extent, Hammond's Flycatchers were closely associated with the conifers. Evening Grosbeaks were observed in flocks throughout the period, but no clear evidence of nesting was obtained. Somewhat remarkable is the substantial number of congeneric species pairs and triplets nesting in the area, including representatives of *Empidonax* (3), *Parus* (2), *Vireo* (3), and *Dendroica* (2). The diversity of vegetative structure and composition is probably an important factor in this pattern of coexistence. Older flood plain hardwood forests such as the present plot are rapidly being cleared in the Pacific Northwest and are in urgent need of protection.—MARK EGGER, 16005 N.E. 175 St., Woodinville, Wa. 98072.

**165. RED ALDER FLOODPLAIN FOREST-FARMLAND.—Location:** Washington; Whatcom Co., 3.5 mi SE of Acme, in the S Fork Nooksack floodplain; 48° 40.7' N, 122° 9.1' W, Wickersham Quadrangle, USGS. **Continuity:** New. **Size:** 6.9 ha = 17.07 acres (800 x 1000 ft rectangle, minus a 504 x 112 ft rectangle on the NW corner, set up with hand compass and tape). **Description of Plot:** Typical of W. Washington floodplain farms; a mixture of forest and cleared land (presently used for hay). Forest and forest edge account for 54% of the acreage; cleared farmland 46%. Fields are nestled within the forest, giving 4300 linear ft of edge area between the two. An old river channel and associated sloughs meander through forested areas; ponds remained in several sloughs until mid-May. A two-strand power line runs through the center. The dominant canopy tree is Red Alder (*Alnus rubra*). Prominent understory consists of Vine Maple (*Acer circinatum*), Hazelnut (*Corylus cornuta*), Snowberry (*Symporicarpus albus*), Salmonberry (*Rubus spectabilis*), and Stinging Nettle (*Urtica dioica*). Forest-edge areas are typically lined with willows (*Salix* spp.). Vegetation was quantitatively sampled using different methods for forest and farmland. A survey of forest and forest edge according to James and Shugart [1970 AFN 24:727-736 (exception: tree heights were determined by triangulation)] gave: Trees, 3-in. diameter and over, based on five 0.1-acre circular samples, 186/acre; total basal area 223.2 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees [figures after each give number of trees/acre, relative density (%), relative dominance, frequency, in that sequence]: Red Alder, 80, 42, 30, 80; Vine Maple, 26, 14, 1, 40; Big-leaf Maple (*A. macrophyllum*), 20, 11, 10, 80; dead trees, 20, 11, 9, 100; Cascara (*Rhamnus purshiana*), 14, 8, 3, 80; W.

Cedar (*Thuja plicata*), 8, 4, 40, 40. Trees by diameter size class (figures after each class give number of trees/acre, relative density (%), basal area (ft<sup>2</sup>/acre), relative dominance): A (3-6 in.) 60, 32, 6.2, 3; B (6-9 in.) 48, 26, 16.6, 12; C (9-15 in.) 44, 24, 35.2, 16, D (15-21 in.) 28, 15, 50.4, 22; H (>40 in.) 6, 3, 104.8, 47. Shrub stems/acre 5930; ground cover 67%; canopy cover 92%; average canopy height 87 ft (range 61-124). The farmland was sampled June 30-July 1, for species cover, frequency, and height of the tallest plant. Six random sample points were chosen; a species-area curve determined four 1-ft<sup>2</sup> samples were needed at each point. Species comprising 90% of the total cover (figures after each give relative cover and relative frequency): Rye Grass (*Elymus* sp.), 19, 64; Orchard Grass (*Dactylis glomerata*), 19, 57; Moss spp., 18, 82; Timothy (*Phleum pratense*), 12, 64; Red Clover (*Trifolium pratense*), 20, 68; Redtop (*Agrostis alba*), 8, 43; *Holcus lanatus*, 4, 4. Tallest plant species (primarily Orchard-grass) averaged 42 in (range 34-66) in height. **Edge:** Bordered on all sides by similar areas. Three houses occur approximately 200 ft from the edge. Saxon Road and, to its south, the S Fork Nooksack River, are located 50 ft from the S. **Border Topography:** Essentially flat. **Elevation:** 359 ft. **Weather:** Temperatures during censuses ranged from 40-60°F; 60% of census periods had 50% cloud cover. Bellingham (12 mi W of Acme) showed colder than usual days and warmer than usual nights during the summer months. **Coverage:** Apr. 27, 29; May 2, 4, 7, 10, 13, 16, 18, 23, 28, 31; June 7-9, 16, 18, 20, 22, 24, 26, 28, 30; July 2, 4, 6; 0500-0900 hours. Total hours: 46. In addition, information on W. Tanagers and Band-tailed Pigeons was recorded on July 20, 23, 27 and Aug 4. **Census:** Am. Robin, 10 (145, 59); Swainson's Thrush, 9 (130, 53); Black-throated Gray Warbler, 9; Song Sparrow, 8 (116, 47); Black-headed Grosbeak, 7 (101, 41); W. Flycatcher, 6 (87, 35); Cedar Waxwing, 5 (72, 29); Warbling Vireo, 5; Rufous Hummingbird, 5; Red-eyed Vireo, 5; Yellow Warbler, 4 (58, 23); Brown-headed Cowbird, 4; Black-capped Chickadee, 3 (43, 18); Wilson's Warbler, 3; Ruffed Grouse, 2; Golden-crowned Kinglet, 2; Orange-crowned Warbler, 2; MacGillivray's Warbler, 2. W. Tanager, 2; Rufous-sided Towhee, 2; White-crowned Sparrow, 2; Band-tailed Pigeon, 1; Com. Flicker, 1; Yellow-bellied Sapsucker (red race), 1; Hairy Woodpecker, 1; Willow Flycatcher, 1; W. Wood Pewee, 1; Chestnut-backed Chickadee, 1; Varied Thrush, 1; Yellow-rumped Warbler, 1; Savannah Sparrow, 1; Mallard, +; Bewick's Wren, +; Purple Finch, +; Am. Goldfinch, +. **Total:** 35 species; 107 territorial males or females (1549/km<sup>2</sup>, 627/100 acres). **Visitors:** Red-tailed Hawk, Com. Snipe, Downy Woodpecker, Violet-green Swallow, Tree Swallow, Rough-winged Swallow, Barn Swallow, Steller's Jay, Com. Crow, Ruby-crowned Kinglet, Starling, Com. Yellowthroat. **Remarks:** Of all song contacts, 98.5% occurred in the forest and forest-edge. A Savannah Sparrow, Willow Flycatcher (on a power line), and a Com. Yellowthroat were the only species to sing in the hay field. Com Crows, Am. Robins, and Brown-headed Cowbirds fed in fields the week after mowing (July 1-8). Nests found: Am. Robin (4),

Black-capped Chickadee (1). Much appreciation to Dave Schuett-Hames and others for help—*JOANNE P. SCHUETT-HAMES, 6192 Saxon Road, Acme, WA 98220.*

**166. 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°09'W, Wildhorse Island Quadrangle, USGS. **Continuity:** Established 1975; 6 consecutive years. **Size:** 40.47 ha = 100 acres. **Description of Plot:** See *AB* 31: 84-85 (1976). **Weather:** All trips on clear or partly cloudy days with no precipitation and moderate breeze. **Coverage:** Apr. 4; May 8, 19, June 3, 25, 28; July 7; between dawn and 1100 and 1900-2200. Total hours: 35. **Census:** Red-winged Blackbird, 26 (64, 26); Yellow-headed Blackbird, 19 (47, 19); Am. Robin, 13 (32, 13); Song Sparrow, 11 (27, 11); Tree Swallow, 10 (25, 10); Pine Siskin, 10; Canada Goose, 9 (22, 9); Brown-headed Cowbird, 9; Mallard, 8 (20, 8); Am. Coot, 8; Black-capped Chickadee, 8; Com. Yellowthroat, 8; Yellow Warbler, 7 (17, 7); Redhead, 6 (15, 6); Pied-billed Grebe, 5 (12, 5); Red-breasted Nuthatch, 5; Blue-winged Teal, 4 (10, 4); Ring-necked Duck, 4; Willow Flycatcher, 4; Violet-green Swallow, 4; Com. Goldeneye, 3 (7, 3); Osprey, 3; Ruffed Grouse, 3; Mourning Dove, 3; Com. Flicker, 3; W. Wood Pewee, 3; Mountain Chickadee, 3; Long-billed Marsh Wren, 3; Swainson's Thrush, 3; Chipping Sparrow, 3; Com. Nighthawk, 2; Calliope Hummingbird, 2; Hairy Woodpecker, 2; Hammond's Flycatcher, 2; Ruby-crowned Kinglet, 2; Warbling Vireo, 2; Am. Redstart, 2; W. Tanager, 2; Cinnamon Teal, 1; Wood Duck, 1; Prairie Falcon, 1; Sora, 1; Great Horned Owl, 1; Rufous Hummingbird, 1; Com. Raven, 1; Olive-sided Flycatcher, 1; Townsend's Solitaire, 1; Cedar Waxwing, 1; MacGillivray's Warbler, 1; Cassin's Finch, 1; Dark-eyed Junco, 1; Great Blue Heron, +; Killdeer, +; Ring-billed Gull, +; Pileated Woodpecker, +. **Total:** 55 species; (586/km<sup>2</sup>, 237/100 acres); 237 territorial males or females. **Remarks:** 24 nests found: Canada Goose, 2; Osprey, 3; Prairie Falcon, 1; Am. Coot, 2; Com. Flicker, 2; Hairy Woodpecker, 1; Tree Swallow, 4; Am. Robin, 2; Red-winged Blackbird, 6. Additional fledglings seen: Pied-billed Grebe, 6; Canada Goose, 5; Mallard, 8; Blue-winged Teal, 8; Ring-necked Duck, 5; Com. Goldeneye, 6; Am. Coot, 18; Great Horned Owl, 2; Song Sparrow, 2. Noticeably reduced numbers of waterfowl were produced in the marsh this season. Judging from the numbers of young located it appears to be about 40% lower than in previous years. Waterfowl pairs that initiated nesting were not significantly different from numbers of previous years. Similar percentage of reduction has been noted on other waterfowl production areas in the valley. Ash residue from Mt. St. Helens, May 18 eruption still clings heavily to submerged vegetation in sheltered areas such as this marsh. Unseasonably cold weather, including snow and excessively heavy rains continued throughout May and June. Any of these natural events may have been a factor in this reduced production—*MARCELLA M. BISHOP, Shoreline Route, Polson, Mont. 59860*

**167. SCATTERED MIXED CONIFEROUS FOREST IN SUBALPINE MEADOWS AND SPRUCE BOGS.—Location:** Oregon; Grant Co., Bates, 1/4 mile E of Indian Rock Lookout; 44°45'N, 118°45'W, Desolation Butte Quadrangle, USGS. **Continuity:** Established 1973; 8 consecutive years. **Size:** 32.38 ha = 80 acres. **Description of Plot:** See *AB* 27:1002-1003 (1973). **Weather:** Temperatures 32-58°F; clear on 9 censuses, cloudy on 2. Rainfall amounted to 1.27 in. during period June 21 to July 31. Winter and spring precipitation was above normal while June was the coldest on record, delaying melt of snow pack. **Coverage:** June 24, 28, 30; July 2, 9, 11, 13, 17, 19, 21, 25; 0520-0815 hours, PDST. Total hours: 20. **Census:** Chipping Sparrow, 11 (34, 14); White-crowned Sparrow, 8 (25, 10); Ruby-crowned Kinglet, 7 (22, 9); Cassin's Finch, 5 (15, 6); Lincoln's Sparrow, 5; Yellow-rumped Warbler, 4 (12, 5); Am. Robin, 3 (9, 4); Fox Sparrow, 2; Hairy Woodpecker, 1; Mountain Chickadee, 1; Mountain Bluebird, 1. **Total:** 11 species; 48 territorial males (148/km<sup>2</sup>, 60/100 acres). **Visitors:** Spotted Sandpiper, Com. Flicker, Steller's Jay, Clark's Nutcracker, Pine Siskin, Dark-eyed Junco. **Remarks:** Nests located: Hairy Woodpecker, 1; Mountain Chickadee, 1; White-crowned Sparrow, 2. Census showed a rise in territorial males from 39 in 1979 to 48 in 1980. I am grateful to the Malheur Nat'l Forest Staff for its cooperation.—*ROBERT A. HUDSON, P.O. Box 81, Bates, Ore. 97817.*

**168. COTTONWOOD-WILLOW CREEKBOTTOM.—Location:** Colorado; El Paso Co., Colorado Springs; El Paso Co. Parks Bear Creek Nature Center, 1-5 mi S of Hwy. 24; 38°50'N, 104°52'30"W, Colorado Springs and Manitou Springs Quadrangles, USGS. **Continuity:** New. **Size:** 8.09 ha = 20 acres (roughly rectangular, following Bear Creek; measured with steel tape). **Description of Plot:** Creek-bottom (Bear Creek) dominated by Narrowleaf Cottonwood (*Populus angustifolia*) and shrubby Willow (*Salix* sp.). Clumps of Scrub Oak (*Quercus gambelii*) border and intergrade with the Cottonwoods. Prominent shrubs are Choke Cherry (*Prunus virginiana*) which occasionally occurs in tree form, Skunkbush (*Rhus trilobata*), Snowberry (*Symphoricarpos occidentalis*), and young Narrowleaf Cottonwoods. Ground cover is primarily very young Snowberry, Poison Ivy (*Toxicodendron rydbergii*), and grass. A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over, based on 5 tenth-acre circular samples, 210/acre; total basal area 64.2 ft<sup>2</sup>/acre. Species comprising 90% of the total number of trees: Narrowleaf Cottonwood, 92, 44, 69, 100; Scrub Oak, 98, 47, 23, 100; Plains Cottonwood (*P. sargentii*), 8, 4, 7, 40. Trees by diameter size class: A (3-6 in.) 116, 55, 11.6, 18; B (6-9 in.) 46, 22, 13.8, 22; C (9-15 in.) 44, 21, 35.2, 55; D (15-21 in.) 2, 1, 3.6, 6. Shrub stems/acre 214,000; ground cover 67%; canopy cover 38%; average canopy height 50.8 ft (range 35-73 ft). Also on the plot is 1 building and 6 wooden nesting boxes designed to attract W. Bluebirds (none used during 1980). **Edge:** Bordered partially on the N by disturbed gravel hillside, road, and residential area; on the remainder by mountain shrub hillside (Scrub Oak and

Mountain Mahogany, *Cercocarpus montanus*) and scattered grassy meadows. **Topography:** W side is fairly steep-sided canyon; gradually opens up to the E, becoming essentially flat. **Elevation:** 6360 ft. **Weather:** Cold and rainy during first 2 weeks of May, warm and clear on census days thereafter. **Coverage:** May 17-18, 21-22, 24, 29; June 3, 7, 18, 24, 27; July 3, 11, 20, 29; Aug. 7; between dawn and 0830 hrs. Total hours: 34. **Census:** Warbling Vireo, 15 (185, 75); Rufous-sided Towhee, 14 (173, 70); Lazuli Bunting, 6 (74, 30); Song Sparrow, 6; W. Flycatcher, 5 (62, 25); MacGillivray's Warbler, 4.5 (56, 23); Am. Robin, 3 (37, 15); Black-capped Chickadee, 2; Broad-tailed Hummingbird, 1.5; Cooper's Hawk, 1; W. Wood Pewee, 1; House Wren, 1; Brown-headed Cowbird, 1; Indigo Bunting, 1; Black-billed Magpie, +; Black-headed Grosbeak, +. **Total:** 16 species; 62 territorial males or females, (776/km<sup>2</sup>, 315/100 acres). **Visitors:** Red-tailed Hawk, Mourning Dove, Com Flicker, Scrub Jay, Mountain Chickadee, White-breasted Nuthatch, Gray Catbird, Solitary Vireo, Virginia's Warbler, W. Tanager, House Finch, Pine Siskin, Lesser Goldfinch, Chipping Sparrow. **Remarks:** Nests located (5) Cooper's Hawk; Broad-tailed Hummingbird; W. Flycatcher, Black-capped Chickadee; Rufous-sided Towhee. Bird density in the plot is somewhat uneven owing to the change in width of the creekbottom habitat. Density, and to some degree diversity, is greatest on the E side where the creekbottom is wide, flat, and open, and is less on the W side where the creekbottom becomes a narrow canyon, shrinking the width of appropriate habitat. As a park preserve, this area is submitted to increasing use by hikers and school study groups. In addition, water being taken out of Bear Creek is resulting in a noticeable die-off of some of the large canopy trees (Narrowleaf Cottonwood). Both of these factors could cause changes in future bird populations. Special thanks to Ben Winship for assistance in measuring the census area and conducting transects.—*KAREN A JEPSON, Biology Department, Colorado College, Colorado Springs, Colo. 80903.*

**169. 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, 13 consecutive years. **Size:** 8.09 ha = 20 acres. **Weather:** A very hot summer. Our normal number of days 90°F or over is 31, we had 44 days this summer; 7 is normal for June, we had 14. **Coverage:** 10 trips in June, July and August; hours varied, 0800-2030. Total hours: 60. **Census:** W. Bluebird, 15 (185, 75); Broad-tailed Hummingbird, 2; Black-headed Grosbeak, 2; House Finch, 2; Lesser Goldfinch, 2; Com. Nighthawk, 1; White-breasted Nuthatch, 1; Brown-headed Cowbird, 1; Rufous-sided Towhee, 1. **Total:** 9 species; 27 territorial males (334/km<sup>2</sup>, 135/100 acres). **Visitors:** Turkey Vulture, Cooper's Hawk, Red-tailed Hawk, Mourning Dove, Rufous Hummingbird, Com. Flicker, Hairy Woodpecker, Downy Woodpecker, W. Wood Pewee, Scrub Jay, Com. Crow, Black-capped Chickadee, Mountain Chickadee,

Pygmy Nuthatch, Am. Robin, Solitary Vireo, Virginia's Warbler, W. Tanager, Pine Siskin, Lark Sparrow, Chipping Sparrow. **Remarks:** Nests found: 17 W. Bluebirds (in 15 boxes); White-breasted Nuthatch, 1; Common Nighthawk, 1; Broad-tailed Hummingbird, 1. Survival rate seemed about normal but because of the extreme heat so early in June, there was very little singing or activity.—*MILDRED O. SNYDER, 161 Del Mar Circle, Aurora, Colo. 80011.*

**170. SAGEBRUSH GRASSLAND, NON-MANIPULATED.**—**Location:** Utah; Tooele Co., 10 km S of Vernon in the Wasatch Nat'l Forest; 40°00'N, 112°27'W, Vernon Quadrangle, USGS. **Continuity:** New (1979). **Size:** 16.2 ha = 40 acres (square, surveyed). **Description of Plot:** Dominated by Sagebrush (*Artemesia tridentata*) and last treated in 1960 with a brush cutter. Grazing cattle present from May 15-June 18. Sagebrush density, as determined from 80-30 m<sup>2</sup> circular plots, consisted of 6712 live shrubs/ha and 683 dead shrubs/ha with a mean height of 44.8 cm. Values for cover from ocular estimates in 160-50 x 20 cm rectangular sampling frames were as follows: Grasses (8.9%), forbs (19.6%), shrubs (11.2%), bare ground (48.8%), and litter (20.2%). Grasses included: Bluebunch Wheat Grass (*Agropyron spicatum*), Cheat Grass (*Bromus tectorum*), Indian Rice Grass (*Oryzopsis hymenoides*), Sandberg Blue Grass (*Poa secunda*), and Squirreltail (*Sitanion hystrix*). Predominant forbs included: Locoweed (*Astragalus cibarius*), Madwort (*Alyssum alyssoides*), Bur Buttercup (*Ranunculus testiculatus*), and Indian Paintbrush (*Castilleja chromosa*). **Edge:** Similar habitat on all sides with a narrow dirt road bisecting the plot. **Topography:** Gradual slope (6%) upward to SW corner. **Elevation:** 1798-1823 m. **Weather:** Cooler and wetter than normal. Temperatures 2-20°C. **Coverage:** Apr. 22, 25, 29; May 13, 20, 27, 30; June 4, 11, 17; 0615-0920, MDT. Total hours, 17. **Census 1980:** Brewer's Sparrow, 6 (37, 15); Horned Lark, 5 (31, 13); W. Meadowlark, 3.5 (22, 9); Sage Thrasher, +. **Total:** 5 species; 14.5 territorial males (90/km<sup>2</sup>, 36/100 acres). **Visitors:** Marsh Hawk, Sage Grouse, Mourning Dove, Com. Nighthawk, Broad-tailed Hummingbird, Violet-green Swallow, Loggerhead Shrike, Lark Sparrow. **Remarks:** Nests found: Brewer's Sparrow, 2. **Coverage 1979:** Total hours, 11. **Census 1979:** Brewer's Sparrow, 7 (43, 18); Horned Lark, 3.5 (22, 9); W. Meadowlark, 2.5 (16, 6); Vesper Sparrow, +. **Total:** 4 species; 13 territorial males (80/km<sup>2</sup>, 33/100 acres). Special thanks to A. Castrale, J. Lee, L. Klein, and P. Platt for surveying assistance, and to the U.S. Forest Service for living quarters. This study was partially funded by the Graduate School and the ASBYU organization of Brigham Young University.—*JOHN S. CASTRALE and WILLIAM K. PARKER, Dept. of Zoology, Brigham Young Univ., Provo, Ut. 84602.*

**171. SAGEBRUSH GRASSLAND-4-YEAR OLD CHAIN.**—**Location:** Utah; Tooele Co., 9 km SW of Vernon in the Wasatch Nat'l Forest; 40°01'N, 112°29'W, Ver-

non Quadrangle, USGS. **Continuity:** New (1979). **Size:** 16.2 ha = 40 acres (square, surveyed). **Description of Plot:** Dominated by Sagebrush (*Artemesia tridentata*) but was chained and seeded to grasses in the spring of 1976. Grazing cattle present from May 12-19. Sagebrush density, as determined from 80-30 m<sup>2</sup> circular plots, consisted of 4263 live shrubs/ha and 1021 dead shrubs/ha with a mean height of 41.4 cm. Values for cover from ocular estimates in 160-50 x 20 cm rectangular sampling frames were as follows: Grasses (13.1%), forbs (16.6%), shrubs (5.4%), bare ground (51.7%), and litter (17.5%). Grasses included: Bluebunch Wheatgrass (*Agropyron spicatum*), Cheat Grass (*Bromus tectorum*), Indian Rice Grass (*Oryzopsis hymenoides*), Sandberg Blue Grass (*Poa secunda*), and Squirreltail (*Sitanion hystrix*). Predominant forbs included: Locoweed (*Astragalus cibarius*), Madwort (*Alyssum alyssoides*), Bur Buttercup (*Ranunculus testiculatus*), and Prickly Poppy (*Argemone corymbosa*). **Edge:** Bordered on the N and W by dirt roads and on the E by unburned sagebrush-grassland. **Topography:** Gradual slope (6%) upwards to SW corner with streambed (contained water from May 5 to June 1) bisecting plot. **Elevation:** 1815-1840 m **Weather:** Cooler and wetter than normal. Temperatures 2-20°C. **Coverage:** Apr. 21, 24, 30; May 14, 16, 22, 29; June 3, 10, 13; 0615-0815, MDT. Total hours: 16. **Census 1980:** Vesper Sparrow, 5.5 (34, 14); Horned Lark, 4 (25, 10); W. Meadowlark, 3 (19, 8), Sage Thrasher, 1; Brewer's Sparrow, 1; Com Raven, +. **Total:** 6 species; 14.5 territorial males (90/km<sup>2</sup>, 36/100 acres). **Visitors:** Golden Eagle, Marsh Hawk, Mourning Dove, W. Kingbird, Barn Swallow, Scrub Jay, Loggerhead Shrike, Yellow-rumped Warbler, Brewer's Blackbird, Lark Sparrow **Remarks:** Nests found: Sage Thrasher, 2 (same pair); Com. Raven, 1. **Coverage 1979:** Total hours, 12. **Census (1979):** Horned Lark, 5.5 (34, 14); Vesper Sparrow, 4 (25, 10); Brewer's Sparrow, 3.5 (22, 9); W. Meadowlark, 3 (19, 8); Sage Thrasher, 1. **Total:** 5 species; 17 territorial males (105/km<sup>2</sup>, 43/100 acres). Special thanks to A. Castrale, P and S. Platt for surveying assistance, and to the U.S. Forest Service for living quarters. This study was partially funded by the Graduate School and the ASBYU organization of Brigham Young University.—*JOHN S. CASTRALE and WILLIAM K. PARKER, Dept. of Zoology, Brigham Young Univ., Provo, Ut. 84602.*

**173. 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 (440 yards square, paced). **Continuity:** New. **Description of Plot:** Bare sandstone ridges, with shallow arid drainages and a 200-ft. deep gorge running S through the plot. Most vegetation is growing in cracks and joints of the rock surfaces; soil is found on only 41% of the plot, and is composed of wind-blown sand and leaf litter that has accumulated around the bases of plants. An actual count of Ponderosa Pines (*Pinus ponderosa*), the only tree found over the entire plot, showed 48, or 12 per acre. Riparian-type trees growing along Pine Creek at the bottom of the gorge are: Velvet Ash (*Fraxinus velutina*), 17 trees, Fremont Cottonwood (*Populus fremontii*), 3, and Rocky Mountain Juniper (*Juniperus scopulorum*), 5. On the slickrock ridges Pygmy Forest trees are Singleleaf Pinon (*Pinus monophylla*), Utah Juniper (*J. osteosperma*), Gambel's Oak (*Quercus gambelii*), and Singleleaf Ash (*Fraxinus anomala*). Chaparral species are Shrub Live Oak (*Q. turbinella*), Littleleaf Mountain Mahogany (*Cercocarpus intricatus*),

Greenleaf Manzanita (*Arctostaphylos patula*), Utah Serviceberry (*Amelanchier utahensis*), Fineleaf and Datil Yuccas (*Yucca angustissima*, *Y. baccata*), and Dollarjoint Cactus (*Opuntia chlorotica*). Among the most abundant of the herbaceous plants are Blue Dicks (*Brodiaea pulchella*), Wallflower (*Erysimum capitatum*), Desert Globemallow (*Spaeralcea ambigua*) and Royal Penstemon (*Penstemon laevis*). Surprising was the lack of grass on the plot. **Elevation:** 5150-5550 ft. **Edge:** Surrounded on all sides by similar terrain and vegetation. Half a mile to the N and W sandstone cliffs rise about 1000 ft higher to a level plateau. **Weather:** Temperatures slightly below average during early August, normal during rest of period. **Coverage:** May 25, June 1, 8, 13-14, 17-18, 22, 29; July 7, 14, 20, 0550-0940, MDT. Total hours: 31.2. **Census:** Black-throated Gray Warbler, 6 (37, 15); Bushtit, 5 (31, 13); Plain Titmouse, 4 (25, 10); Broad-tailed Hummingbird, 3 (19, 8); Mourning Dove, 2; White-breasted Nuthatch, 2; Gray Vireo, 2; Cassin's Finch, 1, 5; Ash-throated Flycatcher, 1; Brown-headed Cowbird, 1; Rufous-crowned Sparrow, 1; Scrub Jay, 0.5. **Total:** 12 species; 29 territorial males or female hummers and cowbird (179/km<sup>2</sup>, 73/100 acres). **Visitors:** White-throated Swift, Violet-green Swallow, Com Raven. **Remarks:** The Brown-headed Cowbird ordinarily is not found in this habitat. Even more surprising was the presence of a Rufous-crowned Sparrow from May 18, before censusing had begun, to July 7, one bird sang regularly on all trips during June. Although this species has been found in lower Pine Creek, less than 2 mi from the plot, all previous records have been 800-1000 ft lower in elevation.—JEROME L. GIFFORD, P.O. Box 85, Springdale, Utah 84767.

**174. 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; 4 consecutive years. **Size:** 15.38 ha = 38 acres. **Description of Plot:** See AB 32:113 (1977). **Weather:** Mostly clear with cool to warm days, usually 45-70°F. **Coverage:** Apr. 21, 26, 30; May 11, 15, 22, 29; June 5; 0530-0830. Total hours: 23. **Census:** Lesser Goldfinch, 21 (137, 55); Bewick's Wren, 13 (85, 34); Gambel's Quail, 9 (59, 24); Starling, 9; House Finch, 9; Costa's Hummingbird, 5 (33, 13); N. Oriole, 5; Rufous-sided Towhee, 5; Brown-headed Cowbird, 4 females (26, 11), House Wren, 4; Nuttall's Woodpecker, 3 (20, 8); Black-chinned Hummingbird, 3; Ash-throated Flycatcher, 3; Verdin, 3; Bushtit, 3; Lucy's Warbler, 3; Yellow-breasted Chat, 3; Summer Tanager, 3; Song Sparrow, 3; California Thrasher, 2.5; Virginia Rail, 2; Mourning Dove, 2; Cooper's Hawk, 1; Am. Kestrel, 1; Barn Owl, 1; Great Horned Owl, 1; Anna's Hummingbird, 1; Wied's Crested Flycatcher, 1; Phainopepla, 1; Com. Yellowthroat, 1; Hooded Oriole, 1; Indigo Bunting, 1; Red-tailed Hawk, +; Brown Towhee, +. **Total:** 34 species; 127.5 territorial males or females (829/km<sup>2</sup>, 336/100 acres). **Visitors:** White-winged Dove, White-throated Swift, W. Kingbird, Say's Phoebe,

Scrub Jay, House Sparrow, W. Meadowlark, Black-headed Grosbeak, Blue Grosbeak. **Remarks:** Nests located (24): Cooper's Hawk 1, Barn Owl 1, Great Horned Owl 1, Black-chinned Hummingbird 3, Costa's Hummingbird 1, Anna's Hummingbird 1, House Wren 2, Bewick's Wren 1, Starling 8, Lucy's Warbler 1, Hooded Oriole, 1, House Finch 1, Lesser Goldfinch 2. American Coots were not present because ponds were silted in from winter floods. The area was very wet with flowing stream; some of largest cottonwood trees fell during winter storms. Only one of two pairs of Vermilion Flycatchers returned to Morongo and did not visit plot. Special thanks to San Bernardino Valley Audubon Society for supporting this study—EUGENE A. CARDIFF, SHARON GOLDWASSER, JESSIE and ROY KNIFFEN, San Bernardino County Museum, 2024 Orange Tree Lane, Redlands, Calif 92373.

**175. RIPARIAN WOODLAND AND OAK SAVANNA.—Location:** California: Monterey Co., Hastings Reservation, 2.5 mi E of Jamesburg; 36° 23'N, 121° 33'W, Rana Creek Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 8.76 ha = 21.65 acres. **Description of Plot:** See AB 34:35-36. **Weather:** A cool, wet, overcast spring. Precipitation was well above the 40-year mean (1.91 in. for April and 0.47 in. for May) with 3.11 in. for April and 0.61 in. for May. The amount of sunshine was below the 10-year mean for April with a daily mean of 469 min (compared to the 10-year mean of 506 min) and was especially low in May with a daily mean of 479 min (compared to the ten-year mean of 582 min). April temperatures were normal, mean 11.0°C (40-year mean 11.2°) while May was cooler than normal, mean 11.8° (40-year mean 13.5°). **Coverage:** Apr. 1, 12, 14, 26-27; May 16, 25-26; 0600-1000, PST. Total hours: 21. **Census:** House Wren, 3.5 (40, 16); Warbling Vireo, 3 (34, 14); Brown Towhee, 3; N. Oriole, 2.5; Plain Titmouse, 2; Black-throated Gray Warbler, 2; W. Flycatcher, 1.5; Scrub Jay, 1.5; Am. Robin, 1.5; Anna's Hummingbird, 1; Downy Woodpecker, 1; Nuttall's Woodpecker, 1; Bushtit, 1; Bewick's Wren, 1; Blue-gray Gnatcatcher, 1; Hutton's Vireo, 1; Black-headed Grosbeak, 1; Lesser Goldfinch, 1; Lawrence's Goldfinch, 1; Rufous-sided Towhee, 1; Dark-eyed Junco, 1; California Quail, 0.5; Com. Flicker, 0.5; Acorn Woodpecker, 0.5; Orange-crowned Warbler, 0.5; Purple Finch, 0.5; Yellow Warbler, +; Brewer's Blackbird, +; Song Sparrow, +. **Total:** 29 species, 35 territorial males (399/km<sup>2</sup>, 162/100 acres). **Visitors:** Sharp-shinned Hawk, Red-shouldered Hawk, Am. Kestrel, Mourning Dove, Black-chinned Hummingbird, Ash-throated Flycatcher, W. Wood Pewee, Steller's Jay, Yellow-billed Magpie, White-breasted Nuthatch, W. Bluebird, Starling, Solitary Vireo, Wilson's Warbler, Lazuli Bunting, House Finch, Chipping Sparrow. **Remarks:** Nests found (12): Plain Titmouse, 2; N. Oriole, 2; Brown Towhee, 2; Com. Flicker, 1; Nuttall's Woodpecker, 1; House Wren, 1; Am. Robin, 1; Warbling Vireo, 1; Lesser Goldfinch, 1.—PAMELA L. WILLIAMS, Hastings Reservation, Univ. of

Calif., Star Route Box 80, Carmel Valley, Calif. 93924.

**176. SUBURBAN PARK.—Location:** California; Los Angeles Co., El Dorado Park, Area II; 33° 49'N, 118° 05'W, Los Alamitos Quadrangle, USGS. **Continuity:** Established 1978, 2 years, see AB 33:88 (1979). **Size:** 63.5 ha = 157 acres. **Description of Plot:** See AB 35 (1981) and AB 33:88 (1979). **Weather:** Spring temperatures (Feb.-May) 48-85°F (mean 64°F). Abnormally heavy rainfall persisted from February through March (nearly 16 in. recorded) with large areas of the park often inundated. Weather during census in April and May consisted of cloudy, damp mornings and evenings with generally sunny afternoons. **Coverage:** Apr. 3-4, 8, 11, 16, 19, 21, 25; May 3, 5, 10, 14, 21, 23. Total hours: 36, 0800-1200 or 1700-1900. Plot coverage was managed alternately by truck, bicycle, and on foot. **Census:** Am. Robin, 7 (11, 4); Loggerhead Shrike, 6 (9, 4); Brewer's Blackbird 6, Mockingbird, 4 (6, 3); N. Oriole, 2; Black-chinned Hummingbird 2; Anna's Hummingbird, 1; House Sparrow, 1; House Finch, 1. **Total:** 9 species; 30 territorial males or females (47/km<sup>2</sup>, 19/100 acres). **Visitors:** Ash-throated and Gray flycatchers; Black Phoebe; Starling; Tree, Rough-winged, Barn and Cliff swallows; Com. Crow; Red-winged and Tricolored blackbirds; W. Tanager, Black-headed Grosbeak; Lazuli Bunting. **Remarks:** The Starlings and a Black Phoebe were feeding fledglings. However, no nests were found and both were known to be nesting within 0.5 mi of park borders. The same was true for Red-winged and Tricolored blackbirds. The crows were often observed carrying nesting material in a westerly direction (early and middle spring) and later foraging for food within the area. Feral Mallards managed to hatch 1 brood of 3 in early May. Nests found (13); Brewer's Blackbird, 6; Loggerhead Shrike, 2; N. Oriole, 2; 3 unidentified, probably robin by type and location.—JAMES and EDITH RONDEAU, 1200 Temple, Apt. C., Long Beach, Calif 90804.

**177. SUBURBAN PARK.—Location:** California; Los Angeles Co., El Dorado Park W, Long Beach, on the NE corner of the intersection of Willow Ave., and Studebaker Rd.; 33° 49'N 118° 06'W, Los Alamitos Quadrangle, USGS. **Continuity:** New. **Size:** 31.57ha = 78 acres (from park map). **Description of Plot:** Typical suburban park, mostly open with manicured lawns and scattered trees. There are a number of non-botanic features: a branch library, community recreation hall, park headquarters and parking lot are located along E edge; softball fields and tennis courts are located near the center. Cement and asphalt roadways wind through the park area. The dominant trees are Canary Island Pine (*Pinus canariensis*), Chinese Evergreen Elm (*Ulmus parvifolia*), Carob (*Ceratonia siliqua*), Honey Locust (*Gleditsia triacanthos*). Sycamore (*Platanus racemosa*) is scattered throughout the park. The few shrubs, around buildings and tennis courts, are primarily *Viburnum ellipticum* and Privet (*Ligustrum vulgare*). Ground cover consists almost entirely of grasses. **Edge:** Bounded by residential areas on N and W; similar park on S. A portion of El Dorado Golf Course is

located adjacent, to the E. **Topography:** Flat. **Elevation:** 25 ft. **Weather:** Partly cloudy most mornings, clearing by mid-afternoon with mild temperatures throughout the day. **Coverage:** Apr. 24; May 1, 7-8, 12, 28. Total hours: 21. **Census:** House Sparrow, 8 (25, 10); House Finch, 7 (22, 9); Mockingbird, 5 (16, 6); Brewer's Blackbird, 3 (10, 4); Starling, 1; Anna's Hummingbird, 1. **Total:** 6 species; 25 territorial males ( $79/\text{km}^2$ , 32/100 acres). **Remarks:** A large number of birds were observed on the plot although little nesting activity was found. A nature center across the San Gabriel River flood control channel (0.5 mi to East) attracts a large number of species; many often fly over the plot. Thanks to the Long Beach Parks Department for assistance with habitat description.—PAUL JOHANSEN, 1407 Vinmar Court, Roseville, Calif. 95678.

**178. URBAN PARK.**—**Location:** California; Los Angeles Co., El Dorado Park Area 111, 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 Ave., on the W by the San Gabriel River, and on the E by the San Gabriel Freeway (I-605). **Continuity:** New. **Size:** 74.9 ha = 185 acres. **Description of Plot:** An urban park for general use; rectangular with a man-made lake of about 40 acres near the center. The main wooded area encircles the park with a mowed lawn parkland in the center. The trees present are: Fremont Cottonwood (*Populus fremontii*), California Sycamore (*Platanus racemosa*), Oregon Ash (*Fraxinus latifolia*), various pines (*Pinus* sp.), California Live Oak (*Quercus agrifolia*), Chinese Elm (*Ulmus parvifolia*), various willows (*Salix* sp.), Alders (*Alnus* sp.), (Eucalyptus sp.), Pepper Tree (*Schinus molle*), and *Jacaranda* sp. **Edge:** Habitat was discontinuous on all sides. **Topography:** Area is flat with one small rise of 20 ft to the W of the lake. **Elevation:** 28 ft. **Weather:** Low clouds every morning. **Coverage:** Apr. 10-11, 20, 26; May 4, 8, 14, 24, 28, 30; 0530-1000. Total hours: 56. **Census:** Brewer's Blackbird, 43 (57, 23); Loggerhead Shrike, 11 (15, 6); N. Oriole, 11; Tricolored Blackbird, 9 (12, 5); Starling, 7 (9, 4); Mourning Dove, 6 (8, 3); Mockingbird, 4 (5, 2); W. Meadowlark, 4; Pied-billed Grebe, 3 (4,2); Am. Robin, 2; Mallard, 1; Killdeer, 1; Am. Coot, 1. **Total:** 13 species; 103 territorial males ( $138/\text{km}^2$ , 56/100 acres). **Visitors:** Green Heron, Anna's Hummingbird, W. Kingbird, Rough-winged Swallow, Barn Swallow, Cliff Swallow, House Sparrow, House Finch. **Remarks:** Nests located: (39); Brewer's Blackbird (15), Loggerhead Shrike (10), Mourning Dove (6), N. Oriole (6), Mockingbird (1), Starling (1). Species seen with young: Pied-billed Grebe, Killdeer, Am. Coot, Mallard. Thanks to Hal Boley and Cameron Barrows for assistance.—JANET VIERHELLER and BRAD R. BLOOD, 16615 Indiana Ave., Paramount, Calif. 90723.

**179. URBAN NATURE CENTER.**—**Location:** California; Los Angeles Co., El Dorado Nature Center, Long Beach,  $33^\circ 48' \text{N}$ ,  $118^\circ 5' \text{W}$ . Bounded on the N by Spring St., S by Willow St., E by a tree farm, W by the San Gabriel River. **Continuity:** Established 1976;

4 intermittent years. **Size:** 34.4 ha = 85 acres. **Description of Plot:** See AB 31:78 (1977). **Weather:** Temperature range  $48\text{-}75^\circ \text{F}$ ; 1 in. rain. **Coverage:** Apr. 2-5, 11, 16, 20, 26; May 2-4, 9, 15, 27, 29; 0630-0930. Total hours: 60. **Census:** Mockingbird, 20 (58, 24); Song Sparrow, 18 (52, 21); Mourning Dove, 17 (49, 20); Anna's Hummingbird, 15 (44, 18); Starling, 7 (20, 8); Lesser Goldfinch, 7; N. Oriole, 6 (17, 7); Bushtit, 4 (12, 5); House Finch, 4; Scrub Jay, 3 (9, 4); Am. Robin, 3; Am. Coot, 2; Com. Yellowthroat, 2; Red-winged Blackbird, 2; Brown-headed Cowbird, 2; Pied-billed Grebe, 1; Spotted Dove, 1; Black Phoebe, 1; Ruby-crowned Kinglet, 1. **Total:** 19 species; 116 territorial males or females ( $337/\text{km}^2$ , 136/100 acres). **Visitors:** Double-crested Cormorant, Green Heron, Mallard, Gadwall, Pintail, Am. Wigeon, Canvasback, Ruddy Duck, Sharp-shinned Hawk, Cooper's Hawk, Red-tailed Hawk, Osprey, Am. Kestrel, Killdeer, Marbled Godwit, W. Gull, Ring-billed Gull, Caspian Tern, Rock Dove, Black-chinned Hummingbird, Allen's Hummingbird, Belted Kingfisher, Com. Flicker, Ash-throated Flycatcher, W. Flycatcher, Tree Swallow, Barn Swallow, Cliff Swallow, Com. Crow, Red-breasted Nuthatch, Hermit Thrush, Swainson's Thrush, Blue-gray Gnatcatcher, Cedar Waxwing, Warbling Vireo, Black-and-white Warbler, Orange-crowned Warbler, Nashville Warbler, Yellow-rumped Warbler, Black-throated Gray Warbler, Townsend's Warbler, Hermit Warbler, MacGillivray's Warbler, Wilson's Warbler, Brewer's Blackbird, W. Tanager, Black-headed Grosbeak, Purple Finch, Am. Goldfinch, Chipping Sparrow, White-crowned Sparrow, Golden-crowned Sparrow, Fox Sparrow, Lincoln's Sparrow. Escapes: Brazilian Cardinal. **Remarks:** 2 Red-breasted Nuthatches first seen on Apr. 2; last seen on May 4. 19 active nests found: Am. Coot, 1; Mourning Dove, 3; Anna's Hummingbird, 3; Black Phoebe, 1; Scrub Jay, 1; Bushtit, 1; Am. Robin, 2; Loggerhead Shrike, 2; Red-winged Blackbird, 1; N. Oriole, 2; Lesser Goldfinch, 1; Song Sparrow, 1.—TIM PEDICORD and TOM HARRINGTON, Dept. Biol., Cal. St. U., Long Beach, Calif. 90840.

**180. URBAN NATURE CENTER.**—**Location:** California; Orange Co., Shipley Nature Center, corner of Golden West and Talbert Ave., Huntington Beach;  $33^\circ 42' \text{N}$ ,  $118^\circ 00' \text{W}$ , Seal Beach Quadrangle, USGS. **Continuity:** Established 1977; 2 intermittent years. **Size:** 7.3 ha = 18 acres. **Description of Plot:** See AB 31:77-78 (1977). **Weather:** Highly variable; 6-10 mph winds normal, but reached up to 30 mph at least once. Rainfall 175% of normal for this season: 1.13 in. since Mar. 19. Temperatures  $40\text{-}85^\circ \text{F}$ , with a daytime average of  $60^\circ$ . **Coverage:** Mar. 19; Apr. 2-5, 16; May 7, 22, 26, 28-31; between 0500-2030. Total hours: 35. **Census:** Song Sparrow, 32 (439, 178); Tricolored Blackbird, 25 (343, 139); Anna's Hummingbird, 18 (nests, females) (247, 100); Am. Goldfinch, 18; N. Oriole, 12.5 (172, 69); Brown-headed Cowbird, 11 (females) (151, 61); House Finch, 11; Black-chinned Hummingbird, 8 (nests, females) (110, 44); Bushtit, 6 (82, 33); Mourning Dove, 4 (55, 22); House Wren, 4; Com. Yellowthroat, 4; Lesser Goldfinch, 4; Mallard, 2; Ring-necked Pheasant, 2; Orange-crowned Warbler, 2; Red Bishop

(*Euplectes*, species of Ploceidae family, East Africa), 1.5; Pied-billed Grebe, 1; Green Heron, 1; Am. Bittern, 1; Ruddy Duck, 1; Cooper's Hawk, 1; Am. Coot, 1; Warbling Vireo, 1. **Total:** 24 species; 172 territorial males or females ( $2361/\text{km}^2$ , 956/100 acres). **Visitors:** Black-crowned Night Heron, Turkey Vulture, Sharp-shinned Hawk, Red-shouldered Hawk, Osprey, Am. Kestrel, Sora, Spotted Dove, Com. Flicker, W. Kingbird, Black Phoebe, W. Flycatcher, W Wood Pewee, Olive-sided Flycatcher, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Swainson's Thrush, Cedar Waxwing, Hutton's Vireo, Yellow-rumped Warbler, Townsend's Warbler, Wilson's Warbler, House Sparrow, Red-winged Blackbird, Black-headed Grosbeak. **Remarks:** Nests located: (52) Anna's Hummingbird (16), N Oriole (12); Black-chinned Hummingbird (6), Am. Goldfinch (5); Song Sparrow (4), Mallard (2); Bushtit (2); House Wren (2, in tree boxes); Cooper's Hawk (1); Mourning Dove (1); House Finch (1). Four significant changes have taken place in the habitats since 1977: the willow coverage (*Salix gooddingii* and *S. lasiolepis*), the principal plants supporting nests and supplying cover, has increased by 5%; the pond is a few feet higher, extending the marsh vegetation through the central portion of the Nature Center, allowing a greater area for exploitation by water-related species; a row of White Alder (*Alnus rhombifolia*) and California Sycamore (*Platanus racemosa*) cover 5% (formerly grassland), providing more food and shelter for passerines; the garden is no longer maintained, decreasing area of utilization. One Am. Goldfinch was incubating 2 Brown-headed Cowbird eggs along with 1 Goldfinch egg. The House Finch population was considerably larger, but only 11 males were territorial. Tricolored Blackbirds were not visible during the day but flocked in and out of their territories at sunrise/sunset. Red-winged Blackbirds were only occasionally seen and were known to be nesting nearby outside the Nature Center. No signs of breeding were observed for the Am. Bittern but it is a resident species. Special thanks to Dave Winkler for his assistance.—MARY K ALLAN, 501 1/2 Walnut Ave., Huntington Beach, Calif. 92648.

**181. COASTAL SCRUB.**—**Location:** California; Marin Co., 4 mi NW of Bolinas and 0.5 mi inside the S boundary of Point Reyes Nat'l Seashore;  $37^\circ 55' \text{N}$ ,  $122^\circ 45' \text{W}$ , Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 8 intermittent years. **Size:** 8.09 ha = 20 acres. **Description of Plot:** See AB 25:1003-1004 (1971). **Weather:** Partly cloudy skies prevailed on 43% of the mornings, while 27% were overcast, 24% clear, and 6% foggy. Winds were generally W or WSW at 7-10 knots. Morning temperatures  $45\text{-}70^\circ \text{F}$ , somewhat cooler than most years. Total rainfall for the period April-June was about normal (2.43 in.), but total rainfall for July 1979-June 1980 was somewhat above normal (38.61 in.). **Coverage:** Apr. 1-10, 12-13, 15, 18-19, 21-27, 29; May 2-4, 6-8, 10-11, 13, 15-16, 19-20, 22-25, 27-28, 30-31, June 2-3, 5-12, 18-21, 23-27; 0630-1230 Total hours: 207. **Census:** Wrentit, 15 (185, 75); White-crowned Sparrow, 7.5 (93, 38); Rufous-sided Towhee, 5.5 (68, 28); Allen's

Hummingbird, 4.5 (56, 23), Song Sparrow, 45, Bewick's Wren, 4 (49, 20); House Finch, 2, Bushtit, 1; California Quail, 0.5; Scrub Jay, 0.5; Red-tailed Hawk, +; Com. Flicker, +; Orange-crowned Warbler, +; Purple Finch, +; Am. Goldfinch, +. **Total:** 15 species; 45 territorial males ( $556/\text{km}^2$ , 225/100 acres). **Remarks:** The total density of territorial males was identical to last year and very nearly identical to the mean for the previous 7 years ( $563/\text{km}^2$ ) despite the greatly increased coverage this year. This reflects the inherent stability of the avian community of this mature coastal scrub habitat. Nevertheless, pronounced changes did occur in several of the species. Bushtits, Rufous-sided Towhees, and Song Sparrows decreased and Rufous-crowned Sparrows disappeared entirely, while Wrentits increased. Data on color-banded birds in the census area indicate an unusually high winter mortality of adult birds of most permanent resident species. This winter mortality, at least for resident seed-eaters, may have resulted from a combination of unusually heavy early winter rains and several unusually prolonged periods of inclement weather later in the winter. The early rains caused seeds to germinate much earlier in the season than normal and led to a concomitant scarcity of seeds later in the winter when the inclement weather occurred. The high winter mortality was presumably responsible for the decreased breeding bird densities in the above mentioned species. It is noteworthy that White-crowned Sparrow, the only resident seed-eater in which immatures flock during the winter, was the only resident seed-eater whose breeding density did not decrease. This was despite the fact that adult White-crowneds also suffered high winter mortality. This indicates that flocking by immatures may provide protection against winter mortality in years of scarce food supplies and thus provide effective recruitment for subsequent breeding populations. Nests found (10): Wrentit, 2; Rufous-sided Towhee, 2; White-crowned Sparrow, 4; Song Sparrow, 2. Contribution No. 226, PRBO.—*TAD THEIMER, DAVE DeSANTE, MIKE BONOFF, KATHY KEANE, and DAVID SHERMAN, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, Calif. 94970.*

**182. 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;  $37^\circ 55' \text{N}$ ,  $122^\circ 45' \text{W}$ , Bolinas Quadrangle, USGS. **Continuity:** Established 1972; 8 intermittent years. **Size:** 4.7 ha = 11.6 acres. **Description of Plot:** See AB 26:987-988 (1972). **Weather:** See Census 181. **Coverage:** Apr. 1, 4-7, 10-11, 14, 16-18, 21-22, 24-26, 29; May 4-7, 10-11, 13-15, 18, 21, 23-24, 26, 28, 30-31; June 5-6, 8, 10, 12-14, 17-21, 25-27; 0630-1230. Total hours: 252. **Census:** Song Sparrow, 6 (128, 52), Wrentit, 4.5 (96, 39); White-crowned Sparrow, 4 (85, 34); Am. Goldfinch, 2.5; California Quail, 2; Allen's Hummingbird, 2; Rufous-sided Towhee, 2; Anna's Hummingbird, 1; Scrub Jay, 0.5; Bewick's Wren, 0.5, House Finch, 0.5; Red-tailed Hawk, +; Com. Flicker, +; Bushtit, +; Am. Robin, +, W. Bluebird, +; Orange-crowned Warbler, +; Brown-headed Cowbird, +; Brown Towhee, +. **Total:** 19 species; 25.5 territorial

males ( $543/\text{km}^2$ , 220/100 acres). **Remarks:** The total density of territorial males was similar to but slightly greater than last year ( $490/\text{km}^2$ ) perhaps because of the gradual succession of the vegetation toward a more mature coastal scrub, which is known to support a higher density of breeding birds. In fact, this year's density very nearly equalled that of the mature, undisturbed coastal scrub ( $556/\text{km}^2$ ). Noteworthy changes also paralleled those on Plot 181, particularly the decreases in Bushtits and Song Sparrows from high winter mortality, and the increase in Wrentits. The wetter-than-average winter caused an increase in the vegetative production of the shrubs, which could have enhanced Wrentit winter survival. Of particular interest is the increase in White-crowned Sparrows despite unusually high winter mortality of adults. The recruitment of breeders from the wintering flocks of immatures, following mortality of the territory-holding adults, resulted in smaller territory sizes and a denser breeding population. The increase in the number of species is attributed to the presence of Anna's Hummingbird, W. Bluebird, Brown-headed Cowbird, and Brown Towhee territories on the edge of the census area near human habitation. The increased coverage this year resulted in an increase in nests found (47): Wrentit, 9; Bewick's Wren, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 4; White-crowned Sparrow, 8; Song Sparrow, 24. Contribution No. 227, PRBO.—*GEOFF GEUPEL and DAVE DeSANTE, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, Calif. 94970.*

**183. 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;  $37^\circ 55' \text{N}$ ,  $122^\circ 45' \text{W}$ , Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 9 intermittent years. **Size:** 8.09 ha = 20 acres. **Description of Plot:** See AB 25:1002-1003 (1971). **Weather:** See Census 181. **Coverage:** Apr. 1-2, 5, 7-8, 10-11, 14, 17-18, 21-23, 26, 29-30; May 3-5, 7, 11, 13-15, 17-18, 20-21, 23-24, 26-28, 30; June 2-3, 5-6, 12-14, 19-20, 22, 25-26, 28; 0630-1230. Total hours: 282. **Census:** Song Sparrow, 12 (148, 60); White-crowned Sparrow, 9.5 (117, 48); Am. Goldfinch, 5, (62, 25); Wrentit, 4 (49, 20); Allen's Hummingbird, 3.5 (43, 18); California Quail, 2.5; Bewick's Wren, 2; Rufous-sided Towhee, 2; Bushtit, 0.5; Com. Flicker, +; Scrub Jay, +; Am. Robin, +; W. Bluebird, +; Brown-headed Cowbird, +; House Finch, +; Brown Towhee, +. **Total:** 16 species; 41 territorial males ( $507/\text{km}^2$ , 205/100 acres). **Remarks:** The density was greater than last year ( $432/\text{km}^2$ ), perhaps because of the gradual succession of the vegetation toward a more mature coastal scrub, which is known to support a higher density of breeding birds, as well as the recovery of the vegetation from recent drought years. The increase was primarily from increases in Wrentits and White-crowned Sparrows, presumably for the reasons given in Census 182. The increased coverage this year resulted in a substantial increase in nests found (67): California Quail, 1; Wrentit, 6; Bewick's Wren, 2; Am. Goldfinch, 3; Rufous-sided Towhee, 5; White-crowned Sparrow, 28; Song Sparrow,

22. Contribution No. 228, PRBO.—*JANET KJELMYR and DAVE DeSANTE, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, Calif. 94970.*

**184. INLAND COASTAL TUNDRA.**—**Location:** Alaska; North Slope Borough, 69 km S of Prudhoe Bay;  $69^\circ 41' \text{N}$ ,  $148^\circ 42' \text{W}$ ; Sagavanirktok (C-3) Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 100 ha = 247.1 acres. **Description of Plot:** See AB 34:82 (1980). **Weather:** Average daily temperature for June was  $10^\circ\text{C}$ ,  $-1^\circ$  departure from 1979; for July  $9^\circ$ ,  $-8^\circ$  departure from 1979. Snow melt complete by June 11, compared to June 4 in 1979. **Coverage:** June 1-Aug. 23. Total hours: 900. **Census:** Lapland Longspur, 25 (25, 10); Am. Golden Plover, 13 (13, 5); Pectoral Sandpiper, 8 (8, 3); Buff-breasted Sandpiper, 7 (7, 3); Rock Ptarmigan, 5 (5, 2); Willow Ptarmigan, 4 (4, 2); Bar-tailed Godwit, 3 (3, 1); Stilt Sandpiper, 2; N. Phalarope, 2; Long-tailed Jaeger, 2; White-fronted Goose, 1; Pintail, 1, Oldsquaw, 1; Baird's Sandpiper, 1; Semipalmated Sandpiper, 1. **Total:** 15 species; 76 territorial males or females ( $76/\text{km}^2$ , 31/100 acres). **Visitors:** Canada Goose, Greater Scaup, Rough-legged Hawk, Golden Eagle, Gyrfalcon, Peregrine Falcon, Black-bellied Plover, Whimbrel, Long-billed Dowitcher, Parasitic Jaeger, Pomarine Jaeger, Glaucous Gull, Arctic Tern, Short-eared Owl, Snowy Owl, Com. Raven, Wheatear, Yellow Wagtail, redpoll sp. **Remarks:** The 1980 breeding bird population was very similar to the 1979 population with respect to species diversity, number of territorial birds, and number of nests. The only major change noted was an increase in Pectoral Sandpiper nests from 1 in 1979 to 8 in 1980. Although Lapland Longspurs nested in similar densities during both the 1979 and 1980 breeding seasons, productivity was much higher in 1980 because of the relatively mild weather during the fledging period. Nest predation was high with 49% of the nests destroyed. Predators included Red and Arctic foxes, Arctic Ground Squirrel, Parasitic and Long-tailed jaegers and possibly Com. Raven and Glaucous Gull. Breeding bird density was one-half that of Census 186 conducted 45 km N, which supports greater numbers of both Lapland Longspurs and calidridine sandpipers in wet *Carex* dominated tundra. Total nests in 1976-1980 season were 22, 45, 51, 64 and 65 respectively. **Nests Found:** Nests found off the study site were included if the male's territory extended into the plot; renesting attempts included; (number successfully fledged in parenthesis): 14 species, 65 (34) nests. Lapland Longspur, 24 (13); Am. Golden Plover, 12 (5); Pectoral Sandpiper 8 (5); Buff-breasted Sandpiper, 7 (5); Rock Ptarmigan, 3 (1); Bar-tailed Godwit, 2 (1); Long-tailed Jaeger, 2 (1); Stilt Sandpiper, 1 (1); N. Phalarope, 1 (1); Semipalmated Sandpiper, 1 (1); White-fronted Goose, 1 (0); Oldsquaw, 1 (0), Pintail, 1 (0); Baird's Sandpiper, 1 (0). This work is part of a long term ecological study on the impact of North Slope petroleum resource development funded through D.O.E Contract, DE-AC06-76RLO-1830.—*ROBERT A. GARROTT, DIANE A. GARROTT, and WAYNE C. HANSON, Ecological Sciences Dept., Battelle, Pacific Northwest Laboratory, Richland, Wa. 99352.*

**185. INLAND WHITE SPRUCE - PAPER BIRCH FOREST.**—**Location:** Alaska; Anchorage Borough, 7.5 mi SSE of Anchorage; W 1/2 Sec. 22, T12N, R3W; 61°07'N, 149°48'W, Anchorage A-8 Quadrangle, USGS. **Continuity:** New. **Size:** 2.23 ha = 5.51 acres. **Description of Plot:** A remnant stand of mature White Spruce-Paper Birch forest, situated on a well-drained hillside with no permanent standing or running water. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on five 0.1-acre circular plots, 234/acre; total basal area, 132.8 ft<sup>2</sup>/acre. Species comprising 100% of the total: White Spruce (*Picea glauca*), 134, 60, 55, 100; Paper Birch (*Betula papyrifera*), 86, 38, 44, 100; dead trees, 4, 2, 1, 20. Trees by diameter size class A (3-6 in.) 82, 37, 8.2, 6; B (6-9 in.) 42, 19, 12.6, 10; C (9-15 in.) 68, 30, 54.4, 41; D (15-21 in.), 32, 14, 57.6, 43. Shrub stems/acre, 1600; consisting of 56% Blueberry (*Vaccinium ovalifolium*), 21% Paper Birch, 17% White Spruce, 4% Mountain Ash (*Sorbus scopulina*), and 2% High Bush Cranberry (*Viburnum edule*). Ground cover, 70% (consisting of 51% herbs, 36% shrubs, 8% mosses, and 5% grasses); canopy cover, 50%; mean canopy height, 43 ft (range 38-50). An average of 8 White Spruce/acre (size classes B-D) were felled by a severe late-winter storm during which winds exceeded 120 mph. **Edge:** Surrounded by similar, but variably disturbed, habitat. Nine homes, approaching to within 150 ft of the S one-half of the plot, are situated on 0.5-acre lots on which the natural vegetation has been minimally disturbed. A 30 ft-wide cleared utility corridor borders on the W; 60 ft-wide gravel road approaches to within 50 ft and parallels the N boundary for 250 ft. **Topography:** Gentle slope (5%) on a W-facing hillside. **Elevation:** 450-500 ft. **Weather:** Colder and wetter than normal. Average monthly temperature and rainfall at Anchorage International Airport (with deviation from long-term average in parentheses): temperature in °F—May 45.8 (-0.4), June 53.2 (-1.4), July 57.0 (-0.9); rainfall in inches—May 1.68 (+1.09), June 2.73 (+0.20). **Coverage:** June 7-11, 15, 19, 24; 0500-1000 and 1750-2040, ADT. Total hours: 15. **Census:** Swainson's Thrush, 3 (134, 54); Dark-eyed Junco, 3; Ruby-crowned Kinglet, 2; Yellow-rumped Warbler, 2, Townsend's Warbler, 1; Orange-crowned Warbler, 0.5; Boreal Chickadee, +; Red-breasted Nuthatch, +; Am. Robin, +; Com. Redpoll, +. **Total:** 10 species; 11.5 territorial males (516/km<sup>2</sup>, 209/100 acres). **Visitors:** Alder Flycatcher, Olive-sided Flycatcher, Black-capped Chickadee, Pine Siskin, White-winged Crossbill, White-crowned Sparrow. **Remarks:** Fledglings of the following species were observed being fed by adults: Boreal Chickadee, Ruby-crowned Kinglet, Yellow-rumped Warbler, Dark-eyed Junco. In mid-July, about 0.18 acres (3%) of the plot was bulldozed and cleared of vegetation in readiness for construction of a new home. The W one-third has been surveyed and staked for eventual development.—JOHN L. TRAPP, U.S. Fish and Wildlife Service, 1011 Tudor Road, Anchorage, Alaska 99503.

**186. WET COASTAL PLAIN TUNDRA.**—**Location:** Alaska; 13.8 km SSW of

Deadhorse, 70°05'N, 148°30'W, Beechey Point Quadrangle (A-3), USGS. **Continuity:** Established 1979. **Size:** 100 ha = 247.1 acres. **Description of Plot:** See AB 34:83-4 (1979). **Weather:** Mean temperature in June 7°C, -1° difference from June of 1979. Mean wind speed during June, 8 mph. Mean temperature and wind speed for July 6° and 11 mph. Mean temperature and wind speed for August (through the 24th) 11° and 7 mph. Percent snow cover as follows: June 2, 100%; June 10, 50%; June 15, 25% with the tundra greater than 100 m away from the pipeline and pipe pad snow-free. The month of June was essentially the same as 1979 in cloud cover, temperature, wind direction, etc (excluding snow melt). July and most of August were considerably cooler with persistent NE winds, low clouds and fog. **Coverage:** June 2-Aug. 24; 0800-1700 hr. Total hours: 1484. **Census:** Lapland Longspur, 44 (44, 18); Pectoral Sandpiper, 37 (37, 15); Semipalmated Sandpiper, 36 (36, 15); N. Phalarope, 10 (10, 4); Stilt Sandpiper, 5 (5, 2); Dunlin, 4 (4, 2); Arctic Loon, 3 (3, 1); Red Phalarope, 3; Long-billed Dowitcher, 3; White-fronted Goose, 2; Am. Golden Plover, 2; Willow Ptarmigan, 1; Com. Snipe, 1; redpoll sp., 1. **Total:** 14 species; 152 territorial males or females (152/100 ha, 62/100 acres). **Visitors:** Whistling Swan, Canada Goose, Brant, Snow Goose, Mallard, Pintail, N. Shoveler, Am. Wigeon, Oldsquaw, King Eider, Spectacled Eider, White-winged Scoter, Red-breasted Merganser, Marsh Hawk, Peregrine Falcon, Gyrfalcon, Willow Ptarmigan, Rock Ptarmigan, Black-bellied Plover, Bar-tailed Godwit, Ruddy Turnstone, Buff-breasted Sandpiper, Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Glaucous Gull, Sabine's Gull, Arctic Tern, Short-eared Owl, Com. Raven, Bluethroat, Yellow Wagtail, Savannah Sparrow, Snow Bunting. **Remarks:** Total male Pectoral Sandpipers defending territories was 17; thus the total breeding density changes to 132 territorial males (132/100 ha; 53/100 acres) if calculations are based on males instead of females. The number of breeding species increased by one over 1979 total. This increase involved the addition of 2 new territorial birds, redpoll and Com. Snipe, and the absence of a displaying Black-bellied Plover. Total breeding density rose 20% over 1979 total. Four species accounted for 84% of the total breeding densities; Lapland Longspurs 30%; Pectoral Sandpipers 24%; Semipalmated Sandpipers 24%; and N. Phalaropes 8%. Compared to the 1979 breeding bird densities of the above 4 species Lapland Longspurs were down (-2%); Pectoral Sandpipers (+20%); Semipalmated Sandpipers (+64%); and N. Phalaropes (+100%) in 1980. The first full clutch of a Lapland Longspur (earliest breeding bird) in 1979 was June 6; in 1980 the date was June 12. Snow melt in 1980 was about 2 weeks later than 1979; the tundra was snowfree by June 2 in 1979, as opposed to June 15 in 1980. On the average, the late spring delayed the breeding schedule and plant phenology some 7-10 days from 1979 patterns. Combinations of an above-average snow-fall year, the "snow-fence" effect of the Trans-Alaskan Pipeline, and the impoundment and restriction of water drainage resulted in approximately 50% of the study site being inaccessible for nesting as late as June 15. This resulted in a

breeding distribution that had its highest densities on the periphery of the study site away from the pipeline and pipe pad. Densities on the E (upwind) side were 72% higher than the W (downward) side. This was primarily the result of the increased accumulation of snow from the pipeline "snow-fence" effect and restricted the normal drainage that usually flowed in a SW to NE direction prior to the construction of the pipeline. In 1980 flooding was much more severe than in 1979 because of the higher snow fall and rapid snow melt. However, even with the above deterrents, densities increased significantly over the 1979 totals, which is inconsistent with the hypothesis on inter-year density fluctuations proposed by Myers and Pitelka (AB 32:116-117, 1978). Once again this year, ponds adjacent to the pipeline pad were very important feeding areas for both adult and juvenile shorebirds and longspurs throughout the breeding season. This was especially true later on in the season when most of the study site was dry except for areas next to the pipe pad. Of the 135 nests found on the study site, 94 (70%) successfully fledged young, an increase of 100% over 1979 success rate. Nests located (number hatched successfully in parentheses) Lapland Longspur 36 (21), 1 renested (1), Pectoral Sandpiper 37 (26); Semipalmated Sandpiper 35 (31); N. Phalarope 10 (5); Arctic Loon 3 (3); Dunlin 3 (2); Red Phalarope 3 (1); White-fronted Goose 2 (2); Am. Golden Plover 2 (2); Stilt Sandpiper 1 (1); Long-billed Dowitcher 1 (1); redpoll sp. 1 (0). This work is part of the long-term ecological study on the impact of north slope petroleum resource developments funded through DOE Contract DE-AC06-76RLO-1830.—CRAIG J. HOHENBERGER, DAVID P. RUDHOLM, WAYNE C. HANSON, Ecological Sciences Dept., Battelle, Pacific Northwest Laboratory, Richland, Wa. 99352.

**187. WET COASTAL PLAIN TUNDRA I**—**Location:** Alaska; North Slope Borough, 3 km due S of Naval Arctic Research Laboratory, Barrow; 71°18'N, 156°42'W, Barrow Quadrangle, USGS. **Continuity:** Established 1975; 6 consecutive yrs. **Size:** 33 ha = 81.5 acres. **Description of Plot:** See AB 29.1135 (1975). **Weather:** Average June temperature 2.8° C (+2.2° departure from normal) Average June wind speed 15.5 kph. Weather data from NOAA, Barrow, Alaska, 3 km to W. Temperatures were below normal in late May but rose well above average, June 5-11. Combined with a very heavy and persistent snow-pack in late May, this produced widespread tundra flooding. Plot was 50% snow-free by June 9 and clear by June 12. These dates were within the range of values observed during the previous 5 yrs (averages approx. June 5 and 12, respectively). **Coverage:** May 28, 31; June 7-8, 12, 17, 22, 27, July 2, 7. Total hours: 36. **Census:** Lapland Longspur, 13.5 (41, 17); Semipalmated Sandpiper, 5 (15, 6); Dunlin, 4 (12, 5); Steller's Eider, 3 (9, 4); Red Phalarope (nesting males), 3; Pintail, 2; Am. Golden Plover, 1; Snow Bunting, 1; Baird's Sandpiper, 0.5; Com. Snipe, +. **Total:** 10 species; 33 territorial males or females (100/km<sup>2</sup>, 40/100 acres). **Visitors:** Ruddy Turnstone, Pectoral Sandpiper, N. Phalarope. **Remarks:** See AB 29.1135 re Pectoral Sandpipers. This year no Pectoral Sandpiper females nested even though males

defended territories through the breeding season: 9 males on June 12 decreasing to 3 by June 17. Totals calculated using number of Pectoral Sandpiper males instead of females would be 11 species; 36 territorial males or females ( $109/\text{km}^2$ , 40/100 acres). Bird density this year is the lowest recorded, and is 26% below the 6-yr mean of 135 birds/ $\text{km}^2$  (mean calculated including 1980 data). Number of species breeding is also low compared to the long-term average of 12.3 species/yr (19% reduction). The reduction in breeding density is widespread across all common species: of 9 regular breeders (present in at least 4 of 6 yrs), 6 are below their 6-yr average while 3 are above. Of those above, only the Steller's Eider is at its highest density recorded while 5 species below their averages are at all-time lows. These latter include all of the core group of breeding shorebirds: Am. Golden Plover, Pectoral Sandpiper, Baird's Sandpiper, Semipalmated Sandpiper, and Dunlin. As among these are both upland and lowland species, the decrease cannot be attributed simply to one habitat guild of shorebirds or another. Lemming densities this year were too low to support breeding populations of any of the avian lemming predators. Nests found (number successfully hatched in parentheses): Pintail, 2 (0); Steller's Eider, 1 (0); Am. Golden Plover, 1 (1); Dunlin, 2 (2); Semipalmated Sandpiper, 4 (4); Red Phalarope, 1 (0); Lapland Longspur, 3 (2). This work was funded by the DOE as part of a study of shorebird ecology.—J.P. MYERS, T.A. SORDAHL, B.J. McCAFFERY, and F.A. PITELKA, Museum of Vertebrate Zoology, Univ. of Calif., Berkeley, Calif. 94720.

**188. WET COASTAL PLAIN TUNDRA**  
**II—Location:** Alaska; North Slope Borough, 3 km SSW of Naval Arctic Research Laboratory, Barrow;  $71^\circ 18' \text{N}$ ,  $156^\circ 38' \text{W}$ , Barrow Quadrangle, USGS. **Continuity:** Established 1975, 6 consecutive yrs. **Size:** 36 ha = 88.9 acres. **Description of Plot:** See AB 29:1136 (1975). **Weather:** See Census 186. Snow-melt schedule: surface area 50% snow free by June 9, 100% by June 12. **Coverage:** May 28, 31; June 9, 13-14, 17, 22, 27; July 1, 8. Total hours: 38.5. **Census:** Lapland Longspur, 12.5 (35, 14); Red Phalarope (nesting males), 6 (17, 7); Dunlin, 4 (11, 4); Steller's Eider, 3 (8, 3); N Phalarope, 2; Pectoral Sandpiper (nesting females), 1.5; Pintail, 1; Oldsquaw, 1; Am. Golden Plover, 1; Semipalmated Sandpiper, 1; Long-billed Dowitcher, 1; Baird's Sandpiper, 0.5; Snow Bunting, 0.5; Ruddy Turnstone, 0.5; Com. Snipe, +. **Total:** 15 species; 35.5 territorial males or females ( $99/\text{km}^2$ , 40/100 acres). **Remarks:** See AB 29:1135 (1975) re calculations of Pectoral Sandpiper density. Number of Pectoral Sandpiper males defending on the plot decreased abruptly from 10 territorial males shortly after display commenced on June 14 to 3 on June 17 and remained relatively stable thereafter. Totals calculated using Pectoral Sandpiper male breeding number: 15 species; 27 territorial males or females ( $103/\text{km}^2$ , 42/100 acres). As with the preceding census (Census 187), 1980 breeding bird density is at a 6-yr low, 26% below the 6-yr mean of  $133/\text{km}^2$ , and 42% below last year's density of  $171/\text{km}^2$ . In contrast, breeding species number is slightly above the 6-yr mean of 13.5/yr. Of the 12 regular breeders (present in at least 4 of 6

yrs), 10 are below their 6-yr means and none are appreciably above. These include all the common shorebirds. Much of the decrease in breeding number, however, occurred in Lapland Longspurs, which dropped from an all-time high last year of 0.69/ha to 0.35/ha, returning to their long-term average density of 0.34/ha. The results of this and of the preceding census (Census 187) indicate a regional decrease in bird densities and of shorebird density in particular. That interpretation is complicated, however, by results of Census 189, summarizing data from another local plot where densities increased overall. Nests found (number hatching in parentheses): Pintail, 1 (0); Oldsquaw, 1; Steller's Eider, 1 (0); Am. Golden Plover, 1 (1); Ruddy Turnstone, 1; Pectoral Sandpiper, 1 (1); Dunlin, 2 (2); Red Phalarope, 4 (3); Lapland Longspur, 5 (3). This work was funded by the DOE as part of a study of shorebird ecology.—J.P. MYERS, T.A. SORDAHL, B.J. McCAFFERY, and F.A. PITELKA, Museum of Vertebrate Zoology, Univ. of Calif., Berkeley, Calif. 94720.

**189. WET COASTAL PLAIN TUNDRA**  
**III—Location:** North Slope Borough, 3 km SSE of Naval Arctic Research Laboratory, Barrow;  $71^\circ 18' \text{N}$ ,  $156^\circ 38' \text{W}$ , Barrow Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive yrs. **Size:** 36 ha = 88.9 acres. The area of this plot was restored to its 1978 value. **Description of Plot:** See AB 33:102 (1979). **Weather:** See Census 178. Snow-melt schedule: surface area 50% snow-free by June 10, 100% snow-free by June 14. The melt-off schedule for this plot differs from our other two Barrow area plots (previous two Censuses) in that areas clear early along exposed upland ridges but snow-covered pockets remain later because of deep tundra polygon troughs, and thus delay the 100% snow-free date. This plot also differs importantly from the other two because it has better drainage and thus does not flood as extensively. **Coverage:** May 28, 31; June 8, 13-14, 19, 21, 24-25, 28; July 1, 3, 9. Total hours 50.5. **Census:** Pectoral Sandpiper (nesting females), 19 (53, 21); Lapland Longspur, 15 (42, 17); Dunlin, 6 (17, 7); Am. Golden Plover, 4 (11, 4); Long-billed Dowitcher, 3 (8, 3); Red Phalarope (nesting males), 3; Pintail, 2; Steller's Eider, 2; Baird's Sandpiper, 2; Semipalmated Sandpiper, 1; White-rumped Sandpiper, +. **Total:** 11 species; 55 territorial males or females ( $153/\text{km}^2$ , 62/100 acres). **Remarks:** See AB 29:1135 (1975) re calculation of Pectoral Sandpiper density. Number of Pectoral Sandpiper male territories defended increased from approximately 3 on June 13 to 14 on June 21. Totals calculated using Pectoral Sandpiper male breeding effort thus become 10 species, 51 territorial males or females ( $142/\text{km}^2$ , 57/100 acres). Compared with a 3-yr mean density of  $137/\text{km}^2$  this year's breeding density is approximately 12% above average; species number is only slightly above the 3-yr mean of 10.3 species. Of 9 regular breeders (present for at least 2 of 3 yrs), 4 increased above their average while 3 decreased. The largest increase was shown by Pectoral Sandpipers, present at double their average density and at the highest density we have recorded on any of our arctic plots during the last 6 yrs. Both Red Phalarope and Long-billed Dowitcher

were also above average, whereas Lapland Longspur, Dunlin, and Baird's Sandpiper fell below average. The general trend was thus for more lowland species to increase while upland species decreased. Viewed in the context of widespread flooding over the Barrow area following snowmelt (see Census 187) and the marked decreased in bird density on our other two plots — both more lowland than this one — the pattern here suggests strong local patchiness in bird density associated with local variation in habitat conditions. The Pectoral Sandpiper case is particularly striking: breeding density was at or near the lowest values we have recorded for those plots in 6 yrs, while females on this plot were exceptionally dense (see above), even though all plots are within 2 km of one another. The net suggestion is that lowland species such as Pectoral Sandpipers may have responded to the flooding by shifting locally to higher areas. Upland species, however, decreased everywhere including this plot, located on one of the highest and best-drained ridges in our study area. Their populations therefore may have suffered on a wider scale. Nests found (numbers hatched in parentheses): Pintail, 1 (0); Am. Golden Plover, 6 (2); Pectoral Sandpiper, 18 (12); Baird's Sandpiper, 1 (1); Dunlin, 8 (5, two destroyed by humans); Semipalmated Sandpiper, 1 (1); Long-billed Dowitcher, 2 (?); Red Phalarope, 3 (1); Lapland Longspur, 9 (5). **Erratum:** The census filed last year for this plot (Census 160, AB 34:83, 1980) omitted one species from the report: Buff-breasted Sandpiper, 2. This alters the totals for 1979 to 9 species, 42.5 territorial males or females ( $170/\text{km}^2$ , 69/100 acres). This work was funded by the DOE as part of a study of shorebird ecology.—J.P. MYERS, B.J. McCAFFERY, T.A. SORDAHL, and F.A. PITELKA, Museum of Vertebrate Zoology, Univ. of Calif., Berkely, Calif. 94720.

**190. HIGH ARCTIC LOWLAND OASIS.**  
**—Location:** Northwest Territories; Ellesmere Island; Alexandra Fjord, located 154 km SE of Eureka;  $78^\circ 53' \text{N}$ ,  $75^\circ 65' \text{W}$ . **Continuity:** New. **Size:** 1200 ha = 2965 acres. **Description of Plot:** An entire, roughly triangular, post-glacial outwash plain. The site is a high Arctic lowland "oasis" (i.e. terrestrial locale of high biological productivity and diversity, in a region otherwise characterized by high Arctic desert or semi-desert). Percentages of vegetation types, associated habitats, and dominant species as follows: Type 1, 49.2% (mesic heath - dwarf shrub - cushion plant communities), *Cassiope tetragona*, *Dryas integrifolia*, *Salix arctica*, *Vaccinium uliginosum*, *Carex misandra*, *C. nardina*, *Silene acaulis*; Type 2, 5.1% (wet to mesic sedge-dominated meadows), *Carex stans*, *C. membranacea*, *C. atrofusca*, *Eriophorum triste*, *Arctagrosis latifolia*; Type 3, 37.0% (xeric rocky outcrops or talus slopes), *Rhizocarpon* spp., *Umbilicaria* spp., *Parmelia* spp., *Alectoria jubata*, *Cetraria nivalis*, with *Cassiope tetragona*, *Dryas integrifolia*, *Carex misandra*, *C. nardina* in mesic microsites; Type 4, 8.7% (wet to xeric [depending on time of season], river bed or river outwash plains), *Epilobium latifolium*, *Papaver radicum*, *Oxyria digyna*, *Draba* spp. Plant names follow: A.E. Parsild, 1964, Illustrated Flora of the Canadian Arctic Archipelago, Second Edition,

National Museum of Canada, Bull. 104, and M.E. Hale, 1969, How to Know the Lichens, W.C. Brown Co., Pub. **Edge:** Bordered at the apex by 2 glacial tongues, on 2 sides by steep talus slopes or cliffs of *ca.* 500 m elevation, and on the third side by the oceanic waters of a fjord. **Topography:** Essentially flat, but gently rising from the sea to the glaciers. **Weather:** Daily maximum air temperatures -8°C, skies clear to cloudy. The tundra was 90% snow-free by July 1. **Coverage:** June 30-July 12, irregularly over July 13-21; 1900-0200 hours. Total hours: 125. **Census:** Snow Bunting, 117 (9.8, 3.9); Baird's Sandpiper, 12 (1.0, 0.4); Hoary Redpoll, 6 (0.5, 0.2); Lapland Longspur, 6; Arctic Tern, 4 (0.3, 0.1); Snow Goose, 3 (0.3, 0.1); Oldsquaw, 3; Rock Ptarmigan, 1; Parasitic Jaeger, 1. **Total:** 9 species; 153 territorial males or females (12.8/km<sup>2</sup>, 5.2/100 acres). **Visitors:** Red-throated Loon (breeding pair on nearby coastal freshwater ponds), Com. Eider, King Eider, Ruddy Turnstone, Long-tailed Jaeger, Glaucous Gull (breeding pair on nearby island in fjord), Ivory Gull, Snowy Owl, Horned Lark. **Remarks:** 65 nests or broods were located: Snow Bunting, 47; Baird's Sandpiper, 9; Snow Goose, 3; Arctic Tern, 3; Oldsquaw, 2; Rock Ptarmigan, 1. This work was funded by the World Wildlife Fund (Canada), and the Natural Sciences and Engineering Research Council of Canada, and is part of a larger study of the ecology of a high Arctic oasis at Alexandra Fjord.—B. FREEDMAN and J. SVOBODA, Department of Botany, Univ. of Toronto, Toronto, Ontario.

**191. ASPEN FOREST.**—**Location:** Manitoba; Norton Municipality, 322 m E of Hwy. 446 on the N boundary of Turtle Mt. Provincial Park; Sect. 31, R20, T1; 49°05'N, 100°08'W, Deloraine 62 F/1. **Continuity:** Established 1977; 4 consecutive years. **Size:** 16 ha = 39.2 acres. **Description of Plot:** See AB 33:96-97 (1979). **Weather:** High temperatures and low precipitation throughout spring and early summer resulted in complete drying up of sedge meadows. **Coverage:** June 6, 13, 16, 20, 23, 25-26; July 1; 0555-0930, CDT. Total hours: 21. **Census:** Least Flycatcher, 14.5 (91, 37); Red-Eyed Vireo 11.5 (72, 29); Ovenbird, 7.5 (47, 19); Veery, 6 (38, 15); Com. Yellowthroat, 4 (25, 10); Am. Redstart, 2.5; White-throated Sparrow, 2; Yellow-bellied Sapsucker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; N. Waterthrush, 1; Mourning Warbler, +; N. Oriole, +. **Total:** 13 species; 52 territorial males or females (358/km<sup>2</sup>, 133/100 acres). **Visitors:** Broad-winged Hawk, Ruffed Grouse, Black-billed Cuckoo, Downy Woodpecker, Black-capped Chickadee, House Wren, Am. Robin, Cedar Waxwing, Brown-headed Cowbird. **Remarks:** Despite no defoliation by forest tent caterpillars this year, total territories remained remarkably constant. Declines were noted for Least Flycatcher, House Wren, and Ovenbird, while Veery, Com. Yellowthroat and White-throated Sparrow increased in abundance from 1979. This year marks the first time territorial Blue Jays, N. Orioles and White-throated Sparrows were recorded, although all have been recorded as visitors in at least 2 of the 3 previous years. One Yellow-bellied Sapsucker nest was located. Several families of Ruffed Grouse were found; how-

ever territories were impossible to delineate.—KENNETH D. DE SMET, Dept. of Natural Resources, 1495 St. James St., Winnipeg, Manitoba, Canada R3H 0W9.

**192. ASPEN FOREST.**—**Location:** Manitoba; Winnipeg, Assiniboine Forest, 1 km S of Grant Avenue and 0.8 km W of Shaftesbury Boulevard; 49°51'N, 97°14'W, Winnipeg (62 H) map sheet. **Continuity:** New. **Size:** 6 ha = 14.8 acres (300 m N-S by 200 m E-W, 50 m grid surveyed). **Description of Plot:** The dominant canopy tree is Quaking Aspen (*Populus tremuloides*), and Bur Oak (*Quercus macrocarpa*) is common. Most prominent in the understory are Saskatoon (*Amelanchier alnifolia*), Am. Hazelnut (*Corylus americana*), Downy Arrow-wood (*Viburnum rafinesquianum*), and Rose (*Rosa spp.*). The ground cover is almost pure Wild Sarsaparilla (*Aralia nudicaulis*) in some areas. The rest is dominated by a mixture of Wild Strawberry (*Fragaria virginiana*), Fowl Blue Grass (*Poa palustris*), Fall Meadow-Rue (*Thalictrum dasycarpum*), N. Bedstraw (*Gaultheria boreale*), and Wild Sarsaparilla. There is about an acre of willow scrub (*Salix spp.*) in the SW corner. A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over, based on 5 tenth-acre circular samples, 61.4/acre; total basal area 123.8 ft<sup>2</sup>/acre. Species comprising all of the trees: Quaking Aspen 368, 60, 71, 100; Bur Oak 104, 17, 14, 100; dead trees 142, 23, 15, 100. Trees by diameter size class: A (3-6 in.) 372, 61, 37.2, 30; B (6-9 in.) 218, 36, 65.4, 53; C (9-15 in.) 22, 4, 17.6, 14; D (15-21 in.) 2, 0, 3.6, 3. Shrub stems/acre 33, 170; ground cover 44%; canopy cover 74%; average canopy height 35 ft (range 31-41). **Edge:** Bordered on all sides by similar forest habitat except for the SW corner which is in an area of willow scrub. There is a man-made pond 100 m NW of the plot. **Topography:** Flat. **Elevation:** 778 ft. **Weather:** Temperatures were 3-23°C (average 14°). Winds were 2-14 km, usually light. Majority of counts were done under clear skies, overcast on 3 counts. **Coverage:** May 18, 25; June 1, 8, 13, 15, 17, 20, 22; 0515-1030 and 2000-2135, CDT. Total hours: 46. **Census:** Least Flycatcher, 19.5 (326, 132); N. Oriole, 9 (150, 61); Warbling Vireo, 7 (117, 47); Great Crested Flycatcher, 6.5 (109, 44); House Wren, 5 (83, 34); Ovenbird, 2.5; Mourning Dove, 2; Rose-breasted Grosbeak, 2; E. Wood Pewee, 2; Veery, 1; Downy Woodpecker, 0.5; Hairy Woodpecker, +; Tree Swallow, +; Brown-headed Cowbird, +. **Total:** 14 species; 57 territorial males (950/km<sup>2</sup>, 385/100 acres). **Visitors:** Broad-winged Hawk, Black-billed Cuckoo, Blue Jay, Black-capped Chickadee, Gray Catbird, Am. Robin, Yellow-throated Vireo, Red-eyed Vireo, Com. Grackle, Am. Goldfinch. **Remarks:** Nests found: Least Flycatcher, 2; Downy Woodpecker, 1; N. Oriole, 1. The Veery inhabited the willow scrub area. This census was carried out by the following members of the Urban Environment Committee of the Manitoba Naturalists Society: Mary Hyland, Kelvin Krieger, Louis L'Arrivée, Carol and Leonard Pressey, Eric Uhnmann. Special thanks to committee members Fran Harcus and Greg Warbanski for their help with the vegetation analysis and surveying.—KEVIN KRIEGER (compiler), Urban Environment Committee, Manitoba

Naturalists Society, 214-190 Rupert Avenue, Winnipeg, Manitoba R3B 0N2.

**193. SHRUBBY SWAMP AND SEDGE HUMMOCKS.**—**Location:** Connecticut, Litchfield Co., N end of Bantam Lake, White Memorial Foundation, Litchfield, 41°43'02"N, 73°12'27"W, Litchfield Quadrangle, USGS. **Continuity:** Established 1965, 14 intermittent years. **Size:** 8.09 ha = 20 acres. **Description of Plot:** See AFN 19 625-627 (1965). **Coverage:** June 2-3, 11. Total hours: 16. **Census:** Swamp Sparrow, 42 (519, 210); Red-winged Blackbird, 36 (445, 180); Yellow Warbler, 28 (346, 140); Com. Yellowthroat, 13 (161, 65); Virginia Rail, 11 (136, 55); Willow Flycatcher, 5 (62, 25); Mallard, 3 (37, 15); Song Sparrow, 3; E. Kingbird, 2; Cedar Waxwing, 2; Brown-headed Cowbird, 2; Am. Goldfinch, 2; Green Heron, 1; Canada Goose, 1; Wood Duck, 1; Com. Flicker, 1; Tree Swallow, 1; Black-capped Chickadee, 1; Long-billed Marsh Wren, 1; Alder Flycatcher, 0.5; Great Blue Heron, +; Black Duck, +; Broad-winged Hawk, +; Yellow-billed Cuckoo, +; Black-billed Cuckoo +; Great Horned Owl, +; Barred Owl, +; Great Crested Flycatcher, +; Com. Crow, +; Blue-gray Gnatcatcher, +; Warbling Vireo, +; Chestnut-sided Warbler, +; N. Oriole, +. **Total:** 33 species; 156.5 territorial males (1934/km<sup>2</sup>, 783/100 acres). **Remarks:** Both species and density returned to normal following last year's disastrous flood. This year was exceptionally dry. Thanks to Jim Cavanaugh.—ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.

**194. 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:** New. **Size:** 5.02 ha = 12.4 acres (rectangular 600 x 900 ft, surveyed with tape and compass). **Description of Plot:** Trees 3-in. diameter and over based on ten 0.1 acre plots, 29/acre. Species comprising forest canopy: Pin Oak (*Quercus palustris*), 20, 69, 82.9, 50; hawthorn (*Crataegus spp.*), 7, 24.1, 9.2, 10; Am. Elm (*Ulmus americana*), 2, 6.9, 7.9, 20. Total basal area, 7.6 ft<sup>2</sup>; average canopy height 20 ft. Marsh vegetation was sampled by taking 20 ocular tube sightings within 10 sample plots and recording each plant species intersected. Relative density and frequency follow the name of each species occurring within the sample plot. Wool Grass (*Scirpus cyperinus*), 69.2; 90; Smartweed (*Polygonum spp.*), 13.5, 80; Grass (*Poaceae spp.*), 7.0, 30; Swamp Milkweed (*Asclepias incarnata*), 2.1, 10, False Nettle (*Boehmeria cylindrica*), 1.6, 20; Burreed (*Sparganium eurycarpum*), 1.6, 30, *Spiraea spp.*, 1.1, 20; Arrow Arum (*Peltandra virginica*), 1.1, 10; Swamp Rose (*Rosa palustris*), 0.6, 10; Blue Flag (*Iris spp.*), 0.6, 10; Cat-tail (*Typha latifolia*), 0.5, 10. **Edge:** Bordered on N, E and S by similar habitat. On W boundary, habitat grades into Pin Oak floodplain forest. **Topography:** Flat, slight slope from N to S. **Elevation:** 226 ft. **Weather:** Average temperature for May was 58°F (28-88°). Total rainfall was 3.25 inches. Average temperature for June was 62°F (30-89°). Total rainfall was 2.96 in. **Cover-**

**age:** May 15, 25, 30, June 5-6, 14, 18, 25, 0500-0900. Total hours: 11. **Census:** Swamp Sparrow, 16 (319, 129); Yellow Warbler, 10 (199, 81); Red-winged Blackbird, 7.5 (149, 60), Com. Yellowthroat, 3 (60, 24); Long-billed Marsh Wren, 2.5; Willow Flycatcher, 2, Am. Bittern, 1; Virginia Rail, 1; Am. Robin, 1. **Total:** 9 species; 44 territorial males ( $877/\text{km}^2$ , 355/100 acres). **Visitors:** Green Heron, Canada Goose, Mallard, Wood Duck, Mourning Dove, Yellow-billed Cuckoo, Red-bellied Woodpecker, Downy Woodpecker, E. Kingbird, Black-capped Chickadee, Starling, N. Oriole, Am. Goldfinch. **Remarks:** Nest found: Red-winged Blackbird. The W edge of the plot contained scattered deciduous trees which resulted in including certain species usually not found in a northern marsh, i.e., Mourning Dove, robin, Starling, oriole.—*THEODORE W. GUTZKE and HAROLD P. LASKOWSKI, Great Swamp Nat'l Wildlife Refuge, USDI, Fish and Wildlife Service, R.D. 1, Box 148, Basking Ridge, N.J. 07920.*

**195. CAT-TAIL-BULRUSH SWAMP.**—**Location:** New Jersey; Morris Co.; 1 mi E of Basking Ridge, Great Swamp Nat'l Wildlife Refuge;  $40^\circ 42' \text{N}$ ,  $74^\circ 32' \text{W}$ , Bernardsville Quadrangle, USGS. Waterfowl Management Unit No. 2. **Continuity:** New. **Size:** 5.87 ha = 14.5 acres (rectangular 600 x 1050 ft, surveyed with tape and compass). **Description of Plot:** Shallow marsh with water depths 0.5-2.0 ft. Forest canopy absent; shrub stems/acre 7; marsh vegetation cover 99.5%; 200 ocular tube sightings were made on 10 randomly selected plots. Species of plant in each sighting was noted. Relative dominance (%) and relative frequency (%) follow listings of each species occurring on plot. Am. Bulrush (*Scirpus americanus*), (30, 40); Cat-tail (*Typha latifolia*), (27, 60); Halberd-leaved Tearthumb, (*Polygonum arifolium*), (12.5, 70); Arrow Arum, (*Peltandra virginica*), (12, 80); Smartweed (*Polygonum* spp.), (5.5, 30); Burreed (*Sparganium eurycarpum*), (5.0, 40); Arrowhead (*Sagittaria* spp.), (4.5, 50); Climbing Hempweed (*Mikania scandens*), (1.5, 10); False Nettle (*Boehmeria cylindrica*), (1.5, 30); Touch-me-not (*Impatiens capensis*), (0.5, 10). **Edge:** Bordered on all sides by similar habitat except NW corner where maple swamp adjoins plot. **Topography:** Flat, slight downhill gradient from E to W. Elevation 227-229 ft. **Weather:** See Census 194. **Coverage:** May 16, 20, 23, 27, 29, June 5, 12, 17; 0600-0800. Total hours: 16. **Census:** Long-billed Marsh Wren, 36 (613, 248); Swamp Sparrow, 10 (170, 69); Red-winged Blackbird, 5 (85, 34); Yellow Warbler, 2. **Total:** 4 species; 53 territorial males ( $903/\text{km}^2$ , 366/100 acres). **Visitors:** Great Blue Heron, Green Heron, Least Bittern, Am. Bittern, Canada Goose, Mallard, Blue-winged Teal, Wood Duck, Virginia Rail, Chimney Swift, E. Kingbird, Alder Flycatcher, Tree Swallow, Barn Swallow, Com. Crow, Com. Yellowthroat. **Remarks:** Some difficulty was observed in censusing Red-winged Blackbirds because they seemed to peak in their nesting activity much earlier than the remaining species. During the latter dates of coverage it was noted that many Red-wing territories were breaking up. Long-billed Marsh Wrens exhibited a definite habitat preference for cat-tails; colonization of

bulrush areas took place after all available territories in cat-tails were claimed.—*HAROLD P. LASKOWSKI, Great Swamp National Wildlife Refuge, USDI, Fish and Wildlife Service, R.D. 1, Box 148, Basking Ridge, N.J. 07920.*

**196. CAT-TAIL MARSH.**—**Location:** New York; St. Lawrence Co., 2 mi NW of Canton. NE end of Upper and Lower Lakes Wildlife Mgt. Area; 1 mi SW of Rte 68;  $44^\circ 37' \text{N}$ ,  $75^\circ 14' \text{W}$ , Canton 7.5' Quadrangle, USGS. **Continuity:** Established 1978; 2 intermittent years. **Size:** 6.9 ha = 17 acres. **Description of Plot:** See AB 33:103 (1979). **Weather:** Temperatures slightly above normal for winter and spring; precipitation considerably below normal until early summer. **Coverage:** May 11-12; June 5-6, 16, 18-19, 24, 28; 0550-1815, EST. Total hours: 19. **Census:** Red-winged Blackbird, 15 (218, 88); Long-billed Marsh Wren, 11 (160, 65); Com. Gallinule, 7 (102, 41); Blue-winged Teal, 3 (44, 18); Com. Grackle, 3; Pied-billed Grebe, 2; Am. Bittern, 2; Canada Goose, 2; Mallard, 1; Am. Coot, 1; Com. Snipe, 1; E. Kingbird, 1; Least Bittern, 0.5; Black Duck, 0.5. **Total:** 14 species; 50 territorial males ( $727/\text{km}^2$ , 294/100 acres). **Visitors:** Great Blue Heron (colony of 100 nests in area), Green Heron, Wood Duck, Ring-necked Duck, Black Tern, Belted Kingfisher, Barn Swallow, Tree Swallow, Cliff Swallow. **Remarks:** Coverage included both walking edges and by canoe; more thorough than in 1978. Nests found: Least Bittern, Canada Goose, Blue-winged Teal, Black Tern, Long-billed Marsh Wren, Cedar Waxwing, and Red-winged Blackbird. First recorded nesting of Least Bittern and Black Tern in this marsh; nests not in plot. Young observed for Pied-billed Grebe (8), Canada Goose (4), Com. Gallinule. Approximately 2200 linear ft (7 acres) of alder and wet meadow edge not included above had the following territories: Yellow Warbler, 6; Com. Yellowthroat, 4; Red-winged Blackbird, 4; Alder Flycatcher, 3; Gray Catbird, 2; Swamp Sparrow, 2; possible Willow Flycatcher, 1; Cedar Waxwing, 1; Song Sparrow, 1; Bobolink, +; E. Meadowlark, +. **Total:** 11 species; 24 territorial males. Marnie Reed Crowell and Thomas L. Crowell assisted.—*KENNETH L. CROWELL, Dept. of Biology, St. Lawrence Univ., Canton, N.Y. 13617.*

**197. CAT-TAILS BORDERED BY WATER**—**Location:** Ontario; Kent Co., Dover West Township, St. Clair Nat'l Wildlife Area, 8.5 km W of Paincourt;  $42^\circ 22' \text{N}$ ,  $82^\circ 24' \text{W}$ ; Chatham 40 J/8, Grid Reference - 845920. **Continuity:** New. **Size:** 5.5 ha = 13.6 acres (52 m strip along 1500 m of shoreline; 1500 m of shoreline measured by rope, area measured from aerial photograph). **Description of Plot:** Four distinct zones were found in the 5.5 ha plot. An open water zone extended 2 m out from shore. This zone consisted of Muskgrass (*Chara* sp.) 75%, Wild Celery (*Vallisneria americana*) 10%, Pickerelweed (*Pontederia cordata*) 5%, and Water Lily (*Nymphaea odorata*) 4%. A Cat-tail zone (*Typha* sp.) extended 12 m inland. A mixed plant zone extended for another 12 m and was composed of Purple Loosestrife (*Lythrum salicaria*) 45%, Jewelweed (*Impatiens biflora*) 35%,

and Cat-tail 20%. The zone farthest in from shore, extending inland another 26 m, was composed almost entirely of Cat-tail with one small stand of Com. Elder (*Sambucus canadensis*). **Edge:** The W side was bordered by a pond with patches of emergent vegetation. The area to the E was similar to the plot except that it contained several sedge and grass meadows, some with a few trees and shrubs. The N and S sides were bordered by marsh consisting of the same vegetation as the plot. **Topography:** Flat. **Elevation:** 580 ft. **Weather:** Cooler and wetter than normal. **Coverage:** May 27; June 4-5, 9, 13, 17, 26, July 9; 0520-0710; and 2020-2130. Total hours: 22.3. **Census:** Red-winged Blackbird, 40 (727, 294); Long-billed Marsh Wren, 10 (182, 74); Com. Yellowthroat, 10; Swamp Sparrow, 7 (127, 51); Com. Gallinule, 6 (109, 44); Com. Grackle, 3 (55, 22); Am. Bittern, 2; Least Bittern, 1; Mallard, 1; Yellow Warbler, 1. **Total:** 10 species; 81 territorial males and females ( $1472/\text{km}^2$ , 596/100 acres). **Visitors:** Great Egret, Great Blue Heron, Virginia Rail, Am. Coot, Com. Tern, Black Tern, Mourning Dove, Barn Swallow, Am. Robin. **Remarks:** Nests found: Red-winged Blackbird (29), Com. Gallinule (4), Com. Grackle (3), Com. Yellowthroat (2), Least Bittern (1), Mallard (1), Swamp Sparrow (1). Virginia Rails were known to nest in 1979. Gratitude is extended to the staff of St. Clair Nat'l Wildlife Area for assistance and to Duncan Gow for advice.—*RON VEENSTRA and JOHN G. HAGGEMAN, Canadian Wildlife Service, St. Clair Nat'l Wildlife Area, RR 1, Paincourt, Ontario, Canada, NOPIZO.*

**198. BUTTONBUSH SWAMP.**—**Location:** Ontario; Haldimand-Norfolk Regional Municipality, Port Rowan, 9.3 mi W of the Long Point Lighthouse;  $42^\circ 33' \text{N}$ ,  $80^\circ 13' \text{W}$ , Little Creek Ridges, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 5 ha = 12.35 acres (100 x 500 m, surveyed). **Description of Plot:** Swamp lies between sand dune ridges running NE-SW. Open water is less than 5%, ranging in depth from 7 cm to 1 m. Dominant species (figure after each gives relative dominance (%) and frequency (%)) of occurrence in 20 plots), Buttonbush (*Cephalanthus occidentalis*), 65, 100; Swamp Loosestrife (*Decodon verticillatus*), 13, 100; Bluejoint (*Calamagrostis canadensis*), 7, 100; Sedges (*Carex* spp.), 6.5, 100. **Edge:** Bordered on the NE by similar swamp, on the SW by similar swamp and open water, and on the NW and SE by mature Red Oak - White Ash - Red Maple forest. **Topography:** Swamp bordered by sand ridges. **Elevation:** 565 ft. **Weather:** Generally warm (15-25°C) with light winds. Cloudy on 3 trips, foggy on 1. **Coverage:** June 1, 5-6, 10, 12, 15, 18, 22, 25, 30, 0545-0930, EST. Total hours: 42. **Census:** Red-winged Blackbird, 37 (740, 300); Yellow Warbler, 16.5 (330, 134); E. Kingbird, 2; Com. Yellowthroat, 2; Com. Grackle, 1; Brown-headed Cowbird, 1; Song Sparrow, 1; Tree Swallow, 0.5; N. Oriole, 0.5; Starling, +. **Total:** 10 species; 61.5 territorial males ( $1230/\text{km}^2$ , 498/100 acres). **Visitors:** Am. Bittern, Mallard, Wood Duck, Virginia Rail. **Remarks:** Nests found: 55 Red-winged Blackbird, 37; Yellow Warbler, 9; E. Kingbird, 2; Tree Swallow, 1; Starling, 1; N

Oriole, 1; Com. Grackle, 1; Brown-headed Cowbird, 1; Com. Yellowthroat, 1; Song Sparrow, 1. One cowbird egg was found in a Yellow Warbler nest, which was deserted before hatching. The density of Yellow Warblers is the highest recorded for that species for any previous Breeding Bird Census on Long Point. All Yellow Warbler nests and 77% of Red-wing nests were built in Buttonbush. Owing to a lack of optimum Yellow Warbler nesting habitat on Long Point, this species appears to be an opportunistic nester in the Buttonbush Swamp. No trees occurred in the study area. This project was funded jointly by the Canadian Wildlife Service and the Summer Youth Employment Program. Special thanks to Jon McCracken.—MARY YOUNG (compiler), PETER LEPSON, SUE McADAM, PETER TUCKER, Canadian Wildlife Service, 152 Newbold Court, London, Ontario N6E 1Z7.

**199. BUR-REED-SEDGE MARSH.**—**Location:** Ontario; Kent Co., Dover West Township, St. Clair Nat'l Wildlife Area, 6 mi W of Paincourt; 42°22'N, 82°24'W, Chatham 40 J/8; Grid Reference - 834916. **Continuity:** New. **Size:** 2 ha = 4.9 acres (measured from aerial photograph). **Description of Plot:** Four major zones were found. Floating mats comprised about 30% of the plot. Greater Bur-reed (*Sparganium eurycarpum*) comprised approximately 75% of the vegetation on these mats; 10% was Hardstem Bulrush (*Scirpus acutus*); 5% was Tufted Sedge (*Carex stricta*); and 5% was Purple Loosestrife (*Lythrum salicaria*). Approximately 30% was clumps of Tufted Sedge. Open water with scattered vegetation comprised 20%. Vegetation in this area consisted of Fragrant Water Lily (*Nymphaea odorata*), Hardstem Bulrush, Spatterdock (*Nuphar advena*), and Greater Bur-reed. The remaining 20% was composed of 99% Cat-tail *Typha* sp.). **Edge:** Similar habitat to the N, S and W. A channel borders the E edge. Lake St. Clair is within 150 m of the W edge. **Topography:** Flat. **Elevation:** 580 ft. **Weather:** Cooler and wetter than normal. **Coverage:** May 28; June 3, 5, 12, 16, 18, 20, 23; July 3, 10; 0530-0700 and 2040-2110. Total hours: 18.6. **Census:** Red-winged Blackbird, 40 (2017, 816); Long-billed Marsh Wren, 8 (403, 163); Com. Gallinule, 7 (353, 143); Virginia Rail, 1; Sora, 1. **Total:** 5 species; 57 territorial males and females (2874/km<sup>2</sup>, 1163/100 acres). **Visitors:** Great Blue Heron, Green Heron, Least Bittern, Am. Bittern, Canada Goose, Mallard, Blue-winged Teal, Am. Coot, Killdeer, Black Tern, Bank Swallow, Rough-winged Swallow, Com. Yellowthroat, Swamp Sparrow. **Nests found:** Red-winged Blackbird (32), Com. Gallinule (6), Long-billed Marsh Wren (4). Red-winged Blackbirds were very difficult to census accurately because of their high density; the actual density may be even higher than listed here. Gratitude is extended to the staff of St. Clair Nat'l Wildlife Area for their assistance and to Duncan Gow for advice.—RON VEENSTRA and JOHN G. HAGGEMAN, Canadian Wildlife Service, St. Clair Nat'l Wildlife Ara, RR 1, Paincourt, Ontario, Canada, NOP 1ZO.

**200. SALT MARSH.**—**Location:** Florida;

Levy Co., Gulf Hammock, 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. The middle of the plot is 6 km NNE of the town of Cedar Key; 29°11'N, 83°00'W, Sumner Quadrangle, USGS. **Continuity:** New. **Size:** 15 ha = 37.07 acres (200 x 750 m, surveyed with compass and measured with tape, then gridded with 1-2 m high stakes placed at 25 m intervals). **Description of Plot:** A regularly flooded salt marsh, with an average daily tidal range of about 1.5 m. Average salinity (on Apr. 25) at 32 stations was  $19.03 \pm 1.09$  (SD) parts per thousand, range 17.2-21.6. At low tide, extensive mud banks, riddled with burrows of crabs (*Uca* and *Sesarma*) are exposed. Of the total plot, 94.1% is covered by vegetation, and 5.9% by tidal creeks. Vegetation cover was determined by tallying contacts with a vertical rod, placed at each corner of a m<sup>2</sup>. These m<sup>2</sup> quadrants were randomly located along 28 transects, each 71 m long. The total number of points sampled was 760. This method follows that of Wiens (1969; A.O.U. Monograph No. 8). Vascular plant species, in order of importance (% relative cover) were: Smooth Cordgrass (*Spartina alterniflora*), 37.8%; Black Rush (*Juncus roemerianus*), 26.3%; Seashore Saltgrass (*Distichlis spicata*), 23.2%; Perennial Glasswort (*Salicornia virginica*), 8.1%; Saltwort (*Batis maritima*), 3.2%; Sea Oxtongue (*Borrichia frutescens*), < 1%; Virginia Dropseed (*Sporobolus virginicus*), < 1%; Sea Lavender (*Limonium carolinianum*), < 1%; Christmas Berry (*Lycium carolinianum*), < 1%; Key Grass (*Monanthochloe littoralis*), < 1%; wrack deposits, < 1%. The relative elevation of the major plant communities is indicated by water depths (cm) during spring flood tide, where greater water depths signify lower elevations: *S. alterniflora* (N=11),  $25.6 \pm 7.2$ ; *J. roemerianus* (11),  $20.9 \pm 5.3$ ; *B. maritima* (3), 16.5; *D. spicata* (31),  $15.3 \pm 3.3$ ; *S. virginica* (6),  $13.8 \pm 1.2$ . **Edge:** Bordered on 3 sides by similar habitat, and on 1 side by open bay or lagoons. **Topography:** Flat, except for creek beds, 1-1.5 m in depth. **Elevation:** 0-2 m. **Weather:** 10-32°C. No census taken when wind was over 9 km/h. **Coverage:** Feb. 23; Mar. 6, 9, 14, 17, 20, 23, 26-27; Apr. 1, 3-4, 10, 12-13, 16, 18-20, 25-26, 28, 30; May 1, 4-5, 8, 11-12, 18-20, 23, 30-31; June 1, 2, 6, 8-9, 13-14, 18, 22, 27-28; July 3. Total hours: 118. **Census:** Seaside Sparrow, 39 (260, 105); Clapper Rail, 9 (60, 24); Long-billed Marsh Wren, 1. **Total:** 3 species; 49 territorial males (327/km<sup>2</sup>, 132/100 acres). **Visitors:** (seen foraging or resting on more than 10 trips): Horned Grebe, White Pelican, Double-crested Cormorant, Great Blue Heron, Green Heron, Little Blue Heron, Cattle Egret, Great Egret, Snowy Egret, Louisiana Heron, Yellow-crowned Night Heron, Am. Bittern, White Ibis, Blue-winged Teal, N. Shoveler, Turkey Vulture, Marsh Hawk, Osprey, Virginia Rail, Sora, Black-bellied Plover, Willet, Greater Yellowlegs, Lesser Yellowlegs, Least Sandpiper, Dunlin, Short-billed Dowitcher, W. Sandpiper, Ring-billed Gull, Laughing Gull, Forster's Tern, Royal Tern, Belted Kingfisher, Fish Crow, Short-billed Marsh Wren, Red-winged Blackbird, Savannah Sparrow, Sharp-tailed Sparrow, Swamp Sparrow. **Remarks:** Nests found (58): Seaside Sparrow,

53, Clapper Rail, 5. The lone Long-billed Marsh Wren was unmated. Seaside Sparrows started nesting March 21. Floods on Mar. 29 and Apr. 13 wiped out all bird nests. Such flooding probably occurs every year (as it did last year), whenever spring tides coincide with S to E winds, that are from the direction of Waccasassa Bay. Only 18% of 45 Seaside Sparrow nests that had eggs produced fledglings. Most nest losses were attributable to predation, about equally divided between Fish Crows and Rice Rats (*Oryzomys palustris*). The density of rice rats in the plot was about 8/ha, as determined by mark-recapture. As in other populations of this species, both males and females frequently foraged off the activity space surrounding their nest. Five of the 39 male Seaside Sparrows were apparently unmated, while the others were monogamous. The Seaside Sparrows nested for the most part in *Distichlis* and *Salicornia*; breeding was terminated by July 3.—WILLIAM POST, 439 NE 9th Avenue, Gainesville, Fl. 32601.

## BREEDING BIRD CENSUS IN THE RED LAKE PEATLANDS OF NORTHERN MINNESOTA

The following 5 breeding bird censuses were conducted in the Red Lake peatlands, an 800 square kilometer bog located N of Upper Red Lake in N.W. Minnesota. The censuses were the "control" plots for the major habitat types within the peatlands impacted by a 500 kilovolt transmission line.

The plots were established in relatively homogeneous areas. The size and shape were made as large and square as possible while allowing a minimum of 25 m buffer from each edge. Each plot was censused 8 times during the breeding season between 0500 and 1010, CDT (most between 0500 and 0830) at an approximate rate of 17 m/min, except in the open fen where the rate was 20 m/min. Censuses of each plot were rotated among the three authors. Two census routes were alternately used in each plot. Each route was 50 m apart corresponding to the 50 x 50 m grid and, thus, census routes used on a census day were 100 m apart. Censuses were conducted on mornings with winds less than 24 km/h and with no precipitation. Temperatures varied from 2-24° with most between 13-18° C.

The description of vegetation was general and primarily qualitative, although the descriptions were supplemented with some quantitative data to enhance the interpretation. The point-centered quarter method was used to estimate the tree density and the frequency of trees and shrubs. Canopy, shrub and forbaceous-herbaceous vegetation heights were measured throughout each plot when present. Percent ground surface cover (green vegetation) was estimated within 1 m<sup>2</sup> plots.

Two important factors had a potential impact on the breeding bird population. First, the breeding season was preceded by an exceptionally warm spring that advanced the foliation and flowering of plants by 2-3 weeks. Second, the entire northern half of Minnesota, including the peatland areas, received unusually low levels of precipitation;

the water levels during the breeding season were much lower than normal.

Funding for the project was provided by Northern States Power Company —MARYBETH NEVERS, JOANN HANOWSKI, and GERALD NIEMI, Lake Superior Basin Studies Center and Dept. of Biology, Univ. of Minn.-Duluth, Duluth, Minn. 55812.

#### 201. CLOSED BLACK SPRUCE BOG.—

**Location:** Minnesota; Koochiching Co., 22.4 km NE of Waskish, W of the Pine Island Trail; 48°16'06"N, 94°23'16"W, Wayland SW Quadrangle, USGS. **Continuity:** New. **Size:** 17.5 ha = 43.24 acres (500 x 350 m, measured with a 50 m rope and compass). **Description of Plot:** A fairly uniform stand of dense Black Spruce (*Picea mariana*) with a sparse Ericaceous shrub layer and a ground cover composed primarily of *Sphagnum* moss. A quantitative survey of the vegetation gave the following results based on 15 point-centered quarter samples: Trees, 2.5-7.5 cm dbh, 67% frequency, 2318/ha, 100% Black Spruce. Trees, 7.5-15 cm dbh, 33% frequency, 1141/ha, 100% Black Spruce. The average canopy height was 7 m (range 5-10 m). The understory was composed of Labrador-tea (*Ledum groenlandicum*) 88%, Leather-leaf (*Chamaedaphne calyculata*) 8%, and Bog Laurel (*Kalmia polifolia*) 4%. The average shrub height was 64 cm (range 15-250 cm). Major forbs and grass-sedges included: Three-leaved False Solomon's Seal (*Smilacina trifolia*), Small Cranberry (*Vaccinium oxycoccus*), Cottongrass (*Eriophorum spp.*) and *Carex* spp. The average ground cover was 80%. **Edge:** Bordered by similar vegetation for at least 50 m on all sides. **Topography:** Flat. **Elevation:** 372 m. **Weather:** See introduction. **Coverage:** May 21, 28; June 4, 14, 26; July 3, 9, 14; 0500-0900, CDT. Total hours: 25. **Census:** Palm Warbler, 8 (46, 19); Yellow-rumped Warbler, 6 (34, 14); Connecticut Warbler, 5 (29, 12); Yellow-bellied Flycatcher, 2; Dark-eyed Junco, 2; Mallard, 1; Gray Jay, 1; Blue Jay, 1; Chipping Sparrow, 1; White-throated Sparrow, 1; Boreal Chickadee, +. **Total:** 11 species; 28 territorial males or females (160/km<sup>2</sup>, 65/100 acres). **Visitors:** Downy Woodpecker, White-breasted Nuthatch, Veery, Golden-crowned Kinglet, Yellow Warbler, Brown-headed Cowbird. **Remarks:** Nests found: Mallard, 1, Yellow-bellied Flycatcher, 1; Palm Warbler, 2.

#### 202. 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:** New. **Size:** 5 ha = 12.36 acres (200 x 240 m, measured with a 50 m rope and compass). **Description of Plot:** An area of scattered, small Black Spruce and Tamarack (*Larix laricina*) trees with a patchy shrub layer and a predominantly *Sphagnum* moss ground cover. A quantitative survey of the vegetation based on 7 point-centered quarter samples gave the following results: Trees, 2.5-7.5 cm dbh (figures after each give number of trees/ha, % relative density, % relative dominance, %

frequency): Black Spruce, 50, 80, 54, 79; Tamarack, 5, 8, 5, 8. Trees, 7.5-15 cm dbh: Black Spruce, 2, 4, 14, 4; Tamarack 5, 8, 27, 8. Average canopy height was 3 m (range 1-8 m). The shrub layer was composed of Swamp Birch (*Betula pumila*), 80%; Tamarack, 12%; and Black Spruce, 8%. Average height of the shrubs was 61 cm (range 31-107 cm). Predominant forbs and herbs included: Three-leaved False Solomon's Seal, Cottongrass, Small Cranberry, and *Carex* spp. **Edge:** Bordered on NW (20-25 m) by an open bog with dense Swamp Birch and no trees, and on all other sides by similar habitat. **Topography:** Flat. **Elevation:** 365 m. **Weather:** See introduction. **Coverage:** May 22, 27; June 2, 15, 19, 30; July 10, 11; 0510-0940, CDT. Total hours: 6.5 **Census:** Savannah Sparrow, 6 (120, 49); Lincoln's Sparrow, 3 (60, 24); Mallard, 1; E. Kingbird, 1; Bobolink, 1; Clay-colored Sparrow, 1; Palm Warbler, +. **Total:** 7 species; 13 territorial males or females (260/km<sup>2</sup>, 105/100 acres). **Visitors:** Com. Flicker, Gray Jay, Yellow-rumped Warbler, Purple Finch, Song Sparrow. **Remarks:** Nests found: Mallard, 1; Savannah Sparrow, 3.

**203. SHRUB SWAMP.—****Location:** Minnesota; Lake of the Woods Co., 3.2 km SW from the junction of Minn. Hwy. 72 and Co. Rd. 77; 48° 24'19"N, 94° 35'51"W, Chase Brook NE Quadrangle, USGS. **Continuity:** New. **Size:** 12.5 ha = 30.9 acres (500 x 250 m, measured with a 50 m rope and compass). **Description of Plot:** A treeless wetland comprised of shrubs intermixed with grasses and sedges. A quantitative survey of vegetation based on 10 point-centered quarter samples gave the following results for shrubs comprising 90% of the relative cover: *Salix* spp., 52%; Swamp Birch, 33%; *Alnus rugosa* 8%; *Spirea alba*, 2%. Average height of the shrub layer was 0.9 m (range 0.3-4 m). *Salix* species included: *S. bebbiana*, *S. discolor*, *S. humilis*, *S. serissima*, *S. plantifolia*. Other plants present were *Carex* spp. and *Typha latifolia*. Average ground cover was 28%. **Edge:** Bordered by similar vegetation for at least 100 m on all sides. **Topography:** Flat. **Elevation:** 362 m. **Weather:** See introduction. **Coverage:** May 20, 24, 31; June 11, 17, 28; July 1, 11, 18; 0520-0850, CDT. Total hours: 18. **Census:** Short-billed Marsh Wren, 36 (288, 117); Swamp Sparrow, 22 (176, 71); Com. Yellowthroat, 18 (144, 58); Le Conte's Sparrow, 9 (72, 29); Bobolink, 5 (40, 16); Yellow Warbler, 3 (24, 10); Clay-colored Sparrow, 2; Am. Bittern, 1; Yellow Rail, 1; Com. Snipe, 1; Short-eared Owl, 1; Alder Flycatcher, 1. **Total:** 12 species; 100 territorial males or females (800/km<sup>2</sup>, 324/100 acres). **Visitors:** Marsh Hawk, Black-billed Cuckoo, Gray Catbird, Nashville Warbler, Red-winged Blackbird. **Remarks:** Nest found: Com. Yellowthroat, 1. Yellow Rail was associated with Cat-tail sedges and areas of low shrub density.

**204. 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:** New. **Size:** 10 ha = 24.7 acres (400 x 250 m, measured with a 50 m rope and compass). **Description of Plot:** Treeless, com-

prised predominantly of low-lying Swamp Birch intermixed with areas of grass-sedge. Shrub frequency, based on 10 point-centered quarter samples showed: Swamp Birch, 80%; *Salix* spp. 20%; the average shrub height was 0.7 m (range 0.3-2.3 m). Other common plants were Leather-leaf, Bog Laurel, and *Carex* spp. (average height 1 m). Average ground cover was 37%, mostly *Sphagnum* moss. **Edge:** Bordered by similar vegetation for a minimum of 100 m on all sides. **Topography:** Flat. **Elevation:** 368 m. **Weather:** See introduction. **Coverage:** May 22, 27; June 2, 15, 19, 30; July 10, 11, 15; 0520-0950, CDT. Total hours: 17. **Census:** Short-billed Marsh Wren, 20 (200, 81); Swamp Sparrow, 8 (80, 32); Le Conte's Sparrow, 7 (70, 28); Com. Yellowthroat, 6 (60, 24); Bobolink, 4 (40, 16); Clay-colored Sparrow, 2; Mallard, 1; Short-eared Owl, 1. **Total:** 8 species; 49 territorial males or females (490/km<sup>2</sup>, 198/100 acres). **Visitors:** Am. Bittern, E. Kingbird, Tree Swallow, Barn Swallow, Yellow Warbler, Red-winged Blackbird, Com. Grackle. **Remarks:** Nest found: Mallard, 1; Swamp Sparrow, 1.

**205. OPEN FEN.—****Location:** Minnesota; Beltrami Co., 2.8 km SE of the Beltrami-Lake of the Woods Co. line on Minn. Hwy. 72; 48°22'00"N, 94°32'24"W, Ludlow Lookout Tower Quadrangle, USGS. **Continuity:** New. **Size:** 15 ha = 37.07 acres (500 x 300 m, measured with a 50 m rope and compass). **Description of Plot:** A persistent emergent wetland of sedges (*Carex* spp.) intermixed with occasional patches of shrubs. No trees were present. The frequency of shrubs based on 15 point-centered quarter samples was: Swamp Birch, 90%; Sweet Gale (*Myrica gale*), 10%. The average height of the shrubs was 0.6 m (range 0.3-0.5 m). Other plants present included: Leather-leaf, Bog Laurel, Labrador-tea, Pitcher-plant (*Sarracenia purpurea*), and Bogbean (*Menyanthes trifoliata*). Average height of the sedge layer was 0.75 m. Ground cover was 30%, with patches of *Sphagnum* moss. **Edge:** Bordered on all sides by similar vegetation for a minimum of 150 m. **Topography:** Flat. **Elevation:** 368 m. **Weather:** See introduction. **Coverage:** May 23, 30; June 3, 16, 25, 30; July 12, 15; 0530-1010, CDT. Total hours: 21. **Census:** Le Conte's Sparrow, 24 (160, 65); Short-billed Marsh Wren, 12 (80, 32); Bobolink, 7 (47, 19); Short-eared Owl, 1. **Total:** 4 species; 44 territorial males or females (293/km<sup>2</sup>, 119/100 acres). **Visitors:** Marsh Hawk, Barn Swallow. **Remarks:** Marsh wrens were associated with areas where Swamp Birch occurred. Highest density of Le Conte's Sparrows was found in the predominantly sedge areas.

**206. CAT-TAIL AND SEDGE MARSH.—****Location:** Wisconsin; Dane Co., S border of Madison, T6N, R9E, Sect. 5 (Fitchburg Township); 43°01'N, 89°27'W, Madison Quadrangle, USGS. **Continuity:** Established 1967; 5 intermittent years. **Size:** Main Marsh (S of railroad berm), 12.47 ha = 30.8 acres, from 1969 census. The area of emergent vegetation on the edge is approximately 5 ha = 12.3 acres, estimated from the

1972 census. North Marsh (N of railroad berm, not included in 1967 census), 1.3 ha = 3.2 acres. Emergent vegetation on edge is 0.73 ha = 1.8 acres. **Description of Plot:** See AFN 21:662-664 (1967), and 23:742-743 (1969). **Edge:** Bordered with residential development, cultivated and old fields and wooded upland. **Topography:** Kettle hole. **Elevation:** 941 ft. **Weather:** Temperature was average, rainfall about 1 in. below normal. **Coverage:** Apr. 16, 19, 21, 23, 25, 28; May 1-7, 9, 11, 12, 14, 16-17, 19, 22, 24-25, 27, 30; June 2-4, 6-7, 16-20, 24-27; July 1-4, 8, 10-12, 14, 18, 21; most 0500-9000, a few early evenings. Total hours: 45. **Census:** Main Marsh—Red-winged Blackbird, 49 (393, 159); Long-billed Marsh Wren, 24 (193, 78); Com. Grackle, 8 (64, 26); Swamp Sparrow, 5 (40, 16); Virginia Rail, 4 (32, 13); Sora, 4. North Marsh—Red-winged Blackbird, 26; Com. Grackle, 6; Virginia Rail, 5; Long-billed Marsh Wren, 4; Sora, 1; Swamp Sparrow, 1. **Total:** (both marshes): 6 species; 137 territorial males ( $996/\text{km}^2$ , 403/100 acres). **Visitors:** Regular-(A) nesting on or near edge: Mallard, Wood Duck, Willow Flycatcher, Tree Swallow, Am. Robin, Gray Catbird, Yellow Warbler, Com. Yellowthroat, Song Sparrow, (B) Suspected of nesting in marsh: Least Bittern, Black Tern, (C) Nesting at distance but use marsh regularly: Green Heron, Ring-necked Pheasant, Killdeer, Mourning Dove, Chimney Swift, Belted Kingfisher, E. Kingbird, Rough-winged Swallow, Barn Swallow, Purple Martin, Cedar Waxwing, E. Meadowlark, Am. Goldfinch. **Irregular**—Blue-winged Teal, Spotted Sandpiper, Com. Snipe, Com. Flicker, Blue Jay, Com. Crow, Warbling Vireo, Brown-headed Cowbird, Cardinal. **Remarks:** The 5 most commonly found species, most notably the Long-billed Marsh Wren and the Swamp Sparrow, increased from the 1978 census. Sightings of the Least Bittern and Black Tern may also indicate an increase from 2 years ago. The Pied-billed Grebe, Com. Gallinule and Am. Coot have declined. While numbers increased, total species have shown a steady decline over the 13 year census history. Nests found: Long-billed Marsh Wren, 5; Tree Swallow, 1; Red-winged Blackbird, 7; Com. Grackle, 14. Four Mallard and 2 Wood Duck broods were observed beginning in late May. Censusing was accomplished by wading and observation from the railroad berm. Rails were counted by tape recorder playback. Lack of rain during the census period may have decreased siltation from the storm sewers and prevented turbid water, thus attracting the Least Bittern and Black Tern. —ROBIN P. WHITE, 550 N. Park, Geography Dept., Madison, Wisc. 53715.

**207. CAT-TAIL-TULE MARSH.**—**Location:** California; San Diego Co., Kit Carson Park in Escondido;  $33^\circ 04' \text{N}$ ,  $117^\circ 03' \text{W}$ , Escondido Quadrangle, USGS. **Continuity:** Established 1979. **Size:** 2.79 ha = 6.89 acres. **Description of Plot:** See AB 34:100 (1980). **Weather:** Temperatures were above average for Mar. and Apr., below average for May (Mar., +2.6°F; Apr., +1.9°; May, -1.5°). Rainfall for the period Mar.-May was 2.4 in. above average with most rain occurring in Mar. **Coverage:** Mar. 22, 29; Apr. 7, 12, 19,

26; May 4, 10, 24, 0450-1005, PST. Total hours: 12. **Census:** Red-winged Blackbird, 26 females (932, 377); Song Sparrow, 14 (502, 203); Com. Yellowthroat, 13.5 (484, 196); Virginia Rail, 2; Brown-headed Cowbird, 2 females; Mourning Dove, 1; Long-billed Marsh Wren, 1; Black Phoebe, +; Bushtit, +. **Total:** 9 species; 59.5 territorial and non-territorial males and females ( $2134/\text{km}^2$ , 864/100 acres). **Visitors:** Cooper's Hawk, Sora, Barn Owl, Anna's Hummingbird, W. Kingbird, Bell's Vireo, Orange-crowned Warbler, Yellow Warbler, Yellow-rumped Warbler, Wilson's Warbler, Tricolored Blackbird, Am. Goldfinch, Savannah Sparrow, White-crowned Sparrow. **Remarks:** Last year 350 female Tricolored Blackbirds nested in the marsh. This year the nearest colony was located 1800 ft W of the plot. The appearance of 6 new species and an increase in female Red-winged Blackbirds from 8 last year to 26 this year is probably related to the absence of the Tricolored Blackbirds. Populations of Com. Yellowthroat and Song Sparrow, the other 2 species recorded in 1979, reflect little change.—KENNETH L. WEAVER, 1339 Taylor Place, Escondido, Calif. 92027.

**208. COASTAL SALT MARSH.**—**Location:** California; Humboldt Co., Eureka, near foot of Bay Street and KIEM radio towers bordering Eureka Slough;  $40^\circ 47' \text{N}$ ,  $124^\circ 07' \text{W}$ , Eureka Quadrangle, USGS. **Continuity:** New. **Size:** 6.5 ha = 16 acres (irregular boundary follows physical features). **Description of Plot:** Most of the marsh is relatively undisturbed with dominant vegetation composed of Pickleweed (*Salicornia virginica*), Cordgrass (*Spartina foliosa*), Saltgrass (*Distichlis spicata*), and Rush (*Juncus lescurii*). Other species present include Humboldt Bay Owl Clover (*Orthocarpus castillejoides* var. *humboldtiensis*), Fat-hen (*Atriplex patula* var. *obtusa*), Gum-plant (*Grindelia stricta blakei*), Coyote Brush (*Baccharis pilularis consanguinea*), and Fescue (*Festuca* sp.). Second Slough, a major tributary to Eureka Slough, crosses the site. Human disturbance is evident in the form of 3 footpaths crossing the area, 4 old boat houses on the edge of Second Slough, and several ditches as well as remnants of an old dike. **Edge:** Bordered by a gravel road, paved road and fence-row, Eureka Slough, Third Slough, and some surrounding upland grassy field habitat. **Topography:** Essentially flat. **Elevation:** Sea level. **Weather:** Temperature 55-65°F. Most days were foggy. **Coverage:** June 11-13, 17-18, 20, 24; July 1, 7; dawn - 1015. Total hours: 11. **Census:** Long-billed Marsh Wren, 4 (62, 25); Brown-headed Cowbird females, 2; Song Sparrow, 2. **Total:** 3 species; 8 territorial males or females ( $124/\text{km}^2$ , 50/100 acres). **Visitors:** Barn Swallow, Cliff Swallow, Violet-green Swallow, Rough-winged Swallow, Belted Kingfisher, House Finch and Am. Goldfinch. **Remarks:** Sightings of immature Long-billed Marsh Wrens and 2 immature Brown-headed Cowbirds with Song Sparrow host parents indicate that the census coverage was rather late in the season. There were 6 additional Song Sparrow territories which slightly overlapped the study site boundaries. This salt marsh is being utilized as a "control site" to two salt

marsh restoration projects taking place around Humboldt Bay. This study was funded through the U.S. Fish and Wildlife Service, Wildlife Research Field Station, Arcata, California. Special thanks to Paul F Springer for his assistance throughout the project.—DANA L. BASE and SANDRA L JACOBSON, P.O. Box 171, Arcata, Calif. 95521.

#### 209. DIKED COASTAL BRACKISH MARSH.

**Location:** California; Humboldt Co., 1 mi S of Eureka on SE side of US Hwy 101 and the Elk River;  $40^\circ 45' \text{N}$ ,  $124^\circ 11' \text{W}$ , Eureka Quadrangle, USGS. **Continuity:** New. **Size:** 8.2 ha = 20.3 acres (triangular, planimetered). **Description of Plot:** Diked brackish marsh with shrub layer dominated by Coyote Brush (*Baccharis pilularis* var *consanguinea*). Ground layer is dominated by rush (*Juncus* sp.), Silverweed (*Potentilla pacifica*), Hair Grass (*Deschampsia cespitosa*), and Fat-hen (*Atriplex patula* var *obtusa*). Higher ground has *Aster chilensis*, California Blackberry (*Rubus vitifolius*), and Water Celery (*Oenanthe sarmentosa*) dominant. Extensive growth of Pickleweed (*Salicornia virginica*) and Saltgrass (*Distichlis spicata*) is present along a regular network of drainage ditches that connect to the Elk River via 2 tide gates. **Edge:** Bordered on NW by US Hwy. 101 (a 4-lane divided freeway), and by the Elk River on the NE as well as nearly all of the S side. **Topography:** Essentially flat with exception of dikes. **Elevation:** Sea level to 5.2 ft with a mean of 3.5 ft (N=61 stations). **Weather:** Temperature 45-60°F; 5 out of 8 days were overcast with fog while 3 were mostly fair and sunny. **Coverage:** May 12, 14, 21, 26, 28, 30; June 2, 4; 0545-1100. Total hours: 26. **Census:** Long-billed Marsh Wren, 16 (195, 79); Song Sparrow, 14 (170, 69), Am. Goldfinch, 2; Brown-headed Cowbird females, 2; Wrentit, 1; Mallard female, 1. **Total:** 6 species; 36 territorial males or females ( $438/\text{km}^2$ , 177/100 acres). **Visitors:** Species sighted foraging in the area on at least two censuses included Turkey Vulture, White-tailed Kite, Marsh Hawk, Am. Kestrel, Vaux's Swift, Barn Swallow, Cliff Swallow, Violet-green Swallow, and Savannah Sparrow. **Remarks:** Am. Goldfinch territories were determined by subsequent censuses on June 12, 18, 25, and July 3, 10, 21, 25. Young birds of the following species were observed: Barn Swallow, Long-billed Marsh Wren, Brown-headed Cowbird (host: Song Sparrow), Am. Goldfinch and Song Sparrow. This area was originally salt or brackish marsh, first diked about 1880 and used primarily for grazing. Grazing was discontinued after 1960 which appears to have encouraged the present extensive shrub layer of Coyote Brush. In early 1980, the California Department of Transportation acquired 17.43 acres of the study site for a salt marsh restoration project for environmental mitigation. The dike was breached in 2 locations on September 17 which has allowed reinundation by tidal salt water from the Elk River. This census is the first in a several-year study of the biological aspects of the salt marsh rehabilitation in which several agencies are cooperating. Special thanks to Mark Stopher for the vegetation analysis and historical information on the site, to Paul F. Springer and Richard E. Genely for advisory assistance

This project was funded in part by the California Department of Transportation—*DANA L. BASE, 1198 Oasis Street, Arcata, Calif. 95521.*

**210. DIKED 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 1979. **Size:** Entire property: 7.87 ha = 19.46 acres; plot 5 ha = 12.4 acres. The entire property was censused, but the plot is the part that will be changed when saltwater is allowed to reenter. Census numbers refer to the entire property. **Description of Plot:** See AB 33(1):100-101. **Weather:** Most days were foggy, 60-70°F. **Coverage:** May 29-30; June 1-2, 4-7; 0600-1100. Total hours: 10. **Census:** Song Sparrow, 5 (63, 26); Long-billed Marsh Wren, 4 (51, 21); Brown-headed Cowbird (females), 3 (38, 15); Savannah Sparrow, 3; Cliff Swallow, 2; Mallard (female), 1; Virginia Rail, 1; Sora, 1; Barn Swallow, 1; Starling, 1; W. Meadowlark, 1; Red-winged Blackbird, 1; W. Flycatcher, +. **Total:** 13 species; 24 territorial males or females (305/km<sup>2</sup>, 123/100 acres). **Visitors:** Great Blue Heron, Black-crowned Night Heron, White-tailed Kite, Killdeer, Vaux's Swift, Anna's Hummingbird, Belted Kingfisher, Com. Flicker, Swainson's Thrush, Com. Yellowthroat, Brewer's Blackbird, House Finch, Am. Goldfinch. **Remarks:** Both Cliff Swallow nests were located. Young were found of the following species: Virginia Rail, Barn Swallow, Cliff Swallow, Long-billed Marsh Wren, Starling, Red-winged Blackbird, Brown-headed Cowbird (host: Song Sparrow), Savannah Sparrow and Song Sparrow. The Sora is a very uncommon bird in the area during nesting season, and it is suspected that it was unpaired because only one bird was found on each census. The number of species nesting is down from 21 last year, but the number of territories was reduced by only 2. The dike restraining salt water from entering the central grassy area is expected to be breached in fall, 1980. This study was funded by the U.S. Fish and Wildlife Service, Wildlife Research Field Station, Arcata, California.—*SANDRA L. JACOBSON, P.O. Box 171, Arcata, Calif. 95521.*

**211. DIKED COASTAL SALT MARSH.**—**Location:** California; Santa Clara Co., South San Francisco Bay; 3 mi NW of Alviso; 37°27'50"N, 121°59'50"W, Milpitas Quadrangle, USGS. **Continuity:** New Size: 5.95 ha = 14.71 acres (determined by aerial photos of area with marked reference points and by tape measure). **Description of Plot:** A coastal salt marsh with levees bordering the S edge. Coyote Creek, the N border, is the route for the sewage effluent of the San Jose-Santa Clara Sewage Treatment Plant. This plant discharges an average of 100 million gallons of fresh water and tertiary-treated wastes a day. This large volume of freshwater has a marked influence on the salt marshes in this area of San Francisco Bay, changing the composition of plants from more salt tolerant to less salt tolerant species. The plot has a large slough running from the NE section to the SW edge and numerous smaller sloughs throughout

the area. The dominant plants are Cordgrass (*Spartina foliosa*) and Pickleweed (*Salicornia virginica*). A survey of the vegetation was made by establishing line transects at 50 m intervals at right angles to Coyote Creek. A total of 6 line transects were run with 11 one m<sup>2</sup> quadrats placed at random distances from 0 to 10 m right or left of each transect line. The plant composition with percent cover and frequency was as follows: Cordgrass, 43.22, 80.0; Pickleweed, 42.69, 81.8; Alkali Heath (*Frankenia grandifolia*), 3.71, 7.5; Saltgrass (*Distichlis spicata*), 1.26, 7.5; Alkali Bulrush (*Scirpus robustus*), 1.06, 3.0; Fat-hen (*Atriplex patula*), 0.61, 1.50; Australian Saltbush (*A. semibaccata*), 0.45, 1.5. Fleshy Carnosa (*Jaumea carnosa*) and Gum-plant (*Grindelia humilis*) were found in trace amounts. Cordgrass was found in the lower elevations at the edge of the marsh or in localized depressions or sloughs within the marsh. Pickleweed and Alkali Bulrush were found at more moderate elevations from low to high marsh. Saltgrass, Alkali Heath, Fleshy Carnosa and Gum-plant were usually found in the high marsh, or at other high areas within the marsh. Australian Saltbush, Fat-hen and Alkali Heath were the dominant plants along the levees. **Edge:** Coyote Creek on the N and a levee on the S. The SE portion is bordered by a pond that fills and empties as the tide comes in and out. The E and W sides are salt marsh. **Topography:** Flat with localized depressions and raised areas. Numerous sloughs including one very large one (3-6 m across) are present. **Elevation:** 5-15 ft. **Weather:** Temperature 50-60°F. Most days were clear with two days of moderate overcast. There was no precipitation and winds were usually 0-5 mph. **Coverage:** May 2; June 6, 8, 12-14, 26, 28; July 10; 0600-1100. Total hours: 48.5. **Census:** Long-billed Marsh Wren, 28 (470, 190); Song Sparrow (*M.m. pusillula*) 17 (286, 116); Virginia Rail, 2.5; Mallard, 1; Cinnamon Teal, 1; Marsh Hawk, 1; Com. Yellowthroat, +. **Total:** 7 species; 50.5 territorial males or females (848/km<sup>2</sup>, 343/100 acres). **Visitors:** Brown Pelican, Great Blue Heron, Great Egret, Snowy Egret, Black-crowned Night Heron, Am. Avocet, Black-necked Stilt, Killdeer, Whimbrel, Long-billed Curlew, Marbled Godwit, Willet, Ring-billed Gull, Forster's Tern, Caspian Tern, Barn Swallow, Cliff Swallow, W. Meadowlark, Red-winged Blackbird. **Remarks:** Nests found (21): Mallard, 1; Cinnamon Teal, 1; Marsh Hawk, 1; Long-billed Marsh Wren, 16 (14 inactive or dummy, 2 active); Song Sparrow, 2. Most of the nests were placed in Alkali Bulrush (all of the Long-billed Marsh Wren, Song Sparrow and Marsh Hawk). The greater stability and height of these plants appeared to play an important role in the selection of territories and nest sites. The males also seemed to select these plants as territorial perches. The marshes of this part of San Francisco Bay are becoming increasingly brackish, and Alkali Bulrush is invading areas formerly dominated by Pickleweed and Cordgrass and it will be of interest to watch for species composition and density changes of the birds. Locations of territorial birds were marked directly on overlays placed over an aerial photograph of the plot. This method permitted very accurate determination of spatial relationships, and is recommended for the repeated censusing of

open terrain. Special thanks to Lorraine Rogers and Sara Zimmer for help with the vegetation analysis. Thanks also to Howard Shellhammer, Lynne Heinemann, the staff of the San Francisco Bay Nat'l Wildlife Refuge and the Biology Department of Calif. State Univ., San Jose. This study was funded in part by the Nat'l Science Foundation-Student Originated Studies (NSF-SOS) Program.—*JAMES R. ANDERSON and VICKI R. JENNINGS, Dept. of Biology, Calif. State Univ., San Jose, Calif. 95112.*

**212. ABANDONED FIELD.**—**Location:** Pennsylvania; Luzerne Co., 2.6 km NNE of Wapwallopen; 41°05'N, 76°07'W, Sybertsville Quadrangle, USGS. **Continuity:** Established 1978; 3 consecutive years. **Size:** 6 ha = 14.8 acres. **Description of Plot:** See AB 34:102 (1980). Also, there are three transmission towers and a transmission structure in the plot. **Weather:** Mostly clear. Temperatures 9.5-20°C (average 15°). Winds light. **Coverage:** May 5, 15, 27; June 4, 10, 18, 25; July 14; 0530-0830 EST. Total hours: 30. **Census:** Com. Yellowthroat, 7 (117, 47); Field Sparrow, 6.5 (109, 44); Song Sparrow, 5.5 (92, 37); Starling, 3 (50, 20); Rufous-sided Towhee, 2.5; Prairie Warbler, 2; Indigo Bunting, 2; Am. Goldfinch, 2; Gray Catbird, 1.5, Blue-winged Warbler, 1; Yellow-breasted Chat, 1; Am. Robin, 0.5; Golden-winged Warbler, 0.5; Am. Kestrel, +. **Total:** 14 species; 35 territories (584/km<sup>2</sup>, 236/100 acres). **Visitors:** Red-tailed Hawk, Mourning Dove, Com. Flicker, E. Kingbird, Blue Jay, Com. Crow, N. Oriole, Cardinal. **Remarks:** Nests found: Starling, 3; Prairie Warbler, 2; Yellow-breasted Chat, 1; Song Sparrow, 1 Starlings nested in transmission towers. In addition to the young of territorial species, hatch year kingbirds, crows, and orioles were observed. Prairie Warbler, a new breeding species, apparently nested in nearby hedgerows in 1979 and was not present in the area in years before. Yellowthroat territories have increased to 7 from 3 in 1978 and 4.5 in 1979. Total territories have increased to 35 from 20.5 in 1978 and 26.5 in 1979. Thanks to D.G. Richie for assistance. This census is part of a study supported by Pennsylvania Power and Light Company. It was previously conducted and authored by Robert M. Ruhe.—*DOUGLAS A. GROSS, Ichthyological Associates, Inc., R.D. 1, Berwick, Pa 18603.*

**213. 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). **Size:** 4.34 ha = 10.7 acres (rectangular, approximately 108 X 400 m, surveyed). **Description of Plot:** Located in a field, abandoned approximately 10 years ago, covered with herbs, patches of blackberries (*Rubus* spp.), Gray Dogwood (*Cornus racemosa*), and few tree saplings and seedlings. The vegetation was analyzed with the line-intercept method to find frequency and dominance (% cover); at least 53 species of herbs, 10 shrubs, and 5 tree seedlings were encountered. Dominant herbs: Grasses, 0.96, 21%; Wild Strawberry (*Fragaria virginiana*), 0.94, 17%; Early Goldenrod (*Solidago juncea*), 0.92, 11%; Sheep Sorrel (*Rumex acetocella*),

0.88, 7%; Hawkweed (*Hieracium pratense*), 0.70, 4%; Butter-and-eggs (*Linaria vulgaris*), 0.74, 3%; Rough Goldenrod (*Solidago rugosa*), 0.32, 5%. Dominant shrubs: Dewberry (*Rubus flagellaris*), 0.90, 30%; Blackberry (*R. allegheniensis*), 0.48, 4%; Poison Ivy (*Rhus radicans*), 0.34, 3%; Gray Dogwood, 0.14, 2%. Dominant tree seedlings: Black Cherry (*Prunus serotina*), 0.10, 1%; Red Maple (*Acer rubrum*), 0.08, 1%. **Edge:** Bordered by similar, but more disturbed, habitat on W and S. A transmission line corridor parallels the W boundary approximately 5 m outside the plot. A hedgerow parallels the E boundary approximately 20 m outside plot, next to a cornfield. A shrubby second-growth woodlot borders the N end. **Topography:** Flat, in river valley. **Elevation:** Approximately 195 m (640 ft). **Weather 1979:** Typically foggy, then clearing. Temperatures 0-18°C (average 10°). Winds calm. **Coverage:** May 2, 8, 15-16; June 6, 12-13; 0520-0800, EST. Total hours: 11. **Census:** Field Sparrow, 6 (139, 56); Song Sparrow, 6; Com. Yellowthroat, 3.5 (81, 33); Red-winged Blackbird, 2; Willow Flycatcher, 1; Am. Goldfinch, 1; Am. Robin, +; E. Meadowlark, +; Com. Grackle, +. **Total:** 9 species; 19.5 territories (450/km<sup>2</sup>, 182/100 acres). **Visitors:** Barn Swallow, Gray Catbird, Brown Thrasher, Cardinal, Indigo Bunting, Rufous-sided Towhee, Grasshopper Sparrow. **Remarks:** Nests found: Willow Flycatcher, 1; Red-winged Blackbird, 1; Field Sparrow, 2; Song Sparrow, 1. Census conducted by Robert M. Ruhe with my assistance. **Weather 1980:** Variable, typically foggy, then clearing, but sometimes overcast. Temperatures 4.5-17.5°C (average 11.5°). Winds usually light. **Coverage:** May 7, 16, 28; June 5, 11, 19, 30; July 15; 0515-0830 EST. Total hours: 27. **Census:** Song Sparrow, 8 (185, 75); Field Sparrow, 7 (162, 65.5); Red-winged Blackbird, 4 (92, 37); Com. Yellowthroat, 2.5; Willow Flycatcher, 2; Am. Goldfinch, 1; Gray Catbird, +; Rufous-sided Towhee, +. **Total:** 8 species; 24.5 territories (566/km<sup>2</sup>, 229/100 acres). **Visitors:** Am. Kestrel, Ring-necked Pheasant, Mourning Dove; Barn Swallow, Am. Robin, Starling, Yellow Warbler, Com. Grackle, Cardinal. **Remarks:** Nests found: Willow Flycatcher, 2; Red-winged Blackbird, 4; Field Sparrow, 5; Song Sparrow, 6. In addition to the young of territorial species, hatch year kestrels, pheasants, Starlings, Yellow Warblers, and grackles were observed. Thanks to J D. Montgomery for vegetative analysis and D G. Richie for assistance. This census is part of a study supported by Pennsylvania Power and Light Company.—DOUGLAS A. GROSS, Ichthyological Associates, Inc., R D. 1, Berwick, Pa. 18603.

**214. OLD FIELD.**—**Location:** Pennsylvania; Schuylkill Co., 1 mi SW of the village of Weishampt; 40°41'N, 76°27'W, Tremont Quadrangle, USGS. **Continuity:** Established 1974; 7 consecutive years. **Size:** 7.12 ha = 17.58 acres. **Description of Plot:** See AB 28:1053 (1974). **Weather:** Cool with temperatures 42-64°F. Most count days were clear. **Coverage:** June 1-3, 11-12, 20, 26-27; 0545-0845. Total hours: 8. **Census:** Field Sparrow, 8 (112, 46); Com. Yellowthroat, 6 (84, 34); House Wren, 5 (70, 28); Gray Catbird, 4 (56, 23); Indigo Bunting, 3 (42, 17);

Rufous-sided Towhee, 3; Red-eyed Vireo, 2; Golden-winged Warbler, 2; Song Sparrow, 2; Ruffed Grouse, 1; Great Crested Flycatcher, 1; Wood Thrush, 1; Blue-winged Warbler, 1; Yellow Warbler, 1; Prairie Warbler, 1; Cardinal, 1; Am. Goldfinch, 1; Yellow-billed Cuckoo, +; N. Oriole, +. **Total:** 19 species; 43 territorial males or females (604/km<sup>2</sup>, 245/100 acres). **Visitors:** Black-capped Chickadee, Tufted Titmouse, Blue-gray Gnatcatcher, Cedar Waxwing, Brown-headed Cowbird, Rose-breasted Grosbeak. **Remarks:** Nests found: Cardinal, 1; Rufous-sided Towhee, 1. A Ruffed Grouse with approximately 10 young was present during the survey.—ROLAND BERGNER, William Penn Memorial Museum, Box 1026, Harrisburg, Pa. 17120.

**215. ABANDONED TURF FIELD.**—**Location:** Maryland; Montgomery Co., McKee-Beshers Wildlife Management Area; 39°04'32"N, 77°23'18"W, Sterling Quadrangle, USGS. **Continuity:** Established 1975; 6 consecutive years. **Size:** 6.3 ha = 15.6 acres. **Description of Plot:** See AB 29:1140-1141 (1975). **Coverage:** Apr. 5, 11, 17, 25; May 3, 10, 15, 30; June 2, 5, 13, 19, 26; July 2, 9, 11, 15, 30; Aug. 13, 19. Total hours: 8.3. **Census:** Field Sparrow, 8 (127, 51); Com. Yellowthroat, 3 (48, 19); Grasshopper Sparrow, 3; Indigo Bunting, 2; Tree Swallow, 1; House Wren, 1; E. Bluebird, 1; E. Meadowlark, 1; Am. Goldfinch, 1. **Total:** 9 species; 21 territorial males (333/km<sup>2</sup>, 135/100 acres). **Remarks:** Nests found: Tree Swallow, 1; House Wren, 1; E. Bluebird, 2; Indigo Bunting, 1. The swallows, wrens, and bluebirds nested in bluebird boxes. Significant increases from last year were Com. Yellowthroats (1 to 3 pairs) and Field Sparrows (5 to 8 pairs).—PAUL W. WOODWARD, 4117 Virginia St., Fairfax, Va. 22203.

**216. GRASSLAND.**—**Location:** West Virginia; Lewis Co., adjacent to airstrip at Jackson's Mill State 4H Camp, 39°05'42"N, 80°28'05"W, Weston Quadrangle, USGS; extends S. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 X 660 yds, length measured, width estimated). **Description of Plot:** A part of the level area surrounding the airstrip. This area has been seeded with grasses and legumes and hay is harvested each year beginning about June 20. The following were essentially equally distributed throughout the area: Sweet Vernal Grass (*Anthoxanthum odoratum*), Timothy (*Phleum pratense*), Velvet Grass (*Holcus lanatus*), Tall Oat Grass (*Arrhenatherum elatius*), Orchard Grass (*Dactylis glomerata*), Kentucky Blue Grass (*Poa pratensis*), Meadow Fescue (*Festuca elatior*), and Red Clover (*Trifolium pratense*). The following species were found in colonies throughout the area, again evenly distributed: Smooth Brome Grass (*Bromus inermis*), Com. Vetch (*Vicia angustifolia*), Four-seeded Vetch (*V. tetrasperma*), Hairy Vetch (*V. villosa*), and Low Hop Clover (*Trifolium procumbens*). **Edge:** Similar habitat on all sides except toward the SW corner approaching the paved runway. **Topography:** Level; 1010 ft except for a swale 100 ft across and 8 ft deep diagonally across the plot near the S end. **Weather:** Rain, cloudy but warm first few days. **Coverage:** May 31; June 1-2, 4; dawn-0800 or 1000-1200. Total hours: 6.

**Census:** Red-winged Blackbird, 22 (362, 147); E. Meadowlark, 2; E. Kingbird, +; Rough-winged Swallow, +. **Total:** 4 species; 24 territorial males (395/km<sup>2</sup>, 160/100 acres). **Visitors:** Chimney Swift, Barn Swallow, Am. Robin, Savannah Sparrow. **Remarks:** Rough-winged Swallows nesting in the weep holes of a nearby bridge abutment did much feeding over the plot. Our Red-wing count was 14 males and 22 females. There was no clear indication just how they were paired.—GEORGE KOCH (compiler), VIRGINIA JOHNSON, GLEN PHILLIPS, EUGENE HUTTON, Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003

**217. ORCHARD GRASS-TALL FESCUE MEADOW.**—Illinois, McLean Co., 6 mi S Gridley; T25N, R2E, SE 1/4, NW 1/4, Sec 5; 40°40'N, 88°54'W, Normal Quadrangle, USGS. **Continuity:** Established 1976; 5 consecutive years. **Size:** 12.1 ha = 30 acres. **Description of Plot:** See AB 31:88-89 (1977), 25 acres of this tract, bare during the census period, has been seeded to native prairie, thus the vegetation will be redescribed next year. **Coverage:** June 8, 11, 15, 24-25, 30, 0600-0800. Total hours: 12. **Census:** Red-winged Blackbird, 10 (82, 33); Dickcissel, 3 (25, 10); E. Meadowlark, 2; Killdeer, 1; Com. Yellowthroat, 1; Ring-necked Pheasant, +; Barn Swallow, +; Am. Goldfinch, +. **Total:** 8 species; 17 territorial males (140/km<sup>2</sup>, 57/100 acres). **Remarks:** All species except the Killdeer (1 pair) were confined to the 5 acres of habitat that still contains vegetation.—DALE E. BIRKENHOLZ, Ill. State Univ., Normal, Ill. 61761.

**218. GRASS FIELDS.**—**Location:** Minnesota; Watonwan Co., Medelia Farmland Wildlife Research Station, along Minn. Hwy 60, 7 mi E of St. James; Section 19, T106N, R30W, 43°58'N, 94° 28'W, Lewisville Quadrangle, USGS. **Continuity:** New. **Size:** 21.37 ha = 52.8 acres (rectangular, 1855 x 1240 ft, determined from map of Research Station). **Description of Plot:** Approximately one third of the fields were planted 1 year ago and contained Intermediate Wheat Grass (*Agropyron intermedium*), Foxtail (*Setaria* sp.), Alfalfa (*Medicago sativa*), Red Clover (*Trifolium pratense*), Yellow Sweet Clover (*Melilotus officinalis*), Little Ragweed (*Ambrosia artemisiifolia*), Blue Vervain (*Verbena hastata*), Com. Evening Primrose (*Oenothera biennis*), Bull Thistle (*Cirsium vulgare*), Horseweed (*Erigeron canadensis*), and Plantain (*Plantago major*). About one fourth of the plot is permanent Brome Grass (*Bromus inermis*) and Blue Grass (*Poa* sp.) cover divided into 30 x 200 ft blocks separated by 10 ft wide mowed strips. The remaining portion of the plot consisted of several fields of Brome, Blue Grass, Quack Grass (*Agropyron repens*), Switch Grass (*Panicum virgatum*), and various forbs. Several small scattered wet areas contained Reed Canary Grass (*Phalaris arundinacea*), sedge (*Carex* sp.) and smartweed (*Polygonum* sp.). All contained water early in the period but only the west central portion at the end of the census. Woody vegetation was limited to a narrow row of honeysuckle (*Lonicera* sp.), small willows (*Salix* sp.) and Cottonwood (*Populus deltoides*) in some of the wet areas, and small



Salt Marsh, Florida.  
Breeding Bird Census  
200. Photo/ *William Post*.



Natural Deciduous Creekbottom, Colorado. Winter  
Bird-Population Study 39. Photo/ *Richard C. Beidleman*.



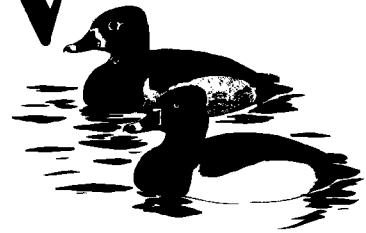
Red Alder Floodplain Forest, Farmland, Washington.  
Breeding Bird Census 165. Photo/ *J. Schuett-Hames*.



Cutover Subtropical Slash Pine Forest, Florida.  
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National Audubon Society

# BIRDATHON



## WHAT?

The Birdathon is Audubon's brand-new, flagship fund-raising program. Counters (participants) will seek sponsors who contribute money (5¢, 25¢, \$1, anything) for each bird species seen by the counter. Vitally needed funds will be raised for (1) participating chapters or other groups, (2) Audubon's expanding regional programs in your region, and (3) the nationwide programs of Audubon—nature centers and sanctuaries, ornithological research, the Washington office, wildlife film-lectures, and endangered species programs.

## WHO?

Anyone—as an individual or as part of a chapter or group. Even nonmembers can participate. If you aren't a birder, an experienced partner or group can help you, but locate your own sponsors. Organizations wishing to take part should contact Birdathon Headquarters in New York City.

## WHEN?

Suggested dates are April 25 and 26, 1981. April 25th is John James Audubon's birthday and a good time for birding in most areas. A different date can be substituted, however, if advisable because of local conditions. But to be considered in the 1981 Birdathon, results must reach Birdathon Headquarters by June 1, 1981.

## WHERE?

Anywhere. There probably are many good birding sites near your home.

## HOW?

Prior to the date of your Birdathon, visit potential sponsors—friends, family, neighbors, fellow-workers. Give them an estimate of how many birds you expect to see (beginners usually spot 25 to 50 birds, advanced birders as many as 150) and ask for their pledge. A sponsor may also stipulate a maximum contribution.

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If your chapter or group is a cosponsor of the Birdathon, give your form and money to the designated person. Individual participants can mail the form and money to Birdathon Headquarters. Do not send cash, use a check or money order.

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**GRAND PRIZE:** The participant who raises the most money will choose any of the outstanding National Audubon Society Tours within the lower 48 states. The tour will be for two persons inclusive of travel costs from their home. Popular tours include California, Texas, Florida, Washington, Arizona, New England, the Rocky Mountains, Yellowstone, and the Snake River.

**Best Birder:** The participant who identifies the most species in the Birdathon will receive a specially inscribed, deluxe leather-bound limited edition of Peterson's new FIELD GUIDE TO THE BIRDS.

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*All participants must exercise caution in the protection of fragile habitat, particularly that of colonial nesting birds, raptors, and waterfowl. Trampling, crowding, and unnecessary proximity are to be avoided at all costs.*

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wild plums (*Prunus* sp.) in the NW corner. A row or large cage-like holding pens occupied a small amount of the plot. About one fifth of the plot had been burned four weeks before the census. The plot was not used for hay harvesting or livestock grazing. **Edge:** Part of the 160-acre Research Station consisting of grassland, hedgerows, woodlots, and cropland, surrounded by intensive rowcrop agriculture. The plot was bordered by White Spruce (*Picea glauca*), honeysuckle, N. White Cedar (*Thuja occidentalis*), Red Cedar (*Juniperus virginiana*), Wild Plum, and Cottonwood hedgerows (61%), grassland (21%), and cropland (18%). **Topography:** Gently rolling with several small, seasonally wet depressions. **Coverage:** June 1, 6, 13, 17, 26, 29; 0535-0705, CDT. Total 5.6 hours. **Census:** Red-winged

Blackbird, 9.5 (44, 18); Brown-headed Cowbird 9 (42, 17); Dickcissel, 7.5 (35, 14); Short-billed Marsh Wren, 6 (28, 11); Com. Yellowthroat, 6; Savannah Sparrow, 6; Bobolink, 5.5 (26, 10); Tree Swallow, 3 (14, 6); Song Sparrow, 2.5; Blue-winged Teal, 2; W. Meadowlark, 2; Mallard, 1; Green-winged Teal, 1; Ring-necked Pheasant, 1; Am. Goldfinch, 1. **Total:** 15 species; 63 territorial males (295/km<sup>2</sup>, 119/100 acres). **Visitors:** Wood Duck, Com. Grackle, Mourning Dove. **Remarks:** Dickcissels and yellow-throats seemed to prefer the Intermediate Wheat Grass/legume fields over the generally shorter, less dense Brome/Blue Grass field, while marsh wren and Bobolink territories were more common in the Brome/Blue Grass field. Savannah Sparrows were proportionately distributed between both field types. The Red-winged Blackbirds were generally concentrated in the wet areas. An August nest search of the Brome/Blue Grass field revealed 7 pheasant, 4 marsh wren, and 1 Mallard nests. Bobolink observations decreased greatly after June 13. Dickcissels were not seen until June 17. The Tree Swallows bred in 3 bird houses—LYNN BRAHAN, Rochester, New York.

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**BIRDING**

m grid laid out with compass and measured rope). **Description of Plot:** Located in a wet meadow, seasonally inundated by water in all but the driest springs. A circular artificial ditch 2.5-3 m in width and 20-100 cm in depth encompasses over half the plot creating an 8.09 ha island. A gradual shift occurs from wet prairie vegetation (10%) in the SW to wet meadow vegetation (75%) in the NE. Whitetop (*Scolochloa festucacea*) is the dominant vegetation over the wet meadow portions, particularly within the circular ditch. An almost equal amount of Field Sow-thistle (*Sonchus arvensis*) also occurs while Giant Reed (*Phragmites australis*) and Cat-tail (*Typha* sp.) are present along the periphery of the ditch and in clumps along the SE and SW boundaries. A powerline and dirt road bisect the SE part. One hundred forty 0.25 m<sup>2</sup> plots were established within the plot in a regular pattern. Vegetation height of living Whitetop was 55 cm while Giant Reed and Cat-tail occasionally reached 1.5 m. Dead standing vegetation of much greater height and areas of dead, matted Whitetop attest to the much higher water levels of 1979. Plant species comprising 76.5% of the relative cover of all green vegetation were Whitetop (20.8% relative cover and 56% relative frequency); Field Sow-thistle, 21.4, 45; Orach (*Atriplex patula*), 17.9; 22; Canada Thistle (*Cirsium arvense*), 4.6, 16; Giant Reed, 4.1, 11; Germander (*Teucrium occidentale*), 4.1, 14 and Awned Sedge *Carex atherodes*, 4.1, 4. **Edge:** Bordered on the SE, SW and NW sides by similar vegetation. The NE corner lies within 100 m of Hwy. 240. **Topography:** Essentially flat. **Elevation:** Slightly over 812.5 ft. **Weather:** Clear, warm and relatively calm on 6 mornings. Cloudy or partially cloudy the remaining 5 with winds exceeding (Beaufort) force 3 once. **Coverage:** May 26-28, 30; June 2, 6, 10, 13, 17, 23, 27; 0500-1000 hours, CDT. Total hours: 23. **Census:** Red-winged Blackbird, 39 (260, 105); Short-billed Marsh Wren, 24.5 (163, 66); Le Conte's Sparrow, 11.5 (77, 31); Com. Yellowthroat, 8.5 (57, 23); Savannah Sparrow, 6.5 (43, 18); Brown-headed Cowbird, 6 (40, 16); Sharp-tailed Sparrow, 5 (33, 13); Clay-colored Sparrow, 5; Long-billed Marsh Wren, 1; Bobolink, 1; Song Sparrow, 1; Am. Bittern, +; N. Shoveler, +; Killdeer, +. **Total:** 14 species; 109 territorial males or females (727/km<sup>2</sup>, 294/100 acres). **Visitors:** Canada Goose, Mallard, Gadwall, Pintail, Blue-winged Teal, Lesser Scaup, Marsh Hawk, Wilson's Phalarope, Short-eared Owl, W. Meadowlark, Yellow-headed Blackbird. **Remarks:** Nests found: N. Shoveler, 1; Red-winged Blackbird, 39. The Red-winged Blackbirds were confined to the circular ditch and other areas where Giant Reed and Cat-tail occurred. Nest success was low for the blackbirds; of 39 known nests only 15 or 38% produced young. Avian predation was believed to be partially responsible. Cowbird parasitism on Red-winged Blackbirds occurred primarily in areas where the powerline passed over or near blackbird nests. Thanks to Nick Foy, Craig Campbell, Lisa Cancade, Clive Welham, Jeff Simpson and Marilyn R. Rayner for assistance. Appreciation is extended to Robert E. Jones for the vegetation analysis and to his assistants John Larson and Dave McDonald.—W.

## The Canvasback on a Prairie Marsh

By H. Albert Hochbaum

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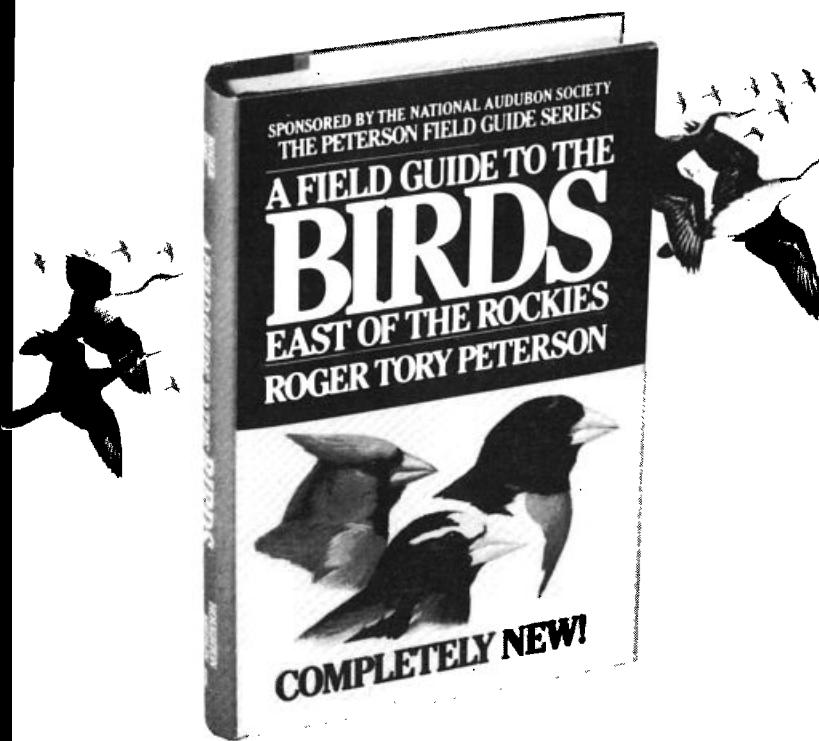
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CALVIN M. CUTHBERT, Biological Services Group, Ducks Unlimited (Canada), 1190 Waverly St., Winnipeg, Manitoba, Canada, R3T 2E2.

**220. ALFALFA HAYLAND I.**—**Location:** North Dakota; Mercer Co., 2 mi S of Stanton, NW 1/4 of Sec. 24, T144N, R85W; 47°17'N, 101°24'W, Stanton Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (rectangular, determined by planimeter from aerial photos). **Description of Plot:** Rolling field planted in alfalfa. Cover estimates from 50 m<sup>2</sup> quadrats revealed the following average cover: Alfalfa, 43.4%; graminoid, 4.75%; other herbs, 7.95%; litter 10.9%; bare ground 48.8%. Average height of vegetation was 18 cm on June 18. The field had a high hill on the N end and a low saline seep on the S portion. The field was fenced on the N, E, and S with scattered shrubs along the fence rows. The predominant shrub was Choke Cherry (*Prunus virginiana*). **Edge:** Bounded S and W by cropland overgrown with Sweet Clover (*Melilotus alba*), N by section line trail and Sweet Clover, and E by wooded ravine and grazed prairie. **Topography:** Hill in NE corner continues as ridge along E edge, site slopes down to the W. **Elevation:** 590-605 m (1930-1970 ft). **Weather:** See Census 134. **Coverage:** Apr. 30; May 8, 30; June 9, 18-19, 22; between dawn and 1100. Total hours: 14. **Census:** Horned Lark, 3 (19, 8); W. Meadowlark, 3; Brown-headed Cowbird, 2; Upland Sandpiper, 1. **Total:** 4 species; 9 territorial males or females (56/km<sup>2</sup>, 23/100 acres). **Visitors:** Killdeer, Mourning Dove, Corn. Flicker, E. Kingbird, Black-billed Magpie, Corn. Crow, Am. Robin, Yellow Warbler, Black-headed Grosbeak, Am. Goldfinch, Lark Bunting, Grasshopper Sparrow, Song Sparrow. **Remarks:** Cattle grazed the site occasionally for about two weeks in mid-May. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

**221. ALFALFA HAYLAND II.**—**Location:** North Dakota; Oliver Co., SW 1/4, Sec. 17, T143N, R84W; 47°11'N, 101°22'W, Hanover NE Quadrangle, USGS, 6 mi NE of Hanover. **Continuity:** New. **Size:** 10.78 ha = 26.63 acres (irregular shaped, determined by planimetric measurement from aerial photos). **Description of Plot:** Predominantly flat field of alfalfa and Smooth Brome (*Bromus inermis*). Rocks have been piled together in seven places in the field to form large rock piles. Two patches in the field have established tall shrubs, predominantly Choke Cherry (*Prunus virginiana*) and Silverberry (*Elaeagnus argentea*). Quantitative measurements of 50 m<sup>2</sup> plots revealed the following average cover: alfalfa, 34.7%; graminoid, 33.8%; other herbs, 1.7%; litter, 12.3%; and bare ground, 14.4%. Average height of vegetation was 30.2 cm. **Edge:** Bounded on E and W by tree and shrub covered slope, S by corn and wheat fields, N by grazed prairie. **Topography:** Hill in NW corner, remainder fairly level, both wooded edges slope away from site. **Elevation:** 635-640 m (2100-2110 ft). **Weather:** See Census 134. **Coverage:** May 6, 29; June 5, 17, 25, 27; between 500 and

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1100 Total hours. 14. **Census:** Grasshopper Sparrow, 7 (65, 26); W. Meadowlark, 3.5 (32, 13); Brown-headed Cowbird, 3 (28, 11); Song Sparrow, 2; E. Kingbird, 1.5; Sharp-tailed Grouse, 1; Upland Sandpiper, 1; Brown Thrasher, 1; Am. Goldfinch, 1; Vesper Sparrow, 1; Clay-colored Sparrow, 1; Horned Lark, 0.5. **Total:** 12 species; 23.5 territorial

males or females (218/km<sup>2</sup>, 88/100 acres) **Visitors:** Mallard, Pintail, Marsh Hawk, Ring-necked Pheasant, Killdeer, Mourning Dove, W. Kingbird, Willow Flycatcher, Barn Swallow, Com. Crow, Gray Catbird, Am. Robin, Yellow Warbler, Com. Yellowthroat, Bobolink, Red-winged Blackbird, Brewer's Blackbird, Lark Bunting, Savannah Spar-

row **Remarks:** The rock piles and the patch of shrubs seemed to attract several species that would not have otherwise been present in an alfalfa field. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

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222. **MIXED PRAIRIE-HAYLAND.** —  
**Location:** North Dakota; Oliver Co., SW 1/4 of Sec. 10 T143N, R84W; 47°13'N, 101°19'W, Hanover NE Quadrangle, USGS  
**Continuity:** New. **Size:** 8.45 ha = 20.87 acres (rectangular, determined by planimetric measurement from aerial photos). **Description of Plot:** Relatively flat grassland which had been cut for hay the previous year Dominant grasses are Porcupine Grass (*Stipa spartea*), Needle-and-thread (*S. comata*), Prairie June Grass (*Koeleria cristata*) and Red Threawn (*Aristida longiseta*). Sampling from 50 m<sup>2</sup> quadrats revealed the following relative cover and importance values/100 *Carex* spp., 15.4, 11.4; Porcupine Grass, 11.8, 9.2; Prairie June Grass, 10.4, 9.1; Needle-and-thread, 10.0, 7.8; Red Threawn, 8.8, 6.8; W. Wheat Grass (*Agropyron smithii*), 5.0, 5.2; Switch Grass (*Panicum virgatum*), 3.6, 4.6; Skeleton Weed (*Lygo-desima juncea*), 3.7, 4.3; and Blue Wild Lettuce (*Lactuca pulchella*), 2.1, 4.1. Average height of vegetation on June 26 was 16.8 cm. average depth of litter was 0.63 cm. **Edge:** Bounded S and W by gravel roads and grazed prairie, E by wet meadow, and N by wheat field. **Topography:** Gradual slope down from W to E into wet meadow. **Elevation:** 580–590 m (1900–1925 ft). **Weather:** See Census 134 **Coverage:** May 7, 15, 31; June 5, 12, 17, 26, between dawn and 1100. Total hours: 14 **Census:** Brown-headed Cowbird, 4 (47, 19), Horned Lark, 3 (36, 14); W. Meadowlark, 2.5; Upland Sandpiper, 1; Red-winged Blackbird, 1. **Total:** 5 species; 11.5 territorial males or females (136/km<sup>2</sup>, 55/100 acres) **Visitors:** Ring-necked Pheasant, Killdeer, Wilson's Phalarope, Rock Dove, Mourning Dove, Barn Swallow, Com. Yellowthroat, Bobolink, Grasshopper Sparrow, Song Sparrow, Chestnut-collared Longspur. **Remarks:** Farmstead about 500 m away. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—JOHN FLECKENSTEIN and STEVEN MACK, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

223. **PLOWED CROPLAND.** —**Location:** North Dakota; Oliver Co.; 3 mi SE of Fort Clark, SE 1/4 of Sec. 16, T143N, R83W; 47°12'N, 101°12'W, Fort Clark Quadrangle, USGS. **Continuity:** New. **Size:** 20.9 ha = 51.7 acres (rectangular, 430 by 2570 ft, measured). **Description of Plot:** Relatively flat cropland. Consists of two strips of approximately equal width; one plowed and planted in flax June 7, the other strip plowed to stubble mulch at an earlier date and left fallow. **Edge:** Bounded on N, W and S by small grain fields: E by section line road and cropland. **Topography:** Level. **Elevation:** 625 m (2010 ft). **Weather:** See Census 134 **Coverage:** May 8, 18; June 2, 10, 18, 22, 29, between dawn and 1100. Total hours: 14 **Census:** Horned Lark, 8 (38, 15). **Total:** 1 species; 8 territorial males. **Visitors:** Great Blue Heron, Mallard, Upland Sandpiper, E.

Kingbird, Barn Swallow, Corn Crow, W. Meadowlark, Brown-headed Cowbird, Lark Bunting. **Remarks:** Field in stubble until May 15; N 1/2 plowed, S 1/2 plowed and planted to flax June 7. N 1/2 plowed again June 20. Large shelterbelt 200 m away. Thanks to A. Jody Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN* and *STEVEN MACK*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**224. SMALL GRAIN CROPLAND.** — **Location:** North Dakota; Oliver Co., 5 mi S of Stanton, NW 1/4 of Sec. 6, T143N, R84W; 47°14'N, 101°23'W, Hanover NW Quadrangle, USGS. **Continuity:** New. **Size:** 16.2 ha = 40 acres (irregular, determined by planimeter from aerial photos). **Description of Plot:** Relatively flat cropland planted about May 10 in small grain. Large rocks have been piled in the NW corner. Quantitative measurements on June 17 revealed an average height of small grains of 16 cm. Seedlings occurred at an average of 93.1/m<sup>2</sup>, and 97.5% of the site was bare ground. A barbed wire fence surrounds the plot. Scattered patches of Choke Cherry (*Prunus virginiana*) occur along the fence line to a height of 2.5 m. **Edge:** Bordered on the W and N by native pasture. Along the E and S edge the land drops down an escarpment. Near the site the vegetation is predominantly shrubs: Wolfberry (*Symphoricarpos occidentalis*) and Silverberry (*Elaeagnus argentea*). The shrubs gradually grade into a Green Ash (*Fraxinus pennsylvanica*) ravine.

**Topography:** Slopes down from NE corner to W and S. **Elevation:** 625-640 m (2050-2100 ft). **Weather:** See Census 134. **Coverage:** May 1, 9, June 1, 6, 16, 26; between dawn and noon. Total hours: 14. **Census:** Horned Lark, 4 (25, 10); Brown-headed Cowbird, 4; Killdeer, 1; W. Meadowlark, 1. **Total:** 4 species; 10 territorial males or females (62/km<sup>2</sup>, 25/100 acres). **Visitors:** Red-tailed Hawk, Sharp-tailed Grouse, Ring-necked Pheasant, Upland Sandpiper, Mourning Dove, Com. Nighthawk, Com. Flicker, E. Kingbird, Barn Swallow, Brown Thrasher, Red-winged Blackbird, Brewer's Blackbird, Grasshopper Sparrow, Vesper Sparrow, Chipping Sparrow, Clay-colored Sparrow, Song Sparrow. **Remarks:** Thanks to A. Jody

Vander Wal and Richard D. Nelson for assistance in censusing.—*JOHN FLECKENSTEIN* and *STEVEN MACK*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

**225. URBAN ABANDONED FIELD.** — **Location:** California; Orange Co., 2 mi N of the Seal Beach business district, 0.5 miles SW of the intersection of Seal Beach Blvd. and Westminster Ave.; 33°45'N, 118°05'W, Los Alamitos Quadrangle, USGS. **Continuity:** New. **Size:** 13.5 ha = 33.3 acres (L-shaped, 500 m on the long side, 328 m on the short side, measured with a calibrated pace). **Description of Plot:** Vegetation dominated by introduced grasses and weeds, none of which exceeded 0.5 m in



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height. The plant species composition included Wild Oats (*Avena* sp.), Yellow Sweet Clover (*Melilotus indicus*), Wild Radish (*Raphanus sativus*), and Shortpod Mustard (*Brassica juncea*). Centrally located were several widely spaced shrubs (*Baccharis emoryi*) ranging from 1 to 2 m high. Edge: Bounded on the S and E edges and on the NE corner by industrial/business complexes and parking lots; on the N by a large settling pond. Topography: Flat, elevation approx. 100 ft. Weather: Mild temperatures (daily maximum of 18–27°C) and unseasonably high precipitation (approx. 10 cm). Coverage: Mar. 31; Apr. 2–3, 10, 21; May 15, 21; mostly 0900–1100. Total hours: 10. Census: Burrowing Owl 7 (52, 21); W. Meadowlark, 2; Killdeer, 1. Total: 3 species; 10 territorial males or females (74/km<sup>2</sup>, 30/100 acres). Visitors: Red-tailed Hawk, Am. Kestrel, Greater Yellowlegs, Mourning Dove, Cliff Swallow, Barn Swallow, Com. Crow, Water Pipit, Starling, House Sparrow, House Finch, Savannah Sparrow. Remarks: Density projections for the Burrowing Owl may be misleading as all burrows were clumped in the NE corner. The field was plowed as a fire prevention measure in mid-April, consequently nesting attempts by the W. Meadowlarks and Killdeer failed and these

birds abandoned the area. The Burrowing Owls tolerated this disturbance and by mid-May at least three pairs had fledged young.—CAMERON BARROWS, Dept. of Biology, Calif. State Univ. Long Beach, Calif. 90804.

**226. VILLAGE RESIDENTIAL.**—Location: Ohio; Wyandot Co., Crawford Township, Carey, on the N edge and E of the area censused in 1979 (AB 34:104), S of the railroad and N of west Findlay St.; approximately 40°57'N, 83°23'15"W, Carey Quadrangle, USGS. Continuity: New. Size: Approximately 13.4 ha = 33.1 acres. Description of Plot: See AB 31:91 (1977) and 32:124 (1978) for a generalized village environment. The plot is bounded on the E by North Vance St. Edge: Supplied by streets, alleys, vegetation, and buildings. Total edge: 1.55 mi; street edge, 1.3 mi; street trees per mile of street edge, 48. Street trees are mostly Silver Maple (*Acer saccharinum*) and Siberian Elm (*Ulmus pumila*). Elevation: 820 ft. Coverage: Almost daily. Total hours: 90. Census: House Sparrow, 10 (75, 30); Chimney Swift, 8 (60, 24); Starling, 8; Am. Robin, 6 (45, 18); House Wren, 5 (37, 15); Chipping Sparrow, 3 (22, 9); Mourning Dove, 2; Com. Grackle, 2; Cardinal, 2; Song Sparrow, 2; Com. Flicker,

1; Downy Woodpecker, 1; Blue Jay, 1; Gray Catbird, 1; Indigo Bunting, 1; Am. Goldfinch, 1. Total: 16 species; 54 territorial males (403/km<sup>2</sup>, 163/100 acres). Remarks: Density of the 1980 census was comparable to that of 1979 (166/100 acres), but still lower than in 1976 and 1977. Lack of enough shrubs or hedges probably helps to maintain a lower density. Weather was not an apparent factor in the census. No evidence of cowbird presence was obtained—A.H. CLAUGUS (compiler), 228 S. Lake St., Carey, Ohio, 43316.

**227. HINTERLAND RAVINE.**—Location: Ontario; Toronto, Borough of Scarborough, Little Rouge River, from Plug-Hat Rd. N to old Canadian Pacific Railway line; 43°51'N, 79°10'W. Located ½ mi N of present site of Metropolitan Toronto Zoo. Continuity: New. Size: 41.4 ha = 102.3 acres (determined from Canadian topographic map 30 M/14 scale 1:50,000.) Description of Plot: The ravine is 30% open habitat and 70% wooded. A fast-flowing river cuts through the gravel valley bottom of glacial till. The river sides are in some places deeply cut and have steep bluff-like banks. There is very little marshy habitat along the river although there is one wetland area where a local groundwater spring has created a sizeable Cat-tail marsh on the west tableland. An infrequently travelled walking path/orienteering trail parallels the course of the river. The drier open areas are characterized by grasses, common herbaceous species, Staghorn Sumac, and E. White Cedar clumps. The dominant herbaceous plants are goldenrod (*Solidago* spp.), Wild Carrot (*Daucus carota*), Milkweed (*Asclepias syriaca*), Wild Bean (*Strophostyles helvola*), and Bouncing Bet (*Saponaria officinalis*). The marsh and the river banks are dominated by Narrow-leaf Cat-tail (*Typha angustifolia*), Jewelweed (*Impatiens biflora*), Rice Cutgrass (*Leersia oryzoides*), Crack Willow (*Salix fragilis*), E. White Pine (*Pinus strobus*) saplings, and mature Yellow Birch (*Betula alleghaniensis*).

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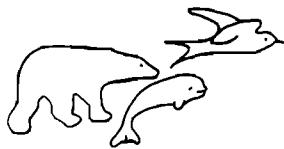
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The area has no overall dominant forest association; a rather large one (about 15% of forest covered area) is a complex mature forest of Am. Elm (*Ulmus americana*), and E. White Cedar (*Thuja occidentalis*)—rare for this area. Reforested E. White Pine and Red Pine (*P. resinosa*), with young Sugar Maple (*Acer saccharum*) associations occur over about 10% of the forest covered area. Most of the other forested area contains Quaking Aspen (*Populus tremuloides*), E. White Cedar, Staghorn Sumac (*Rhus typhina*), Choke Cherry (*Prunus virginiana*), and Box-elder (*Acer negundo*) in very loose associations of dense new growth. Less than 5% of the forested area includes 3 old orchard areas of wild Crab Apple (*Malus coronaria*). The respective understories are dominated by these species and ground cover consists of Ostrich Fern (*Matteuccia struthiopteris*), Aster ssp., Goldenrod, White Baneberry (*Actaea pachypoda*), and Red Baneberry (*A. rubra*). Edge: Bordered on the W side by corn fields and fallow fields, and on the E side by large homes on well landscaped properties. Topography: Low-sided river valley on upper reaches of the Little Rouge River, a tributary of the greater Rouge River Valley system. Forest areas adjacent to river grades into rolling farms. The ravine section is 875 m long running NW-SE. Weather: 5 clear mornings and 2 overcast days. Coverage: May 31; June 5, 10, 14, 25; July 1, 5; 0700-0930, EDT. Total hours: 28. Census: Gray Catbird, 8 (19, 8); Rough-winged Swallow, 8; Song Sparrow, 8; Blue Jay, 7 (17, 7); Com. Crow, 7; Black-capped Chickadee, 5 (12, 5); Am. Robin, 5; Barn Swallow, 4 (10, 4); Red-winged Blackbird, 4; Com. Grackle, 3 (7, 3); Ruffed Grouse, 2; Spotted Sandpiper, 2; Mourning Dove, 2; Belted Kingfisher, 2; Com. Flicker, 2; Red-headed Woodpecker, 2; E. Phoebe, 2; Tree Swallow, 2; Bank Swallow, 2; Com. Yellowthroat, 2; N. Oriole, 2; Cardinal, 2; Rose-breasted Grosbeak, 2; Mallard, 1; Killdeer, 1; Downy Woodpecker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; House Wren, 1; Brown Thrasher, 1; Cedar Waxwing, 1; Starling, 1; Yellow Warbler, 1; Bobolink, 1; Brown-

headed Cowbird, 1; Ring-necked Pheasant, +; Hairy Woodpecker, +; House Sparrow, +; Am. Goldfinch, +; Field Sparrow, +. Total: 40 species; 97 territorial males (234/km<sup>2</sup>, 95/100 acres). Visitors: Great Blue Heron, Am. Kestrel. Remarks: This area seems to be quite diverse compared to other Toronto ravine lands, probably because there is still little urbanization near it. A new 4-lane highway is planned to go through the site.—PAUL HARPLEY, DEBRA HARPLEY (compilers), JAMES FAIRCHILD, RUTH REINPRECHT, KATHY RETTIE, 501-70 Mornelle Ct., Scarborough, Ontario, Canada M1E 4S8.

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**228. ALPINE-SUBALPINE ECOTONE, RIDGETOP.**—**Location:** Washington; Whatcom Co.; North Cascades Nat'l Park, Sourdough Ridge, 8 km by trail NNE of Diablo; 48°43'N, 121°6'30"W; Ross Dam Quadrangle, USGS. **Continuity:** New. **Size:** 32.3 ha = 79.7 acres (irregular, length 2 km, width 120 m - 250 m, surveyed with compass and rangefinder). **Description of Plot:** 80% is treeless, extensive rocky (gneiss) outcroppings with low growing alpine vegetation, primarily Mountain Heather (*Phillydode empetrifolius*, *Cassiope mertensiana*), Dwarf Huckleberry (*Vaccinium deliciosum*), Crowfoot (*Leptkia pectinata*), and Black-headed Sedge (*Carex nigricans*). The dominant canopy trees in the remaining 20% of the plot are Subalpine Fir (*Abies lasiocarpa*). Most prominent in the understory is Mountain Ash (*Sorbus spp.*). A quantitative survey (applying correction, see AB 34:22, 1980) of the forested portion gave the following results: Trees 3-in. diameter and over, based on five 0.1 acre circular samples, 208/acre; total basal area 35.4 ft<sup>2</sup>/acre. Species comprising 100% of the total number of trees: Subalpine Fir, 164, 78, 90, 100; Mountain Hemlock

(*Tsuga mertensiana*), 42, 20, 9, 60; Alaska Cedar (*Chamaecyparis nootkatensis*), 4, 2, 1, 20. Trees by diameter size class: A (3-6 in.) 144, 69, 7.2, 20; B (6-9 in.) 38, 18, 5.7, 16; C (9-15 in.) 16, 8, 6.4, 18; D (15-21 in.) 10, 5, 9.0, 26; G (33-40 in.) 2, 1, 7.1, 20. Shrub stems/acre 19,700; ground cover 82%; canopy cover 25%; average canopy height 21 ft (range 16-32). In the center of the study plot is a Nat'l Park Service fire lookout, manned during the study period by the first author, and visited by 80 hikers using a trail which bisects one-quarter of the study area. Over 80% of the study plot was snow-covered on July 1. During July numerous snowmelt creeks and small ponds formed, and by Aug. 14 little snow remained. **Edge:** Bordered on the N and E by treeless rock-heather slopes and steep cliff walls; on the S and W by subalpine meadows and forests. **Topography:** Rolling ridgeline, running NW-SE with slopes facing all directions. **Elevation:** 5560-6100 ft. **Weather:** Variable, clear and sunny to intermittent fog and rain. Temperatures: 4-17°C, winds 1-15 mph. **Coverage:** July 3, 5-6, 9, 12-13, 17-20, 24, 27, 31; Aug. 7, 9, 14; 0530-1130 or 1800-2100, PST. Total hours: 55. **Census:** Gray-crowned Rosy Finch, 5 (15, 6); Fox Sparrow, 5; Water Pipit, 4 (12, 5); Dark-eyed Junco, 4; White-tailed Ptarmigan, 3 (9, 4); Hermit Thrush, 3; Blue Grouse, 2; Red-breasted Nuthatch, 2; Red-shafted Flicker, 1; Townsend's Solitaire, 1; Yellow-rumped Warbler, 1. **Total:** 11 species; 31 territorial males or females (96/km<sup>2</sup>, 39/100 acres). **Visitors:** Golden Eagle, Am. Kestrel, Band-tailed Pigeon, Pygmy Owl, Black Swift, Rufous Hummingbird, Com. Raven, Clark's Nutcracker, Mountain Chickadee, Chestnut-backed Chickadee, Am. Robin, Cedar Waxwing, Townsend's Warbler,

Black-headed Grosbeak, Evening Grosbeak, Purple Finch, Pine Siskin.—**SUSAN K. SKAGEN**, 419 N. Township, Sedro Woolley, WA 98284, and **RICHARD L. KNIGHT**, Nongame Wildlife Program, Wash. Dept. of Game, 600 N. Capitol Way, Olympia, WA 98504.

*continued from page 62*

30); Great Crested Flycatcher, 5 (62, 25); Blue Jay, 4 (49, 20); Downy Woodpecker, 3 (37, 15); E. Wood Pewee, 3; Black-capped Chickadee, 3; Tufted Titmouse, 3; Kentucky Warbler, 3; Cardinal, 3; Yellow-billed Cuckoo, 2; Red-bellied Woodpecker, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Mourning Dove, 1; Chuck-will's-widow, 1; Whip-poor-will, 1; Hairy Woodpecker, 1; White-breasted Nuthatch, 1; Brown Thrasher, 1; Wood Thrush, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Red-headed Woodpecker, +; Com. Grackle, +. **Total:** 24 species; 50 territorial males (618/km<sup>2</sup>, 250/100 acres). **Visitors:** Red-tailed Hawk, Great Horned Owl, Barn Swallow, Com. Crow, Louisiana Waterthrush, Am. Goldfinch. **Remarks:** Nests found: Yellow-billed Cuckoo, Whip-poor-will, Downy Woodpecker, E. Wood Pewee, Brown Thrasher, Wood Thrush, Red-eyed Vireo (3).

## The Last Word

We think it is time to pay tribute to A.H. Claugus, of Carey, Ohio, whose Breeding Bird Census 105, Disturbed Oak-Hickory Forest, Pine Stand, Edge and Pond boasts the longevity record for all our published studies. This year is its 42nd since 1937: only the war year of 1943 was missed. In other years, Claugus arranged his army furloughs to allow for census work. We were interested in A.H. Claugus as a person, and a letter of inquiry was met with a fascinating but overlong-to-print account of the history of the Camp Falling Rock studies, with a bit of personal history and the photo-

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