

winged Teal, +, European Wigeon, +, Turkey Vulture, +, Cooper's Hawk, +, Am Kestrel, +, Spotted Dove, +; Varied Thrush, +; Hermit Thrush, +; Brazilian Cardinal, +; Purple Finch, +. **Average Total:** 495 (1439/km², 582/100 acres). **Remarks:** Species total: 50. The

House Finch, Am Goldfinch and White-crowned Sparrow were seen on all trips, the Am. Wigeon on 9 trips. Two Brazilian Cardinals are now resident at the nature center. Since 1971, the W. Meadowlark has decreased and this year did not appear, while the Mock-

ingbird has steadily increased, perhaps the latter because of increasing availability of Toyon, *Cotoneaster* and *Pyracantha* species. — *DOROTHY D. RYPKA, Dept. of Biology, California St. Univ., Long Beach and 16818 S. Bety Avenue, Cerritos, CA 90701.*

Forty-third Breeding Bird Census

Edited by Willet T. Van Velzen

List of Censuses

Habitat	State or Province	Hec-tares	Birds per sq. km.	Hrs. Obs.	Spe-cies	Yrs. of Study
A. Eastern-Deciduous Forest						
1 Sugar Maple Forest	New Brunswick	10.5	467	22	16	1
2 Birch-Maple-Oak Forest	Connecticut	13.9	603	18	32	4
3 Second-growth Hardwood Forest	Connecticut	10.1	979	14	36	13
4 Maple-Oak Forest	New York	72.8	486	45	69	3
5 Young Red Maple-Gray Birch Forest	New York	8.1	1198	12	38	4
6 Young White Ash-Basswood Forest	New York	8.1	1149	11	33	4
7 Mature Deciduous Floodplain Forest	Maryland	7.6	909	37	24	27
8 Mixed Hardwood Forest	Maryland	11.3	1218	22	46	19
9 Mixed Upland Habitat	Dist. of Columbia	14.2	713	31	21	20
10 Beech-Tulip-tree-Basswood Forest	West Virginia	6.1	527	10	16	1
11 Hemlock-Black Cherry-Birch Forest	West Virginia	6.1	380	12	18	1
12 Maple-Cherry-Birch Forest	West Virginia	6.1	313	9	20	1
13 Maple-Tulip-tree-Red Oak Forest	West Virginia	6.1	659	8	20	1
14 Oak-Beech-Tulip-tree Forest	West Virginia	6.1	708	14	17	1
15 Oak Forest	West Virginia	6.1	280	14	13	1
16 Red Oak Forest	West Virginia	6.1	486	13	20	1
17 Red Maple-Black Gum-Mixed Hardwoods	Virginia	10.1	623	37	16	2
18 Upland Oak-Hickory Forest	Virginia	11.0	854	71	22	7
19 Upland Tulip-tree-Oak Forest	Virginia	20.6	228	11	19	6
20 Floodplain Forest	North Carolina	13.0	481	19	20	3
21 Mixed Deciduous Forest	North Carolina	12.6	582	23	26	4
22 Hardwood Swamp Forest	South Carolina	8.1	1483	40	29	1
23 Virgin Hardwood Swamp Forest	South Carolina	8.9	1634	40	28	1
24 Largetooth Aspen-Sugar Maple Forest*	Ontario	10.0	310	18	20	1
25 Red Oak-Sugar Maple Savannah	Ontario	7.5	1316	35	18	1
26 Wooded City Ravine	Ontario	20.0	210	21	16	10
27 Aspen Forest (19 Yr.)	Minnesota	7.1	282	10	15	1
28 Birch-Elm-Ash Forest	Minnesota	8.7	1529	18	22	1
29 Mature Aspen-Northern Hardwoods Forest	Minnesota	12.5	392	16	23	2
30 Young Aspen Forest	Minnesota	6.4	331	13	17	1
31 Upland Maple-Oak Forest	Wisconsin	5.4	260	11	13	3
32 Mature Mixed Hardwood Forest	Michigan	9.3	779	15	24	6
33 Oak-Hickory-Maple Forest	Illinois	13.0	293	15	25	4
34 Black Oak-Sassafras Woods	Indiana	22.2	203	64	19	6
35 Mixed Hardwood Regenerating	Ohio	20.2	282	22	34	4
36 Neotoma Valley	Ohio	20.2	465	115	37	2
37 Virgin Beech-Maple Forest	Ohio	6.1	840	32	24	6
38 Green Ash-Box-elder Forest	Manitoba	15.0	943	25	22	1
39 River Bottom Forest	Manitoba	14.0	543	24	23	3
40 Cottonwood Floodplain I	North Dakota	19.0	668	37	28	1
41 Cottonwood Floodplain II	North Dakota	13.0	886	34	26	1
42 Ash-Cottonwood Draw	North Dakota	3.0	868	10	9	1
43 Ash-Elm Hardwood Draw	North Dakota	2.9	1027	10	14	1
44. Deciduous Floodplain Forest	Oklahoma	6.7	1637	78	26	1

<i>Habitat</i>	<i>State or Province</i>	<i>Hectares</i>	<i>Birds per sq. km.</i>	<i>Hrs Obs.</i>	<i>Species</i>	<i>Yrs of Study</i>
B. Eastern-Coniferous-Deciduous (Mixed)						
45. Maple-Pine-Oak Second-growth Forest	Massachusetts	11.8	402	30	23	4
46. Climax Hemlock-White Pine Forest	Connecticut	10.5	950	16	40	13
47. White Pine-Hemlock-Northern Hardwoods Forest	Connecticut	10.3	748	58	30	1
		4.0	374	23	12	1
48. Pitch Pine-Scrub Oak Barrens	New York	9.7	362	29	7	3
49. Second-growth Oak-Pitch Pine Forest	New York	9.3	484	28	10	3
50. Upland Mixed Pine-Spruce-Hardwood Plantation	New York	16.6	564	20	34	6
51. Pitch Pine-Oak Forest I*	New Jersey	13.8	458	50	20	1
52. Pitch Pine-Oak Forest II*	New Jersey	6.1	535	32	12	1
53. Mixed Oak-Pine Forest I	Pennsylvania	6.0	476	16	22	3
54. Mixed Oak-Pine Forest II	Pennsylvania	11.0	421	17	26	3
55. Central Hardwood Forest with Scattered Pine	Dist. of Columbia	26.3	232	57	22	20
56. Hemlock-White Pine-Mixed Hardwood Forest	Virginia	6.1	544	20	11	1
57. Hemlock-Cedar-Pine and Aspen-Birch Forests*	Ontario	10.0	435	22	29	1
58. White Pine-White Birch Coniferous Forest	Ontario	8.4	417	23	31	1
59. Tamarack Bog and Hardwood	Michigan	8.5	288	8	20	4
60. Mixed Hardwood and Hemlock Ravines	Ohio	4.9	597	12	30	2
C. Eastern-Coniferous						
61. Red Spruce Forest	New Brunswick	11.3	1151	35	21	1
62. Upland Scotch Pine Plantation	New York	9.3	800	16	20	11
63. Red Pine Plantation	Connecticut	8.5	500	10	31	2
64. Mature Longleaf Pine Forest	Georgia	58.3	410	69	45	1
65. Slash Pine-Cypress Mosaic	Florida	40.0	121	22	18	1
66. Jack Pine Forest	Ontario	6.6	311	24	11	1
67. Pine Plantation	Indiana	7.8	499	32	23	1
68. Red Pine Plantation	Minnesota	11.5	381	15	22	1
69. Red Cedar Coulee	North Dakota	1.5	455	7	4	1
D. Eastern-Mixed Habitats						
70. Landscaped Park Area	New Brunswick	22.5	371	28	29	1
71. Mixed Upland Habitat and Swamp	Connecticut	14.2	240	15	22	12
72. Upland Brushy Pasture	Connecticut	8.5	1206	16	35	13
73. Deciduous Forest with Pond and Brook	New Jersey	16.2	327	11	30	16
74. Brushy Field and Wooded Edge	Pennsylvania	7.5	498	20	21	2
75. Mixed Upland Habitat	Pennsylvania	7.8	1158	24	26	3
76. Rustic Camping Area	West Virginia	7.3	446	17	32	1
77. City Ravine	Ontario	20.9	330	39	27	1
78. Open Electrical Transmission Corridor	Ontario	7.0	707	17	22	1
79. Red Oak-American Basswood Savannah	Ontario	7.5	1089	32	16	1
80. Transitional Mixed Forest-Field	Ontario	6.1	1063	44	26	1
81. Disturbed Oak-Hickory Forest, Pine stand, Edge, and Pond	Ohio	14.2	628	20	38	41
82. Suburban Cemetery	Indiana	5.9	912	24	20	2
83. Deciduous Clearcut	Tennessee	20.2	393	16	19	5
84. Deciduous Forest and Contour Strip Mine	Tennessee	23.4	395	17	35	2
85. Mixed-Mesophytic Woods, Fields and Brush	Tennessee	30.0	319	51	44	3
86. Strip Mine and Deciduous Woodlot	Tennessee	20.1	234	15	22	2
87. Deciduous Clearcut	Georgia	6.9	363	18	10	3
88. Aspen Clearcut (6 Yr.)	Minnesota	11.5	295	14	19	2
89. Mixed Wetland with Tamarack and Aspen Groves, Shrubland and Fen	Wisconsin	16.9	631	14	33	3
E. Central-Prairie						
90. Kentucky Blue Grass Prairie	North Dakota	4.9	154	3	9	8
91. Mixed Prairie I	North Dakota	6.1	197	5	5	1
92. Mixed Prairie II	North Dakota	6.1	131	5	3	1
93. Mixed Prairie III	North Dakota	6.1	148	5	6	1
94. Silver Sage Flat I	North Dakota	6.1	361	5	5	1
95. Silver Sage Flat II	North Dakota	6.1	328	5	6	1
96. Mixed Prairie I	North Dakota	10.0	285	6	15	8
97. Mixed Prairie II	North Dakota	6.1	189	4	13	8
98. Mixed Prairie III	North Dakota	6.1	82	4	8	8
99. Mixed Prairie IV	North Dakota	6.1	66	3	5	8
100. Mixed Prairie V	North Dakota	6.1	107	2	7	8
101. Mixed Prairie VIII	North Dakota	8.7	195	5	12	4
102. Mixed Prairie	North Dakota	4.1	49	8	5	1
103. Floodplain Tallgrass Prairie	Kansas	10.1	277	75	7	4
104. Unburned Tallgrass Prairie	Kansas	25.2	79	8	11	1
105. Annually Burned Tallgrass Prairie I	Kansas	35.1	71	8	10	1
106. Annually Burned Tallgrass Prairie II	Kansas	12.2	147	6	11	1
107. Unburned Upland Tallgrass Prairie	Kansas	38.6	91	14	10	1
F. Central-Disturbed Habitats						
108. Improved Pasture and Oak-Pine Forest	Oklahoma	9.1	769	45	25	1

<i>Habitat</i>	<i>State or Province</i>	<i>Hec- tares</i>	<i>Birds per sq km</i>	<i>Hrs Obs</i>	<i>Spe- cies</i>	<i>Yrs of Study</i>
109. Mixed Habitat–Disturbed Bottomland	Oklahoma	40.5	321	35	39	8
110. Oak–Pine Ravine Forest with Clearings	Oklahoma	7.4	959	58	22	1
G. Central-Shelter Belts						
111. Mature (1946) Four-Row Belt	Minnesota	0.7	3448	17	11	1
112. Mature (1948) Five-Row Belt	Minnesota	0.7	9799	12	7	1
113. Mature (1949) Eight-Row Belt	Minnesota	0.4	9232	8	7	1
114. Mature (1951) Three-Row Belt	Minnesota	0.3	2780	6	6	1
115. Immature (1961) Nine-Row Belt	Minnesota	0.8	3439	9	7	1
116. Immature (1966) Four-Row Belt	Minnesota	0.3	7386	9	7	1
117. Immature (1974) Three-Row Belt	Minnesota	0.2	2878	5	3	1
H. Western-Deciduous						
118. Floodplain Cottonwood Forest	Colorado	9.7	1272	39	24	9
119. Gambel's Oak–Mountain Mahogany Woodland	Colorado	18.4	190	57	9	1
120. Deciduous Oak Woodland	California	5.7	247	12	11	2
121. Sycamore-Coast Live Oak-Riparian Woodland	California	6.2	1536	13	25	1
I. Western-Coniferous-Deciduous (Mixed)						
122. Open Aspen Grove–Scattered Conifers	Colorado	14.0	489	30	33	4
123. Ponderosa Pine–Scrub Oak–Mt. Mahogany Woodland	Colorado	9.1	334	60	10	12
124. Scrub Oak–Ponderosa Pine Association	Colorado	8.0	301	35	10	1
125. Douglas-fir–Madrone–Tanbark Oak Forest	Oregon	7.5	730	16	17	1
J. Western-Coniferous						
126. Ponderosa Pine I	North Dakota	20.3	264	41	10	1
127. Ponderosa Pine II	North Dakota	4.1	148	12	3	1
128. Pinyon–Juniper–Ponderosa Pine Ecotone	New Mexico	15.0	147	20	15	3
K. Western-Mixed Habitats						
129. Rocky Mountain Juniper–Limber Pine–Grassland	Montana	20.0	118	23	12	1
130. Scattered Mixed Coniferous Forest	Oregon	32.4	120	22	11	7
131. Ghost Town, Orchards and Pastures	Utah	24.3	346	27	32	1
132. Mixed-Mesophytic Canyon Bottom	New Mexico	12.1	548	34	24	4
133. Riparian Woodland and Oak Savannah	California	8.8	314	16	34	1
134. Semi-disturbed Riparian Woodland	California	17.7	752	65	41	1
135. Suburban Nature Center	California	34.4	423	40	19	4
136. Urban Woodland Park	California	13.5	701	72	11	1
L. Western-Desert and Scrub						
137. Shortgrass Uplands–Relic Sagebrush	Idaho	64.8	76	40	8	1
138. Desert Shrub	Utah	64.8	93	50	16	2
139. Pygmy Forest–Chaparral	Utah	16.2	315	21	21	3
140. Blue Grama–Rabbitbrush Grassland	New Mexico	16.2	154	87	6	3
141. Alkali Sink Community*	California	12.3	212	14	4	1
142. Creosotebush Scrub I	California	25.5	90	8	4	1
143. Creosotebush Scrub II	California	25.5	157	8	5	1
144. Desert Scrub	California	25.5	94	9	5	1
145. Desert Riparian–Freshwater Marsh and Ponds	California	15.4	618	27	40	3
146. High Desert Hot Springs	California	33.2	21	10	5	1
147. High Desert Reservoir and Shoreline	California	31.9	356	15	18	1
148. High Desert Spring	California	5.5	327	9	6	1
149. Joshua Tree Woodland	California	26.3	103	8	8	1
150. Lower Sonoran Grassland*	California	20.3	133	9	3	1
151. Ocotillo–Cholla	California	16.2	225	33	10	2
152. Saltbush Scrub	California	25.5	114	8	4	1
153. Coastal Scrub	California	8.1	556	45	16	7
154. Disturbed Coastal Scrub A	California	4.7	490	91	15	7
155. Disturbed Coastal Scrub B	California	8.1	432	84	17	8
M. Northern-Tundra and Taiga						
156. Arctic Low Foothills Tundra	Alaska	25.0	158	109	14	3
157. Inland Coastal Tundra	Alaska	100.0	72	854	18	1
158. Wet Coastal Plain Tundra I	Alaska	33.0	164	65	17	5
159. Wet Coastal Plain Tundra II	Alaska	36.0	171	60	17	5
160. Wet Coastal Plain Tundra III	Alaska	25.0	162	47	8	2
161. Wet Coastal Plain Tundra	Alaska	100.0	126	1088	13	1
162. Boreal Mixedwood–24 Year Upland Cutover*	Ontario	9.0	833	23	23	1
163. Boreal Conifer–24 Year Lowland Cutover*	Ontario	9.0	1517	19	21	1
164. Boreal Mixedwood–19 Year Upland Cutover*	Ontario	9.0	1044	22	21	1
165. Boreal Mixedwood–19 Year Lower Slope Cutover*	Ontario	9.0	2005	20	26	1
166. Boreal Conifer–19 Year Lowland Cutover*	Ontario	9.0	1978	20	16	1
167. Boreal Mixedwood–17 Year Upland Cutover*	Ontario	9.0	783	28	18	1
168. Boreal Mixedwood–17 Year Lower Slope Cutover*	Ontario	9.0	1605	20	20	1

<i>Habitat</i>	<i>State or Province</i>	<i>Hec-tares</i>	<i>Birds per sq km</i>	<i>Hrs Obs</i>	<i>Spe-cies</i>	<i>Yrs of Study</i>
169. Boreal Conifer-17 Year Lowland Cutover*	Ontario	9.0	1033	19	18	1
170. Boreal Mixedwood-13 Year Upland Cutover*	Ontario	9.0	1194	20	21	1
171. Boreal Conifer-13 Year Lowland Cutover*	Ontario	9.0	1778	22	17	1
172. Boreal Mixedwood-11 Year Upland Cutover*	Ontario	9.0	1167	22	22	1
173. Boreal Conifer-11 Year Lowland Cutover*	Ontario	9.0	1022	22	13	1
174. Boreal Mixedwood-9 Year Upland Cutover*	Ontario	9.0	1022	24	20	1
175. Boreal Mixedwood-9 Year Lowland Cutover*	Ontario	9.0	850	19	18	1
176. Boreal Mixedwood-6 Year Upland Cutover*	Ontario	9.0	1694	27	30	1
177. Boreal Conifer-6 Year Lowland Clearcut*	Ontario	9.0	617	11	17	1
178. Boreal Mixedwood-5 Year Upland Cutover*	Ontario	9.0	1000	22	16	1
179. Boreal Mixedwood-5 Year Lowland Cutover*	Ontario	9.0	694	18	12	1
180. Boreal Mixedwood-3 Year Upland Cutover*	Ontario	9.0	783	16	18	1
181. Boreal Conifer-3 Year Lowland Cutover*	Ontario	18.0	194	28	14	1
182. Boreal Mixedwood-Uncut Upland*	Ontario	9.0	1511	25	30	1
183. Boreal Conifer-Uncut Lowland*	Ontario	6.0	559	11	15	1
184. White Spruce Forest	Alberta	14.8	402	30	17	1
185. Aspen Forest	Manitoba	39.5	335	16	12	3
186. Aspen Forest	Manitoba	16.0	231	20	14	1
N. Wetlands						
187. Shrubby Swamp and Sedge Hummocks	Connecticut	8.1	914	18	15	13
188. Calla-Sedge Wetland	Wisconsin	1.0	600	5	3	1
189. Cat-tail-Bur-reed Wetland	Wisconsin	1.0	700	5	2	1
190. Sedge-Bogbean-Myrica Wetland	Wisconsin	1.0	1100	5	5	1
191. Sedge-Bur-reed Wetland	Wisconsin	1.0	750	5	3	1
192. Sedge-Calla Wetland	Wisconsin	1.0	800	5	3	1
193. Sedge-Cat-tail-Calla Wetland	Wisconsin	1.0	950	5	6	1
194. Sedge-Cat-tail Wetland	Minnesota	1.0	1050	5	5	1
195. Sedge-Potentilla-Cat-tail-Phragmites Wetland	Wisconsin	1.0	800	5	4	1
196. Sedge-Potentilla Wetland I	Wisconsin	1.0	800	5	4	1
197. Sedge-Potentilla Wetland II	Minnesota	1.0	500	5	2	1
198. Sedge Wetland I	Wisconsin	1.0	950	5	5	1
199. Sedge Wetland II	Wisconsin	1.0	350	5	1	1
200. Bulrush and Cat-tail Marsh in Conifer Forest	Montana	40.5	628	32	68	5
201. Cat-tail-Tule Marsh	California	2.8	13,843	15	4	1
202. Diked Coastal Salt Marsh	California	7.9	330	16	21	1
203. Freshwater Marsh	California	20.0	213	32	11	1
O. Fields and Cultivated Areas						
204. Abandoned Field*	Pennsylvania	6.0	342	7	13	1
		6.0	442	10	14	2
205. Old Field	Pennsylvania	7.1	394	8	16	6
206. Abandoned Turf Field	Maryland	6.3	222	5	6	5
207. Grassland	West Virginia	6.1	297	10	9	1
208. Orchard Grass-Tall Fescue Meadow	Illinois	12.1	222	12	12	4
209. Soybean Field	Indiana	23.3	21	20	3	1
210. English Walnut Orchard	California	4.1	1013		16	1
P. Residential						
211. Small Town, Residential and Commercial Areas	New Brunswick	50.5	285	26	16	1
212. Village, Residential	Ohio	12.1	412	90	16	1
Q. Late Reports						
213. Oak-Hickory Forest I	Kansas	8.1	803	31	26	2
214. Oak-Hickory Forest II	Kansas	8.1	575	15	28	2
215. Oak-Hickory Forest III	Kansas	8.1	877	25	35	2
216. Oak-Hickory Forest IV	Kansas	8.1	593	18	25	2
217. Oak-Hickory Forest V	Kansas	8.1	568	22	27	2
218. Oak-Hickory Forest VI	Kansas	8.1	507	20	25	2
219. Woodland along Stream on Prairie	Kansas	12.4	647	18	34	2

*Count made in 1978

1. SUGAR MAPLE FOREST. — **Location:** New Brunswick, Albert Co., in Fundy Nat'l Park, crossed by Maple Grove Auto Trail 1 mi N of Point Wolfe Rd; 45°35'N, 64°59'W, NTS map 21H/10W Alma. **Continuity:** New. **Size:** 10.5 ha = 25.9 acres (rectangular, 525 m 261' by 200 m 171' with 100 m grid; compass and measured rope). **Description of Plot:** A single story, deciduous forest, very open beneath the main canopy except for a 2-3 acre area where porcupines have killed about 40% of the trees. A 15 ft wide gravel road causes little break in the canopy along its 1000 ft path across the plot. Area very well drained. A quantitative survey of the vegetation, based on eight 0.1 acre circles, gave the following results: Trees 3-in diameter and over, 382/acre; total basal area 148.4 ft²/acre. Species comprising 90% of the total, followed by number of trees/acre, relative density (%), relative dominance (%), and frequency (%) were: Sugar Maple (*Acer saccharum*), 284, 74, 79, 100; dead trees, 62, 16, 10, 100. Trees by diameter size class, followed by trees/acre, relative density (%), basal area (ft²/acre), and relative dominance (%): A (3-6 in.), 118, 31, 12.9, 9; B (6-9 in.), 145, 38, 44, 7, 30; C (9-12 in.), 92, 24, 55.5, 37; D (12-15 in.), 20, 5, 20.2, 14; E (15-21 in.), 6, 2, 11.2, 8; F (21-27 in.), 1, 0.3, 3.9, 3. Shrub stems/acre 370 (ranging from almost none in half the plot to about 1500 in the major openings) of which Beech (*Fagus grandifolia*) comprises 38%, Sugar Maple 26%, Mountain Maple (*A. spicatum*) 16%, and Striped Maple (*A. pensylvanicum*) 14%, ground cover 55%, the principal species being Spinulose Shield-fern (*Dryopteris austriaca*) cover 27%, Hay-scented Fern (*Dennstaedtia punctilobula*), 7%, and Red Raspberry (*Rubus idaeus*) 7%. Canopy cover 83%; mean canopy height 59 ft (range 52-72); mean height of canopy base 28 ft. **Edge:** Adjoined by similar vegetation on the N and SE but grading into spruce-fir forest beyond the W end and to mixed forest just outside the NE corner. **Topography:** Moderate slope to the SE. **Elevation:** 800-900 ft. **Weather:** Very wet but warm in May, near average conditions in June and July except for a freak windstorm on June 27. Clear during 4 coverages, overcast during 2, foggy during 4; rain curtailed the June 22 survey when 80% complete; calm to moderate breeze except strong breeze June 18; temperatures 42-65°F. **Coverage:** May 23, 30; June 4, 9, 18, 22, 29; July 7, 16; 0517-1015, ADT Total man-hours: 22. **Census:** Ovenbird, 11 (105, 42); Least Flycatcher, 8 (76, 31); Red-eyed Vireo, 7.5 (72, 29); Black-throated Green Warbler, 4.5 (43, 17); E. Wood Pewee, 4 (38, 15); Am. Robin, 3 (29, 12); Swainson's Thrush, 3; Am. Redstart, 3; Rose-breasted Grosbeak, 1.5; Hairy Woodpecker, 1; Downy Woodpecker, 1; Dark-eyed Junco, 1; Yellow-bellied Sapsucker, 0.5; Ruffed Grouse, +; Mourning Warbler, +; Purple Finch, +. **Total:** 16 species; 49 territorial males (467/km², 189/100 acres). **Visitors:** Am. Woodcock, Ruby-throated Hummingbird, Gray Jay, Blue Jay, White-breasted Nuthatch, Wood Thrush, Hermit Thrush, Cedar Waxwing, Black-throated Blue Warbler, Canada Warbler. **Remarks:** Nests found: Yellow-bellied Sapsucker, Hairy Woodpecker, Downy Woodpecker. One brood each of Ruffed Grouse and Am Woodcock were observed. One Red-eyed Vireo and 2 Black-throated Green Warblers were seen feeding fledglings. The common birds were evenly distributed except for Least

Flycatcher which was confined to the areas of closed canopy and open understory and Am Redstart which preferred the brushy openings. This study is part of the Avifaunal Survey of Fundy Nat'l Park, Parks Canada contract ARO 78-44. — DAVID S. CHRISTIE and BRIAN DALZELL, *New Brunswick Museum, 277 Douglas Avenue, Saint John, N.B. E2K 1E5.*

2. BIRCH - MAPLE - OAK FOREST. — **Location:** Connecticut; New London Co., 1 mi N-NW of intersection of state routes 161 and 156; 40°20'N, 72°12'W, Niantic Quadrangle, USGS. **Continuity:** Established 1976; 4 consecutive years. **Size:** 13.94 ha = 34.44 acres. **Description of Plot:** See AB 31:29 (1977). **Weather:** April, May, and early June were very wet with below normal temperatures; late June and July were very dry. **Coverage:** May 19, 26, 28; June 2, 9, 16. Total man-hours: 17.5. **Census:** Veery, 9 (65, 26); Gray Catbird, 6 (43, 17); Rufous-sided Towhee, 6; Wood Thrush, 5 (36, 15); Black-and-white Warbler, 5; Canada Warbler, 5; Blue Jay, 4 (29, 12); Black-capped Chickadee, 4; Tufted Titmouse, 4; Com. Flicker, 3 (22, 9); Great Crested Flycatcher, 3; Red-eyed Vireo, 3; Brown-headed Cowbird, 3; E. Wood Pewee, 2; Brown Thrasher, 2; Worm-eating Warbler, 2; Blue-winged Warbler, 2; Com. Yellowthroat, 2; Scarlet Tanager, 2; Ruffed Grouse, 1; Mourning Dove, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; White-breasted Nuthatch, 1; Am. Robin, 1; White-eyed Vireo, 1; Yellow-throated Vireo, 1; Ovenbird, 1; Am. Redstart, 1; Red-winged Blackbird, 1; Rose-breasted Grosbeak, 1; Great Horned Owl, +. **Total:** 32 species; 84 territorial males or females (603/km², 244/100 acres). **Remarks:** Nests found: Mourning Dove, 1; Rufous-sided Towhee, 1. The number of territorial males increased from 68 last year to 84. — ANDREW DASINGER, 12 Stone Cliffe Dr., Niantic, Conn. 06357.

3. 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; 13 intermittent years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AFN 19:590-591 (1965). **Coverage:** May 16, 27, 29; June 2, 16, 24. Total man-hours: 14. **Census:** Red-eyed Vireo, 12 (119, 48); Veery, 9 (89, 36); Ovenbird, 9; Rufous-sided Towhee, 8 (79, 32); Black-capped Chickadee, 6 (59, 24); Com. Yellowthroat, 6; Scarlet Tanager, 6; Black-and-white Warbler, 5 (49, 20); Tufted Titmouse, 3 (30, 12); Gray Catbird, 3; Wood Thrush, 3; Chestnut-sided Warbler, 3; Am. Redstart, 3; Com. Flicker, 2; Great Crested Flycatcher, 2; Blue Jay, 2; White-breasted Nuthatch, 2; Am. Robin, 1.5; Blue-gray Gnatcatcher, 1.5; Broad-winged Hawk, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Com. Crow, 1; Red-breasted Nuthatch, 1; Blue-winged Warbler, 1; Louisiana Waterthrush, 1; Brown-headed Cowbird, 1; Cardinal, 1; Rose-breasted Grosbeak, 1; Barred Owl, 0.5; House Wren, 0.5; Great Horned Owl, +; Yellow-throated Vireo, +; Solitary Owl, +; Magnolia Warbler, +. **Total:** 36 species; 99 territorial males (979/km², 396/100 acres). **Remarks:** The number of territorial males rose in 1 year from 87.5 to

98.5 for a new high. No new species or surprising changes. Thanks to Jim Cavanaugh — ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.

4. MAPLE - OAK FOREST. — **Location:** New York; Ulster Co., John Burroughs Nature Sanctuary, 1 mi W of West Park; 41°48'N, 73°58'W, Hyde Park Quadrangle, USGS. **Continuity:** Established 1977; 3 consecutive years. **Size:** 72.8 ha = 180 acres. **Description of Plot:** See AB 32:54 (1978). **Weather:** Normal. **Coverage:** Mar. 18; Apr. 1, 15; May 2, 10, 17, 27-29, 31; June 1-9, 11-15, 20, 28; July 10, 18, 0445-0800, EDT, and occasionally at dusk. Total man-hours: 45. **Census:** Black-and-white Warbler, 30 (41, 17); Great Crested Flycatcher, 25 (34, 14); Worm-eating Warbler, 23 (32, 13); Red-eyed Vireo, 21.5 (30, 12); Louisiana Waterthrush, 18.5 (25, 10); Scarlet Tanager, 16.5 (23, 9); Ovenbird, 14 (19, 8); E. Wood Pewee, 13 (18, 7); Black-capped Chickadee, 13; Wood Thrush, 12 (16, 7); Blue-gray Gnatcatcher, 10 (14, 6); Blue Jay, 8.5 (12, 5); Cardinal, 8.5; Chipping Sparrow, 8.5; Com. Flicker, 8 (11, 4); N. Oriole, 7 (10, 4); Tufted Titmouse, 6.5 (9, 4); Winter Wren, 6.5; Brown Creeper, 6 (8, 3); Black-billed Cuckoo, 5 (7, 3); Downy Woodpecker, 5; Com. Grackle, 5; Indigo Bunting, 5; E. Phoebe, 4 (5, 2); Willow Flycatcher, 3.5 (5, 2); Am. Robin, 3.5; Golden-winged Warbler, 3.5; Com. Yellowthroat, 3.5; Red-winged Blackbird, 3.5; Ruffed Grouse, 3 (4, 2); Hairy Woodpecker, 3; Cedar Waxwing, 3; Cerulean Warbler, 3; Brown-headed Cowbird, 3; Pileated Woodpecker, 2.5; Yellow-billed Cuckoo, 2; Barn Swallow, 2; Yellow-throated Vireo, 2; Yellow Warbler, 2; N. Waterthrush, 2; Am. Redstart, 2; Rose-breasted Grosbeak, 2; Am. Goldfinch, 2; Black Duck, 1.5; White-breasted Nuthatch, 1.5; Blue-winged Warbler, 1.5; Canada Goose, 1; Wood Duck, 1; Mallard, 1; Broad-winged Hawk, 1; Spotted Sandpiper, 1; Barred Owl, 1; Belted Kingfisher, 1; E. Kingbird, 1; Gray Catbird, 1; Veery, 1; E. Bluebird, 1; Black-throated Blue Warbler, 1; Yellow-rumped Warbler, 1; Black-throated Green Warbler, 1; Chestnut-sided Warbler, 1; Bay-breasted Warbler, 1; Hooded Warbler, 1; Song Sparrow, 1; Red-shouldered Hawk, 0.5; Red-tailed Hawk, +; Whip-poor-will, +; Chimney Swift, +; Com. Crow, +. **Total:** 69 species; 354 territories (486/km², 197/100 acres). **Remarks:** Reduced numbers from last year may reflect less time spent censusing. Nests found (9): E. Phoebe, 3; 1 each of Canada Goose, Black Duck, Ruffed Grouse, Wood Thrush, Scarlet Tanager, Chipping Sparrow. — JIM STAPLETON, *John Burroughs Nature Sanctuary, P.O. #220, West Park, N.Y. 12493.*

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; 4 consecutive years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 31:31 (1977). **Weather:** No precipitation during census; a very dry season. **Coverage:** June 6, 8, 13, 17, 22, 25-26; July 4, 12; 0440-2130, EDT. Total man-hours: 12. **Census:** Veery, 14 (173, 70); Am. Redstart, 12 (148, 60); N. Oriole, 6 (74, 30); Yellow Warbler, 5 (62, 25); Red-eyed Vireo, 4 (49, 20); Com. Yellowthroat, 4; Red-

winged Blackbird, 4, Com Grackle, 4, Great Crested Flycatcher, 3 (37, 15), Am Robin, 3, Rose-breasted Grosbeak, 3; Com. Flicker, 2; Downy Woodpecker, 2; Least Flycatcher, 2; E. Wood Pewee, 2; Gray Catbird, 2; Wood Thrush, 2; Warbling Vireo, 2; Ovenbird, 2; Ruffed Grouse, 1; Mourning Dove, 1; Black-billed Cuckoo, 1; Hairy Woodpecker, 1; E. Kingbird, 1; Tree Swallow, 1; Blue Jay, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Brown Thrasher, 1; Cedar Waxwing, 1; Starling, 1; Black-and-white Warbler, 1; Nashville Warbler, 1; Chestnut-sided Warbler, 1; Scarlet Tanager, 1; Rufous-sided Towhee, 1; White-throated Sparrow, 1; Song Sparrow, 1. **Total:** 38 species; 97 territorial males (1198/km², 485/100 acres). **Visitors:** Great Blue Heron, Green Heron, Am. Bittern, Canada Goose, Red-tailed Hawk, Am. Kestrel, Killdeer, Ring-billed Gull, Chimney Swift, Belted Kingfisher, Bank Swallow, Barn Swallow, Purple Martin, Com. Crow, E. Meadowlark, Brown-headed Cowbird, Am. Goldfinch. — *JO VAN REIT and GERALD A. SMITH, Derby Hill Bird Observatory, P.O. Box 620, Syracuse, N.Y. 13201.*

6. YOUNG WHITE ASH - BASSWOOD FOREST. — **Location:** New York; St. Lawrence Co., 3 mi SW of Morristown at Jacques Cartier State Park, 44°33'N, 75°41'W, Morristown Quadrangle, USGS. **Continuity:** Established 1976; 4 consecutive years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See *AB* 31:31-32 (1977). **Weather:** No precipitation during census; a very dry year. **Coverage:** June 5, 8, 10, 14, 17, 24; July 4, 10; 0430-2130, EDT. Total man-hours: 10.5. **Census:** Am. Redstart, 12 (148, 60); Yellow Warbler, 8 (99, 40); E. Wood Pewee, 6 (74, 30); Am. Robin, 6; Wood Thrush, 6; Warbling Vireo, 6; Rose-breasted Grosbeak, 5 (62, 25); Veery, 4 (49, 20); Red-winged Blackbird, 4; Great Crested Flycatcher, 3 (37, 15); Gray Catbird, 3; Com. Grackle, 3; Blue Jay, 2; Black-capped Chickadee, 2; House Wren, 2; Red-eyed Vireo, 2; Com. Yellowthroat, 2; Song Sparrow, 2; Ruffed Grouse, 1; Com. Flicker, 1; Downy Woodpecker, 1; Least Flycatcher, 1; Tree Swallow, 1; White-breasted Nuthatch, 1; Red-breasted Nuthatch, 1; Black-and-white Warbler, 1; Yellow-rumped Warbler, 1; Pine Warbler, 1; Ovenbird, 1; Scarlet Tanager, 1; Cardinal, 1; Rufous-sided Towhee, 1; White-throated Sparrow, 1. **Total:** 33 species; 93 territorial males (1149/km², 465/100 acres). **Visitors:** Great Blue Heron, Green Heron, Mallard, Gadwall, Killdeer, Am. Woodcock, Ring-billed Gull, Chimney Swift, Bank Swallow, Barn Swallow, Purple Martin, Com. Crow, Cedar Waxwing, Brown-headed Cowbird, Am. Goldfinch. — *GEORGE R. MAXWELL II and GERALD A. SMITH, Derby Hill Bird Observatory, P.O. Box 620, Syracuse, N.Y. 13201.*

7. MATURE DECIDUOUS FLOOD-PLAIN 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; 27 intermittent years. **Size:** 7.6 ha = 18.75 acres. **Description of Plot:** See *AFN* 1:212-213 (1947). **Weather:** Temperatures averaged: Apr., 49°F; May, 60°; June 69°. Rainfall was below average for this

period, but in late May the river was high for a few days and covered some shore areas of the island. **Coverage:** Apr. 1, 7, 15, 21, May 6, 12-13, 20, 26-28; June 2-3, 16, 30; 0520-0930, EST. Total man-hours: 37.2. **Census:** Starling, 15 (198, 80); Red-eyed Vireo, 6 (79, 32); N. Parula, 6; Cardinal, 5 (66, 27); Am. Redstart, 4 (53, 21); Downy Woodpecker, 3 (40, 16); Acadian Flycatcher, 3; Carolina Chickadee, 3; Tufted Titmouse, 3; Great Crested Flycatcher, 2.5; Carolina Wren, 2.5; Red-bellied Woodpecker, 2; Blue-gray Gnatcatcher, 2; Prothonotary Warbler, 2; Yellow-throated Warbler, 2; Wood Duck, 1; Barred Owl, 1; Com. Flicker, 1; Pileated Woodpecker, 1; Rough-winged Swallow, 1; Com. Crow, 1; Brown Creeper, 1; Song Sparrow, 1; Brown-headed Cowbird, +. **Total:** 24 species; 69 territorial males or females (909/km², 368/100 acres). **Visitors:** Yellow-billed Cuckoo, Ruby-throated Hummingbird, E. Wood Pewee, Blue Jay, House Wren, Gray Catbird, Veery, N. Oriole. **Remarks:** Nests found: Starling, 10; Red-bellied Woodpecker, 2; Tufted Titmouse, Brown Creeper, Rough-winged Swallow, 1 each. Number of species (24), is the same as last year, but the total of 69 pairs is well below the 1978 total of 83 and reflects the continuing loss of summer residents: vireos, warblers, flycatchers and thrushes. In addition, Starlings have been decreasing since 1976. Carolina Wrens, owing to the cold winter of 1977, had decreased from a high of 7 in 1976 to 1 in 1977 but had gone up to 4 in 1978, dropping to 2.5 in 1979. A new arrival this year was the Rough-winged Swallow. — *J. R. GAUTHEY and JOAN H. CRISWELL (compiler), 3519 Jermantown Rd., Fairfax, Va. 22030.*

8. MIXED HARDWOOD FOREST. — **Location:** Maryland; Calvert Co., NW of Plum Point and 1 mi inland from Chesapeake Bay on Tobacco Rd between Routes 263 and 261. **Continuity:** Established 1960; 19 intermittent years. **Size:** 11.3 ha = 28 acres. **Description of Plot:** See *AFN* 13:333 (1959). **Weather:** All except 1 trip were on clear days. Maximum temperatures, 60°-80°F. The creek and low area remained wet. **Coverage:** May 5, 9, 13, 16, 27; June 5, 8, 12, 20, 27; July 3, 6-7. Total man-hours: 22. **Census:** Red-eyed Vireo, 20 (177, 71); Rufous-sided Towhee, 12 (106, 43); Com. Yellowthroat, 10 (88, 36); Wood Thrush, 9 (80, 32); Hooded Warbler, 9; Cardinal, 6 (53, 21); Tufted Titmouse, 5 (44, 18); White-eyed Vireo, 5; Kentucky Warbler, 5; Mourning Dove, 4 (35, 14); Acadian Flycatcher, 4; Carolina Wren, 4; Yellow-breasted Chat, 4; Summer Tanager, 4; Indigo Bunting, 4; Red-bellied Woodpecker, 3 (26, 11); Ovenbird, 3; Am. Woodcock, 2; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; N. Parula, 2; Pine Warbler, 2; Scarlet Tanager, 2; Red-tailed Hawk, 1; Bobwhite, 1; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Carolina Chickadee, 1; Am. Robin, 1; Blue-gray Gnatcatcher, 1; Yellow-throated Vireo, 1; Louisiana Waterthrush, 1; Am. Redstart, 1; Com. Grackle, 1; Field Sparrow, 1; Red-shouldered Hawk, +; Belted Kingfisher, +; E. Kingbird, +; Blue Jay, +; Gray Catbird, +; E. Bluebird, +; Prairie Warbler, +; Brown-headed Cowbird, +; Chipping Sparrow, +. **Total:** 46 species; 138 territorial males (1218/km², 493/100 acres). **Remarks:** The 46 species on territory made up for last year's losses. The

territorial males (138) were also a recovery from last year's all time low of 116. The 19-year average is 217. The Red-eyed Vireo repeated as the most numerous species, and equalled last year in number of territories (20). The Rufous-sided Towhee was second again and increased slightly. The Com. Yellowthroat was third and showed a marked increase from 6 to 10 territories. Other species showing marked increases were White-eyed Vireo (5 over 1), and Carolina Wren (4 over 1). The latter species was almost nonexistent the last 2 years. Also increasing over last year were Yellow-billed Cuckoo, Downy Woodpecker, Tufted Titmouse, Yellow-breasted Chat and Summer Tanager. Notable losses were Bobwhite (1 under 4) and Ovenbird (3 under 5). This is the lowest yet for the latter species. The Carolina Chickadee remained low. — *JOHN H. FALES, 2809 Ridge Road, Neeld Estate, Huntingtown, Md. 20639.*

9. MIXED UPLAND HABITAT. — **Location:** District of Columbia; the central third of Glover-Archbold Park, a narrow, long stream valley park in the NW section. **Continuity:** Established 1960; 20 consecutive years. **Size:** 14.2 ha = 35 acres. **Description of Plot:** See *AFN* 14:502-503 (1960). **Coverage:** Mar 31, Apr. 8, 14, 22, 29-30; May 6, 10, 20; June 4, 17, 25; July 4; between 0750-2050. Total man-hours: 31. **Weather:** Clear on 7 trips, cloudy on 6, rainy on 1; temperature 45-89°F, averaging 67°; wind calm on 11 trips, 5, 15, and 23 mph on the other 3. **Census:** Veery, 17 (120, 49); Cardinal, 13 (92, 37); Gray Catbird, 11 (78, 31); Carolina Chickadee, 9 (64, 26); Tufted Titmouse, 9; Blue Jay, 8 (56, 23); Red-bellied Woodpecker, 6.5 (46, 19); Carolina Wren, 4 (28, 11); Rufous-sided Towhee, 4; Downy Woodpecker, 3 (21, 9); Com. Crow, 3; White-breasted Nuthatch, 3; Wood Thrush, 3; Starling, 2; Red-eyed Vireo, 1.5; Rock Dove, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; Ovenbird, 0.5; Song Sparrow, 0.5; Screech Owl, +. **Total:** 21 species; 101 territorial males (713/km², 289/100 acres). **Visitors:** Wood Duck, Mourning Dove, Yellow-billed Cuckoo, Com. Nighthawk, Chimney Swift, Com. Flicker, House Wren, Mockingbird, Am. Robin, Blue-gray Gnatcatcher, Cedar Waxwing, Com. Yellowthroat, Am. Redstart, House Sparrow, Com. Grackle, Scarlet Tanager, House Finch. **Remarks:** Coverage was about the same as last year, but spread evenly through the peak of the breeding season. Increased observation might have found more marginal records, and changed a visitor or so into a partial or single territory, but the results are consistent with recent trends. We have had 3 unusually severe winters in a row, so species are probably at the lower levels of the area's carrying capacity for year-round residents. There has been no change in the pattern of the last 20 years in which the summer residents have declined steadily, while the year-around residents have maintained their numbers or increased, with minor variations that can be explained by changes in climate or alterations in the census areas. The only remaining warbler is the Ovenbird, which managed 0.5 of a territory this year. We began in 1959 with 8 species and 30 nesting pairs of warblers, 3 species and 125 nesting pairs of vireos (now 1 species and 15 pairs), 3 species and 18 nesting pairs of flycatchers (now none), 3 species and 25 nesting pairs

of thrushes (now 2 species and 20 pairs) The better record of the thrushes comes from the staying power of the Veeries, which with the catbirds are the only migratory species still among the more abundant birds in the tract. Some permanent residents are declining as well, the Com. Flicker dropping this year to a visitor, the Carolina Wren at its lowest in 12 years in what seems a typical reaction to a series of hard winters, the Downy Woodpecker still at about last year's low ebb, and the Starling at last year's low of 2. They started at 3 in 1959, built up to 25 in 1970, and have steadily declined since. Weather here and changing conditions in migration and wintering areas offer the most logical explanations of the changes, since the Park and its surrounding neighborhood have not been altered significantly — *SHIRLEY A. BRIGGS (compiler), OLIVE HOLBROOK, G. T. and SUSAN HUNT, 7605 Honeywell Lane, Bethesda, Md. 20014*

10. BEECH-TULIP-TREE-BASSWOOD FOREST. — **Location:** West Virginia; Wood Co., Mountwood Park; 13 mi E of Parkersburg, 1 mi S of US route 50; starts at 39°14'34"N, 81°17'38"W, Petroleum Quadrangle, USGS, and extends SE. **Continuity:** New. **Size:** 6.1 ha = 15 acres (rectangular, 110 × 660 yds, length measured, width estimated). **Description of Plot:** The dominant canopy trees are Am. Beech (*Fagus grandifolia*) and Tulip-tree (*Liriodendron tulipifera*). The understory is mostly Spicebush (*Lindera benzoin*) and saplings of the canopy trees. Prominent in the ground cover are Black Snakeroot (*Cimicifuga racemosa*), Blue Cohosh (*Caulophyllum thalictroides*) and 14 species of ferns. A quantitative vegetation survey of six 0.1 acre samples gives: Trees 3 in. dbh and over 217/acre, total basal area 114 ft²/acre. Species comprising 90% of the total number of trees: Am Beech, 40, 18, 30, 100; Tulip-tree, 33, 15, 20, 100, White Basswood (*Tilia heterophylla*), 22, 12, 11, 67; Red Elm (*Ulmus rubra*), 20, 9, 9, 50, White Oak (*Quercus alba*), 12, 5, 3, 50; hickory (*Carya*, sp.), 10, 5, 6, 33; Sugar Maple (*Acer saccharum*), 8, 4, 4, 50; Red Maple (*A. rubrum*), 10, 5, 2, 67; White Ash (*Fraxinus americana*), 15, 7, 1, 67; Am. Hornbeam (*Carpinus caroliniana*), 8, 4, 1, 50; dead trees, 13, 6, 5, 67. Trees by diameter size class: A (3-6 in.) 107, 49, 11, 9; B (6-9 in.) 53, 25, 16, 14; C (9-15 in.) 35, 16, 28, 25; D (15-21 in.) 12, 5, 21, 19, E (21-27 in.) 8, 4, 26, 23; G (33-40 in.) 2, 1, 12, 10 Shrub stems/acre 2640; ground cover 55%, canopy cover 76%; average canopy height 74 ft (range 61-87). **Edge:** Similar vegetation on all sides. **Topography:** The centerline follows a small stream, elevation 810-900 ft. The plot is level for about 30 ft on each side of the stream, then slopes up about 15'. **Weather:** Fair, except for 2 trips made in a drizzle. **Coverage:** May 18-22; 12 trips between 0535 and 0800 and 2 in late evening. Total party-hours: 10. **Census:** Acadian Flycatcher, 8 (132, 53); Red-eyed Vireo, 4 (66, 27); Ovenbird, 4, Am. Redstart, 4; Wood Thrush, 2; Blue-gray Gnatcatcher, 2; Worm-eating Warbler, 2, Louisiana Waterthrush, 2; Pileated Woodpecker, 1; Kentucky Warbler, 1; Scarlet Tanager, 1; Indigo Bunting, 1; Carolina Chickadee, +; Tufted Titmouse, +; Cerulean Warbler, +; Hooded Warbler, +. **Total:** 16 species, 32 territorial males (527/km², 213/100 acres). **Visitors:** Yellow-billed Cuckoo,

Whip-poor-will, E Wood Pewee, Blue Jay, Com Crow, Am Robin, Yellow-throated Vireo. **Remarks:** Nests found. Louisiana Waterthrush (1), Acadian Flycatcher (1). The many overhanging saplings along the stream made excellent nesting habitat for Acadian Flycatchers. The Indigo Bunting occurred in the only opening on the plot and was present on all trips. Turkey Vultures and Chimney Swifts were seen above the plot but were not considered to have nesting territories. — *NEVADA LAITSCH and GEORGE KOCH (compilers), KEN ANDERSON, DOROTHY BROEMERSON, MARY FORD, GEORGE HURLEY, ANN PYLE, BILL SMITH, Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.*

11. HEMLOCK - BLACK CHERRY - BIRCH FOREST. — **Location:** West Virginia; Preston Co.; 2 mi S from Terra Alta; 39°24'44"N, 79°32'22"W, Terra Alta Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Wooded ravine with small stream and steep hillsides. The dominant canopy trees are Hemlock (*Tsuga canadensis*), and Black Cherry (*Prunus serotina*). Most prominent in the understory are *Rhododendron maximum* and Striped Maple (*Acer pensylvanicum*). The ground cover is primarily Wood Fern (*Dryopteris intermedia*) and Wood Sorrel (*Oxalis montani*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 224/acre; total basal area 129 ft²/acre. Species comprising 92% of the total number of trees (numbers following each species are number/acre, % density, % dominance, and % frequency, in that order): Hemlock, 62, 28, 38, 83; Black Cherry, 33, 13, 19, 100; Yellow Birch (*Betula alleghaniensis*), 38, 17, 13, 83; dead trees, 23, 12, 3, 100; Red Maple (*A. rubrum*), 25, 11, 16, 83; Am. Beech (*Fagus grandifolia*), 20, 9, 5, 33. Trees by diameter size class (following each class are number/acre, % density, basal area in sq ft/acre, % dominance): A (3-6 in.) 20, 31, 7, 5.4; B (6-9 in.) 90, 40, 27, 21; C (9-15 in.) 42, 19, 34, 26; D (15-21 in.) 15, 7, 18, 14; E (21-27 in.) 3, 1, 26, 20; F (27-33 in.) 3, 1, 16, 13. Shrub stems/acre 4325; ground cover 48%; canopy cover 86%; average canopy height 66 ft (range 58-74). **Edge:** Forest continues in all directions except some variation between E and W sides. **Topography:** Extends E to SE from 2590 to 2540 ft; a wooded ravine with small stream and steep hillside on S side. **Elevation:** 2560 ft. **Weather:** Clear and cool. **Coverage:** June 6, 10-13; between dawn and 0730 and 2 mid-morning trips. **Census:** Red-eyed Vireo, 4 (66, 27); Black-throated Blue Warbler, 4; Black-throated Green Warbler, 3 (49, 20); Acadian Flycatcher, 2; Solitary Vireo, 2; Canada Warbler, 2; Wood Thrush, 1; Magnolia Warbler, 1; Louisiana Waterthrush, 1; Hooded Warbler, 1; Scarlet Tanager, 1; Rufous-sided Towhee, 1; E. Wood Pewee, +; Great Crested Flycatcher, +; Blue-gray Gnatcatcher, +; Am. Robin, +; Ovenbird, +; Brown-headed Cowbird, +. **Total:** 18 species; 23 territorial males (379/km², 153/100 acres). **Visitors:** Downy Woodpecker, Blue Jay, Com. Crow, Rose-breasted Grosbeak, Am. Goldfinch. **Remarks:** Active nests of Black-throated Blue Warbler, Solitary Vireo, and Wood Thrush were found.

Census participants and visitors: George Hall, Jack Werner, George Hurley, Anne Pyle, Seal Brooks, Glen Phillips, Dorothy Conrad, Josephine Wood, Anna Llewellyn, Hester Werner. Assistance on the Vegetation Survey given by Glen Phillips, Robert Richardson, Elsa Thompson, Robert Weaver, Peter Harrison, Frances Garbart. Topographic data furnished by George Koch. — *PETER HARRISON, E. R. and E. D. CHANDLER, 707 Warwood Ave., Wheeling, W. Va. 26003.*

12. MAPLE-CHERRY-BIRCH FOREST. — **Location:** West Virginia; Preston Co.; 2 mi SW of Terra Alta; 39°25'30"N, 79°34'42"W, Terra Alta Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Cove hardwoods that extend up Irish Run from 1925 to 1980 ft elevation. The dominant canopy trees are Sugar Maple (*Acer saccharum*), Black Cherry (*Prunus serotina*) and Yellow Birch (*Betula lutea*). Most prominent in the understory are Am. Beech (*Fagus grandifolia*) and Sugar Maple. The ground cover is primarily May-apple (*Podophyllum peltatum*) and New York Fern (*Dryopteris noveboracensis*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 277/acre; total basal area 92 ft²/acre. Species comprising 93% of the total number of trees: Sugar Maple, 55, 20, 12, 83; Black Cherry, 20, 7, 11, 83; Yellow Birch, 32, 12, 11, 67; Basswood (*Tilia americana*), 20, 7, 10, 50; Hemlock (*Tsuga canadensis*), 20, 7, 9, 33; Red Maple (*A. rubrum*), 20, 7, 8, 50; Red Oak (*Quercus rubra*), 15, 5, 7, 67; Am. Beech, 8, 3, 6, 17; White Oak (*Q. alba*), 7, 3, 6, 50; Am Hornbeam (*Carpinus caroliniana*), 28, 10, 4, 67; Black Birch (*Betula lenta*), 7, 3, 4, 50; dead trees, 18, 7, 4, 83. Trees by diameter size class: A (3-6 in.) 140, 51, 14, 15; B (6-9 in.) 77, 28, 24, 26; C (9-15 in.) 53, 19, 43, 47; D (15-21 in.) 7, 2, 12, 13. Shrub stems/acre 4658; ground cover 39%; canopy cover 86%; average canopy height 70 ft (range 52-81). **Edge:** Bounded on all sides by similar habitat. **Topography:** Ravine with steep slopes lying in a NE-SW direction. **Elevation:** 1925-1980 ft. **Weather:** 0.8 in. rainfall during study. **Coverage:** June 2-7; 16 trips between dawn and 0811 hours or 0955-1115 hours. Total party-hours: 9. **Census:** Red-eyed Vireo, 9 (148, 60); Black-and-white Warbler, 2; Black-throated Green Warbler, 2; Louisiana Waterthrush, 2; Ovenbird, 1.5; Acadian Flycatcher, 1; Hooded Warbler, 0.5; Scarlet Tanager, 0.5; Indigo Bunting, 0.5; Ruffed Grouse, +; Belted Kingfisher, +; Great Crested Flycatcher, +; Blue Jay, +; Com. Crow, +; Black-capped Chickadee, +; Tufted Titmouse, +; Wood Thrush, +; Blue-gray Gnatcatcher, +; Com. Yellowthroat, +; Brown-headed Cowbird, +. **Total:** 20 species; 19 territorial males (313/km², 127/100 acres). **Visitors:** E. Wood Pewee, Gray Catbird, Cedar Waxwing, N. Parula, Cardinal, Am. Goldfinch, Rufous-sided Towhee. **Remarks:** One Louisiana Waterthrush nest found. — *GREG EDDY, LORRAINE HARPER, ESTHER REICHELDERFER, ELLEN SNYDER, JIM WEIMER, LAURA LEE, VIRGINIA JOHNSON, SUE ULRICH, ELLEN THOMAS, MAXINE THACKER, RALPH BELL, SUE WEIMER, and KATHY*

13. MAPLE - TULIP-TREE - RED OAK FOREST. — **Location:** West Virginia; Preston Co.; 6 mi NNW of Terra Alta; the centerline starts at 39° 31' 31" N, 79° 34' 22" W, Cuzzart Quadrangle, USGS, and extends W. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Selectively logged about 1965, leaving brushy openings between some of the trees, making a varied habitat. The dominant canopy trees are Sugar Maple (*Acer saccharum*) and Tulip-tree (*Liriodendron tulipifera*). Most prominent in the understory are Black Cherry (*Prunus serotina*) and Striped Maple (*A. pennsylvanicum*). The ground cover is primarily fern (*Osmunda claytoniana*) and Jewelweed (*Impatiens pallida*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 121/acre; total basal area 76 ft²/acre. Species comprising 90% of the total number of trees: Sugar Maple, 80, 41, 26, 100; Tulip-tree, 3.3, 1.7, 14.8, 17; Red Maple (*A. rubrum*), 36, 19, 14.6, 83; Red Oak (*Quercus rubra*), 13.4, 6.9, 11.4, 83; Basswood (*Tilia americana*), 11.7, 6, 7.9, 50; Black Cherry, 5, 2.6, 6.4, 17; Hickory (*Carya* sp.), 10, 5.2, 4.2, 67. Trees by diameter size class: A (3-6 in.) 87, 45, 9, 11; B (6-9 in.) 78, 37, 21, 38; C (9-15 in.) 75, 13, 20, 26; D (15-21 in.) 7, 3, 12, 16; E (21-27 in.) 2, 0.1, 5, 6.8; F (27-33 in.) 2, 0.1, 8, 11. Shrub stems/acre 7367; ground cover 61%; canopy cover 82%; average canopy height 74 ft (range 52-96). **Edge:** Bordered on all sides by similar habitat. **Topography:** A steep (21°) N-facing slope on the shoulder of Briery Mountain, the centerline follows the contour, varying from 2100-2160 ft. **Weather:** Warm with light morning fog. **Coverage:** June 1-6; between dawn and 0700 hours or 1900-2100 hours. Total party-hours: 8. **Census:** Red-eyed Vireo, 7 (115, 47); Indigo Bunting, 6 (99, 40); Chestnut-sided Warbler, 4 (66, 27); Hooded Warbler, 4; Am. Redstart, 4; Black-throated Green Warbler, 3 (49, 20); Black-throated Blue Warbler, 2; Acadian Flycatcher, 1.5; E. Wood Pewee, 1; Black-and-white Warbler, 1; N. Parula, 1; Magnolia Warbler, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Rufous-sided Towhee, 1; Wood Thrush, 0.5; Louisiana Waterthrush, 0.5; Kentucky Warbler, 0.5; Am. Crow, +; Brown-headed Cowbird, +. **Total:** 20 species; 40 territorial males (659/km², 267/100 acres). **Visitors:** Green Heron, Black-capped Chickadee, Canada Warbler, Blackburnian Warbler and Am. Goldfinch. **Remarks:** The Blackburnian and Canada Warblers are possible migrants, although a Canada Warbler nest was found within 20 mi and others have been found in other years. — K. BUSH, C. CONRAD, E. HUTTON, N. LAITSCH, C. REEVES, C. RUDDLE, B. SMITH (compiler), and S. and J. WEIMER, 707 Warwood Ave., Wheeling, W. Va. 26003.

14. OAK - BEECH - TULIP-TREE FOREST. — **Location:** West Virginia; Wood Co.; Mountwood Park; 13 mi E of Parkersburg, 1 mi S of route US 50; starts at 39° 14' 45" N, 81° 16' 55" W, Petroleum Quadrangle, USGS, and extends NE. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, length

measured, width estimated) **Description of Plot:** The dominant canopy trees are oaks (*Quercus* sp.), Am. Beech (*Fagus grandifolia*), and Tulip-tree (*Liriodendron tulipifera*). Most prominent in the understory are Maple-leaved Viburnum (*Viburnum acerifolium*), Flowering Dogwood (*Cornus florida*), and seedlings of canopy trees. The ground cover is primarily Christmas Fern (*Polystichum acrostichoides*) and New York Fern (*Dryopteris noveboracensis*). A quantitative vegetation survey of six 0.1 acre samples gives: Trees 3 in. dbh and over 207/acre; total basal area 156 ft²/acre. Species comprising 90% of the total number of trees: White Oak (*Q. alba*), 28, 14, 15, 83; Red Oak (*Q. rubra*), 12, 6, 12, 67; Chestnut Oak (*Q. prinus*), 8, 4, 5, 33; Am. Beech, 47, 23, 24, 100; Tulip-tree, 18, 9, 24, 83; Red Maple (*Acer rubrum*), 47, 23, 12, 83; Hickory (*Carya* sp.), 7, 3, 2, 33; dead trees, 17, 8, 1, 67. Trees by diameter size class: A (3-6 in.) 72, 35, 7, 5; B (6-9 in.) 72, 35, 22, 14; C (9-15 in.) 32, 15, 25, 16; D (15-21 in.) 12, 6, 21, 13; E (21-27 in.) 13, 6, 41, 26; F (27-33 in.) 3, 2, 16, 10; G (33-40 in.) 3, 2, 24, 15. Shrub stems per acre 2600; ground cover 23%; canopy cover 87%; average canopy height 85 ft (range 67-108). **Edge:** Similar habitat on all sides. **Topography:** The centerline is a path following the upper reaches of Mudlick Run from elevation 890-975 ft. The sides of the plot are often as much as 50 ft higher than the stream. **Weather:** Clear and cool except for light rain 1 morning. **Coverage:** May 18-21; 12 trips between dawn and 0900, 2 in late morning and 2 in evening. Total party-hours: 14. **Census:** Acadian Flycatcher, 8 (132, 53); Am. Redstart, 8; Red-eyed Vireo, 6 (99, 40); Cerulean Warbler, 4 (66, 27); Wood Thrush, 3 (49, 20); Worm-eating Warbler, 3; Scarlet Tanager, 3; Blue-gray Gnatcatcher, 2; Louisiana Waterthrush, 2; Ovenbird, 1; Kentucky Warbler, 1; Hooded Warbler, 1; Summer Tanager, 1; Yellow-billed Cuckoo, +; Carolina Chickadee, +; Tufted Titmouse, +; White-breasted Nuthatch, +. **Total:** 17 species; 43 territorial males (708/km², 287/100 acres). **Visitors:** Red-tailed Hawk, Red-shouldered Hawk, Pileated Woodpecker, Com. Crow, Brown-headed Cowbird. **Remarks:** Nests found: Acadian Flycatcher (2), Louisiana Waterthrush (1). — E. R. and ELIZABETH D. CHANDLER (compilers) with others from Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.

15. OAK FOREST. — **Location:** West Virginia; Preston Co.; Camp Galilee; 1.5 mi NE from Terra Alta; starts at 39° 27' 41" N, 79° 31' 33" W, Terra Alta Quadrangle, USGS, and extends SE. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, length measured, width estimated). **Description of Plot:** An oak forest undisturbed for about 40 years. More than half of the canopy is in the Red Oak group and apparently many trees are hybrids of Scarlet and Pin Oak as well as Red and possibly Black Oak, combined under Red Oak (*Quercus rubra*) and Scarlet Oak (*Q. coccinea*). The White Oaks (*Q. alba*) and Chestnut Oaks (*Q. prinus*) seemed true to species. Prominent in the understory are Black Cherry (*Prunus serotina*), *Viburnum dentata*, and seedlings of the canopy species. The ground cover is primarily ferns, mostly Hay-scented Fern (*Dennstaedtia punctilobula*) and Bracken (*Pteridium aquilinum*). There are also a number of weak Blackberry (*Rubus*,

sp.) canes and some Whorled Loosestripe (*Lysimachia quadrifolia*). A quantitative vegetation survey of six 0.1 acre samples gives: Trees 3 in. dbh and over 330/acre; total basal area 186 ft²/acre. Species comprising 90% of the total number of trees: Red Oak, 55, 17, 41, 100; Scarlet Oak, 35, 11, 17, 50; White Oak, 65, 20, 13, 100; Chestnut Oak, 17, 5, 5, 33; Red Maple (*Acer rubrum*), 33, 10, 7, 83; dead trees, 93, 28, 14, 100. Trees by diameter size class: A (3-6 in.) 126, 38, 13, 7; B (6-9 in.) 75, 23, 23, 12; C (9-15 in.) 92, 28, 73, 39; D (15-21 in.) 28, 9, 51, 27; E (21-27 in.) 3, 1, 10, 6; F (27-33 in.) 3, 1, 16, 9. Shrub stems/acre 6740, ground cover 39%; canopy cover 76%; average canopy height 76 ft (range 57-92). **Edge:** Forest continues in all directions. **Topography:** Centerline about level on a gently sloping hillside with SW exposure. Fall across plot down to right 10 ft at start, increasing to 80 ft at end. **Weather:** Clear and cool with some light morning fog. **Coverage:** June 3-7; 16 trips 0545-0745 and 1800-2000. Total party-hours 14. **Census:** Red-eyed Vireo, 6 (99, 40); Brown Creeper, 2; Veery, 2; Ovenbird, 2; Great Crested Flycatcher, 1; E. Wood Pewee, 1; Black-and-white Warbler, 1; Hooded Warbler, 1; Scarlet Tanager, 0.5; Cardinal, 0.5; Hairy Woodpecker, +; Blue Jay, +; Com. Crow, +. **Total:** 13 species; 17 territorial males (280/km², 113/100 acres). **Visitors:** Downy Woodpecker, Black-capped Chickadee, Tufted Titmouse, Cerulean Warbler, Brown-headed Cowbird, Am. Goldfinch, Rufous-sided Towhee. **Remarks:** Most of the territories of birds censused were well defined. At least one Brown Creeper was seen or heard on each trip and contemporary singing was noted on 5 trips. I am indebted to George Koch and Glen Phillips for locating and measuring the plot, stringing the centerline, and making the vegetation survey — NEVADA LAITSCH (compiler), SUE WEIMER and others of the Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003

16. RED OAK FOREST. — **Location:** West Virginia; Wood Co.; Mountwood Park, 13 mi E of Parkersburg, 1 mi S of Rt. 50, 39° 14' 12" N, 81° 17' 48" W, Petroleum Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** An oak-hickory woods on a SW-facing hillside. The dominant canopy trees are Red Oak (*Quercus rubra*) and White Oak (*Q. alba*). Most prominent in the understory are Greenbrier (*Smilax*, sp.) and Dogwood (*Cornus florida*). The ground cover is primarily Bedstraw (*Galium*, sp.) and Anise (*Osmorhiza longistylis*). A quantitative survey of the vegetation gave the following results: Trees 3-in. and over, based on 6 circular 0.1 acre samples, 222/acre; total basal area 146 ft²/acre. Species comprising 91% of the total number of trees: Red Oak, 23, 10, 37, 100; White Oak, 27, 12, 19, 100; Chestnut Oak (*Q. montana*), 17, 8, 9, 33; dead trees, 32, 15, 5, 100; Red Elm (*Ulmus rubra*), 25, 11, 5, 17; Scarlet Oak (*Q. coccinea*), 2, 1, 3, 33; Shagbark Hickory (*Carya ovata*), 7, 3, 3, 33. Trees by diameter size class: A (3-6 in.) 102, 46, 8, 5.5; B (6-9 in.) 40, 18, 12, 8; C (9-15 in.) 38, 17, 29, 20; D (15-21 in.) 30, 14, 58, 40; E (21-27 in.) 10, 4, 31, 21; F (27-33 in.) 2, 1, 8, 5.5. Shrub stems/acre 7375; ground cover 50%; canopy cover 93%; average canopy height 98 ft (range

81-123) **Edge:** Surrounded on all sides by similar cover. **Elevation:** 1050 ft. **Coverage:** May 18-22, 14 trips between dawn and 0815, EDT, or 1815-2100 hours. Total party-hours: 12.6. **Census:** Red-eyed Vireo, 4 (66, 27); Wood Thrush, 3 (49, 20); Yellow-throated Vireo, 3; Cerulean Warbler, 3; Ovenbird, 3; Hooded Warbler, 3; E. Wood Pewee, 2; Acadian Flycatcher, 1.5; Scarlet Tanager, 1.5; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Worm-eating Warbler, 1; Kentucky Warbler, 1; Am. Redstart, 1; Summer Tanager, 0.5; Yellow-billed Cuckoo, +; Black-billed Cuckoo, +; Pileated Woodpecker, +; Hairy Woodpecker, +; Brown-headed Cowbird, +. **Total:** 20 species; 29.5 territorial males (486/km², 197/100 acres). **Visitors:** Red-bellied Woodpecker, Black-throated Green Warbler, Canada Warbler and Rose-breasted Grosbeak. **Remarks:** Nests found: Wood Thrush (2) and Hooded Warbler (1). This excellent example of oak-hickory woodlands is scheduled for cutting as development of the park progresses. — **KENNETH ANDERSON, BRENT BAILLEY, DOROTHY BROEMSEN, E. R. CHANDLER, MARY FORD, EDNA GREGG, GEORGE HURLEY, TOM HURLEY, GEORGE KOCH, ANN PYLE and GLEN PHILLIPS (compiler), 707 Warwood Ave., Wheeling, W. Va. 26003.**

17. 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 1979. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AB 33 61-62 (1979). **Coverage:** Apr. 28; May 3, 12, 19, 24, 27; June 2, 14, 16; 0530-0900. Total man-hours: 36.5. **Census:** Prothonotary Warbler, 10 (99, 40); Great Crested Flycatcher, 7 (69, 28); Ovenbird, 7; Wood Thrush, 6 (59, 24); Hooded Warbler, 6; Louisiana Waterthrush, 5 (49, 20); Com. Yellowthroat, 5; E. Wood Pewee, 4 (40, 16); Carolina Wren, 4; Red-eyed Vireo, 4; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; Carolina Chickadee, 1, Com. Flicker, +; Pileated Woodpecker, +; Hairy Woodpecker, +. **Total:** 16 species; 63 territorial males or females (623/km², 252/100 acres). **Visitors:** Blue Jay, N. Parula, Blackpoll Warbler, Brown-headed Cowbird. **Remarks:** The swamp received thunderstorms late in the evening throughout 60% of the census period. Weather was warm and humid with an average temperature of 70°F. Rainfall for May and June was just short of 4 inches, nearly twice that of last year. — **TOM GWYNN and DON SCHWAB, RD 1, Box 147, Basking Ridge, N.J. 07920**

18. UPLAND OAK-HICKORY FOREST. — **Location:** Virginia; Fairfax Co., Dranesville District Park, McLean, along Route 193 (Old Georgetown Pike), approximately 3/4 mi W of Exit 13, Capital Beltway (Interstate 495); 38°57'N, 77°12'W, Falls Church Quadrangle, USGS. **Continuity:** Established 1973; 7 consecutive years. **Size:** 11 ha = 27.2 acres. **Description of Plot:** See AB 25 636 (1971). A partial clearing on the tract has now largely closed in, and the few Virginia Pines (*Pinus virginiana*) at the E end are dying off, enhancing the uniformity of the tract. **Weather:** Generally clear with moderate temperature and no unusual features; some rain

on 3 trips. Temperatures, 32-76° **Coverage:** Mar 31, Apr 7-9, 12, 15, 17, 19, 21-24, 26, 28-29; May 2, 5-8, 13, 16, 18-19, 25, 30; June 2, 5, 9-10; July 1, 5, 8, 14; August 1; between 0530-1215 or 1345-1755, EDT. Total party-hours: 71. **Census:** Red-eyed Vireo, 16.5 (150, 61); Brown-headed Cowbird, 12 (109, 44); Cardinal, 9 (82, 33); Carolina Chickadee, 8 (73, 29); Wood Thrush, 6.5 (59, 24); Scarlet Tanager, 5 (45, 18); E. Wood Pewee, 4.5 (41, 17); Red-bellied Woodpecker, 4 (36, 15); Great Crested Flycatcher, 4; Tufted Titmouse, 3.5 (32, 13); Downy Woodpecker, 3 (27, 11); Blue Jay, 3; Acadian Flycatcher, 2.5; Mourning Dove, 2; White-breasted Nuthatch, 2; Brown Creeper, 2; Pileated Woodpecker, 1.5; Worm-eating Warbler, 1.5; Wood Duck, 1; Com. Flicker, 1; Ovenbird, 1; Louisiana Waterthrush, 0.5. **Total:** 22 species; 94 territorial males (854/km², 346/100 acres). **Visitors:** Black Vulture, Red-shouldered Hawk, Broad-winged Hawk, Com. Gallinule, Yellow-billed Cuckoo, Great Horned Owl, Hairy Woodpecker, Com. Crow, Am. Robin, E. Bluebird, Blue-gray Gnatcatcher, Yellow-throated Vireo, Black-and-white Warbler, N. Parula, Kentucky Warbler, Am. Redstart, Com. Grackle, Summer Tanager, Am. Goldfinch, Rufous-sided Towhee. Nests found: Blue Jay 3, Wood Duck 1, Red-bellied Woodpecker 1, Acadian Flycatcher 1, Carolina Chickadee 1, Ovenbird 1. **Remarks:** The cowbird figure is the highest on record. Whether by coincidence or not, the Cardinal, Worm-eating Warbler, and Ovenbird, species that nest on or near the ground, have increased noticeably since the Carolina Wren disappeared from the tract after the severe winter of 1977. — **MARY BAYLESS, LOUIS CRAIG, GILBERT ESPENSHADE, JESSICA GIUSTI, KENNETH and JAYNE MACLEAN, BILL PER-LEE, MARK STRONG, ROBERT J. WATSON (compiler), 2636 Marcey Road, Arlington, Va. 22207.**

19. UPLAND TULIP-TREE - OAK FOREST. — **Location:** Virginia; Fairfax Co., U.S. Geological Survey National Center, Reston; 38°56'45"N, 77°21'50"W, Vienna Quadrangle, USGS. **Continuity:** Established 1974; 6 consecutive years. **Size:** 20.6 ha = 50.9 acres. **Description of Plot:** See AB 28:701-2, 1003-4 (1974). This spring, a 45-ft-wide sewer line was built along approximately 500 ft of the NE boundary, eliminating ca 0.2 acre of woodland from the plot. In addition, 400 ft NE of the plot, about 30 acres of forest was cleared. **Weather:** Temperatures in April, June, and July were below normal, while March and May were above. Precipitation was above normal in March and May and below in April, June, and July. **Coverage:** Apr. 29; May 16, 18, 30; June 10, 19, 29; July 2. Total man-hours: 11.2. **Census:** Wood Thrush, 6 (29, 12); Blue Jay, 5 (24, 10); E. Wood Pewee, 4 (19, 8); Tufted Titmouse, 4; Carolina Chickadee, 3 (15, 6); Am. Robin, 3; Cardinal, 3; Rufous-sided Towhee, 3; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; White-breasted Nuthatch, 2; Brown-headed Cowbird, 2; Scarlet Tanager, 2; Com. Flicker, 1; Hairy Woodpecker, 1; Com. Crow, 1; Starling, 1; Red-eyed Vireo, 1; Ovenbird, 1. **Total:** 19 species; 47 territorial males (228/km², 92/100 acres). **Remarks:** Nests found: Hairy Woodpecker, 1; Starling, 1; Cardinal, 1. — **JOAN C. and PAUL W.**

WOODWARD, 4117 Virginia St Fairfax, Va 22030

20. 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; 3 consecutive years. **Size:** 13 ha = 32.1 acres. **Description of Plot:** See AB 32:63 (1978). **Coverage:** Eight visits between Apr. 23 and June 3; between dawn and 0900 hours. Total party-hours: 19. **Census:** Red-eyed Vireo, 16.5 (127, 51); Acadian Flycatcher, 6 (46, 19); Tufted Titmouse, 5.5 (42, 17); Blue-gray Gnatcatcher, 5 (38, 16); Carolina Wren, 3.5 (27, 11); Wood Thrush, 3.5; Yellow-billed Cuckoo, 3 (23, 9); Red-bellied Woodpecker, 3; Carolina Chickadee, 3; Cardinal, 3; Ruby-throated Hummingbird, 2; Kentucky Warbler, 2; Hooded Warbler, 2; Downy Woodpecker, 1.5; Com. Flicker, 1; Hairy Woodpecker, 1; Scarlet Tanager, 1; Barred Owl, +, Blue Jay, +; Com. Crow, +. **Total:** 20 species, 62.5 territorial males (481/km², 195/100 acres). **Visitors:** Wood Duck, Pileated Woodpecker, Yellow-throated Vireo, N. Parula, Ovenbird, Com. Grackle, Indigo Bunting. **Remarks:** Nests found: Hairy Woodpecker and Tufted Titmouse. Newly fledged Barred Owls were seen, and the owls almost certainly nested on the plot. Populations are low for the second consecutive year. The most marked changes since last year are the return of Hooded Warblers and a 45% reduction in Acadian Flycatchers. Most species seemed to sing less frequently this year. — **C. CHRISTENSEN, C. DAL MOLIN, S. HALL (co-compiler), D. KENNEDY, J. KIMBALL, B. LORD, C. M. LAUGHLIN, H. MUELLER (co-compiler), Dept. of Zoology, Univ. of North Carolina, Chapel Hill, N.C. 27514.**

21. 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, 4 consecutive years. **Size:** 12.55 ha = 31 acres. **Description of Plot:** See AB 31:41 (1977). **Coverage:** Eight visits between Apr. 23 and June 5. Total party-hours: 23. **Census:** Red-eyed Vireo, 13 (104, 42); Wood Thrush, 11 (88, 35); Tufted Titmouse, 7 (56, 23); Acadian Flycatcher, 5 (40, 16); Blue-gray Gnatcatcher, 5; Carolina Chickadee, 4 (32, 13); Red-bellied Woodpecker, 3 (24, 10); Carolina Wren, 3; Cardinal, 3; Scarlet Tanager, 2.5; Summer Tanager, 2.5; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; Ovenbird, 2; Pine Warbler, 1.5; Kentucky Warbler, 1.5; Mourning Dove, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Yellow-throated Vireo, 1; Barred Owl, +; Pileated Woodpecker, +, Com. Crow, +; Yellow-throated Warbler, +, Brown-headed Cowbird, +. **Total:** 26 species, 73 territorial males (582/km², 235/100 acres). **Visitors:** Bobwhite, Am. Woodcock, Com Flicker, Purple Martin, White-breasted Nuthatch, Black-and-white Warbler, Hooded Warbler. **Remarks:** A Red-bellied Woodpecker nest was found. Individual pairs of Blue Jays and Carolina Wrens were seen with recently fledged young. Total population is about the same as in previous years. Acadian

Flycatcher, Wood Thrush and Red-eyed Vireo show the greatest increase since last year, no species showed a dramatic decline. The increase in Acadian Flycatchers is curious because populations of the species decreased markedly on our floodplain forest census area only a few hundred meters away. — M. CROTTEAU, S. HALL (co-compiler), K. MEYER, H. MUELLER (co-compiler), B. SIMPSON, H. WILEY, Dept. of Zoology, Univ. of North Carolina, Chapel Hill, N.C. 27514.

22. HARDWOOD SWAMP FOREST

(Logged from 1962-67). **Location:** South Carolina; in Dorchester and Berkeley Cos., National Audubon Society's Francis Beidler Forest, 6.5 mi E of Harleyville, 33°00'N, 80°15'W, Ridgeville Quadrangle, USGS. **Continuity:** New. **Size:** 8.1 ha = 20 acres (875 × 1000 ft, steel tape and compass). **Description of Plot:** Laurel Oak (*Quercus laurifolia*) and White Ash (*Fraxinus americana*) that were not logged form a sparse canopy. There is a dense understory containing young Laurel Oak, White Ash and Black Willow (*Salix nigra*). Flooding precludes ground cover except for dense stands of Dwarf Palmetto (*Sabal minor*) covering about 25% of the plot. A quantitative survey of the vegetation gave the following: Trees 3-in. diameter and over, based on 5 circular 0.1 acre samples, 300/acre; total basal area 128 ft²/acre. Species comprising 98% of the total number of trees: Laurel Oak, 106, 35, 44, 80; Black Willow, 32, 11, 3, 60; Red Maple (*Acer rubrum*), 18, 6, 5, 100; Sweet Gum (*Liquidambar styraciflua*), 20, 7, 13, 80; White Ash, 80, 27, 20, 80; Am. Elm (*Ulmus americana*), 8, 3, 2, 60; Bald Cypress (*Taxodium distichum*), 12, 4, 5, 80; Swamp Black Gum (*Nyssa sylvatica* var. *biflora*), 14, 5, 4, 40. Trees by diameter size class: A (3-6 in.) 178, 59, 17.8, 14; B (6-9 in.) 28, 9, 8.4, 7; C (9-15 in.) 70, 23, 56, 44; D (15-21 in.) 22, 7, 39.6, 31; E (21-27 in.) 2, 1, 6.2, 5. Shrub stems/acre 35,900; ground cover 0%, but Dwarf Palmetto (which has both stem and ground cover qualities) covers (1 plant/m² × 1 m high) the drier sites of the swamp forest (25%); canopy cover 69%; average canopy height 112 ft (range 95-125 ft). **Edge:** Bordered on all sides by similar forest. **Topography:** Essentially flat but small changes in elevation (1-2 ft) determine period of inundation. **Elevation:** 50 ft. **Weather:** Warm and mild throughout period. **Coverage:** Apr. 27, 29-30; May 14, 18, 26, 29; June 18; between dawn and 1000 or 1700 to dusk. Total man-hours: 40. **Census:** White-eyed Vireo, 17 (210, 85), Blue-gray Gnatcatcher, 16 (198, 80); N. Parula, 15 (185, 75); Hooded Warbler, 9 (111, 45); Tufted Titmouse, 7.5 (93, 48); Red-eyed Vireo, 6 (74, 30); Swainson's Warbler, 6; Cardinal, 6; Carolina Wren, 5 (62, 25); Prothonotary Warbler, 5; Yellow-billed Cuckoo, 4 (49, 20); Acadian Flycatcher, 4; Wood Thrush, 4; Carolina Chickadee, 3 (38, 15); Red-bellied Woodpecker, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Chimney Swift, 1; Pileated Woodpecker, 1; Great Crested Flycatcher, 1; White-breasted Nuthatch, 1; Brown Thrasher, 1; Rufous-sided Towhee, 1; Gray Catbird, 0.5; Barred Owl, +; Downy Woodpecker, +; Com. Crow, +; Fish Crow, +; Com. Grackle, +. **Total:** 29 species; 120 territorial males (1483/km², 600/100 acres). **Visitors:** Yellow-crowned Night Heron and White Ibis. **Remarks:** For a discussion of

this plot and its virgin counterpart see Census 23 — STEPHEN G. WINTON, Route 1, Box 114, Harleyville, S.C. 29448.

23. VIRGIN HARDWOOD SWAMP FOREST.

— **Location:** South Carolina; in Dorchester and Berkeley Cos., National Audubon Society's Francis Beidler Forest, 6.5 mi E of Harleyville, 33°00'N, 80°15'W, Ridgeville Quadrangle, USGS. **Continuity:** New. **Size:** 8.9 ha = 22 acres (800 × 1200 ft, steel tape and compass). **Description of Plot:** Dense canopy with trees averaging 122 ft in height. Dominant are Sweetgum (*Liquidambar styraciflua*), Laurel Oak (*Quercus laurifolia*), Overcup Oak (*Q. lyrata*), White Ash (*Fraxinus americana*), and Bald Cypress (*Taxodium distichum*). Most prominent in the understory are Red Maple (*Acer rubrum*), Swamp Black Gum (*Nyssa sylvatica* var. *biflora*), Tupelo Gum (*N. aquatica*), Am. Elm (*Ulmus americana*), and Ironwood (*Carpinus caroliniana*). Flooding precludes ground cover except for dense stands of Dwarf Palmetto (*Sabal minor*) covering about 40% of the plot. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 5 circular 0.1 acre samples, 344/acre; total basal area 304.2 ft²/acre. Species comprising 94% of the total number of trees: Swamp Black Gum, 42, 12, 9, 80; Red Maple, 46, 13, 6, 100; White Ash, 70, 21, 9, 100; Bald Cypress, 34, 10, 15, 80; Laurel Oak, 22, 6, 8, 80; Overcup Oak, 20, 6, 28, 60; Ironwood, 32, 9, 2, 40; Tupelo Gum, 18, 5, 10, 60; Sweet Gum, 6, 2, 7, 60; Water Ash (*F. caroliniana*), 12, 4, 1, 20; Water Elm (*Planera aquatica*), 8, 2, 1, 40; Am. Elm, 14, 4, 2, 60. Trees by diameter size class: A (3-6 in.) 152, 44, 15.2, 5; B (6-9 in.) 88, 26, 26.4, 9; C (9-15 in.) 50, 15, 40, 13; D (15-21 in.) 20, 6, 36, 12; E (21-27 in.) 12, 3, 37.2, 12; F (27-33 in.) 12, 3, 58.8, 19; G (33-40 in.) 6, 2, 42.6, 14; H (40 in.) 4, 1, 48, 16. Shrub stems/acre 10,900; ground cover 0%, but Dwarf Palmetto (which has both stem and ground cover qualities) covers (1 plant/m² × 1 m high) the drier sites of the swamp forest (40%); canopy cover 87%; average canopy height 122 ft (range 110-140 ft). **Edge:** Bordered on all sides by similar forest. **Topography:** Essentially flat but small changes in elevation (1-2 ft) determine period of inundation. **Elevation:** 50 ft. **Weather:** Warm and mild throughout period. **Coverage:** Apr. 29; May 7, 11, 16, 23, 29, 31; June 15; between dawn and 1000 or 1700 to dusk. Total man-hours: 40. **Census:** N. Parula, 33 (371, 150); Blue-gray Gnatcatcher, 17 (191, 77); Great Crested Flycatcher, 13 (146, 59); Tufted Titmouse, 10 (112, 45); Red-eyed Vireo, 10; Yellow-billed Cuckoo, 6 (67, 27); Prothonotary Warbler, 6; Cardinal, 6; Acadian Flycatcher, 5.5 (62, 25); White-breasted Nuthatch, 4 (45, 18); Hooded Warbler, 4; Yellow-throated Warbler, 3.5 (39, 16); Carolina Chickadee, 3 (34, 14); Carolina Wren, 3; White-eyed Vireo, 3; Brown-headed Cowbird, 3 (males); Wood Thrush, 2.5; Pine Warbler, 2.5; Red-bellied Woodpecker, 2; Downy Woodpecker, 2; Wood Duck, 1.5; Chimney Swift, 1; Ruby-throated Hummingbird, 1; E. Wood Pewee, 1; Swainson's Warbler, 1; Summer Tanager, 1; Barred Owl, +; Pileated Woodpecker, +. **Total:** 28 species; 145.5 territorial males (1634/km², 661/100 acres). **Visitors:** Yellow-crowned Night Heron, White Ibis, Red-shouldered Hawk, Mourning Dove, Blue Jay, Com. Crow, and Fish Crow.

Remarks: This census and Census 22 were run simultaneously. These two plots were selected and laid out to be as much alike as possible, the only difference being this plot was never logged and plot #22 was logged between 1962 and 1967. During the census period there were 0-3 ft of water on the study plots. Winter water levels are higher (1-4 ft) and in late summer most of both plots are dry. On the palmetto areas were found the Wood Thrush, White-eyed Vireos, Swainson's and Hooded Warblers, and Cardinals. Some palmetto areas are dry enough to support pines; Loblolly (*Pinus taeda*) and Spurge Pine (*P. glabra*), where the Pine Warblers were found. There were at least twice as many woodpeckers, Great-Crested Flycatchers, Red-eyed Vireos, White-breasted Nuthatches, N. Parulas, Yellow-throated and Pine Warblers on the virgin plot compared to the logged. The logged area was more abundant in White-eyed Vireos and Swainson's and Hooded Warblers. Two Prothonotary Warbler nests were found. Special thanks to Paul Hamel for his assistance throughout this project. — STEPHEN G. WINTON, Route 1, Box 114, Harleyville, S.C. 29448.

24. LARGETOOTH ASPEN - SUGAR MAPLE FOREST.

— **Location:** Ontario, Ottawa-Carleton Region; West Carleton Township; SW of Fitzroy Harbour; 31 F/8 (Arnprior) 033332; Chat Falls Generating Station. **Continuity:** New. **Size:** 10 ha = 24.7 acres (rectangular, 283 × 353 m measured with tape on ground). **Description of Plot:** Trees, 7.6 cm diameter and over, based on five 0.04 ha circular samples, 970/ha; total basal area 21.5 m²/ha. Species comprising 90% of the total number of trees [figures after each give number of trees/ha, relative density (%), relative dominance (%), relative frequency (%), in that sequence]: Sugar Maple (*Acer saccharum*), 515, 53, 36, 100; Large-toothed Aspen (*Populus grandidentata*), 130, 13, 28, 60; Hop-hornbeam (*Ostrya virginiana*), 100, 10, 6, 80; White Birch (*Betula papyrifera*), 65, 7, 6, 100; Basswood (*Tilia americana*), 40, 4, 6, 40; Bur Oak (*Quercus macrocarpa*), 25, 3, 5, 40. Additional species sampled were: Balsam Fir (*Abies balsamea*), White Cedar (*Thuja occidentalis*), Quaking Aspen (*P. tremuloides*), Beech (*Fagus grandifolia*), ash (*Fraxinus*, sp.) Trees by diameter size class [figures after each class give number of trees/ha, relative density (%), basal area in m²/ha, relative dominance (%): A (7.6-15.2 cm) 645, 66, 6, 27; B (15.3-22.9 cm) 195, 20, 5.4, 26; C (23-38.1 cm) 125, 13, 9.3, 43; D (38.2-53.3 cm) 5, 0.5, 0.8, 4. Shrub stems/ha, 435; ground cover 56%, canopy cover 72%; average canopy height 18.7 m (range 16-23.5). One large intermittent pond system is situated near the centre and two other such ponds encroach on the S-E and N-E corners. These areas, totalling approximately 1 ha, are characterized by small-size White Cedar, medium-sized White Birch and ash. None of the 5 randomly chosen plots sampled this smaller habitat type. An old logging road traverses the length of the plot and evidence of former clear-cutting is plentiful. Although not strongly reflected by the collected data, it is apparent that Large-toothed Aspen (9 C-size trees, 11 B-size, 5 A-size) is the current dominant canopy species and that Sugar Maple (6 C-size, 12 B-size, 85 A-size) is a very strong secondary dominant. Numerous mature aspen exhibit die-off and it is probably

inevitable that the maple will soon be the primary overstory species. **Edge:** The areas adjacent to the N, E, and S edges are of similar habitat. The predominant aspen-maple community continues to be occasionally interrupted by relatively small intermittent pond areas. To the W of the plot the hardwood community begins to lose its relative homogeneity within 50-100 m of its boundary. A heterogeneous, interspersed patchwork of deciduous, coniferous, mixed, and pond habitat types is to be found 100-150 m beyond the edge. **Topography:** Rugged with numerous rock outcropping that characterize the Canadian Shield in this region. **Elevation:** 76-91 m. **Weather:** See Census 58. **Coverage:** 1978: June 3, 7, 12, 22, 28; July 6, 15; Aug. 10, 18; 9 trips: 8 between 0519-0822 hours, EDT; 1 trip 1810-2011. Total man-hours: 18.1. **Census:** Ovenbird, 9 (90, 36); Red-eyed Vireo, 5 (50, 20); Scarlet Tanager, 3 (30, 12); Brown Creeper, 2; Veery, 2; Green-winged Teal, 1; Yellow-bellied Sapsucker, 1; Hairy Woodpecker, 1; E Wood Pewee, 1; Blue Jay, 1; Black-capped Chickadee, 1; Wood Thrush, 1; N. Waterthrush, 1; N. Oriole, 1; Purple Finch, 1; Goshawk, +; Red-shouldered Hawk, +; Am. Woodcock, +; Brown-headed Cowbird, +; Rose-breasted Grosbeak, +. **Total:** 20 species; 31 territorial males (310/km², 126/100 acres). **Visitors:** Great Blue Heron, Ruffed Grouse, Killdeer, Mourning Dove, Great Crested Flycatcher, Tree Swallow, Purple Martin, Com. Crow, Red-breasted Nuthatch, Winter Wren, Am. Robin, Swainson's Thrush, Golden-crowned Kinglet, Magnolia Warbler, Black-throated Green Warbler, Red-winged Blackbird, Com. Grackle, Evening Grosbeak, Am. Goldfinch. **Remarks:** The teal and waterthrush territories as well as one of the two creeper territories were strongly associated with the intermittent pond/White Cedar habitat type. Nests found: Goshawk, sapsucker, Hairy Woodpecker, Veery. A woodcock was observed with young on May 26. A female Rose-breasted Grosbeak feeding fledged young on July 6 was the only registration for this species. This survey was 1 of 4 conducted as part of a baseline study associated with the development of a proposed Ontario Hydro Generating Station at Chats Falls on the Ottawa River. Thanks to Ontario Hydro for permission to publish their data and to Walter Sarafyn for assistance with the vegetation analysis. — **TERRY N. TOBIAS, and ROB R. EVANS, The Proctor & Redfern Group, 75 Eglinton Ave East, Toronto, Ontario, M4P 1H3.**

25. RED OAK-SUGAR MAPLE SAVANNAH. — **Location:** Ontario; Haldimand-Norfolk Regional Municipality, Port Rowan, 6 mi E of Long Point Provincial Park on Squire's Ridge; 42°33'N, 80°16'W, Big Rice Bay, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 7.5 ha = 18.5 acres (rectangular, surveyed). **Description of Plot:** Includes two dune ridges separated by a wetland basin. The dominant canopy trees are Red Oak (*Quercus rubra*), Sugar Maple (*Acer saccharum*), and Am. Basswood (*Tilia americana*). The majority of the plot is grassland savannah with extremely few shrubs or saplings. The only shrub species present is Button Bush (*Cephalanthus occidentalis*), found in the wet zones between the ridges. The ground cover is primarily grasses, Canada Blue Grass (*Poa compressa*), and Kentucky Blue Grass (*P. pra-*

tensis). Also prominent are Com Milkweed (*Asclepias syriaca*), Swamp Loosestrife (*Decodon verticillatus*), Rye Grass (*Elymus canadensis*) and Rice Cutgrass (*Leersia oryzoides*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on ten 0.1 acre circular samples, 31/acre; total basal area 43.4 ft²/acre. Species comprising 90% of the total number of trees: Red Oak, 14, 45, 57, 50; Sugar Maple, 5, 16, 24, 40; Am. Basswood, 4, 13, 14, 20; Choke Cherry (*Prunus virginiana*), 3, 10, 1, 10; White Oak (*Quercus alba*), 2, 7, 2, 10. Trees by diameter size class: A (3-6 in.) 5, 11, 0.5, 1; B (6-9 in.) 1, 3, 0.3, 1; C (9-15 in.) 7, 23, 5.6, 13; D (15-21 in.) 14, 45, 25.9, 60; E (21-27 in.) 2, 6.5, 6.2, 14; F (27-33 in.) 2, 6.5, 4.9, 11. Shrubs stems/acre 550; ground cover 73%; canopy cover 37%; canopy height 58 ft (range 48-75). **Edge:** The W and E edges are bordered by similar habitat, the N and S edges at the W end by marshland, and the E end by similar habitat. **Topography:** Rolling sand dunes, forming irregular ridges running in an E-W direction. **Elevation:** 575-590 ft. **Weather:** Generally 60-70% cloud cover, warm, with light winds. **Coverage:** June 1, 3, 5, 7, 12, 14, 19, 21, 23, 25, 27; between 0500-0900 and 1830-2030, EST. Total man-hours: 35. **Census:** E. Wood Pewee, 17.5 (234, 95); Red-winged Blackbird, 17.5; Tree Swallow, 11 (147, 59); Yellow Warbler, 9 (120, 49); Com. Yellowthroat, 6.5 (87, 35); Great Crested Flycatcher, 5 (67, 27); House Wren, 5; Starling, 5; N. Oriole, 5; Com. Grackle, 5; E. Kingbird, 3.5 (47, 19); Red-headed Woodpecker, 2; Song Sparrow, 1.5; Mallard, 1; Yellow-billed Cuckoo, 1; Com. Flicker, 1; Warbling Vireo, 1; Brown-headed Cowbird, 1. **Total:** 18 species; 98.5 territorial males or females (1316/km², 532/100 acres). **Remarks:** Nests found (28): Tree Swallow, 7; Red-winged Blackbird, 7; E. Kingbird, 3; N. Oriole, 3; Red-headed Woodpecker, 2; House Wren, 2; Com. Grackle, 2; Mallard, 1; Starling, 1. Special thanks to Jon McCracken and Murray Palmer for laying-out the census grid. — **PETER VERBURG (compiler), Long Point Bird Observatory, Port Rowan, Ontario, Canada, NOE 1M0.**

26. WOODED CITY RAVINE. — **Location:** Ontario; York Co., Toronto, Moore Park Ravine, between Moore Ave. and Chorley Park; 43°41'N, 79°22'30"W. **Continuity:** Established 1966; 10 intermittent years. **Size:** 20 ha = 49.4 acres. **Description of Plot:** See AB 25:993 (1971). **Weather:** 7 days sunny, 6 cloudy. Average temperature 57°F (45°-72°). **Coverage:** Apr. 29; May 2, 13, 17, 23, 29; June 9, 13, 16-18, 20; July 6; 0615-1000. Total man-hours: 21. **Census:** Am. Robin, 6 (30, 12); Cardinal, 5 (25, 10); Wood Thrush, 4 (20, 8); Downy Woodpecker, 3 (15, 6); Great Crested Flycatcher, 3; Blue Jay, 3; N. Oriole, 3; Com. Grackle, 3; Mourning Dove, 2; Black-capped Chickadee, 2; Gray Catbird, 2; Starling, 2; E. Wood Pewee, 1; Red-winged Blackbird, 1; Indigo Bunting, 1; Song Sparrow, 1. **Total:** 16 species; 42 territorial males (210/km², 85/100 acres). **Remarks:** Regularly recorded species that recovered from zero in 1978 are: Mourning Dove, chickadee, catbird, Song Sparrow. Declining to zero status are: White-breasted Nuthatch, Red-eyed Vireo, and Brown-headed Cowbird. Both Great Crested Flycatcher and E. Wood Pewee declined. Northern Oriole, which in 9 years has had 6 years of 2 territorial

males, increased to 3 for the first time. Factors affecting the bird life this year were below-average temperature and increased human activity (joggers) in the ravine. — **ERIC NASMITH, 28 Donwoods Drive, Toronto, Ont., Canada M4N 2G1.**

27. ASPEN FOREST (19 YR). — **Location:** Minnesota; Cass Co., Chippewa Nat'l Forest, NE ¼ of SE ¼, Sec. 16, T145N, R30W; Pennington Quadrangle, USGS. **Continuity:** New. **Size:** 7.08 ha = 17.5 acres. **Description of Plot:** Dominant canopy species is Quaking Aspen (*Populus tremuloides*) with an average height of about 35-40 ft. There were also scattered Paper Birch (*Betula papyrifera*), Am. Basswood (*Tilia americana*), and Am. Elm (*Ulmus americana*). Understory species included hazels (*Corylus* spp.); *Viburnum* spp.; *Amelanchier* spp.; *Cornus* spp.; and *Prunus* spp. **Edge:** Bordered on N and S by more mature, mixed hardwoods; on W by 6 ft Red Pine plantation and on E by similar cover. **Topography:** Flat. **Coverage:** May 23, 28; June 6, 10, 20, 23, 0630-1130. Total man-hours: 10. **Census:** Red-eyed Vireo, 6.5 (92, 37); Am. Redstart, 4.5 (64, 26); Rose-breasted Grosbeak, 3 (42, 17); Ovenbird, 2.5; Veery, 1; Black-and-white Warbler, 1; Black-capped Chickadee, 1, Mourning Warbler, 0.5; Ruffed Grouse, +, Blue Jay, +; Am. Robin, +; Nashville Warbler, +; Chestnut-sided Warbler, +; Brown-headed Cowbird, +; Song Sparrow, +. **Total:** 15 species; 20 territorial males (282/km², 114/100 acres). — **DONALD RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St Paul, Minn. 55108.**

28. BIRCH - ELM - ASH FOREST. — **Location:** Minnesota; Clearwater Co., Univ. of Minn. Forestry and Biological Station, Itasca State Park; 47°10'N, 95°12'W. **Continuity:** New. **Size:** 8.7 ha = 21.5 acres (surveyed). **Description of Plot:** The dominant canopy trees are birch (*Betula*, sp.), Am. Elm (*Ulmus americana*), and Black Ash (*Fraxinus nigra*). Most prominent in the understory are Basswood (*Tilia americana*), ash, and Ironwood (*Ostrya virginiana*). The ground cover consists mainly of *Equisetum arvense*, Ostrich Fern (*Matteucia struthiopteris*), and Blue Cohosh (*Caulophyllum thalictroides*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on ten 0.1-acre circular samples, 365 trees/acre; total basal area 316 ft²/acre. Species comprising 90% of the total number of trees: Am. Elm, 113, 31, 17, 100; birch, 74, 20, 53, 70; Black Ash, 46, 13, 11, 60; dead trees, 41, 11, 5, 70; spruce (*Picea*, sp.), 35, 10, 3, 50; Balsam Fir (*Abies balsamea*), 27, 7, 4, 90. Trees by diameter size class: A (3-6 in.) 96, 26, 9.6, 3; B (6-9 in.) 78, 21, 24, 8; C (9-15 in.) 128, 35, 102, 32; D (15-21 in.) 13, 4, 23, 7; E (21-27 in.) 49, 13, 152, 48. Shrub stems/acre 900; ground cover 64%; canopy cover 65%; average canopy height 55 ft (range 30-75). **Edge:** Bordered by similar habitat on all sides, with the exception of a cat-tail marsh to the E. **Topography:** Mostly flat but with low areas in the E section and a small hill in the SW corner. **Elevation:** 1457 ft. **Weather:** Variable. **Coverage:** July 2-5, between 0500-0700 and 1830-2100 hours. Total man-hours: 17.5. **Census:** Red-eyed Vireo, 25 (287, 116); Ovenbird, 21 (241, 98); N. Parula, 12 (138, 56); Com. Yellowthroat, 8.5 (98,

40), Black-throated Green Warbler, 8 5, Blackburnian Warbler, 8 (92, 37), Great Crested Flycatcher, 6 (69, 28); Veery, 6; Am. Redstart, 5 (57, 23); Hairy Woodpecker, 4 (46, 19); Least Flycatcher, 4; White-breasted Nuthatch, 4; Black-capped Chickadee, 3 (34, 14); Brown Creeper, 3; Winter Wren, 3; Black-and-white Warbler, 3; Yellow-bellied Sapsucker, 2; Downy Woodpecker, 2; Chestnut-sided Warbler, 2; Broad-winged Hawk, 1; Ruby-throated Hummingbird, 1; Yellow-rumped Warbler, 1. **Total:** 22 species; 133 territorial males (1529/km², 619/100 acres). **Visitors:** Blue Jay, Com. Crow, Song Sparrow. **Remarks:** Seen before the census began were a Pileated Woodpecker, and a Brown Creeper nest with young. Three Ovenbird fledglings and a flock of Cedar Waxwings were seen after the census. We thank the Field Ornithology class for assistance with surveying the grid and obtaining the habitat analysis. Special thanks to Barb Knuth, Missy Martin, Tom Ptacek and John Thompson for assisting with the census. — SARAH PONTO and ELAINE LOEFFLER, 3314 Ulysses St. N.E., Minneapolis, Minn. 55418.

29. MATURE ASPEN - NORTHERN HARDWOODS FOREST. — **Location:** Minnesota; Cass Co., on the Pike Bay Experimental Forest, Chippewa Nat'l Forest; NE ¼ of SE ¼, Sec. 6, T144N, R30W; Pike Bay Quadrangle, USGS. **Continuity:** 2 intermittent years (smaller subplot of area censused in 1977). **Size:** 12.5 ha = 30.9 acres. **Description of Plot:** See AB 32:65 (1977). **Coverage:** May 24, 28; June 5, 11, 23, 25; 0600-1100. Total man-hours: 16. **Census:** Least Flycatcher, 17 (136, 55); Red-eyed Vireo, 15 (120, 49); Ovenbird, 10 (80, 32); E. Wood Pewee, 2.5; Great Crested Flycatcher, 1; Veery, 1; Black-throated Green Warbler, 1; Scarlet Tanager, 1; Hairy Woodpecker, 0.5; Broad-winged Hawk, +; Black-billed Cuckoo, +; Ruby-throated Hummingbird, +; Yellow-bellied Sapsucker, +; Downy Woodpecker, +; Blue Jay, +; Black-capped Chickadee, +; White-breasted Nuthatch, +; Winter Wren, +; Am. Robin, +; Am. Redstart, +; N. Oriole, +; Brown-headed Cowbird, +; Chipping Sparrow, +. **Total:** 23 species; 49 territorial males (392/km², 159/100 acres). — DONALD RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, Minn. 55108.

30. YOUNG ASPEN FOREST. — **Location:** Minnesota; Itasca Co.; Chippewa Nat'l Forest; SE ¼ of NW ¼, Sec. 36, T148N, R26W; Bowstring Lake Quadrangle, USGS. **Continuity:** New. **Size:** 6.35 ha = 15.7 acres. **Description of Plot:** Average height about 20 ft (16-25) with Quaking Aspen (*Populus tremuloides*) the dominant species. Canopy coverage also included Balsam Poplar (*P. balsamifera*) and Paper Birch (*Betula papyrifera*) with scattered Basswood (*Tilia americana*). The shrub layer was primarily comprised of Beaked Hazel (*Corylus cornuta*), with Mountain Maple (*Acer spicatum*), Round-leaf Dogwood (*Cornus rugosa*), *Viburnum* spp., and *Amelanchier* spp. **Edge:** Bordered on S and W by similar vegetation, on N by 80-ft wide power line swath. The E border is a gravel road. **Topography:** Essentially flat. **Coverage:** May 25, 29; June 7, 12, 21, 26; 0600-0900. Total man-hours: 13. **Census:** Chestnut-sided

Warbler, 4 5 (71, 29), Red-eyed Vireo, 3 (47, 19), Am Redstart, 3, Mourning Warbler, 2 5, Rose-breasted Grosbeak, 2; Veery, 1.5; Am. Robin, 1; Ovenbird, 1; White-throated Sparrow, 1; Song Sparrow, 1; Nashville Warbler, 0.5; Ruby-throated Hummingbird, +; Com. Flicker, +; Blue Jay, +; Gray Catbird, +; Golden-winged Warbler, +; Brown-headed Cowbird, +. **Total:** 17 species; 21 territorial males (331/km², 134/100 acres). — DONALD RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, Minn. 55108.

31. 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; 3 consecutive years. **Size:** 5.4 ha = 13.3 acres. **Description of Plot:** See AB 32:66 (1978). **Weather:** Normal temperatures; below normal rainfall. **Coverage:** May 27; June 10, 18-19, 22, 30; 0600-1015. Total man-hours: 11. **Census:** E. Wood Pewee, 2; Blue Jay, 2; Red-eyed Vireo, 2; Wood Thrush, 1.5; Com. Flicker, 1; Downy Woodpecker, 1; Gray Catbird, 1; Scarlet Tanager, 1; Rufous-sided Towhee, 1; Brown Thrasher, 0.5; Rose-breasted Grosbeak, 0.5; Indigo Bunting, 0.5; Com. Crow, +. **Total:** 13 species; 14 territorial males (260/km², 105/100 acres). **Visitors:** Red-headed Woodpecker, Great Crested Flycatcher, Black-capped Chickadee, White-breasted Nuthatch, Cedar Waxwing, Com. Grackle. **Remarks:** Fledglings noted: Downy Woodpecker, Blue Jay. — BOB ADAMS, JOHN BIELEFELDT, VERN AUNE (compiler), Benjamin F. Goss Bird Club, S. 13 W. 22167 Ridge Road, Waukesha, Wis. 53186.

32. 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; 6 consecutive years. **Size:** 9.3 ha = 23 acres. **Description of Plot:** See AB 28:1005-1006 (1974). **Weather:** Temperatures 38-72°F; overcast on 4 trips with some drizzle, otherwise clear and calm. Max. wind 10 mph. May was dry and cool; June wet and cool. **Coverage:** Apr. 28; May 2, 4, 9-11, 22, 30; June 1, 5, 7; between 0530-0800 or 2000-2200, EDT. Total man-hours: 15. **Census:** Starling, 11 (118, 48); Com. Flicker, 8 (86, 35); Red-headed Woodpecker, 5 (54, 22); Downy Woodpecker, 5; Cardinal, 5; Song Sparrow, 4.5 (48, 20); Ring-necked Pheasant, 4 (43, 17); Am. Robin, 4; Red-winged Blackbird, 4; Mallard, 3 (32, 13); Blue Jay, 3; E. Wood Pewee, 2; Com. Crow, 2; Com. Grackle, 2; Canada Goose, 1; Am. Kestrel, 1; Hairy Woodpecker, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; Red-eyed Vireo, 1; Scarlet Tanager, 1; Am. Goldfinch, 1. **Total:** 24 species; 72.5 territorial males (779/km², 315/100 acres). **Remarks:** Number of nesting species is the lowest in 6 years, however territorial male numbers increased from last year; notable was Red-winged Blackbirds from 2 to 4 and Red-headed Woodpeckers from 2 to 5. The Red-headed Woodpecker / Starling relationship was interesting; the Red-headed Woodpecker population was quite markedly concentrated

at the N end, adjacent to the residential area, while the Starling population concentrated to the S end next to the golf course. No obvious reason for this could be seen. Young seen included Canada Goose, Mallard, Red-headed Woodpecker, Com. Flicker, Am. Robin and Starling. Visited Ruffed Grouse and Com Nighthawk were seen for the first time. Other visitors included Killdeer, Spotted Sandpiper, Mourning Dove, E. Kingbird and Barn Swallow. — BETTY CHALLIS, Oakland Audubon Society, 2335 Pontiac Lk. Rd., Pontiac, Mich. 48054.

33. 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, 4 consecutive years. **Size:** 13 ha = 32 acres. **Description of Plot:** See AB 31:43 (1977). **Coverage:** June 3, 7, 10-11, 18, 20-22; between 0600-0900. Total man-hours: 15. **Census:** House Wren, 5 (38, 16); Red-eyed Vireo, 4 (31, 13); E. Wood Pewee, 3 (23, 9); Indigo Bunting, 3; Yellow-billed Cuckoo, 2; Great Crested Flycatcher, 2; Blue Jay, 2; Tufted Titmouse, 2, Am. Robin, 2; Wood Thrush, 2; Rose-breasted Grosbeak, 2; Red-bellied Woodpecker, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1, Black-capped Chickadee, 1; Kentucky Warbler, 1; Ovenbird, 1; Scarlet Tanager, 1, Cardinal, 1; Whip-poor-will, +; Com. Flicker, +, Com. Crow, +; Brown-headed Cowbird, +, Cedar Waxwing, +. **Total:** 25 species; 38 territorial males (293/km², 119/100 acres). **Remarks:** The population density and composition was about the same as last year. The increased number of House Wrens was the only significant change recorded. — DALE E BIRKENHOLZ, Ill. State Univ., Normal, Ill 61761.

34. BLACK OAK-SASSAFRAS WOODS. — **Location:** Indiana; Porter Co., 1.5 mi E intersection of Rtes 49 and 12, within Indiana Dunes National Lakeshore. Area bisected by country road and bridge path; 41°39'N, 87°02'W, Dune Acres Quadrangle, USGS. **Continuity:** Established 1974; 6 consecutive years. **Size:** 22.22 ha = 54.9 acres. **Description of Plot:** See AB 28:1007 (1974). **Weather:** Cold, late, wet spring after bitter winter of early and heavy snow. Early May had 5 very hot days then back to the 40s again. **Coverage:** Apr 15 - July 7; 25 early morning trips. Total man-hours: 63.5. **Census:** Rufous-sided Towhee, 9 (41, 16); Field Sparrow, 7 (32, 13); Gray Catbird, 6 (27, 11); Brown Thrasher, 3 (14, 5), Com. Yellowthroat, 3; Great Crested Flycatcher, 2; Blue-winged Warbler, 2; Indigo Bunting, 2; Mallard, 1; Mourning Dove, 1; Com. Flicker, 1; Black-capped Chickadee, 1; Veery, 1; Cedar Waxwing, 1; Golden-winged Warbler, 1; N. Oriole, 1; Scarlet Tanager, 1, Cardinal, 1; Rose-breasted Grosbeak, 1. **Total:** 19 species; 45 territories (203/km², 82/100 acres). **Remarks:** Nests located: Mallard, Mourning Dove. There were fewer cowbirds than last year. — EMMA B. PITCHER, 1159 E 56th Street, Chicago, Ill. 60637.

35. MIXED HARDWOOD REGENERATING. — **Location:** Ohio; Fairfield Co., Bern Township, 1 mi W of Sugar Grove and 6 mi S of Lancaster; 39°37'30"N, 82°30'W, NE

1/4 Lancaster Quadrangle, USGS **Continuity:** Established 1976, 4 consecutive years **Size:** 20.2 ha = 50 acres. **Description of Plot:** See AB 31:45 (1977). **Weather:** 49-65°F; half trips overcast, half clear. **Coverage:** May 15 - June 12, 10 trips, majority 0700-0930. Total man-hours 22. **Census:** Red-eyed Vireo, 10 (49, 20), Acadian Flycatcher, 7 (35, 14); Ovenbird, 7, Worm-eating Warbler, 4 (20, 8); Great Crested Flycatcher, 3 (15, 6); Wood Thrush, 3; Kentucky Warbler, 3; Scarlet Tanager, 3; E. Wood Pewee, 2; Blue-gray Gnatcatcher, 2; Black-and-white Warbler, 2; Cerulean Warbler, 2; Hooded Warbler, 2; Cardinal, 2; Yellow-billed Cuckoo, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; Turkey Vulture, +; Ruby-throated Hummingbird, +; E. Phoebe, +; Blue Jay, +; Com. Crow, +; White-breasted Nuthatch, +; White-eyed Vireo, +; Blue-winged Warbler, +; Tennessee Warbler, +; N. Parula, +; Magnolia Warbler, +; Black-throated Green Warbler, +; Louisiana Waterthrush, +; Brown-headed Cowbird, +; Rufous-sided Towhee, +. **Total:** 34 species; 57 territorial males (282/km², 114/100 acres). **Remarks:** Three of 4 Red-eyed Vireo nests found were unsuccessful. The previously common Carolina Wren was not heard this year. — ANN BINGAMAN (compiler), DALE EICHER, ESTHER REICHELDERFER, E. E. GOOD, and TOM WOOD, *Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio 43211*

36. NEOTOMA VALLEY. — **Location:** Ohio, Hocking Co., Good Hope Township, NW 1/4, Sec. 16, T13N, R18W; approximately 39°36'N, 82°34'W, Rockbridge Quadrangle, USGS **Continuity:** Established 1978. **Size:** Approximately 20.2 ha = 50 acres. **Description of Plot:** See AB 33:37-38 (1979). **Weather:** No unusual patterns. **Coverage:** June 2-4. **Total:** Approximately 115 man-hours (31 members of the Wheaton Club and guests present for a few hours June 2, for most of June 3 a.m., the compiler June 3 p.m. and all day June 4. **Census:** Wood Thrush, 11 (54, 22); Red-eyed Vireo, 9 (44, 18); Acadian Flycatcher, 8 (40, 16); Scarlet Tanager, 6 (30, 12); E. Wood Pewee, 4 (20, 8); Cerulean Warbler, 4; Ovenbird, 4; Downy Woodpecker, 3 (15, 6); Blue Jay, 3; White-breasted Nuthatch, 3; Kentucky Warbler, 3; Yellow-billed Cuckoo, 2; Red-bellied Woodpecker, 2; Great Crested Flycatcher, 2; Carolina Chickadee, 2; Tufted Titmouse, 2; Yellow-throated Vireo, 2; Worm-eating Warbler, 2; Brown-headed Cowbird, 2; Cardinal, 2; Indigo Bunting, 2; Ruffed Grouse, 1; Whip-poor-will, 1; Ruby-throated Hummingbird, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1; E. Phoebe, 1; Com. Crow, 1; Gray Catbird, 1; Blue-gray Gnatcatcher, 1; Black-and-white Warbler, 1; Louisiana Waterthrush, 1; Hooded Warbler, 1; Summer Tanager, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 1; Song Sparrow, 1. **Total:** 37 species; 94 territorial males (females), (465 pairs/km², 188 pairs/100 acres) **Remarks:** Habitat changes were confined to those which are normally brought about by growth and weather. The valley was apparently within the territories of the Red-tailed and Broad-winged hawks, Screech, Great Horned, and Barred owls. The low density of the Acadian Flycatcher is believed to be a result of the concentration of pairs along Arbu-

tus Run and the lower level of the NE-facing slope. There is some evidence that a recovery trend has started following the two successively stressful winters. Parasitism by the Brown-headed Cowbird was not recorded. Fifteen nests were located. Corrections: (AB 33:65-66); in the vegetational survey delete the word "yellow"; in "shrubs and seedlings per acre", delete "670.01" and substitute "67 (.01 acre stations)"; change the man-hours to 120 to conform with the 1979 method of computing. Wheaton Club members and guests of Edward S. Thomas. — A. H. CLAUGUS (compiler), 228 S. Lake St., Carey, Ohio 43316.

37. VIRGIN BEECH-MAPLE FOREST. — **Location:** Ohio; Preble Co., Hueston Woods State Park, 4 mi N of Oxford near intersection of Brown and Main Loop Rds.; SE 1/4, SW 1/4 (erroneously reported as E 1/2, SE 1/4) Sec. 34, T6N, R1E, College Corner Quadrangle, USGS. **Continuity:** Established 1973; 6 intermittent years. **Size:** 6.1 ha = 15 acres. **Description of Plot:** See AB 28:1009-1010 (1974). **Weather:** Late spring was warm, dry and summerlike. **Coverage:** June 1, 4-7, 9, 12-13, 15-16; between 0600-0730, 0730-1100, and 2100-2215. Total man-hours: 32. **Census:** Acadian Flycatcher, 10.5 (173, 70); Red-eyed Vireo, 8.5 (140, 57); Blue-gray Gnatcatcher, 4.5 (74, 30); Cardinal, 4.5; E. Wood Pewee, 3 (49, 20); Brown-headed Cowbird, 3; Red-headed Woodpecker, 2.5; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; Great Crested Flycatcher, 2; Cerulean Warbler, 2; Com. Flicker, 1; Pileated Woodpecker, 1; Red-bellied Woodpecker, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Gray Catbird, 0.5; Wood Thrush, 0.5; Kentucky Warbler, 0.5; Wood Duck, +; Barred Owl, +; Hairy Woodpecker, +; Prothonotary Warbler, +; Indigo Bunting, +. **Total:** 24 species; 51 territorial males or females (840/km², 340/100 acres). **Visitors:** Blue Jay, Com. Crow, Carolina Chickadee, Veery, Yellow-throated Vireo, Warbling Vireo, N. Waterthrush, Com. Yellowthroat, Am. Redstart, House Sparrow, N. Oriole, Am. Goldfinch. **Remarks:** Mean totals for 1973 through 1977 are 33.8 species and 91.2 territorial males or females. The 29% decrease in total species in 1979 may be a result of the census period being delayed until June 1, when species such as the Carolina Chickadee have often completed nesting, and because many of the less common species did not nest within the plot. The relatively conservative interpretation of the 1979 data, in addition to the decrease in species, largely explains the 44% decrease in territorial males or females. Acadian Flycatchers, Red-eyed Vireos and Blue-gray Gnatcatchers consistently have the highest breeding densities. Thanks to the Ohio Department of Natural Resources for permission to conduct this study. — JOHN A. SMALLWOOD and PATRICIA T. KOZUSKO, *Miami University, Oxford, Ohio 45056*.

38. GREEN ASH-BOX-ELDER FOREST. — **Location:** Manitoba; 2.4 km W and 6.1 km N of Oakland, about 500 m W of the municipal road; 50°10'N, 98°21'W, MacDonald, 62 J/1 West. **Continuity:** New. **Size:** 15 ha = 37.07 acres (500 m NE-SW; 50 m grid laid out with compass and measured rope). **Description of Plot:** The dominant canopy trees are Green Ash (*Fraxinus pennsylvanica*) and Box-elder (*Acer negundo*). Prominent in the

understory are Pussy Willow (*Salix discolor*) and Nannyberry (*Viburnum lentago*). The ground cover is primarily a sedge-grass mixture (*Carex tenuiflora*) and blue-grass (*Poa*, sp.). Several extensive patches of Wild Sarsaparilla (*Aralia nudicaulis*) achieve nearly 100% ground cover in local areas. Ostrich Fern (*Matteuccia struthiopteris*) dominates the ground cover in patches along the NW corner. Other important components of the ground flora were Green Ash seedlings, Canada Thistle (*Cirsium arvense*), Coneflower (*Rudbeckia laciniata*) and Blue-joint (*Calamagrostis canadensis*). Hazel (*Corylus cornuta* and *C. americana*), Rasperry (*Rubus idaeus*) and Snowberry (*Symphoricarpos albus*) were the most important components of the shrub layer. A quantitative examination of the vegetation was based on 15 0.1 acre circular plots: Trees 2-in. diameter and over 259/acre, total basal area, 88.7 ft²/acre. Species comprising 98% of the total number of trees: Green Ash, 121, 47, 54, 100; Box-elder, 47, 18, 24, 80; Pussy Willow, 37, 14, 3, 40; Balsam Poplar (*Populus balsamifera*), 17, 6, 8, 7; Nannyberry, 15, 6, T, 33; Choke Cherry (*Prunus virginiana*), 5, 5, 1, 47; Bur Oak (*Quercus macrocarpa*), 3, 2, 9, 27. Trees by diameter class: A (2-6 in.) 135, 54, 149, 11; B (6-9 in.) 62, 25, 33.1, 25; C (9-15 in.) 41, 16, 47.3, 35; D (15+ in.) 13, 5, 37.9, 28. Shrub stems/acre: 1123; ground cover 44.3%, canopy cover 52%; average canopy height 55 ft (range 12-70). **Edge:** Bordered on all sides by similar forest. On two sides, the NE end lies within 60 m of the Oxbow slough. **Topography:** Essentially flat. **Elevation:** About 818 ft. **Weather:** Clear, warm and relatively calm with only one overcast, windy morning in which the wind reached or exceeded (Beaufort) force 3. **Coverage:** June 6-7, 11, 15, 25, 27, 29; July 3; between 0530-1500 hours, CDT. Total man-hours: 25. **Census:** Yellow Warbler, 48 (320, 129); Least Flycatcher, 23.5 (157, 63); Mourning Dove, 15 (100, 40); N. Oriole, 10 (67, 27); Warbling Vireo, 7.5 (50, 20); Red-eyed Vireo, 5 (33, 13); Am. Goldfinch, 4.5 (30, 12); Gray Catbird, 4 (27, 11); House Wren, 3.5 (23, 9); E. Wood Pewee, 3 (20, 8); Com. Yellowthroat, 3; E. Kingbird, 2.5; Ruffed Grouse, 2; Great Crested Flycatcher, 2; Rose-breasted Grosbeak, 2; Clay-colored Sparrow, 2; Black-billed Cuckoo, 1.5; Yellow-throated Vireo, 1.5; Song Sparrow, 1; Red-tailed Hawk, +, Great Horned Owl, +; Downy Woodpecker, +. **Total:** 22 species; 141.5 territorial males or females (943/km², 382/100 acres). **Visitors:** Cooper's Hawk, Broad-winged Hawk, Blue Jay, White-breasted Nuthatch, Cedar Waxwing, Mourning Warbler, Am. Redstart, Brown-headed Cowbird. **Remarks:** Nests found (6) Red-tailed Hawk, 1; Great Horned Owl, 1, Mourning Dove, 2; Yellow Warbler, 2. Three young Great Horned Owls successfully fledged by June 11 and were seen for the remainder of the censuses. The number of young Red-tailed Hawks was not determined but both adults were present throughout the period. Sightings of at least one bird each of Cooper's and Broad-winged Hawks were made through early June; both may have nested in the area. The extremely high density of Yellow Warblers was probably related to the luxuriant Beaked Hazel and Snowberry growth, particularly along the SE and NE boundaries. Least Flycatchers were distributed evenly between the dense subcanopy of Beaked Hazel and those areas lacking a subcanopy. The Com. Yellow-

throats were confined to willow clumps among existing wet openings. This project was made possible through the Delta Marsh Project. Thanks to Jennifer Shay who granted permission to conduct the study at the Univ. of Manitoba Field Station and also to John Larson, Dave McDonald and Kent Whaley who helped set up the plot. — *W. CALVIN M. CUTHBERT (compiler) and ROBERT E. JONES, Delta Marsh Project, Department of Mines, Natural Resources and Environment, 25 Tupper Street N, Portage la Prairie, Manitoba, Canada R1N 3K1.*

39. RIVER BOTTOM FOREST. — **Location:** Manitoba; Headingley, 3 mi SW of village and 800 m N of Hwy. 241 (4 mi W of jcts. of Hwys. 241 and 334); 49°52'N, 97°30'W, Winnipeg 62 H/14. **Continuity:** Established 1977; 3 consecutive years. **Size:** 14 ha = 34.6 acres. **Description of Plot:** See AB 33:64 (1978). **Weather:** Normal, calm. **Coverage:** June 5, 7, 9, 15-16, 22, 24, 26, 30; 0500-0800 hours. **Total man-hours:** 24. **Census:** Least Flycatcher, 22 (157, 64); N. Oriole, 18 (129, 52); Rose-breasted Grosbeak, 18; Am. Robin, 3 (21, 9); Red-eyed Vireo, 3; Great Crested Flycatcher, 2.5; E. Wood Pewee, 2.5; Warbling Vireo, 2; Yellow-throated Vireo, 1; Philadelphia Vireo, 1; Gray Catbird, 1; Yellow Warbler, 1; Wood Thrush, 0.5; Veery, 0.5; Mourning Dove, +; Black-billed Cuckoo, +; Hairy Woodpecker, +; Downy Woodpecker, +; E. Kingbird, +; Blue Jay, +; Black-capped Chickadee, +; White-breasted Nuthatch, +; Brown-headed Cowbird, +. **Total:** 23 species; 76 territorial males (543/km², 200/100 acres). **Visitors:** Red-tailed Hawk, Great Horned Owl, Com. Crow, Tennessee Warbler, Ovenbird. **Remarks:** Nests found: Am. Robin, 3; Downy Woodpecker, 1. Black-capped Chickadee, Blue Jay, Am. Robin and White-breasted Nuthatch fledglings were seen. Increase in numbers resulted in part from lack of disturbance, and increased foliage from absence of caterpillars. Spring was extremely late, ground nesting birds not established until mid-June. — *W. H. KOONZ, Dept. of Mines, Natural Resources and Environment, 1495 St. James Street, Winnipeg, Canada R3H 0W9.*

40. COTTONWOOD FLOODPLAIN I. — **Location:** North Dakota; Billings Co., 1.7 mi NW Medora; NW 1/4, SW 1/4, Sec. 15, and SW 1/4, SW 1/4, Sec. 16, T140N, R102W; 46°56'N, 103°33'W, Medora Quadrangle, USGS. **Continuity:** New. **Size:** 19 ha = 47 acres (irregular shaped; size determined by planimetric measurement from aerial photos, Soil Conservation Service). **Description of Plot:** Mature cottonwood floodplain forest. Canopy dominated by Cottonwood (*Populus deltoides*). Prominent shrubs are Buckbrush (*Symphoricarpos occidentalis*), Skunk Bush (*Rhus trilobata*), and Buffalobery (*Shepherdia argentea*). Ground cover fairly sparse. Major species include Big Sand Grass (*Calamovilfa longifolia*), Kentucky Blue Grass (*Poa pratensis*), Marsh Muhly (*Muhlenbergia racemosa*), Canada Wildrye (*Elymus canadensis*), Slender Wheat Grass (*Agropyron trachycalum*), White Sweet Clover (*Melilotus alba*), and Yellow Sweet Clover (*M. officinalis*). A quantitative survey of the vegetation revealed the following: Trees 3 in. diameter and over based on 30 points from the point-center method, 80/acre (197/ha); total basal area 83.4 ft²/acre. Species comprising

100% of the total number of trees (tree/acre, relative density (%), relative dominance, and frequency in that order): Cottonwood, 47, 58.75, 92.75, 86.7; Rocky Mountain Red Cedar (*Juniperus scopulorum*), 31, 38.75, 7.01, 76.7; Green Ash (*Fraxinus pennsylvanica*), 2, 2.5, 0.23, 6.7. Trees by diameter size class (trees/acre, relative density (%), basal area in square feet/acre, and relative dominance in that order): A (3-6 in.) 22.7, 28.3, 2.5, 1.9; B (6.1-9 in.) 9.3, 11.7, 2.5, 4.7; C (9.1-15 in.) 12.7, 15.8, 11.4, 15.6; D (15.1-21 in.) 29.3, 36.7, 50.7, 30.1; E (21.1-27 in.) 6, 7.5, 16.4, 47.7. Ground cover 20%. Grasses comprise 40% of cover, forbs 40%, and shrubs 20%. Canopy cover about 85%; canopy height 45 to over 80 ft (average about 70 ft). **Edge:** Bordered on SW and NW by the Little Missouri River, on SE by upland prairie. **Topography:** Flat. **Elevation:** 2340 ft. **Weather:** Partly cloudy to clear. Dry throughout period. No precipitation during any census. Temperatures 40-70°F. Wind calm to 15 mph mostly from the S or SE. **Coverage:** June 2, 11, 15, 18, 21-24; July 21; between dawn and 0900 and 1930-2035. **Total man-hours:** 37.2. **Census:** House Wren, 23 (121, 49); Red-eyed Vireo, 18 (95, 38); Mourning Dove, 11 (58, 23); Am. Robin, 9 (47, 19); Rufous-sided Towhee, 9; Chipping Sparrow, 8 (42, 17); Ovenbird, 7.5 (39, 16); Com. Flicker, 7 (37, 15); Black-headed Grosbeak, 6.5 (34, 14); Warbling Vireo, 6 (32, 13); E. Kingbird, 4 (21, 9); Com. Yellowthroat, 3 (16, 6); Great Horned Owl, 2; Black-capped Chickadee, 2; Brown Thrasher, 2; Red-tailed Hawk, 1; Black-billed Cuckoo, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 1; Gray Catbird, 1; Starling, 1; Yellow-breasted Chat, 1; Am. Kestrel, +; W. Meadowlark, +; Lazuli Bunting, +; Field Sparrow, +. **Total:** 28 species; 127 territorial males or females (668/km², 270/100 acres). **Visitors:** Cooper's Hawk, Spotted Sandpiper, Com. Nighthawk, Cliff Swallow, *Empidonax* sp., Black-billed Magpie, Com. Crow, White-breasted Nuthatch, Swainson's Thrush, Yellow Warbler, Am. Redstart, Red-winged Blackbird, N. Oriole, Am. Goldfinch, and Song Sparrow. **Remarks:** Nests found (22): Red-tailed Hawk, 1; Mourning Dove, 7; Black-billed Cuckoo, 1; Great Horned Owl, 2; Com. Flicker, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; Brown Thrasher, 2; Black-headed Grosbeak, 4; Rufous-sided Towhee, 1. A large concentration of Com. Grackles was located at the SW end. They were too numerous to count and sort out into individual pairs with nest and dependent young. The Red-tailed Hawk nest apparently failed as did one Black-headed Grosbeak nest. Interstate 94 passes within 50 yds of the southernmost point of the plot. This area is located within the boundaries of Theodore Roosevelt Nat'l Park (South Unit). — *J. M. WIEHE and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

41. COTTONWOOD FLOODPLAIN II. — **Location:** North Dakota; Billings Co., 0.5 mi SW of Medora, NW 1/4, SE 1/4, Sec. 27, T140N, R102W; 46°54'N, 103°32'W, Medora Quadrangle, USGS. **Continuity:** New. **Size:** 13 ha = 32.2 acres (irregular shape; size determined by planimetric measurement from aerial photos, Soil Conservation Service). **Description of Plot:** Mature cottonwood

floodplain forest. Canopy dominated by Cottonwood (*Populus deltoides*). Prominent shrubs are Buckbrush (*Symphoricarpos occidentalis*), W. Wild Rose (*Rosa woodsii*), Skunk Bush (*Rhus trilobata*), Poison Ivy (*Toxicodendron rydbergii*), and Choke Cherry (*Prunus virginiana*). Major grasses include Big Sand Grass (*Calamovilfa longifolia*), Kentucky Blue Grass (*Poa pratensis*), and Marsh Muhly (*Muhlenbergia racemosa*). Major forbs include White Sweet Clover (*Melilotus alba*) and Yellow Sweet Clover (*M. officinalis*). A quantitative survey of the vegetation revealed the following: Trees 3-in. diameter and over based on 30 points from the point-center method, 75/acre (185/ha); total basal area 69.14 ft²/acre. Species comprising 100% of the total number of trees (trees/acre, relative density (%), relative dominance, and frequency in that order): Cottonwood, 40.6, 54, 91.67, 96.67; Rocky Mountain Red Cedar (*Juniperus scopulorum*), 32.5, 43, 8.05, 86.67; Green Ash (*Fraxinus pennsylvanica*), 1.9, 3, 0.28, 6.67. Trees by diameter size class (trees/acre, relative density (%), basal area in square feet/acre, and relative dominance in that order): A (3-6 in.) 24.4, 32.5, 2.6, 1.8; B (6.1-9 in.) 8, 11.7, 2.5, 4.7; C (9.1-15 in.) 14.4, 19.2, 14.3, 16.4; D (15.1-21 in.) 24.4, 32.5, 40.4, 27.3, E (21.1-27 in.) 3.1, 4.2, 9.4, 49.8. Ground cover 25%. Grasses comprise 15% of cover, forbs 25%, and shrubs 60%. Canopy cover about 70%; canopy height 45 to over 80 ft (average about 70 ft). **Edge:** Bordered on S and SE by the Little Missouri River, on NW and N by mixed prairie and an abruptly rising butte (Badlands). **Topography:** Flat. **Elevation:** 2260 ft. **Weather:** Overcast to clear. Mostly partly cloudy. Dry throughout period. No precipitation during any census. Temperatures 30-70°F. Winds mostly calm. **Coverage:** May 26; June 5, 10, 13, 17, 19, 21, 23, 25; July 22, between dawn and 1000 and 2000-2100. **Total man-hours:** 34. **Census:** Red-eyed Vireo, 16 (123, 50); House Wren, 12 (92, 37); Mourning Dove, 11 (84, 34); Rufous-sided Towhee, 10.5 (81, 33); Ovenbird, 10 (77, 31); Chipping Sparrow, 8.5 (65, 26); Warbling Vireo, 8 (61, 25); Com. Flicker, 5 (38, 16); Com. Yellowthroat, 4.5 (35, 14); Black-headed Grosbeak, 4.5, Lazuli Bunting, 4.5; E. Kingbird, 4 (31, 12); Am. Robin, 4; Red-headed Woodpecker, 2, Blue Jay, 2; Am. Redstart, 2; Field Sparrow, 2; Red-tailed Hawk, 1; Turkey, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1, Black-and-white Warbler, 1; Mallard, +, Ring-necked Pheasant, +; Yellow-breasted Chat, +; Com. Grackle, +. **Total:** 26 species, 115.5 territorial males or females (886/km², 359/100 acres). **Visitors:** Black-billed Cuckoo, Great Horned Owl, Com. Nighthawk, Black-billed Magpie, Com. Crow, Black-capped Chickadee, White-breasted Nuthatch, Yellow Warbler, W. Meadowlark, Orchard Oriole, N Oriole, Rusty Blackbird, Brown-headed Cowbird, Am. Goldfinch, Song Sparrow. **Remarks:** Nests found (13): Red-tailed Hawk, 1; Turkey, 1; Mourning Dove, 4; Com. Flicker, 1; Downy Woodpecker, 1; E. Kingbird, 1, House Wren, 1; Black-headed Grosbeak, 2, Field Sparrow, 1. This site is located on the Chateau de Mores Historical Site (State Historical Society). Thanks to J. Frank Cassel and Greg Hiemenz for assistance in censusing. — *J. M. WIEHE and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

42. ASH - COTTONWOOD DRAW. —

Location: North Dakota, Billings Co., 9 mi S Medora; SE 1/4 of SW 1/4, Sec. 12, T138N, R102W; 46°47'N, 103°30'W, Tracy Mountain Quadrangle, USGS. **Continuity:** New. **Size:** 3 ha = 7.4 acres (size determined by planimetric measurement from aerial photos, Soil Conservation Service). **Description of Plot:** Mature ash-cottonwood draw. Dominant canopy trees are Green Ash (*Fraxinus pennsylvanica*) and Black Cottonwood (*Populus trichocarpa*). Prominent shrubs are Buckbrush (*Symphoricarpos occidentalis*) and W. Wild Rose (*Rosa woodsii*). Ground cover fairly sparse. Major species include Little Rice Grass (*Oryzopsis micrantha*) and N. Bedstraw (*Galium boreale*). A quantitative survey of the vegetation showed the following: Trees 3-in. diameter and over based on 30 points from point-center method, 126/acre (363/ha); total basal area 32.18 ft²/acre. Species comprising 100% of the total number of trees (trees/acre, relative density (%), relative dominance, and frequency in that order): Green Ash, 71, 37, 13.5, 93; Black Cottonwood, 54, 48, 81, 73; Rocky Mountain Red Cedar (*Juniperus scopulorum*), 16, 11, 3.4, 30; Box-elder (*Acer negundo*), 6, 4, 2.24, 13. Trees by diameter size class (trees/acre, relative density (%), basal area in square feet/acre, relative dominance in that order): A (3-6 in.) 69.3, 55, 7.1, 10; B (6.1-9 in.) 30.1, 24, 9.4, 31; C (9.1-15 in.) 26.6, 21, 15.7, 59. Ground cover 20%. Grasses comprise 15% of cover, forbs 15%, and shrubs 70%. Canopy cover about 90%, canopy height 15 to over 60 ft, average height about 45 ft. **Edge:** Bordered on N by a steep Red Cedar covered slope; other edges by upland prairie. **Topography:** A wooded coulee (draw) sloping down toward the north. **Elevation:** 2750-2800 ft. **Weather:** Fairly dry throughout period. Skies clear to partly cloudy; no precipitation. Temperatures 35-75°F. **Coverage:** May 16, 18, 28, 31; June 14, 16, 19-20, 22; between dawn and 0945 and 2025-2125. Total man-hours: 10.2. **Census:** Rufous-sided Towhee, 7 (234, 95); Ovenbird, 4 (134, 54); Chipping Sparrow, 4; Red-eyed Vireo, 3 (100, 41); Lazuli Bunting, 3; House Wren, 2; Com Flicker, 1; Am. Robin, 1; Black-and-white Warbler, 1. **Total:** 9 species; 26 territorial males or females (868/km², 351/100 acres). **Visitors:** Sharp-shinned Hawk, Turkey, Mourning Dove, Saw-whet Owl, Black-capped Chickadee, Red-breasted Nuthatch, Brown Thrasher. **Remarks:** This is the only area in the state where Black Cottonwood is found, this species is rarely found E of the Rocky Mountains. A spring and a stock tank are located near the bottom of this draw. Heavy cattle use of this area has resulted in sparse ground cover. No reproduction of Black Cottonwood was evident at this site. — J. M. WIEHE and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105

43. ASH - ELM HARDWOOD DRAW. —

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:** New. **Size:** 2.87 ha = 7.1 acres (irregular shape; size determined by planimetric measurement from aerial photos, Soil Conservation Service). **Description of Plot:** Mature ash-elm hardwood draw. Dominant canopy trees are Green Ash (*Fraxinus pennsylvanica*) and Am. Elm

(*Ulmus americana*) Prominent shrubs are W Wild Rose (*Rosa woodsii*), Buckbrush (*Symphoricarpos occidentalis*), Choke Cherry (*Prunus virginiana*), Skunk Bush (*Rhus trilobata*), and Buffaloberry (*Shepherdia argentea*). Major grasses and forbs are Kentucky Blue Grass (*Poa pratensis*), Little Rice Grass (*Oryzopsis micrantha*), and N. Bedstraw (*Galium boreale*). A quantitative survey of the vegetation provided the following data: Trees 3-in. diameter and larger based on 30 points from point-center method, 214.52/acre (530/ha); total basal area 84.97 ft²/acre. Species comprising 98% of the total number of trees (trees/acre, relative density (%), relative dominance, and frequency in that order): Green Ash, 146.6, 68.3, 65.23, 93.3; Am. Elm, 60, 27.5, 34, 66.7; Red Cedar (*Juniperus scopulorum*), 5.36, 2.5, 0.356, 6.67. Trees by diameter size class (trees/acre, relative density (%), basal area in square feet/acre, and relative dominance in that order): A (3-6 in.) 71.5, 33.3, 7.98, 1.84; B (6.1-9 in.) 85.8, 40, 26.1, 5.02; C (9.1-15 in.) 48.3, 22.5, 32.8, 11.2; D (15.1-21 in.) 7.2, 3.3, 12.4, 28.3; E (21.1-27 in.) 1.8, 0.8, 5.9, 53.6. Ground cover 30%. Grasses comprise 10% of cover, forbs 10%, and shrubs 80%. Canopy cover about 70%; canopy height 15-40 ft, average about 30 ft. **Edge:** Bordered on N and E by open prairie, on S by a shrubby transition zone from trees to prairie. **Elevation:** 2750-2800 ft. **Topography:** Located on the N-facing slope of a broad coulee draining to the W. Fairly flat bottom in the draw rising to the SE. The plot rises to the S, up the N-facing slope toward the top of a high plateau. **Weather:** Fairly dry throughout period. Skies mostly clear; no precipitation. Temperatures 35-75°F. **Coverage:** May 16, 30; June 1, 14, 16, 19-20, 22; between dawn and 0950 and 2030-2130. Total man-hours: 10.33. **Census:** Rufous-sided Towhee, 8 (278, 113); House Wren, 3.5 (122, 49); Red-eyed Vireo, 3 (104, 42); Yellow-breasted Chat, 2; Lazuli Bunting, 2; Chipping Sparrow, 2; Field Sparrow, 2; Cooper's Hawk, 1; Long-eared Owl, 1; Com. Crow, 1; Black-capped Chickadee, 1; Black-and-white Warbler, 1; Am. Redstart, 1; Lark Sparrow, 1. **Total:** 14 species; 29.5 territorial males or females (1027/km², 415/100 acres). **Visitors:** Ring-necked Pheasant, Turkey, Rusty Blackbird, Am. Goldfinch, Song Sparrow. **Remarks:** Nests located (3): Com. Crow, 1; Black-capped Chickadee, 1; Chipping Sparrow, 1. Heavy cattle use (trail plus grazing) along the bottom of this SE to NW oriented draw. Special thanks to J. Frank Cassel for assistance in censusing. — J. M. WIEHE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

44. DECIDUOUS FLOODPLAIN FOREST. —

Location: Oklahoma; Delaware Co., 4 mi S of Jay; 36°21'N, 94°48'W, Lake Eucha East Quadrangle, USGS. **Continuity:** New. **Size:** 6.7 ha = 16.6 acres (measured from aerial photograph, about 300 × 2000 ft, width variable). **Description of Plot:** The dominant canopy trees are Am. Elm (*Ulmus americana*) and Sycamore (*Platanus occidentalis*). Prominent understorey are Coralberry (*Symphoricarpos orbiculatus*) and Spicebush (*Lindera benzoin*). Ground cover is dominated by spring ephemerals in April and May and by Ground Ivy (*Glechoma hederacea*), Wood Nettle (*Laportea canadensis*), and several species of Tick Trefoil (*Desmodium* spp.) in the summer. A small clear stream runs through the

area. Two clearings, once cultivated fields, cover about 1 acre. The area is lightly grazed by cattle. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 5 circular samples, 340/acre; total basal area 128.2 ft²/acre. Species comprising 90% of the total number of trees: Am. Elm, 128, 38, 15, 80; Sycamore, 48, 14, 45, 80; Bitternut Hickory (*Carya cordiformis*), 42, 12, 4, 40; Honey Locust (*Gleditsia triacanthos*), 24, 7, 5, 60; dead trees, 20, 6, 4, 80; Black Walnut (*Juglans nigra*), 16, 5, 3, 60; hackberry (*Celtis* sp.), 16, 5, 5, 60; Swamp White Oak (*Quercus bicolor*), 12, 4, 6, 40. Trees by diameter size class: A (3-6 in.) 208, 61, 20.8, 16; B (6-9 in.) 64, 19, 19.2, 15; C (9-15 in.) 50, 15, 40, 31; D (15-21 in.) 12, 4, 21.6, 17; E (21-27 in.) 4, 1, 12.4, 10; F (33-40 in.) 2, 1, 14.2, 11. Shrub stems/acre, 5680; ground cover 54%; canopy cover 74%; average canopy height 44 ft (range 25-50). **Edge:** Bounded on 3 sides by similar cover, on the 4th by limestone escarpments and upland forest. **Topography:** Essentially flat. **Elevation:** 800 ft. **Weather:** Generally favorable with well distributed rains and mild temperatures. **Coverage:** May 15, 18, 25; June 1, 8, 15, 22, 29; July 6, 13; 0600-1000 or 1730-1930 hours. Total man-hours: 78. **Census:** Blue-gray Gnatcatcher, 10 (149, 60); Acadian Flycatcher, 9 (134, 54); Cardinal, 9; Indigo Bunting, 9; Yellow-billed Cuckoo, 7 (104, 42); Tufted Titmouse, 7; Carolina Chickadee, 6 (89, 36); N. Parula, 6; Louisiana Waterthrush, 6; Kentucky Warbler, 6; Red-eyed Vireo, 5 (74, 30); Red-bellied Woodpecker, 4 (60, 24); Brown-headed Cowbird, 4; E. Wood Pewee, 3 (45, 18); Black-and-white Warbler, 3; Prothonotary Warbler, 3; Great Crested Flycatcher, 2; Blue Jay, 2; White-eyed Vireo, 2; Summer Tanager, 2; Ruby-throated Hummingbird, 1; Downy Woodpecker, 1; E. Phoebe, 1; White-breasted Nuthatch, 1; Barred Owl, 0.5; Pileated Woodpecker, 0.5. **Total:** 26 species; 110 territorial males (1637/km², 663/100 acres). **Visitors:** Turkey Vulture, Red-shouldered Hawk, Com. Crow, Gray Catbird. **Remarks:** Nests found Acadian Flycatcher (1), Blue-gray Gnatcatcher (1); 19 broods were located. — PAUL B., JR. and MIDA G. GROVER and FREDERICK M. BAUMGARTNER, Little Lewis Whirlwind Nature School and Sanctuary, Rte. 2, Jay, Okla. 74346.

45. 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; 4 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 2.5° above normal, for June 0.2° above; rainfall in May was 0.77 in. above normal, in June 2.33 in. below. **Coverage:** Apr 29; May 2, 14, 16, 19, 22, 25-27, 30; June 1, 5-7, 15, 17, 21; 0555-1140. Total man-hours 30. **Census:** Blue Jay, 8 (68, 27); Veery, 4 (34, 14); Ovenbird, 4; Gray Catbird, 3 (25, 10); Scarlet Tanager, 3; Rufous-sided Towhee, 3; Wood Thrush, 2.5; Black-capped Chickadee, 2; Tufted Titmouse, 2; White-breasted Nuthatch, 2; Com. Yellowthroat, 2; Yellow-billed Cuckoo, 1.5; Com. Grackle, 1.5; Broad-winged Hawk, 1; Ruffed Grouse, 1; Com. Flicker, 1; Downy Woodpecker, 1; Great

Crested Flycatcher, 1, Brown Thrasher, 1, Am Robin, 1, Black-and-white Warbler, 1, N. Oriole, 1; Hairy Woodpecker, +. **Total:** 23 species; 47.5 territorial males or females (402/km², 163/100 acres). **Visitors:** E. Kingbird, Barn Swallow, Com. Crow, Red-eyed Vireo, Blue-winged Warbler, Cardinal, Rose-breasted Grosbeak, Field Sparrow. **Remarks:** Nests found: Blue Jay, 6; Broad-winged Hawk, Com. Flicker, Black-capped Chickadee, Brown Thrasher, 1. Several acres which are usually dry by the end of May were still under standing water in mid-June. The warbler population was the lowest for the 4 years censused. — WILLIAM E. DAVIS, JR., *College of Basic Studies, Boston Univ., Boston, Mass. 02215.*

46. 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; 13 intermittent years. **Size:** 10.52 ha = 26 acres. **Description of Plot:** See *AFN* 19:594-595 (1965). **Coverage:** May 16, 26, 28; June 2-3, 9, 16. Total man-hours: 16. **Census:** Blackburnian Warbler, 17 (162, 65); Ovenbird, 9 (86, 35); Veery, 8 (76, 31); Red-eyed Vireo, 8; Black-throated Green Warbler, 6 (57, 23); Scarlet Tanager, 6; Black-capped Chickadee, 5 (48, 19); Brown Creeper, 4 (38, 15); Wood Thrush, 3 (29, 12); Solitary Vireo, 3; Black-and-white Warbler, 3; Com. Yellowthroat, 2.5; Great Crested Flycatcher, 2; Blue Jay, 2; Red-breasted Nuthatch, 2; Barred Owl, 1; Ruby-throated Hummingbird, 1; Com. Flicker, 1; Hairy Woodpecker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; Am. Robin, 1; Blue-gray Gnatcatcher, 1; Yellow-rumped Warbler, 1; Brown-headed Cowbird, 1; Cardinal, 1; Purple Finch, 1; Rufous-sided Towhee, 1; Song Sparrow, 1; Broad-winged Hawk, 0.5; Pileated Woodpecker, 0.5; Tufted Titmouse, 0.5; N. Oriole, 0.5; Rose-breasted Grosbeak, 0.5; Great Horned Owl, +; Pine Warbler, +; Com. Grackle, +. **Total:** 40 species; 100 territorial males (950/km², 385/100 acres). **Remarks:** No significant changes. Thanks to Jim Cavanaugh. — ANDREW MAGEE, 34 Hobson Street, Springfield, Mass. 01100.

47. WHITE PINE-HEMLOCK-NORTHERN HARDWOODS FOREST. — **Location:** Connecticut; Litchfield Co., on the Phelps Research Area of the Nature Conservancy in the NW corner of the town of Colebrook; 42°01'00"N, 73°07'30"W, Tolland Center and Sandersfield Quadrangle, Mass.-Conn. 1958, photorevised 1969. **Continuity:** New. **Size:** 14.3 ha = 35.3 acres total, with deciduous mid-slope (4 ha = 9.88 acres) and evergreen mid and lower slope communities (10.3 ha = 25.45 acres) being treated as separate censuses. Roughly a parallelogram, measured with compass and meter tape. **Description of Plot:** For purposes of the vegetation analysis, the flora was separated into three community types: (1) White Pine-Northern Hardwoods Mid and Lower Slope, (2) Hemlock-Northern Hardwoods Lower Slope and (3) Northern Hardwoods Mid-Slope. The vegetation analysis was conducted using 0.04 ha circles following methods outlined by James and Shugart.

Community descriptions are as follows (1) *White Pine-Northern Hardwoods Mid and Lower Slope Community.* The lower slope section of this community (6.3 ha) was cleared early in the 1800s. White Pine (*Pinus strobus*) (dbh 10-24 in.) dominates the canopy, although there are locally dense pockets of deciduous growth. The shrub stratum is poorly developed; Hemlock (*Tsuga canadensis*) and saplings of hardwood species such as Red Maple (*Acer rubrum*), Sugar Maple (*A. saccharum*), and Striped Maple (*A. pensylvanicum*) being most common. The herb layer is quite sparse from lack of light. Canada Mayflower (*Maianthemum canadense*), Starflower (*Trientalis borealis*) and Partridgeberry (*Mitchella repens*) are most common in the ground cover. There is a limited section (0.4 ha) within the lower slope pine community that was affected by a tornado in 1976. Damage was nearly complete over 0.1 ha with a peripheral section of 0.3 ha receiving damage to approximately 25% of the canopy. Shrub and herb growth in this section are prolific. Beech (*Fagus grandifolia*), Sugar Maple, Red Maple and Striped Maple saplings and Maple-leaved Viburnum (*Viburnum acerifolium*) are found in this stratum, while among the windfalls, Dewberry (*Rubus hispidus*), Hay-scented Fern (*Dennstaedtia punctilobula*), Starflower and Partridgeberry are found as ground cover. The mid-slope phase, although dominated by pine, is somewhat different in structure. This section of 2 ha was used as a night pasture and apple orchard and remained in an open state until 1920. Pines are uniform (dbh 12-18 in.) and are accompanied by scattered Black Cherries (*Prunus serotina*) and hardwood species. The shrub stratum is densely populated with hardwood saplings less than 1 in. dbh and with Maple-leaved Viburnum and Alternate-leaf Dogwood (*Cornus alternifolia*). The herb stratum contains locally dense areas of May-scented Fern, Canada Mayflower, Partridgeberry, Starflower, Shining Clubmoss (*Lycopodium lucidulum*) and *Pyrola elliptica*. Quantitative analysis of the mid and lower slope communities gave the following results: Trees 3-in. (dbh) and over, 442/ha; total basal area, 21 m²/ha (91 ft²/acre); canopy cover, 83%; av. canopy ht., 30 m; shrub stratum, 26,768 stems/ha; ground cover, 53%. Species comprising over 95% of the total number of trees (figures after each species indicate trees/ha, relative density (%), relative dominance (%), and frequency, in that sequence): White Pine, 212, 48, 79, 100; Hemlock, 94, 21, 11, 830 Red Maple, 35, 8, 2, 67; White Ash (*Fraxinus americana*), 35, 8, 3, 83; Black Cherry, 15, 1, 4, 50; Sugar Maple (12, 3, 0.5, 17; Yellow Birch (*Betula lutea*), 12, 3, 0.5, 33; Black Birch (*B. lenta*), 12, 3, 1, 33. (2) *Hemlock-Northern Hardwoods Lower Slope Community.* Dominated by Hemlocks ranging from 3 to 21 in. dbh, and poorly drained in sections. Again, hardwood species are found scattered through this forest type and are locally dense in areas that have been opened up by windfalls. Both the shrub and herb layers are poorly developed because of lack of light. Ironwood (*Carpinus caroliniana*), Sugar Maple and Beech saplings are dominant in the shrub stratum, while Christmas Fern (*Polystichum acrostichoides*) and New York Fern (*Thelypteris noveboracensis*) are the most common in the ground cover. Trees 3-in. (dbh) and over, 662/ha; total basal area, 10 m²/ha (41 ft²/acre); canopy cover, 96%; av.

canopy ht., 24 m, shrub stratum, 3,398 stems/ha, ground cover, 10%. Species comprising over 95% of the total number of trees (figures after each species indicate trees/ha, rel. density, rel. dom. and frequency, in that sequence) Hemlock, 279, 42, 46, 100; Yellow Birch, 111, 17, 18, 75; White Ash, 94, 14, 6, 75; Beech, 49, 7, 6, 75; Black Birch, 44, 7, 9, 75; Red Maple, 37, 6, 3, 25; Red Oak (*Quercus rubrum*), 32, 5, 10, 75. (3) *Northern Hardwoods Mid-Slope Community.* Used for pastureland as late as 1915-1920, this 4 ha section is well drained and more level in slope than the lower slope pine and hemlock communities. White Ash and Sugar Maple are the most dominant tree species. The shrub stratum is quite dense with saplings of hardwood species and there are locally dense areas of Mountain Laurel (*Kalmia latifolia*) and Ironwood. The herb stratum contains seedlings of hardwood species as well as Sensitive Fern (*Onoclea sensibilis*), Twisted Stalk (*Streptopus roseus*), Sarsaparilla (*Aralia nudicaulis*), sedges (*Carex* spp.) and grasses. Trees 3-in. (dbh) and over, 568/ha; total basal area, 7 m²/ha (29 ft²/acre); canopy cover, 88%; av. canopy ht. 21 m; shrub stratum, 45,405 stems/ha; ground cover, 48%. Species comprising over 95% of the total number of trees (figures after each species indicate trees/ha, rel. density, rel. dom. and frequency, in that sequence): White Ash, 148, 26, 26, 45; Sugar Maple, 135, 24, 11, 100; Red Maple, 98, 17, 22, 100; Black Cherry, 62, 11, 8, 50; White Pine, 49, 9, 15, 100; Red Oak, 37, 7, 13, 50, Paper Birch (*B. papyrifera*), 12, 2, 2, 25. A seasonal stream runs in a southerly direction through the site. The census grid is traversed across its SE corner by an old logging road. **Edge:** Similar vegetation extends over 120 m on the E and W boundaries. A wetland forms the S boundary and a lightly travelled tar road forms the N boundary. Areas similar in habitat extend beyond the road on this N edge. **Topography:** Located on a S-facing slope, underlain by Precambrian gneiss. Firm glacial till covers the bedrock upon which the sandy loam soils of the Charlton and Tisbury and Sudbury Series are found. Rocky sections on the lower slope remain wet into the month of June. **Elevation:** 1100-1200 ft. **Climate:** Mean annual temperature, 44.2°F. Normal for the summer months (June, July, August) is 65.3°F. Average rainfall for the summer period is 13.41 in. A NW wind usually prevails in this region, with the exception of the months of July, August and September when SW winds prevail. **Coverage:** Apr. 28-30; May 5-7, 10, 18, 27-28; June 1, 3, 10-11, 17-18, 22, 24, 29-30, July 14; between 0515-1100. Total man-hours 81. **Census:** Breeding birds of the study site were divided into two categories according to vegetation types: (1) White Pine-Hemlock (10.3 ha) and (2) Northern Hardwoods (4 ha) (1) *White Pine-Hemlock.* Blackburnian Warbler, 12 (117, 47); Ovenbird, 7 (68, 28); Wood Thrush, 6.5 (63, 26); Veery, 6 (58, 24); Black-capped Chickadee, 4.5 (44, 18); Brown Creeper, 4 (39, 16); Black-and-white Warbler, 4; Red-eyed Vireo, 3.5 (34, 14); Blue Jay, 3 (29, 12), Com. Yellowthroat, 3; Scarlet Tanager, 3, Yellow-rumped Warbler, 2.5; Brown-headed Cowbird, 2.5; Red-breasted Nuthatch, 2, Rose-breasted Grosbeak, 2; White-throated Sparrow, 2; Yellow-bellied Sapsucker, 1.5, Black-throated Green Warbler, 1.5; Ruffed Grouse, 1; Cedar Waxwing, 1; Solitary Vireo, 1; Chestnut-sided Warbler, 1; Louisiana

Waterthrush, 1, E Wood Pewee, 0.5, Am Robin, 0.5, Com. Grackle, 0.5, Great Horned Owl, +; House Wren, +; Gray Catbird, +; Am Redstart, +. **Total:** 30 species; 77 territorial males (748/km², 303/100 acres). (2) *Northern Hardwoods*. Ovenbird, 3 (75, 30); Wood Thrush, 3; Red-eyed Vireo, 2.5; Yellow-bellied Sapsucker, 1.5; Downy Woodpecker, 1, Hermit Thrush, 1; Blue Jay, 0.5; Black-capped Chickadee, 0.5; Am. Robin, 0.5; Veery, 0.5; Black-throated Blue Warbler, 0.5; Brown-headed Cowbird, 0.5. **Total:** 12 species, 15 territorial males (375/km², 152/100 acres). **Visitors:** Great Blue Heron, Canada Goose, Turkey Vulture, Sharp-shinned Hawk, Red-tailed Hawk, Red-shouldered Hawk, Broad-winged Hawk, Mourning Dove, Black-billed Cuckoo, Barred Owl, Belted Kingfisher, Com. Flicker, Pileated Woodpecker, Hairy Woodpecker, E. Phoebe, Least Flycatcher, Tree Swallow, Rough-winged Swallow, Barn Swallow, Com. Crow, Tufted Titmouse, White-breasted Nuthatch, Winter Wren, Starling, Blue-winged Warbler, Yellow Warbler, Canada Warbler, Red-winged Blackbird, N. Oriole, Cardinal, Purple Finch, Am. Goldfinch, Rufous-sided Towhee, Dark-eyed Junco, Swamp Sparrow, Song Sparrow. **Remarks:** Nests found: Downy Woodpecker, Blue Jay, and Wood Thrush (2). The vegetation on the Phelps Research Area represents an ecotone between northern coniferous forests and more southerly deciduous forests. The avian species reflect the transitional nature of this habitat type — *NATHALIE W. LOWE, The Nature Conservancy, Science Tower, P.O. Box MMM, Wesleyan Station, Middletown, Conn. 06457*

48. 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; 3 consecutive years. **Size:** 9.67 ha = 23.9 acres. **Description of Plot:** See AB 33:68 (1979). **Weather:** May was slightly drier than normal. **Coverage:** May 17, 27, June 1, 5, 9, 11, 21-22, 24, 26; July 5; 0419-0840, EST. Total man-hours: 29. **Census:** Rufous-sided Towhee, 13 (134, 54); Prairie Warbler, 12 (124, 50); Field Sparrow, 4 (41, 17); Brown Thrasher, 3.5 (36, 15); Com. Yellowthroat, 2.5; Marsh Hawk, +; Brown-headed Cowbird, +. **Total:** 7 species; 35 territories (362/km², 146/100 acres). **Visitors:** Red-tailed Hawk, Bobwhite, Mourning Dove, Black-billed Cuckoo, Barn Swallow, Purple Martin, Blue Jay, Black-capped Chickadee, Mockingbird, Gray Catbird, Am. Robin, Red-winged Blackbird, Com. Grackle. **Remarks:** Nests found: Towhee (1), Prairie Warbler (1). — *ROBERT ADAMO, JAMES CLINTON, EDWARD KEMNITZER, DAVID LARSEN (compiler), and GILBERT RAYNOR, Moriches Bay Audubon Society, Box 802, Center Moriches, N.Y. 11934.*

49. 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; 3 consecutive years. **Size:** 9.3 ha = 22.97 acres. **Description of Plot:** See AB 33:69 (1979). **Weather:** May was slightly

warmer (59.3°F vs 55.6° 20-year average) and wetter (4.09 in vs 3.83 in average) than usual, while June was cooler and slightly drier than normal (62.8° vs 65.4°, 2.15 in. vs 2.72 in.). The last sub-freezing night was on May 2. **Coverage:** May 6, 10, 20, 28; June 1, 6-7, 11, 13, 21, 27; July 4; 0405-0910, EST. Total man-hours: 28. **Census:** Rufous-sided Towhee, 14 (151, 61); Ovenbird, 7.5 (81, 33); Brown Thrasher, 5 (54, 22); Great Crested Flycatcher, 4 (43, 17); Blue Jay, 4; Black-capped Chickadee, 4; N. Oriole, 3 (32, 13); Hermit Thrush, 2; Pine Warbler, 1.5; Scarlet Tanager, +. **Total:** 10 species; 45 territories (484/km², 196/100 acres). **Visitors:** Com. Flicker, Downy Woodpecker, E. Wood Pewee, Com. Crow, Tufted Titmouse, Am. Robin, Com. Grackle, Brown-headed Cowbird. **Remarks:** A large construction project, approximately ½ mi W of the plot has resulted in the destruction of a substantial amount of similar habitat. The laboratory's perimeter fire road, which passes approximately 200 ft N of the plot, has been used as a dumping area for some of the trees and brush cleared from this site. Notwithstanding the increased human activity nearby, the population densities of the major breeding species have not changed significantly (with the possible exception of the Brown Thrasher, which seems to have increased somewhat). Several of the marginal breeders, notably the woodpecker, have been less in evidence, reducing them to visitor status. — *JAMES CLINTON, DAVID LARSEN (compiler), GILBERT RAYNOR, JOHN RUSCICA and KATHLEEN TUOHY, Moriches Bay Audubon Society, Box 802, Center Moriches, N.Y. 11934.*

50. UPLAND MIXED PINE - SPRUCE - HARDWOOD PLANTATION. — **Location:** New York; Allegany Co., on the S side of Brown Rd., near its intersection with Vandermark Rd., in Ward, 3.5 mi W of Alfred, 42°7'30"N, 77°45'W; Andover Quadrangle, USGS. **Continuity:** Established 1974; 6 consecutive years. **Size:** 16.6 ha = 41 acres. **Description of Plot:** See AB 28:699 (1974). **Weather:** Monthly precipitation data furnished by the Alfred Cooperative Weather Station (May, 3.47 in.; June, 2.48 in.; July, 1.67 in.) were slightly below normal as were the average daily temperatures (May, 53.2°; June, 60.7°; July, 65.3°); 7 consecutive days with rain showers and abnormal daily lows (35-45°) in late May and a similar 8-day period, June 6-13, plus near-frosts on June 25-26 may have had an adverse affect on nesting success. **Coverage:** Apr. 23; May 4, 9, 18, 28; June 3, 14, 22-23; July 17, 29-30; Aug. 3; 0500-2030, EDT. Total man-hours: 19.5. **Census:** Black-throated Green Warbler, 17 (102, 41); Magnolia Warbler, 11 (66, 27); Blackburnian Warbler, 10 (60, 24); Dark-eyed Junco, 7 (42, 17); Golden-crowned Kinglet, 5 (30, 12); Red-breasted Nuthatch, 4 (24, 10); Yellow-rumped Warbler, 4; Blue Jay, 3 (18, 7); Black-capped Chickadee, 3; Am. Robin, 3; Wood Thrush, 3; Ovenbird, 3; Com. Yellowthroat, 2.5; Veery, 2; Solitary Vireo, 2; Brown-headed Cowbird (females), 2; Purple Finch, 2; Scarlet Tanager, 1.5; Indigo Bunting, 1.5; Downy Woodpecker, 1; Brown Creeper, 1; House Wren, 1; Canada Warbler, 1; Rose-breasted Grosbeak, 1; Chipping Sparrow, 1; Song Sparrow, 1; Cooper's Hawk, +; Red-shouldered Hawk, +; Broad-winged Hawk, +; Barred Owl, +; Pileated

Woodpecker, +, Great Crested Flycatcher, +, Com. Crow, +, Gray Catbird, +. **Total:** 34 species; 93.5 territorial males (564/km², 228/100 acres). **Remarks:** After 2 years of declining territorial males, totals were back to normal. White-throated Sparrows were absent for the first time. Some selective lumbering of Red Pine at the W end of the area did not seem to influence bird density but may have contributed to the absence of hawk nests. Appreciation is extended to Gaylord Rough for weather data — *ELIZABETH W. BROOKS, Water Wells Rd., Alfred Station, N.Y. 14803.*

51. PITCH PINE-OAK FOREST. — **Location:** New Jersey; Ocean Co., 3 mi S of Interchange 74, Garden State Parkway; 39°48'N, 74°13'W, Forked River Quadrangle. **Continuity:** New (1978). **Size:** 13.76 ha = 34 acres. **Description of Plot:** Canopy dominated almost exclusively by Pitch Pine (*Pinus rigida*) Pitch pine and Post Oak (*Quercus stellata*) to heights of 15-20 ft comprised the upper shrub layer. The lower shrub layer was predominantly oaks, including Bear Oak (*Q. ilicifolia*), Black-jack Oak (*Q. marilandica*), and Post Oak. The ground layer was dominated by these oaks and other woody species: Black Huckleberry (*Gaylussacia baccata*), Dangleberry (*G. frondosa*), Low Blueberry (*Vaccinium vacillans*), and Teaberry (*Gaultheria procumbens*). Bracken (*Pteridium aquilinum*) was the dominant herbaceous plant. A quantitative vegetation description indicates the following: Trees, 3-in diameter and over, based upon five 13.2 × 82.5 ft rectangular plots, 240/acre; total basal area 37.3 ft²/acre. Species comprising 90% of the total number of trees (figures give number of trees/acre, percent relative density, relative dominance, and frequency): Pitch Pine, 358, 100, 100, 100. Trees by diameter size class (figures give number of trees/acre, percent relative density, basal area in ft²/acre, and relative dominance): A (3-6 in.) 325, 91, 28.5, 76; B (6-9 in.) 33, 9, 8.9, 24. Shrub stems/acre 2409, ground cover 70%; canopy cover 85%; average canopy height of dominant species 37 ft (range, 30-44 ft). **Edge:** Bounded on all sides by sandy roads. **Topography:** Level. **Elevation:** 22 ft. **Coverage:** (1978). June 17-24, 26-28; 0530-0900 or 1730-2130. Total man-hours: 50. **Census:** Rufous-sided Towhee, 16.5 (121, 49); Prairie Warbler, 12.5 (91, 37); Pine Warbler, 9 (65, 26); Brown Thrasher, 5 (36, 15); Blue Jay, 3 (22, 9); Carolina Chickadee, 3; Mourning Dove, 2; Whip-poor-will, 2; Field Sparrow, 2; E. Kingbird, 1.5; Com. Nighthawk, 1; Great Crested Flycatcher, 1; Fish Crow, 1; Brown-headed Cowbird, 1; Bobwhite, 0.5; Mockingbird, 0.5; Gray Catbird, 0.5; Am. Robin, 0.5; Song Sparrow, 0.5; Ovenbird, +. **Total:** 20 species; 63 territorial males (458/km²; 185/100 acres). **Remarks:** This study was funded by Jersey Central Power and Light Company. — *ROY S. SLACK and BARBARA J. ROOT, Terrestrial Environmental Specialists, Inc., Box 388, RD 1, Phoenix, N.Y. 13135.*

52. PITCH PINE-OAK FOREST. — **Location:** New Jersey; Ocean Co., 3 mi S of Interchange 74, Garden State Parkway; 39°48'N, 74°14'W, Forked River Quadrangle, USGS. **Continuity:** New (1978). **Size:** 6.07 ha = 15 acres. **Description of Plot:** The uniform canopy is dominated by Pitch Pine (*Pinus rigida*), with a few Post Oak (*Quercus stellata*) scattered throughout. Pitch Pine and Bear Oak

(*Q. ilicifolia*) dominate the upper shrub layer. Several low-growing heath shrubs, including Dangleberry (*Gaylussacia frondosa*), Black Huckleberry (*G. bacata*), and Low Blueberry (*Vaccinium vacillans*) cover the ground surface. Bracken (*Pteridium aquilinum*) and Teaberry (*Gaultheria procumbens*) are the common herbaceous plants. A quantitative survey of the vegetation yielded the following: Trees 3-in. or over, based on five 13.2 × 82.5 ft rectangular plots, 400/acre; total basal area 31.4 ft²/acre. Species comprising 90% of total number of trees (figures give number of trees/acre, relative density, relative dominance, and frequency): Pitch Pine, 360, 98, 98, 100. Trees by diameter size class (figures give number of trees/acre, relative density, basal area in ft²/acre, and relative dominance): A (3-6 in.) 392, 98, 29.8, 94; B (6-9 in.) 8, 2, 1.6, 6. Shrub stems/acre, 6435; ground cover 75%; canopy cover 85%; average canopy height 33 ft (range, 26-39 ft). **Edge:** Bounded on E by barren area and on other sides by similar habitat. **Topography:** Level. **Elevation:** 30-33 ft. **Weather:** Warm, no rain during censuses. **Coverage** (1978): June 17-18, 20-21, 23, 26-28; between 0545-0900 or 1830-2130. Total man-hours: 32. **Census** (1978): Prairie Warbler, 10.5 (173, 70); Rufous-sided Towhee, 10.5; Pine Warbler, 3 (49, 20); Com. Yellowthroat, 3; Field Sparrow, 1.5; Mourning Dove, 1; Whip-poor-will, 1; Carolina Chickadee, 1; Brown-headed Cowbird, 1; Black-billed Cuckoo, +; Am. Robin, +; Ovenbird, +. **Total:** 12 species; 32.5 territorial males (535/km², 217/100 acres). **Remarks:** This study was funded by Jersey Central Power and Light Company. — **CATHIE BAUMGARTNER SLACK, JOSEPH M. McMULLEN, and ROY S. SLACK, Terrestrial Environmental Specialists, Inc., Box 388, RD 1, Phoenix, N.Y. 13135.**

53. 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; 3 consecutive years. **Size:** 6 ha = 14.8 acres. **Description of Plot:** See AB 33:70 (1979). **Weather:** Mostly clear mornings with intermittent ground fog or haze; temperatures, 6-18°C (averaging 12°). **Coverage:** May 1, 8, 17, 22; June 7, 14, 19. Total man-hours: 16. **Census:** Ovenbird, 4.5 (75, 30); Red-eyed Vireo, 3.5 (58, 24); Wood Thrush, 2.5; Great Crested Flycatcher, 2; Black-capped Chickadee, 2; Brown-headed Cowbird, 2; Scarlet Tanager, 2; Blue Jay, 1.5; Black-and-white Warbler, 1.5; Ruffed Grouse, 1; Com. Flicker, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Tufted Titmouse, 1; Worm-eating Warbler, 1; Rose-breasted Grosbeak, 1; Yellow-billed Cuckoo, +; Pileated Woodpecker, +; Am. Robin, +; Blue-gray Gnatcatcher, +; Am. Redstart, +; N. Oriole, +. **Total:** 22 species; 28.5 territorial males (476/km², 193/100 acres). **Remarks:** Wood Thrushes have decreased for the second year from a high of 7 males. An increase of species but an overall decrease in community density was noted. Special thanks to D. A. Gross for his assistance with the counts and the Pennsylvania Power and Light Company for its financial support. — **ROBERT M. RUHE, Ichthyological Associates, Inc., R.D. 1, Berwick, Pa. 18603.**

54. 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; 3 consecutive years. **Size:** 11.05 ha = 27.3 acres. **Description of Plot:** See AB 33:70 (1979). **Weather:** See Census 53. **Coverage:** May 1, 8, 17, 22; June 7, 14, 19. Total man-hours: 17. **Census:** Wood Thrush, 5 (45, 18); Brown-headed Cowbird, 5; Black-and-white Warbler, 3 (27, 11); Rose-breasted Grosbeak, 3; Black-capped Chickadee, 2.5; Cardinal, 2.5; Rufous-sided Towhee, 2.5; Downy Woodpecker, 2; E. Wood Pewee, 2; Blue Jay, 2; Am. Redstart, 2; Scarlet Tanager, 2; Am. Robin, 1.5; Blue-gray Gnatcatcher, 1.5; Red-eyed Vireo, 1.5; Ovenbird, 1.5; Ruffed Grouse, 1; Com. Flicker, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; House Wren, 1; Worm-eating Warbler, 1; Gray Catbird, +; Veery, +; N. Oriole, +. **Total:** 26 species; 46.5 territorial males (421/km², 171/100 acres). **Remarks:** Nests found: 1 Black-capped Chickadee, 1 Am. Robin, 1 Rose-breasted Grosbeak. Special thanks to D. A. Gross for his assistance with the counts and the Pennsylvania Power and Light Company for its financial support. — **ROBERT M. RUHE, Ichthyological Associates, Inc., R.D. 1, Berwick, Pa. 18603.**

55. 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; 20 intermittent years. **Size:** Until 1961, 80 acres; since 1961, 26.3 ha = 65 acres. **Description of Plot:** See AFN 2:153-154 (1948). **Weather:** Temperatures averaged: April, 51°F; May, 67°; June, 74°. Rainfall was below normal. **Coverage:** Apr. 4, 8, 11, 14-15, 19, 21; May 1-2, 9, 15, 20, 25, 29, 31; June 1, 2, 7-8, 13, 18, 20, 29; July 6, 13; 0445-1100 and 1720-1945, EST. Total man-hours: 57. **Census:** Red-eyed Vireo, 11 (42, 17); Carolina Chickadee, 6 (23, 9); Tufted Titmouse, 5.5 (21, 8); Ovenbird, 4.5 (17, 7); Red-bellied Woodpecker, 4 (15, 6); Blue Jay, 4; White-breasted Nuthatch, 4; Scarlet Tanager, 3.5 (13, 5); Wood Thrush, 3 (11, 5); Downy Woodpecker, 2.5; Com. Flicker, 2; Hairy Woodpecker, 1.5; E. Wood Pewee, 1.5; Veery, 1.5; Pileated Woodpecker, 1; E. Phoebe, 1; Starling, 1; Louisiana Waterthrush, 1; Am. Redstart, 1; Cardinal, 1; Great Crested Flycatcher, 0.5; Brown-headed Cowbird, +. **Total:** 22 species; 61 territorial males or females (232/km², 94/100 acres). **Visitors:** Yellow-billed Cuckoo, Barred Owl, Acadian Flycatcher, Com. Crow, Am. Robin, Com. Grackle, Rufous-sided Towhee. **Remarks:** Nests found: Blue Jay, 2; Starling and E. Phoebe, 1 each. This year the number of species (22) is higher than the 17 in 1978 and the 21 in 1977. The total count of 61 is also higher than last year's 50.5 but lower than the total of 77 in 1977. As in past years, the figures continue a radical downward trend for summer residents: flycatchers, thrushes, vireos, and warblers. Permanent residents tend to increase except for the Carolina Wren, which was wiped out in the hard winter of 1977 and has not yet returned. — **R. FORD, D. LITTON, N. SCHLIAPIN, M. M. TERRY, JOAN H. CRISWELL (compiler), 3519 Jermantown Rd., Fairfax, Va. 22030.**

56. HEMLOCK - WHITE PINE - MIXED HARDWOOD FOREST. — Location: Virginia; Rockingham Co., 3.5 mi N of Rawley Springs on Va. Route 33; 38°32'49"N, 79°3'53"W, Rawley Springs Quadrangle, USGS. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured longitudinally and estimated laterally). **Description of Plot:** Mature second-growth forest flanking a low-gradient stream (Kephart Run). Although the two dominant canopy trees, E. Hemlock (*Tsuga canadensis*) and E. White Pine (*Pinus strobus*), are evergreen, the community is thoroughly mixed with a wide range of hardwoods typical of mountain ravines. The most prominent shrubs are Mountain Laurel (*Kalmia latifolia*) and Mountain Fetterbush (*Persis floribunda*). The ground cover is sparse and also diverse with greenbrier (*Smilax* spp.) and Partridgeberry (*Mitchella repens*) being the most common. A quantitative survey of the vegetation gave the following results: Trees 3+ in. in diameter, based on 6 circular samples, 517/acre; total basal area 190.7 ft²/acre. Species comprising 90% of the total number of trees: E. Hemlock, 150, 27, 33.4, 100, E. White Pine, 45, 8, 13.7, 83; Sweet Birch (*Betula lenta*), 47, 8.5, 9.3, 100; Tulip-tree (*Liriodendron tulipifera*), 35, 6, 7.7, 66; N. Red Oak (*Quercus rubra*), 7, 1.2, 4.7, 33; Chestnut Oak (*Q. prinus*), 27, 5, 4.6, 50; Red Maple (*Acer rubrum*), 53, 10, 4.5, 100; dead trees, 40, 7, 3.5, 100; White Ash (*Fraxinus americana*), 17, 3, 2.7, 83; Black Oak (*Q. velutina*), 3, 0.6, 22, 33; White Oak (*Q. alba*), 20, 4, 1.9, 83; Shagbark Hickory (*Carya ovata*), 17, 3, 1.6, 50, Bitternut Hickory (*C. cordiformis*), 20, 4, 1.5, 50. Trees by diameter size class: A (3-6 in.) 295, 57, 29.5, 15.6; B (6-9 in.) 115, 22, 34.5, 18.2, C (9-15 in.) 75, 15, 60, 31.6; D (15-21 in.) 25, 5, 45, 23.7; E (21-27 in.) 6.7, 1, 20.7, 10.9. Shrub stems/acre 3150; ground cover 40%; canopy cover 80%; average canopy height 67.5 ft (range 56-75). **Topography and Edge:** Like habitat extends on 3 sides but the ravine side rises steeply on the S edge and the stream borders to the N. The plot itself is relatively level with a gentle longitudinal slope. **Elevation:** 1860-1940 ft. **Weather:** Variable, clear to overcast and rain every day for the first 8 trips. **Coverage:** May 21-23, 25, 27-28, 30-31, June 5-6, 13, 16; 0545-0730 and 2000-2025. Total man-hours: 20. **Census:** Acadian Flycatcher, 10 (165, 67); Red-eyed Vireo, 8 (132, 53); Ovenbird, 4 (66, 27); Louisiana Waterthrush, 4; Wood Thrush, 2; N. Parula, 2; Scarlet Tanager, 2; Carolina Chickadee, 1; Great Crested Flycatcher, +; E. Wood Pewee, +; Rufous-sided Towhee, +. **Total:** 11 species; 33 territorial males (544/km², 220/100 acres). **Visitors:** Ruffed Grouse, and Black-and-white and Blackburnian Warblers. **Remarks:** Nest found: 1 Acadian Flycatcher. Special thanks to Kathleen Finnegan who laid out the plot and to Ellen Goetz and Clair Mellinger for the vegetative study. — **CHARLES ZIEGENFUS, Dept. of Mathematics and Computer Science, James Madison Univ., Harrisonburg, Va. 22807.**

57. HEMLOCK - CEDAR - PINE AND ASPEN - BIRCH FORESTS. — Location: Ontario; Ottawa-Carleton Region; West Carleton Township; SW of Fitzroy Harbour, 31 F/8 (Arnprior) 045342; Chats Falls Generating Station; 45°27'N, 76°15'W. **Continuity:** New. **Size:** 10 ha = 24.7 acres (rectangular,

283 × 353 m, measured with tape on ground)

Description of Plot: Encompasses two major community types. Deciduous forest covers most of the S half (about 3.4 ha) and coniferous most of the rest (6.1 ha). Four intermittent ponds, or portions thereof, account for approximately 0.5 ha. The vegetation of each type was assessed separately. Trees 7.6 cm dbh and over, based on four 0.04-ha circular samples, 1306/ha, total basal area 39.4 m²/ha. Species comprising 90% of the total number of trees [figures after each give number of trees/ha, relative density (%), relative dominance (%), relative frequency (%), in that sequence]: White Cedar (*Thuja occidentalis*), 319, 24, 29, 100; E Hemlock (*Tsuga canadensis*), 256, 20, 15, 100; White Pine (*Pinus strobus*), 194, 15, 20, 100; White Birch (*Betula papyrifera*), 131, 10, 10, 100; Balsam Fir (*Abies balsamea*), 119, 9, 3, 75; dead trees, 81, 6, 7, 100; Basswood (*Tilia americana*), 75, 6, 2, 100. Additional species sampled were White Spruce (*Picea glauca*), Quaking Aspen (*Populus tremuloides*), Hop-hornbeam (*Ostrya virginiana*), Bur Oak (*Quercus macrocarpa*), White Elm (*Ulmus americana*), Black Cherry (*Prunus serotina*), Sugar Maple (*Acer saccharum*), ash (*Fraxinus* sp.) Trees by diameter size class [figures after each class give number of trees/ha, relative density (%), basal area in m²/ha, relative dominance (%): A (7.6-15.2 cm) 587, 45, 5.5, 14; B (15.3-22.9 cm) 431, 33, 12, 31; C (23-38.1 cm) 281, 22, 20.9, 53; D (38.2-53.3 cm) 6, 0.5, 1, 3. Shrub stems/ha 644; ground cover 65%; canopy cover 92%; average canopy height 16.8 m (range 15-20.5). Deciduous habitat: Trees, based on four 0.04-ha plots, 825/ha, total basal area 20.2 m²/ha. Species comprising 90% of the total number of trees: White Birch, 156, 19, 18, 100; White Spruce, 125, 15, 10, 100; Balsam Fir, 113, 14, 7, 50; Sugar Maple, 100, 12, 8, 100; Quaking Aspen, 88, 11, 20, 75; Largetooth Aspen (*Populus grandidentata*), 50, 6, 14, 50; Basswood, 50, 6, 1, 50; ash, 38, 4, 2, 25; dead trees, 25, 3, 4, 75. Additional species sampled were E. Hemlock, White Cedar, Bur Oak, White Elm, Silver Maple (*A. saccharinum*). Trees by diameter size class: A, 494, 60, 4.6, 22; B, 194, 24, 5.4, 27; C, 138, 17, 10, 2, 51. Shrub stems/ha, 1743; ground cover 43%, canopy cover 73%. Average canopy height 17 m (range 15.5-19.5). An old logging road traverses the deciduous portion of the plot. The plot lies within a large area that can best be described as an interspersed patchwork of deciduous, coniferous, mixed, intermittent pond and open habitat types. Few homogeneous habitat types covering contiguous, centralized areas larger than 5 ha can be found on the 445 ha generating station site.

Edge: Within 50-150 m of all edges the on-plot community types change. The adjacent mosaic of community types is representative of the patchwork of types found on the plot itself.

Topography: Rugged with numerous rock outcroppings that characterize the Canadian Shield in this region. **Elevation:** 69-76 m. **Weather:** See Census 58. **Coverage (1978):** June 4, 8, 14, 24; July 4, 12, 17, 24; Aug. 23; 9 trips, 8 between 0513-0818 hours, EDT; 1 trip 1750-1934. Total man-hours: 21.9. **Census:** Red-breasted Nuthatch, 4 (40, 16); Ovenbird, 4, N. Waterthrush, 3 (30, 12); Scarlet Tanager, 25, Black-capped Chickadee, 2; Brown Creeper, 2; Veery, 2; Black-and-white Warbler, 2; Black-throated Green Warbler, 2; Brown-headed Cowbird, 2; Purple Finch, 2;

Great Crested Flycatcher, 15, E Wood Pewee, 15, Com. Crow, 15, Red-eyed Vireo, 15, Ruffed Grouse, 1; Mourning Dove, 1; Hairy Woodpecker, 1; E. Kingbird, 1; Blue Jay, 1; Am. Robin, 1; Wood Thrush, 1; N. Oriole, 1; Com. Grackle, 1; Rose-breasted Grosbeak, 1; Red-shouldered Hawk, +; Tree Swallow, +; Purple Martin, +; Blackburnian Warbler, +. **Total:** 29 species; 43.5 territorial males (435/km², 176/100 acres). **Visitors:** Mallard, Killdeer, Am. Woodcock, Barred Owl, Belted Kingfisher, Com. Flicker, Pileated Woodpecker, White-breasted Nuthatch, Swainson's Thrush, Cedar Waxwing, Bobolink, Red-winged Blackbird, Am. Goldfinch, Rufous-sided Towhee, White-throated Sparrow. **Remarks:** A Mourning Dove nest was found. A female Blackburnian Warbler feeding fledged young on July 17 was the only registration for this species. The Tree Swallow and Purple Martin were assessed + based solely on evidence of foraging activity over the plot. A grouse was observed on 5 days (twice with young) and the registrations formed a concentrated cluster. This survey was 1 of 4 conducted as part of a baseline study associated with the development of a proposed Ontario Hydro Generating Station at Chats Falls on the Ottawa River. Thanks to Ontario Hydro for permission to publish their data and thanks to Walter Sarafyn for assistance with the vegetation analysis. — TERRY N. TOBIAS and ROB R. EVANS, *The Proctor & Redfern Group, 75 Eglinton Ave. E., Toronto, Ontario, M4P 1H3.*

58. WHITE PINE - WHITE BIRCH CONIFEROUS FOREST. — **Location:** Ontario; Ottawa-Carleton Region; West Carleton Township; SW of Fitzroy Harbour; 31 F/8 (Arnprior) 046348; Chats Falls Generating Station; 45°27'N, 76°15'W. **Continuity:** New. **Size:** 8.4 ha = 20.76 acres (rectangular, 240 × 350 m, measured with tape on ground). **Description of Plot:** Trees 7.6 cm diameter and over, based on five 0.04-ha circular samples, 1,015/ha, total basal area 26 m²/ha. Species comprising 92% of the total number of trees [figures after each give number of trees/ha, relative density (%), relative dominance (%), relative frequency (%), in that sequence]: White Pine (*Pinus strobus*), 247, 25, 44, 100; Balsam Fir (*Abies balsamea*), 232, 23, 9, 100; White Cedar (*Thuja occidentalis*), 178, 18, 14, 80; White Birch (*Betula papyrifera*), 124, 12, 19, 100; Hop-hornbeam (*Ostrya virginiana*), 49, 5, 2, 40; dead trees, 49, 5, 4, 80; Sugar Maple (*Acer saccharum*), 45, 4, 2, 100. Additional species sampled were: White Spruce (*Picea glauca*), Quaking Aspen (*Populus tremuloides*), White Elm (*Ulmus americana*), Basswood (*Tilia americana*), Black Cherry (*Prunus serotina*), Largetooth Aspen (*P. grandidentata*). Trees by diameter size class [figures after each give number of trees/ha, relative density (%), basal area in square m²/ha, relative dominance (%): A (7.6-15.2 cm) 625, 62, 5.7, 22; B (15.3-22.9 cm) 195, 19, 5.4, 21; C (23-38.1 cm) 190, 19, 14.1, 54; D (38.2-53.3 cm) 5, 0.5, 0.8, 3. White Pine is the dominant canopy species (23 C-size trees in sample, 18 B-size) followed by White Birch (8 C-size, 12 B-size), White Cedar (5 C-size, 4 B-size), Largetooth Aspen (1 C-size, 0 B-size). Shrub stems/ha, 1,035; ground cover 25%; canopy cover 73%; average canopy height 17.6 m (range 14-20). Portions of 2 intermittent ponds totalling approximately

0.3 ha are located on the plot. **Edge:** Open electricity transmission corridors border the E and N edges. These are 60 and 25 m wide respectively. Similar White Pine-White Birch habitat exists beyond the N corridor, S of the plot, and along about 50% of the W edge. A large intermittent pond, a portion of which is on the plot, abuts on the SW corner. Another much smaller pond is located along the NW edge. The coniferous community along the N half of the W boundary begins to be mixed with a significantly different proportion of hardwoods within 50-100 m of the edge. Beyond this zone of intermediary community types lies a large hardwood community dominated by aspen and maple. Beyond the E corridor is another aspen-maple stand. **Topography:** Rugged with numerous rock outcroppings that characterize the Canadian Shield in this region. **Elevation:** 69-76 m. **Weather:** Average monthly temperature and rainfall at Ottawa International Airport with 30-year (1941-71) averages in brackets. Temperature in C — June 17.3° (18.2°); July 20.6° (20.7°); Aug. 19.7° (19.3°) Rainfall in mm — June 91.1 (72.6); July 55.1 (81.3); Aug. 116.2 (81.5). **Coverage (1978):** June 2, 6, 12, 21, 25; July 5, 14; Aug. 2, 15; 9 trips: 0510-0825 and 1836-2040. Total man-hours: 22.6. **Census:** Red-breasted Nuthatch, 3 (36, 14); Ovenbird, 3; E. Kingbird, 2; Great Crested Flycatcher, 2; Brown Creeper, 2; Wood Thrush, 2; Veery, 2; N. Waterthrush, 2; Brown-headed Cowbird, 2; Scarlet Tanager, 2; E. Wood Pewee, 1.5; Hairy Woodpecker, 1, Blue Jay, 1; Com. Crow, 1; Black-capped Chickadee, 1; Am. Robin, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Blackburnian Warbler, 1; Red-winged Blackbird, 1; Rose-breasted Grosbeak, 1; Purple Finch, 1; N. Oriole, 0.5; Mallard, +; Ruffed Grouse, +; Wood Duck, +; Red-shouldered Hawk, +; Purple Martin, +; Com. Grackle, +; Indigo Bunting, +; White-throated Sparrow, +. **Total:** 31 species; 35 territorial males (417/km², 169/100 acres). **Visitors:** Killdeer, Am Woodcock, Mourning Dove, Com. Flicker, Downy Woodpecker, Least Flycatcher, Tree Swallow, White-breasted Nuthatch, Cedar Waxwing, Starling, Black-throated Green Warbler, Bobolink, Am. Goldfinch, Rufous-sided Towhee, Chipping Sparrow, Song Sparrow. **Remarks:** The high community richness and low population densities are probably related to plot size and plurality of edge habitat types. Breeding species having territories strongly associated only with the intermittent pond habitat type were Mallard, Wood Duck, Black-and-white Warbler, waterthrush, Red-winged Blackbird. Species having territories strongly associated only with the corridor habitat type were oriole, bunting, White-throated Sparrow. Species having territories associated with both these open habitat types were kingbird (3 edge territories maintained) and robin (4 or 5 edge territories maintained). One of the 2 pewee territories was adjacent to the hardwood community to the W of the plot as was the only vireo territory. A second pewee territory was associated with the open pond. It is suspected that the Red-shouldered Hawk nested on the plot. A grouse was observed with young June 25. The martin and grackle were based solely on evidence of foraging activity on or over the plot. This survey was one of 4 conducted as part of a baseline study associated with the development of a proposed Ontario Hydro

Generating Station at Chats Falls on the Ottawa River Thanks to Ontario Hydro for permission to publish their data and to Walter Sarafyn for assistance with the vegetation analysis. — **TERRY N. TOBIAS and ROB R. EVANS**, *The Proctor & Redfern Group, 75 Eglinton Ave. E., Toronto, Ont. M4P 1H3.*

59. TAMARACK BOG AND HARDWOOD. — **Location:** Michigan; Berrien Co., 1 mi SW of Stevensville in Grand Mere State Park; 5 mi N of Willow Drive on Wishart Road; 41°59'30"N, 86°33'W, Bridgman Quadrangle. **Continuity:** Established 1976; 4 consecutive years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AB 30:1049 (1976). **Weather:** Below normal. **Coverage:** May 26; June 3, 16-17, 23-24; July 14; 0700-2200 hours. Total man-hours: 8. **Census:** Veery, 3 (35, 14); E. Wood Pewee, 2; Blue Jay, 2; Am. Robin, 2; Wood Thrush, 2; Red-eyed Vireo, 2; Ovenbird, 2; Canada Warbler, 2; Mourning Dove, 1; Great Crested Flycatcher, 1; Tufted Titmouse, 1; Black-throated Green Warbler, 1; Scarlet Tanager, 1; Cardinal, 1; Am. Woodcock, 0.5; Downy Woodpecker, 0.5; Black-capped Chickadee, 0.5; Com. Flicker, +; Hairy Woodpecker, +; White-breasted Nuthatch, +. **Total:** 20 species; 24.5 territorial males (288/km², 117/100 acres). **Visitors:** Whip-poor-will, Prairie Warbler, Com. Grackle. **Remarks:** Population density at a 4-yr high with 1 new species. Cowbird was absent this year. — **ALBERT MORSE and JAMES MULLINS (compiler)**, 2558 Locust Lane, Stevensville, Mich. 49127.

60. 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. **Size:** 4.86 ha = 12 acres. **Description of Plot:** See AB 33:71 (1978). **Weather:** Cool for May and June. **Coverage:** May 16 to June 14; 5 trips. Total man-hours: 12. **Census:** Red-eyed Vireo, 4 (82, 33); Acadian Flycatcher, 3 (62, 25); E. Wood Pewee, 3; Am. Robin, 3; Wood Thrush, 2; Chipping Sparrow, 2; Com. Flicker, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; Great Crested Flycatcher, 1; E. Phoebe, 1; Com. Crow, 1; Ovenbird, 1; Com. Yellowthroat, 1; Com. Grackle, 1; Scarlet Tanager, 1; Blue-gray Gnatcatcher, 1; Indigo Bunting, 1; Yellow-billed Cuckoo, +; Screech Owl, +; Ruby-throated Hummingbird, +; Blue Jay, +; Tufted Titmouse, +; White-breasted Nuthatch, +; Brown Thrasher, +; Black-throated Green Warbler, +; Cerulean Warbler, +; Kentucky Warbler, +; Cardinal, +; Song Sparrow, +. **Total:** 30 species; 29 territorial males (597/km², 241/100 acres). **Remarks:** Not enough singing was heard to establish with absolute certainty that all male birds present were mated, but since the 12 acres in question are surrounded on 3 sides by fields, any nesting of woodland birds would probably take place inside the Leo Petroglyph site (the fourth side is shrub). So, the +'s are assumed very likely candidates for breeding; they were all seen repeatedly but were not necessarily vocal or located in a consistent territory. Possibly, the entire 12 acres was territory for all of them. Two unidentified flycatchers were seen and heard consistently; 1 was nesting. — **ANN BINGAMAN (compiler)**, **DALE EICHER**,

and **ESTHER REICHELDERFER**, *Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio 43211.*

61. RED SPRUCE FOREST. — **Location:** New Brunswick; Albert Co., in Fundy Nat'l Park, 0.8 mi S of Marven Lake; 45°34'N, 65°06'W, NTS map 21H/11E Waterford. **Continuity:** New. **Size:** 11.25 ha = 27.8 acres (rectangular, 450 m 178° by 250 m 268°, with 50 m grid); compass and measured rope). **Description of Plot:** An uneven-aged, mainly two-storied, Red Spruce (*Picea rubens*) stand, with scattered large Yellow Birch (*Betula lutea*), that developed following a selective cutting of large trees about 1930 prior to establishment of the park. Area well-drained except around 3 spring-fed booklets arising near the E edge. A quantitative survey of the vegetation, based on eight 0.1 acre circles, gave the following results: Trees 3-in. diameter and over, 530/acre; total basal area, 262.3 ft²/acre. Species comprising 90% of the total, followed by number of trees/acre, relative density (%), relative dominance (%) and frequency (%) were: Red Spruce, 406, 77, 69, 100; dead trees, 95, 18, 18, 100. Trees by diameter size class, followed by trees/acre, relative density (%), basal area (ft²/acre), and relative dominance (%): A (3-6 in.), 240, 45, 26.2, 10; B (6-9 in.), 142, 27, 43.9, 17; C (9-12 in.), 74, 14, 43.9, 17; D (12-15 in.), 19, 4, 18.9, 7; E (15-21 in.) 32, 6, 57.2, 22; F (21-27 in.), 21, 4, 66.2, 25; G (27-33 in.), 1, 0.2, 6.0, 2. Shrub stems/acre, 550 (Red Spruce 59%, dead saplings 40%); ground cover 82%, the principal species being Am. Wood-sorrel (*Oxalis montana*) cover 43%, various small liverworts and mosses (*Bazzania*, *Dicranum*, *Hypnum* and others) 27%, Spineulose Shieldfern (*Dryopteris austriaca*) 22%, Bunchberry (*Cornus canadensis*) 8%. Canopy cover 79%; mean overstory canopy height 79 ft (range 62-85); mean understorey canopy height 39 ft (range 36-46). **Edge:** Similar habitat N and S but changing to forest with a considerable Yellow Birch component about 50 m E and W of the plot. **Topography:** A low N-S ridge sloping off to small brooks E and W of the plot. **Elevation:** 700-800 ft. **Weather:** Very wet, but warm during May preceding a rather normal June and July. Clear to partly cloudy during 7 coverages, foggy during 2; winds calm to light; temperatures 45-75°F. **Coverage:** June 2, 14-15, 21, 30; July 10, 13-14; 0530-1050 and 2020-2145, ADT. Total man-hours: 34.6. **Census:** Bay-breasted Warbler, 51 (453, 183); Blackburnian Warbler, 21 (187, 76); Yellow-bellied Flycatcher, 14 (124, 50); Tennessee Warbler, 9.5 (84, 34); Swainson's Thrush, 6 (53, 22); Yellow-rumped Warbler, 5.5 (49, 20); Black-throated Green Warbler, 5.5; Brown Creeper, 4 (36, 14); Dark-eyed Junco, 4; Magnolia Warbler, 2; Ovenbird, 1.5; Hairy Woodpecker, 1; Downy Woodpecker, 1; Golden-crowned Kinglet, 1; White-throated Sparrow, 1; Black-backed Three-toed Woodpecker, 0.5; Purple Finch, 0.5; Pine Siskin, 0.5; Goshawk, +; Ruffed Grouse, +; Solitary Vireo, +. **Total:** 21 species; 129.5 territorial males (1151/km², 466/100 acres). **Visitors:** Chimney Swift, Pileated Woodpecker, Gray Jay, Boreal Chickadee, Red-breasted Nuthatch, Am. Robin, Hermit Thrush, Ruby-crowned Kinglet, Red-eyed Vireo, Nashville Warbler, N. Parula, Mourning Warbler, Am. Redstart, Evening Grosbeak, White-winged Crossbill. **Remarks:** Nests found: Goshawk (1) and Ten-

nessee Warbler (2), and a brood of downy young Ruffed Grouse Chimney Swifts and Evening Grosbeaks were observed regularly and may have nested. The Spruce Budworm population was high and probably responsible for the large numbers of several of the more numerous species. Thanks to A. J. Erskine who provided advice on determining the number of territories of several species. This study is part of the Avifaunal Survey of Fundy Nat'l Park, Parks Canada contract ARO 78-44 — **DAVID S. CHRISTIE and BRIAN DALZELL**, *New Brunswick Museum, 277 Douglas Ave., Saint John, N.B. E2K 1E5.*

62. 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; 11 consecutive years. **Size:** Approximately 9.3 ha = 23 acres. **Description of Plot:** See AFN 23:743-744 (1969). **Weather:** See Census #50. **Coverage:** Apr. 23, 29, May 10, 19, 29; June 6, 17, 27; July 18, 23; Aug 2, 0850-2020, EDT. Total man-hours: 16. **Census:** Song Sparrow, 15 (161, 65); Chipping Sparrow, 14 (150, 61); Com. Yellowthroat, 8 (86, 35); Field Sparrow 8; Am. Robin, 4 (43, 17); Rufous-sided Towhee, 4; Cedar Waxwing, 3 (32, 13); Yellow-rumped Warbler, 3; Purple Finch, 3; Alder Flycatcher, 2.5; Am. Woodcock, 2; Nashville Warbler, 2; Black-billed Cuckoo, 1; Tree Swallow, 1; Gray Catbird, 1; Brown Thrasher, 1; Black-throated Green Warbler, 1; Brown-headed Cowbird (female), 1; Magnolia Warbler, +; Indigo Bunting, +. **Total:** 20 species; 74.5 territorial males (800/km², 324/100 acres). **Remarks:** This year's total territorial males (74.5) is down 16.3 from the 11-year average and represents the lowest total ever, climaxing a 3-yr decline which is reflective of the changing, maturing habitat. Nests found: Chipping Sparrow, 8; Song Sparrow, 7; Am. Robin, 6; Cedar Waxwing, 3; Alder Flycatcher, 1; Tree Swallow, 1; Gray Catbird, 1; Yellow-rumped Warbler, 1; Purple Finch, 1; Rufous-sided Towhee, 1; Field Sparrow, 1. Of the 31 nests, only 1 Chipping Sparrow's was parasitized by cowbirds. A Ruffed Grouse with 8 young was seen in mid-June. A male Prairie Warbler was territorial on several surveys but disappeared after May 29. Of the 31 nests, only 1 was located in Scotch Pine, the rest being found in Multiflora Rose or in the less mature spruce plantings at either end of the plot. Appreciation is extended to Alice Foster for permission to conduct the study on her land; to Gaylord Rough for assistance in field work. — **ELIZABETH W BROOKS**, *Water Wells Rd., Alfred Station, N.Y. 14803.*

63. RED PINE PLANTATION. — **Location:** Connecticut; Litchfield Co., White Memorial Foundation, Morris; 41°42'30"N, 73°10'W, Litchfield Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See AB 33 72 (1979). **Coverage:** May 16, 29; June 10, 16, 24. Total man-hours: 10. **Census:** N. Oriole, 5 (59, 24); Com. Yellowthroat, 4 (47, 19); Scarlet Tanager, 4; Rose-breasted Grosbeak, 4; Rufous-sided Towhee, 4; Com. Flicker, 2; Blue Jay, 2; Wood Thrush, 2; Veery, 2; Hairy

Woodpecker, 1, Great Crested Flycatcher, 1, E. Phoebe, 1, Black-capped Chickadee, 1, House Wren, 1; Am. Robin, 1; Blue-gray Gnatcatcher, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Ovenbird, 1; White-throated Sparrow, 1; Broad-winged Hawk, 0.5, E. Kingbird, 0.5; Solitary Vireo, 0.5; Louisiana Waterthrush, 0.5; Am. Redstart, 0.5, Red-tailed Hawk, +; Barred Owl, +; E. Wood Pewee, +; Com. Crow, +; White-breasted Nuthatch, +; Brown-headed Cowbird, +. **Total:** 31 species; 42.5 territorial males (500/km², 202/100 acres). **Remarks:** All but a quarter acre of the Red Pine, the chief overstory tree, was cut during the winter of 1978-79. Approximately 80% of the plot was cleared with only scattered hardwood saplings remaining. Except for 2 to 3 acres of "sinks" in which hardwood saplings and bushes dominate, the remaining hardwoods along the plot edge, brook edge and along a stone wall appear very top heavy with little lower story. As a result of the cutting 23 nesting species declined in numbers including 8 that were completely lost, 11 others increased including 5 that were completely new. Numbers of 5 nesting species were unchanged. The big gainers were N. Oriole (up from 0.5 to 5) and Rose-breasted Grosbeak (1.5 to 4). The big losers were Ovenbird (down from 15 to 1), Veery (7 to 2), Red-eyed Vireo (6 to 1), Blackburnian Warbler (5 to 0), Solitary Vireo (5 to 0.5), Wood Thrush (5 to 2), Black-capped Chickadee (4 to 1), Gray Catbird (3 to 0) and Black-and-white Warbler (3.5 to 1). All but 1 of the above are migratory species. There was a net loss of 3 nesting species and 45 territorial males. Thanks to Jim Cavanaugh. — **ANDREW MAGEE**, 34 Hobson St., Springfield, Mass. 01109.

64. MATURE LONGLEAF PINE FOREST. — **Location:** Georgia; Thomas Co., Mill Pond 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. **Size:** 58.3 ha = 144 acres (square, surveyed). **Description of Plot:** See Winter Bird-Population Study #15, this issue. **Weather:** Temperature 47-93° (average 60-85°) There was no precipitation and very little wind. **Coverage:** Apr. 4, 6, 13, 15, 18, 20, 27-28; May 4-5, 11-12, 18-19; June 1-4; 0530-1015, EST Total man-hours: 69. **Census:** Rufous-sided Towhee, 32 (55, 22); Red-cockaded Woodpecker, 17 (29, 12); Red-headed Woodpecker, 14 (24, 10); Com. Yellowthroat, 13 (22, 9), Bachman's Sparrow, 13; Great Crested Flycatcher, 11 (19, 8); Indigo Bunting, 11; Yellow-breasted Chat, 10 (17, 7); Blue Grosbeak, 10; Mourning Dove, 9 (15, 6); Red-bellied Woodpecker, 9; Pine Warbler, 9; E. Meadowlark, 9; Blue Jay, 8 (14, 6); E. Wood Pewee, 7 (12, 5); Brown-headed Nuthatch, 6 (10, 4); Bobwhite, 5 (9, 3); Com. Flicker, 5; Brown-headed Cowbird, 5; White-breasted Nuthatch, 4 (7, 3); Cardinal, 4; Orchard Oriole, 3 (5, 2); Summer Tanager, 3; Wood Duck, 2; E. Kingbird, 2; Com. Crow, 2; Carolina Wren, 2; Brown Thrasher, 2; E. Bluebird, 2; Red-winged Blackbird, 2; Great Horned Owl, 1; Pileated Woodpecker, 1; Downy Woodpecker, 1; Tufted Titmouse, 1; Mockingbird, 1; Loggerhead Shrike, 1; Yellow-throated Vireo, 1; Com. Grackle, 1; Ground Dove, +; Com. Nighthawk, +; Hairy Woodpecker, +; Purple Martin, +; Fish Crow, +; Carolina Chickadee, +; Blue-gray Gnat-

catcher, + **Total:** 45 species, 239 territorial males or females (410/km², 166/100 acres) **Visitors:** Gray Catbird, Red-eyed Vireo, Prairie Warbler, Field Sparrow. **Remarks:** The Red-cockaded Woodpecker and the Bobwhite deserve special consideration because of their social organizations. Although 17 Red-cockaded/trip were reported in the results, this figure is the total population, composed of 4 clans each with only 1 breeding pair. The Bobwhite occurs in coveys and should not be interpreted in terms of territorial males. Also, it should be noted that if the plot had been as small as 100 acres, fewer than 45 species would be expected because of the species-area effect. — **TODD ENGSTROM**, Dept. Biol. Sci., Fla. State Univ., Tallahassee, Fla. 32306.

65. SLASH PINE-CYPRESS MOSAIC. — **Location:** Florida; Collier Co., Big Cypress Nat'l Preserve; (plot center), N of Fiftymile Bend Quadrangle, USGS. **Continuity:** New. **Size:** 40 ha = 98.8 acres (square, 632.5 × 632.5 m, measured). **Description of Plot:** Virgin south Florida Slash Pine forest with a mosaic pattern of interspersed cypress domes and cypress prairies. Four plant communities comprise the plot: pine forest 63% (25.2 ha), cypress dome 18% (7.2 ha), cypress prairie 17% (6.8 ha), and mixed hardwood hammock 2% (0.8 ha). Excluding the small amount of mixed hardwood hammock, this mixture is typical for the area. Dominant species in the pine forest is Slash Pine (*Pinus elliotii* var. *densa*) and in the cypress communities, Pond Cypress (*Taxodium ascendens*). Quantitative analysis of the pine forest, based on two 0.06 ha rectangular plots, yielded: for trees 2-in. dbh and greater, 158 trees/ha; total basal area 1.2 m²/ha. Species comprising 100% of the total number of trees (figures after each give number of trees/ha, relative density (%), relative dominance (%), relative frequency (%) in that sequence): *Pinus* 125, 79, 90, 84; Cabbage Palm (*Sabal palmetto*) 33, 21, 10, 16. Canopy cover was 34%; mean canopy height 15 m (range 5-24). Shrubs covered 24% of the ground area, dominant species (followed by importance value) being *Sabal* (124) and *Sereinoa repens* (69). Understory herbaceous species (followed by importance value) include *Schizachyrium rhizomatum* (32), *Rhynchospora divergens* (22), *Cassyttha filiformis* (17), *Flaveria linearis* (14), and *Muhlenbergia filipes* (11). Quantitative analysis of the cypress prairie, based on one 0.06 ha plot, yielded: for trees 2-in. dbh and greater, 967 trees/ha; total basal area 4.9 m²/ha. The only tree encountered was *Taxodium*. Canopy cover was 14%; tree heights varied 2-7 m. Shrub cover was 18%, dominant species being *Taxodium* (169) and *Stillingia aquatica* (31). Dominant understory species include *Rhynchospora microcarpa* (47), *Schizachyrium* (43), and *Muhlenbergia* (26). Quantitative analysis of the cypress dome, based on one 0.6 ha plot, yielded: for trees 2-in. dbh and greater, 2067 trees/ha; total basal area 69.4 m²/ha. *Taxodium*, 1850, 90, 98, 92; and Pond-Apple (*Annona glabra*), 217, 10, 2, 8; comprised 100% of the total number of trees. Canopy cover was 86%; canopy height varied 4 to 20 m. Shrub cover was 0.1%; *Taxodium* being the only shrub species in the plot. Understory species include *Panicum hemitomon* (73) and *Bacopa caroliniana* (59). No quantitative analysis was done on the mixed hardwood hammock owing to its irregular



Census 65. Slash Pine-Cypress Mosaic. Photo /G. A. Patterson.

shape and the little use of the area by the territorial birds listed. The dominant plants of the hammock were: *Quercus laurifolia*, *Myrica cerifera*, *Sabal*, *Pinus*, *Magnolia virginiana*, *Rhus copallina*, *Ficus aurea*, *Myrsine guianensis*, and *Trema micrantha* in the overstory, *Blechnum serrulatum*, *Nephrolepis exaltata*, *Myrsine*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Chrysobalanus icaco* in the understory. **Edge:** Similar habitat on the N, W, and S sides. The E side has a higher percentage of cypress prairie. **Topography:** Flat. **Elevation:** 3 to 4 m. **Weather:** Skies clear, mean 0-5% cloud formation (range 0-50), wind 0-3.2 km/hr during all censuses; temperatures: 21-27°C (range for the period 5/30 to 6/9, recorded at Oasis Ranger Station — Big Cypress Nat'l Preserve, 18.3-36.1°); no precipitation during censuses (4.8 cm recorded for the period); humidity: 70-97% during censuses. **Coverage:** May 30; June 1-9; 0625-0930, EDST. Total man-hours: 22.25. **Census:** Red-bellied Woodpecker, 7 (18, 7); Great Crested Flycatcher, 6 (15, 6); Carolina Wren, 6; Pine Warbler, 6; Bobwhite, 4 (10, 4); Cardinal, 3 (8, 3); E. Meadowlark, 2.5; Com. Flicker, 2; Pileated Woodpecker, 2; Downy Woodpecker, 2; Brown-headed Nuthatch, 2, E. Bluebird, 2; Swallow-tailed Kite, 1; Red-cockaded Woodpecker, 1; Tufted Titmouse, 1; Blue-gray Gnatcatcher, 1; Com. Crow, +, White-eyed Vireo, +. **Total:** 18 species; 48.5 territorial males (121/km², 49/100 acres). **Visitors:** Red-shouldered Hawk, Great Egret, Snowy Egret, Cattle Egret, Little Blue Heron, Wood Stork, White Ibis, Barred Owl, Ruby-throated Hummingbird, Hairy Woodpecker, Com. Grackle, Summer Tanager. **Remarks:** Nests found: Red-shouldered Hawk, 3 (inactive); Red-bellied Woodpecker, 3; Com. Flicker, 2; Swallow-tailed Kite, 1; Pileated Woodpecker, 1; Red-cockaded Woodpecker, 1, Great Crested Flycatcher, 1; E. Bluebird, 1; E. Meadowlark, 1. A pair of Turkeys with 8+ young (2-3 weeks old) was observed. The pair of Swallow-tailed Kites was observed building a nest and in courtship flight. Carolina Wrens

and E Meadowlarks were utilizing the cypress communities almost entirely, cypress domes for the former and cypress prairies for the latter. All other territorial birds utilized the slash pine community. — GARY A. PATTERSON, WILLIAM B. ROBERTSON, JR., and DENNIS E. MINSKY. (Vegetation analysis by LANCE GUNDERSON and REGINA ROCHEFORT). Nat'l Park Service, South Florida Research Center, Homestead, Fla. 33030.

66. JACK PINE FOREST. — **Location:** Ontario; District of Kenora, Sandbar Lake Prov. Park, 6 mi N of Highway 17 on Highway 599; 49°27'N, 91°33'W, Ignace, Dept. of Energy, Mines and Resources, Ottawa. **Continuity:** New. **Size:** 6.59 ha = 16.29 acres (surveyed by compass and tape; irregular rectangle). **Description of Plot:** Selectively logged in the early 1960's for Jack Pine (*Pinus banksiana*) and possibly White Pine (*P. strobus*). The dominant canopy tree is Jack Pine. Most dominant in the understory is Bush Honeysuckle (*Diervilla lonicera*), Labrador Tea (*Ledum groenlandicum*), and Green Alder (*Alnus crispa*). The ground cover is primarily Bunchberry (*Cornus canadensis*), Wild Lily-of-the-valley (*Maianthemum canadense*), Twinflower (*Linnaea borealis*), Bracken (*Pteridium aquilinum*), Bluebead (*Clintonia borealis*), and Shining Clubmoss (*Lycopodium lucidulum*). There is also a continuous ground cover of mosses, dominated by *Pleurozium schreberi*. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 5 circular samples, 426/acre; total basal area 155.6 ft²/acre. Species comprising 90% of the total number of trees: Jack Pine, 244, 57, 77, 100; Balsam Fir (*Abies balsamea*), 100, 24, 10, 100; dead trees, 48, 11, 6, 80. Trees by diameter size class: A (3-6 in.) 116, 27, 5.8, 7; B (6-9 in.) 208, 49, 31.5; 40; C (9-15 in.) 102, 24, 41.6, 53. Shrub stems/acre 26,962; ground cover 42%; canopy cover 70%; average canopy height 66 ft (range 60-71). **Edge:** Bordered on the E by similar vegetation. The N, S and W borders are aspen-pine woods. **Elevation:** 443 ft. **Weather:** Warm and extremely dry June. Census periods generally cool (4-10°C) with little or no wind. Rain during 1 census. **Coverage:** June 3, 5, 7, 9, 11, 15, 27, 29; between dawn and 0800 or 1800-2100 hours, CDT. Total man-hours: 24. **Census:** Least Flycatcher, 7 (106, 43); Ovenbird, 4 (61, 25); Brown Creeper, 3 (46, 18); E. Wood Pewee, 1; Ruby-crowned Kinglet, 1; Solitary Vireo, 1; Red-eyed Vireo, 1; Yellow-rumped Warbler, 1; Bay-breasted Warbler, 1; Hermit Thrush, 0.5; Nashville Warbler, +. **Total:** 11 species; 20.5 territorial males or females (311/km², 126/100 acres). **Visitors:** Spruce Grouse, Pileated Woodpecker, Black-backed Three-toed Woodpecker, Blue Jay, Gray Jay, Com. Raven, Evening Grosbeak, Blackburnian Warbler. **Remarks:** Solitary Vireo, Red-eyed Vireo, Hermit Thrush and Nashville Warbler were found in areas with higher density of Quaking Aspen (*Populus tremuloides*) near forest edge. Special thanks to Paula Terpstra for assistance with the quantitative habitat destruction. — BRUCE D. RALPH, P.O. Box 1096, Ignace, Ont. P0T 1T0, Canada.

67. PINE PLANTATION. — **Location:** Indiana; Perry Co., Hoosier Nat'l Forest, 0.5 mi N Gatchel, N corner at 38°3'22"N, 86°39'

10'W, in Sect 29, T5S, R2W Gatchel Quadrangle, USGS **Continuity:** New **Size:** 781 ha = 19.3 acres (irregular trapezoid, measured with steel tape and compass). **Description of Plot:** Pines planted, variously, 15-30 years ago. Deciduous trees succeeding slowly to rapidly in various sectors, but only one tree on the plot now overtops the pines. A gravelled road curves through the plot from NW to S. Trees 2 in. dbh and over on five 0.1 acre plots totaled 738 stems/acre and 153 ft²/acre basal area. By diameter size classes they were: 2-4 in. dbh 184/acre density, 9 ft²/acre basal area; 4-8 in. dbh 452.89; 8-12 in. dbh 51, 56. By species they were: Red Pine (*Pinus resinosa*), 248/acre density, 66 ft²/acre basal area; Scrub Pine (*P. virginiana*), 228, 62; Scotch Pine (*P. sylvestris*), 138, 12; Persimmon (*Diospyros virginiana*), 30, 41; *Sassafras albidum*, 22, 3; Black Locust (*Robinia pseudoacacia*), 20, 2; 9 other species, White Ash (*Fraxinus americanus*), Flowering Dogwood (*Cornus florida*), Sugar Maple (*Acer saccharum*), Red Mulberry (*Morus rubra*), Am. Elm (*Ulmus americana*), Red Maple (*A. rubrum*), Tulip-tree (*Liriodendron tulipifera*), Black Cherry (*Prunus serotina*), Black Oak (*Quercus velutina*), 52, 4. Canopy not closed in the NW one-fourth of the plot (height 15 ft); canopy mostly closed elsewhere, with height 30-50 ft. **Topography:** Moderate slopes, down toward the SW except near the E boundary, where down toward the E. Relief 80 ft. **Elevation:** 735 ft at the highest point, near the N corner. **Edge:** Similar pine stands extend 100 ft or more from about 2900 ft of the boundary, but deciduous forest adjoins 500 ft and open grass or brush adjoin 800 ft near the NW corner. **Weather:** About average for season; temperature 60-82°F; sky clear to partly cloudy during 7 counts, overcast once with a light rain falling for 30 minutes; wind Beaufort 0-2 (mostly 1). **Coverage:** May 8, 9, 28-30; June 4-6, 13, 18-19, 29. Total man-hours: 32. **Census:** Indigo Bunting, 4 (51, 21); Cardinal, 3.5 (45, 18); Red-eyed Vireo, 3 (38, 16); Pine Warbler, 3; Kentucky Warbler, 3; Blue-gray Gnatcatcher, 2.5; Rufous-sided Towhee, 2.5; White-eyed Vireo, 2; Yellow-billed Cuckoo, 1.5; Black-billed Cuckoo, 1.5; Chuck-will's-widow, 1.5; Gray Catbird, 1.5; Prairie Warbler, 1.5; Yellow-breasted Chat, 1.5; Chipping Sparrow, 1.5; Ruby-throated Hummingbird, 1 (female); Great Crested Flycatcher, 1; Acadian Flycatcher, 1; Field Sparrow, 1; Whip-poor-will, 0.5; Brown Thrasher, 0.5; Com. Yellowthroat, +; Summer Tanager, +. **Total:** 23 species; 39 territorial males (499/km², 202/100 acres). Scott Phillips and Juanita R. Webster helped with the census work, but their time was not calculated above. — J. DAN WEBSTER, Hanover College, Hanover, Ind. 47243.

68. RED PINE PLANTATION. — **Location:** Minnesota; Cass Co., Chippewa Nat'l Forest; NE ¼ of SE ¼, Sec. 4, T145N, R30W; Pennington Quadrangle, USGS. **Continuity:** New. **Size:** 11.5 ha = 28.5 acres. **Description of Plot:** Red Pine (*Pinus resinosa*) plantation with average canopy height about 60-65 ft. There are scattered hardwood saplings 20-35 ft high, mainly Paper Birch (*Betula papyrifera*) with a lower, 8-12 ft, discontinuous layer of *Corylus* spp. and *Prunus* spp. **Edge:** Bordered on S, W and NW by mixed coniferous-hardwood forest and a Red Pine clearcut on E and NE. **Topography:** Flat. **Coverage:** May 23, 27; June 6, 10, 24-25; 0600-1100. Total man-

hours 15 **Census:** Least Flycatcher, 16.5 (143, 58), Red-eyed Vireo, 7 (61, 25), Ovenbird, 5 (43, 18); E. Wood Pewee, 3 (26, 11), Veery, 2; Chipping Sparrow, 2; Pine Warbler, 1.5; Blue Jay, 1; Black-capped Chickadee, 1, Red-breasted Nuthatch, 1; Brown-headed Cowbird, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Rufous-sided Towhee, 1; Black-billed Cuckoo, +; Hairy Woodpecker, +, Olive-sided Flycatcher, +; House Wren, +, Solitary Vireo, +; Chestnut-sided Warbler, +, Nashville Warbler, +; Purple Finch, +. **Total:** 22 species; 44 territorial males (381/km², 154/100 acres). — DONALD RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St Paul, Minn. 55108.

69. RED CEDAR COULEE. — **Location:** North Dakota; Billings Co., 1.5 mi NW of Medora; NE ¼ of SW ¼, Sec. 15, T140N, R102W; 46°56'N, 103°33'W, Medora Quadrangle, USGS. **Continuity:** New. **Size:** 1.54 ha = 3.8 acres (irregular shape; size determined by planimetric measurement from aerial photos, Soil Conservation Service). **Description of Plot:** A coulee with three "arms" merging into one and draining NW toward the Little Missouri River. Predominantly covered with Rocky Mountain Red Cedar (*Juniperus scopulorum*) with a small amount of Green Ash (*Fraxinus pennsylvanica*) at the NW point of the coulee. Dominant grasses are Little Rice Grass (*Oryzopsis micrantha*), Little Bluestem (*Andropogon scoparius*), Big Sand Grass (*Calamovilfa longifolia*), and Plains Muhly (*Muhlenbergia cuspidata*). Dominant shrubs are Creeping Juniper (*Juniperus horizontalis*), Dwarf Juniper (*J. communis*), Buckbrush (*Symphoricarpos occidentalis*), and Skunk Bush (*Rhus trilobata*). Ground cover 10% Grasses comprise 30% of cover, forbs 10%, and shrubs 60%. **Edge:** Bordered on all sides by eroded Badlands. **Topography:** Rugged. Very steeply sloping from a high butte into the coulee. Moderately sloping from the head of the coulee to the bottom of the drainage. Surrounded by Badlands on all sides. **Elevation:** 2350-2450 ft. **Weather:** Skies overcast to mostly clear. Dry throughout period. No precipitation during any census. Temperatures 40-75°F. **Coverage:** June 2, 10-11, 13, 15, 18, 21, July 21; between dawn and 0910. Total man-hours 7.2. **Census:** Rufous-sided Towhee, 4 (260, 105); Black-billed Magpie, 1; Black-and-white Warbler, 1; Chipping Sparrow, 1. **Total:** 4 species; 7 territorial males or females (455/km², 184/100 acres). **Visitor:** Brown-headed Cowbird. **Remarks:** Nest located: Black-billed Magpie, 1. This coulee lies within Theodore Roosevelt Nat'l Park (South Unit). The steepness of this site made it impossible to obtain quantitative data on the trees forming the canopy. — J. M. WIEHE and FARRON WALLACE, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

70. LANDSCAPED PARK AREA. — **Location:** New Brunswick; Albert Co., at junction of Route 114 and Point Wolfe Road in Fundy Nat'l Park; 45°36'N, 64°57'W, NTS map 21H/10W Alma. **Continuity:** New. **Size:** 22.5 ha = 55.6 acres (irregular, roughly six-sided, area with topographic boundaries, about 1900 ft N-S by 2050 ft E-W; area calculated from 1:2400 park plan). **Description of Plot:** A landscaped accommodation and

recreation area dominated by mowed lawn (about 25 acres), 7 woodland groves (about 10 acres), flower beds, ornamental shade trees and shrubs, 7600 ft of paved roadways, 6 small parking lots, 43 buildings and a deep pond (2 acres). Most of the buildings are small (including 29 rental cabins and 4 single family residences) but 3, the main park office, a restaurant and a meeting hall are of moderate size. Recreational facilities include 3 tennis courts, a golf putting green, lawn bowling green, children's playground and outdoor theatre. Four of the wooded areas have considerable human traffic through them. Two groves are coniferous, composed primarily of Red Spruce (*Picea rubens*) with some White Spruce (*P. glauca*) and Balsam Fir (*Abies balsamea*). The remainder are of mixed composition, primarily of Red Spruce, Yellow Birch (*Betula lutea*), White Birch (*B. papyrifera*), Am Mountain Ash (*Sorbus americana*) and Shadbush (*Amelanchier* spp.). The coniferous woods have little undergrowth but the mixed wood areas support a moderate growth of tree saplings and shrubs. **Edge:** Bounded to the N by a campground in mixed woods, to the W by spruce-birch forest, to the SW by a golf course and to the E by a gravel bank, supporting willow (*Salix* sp.) and alder (*Alnus* sp.) thickets and dropping abruptly to the sea beach. **Topography:** Flat terrace sloping gently to a central depression around the pond. **Elevation:** 75-150 ft. **Weather:** Very wet but warm in May; near average conditions in June and July. Clear during 4 coverages, foggy during 4, overcast once; mostly calm to a gentle breeze; temperatures 45-70°F. **Coverage:** May 26; June 2, 6, 13, 21, 24; July 1, 7, 15; 0530-0945, ADT Total man-hours: 27.9. **Census:** Barn Swallow, 22 (98, 40); Am. Robin, 8.5 (38, 15); Chipping Sparrow, 8 (36, 14); Am. Redstart, 7 (31, 13); Cliff Swallow, 5 (22, 9); N. Parula, 4 (18, 7); Yellow-rumped Warbler, 4; Starling, 3 (13, 5), Com. Grackle, 3; Dark-eyed Junco, 3; Red-eyed Vireo, 2; Tree Swallow, 1.5; Least Flycatcher, 1; E. Wood Pewee, 1; Gray Catbird, 1; Cedar Waxwing, 1; Black-and-white Warbler, 1; Yellow Warbler, 1; Cape May Warbler, 1; Blackburnian Warbler, 1; Red-winged Blackbird, 1; Purple Finch, 1; Am. Goldfinch, 1; Com. Crow, 0.5; Ruby-crowned Kinglet, 0.5; Magnolia Warbler, 0.5; Belted Kingfisher, +; Blue Jay, +; Tennessee Warbler, +. **Total:** 29 species; 83.5 territorial males (371/km², 150/100 acres). **Visitors:** Chimney Swift, Ruby-throated Hummingbird, Downy Woodpecker, Bank Swallow, Swainson's Thrush, Nashville Warbler, Black-throated Green Warbler, Bay-breasted Warbler, Ovenbird, Com. Yellowthroat, Canada Warbler, Evening Grosbeak, Pine Siskin, Bobolink, Rusty Blackbird, Rose-breasted Grosbeak. **Remarks:** Nests found: Barn Swallow, 22; Cliff Swallow, 5; Am. Robin, 2; Starling, 2; Com. Grackle, 2. Broods of dependent fledglings: Chipping Sparrow, 2; Am. Robin, 1; Yellow-rumped Warbler, 1; Am. Redstart, 1. Territories centered about the wooded areas and thicker shade trees and shrubbery. Most of the Barn Swallows and all the Cliff Swallows nested beneath the broad eaves of two of the larger buildings. This study is part of the Avifaunal Survey of Fundy Nat'l Park, Parks Canada contract ARO 78-44. — *DAVID S. CHRISTIE and BRIAN DALZELL, New Brunswick Museum, 277 Douglas Ave., Saint John, N.B. E2K 1E5.*

71. 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; 12 consecutive years. **Size:** 14.17 ha = 35 acres. **Description of Plot:** See *AFN* 22:714-715 (1968). **Coverage:** May 21, 30; June 6, 14, 21, 27; 0600-1400, EDT. Total man-hours: 15. **Census:** Blue Jay, 4 (28, 11); Wood Thrush, 4; Ovenbird, 4; Veery, 3 (21, 9); Black-capped Chickadee, 2; House Wren, 2; Com. Yellowthroat, 2; Cardinal, 2; Rufous-sided Towhee, 2; E. Wood Pewee, 1; White-breasted Nuthatch, 1; Gray Catbird, 1; Am. Robin, 1; Black-and-white Warbler, 1; Blue-winged Warbler, 1; Com. Grackle, 1; Scarlet Tanager, 1; Com. Flicker, 0.5; Hairy Woodpecker, 0.5; Tufted Titmouse, 0.5; Red-eyed Vireo, 0.5; Downy Woodpecker, +; Brown Thrasher, +. **Total:** 23 species; 35 territorial males (247/km², 100/100 acres). **Visitors:** Broad-winged Hawk, Chimney Swift, Com. Crow, Yellow-throated Vireo, Chestnut-sided Warbler, Louisiana Waterthrush, Brown-headed Cowbird, House Finch, Chipping Sparrow. **Remarks:** Only 3 fewer species were seen but the total number of territorial males was down by 56.5. — *LEON L. BARKMAN and POLLY BRODY, Western Connecticut Bird Club, P.O. Box 542, Woodbury, Conn. 06798.*

72. UPLAND BRUSHY PASTURE. — **Location:** Connecticut; Litchfield Co., White Memorial Foundation, Litchfield; 41°42'N, 73°13'28'W, Litchfield Quadrangle, USGS. **Continuity:** Established 1963; 13 intermittent years. **Size:** 8.5 ha = 21 acres. **Description of Plot:** See *AFN* 19:609-610 (1965). **Coverage:** May 27-28; June 2, 9, 24. Total man-hours: 16. **Census:** Gray Catbird, 17 (200, 81); Blue-winged Warbler, 9 (106, 43); Red-eyed Vireo, 7 (82, 33); Com. Yellowthroat, 6 (71, 29); Black-capped Chickadee, 4 (47, 19); Brown Thrasher, 4; Cedar Waxwing, 4; Black-and-white Warbler, 4; Nashville Warbler, 4; Am. Redstart, 4; Am. Goldfinch, 4; Rufous-sided Towhee, 4; Am. Woodcock, 3 (35, 14); Veery, 3; Field Sparrow, 3; Chestnut-sided Warbler, 2.5; Blue Jay, 2; Am. Robin, 2; Wood Thrush, 2; Song Sparrow, 2; Ruffed Grouse, 1.5; Com. Flicker, 1.5; Black-billed Cuckoo, 1; Tufted Titmouse, 1; Yellow Warbler, 1; N. Oriole, 1; Brown-headed Cowbird, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Hairy Woodpecker, 0.5; Com. Crow, 0.5; Ovenbird, 0.5; Scarlet Tanager, 0.5; Broad-winged Hawk, +; Am. Kestrel, +. **Total:** 35 species; 102.5 territorial males (1,206/km², 488/100 acres). **Remarks:** Growth of vegetation is significant every year. Number of territorial males decreased slightly. Tent caterpillar infestation was significant. Thanks to Jim Cavanaugh. — *ANDREW MAGEE, 34 Hobson St., Springfield, Mass. 01109.*

73. DECIDUOUS FOREST WITH POND AND BROOK. — **Location:** New Jersey; Bergen Co.; Mahwah; Campgaw Mountain Reservation. **Continuity:** Established 1964; 16 consecutive years. **Size:** Approximately 16.2 ha = 40 acres. **Description of Plot:** See *AFN* 19:623-624 (1965). **Coverage:** May 24, 29, 31; June 5, 7, 12, 14, 19, 21; 0530-0645. Total party-hours: 11. **Census:** Wood Thrush, 4 (25, 10); Starling, 4; Tufted Titmouse, 3 (19, 8); Gray Catbird, 3; Red-eyed Vireo, 3; Ovenbird,

3; Yellow-billed Cuckoo, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; Tree Swallow, 2; Blue Jay, 2; Veery, 2; Scarlet Tanager, 2; Cardinal, 2; Song Sparrow, 2; Mallard, 1; Com. Flicker, 1; E. Kingbird, 1; Great Crested Flycatcher, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; House Wren, 1; Am. Robin, 1; Chestnut-sided Warbler, 1; Louisiana Waterthrush, 1; Com. Yellowthroat, 1; Red-winged Blackbird, 1; N. Oriole, 1; Com. Grackle, 1; Indigo Bunting, 1. **Total:** 30 species; 53 territorial males (327/km², 133/100 acres). — *J. and N. BRISTOW, K. SJOLANDER, J. WHITE, J. WORRALL and J. BROTHERTON (compiler), Fyke Nature Assoc., 249 E. Crescent Ave., Mahwah, N.J. 07430.*

74. 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. **Size:** 7.54 ha = 18.62 acres. **Description of Plot:** See *AB* 33:74 (1979). **Weather:** Somewhat cooler and drier than usual. Temperatures: 9°-21°C. **Coverage:** May 27; June 2-3, 10, 12, 14, 18, 24, 29; 0540-0820. Total man-hours: 19.6. **Census:** Song Sparrow, 6.5 (86, 35); Gray Catbird, 6 (80, 32); Brown-headed Cowbird, 3 (40, 16); Willow Flycatcher, 2; Yellow Warbler, 2; Com. Yellowthroat, 2; Cardinal, 2; Am. Goldfinch, 2; Field Sparrow, 2; House Wren, 1.5; Am. Robin, 1.5; Black-billed Cuckoo, 1; Com. Flicker, 1; Downy Woodpecker, 1; Blue Jay, 1; Brown Thrasher, 1; Yellow-breasted Chat, 1; N. Oriole, 1; Com. Crow, +; Starling, +; Com. Grackle, +. **Total:** 21 species; 37.5 territorial males or females (498/km², 201/100 acres). **Visitors:** Mallard, Ring-necked Pheasant, Rock Dove, Mourning Dove, Chimney Swift, Barn Swallow, Carolina Wren, Mockingbird, Cedar Waxwing, Am. Redstart, House Sparrow, Red-winged Blackbird, Indigo Bunting, House Finch, Rufous-sided Towhee, Chipping Sparrow. **Remarks:** Immature birds seen with adults: Brown Thrasher, Am. Robin, Com. Yellowthroat, N. Oriole, Song Sparrow, and Brown-headed Cowbird with adult Song Sparrow. — *BRIAN F. ROLLFINKE, 1013 Harriet St., Carlisle, Pa. 17013.*

75. 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; 3 consecutive years. **Size:** 7.77 ha = 19.2 acres. **Description of Plot:** See *AB* 32:74-75 (1978). Nearly 15% of acreage was clear-cut in late 1978 for installation of storm sewer conduit along NS boundary line. This is the first census following the clearing. **Weather:** Normal temperatures (50-90°F) and precipitation. **Coverage:** Mar. 31; Apr. 15, 21, 29; May 5, 20, 23, 25, 27-28, 30; June 2, 5, 10, 16, 24, July 15, 22, 28; Aug. 5; 20 trips; mostly 0600-1100, occasionally 1300-1900. Total man-hours: 24.25. **Census:** Gray Catbird, 11 (142, 57); Am. Robin, 9 (116, 47); Cardinal, 9, Ring-necked Pheasant, 7 (90, 36); Com. Yellowthroat, 7; Song Sparrow, 7; Com. Flicker, 4 (51, 21); Starling, 4; Mourning Dove, 3 (39, 16); Wood Thrush, 3; Red-eyed Vireo, 3; Rufous-sided Towhee, 3; Blue Jay, 2; House

Wren, 2; Mockingbird, 2; Com. Grackle, 2; Brown-headed Cowbird, 2; Am. Goldfinch, 2; Mallard, 1; Screech Owl, 1; Downy Woodpecker, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; White-eyed Vireo, 1; Am. Redstart, 1; House Finch, 1. **Total:** 26 species; 90 territorial males or females (1158/km², 469/100 acres). **Visitors:** Sharp-shinned Hawk, Broad-winged Hawk, Barn Swallow, Com. Crow. **Remarks:** Nests located: Starling, 4; Com. Flicker, 2; Cardinal, 1. Ring-necked Pheasant, Screech Owl, Com. Flicker, House Wren, and Com. Grackle were seen with fledglings. The clear-cutting prior to the census season provided a unique opportunity to assess the effect of this clearing on the ability of the vegetation structure to support nesting populations. The census data show that the total species diversity was little affected (26 vs. 28 previous year), while the density of territorial males dropped 10.4% (1158/km² vs. 1293/km²). By the end of the season, the clear-cut area was filling in with grasses and herbaceous plants. — DAVID M. WRIGHT, 527 Rock Glen Dr., Wynnwood, Pa. 19096.

76. RUSTIC CAMPING AREA. — **Location:** West Virginia; Preston Co., 1 mi N of Terra Alta; 39°27'17"N, 79°31'39"W, Terra Alta Quadrangle, USGS. **Continuity:** New. **Size:** 7.28 ha = 18 acres (roughly triangular, grids laid out with surveyor's chain). **Description of Plot:** Camp used for nature study; partly wooded and partly open field. The dominant canopy trees are Red Maple (*Prunus rubrum*) and Black Cherry (*Prunus serotina*). Most prominent in the understory are *Crataegus* sp. and Speckled Alder (*Alnus rugosa*). The ground cover is primarily grasses (*Anthoxanthum odoratum*) and Jewelweed (*Impatiens pallida*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on 6 circular samples, 261/acre; total basal area 158 ft²/acre. Species comprising 90% of the total number of trees: Red Maple, 95, 36, 30, 83; Black Cherry, 55, 21, 26, 67; Serviceberry (*Amelanchier arborea*), 38, 15, 6, 50; dead trees, 25, 10, 16, 83; Scotch Pine (*Pinus sylvestris*), 15, 6, 4, 33. Trees by diameter size class: A (3-6 in.) 113, 43, 10.2, 5.9; B (6-9 in.) 78, 30, 22.6, 13.2; C (9-15 in.) 40, 15, 30.8, 18; D (15-21 in.) 17, 6, 28, 16.4; E (21-27 in.) 5, 2, 25.8, 15; F (27-33 in.) 3, 1, 16.3, 9.5; G (33-40 in.) 3, 1, 23.6, 16.4; H (>40 in.) 2, 0.6, 13.3, 7.8. Shrub stems/acre 9750; ground cover 75%; canopy cover 48%; average canopy height 50 ft (range 0-110). **Edge:** Bordered on 1 side by a lake, 2 sides by cultivated fields and 1 side by mature hardwoods. **Topography:** A nearly level creek bottom adjoining a created lake. **Elevation:** 2580 ft. **Coverage:** June 2-10; 16 trips between dawn and 0815 hours or 1850-2100 hours. Total party-hours: 17. **Census:** Red-eyed Vireo, 7 (96, 39); Gray Catbird, 5 (69, 28); Song Sparrow, 4 (55, 22); Wood Thrush, 2; Com. Yellowthroat, 2; House Wren, 1.5; E. Wood Pewee, 1; White-breasted Nuthatch, 1; Brown Thrasher, 1; Am. Robin, 1; Solitary Vireo, 1; Chestnut-sided Warbler, 1; Scarlet Tanager, 1; Cardinal, 1; Rufous-sided Towhee, 1; Field Sparrow, 1; Chipping Sparrow, 1; Ruffed Grouse, +; Am. Woodcock, +; Chimney Swift, +; Com. Flicker, +; Downy Woodpecker, +; Great Crested Flycatcher, +; Acadian Flycatcher, +; Blue Jay, +; Com. Crow, +; Black-capped Chickadee, +; Tufted Titmouse, +;

Veery, +; Cedar Waxwing, +; Bobolink, +; Brown-headed Cowbird, +. **Total:** 32 species; 32.5 territorial males (446/km², 181/100 acres). **Visitors:** Ruby-throated Hummingbird, Barn Swallow, Red-winged Blackbird, N. Oriole, Com. Grackle, Indigo Bunting, Am. Goldfinch. **Remarks:** The number of species is high, but this is predictable from the varied habitat. Nests found: White-breasted Nuthatch, Am. Robin, Wood Thrush and Chipping Sparrow. — GLEN PHILLIPS (compiler), Brooks Bird Club, 707 Warwood Ave., Wheeling, W. Va. 26003.

77. CITY RAVINE. — **Location:** Ontario; Toronto, Cedarvale Ravine, from Heath Street to Cedarvale Park. **Continuity:** New. **Size:** 20.9 ha = 51.6 acres (determined from aerial photograph with the use of a planimeter). **Description of Plot:** The ravine is 46% open habitat and 54% wooded. A sluggish stream occupies the bottom of the valley and spreads out into a marsh at several points. A walking path parallels the route of the stream. The drier open areas are dominated by grasses and weedy herbaceous species. The streambed and marshes are dominated by Narrow-leaf Cattail (*Typha angustifolia*), Jewelweed (*Impatiens biflora*), Rice Cutgrass (*Leersia oryzoides*), Field Horsetail (*Equisetum arvense*), and Crack Willow (*Salix fragilis*), with numerous other species present (based on a line transect). Red Oak (*Quercus borealis*) dominates (importance values >150) 40% of the wooded area (22% of total), with secondary species, Sugar Maple (*Acer saccharum*), Norway Maple (*A. platanoides*), Red Maple (*A. rubrum*), Hemlock (*Tsuga canadensis*), White Ash (*Fraxinus americana*), Basswood (*Tilia americana*), and Ironwood (*Ostrya virginiana*). The understory is sparse and almost completely dominated by Choke Cherry (*Prunus virginiana*). Another 20% of the wooded area (11% of total) is recently disturbed areas dominated by Boxelder (*Acer negundo*), Black Locust (*Robinia pseudoacacia*), and Siberian Elm (*Ulmus pumila*). The understory is dominated by saplings of these species and Garlic Mustard (*Alliaria officinalis*), *Aster* ssp., and goldenrod

(*Solidago* ssp.). The only other sizable habitat is a mixed conifer-hardwood forest occupying 12% of the wooded area (6.5% of total). Tree species are hawthorn (*Crataegus* sp.), Norway Maple, White Pine (*Pinus strobus*), White Oak (*Q. alba*), Hemlock, and Black Cherry (*P. serotina*). The shrub layer is dominated by Choke Cherry and Witch Hazel (*Hamamelis virginiana*) while common ground cover species are Zig Zag Goldenrod (*S. flexicaulis*), Garlic Mustard, and Poison Ivy (*Rhus radicans*). **Edge:** Bordered on both sides by well landscaped neighborhoods. **Topography:** The ravine is 1224 m in length, running SE-NW. The width varies between 204 and 55 m and has an average slope of 15-18 m on both sides. Elevation 141-151 m at the base of the slope and 151-165 at the top. **Weather:** Temperature from 8-28°C; 5 overcast days and 8 clear days. **Coverage:** Apr. 4, 11, 16; May 10, 14; June 11, 15, 19, 22, 26, 29; July 3, 5; 0500-0930. Total party-hours: 39. **Census:** Red-winged Blackbird, 9 (43, 17); Cardinal, 8 (38, 16); Gray Catbird, 7 (34, 14); Am. Robin, 7; Com. Grackle, 6 (29, 12); Blue Jay, 5 (24, 10); Black-capped Chickadee, 3 (14, 6); Starling, 3; House Sparrow, 3; N. Oriole, 3; Song Sparrow, 3; Com. Flicker, 2; Great Crested Flycatcher, 2; Wood Thrush, 2; Mallard, 1; Killdeer, 1; Downy Woodpecker, 1; E. Wood Pewee, 1; Com. Crow, 1; Red-eyed Vireo, 1; Am. Kestrel, +; Mourning Dove, +; Chimney Swift, +; Cedar Waxwing, +; Brown-headed Cowbird, +; Rose-breasted Grosbeak, +; Am. Goldfinch, +. **Total:** 27 species; 69 territorial males (330/km², 134/100 acres). **Visitors:** Yellow-billed Cuckoo, Belted Kingfisher, Swainson's Thrush, Black-and-white Warbler, Yellow-rumped Warbler, Canada Warbler. **Remarks:** The numbers of House Sparrows and Starlings were undetermined because large numbers of these species were foraging in the ravine; 3 nests of each species were found and provides a minimum estimate. Up to 34 Mourning Doves used a weedy field in the ravine to forage, but no evidence of breeding was found. Brown Thrasher and Indigo Bunting, known to have bred here in recent years, were not present this year. The density is similar to that



Census 77. City Ravine. Photo/P. Smith.

noted in other Toronto ravines. The diversity as measured by the Shannon-Wiener Index is 1.22 and is also similar to the values obtained for other Toronto ravines (Moore Park, 1.18; Park Drive, 1.20 etc.). A measure of similarity in species composition, Sorenson's Coefficient of Community, revealed greatest similarity with the Park Drive Ravine. Both density and diversity were also most similar to this ravine. — PAUL SMITH (compiler), ALLAN GREENBAUM, PATRICIA WEBB, 822 Broadview Ave., Toronto, Ontario M4K 2P7.

78. OPEN ELECTRICAL TRANSMISSION CORRIDOR. — **Location:** Ontario; Ottawa-Carleton Region; West Carleton Township; SW of Fitzroy Harbour; 31 F/8 (Arnprior) 028335; Chats Falls Generating Station; 45°27'N, 76°15'W. **Continuity:** New. **Size:** 7 ha = 17.3 acres (rectangular, 120 × 585 m, measured with tape on ground). **Description of Plot:** The 120 m wide corridor facilitates the operation of 4 parallel sets of towers. The plot is virtually treeless although young (less than 7.6 cm dbh) trees are found in areas of regeneration along the edges. Shrub stems/ha based on six 0.04 ha, circular samples, 108. This is representative of only those woody stems that reach breast height. The vegetation is dominated by prolific dense growths of Com Juniper (*Juniperus communis*) that do not reach breast height. The area covered by Com Juniper, based on estimates at the six 0.04 ha circles, is approximately 50% (range 20-100%). Numerous small intermittent ponds and marshes (*Typha* sp.) account for approximately 1 ha of the area. **Edge:** Bordered on both sides by White Pine (*Pinus strobus*) – White Birch (*Betula papyrifera*) coniferous forest. A large deadwood beaver swamp is located approximately 250 m to the NE of the NE corner. **Topography:** Rugged with numerous rock outcroppings that characterize the Canadian Shield in this region. **Elevation:** 69-91 m. **Weather:** See Census 58. **Coverage:** June 5, 10, 19, 27, 29; July 13, 26; Aug. 11, 25; 9 trips, 0521-0804 and 1814-2019 hours, EDT. Total man-hours: 17.1. **Census:** Song Sparrow, 13.5 (193, 78); Com. Yellowthroat, 8 (114, 46); Am. Robin, 6 (86, 35); White-throated Sparrow, 6; Brown-headed Cowbird, 5 (71, 29); E. Kingbird, 2; Red-winged Blackbird, 2; Chipping Sparrow, 2; Gray Catbird, 1, Brown Thrasher, 1; Cedar Waxwing, 1; Am. Goldfinch, 1; Rufous-sided Towhee, 1; Cooper's Hawk, +; Red-tailed Hawk, +; Red-shouldered Hawk, +; Com. Flicker, +; Great Crested Flycatcher, +; Tree Swallow, +; Blue Jay, +; Scarlet Tanager, +; Rose-breasted Grosbeak, +. **Total:** 22 species; 49.5 territorial males (707/km², 286/100 acres). **Visitors:** Great Blue Heron, Mallard, Black Duck, Osprey, Am. Kestrel, Killdeer, Herring Gull, Rock Dove, Mourning Dove, Ruby-throated Hummingbird, Belted Kingfisher, Pileated Woodpecker, E. Phoebe, Willow Flycatcher, Purple Martin, Black-capped Chickadee, House Wren, Starling, Black-and-white Warbler, Yellow-rumped Warbler, N. Oriole, Com. Grackle, Indigo Bunting, Purple Finch. **Remarks:** Species that had significant numbers of registrations located along the corridor's ecotonal edges include kingbird, robin, Chipping Sparrow, White-throated Sparrow. A yellowthroat nest containing 2 eggs plus one cowbird egg was found. This survey was one of 4 conducted as part of a baseline study asso-

ciated with the development of a proposed Ontario Hydro Generating Station at Chats Falls on the Ottawa River. Thanks to Ontario Hydro for permission to publish their data. — TERRY N. TOBIAS and ROB R. EVANS, *The Proctor & Redfern Group, 75 Eglinton Ave. E., Toronto, Ont. M4P 1H3.*

79. RED OAK - AMERICAN BASSWOOD SAVANNAH. — **Location:** Ontario; Haldimand-Norfolk Regional Municipality, Port Rowan, 5 mi E of Long Point Prov. Park on Courtright Ridge; 42°33'N, 80°17'W, Big Rice Bay, Dept. of Energy, Mines & Resources, Ottawa. **Continuity:** New. **Size:** 7.5 ha = 18.5 acres (rectangular, surveyed). **Description of Plot:** Consists of a rolling sand dune ridge extending through the center of the plot, interspersed with small ponds and marshy areas. The dominant canopy trees are Red Oak (*Quercus rubra*), Am. Basswood (*Tilia americana*) and White Ash (*Fraxinus americana*). The only shrub present is Buttonbush (*Cephalanthus occidentalis*) in the wet zones. The ground cover is primarily composed of grasses, Canada Bluegrass (*Poa compressa*) and Kentucky Bluegrass (*P. pratensis*). Also prominent are Broad-leaf Arrowhead (*Sagittaria latifolia*), Am. Bulrush (*Scirpus americana*), Rice Cutgrass (*Leersia oryzoides*), Stinging Nettle (*Urtica dioica*), Broad-leaf Cat-tail (*Typha latifolia*), Marsh Fern (*Thelypteris palustris*), Milkweed (*Asclepias syriaca*). A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over, based on ten 0.1 acre circular samples, 23/acre; total basal area 27.6 ft²/acre. Species comprising 90% of the total number of trees: Red Oak, 6, 26, 37, 30; Buttonbush, 5, 22, 2, 10; Hornbeam (*Ostrya virginiana*), 3, 17, 10, 20; Am. Basswood, 3, 13, 23, 20; White Ash, 2, 9, 18, 20; Sugar Maple (*Acer saccharum*), 1, 4, 7, 10. Trees by diameter size class: A (3-6 in.) 5, 21.7, 0.5, 1.8; B (6-9 in.) 2, 8.7, 0.6, 2.2; C (9-15 in.) 5, 21.7, 4, 14.5; D (15-21 in.) 8, 34.8, 13.2, 47.8; E (21-27 in.) 3, 13.1, 9.3, 33.7. Shrubs stems/acre 2600; ground cover 80%; canopy cover 28.5%; average canopy height 46 ft (range 30-75). **Edge:** Bordered on the E and W by similar habitat, the N and S sides by marshland. **Topography:** Gently rolling slopes, interspersed with small ponds and marsh areas. **Elevation:** 575-590 ft. **Weather:** Generally 50-60% cloud cover, warm with light winds. **Coverage:** May 31; June 2, 4, 6, 10, 13, 16, 20, 24, 26; 0430-0830, and 1830-2015, EST. Total man-hours: 32. **Census:** Red-winged Blackbird, 23.5 (314, 127); Tree Swallow, 10 (134, 54); Starling, 10; E. Wood Pewee, 8.5 (114, 46); Com. Grackle, 8 (107, 43); House Wren, 5 (67, 27); E. Kingbird, 4 (53, 22); N. Oriole, 3 (40, 16); Com. Yellowthroat, 2; Song Sparrow, 2; Mallard, 1; Blue-winged Teal, 1; Great Crested Flycatcher, 1; Cedar Waxwing, 1; Yellow Warbler, 1; Com. Flicker, 0.5. **Total:** 16 species; 81.5 territorial males or females (1089/km², 441/100 acres). **Visitors:** Belted Kingfisher, Red-eyed Vireo, Brown-headed Cowbird, Rose-breasted Grosbeak. **Remarks:** Nests found (33): Red-winged Blackbird, 12; Tree Swallow, 7; Starling, 6; N. Oriole, 2; Com. Grackle, 2; Mallard, 1; Blue-winged Teal, 1; E. Kingbird, 1; House Wren, 1. Special thanks to Jon McCracken and Murray Palmer for laying out the census grid. — PETER VERBURG (compiler), Long Point

Bird Observatory, Port Rowan, Ontario, Canada NOE 1M0

80. 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:** New. **Size:** 6.07 ha = 15 acres (L-shaped, 900 × 400 × 160 m; surveyed into 25 m squares) **Description of Plot:** Three distinct transitional stages were found. The youngest area of regeneration is southernmost, and covers approximately 35% of the total area. There are some scattered trees or bushes, mainly White Ash (*Fraxinus americana*), willow (*Salix* sp.), and Quaking Aspen (*Populus tremuloides*), none exceeding 2 m in height. Most of this area is covered with a variety of field plants including Timothy (*Phleum pratense*), Wild Oats (*Avena* sp.), Wild Carrot (*Daucus carota*), Red Clover (*Trifolium pratense*), and goldenrod (*Solidago* sp.). Approximately 45% of the plot is dotted with a few large deciduous trees, mainly Sugar Maple (*Acer saccharum*), Basswood (*Tilia americana*), and Am. Beech (*Fagus grandifolia*), ranging in size from 20-30 m. Numerous patches of secondary growth exist throughout this area and range in height from 1-4 m; most common species are hawthorn (*Crataegus* sp.), White Ash, Tartarian Honeysuckle (*Lonicera tatarica*), Basswood, Serviceberry (*Amelanchier* sp.), Sugar Maple, White Cedar (*Thuja occidentalis*), and White Elm (*Ulmus americana*). The remaining 20% of the plot is primarily a Cedar-Hawthorn forest, consisting of White Cedar with some hawthorn. The canopy in this section is 10-12 m. Nature trails pass through each section of the plot. **Edge:** The W side is bordered by an extensive marsh with patches of White Cedar, willow and Black Ash just outside the plot. The S and E sides are bordered by field; the Wye Marsh Wildlife Interpretation Centre and parking lot are directly to the E. The N end is bordered by a Cedar-Ash forest. **Topography:** Generally flat, with some gentle slope towards the W. **Elevation:** 600 ft. **Weather:** Generally warm, ranging from 12-30°C, with moderate amounts of rain, and 1 severe cold spell from June 22-24. **Coverage:** June 17, 19-20, 22, 28-29; July 4-5; 0600-0920, EDT. Total man-hours: 44. **Census:** Yellow Warbler, 12 (198, 80); Am. Redstart, 7.5 (124, 50); Red-winged Blackbird, 5 (82, 33); Gray Catbird, 4 (66, 27); Am. Robin, 4; Cedar Waxwing, 3.5 (58, 23); Veery, 2.5; N. Oriole, 2.5; Brown-headed Cowbird, 2.5; Rose-breasted Grosbeak, 2.5; Great Crested Flycatcher, 2; Black-capped Chickadee, 2; Am. Goldfinch, 2; Mourning Dove, 1.5; Tree Swallow, 1.5; Warbling Vireo, 1.5; E. Meadowlark, 1.5; Ruffed Grouse, 1; Com. Flicker, 1; E. Kingbird, 1; Brown Thrasher, 1; Bobolink, 1; Song Sparrow, 1; Downy Woodpecker, 0.5; Am. Bittern, +; Com. Grackle, +. **Total:** 26 species; 65 territorial and non-territorial males (1063/km², 430/100 acres). **Visitors:** Green Heron, Mallard, Am. Woodcock, Com. Snipe, Hairy Woodpecker, Barn Swallow, Red-breasted Nuthatch, Black-and-white Warbler, Golden-winged Warbler. **Remarks:** Nests found (16): Am. Bittern, 1; E. Kingbird, 1, Great Crested Flycatcher, 1; Gray Catbird, 1, Am. Robin, 3; Yellow Warbler, 4; Am. Redstart, 1; Rose-breasted Grosbeak, 1. Breeding evidence was found for Downy Woodpecker,

Brown Thrasher, Bobolink, and Red-winged Blackbird, Brown Thrasher and Downy Woodpecker were seen feeding young and Bobolink and Red-winged Blackbird carrying food. Two of the Yellow Warbler nests were parasitized by Brown-headed Cowbirds. Gratitude is extended to the staff of the Wye Marsh Wildlife Interpretation Centre and Bufo Inc. for their assistance. A special thanks to Robert Whittam and Harold J. Parsons for their advice. — **MICHAEL A. ELLIOT, CHRISTOPHER G. HARRIS, 11 Letitia Street, Barrie, Ontario, Canada L4N 1N7.**

81. 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; 41 intermittent years. **Size:** 14.16 ha = about 35 acres. **Description of Plot:** See *Bird-Lore* 39:379-380 (1937). Habitat changes: Loss of several large-diameter trees, from windfall and cutting in the small stream valley. **Weather:** No unusual patterns. **Coverage:** June 2, 5; Aug. 24. Total man-hours: 20. **Census:** Acadian Flycatcher, 8 (56, 23); Red-eyed Vireo, 8; Wood Thrush, 7 (49, 20); 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; Mourning Dove, 2; 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; Yellow-billed Cuckoo, 1; Screech Owl, 1; Ruby-throated Hummingbird, 1; Hairy Woodpecker, 1; E. Phoebe, 1; Blue Jay, 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:** 38 species; 89 territorial males (females), 628/km², 254/100 acres. **Remarks:** The most mature and productive area, in the E end of the small stream valley, suffered its second significant disturbance by the loss of two oaks by cutting and Red Elm by windfall. In removing the timber, caterpillar tractor damage to ground cover and understory, in addition to what was downed by the trees, was added. Owing to reduced coverage because of travel restrictions, this year's census is not typical of previous ones. Time was available for the discovery of only 16 nests (average about 34). The number of species and pairs remained relatively unchanged. The presence of the Hooded Warbler could not be verified as a summer resident. No evidence of cowbird parasitism was obtained. Corrigendum: In *AB* 31(1):60, under total, change 3.6/km, 3.5/mi to 14.8 pairs/km, 23.7 pairs/mi. — **A. H. CLAUGUS, 228 S. Lake St., Carey, Ohio 43316.**

82. SUBURBAN CEMETERY. — Location: Indiana; Wayne Co., Earlham Cemetery, along Route 40 W on the W edge of Richmond; 39°49'20"N, 84°55'W, Richmond Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 5.87 ha = 14.5 acres. **Description of Plot:** See *AB* 33:78 (1979). **Weather:** Clear to partly cloudy; no precipitation during

counts, early morning fog once, temperatures normal. **Coverage:** May 28-31, June 1-4, 0500-0630 or 1900-2030 hours. Total man-hours: 24. **Census:** Am. Robin, 12 (204, 83); Starling, 10 (170, 69); Cardinal, 5 (85, 34); Chipping Sparrow, 4 (68, 28); E. Wood Pewee, 3 (51, 21); Brown-headed Cowbird, 2.5; Mourning Dove, 2; Purple Martin, 2; Red-eyed Vireo, 2; Ruby-throated Hummingbird, 1; Com. Flicker, 1; Red-headed Woodpecker, 1; Blue Jay, 1; Carolina Chickadee, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; House Wren, 1; Gray Catbird, 1; Indigo Bunting, 1; Song Sparrow, 1. **Total:** 20 species; 53.5 territorial males or females (912/km², 369/100 acres). **Visitors:** Com. Crow, Com. Grackle, Am. Goldfinch. **Remarks:** Total density lower this year, 53.5 territories compared to 63.5. Three species had decreases of 3 or more territories: Am. Robin (15 to 12), Cardinal (13 to 5), Mourning Dove, (8 to 2). Starling had an increase from 2 to 10. Special thanks to W. H. Buskirk for assistance. — **SHEILA CUMMINS, DAVE MCCONNELL, CINDY MANNING, and MARILYN MARSHALL, Biology Dept., Earlham College, Richmond, Ind. 47374.**

83. DECIDUOUS CLEARCUT. — Location: Tennessee; Washington Co., Horse Cove Gap; about 4.5 mi S of Johnson City; 36°14'N, 82°22'W, Erwin Quadrangle, USGS. **Continuity:** Established 1975; 5 consecutive years. **Size:** 20.23 ha = 50 acres. **Description of Plot:** See *AB* 29:1117-8 (1975). **Weather:** A wet spring. **Coverage:** May 19-21, 23, 25, 28, 30; June 6, 25; 0600-0900 and 1700-1900. Total man-hours: 16. **Census:** Rufous-sided Towhee, 14 (69, 28); Yellow-breasted Chat, 10 (49, 20); Indigo Bunting, 10; Hooded Warbler, 7.5 (37, 15); White-eyed Vireo, 6 (30, 12); Kentucky Warbler, 6; Ruby-throated Hummingbird, 5 (25, 10); Red-eyed Vireo, 5; Cardinal, 4 (20, 8); Am. Goldfinch, 3 (15, 6); Blue-gray Gnatcatcher, 2; Black-and-white Warbler, 2; Carolina Chickadee, 1; Gray Catbird, 1; N. Parula, 1; Com. Yellowthroat, 1; Brown-headed Cowbird, (female) 1; Pileated Woodpecker, +; Downy Woodpecker, +. **Total:** 19 species; 79.5 territorial males or females (393/km², 159/100 acres). **Remarks:** Observed feeding young: Blue-gray Gnatcatcher and Yellow-breasted Chat. Total density continues to increase. Total species up this year, also. Six new territorial species this year: Pileated Woodpecker, Carolina Chickadee, Gray Catbird, N. Parula, Com. Yellowthroat, and Am. Goldfinch. Species showing greatest increase was the Red-eyed Vireo (5 this year compared to 1 last year). Species showing greatest decrease was the Chestnut-sided Warbler (none this year as opposed to 5 last year). — **RICHARD P. LEWIS, Rt. 3, Box 5, Bristol, Tenn. 37620.**

84. DECIDUOUS FOREST AND CONTOUR STRIP MINE. — Location: Tennessee; Campbell Co., on SE slope of Walnut Mountain, 3.1 mi NW of LaFollette; 36°24'30"N, 84°09'53"W; Ivydell Quadrangle. **Continuity:** Established 1978. **Size:** 23.4 ha = 57.8 acres. **Description of Plot:** See *AB* 33:78-79 (1979). Bulldozing and exploratory core drilling disturbed about 5% of the bench area this spring. Several of these cleared areas held water throughout the census. **Weather:** May and June normal; July cool and much wetter

than normal. Temperature 45-80°F. **Coverage:** May 14, 19, June 7, 14, 19, 22, 0615-0945, EDT. Total man-hours: 16.5. **Census:** Indigo Bunting, 9.5 (41, 16); Ovenbird, 8 (34, 14), Red-eyed Vireo, 7.5 (32, 13); Black-and-white Warbler, 7 (30, 12); Worm-eating Warbler, 6.5 (28, 11); Rufous-sided Towhee, 5.5 (24, 10); Hooded Warbler, 4.5 (19, 8); Cerulean Warbler, 4 (17, 7); Scarlet Tanager, 4; Wood Thrush, 3 (13, 5); Kentucky Warbler, 2.5; Yellow-billed Cuckoo, 2; Carolina Chickadee, 2; Tufted Titmouse, 2; Blue-gray Gnatcatcher, 2; Golden-winged Warbler, 2; Chestnut-sided Warbler, 2; Am. Redstart, 2; Summer Tanager, 2; E. Phoebe, 1.5; Brown-headed Cowbird (female), 1.5; Am. Goldfinch, 1.5; Downy Woodpecker, 1; Acadian Flycatcher, 1; Rough-winged Swallow, 1; Blue Jay, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Yellow-throated Vireo, 1; Cardinal, 1; Field Sparrow, 1; Pileated Woodpecker, 0.5; E. Wood Pewee, 0.5; Red-bellied Woodpecker, +; Great Crested Flycatcher, +. **Total:** 35 species; 92.5 territorial males or females (395/km², 160/100 acres). **Visitors:** Red-tailed Hawk, Hairy Woodpecker, Solitary Vireo, Yellow-throated Warbler, Red-winged Blackbird. **Remarks:** Nests found: E. Phoebe, Wood Thrush, Cardinal, Field Sparrow, 1 each. Fledglings noted: Downy Woodpecker, Red-eyed Vireo, Black-and-white Warbler, Worm-eating Warbler, Golden-winged Warbler, Am. Redstart. In early August the forested area was cleared and coal strip-mining begun immediately upslope of the existing mine bench. This study was funded by an orphan mine reclamation project coordinated by the Tennessee Valley Authority — **CHARLES P. NICHOLSON, P.O. Box 402, Norris, Tenn. 37828.**

85. 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 1978 (1977 open portions); 3 consecutive years. **Size:** 30 ha = 74 acres. **Description of Plot:** See *AB* 32 80 (1978) and 33:79 (1979). Changes: House built. The ½ acre field planted to sweet corn, millet, sorghum, beans, and sunflowers (last two destroyed by rabbits); some of rye harvested by June; quite weedy in July. **Weather:** Cooler than normal; late frosts Apr. 29 and May 26. Bad flooding May 3-5, some flooding in the very wet July; June and August mostly dry. **Coverage:** Apr. 17-18, 20, 22, 28-29; May 1-3, 6-10, 14-15, 18, 26-27, 30; June 1-2, 6, 8, 19, 0500-2030 hours, CDT. Total man-hours over 51. **Census:** Red-eyed Vireo, 22.5 (75, 30), Blue-gray Gnatcatcher, 6.5 (22, 9); Indigo Bunting, 6.5; Prairie Warbler, 5.5 (18, 7), White-eyed Vireo, 5 (17, 7); Yellow-breasted Chat, 5; Cardinal, 4 (13, 5); Field Sparrow, 4; Acadian Flycatcher, 3.5 (12, 5); Rufous-sided Towhee, 3.5; Kentucky Warbler, 3 (10, 4), Yellow-billed Cuckoo, 2; Carolina Chickadee, 2; Yellow-throated Vireo, 2; Summer Tanager, 2; Wood Thrush, 1.5; Hooded Warbler, 1.5; Scarlet Tanager, 1.5; Whip-poor-will, 1; Ruby-throated Hummingbird, 1; Downy Woodpecker, 1; E. Phoebe, 1; Blue Jay, 1; Tufted Titmouse, 1; White-breasted Nuthatch, 1; Worm-eating Warbler, 1; Ovenbird, 1; Com. Yellowthroat, 1; Brown-headed Cowbird, 1,

Bachman's Sparrow, 1, Broad-winged Hawk, 0.5, Pileated Woodpecker, 0.5; Blue-winged Warbler, 0.5; Red-tailed Hawk, +; Ruffed Grouse, +; Mourning Dove, +; Screech Owl, +; Barred Owl, +; Hairy Woodpecker, +; E. Wood Pewee, +; Carolina Wren, +; Brown Thrasher, +, Am. Goldfinch, +. **Total:** 44 species; 95.5 territorial males or females (319/km², 129/100 acres) **Visitors:** Turkey Vulture, Chimney Swift, E. Kingbird, Great Crested Flycatcher, Barn Swallow, Purple Martin, Com. Crow, E. Bluebird, Cerulean Warbler, Blue Grosbeak, Chipping Sparrow. **Remarks:** Despite the larger species total, the total density declined slightly from 1978. Of the neotropical element only the White-eyed Vireo, Yellow-throated Vireo, Blue-winged Warbler, and Prairie Warbler showed real increases. Kathryn and Sam Coward, Bill Jones, Amy Johnson, and Patty Boles helped confirm several species, notably the Bachman's Sparrow; their time (about an hour each) is not included. — **RICHARD W. SIMMERS, JR., Route 6, Box 211-C, Cookeville, Tenn. 38501.**

86. STRIP MINE AND DECIDUOUS WOODLOT. — **Location:** Tennessee; Scott Co., 2.3 mi NW of Winfield, 36°34'23"N, 84°29'13"W; Winfield Quadrangle. **Continuity:** Established 1978. **Size:** 20.1 ha = 49.6 acres. **Description of Plot:** See AB 33:79 (1979). Ground cover on the E portion of the mine increased from 30 to 48%, mostly a result of increases in *Lespedeza* and *Melilotus*. Pine seedlings were planted on the same area in fall of 1978, at approximately 2 × 2 m spacing. The remainder of the area is essentially unchanged. **Weather:** May dry and warm; June slightly cooler than normal. Temperature 45-80°F. **Coverage:** May 7, 16; June 4, 13, 25-26, 0615-0930, 2015-2215, EDT. Total man-hours 15. **Census:** Indigo Bunting, 11 (55, 22), Field Sparrow, 8.5 (42, 17); Prairie Warbler, 5.5 (27, 11); Rufous-sided Towhee, 3.5 (17, 7); Rough-winged Swallow, 2; Blue-gray Gnatcatcher, 2; Red-eyed Vireo, 2; Red-winged Blackbird, 2; Cardinal, 2; Whip-poor-will, 1; Ruby-throated Hummingbird, 1; Tufted Titmouse, 1; Brown Thrasher, 1; Yellow-breasted Chat, 1; Brown-headed Cowbird (female), 1; Am. Goldfinch, 1; Song Sparrow, 1, Yellow-billed Cuckoo, 0.5; Screech Owl, +; Great Crested Flycatcher, +; Com. Crow, +; White-eyed Vireo, +. **Total:** 22 species; 47 territorial males or females (234/km², 95/100 acres) **Visitors:** Green Heron, E. Phoebe, Barn Swallow, E. Bluebird, Yellow-throated Vireo, Golden-winged Warbler, Yellow-throated Warbler, Chestnut-sided Warbler, Blue Grosbeak. **Remarks:** Nests found: Field Sparrow, 4; Brown Thrasher, Prairie Warbler, Cardinal, 1 each. This study was funded by an orphan mine reclamation project coordinated by the Tennessee Valley Authority. — **CHARLES P. NICHOLSON, P.O. Box 402, Norris, Tenn. 37828.**

87. DECIDUOUS CLEARCUT. — **Location:** Georgia; Rabun Co.; Chattahoochee Nat'l Forest; 5 mi SE of Clayton; Tiger Quadrangle, USGS. **Continuity:** Established 1977. **Size:** 6.88 ha = 17 acres. **Description of Plot:** See AB 32:80-1 (1977). **Weather:** Cloudy and cool **Coverage:** Apr. 29; May 7, 12, 19-20, 25, 28, June 2, 11, 17, 24; 0730-0930. Total man-hours 17.5. **Census:** Rufous-sided Towhee, 12

(174, 71), Indigo Bunting, 3 (44, 18), Prairie Warbler, 3, Bobwhite, 1, Mourning Dove, 1, Carolina Chickadee, 1; Brown Thrasher, 1; Yellow-breasted Chat, 1; Cardinal, 1; Chipping Sparrow, 1. **Total:** 10 species; 25 territorial males or females (363/km², 147/100 acres). **Visitors:** Chimney Swift, Ruby-throated Hummingbird, Com. Flicker, Downy Woodpecker, Pileated Woodpecker, Great Crested Flycatcher, E. Phoebe, Com. Crow, Com. Raven, Tufted Titmouse, Brown-headed Nuthatch, Blue-gray Gnatcatcher, Chestnut-sided Warbler, Am. Goldfinch. There was a decrease of 4 breeding species from the previous census. — **LOUIS W. SCHWEIZER, 2573 Tilson Dr., SE, Atlanta, Ga. 30317.**

88. ASPEN CLEARCUT (6 yr). — **Location:** Minnesota; Itasca Co., Chippewa National Forest; NE ¼ of SE ¼, Sec. 3, T57N, R25W; 47°27'N, 93°30'W, Lawrence Lake West Quadrangle, USGS. **Continuity:** Established 1977; 2 intermittent years. **Size:** 11.5 ha = 28.5 acres. **Description of Plot:** See AB 32:79 (1977). Most saplings were 11-13 ft in height. **Coverage:** May 26, 30; June 8, 13, 22, 26; 0630-1030. Total man-hours: 13.5. **Census:** Chestnut-sided Warbler, 10 (87, 35); Mourning Warbler, 4 (35, 14); Rose-breasted Grosbeak, 3 (26, 11); White-throated Sparrow, 2.5; Song Sparrow, 2.5; Gray Catbird, 2; Golden-winged Warbler, 2; Nashville Warbler, 2; Alder Flycatcher, 1.5; Veery, 1.5; Com. Yellowthroat, 1; Am. Robin, 0.5; Brown Thrasher, 0.5; Black-billed Cuckoo, 1; Ruby-throated Hummingbird, +; Blue Jay, +; Black-capped Chickadee, +; Ovenbird, +; Brown-headed Cowbird, +. **Total:** 19 species; 34 territorial males (295/km², 119/100 acres). — **DONALD RAKSTAD and JOHN R. PROBST, North Central Forest Experiment Station, USDA Forest Service, St. Paul, Minn. 55108.**

89. MIXED WETLAND WITH TAMARACK AND ASPEN GROVES, SHRUBLAND AND FEN. — **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; 3 consecutive years. **Size:** 16.9 ha = 41.7 acres. **Description of Plot:** See AB 32:79-80 (1978). **Weather:** Normal temperatures; below normal rainfall. **Coverage:** May 27; June 6, 19, 22; July 1; 0615-1000. Total man-hours: 14. **Census:** Red-winged Blackbird, 15 (89, 36); Yellow Warbler, 12 (71, 29); Com. Yellowthroat, 9 (53, 22); Gray Catbird, 8 (47, 19); Swamp Sparrow, 8; Song Sparrow, 6.5 (39, 16); Am. Goldfinch, 6 (36, 14); Veery, 5 (30, 12); House Wren, 3.5 (21, 8); Willow Flycatcher, 3 (18, 7); Least Flycatcher, 3; Am. Robin, 3; Alder Flycatcher, 2; Cedar Waxwing, 2; Brown-headed Cowbird (female), 2; Cardinal, 2; Rose-breasted Grosbeak, 2; Mourning Dove, 1.5; Com. Flicker, 1.5; Mourning Warbler, 1.5; Blue Jay, 1; Black-capped Chickadee, 1; Red-eyed Vireo, 1; Blue-winged Warbler, 1; Chestnut-sided Warbler, 1; Indigo Bunting, 1; Rufous-sided Towhee, 1; Hairy Woodpecker, 0.5; Great Crested Flycatcher, 0.5; Com. Crow, 0.5; Wood Thrush, 0.5; Golden-winged Warbler, 0.5; N. Oriole, 0.5. **Total:** 33 species; 106.5 territorial males or females (631/km², 255/100 acres). **Visitors:** Black-billed

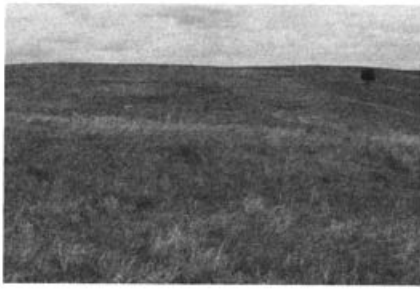
Cuckoo, Downy Woodpecker, E. Phoebe, White-breasted Nuthatch, Savannah Sparrow **Remarks:** Fledglings noted: Downy Woodpecker, Am. Robin. — **BOB ADAMS, JOHN BIELEFELDT, VERN AUNE (compiler), Benjamin F. Goss Bird Club, S. 13 W. 22167 Ridge Road, Waukesha, Wis. 53186.**

90. KENTUCKY BLUE GRASS PRAIRIE. — **Location:** North Dakota; Stutsman Co., NE quarter of Sect. 12, T142N, R68W; 47°8'N, 99°14'W, Goldwin Quadrangle, USGS **Continuity:** Established 1972; 8 consecutive years. **Size:** 4.86 ha = 12 acres. **Description of Plot:** See AB 26:972 (1972). **Weather:** Spring arrived very late and phenological events averaged about 2 weeks later than usual. Temperatures in May were subnormal, with average extremes of 35° and 65°F. June temperatures were nearly normal (49-77°). Snow conditions during the 1978-79 winter were adequate and most wetlands on the Woodworth Station contained water. Precipitation, which totaled 1.58 in. in May and 4.64 in. in June, was sufficient to maintain most of the wetlands throughout the period. **Coverage:** May 28, 31; June 1, 4, 6, 13, 22; 8 trips, 0545-1140, CDT. Total man-hours: 3. **Census:** Blue-winged Teal, 2; Bobolink, 2; W. Meadowlark, 1; Red-winged Blackbird, 1; Brown-headed Cowbird, 1 (female); Savannah Sparrow, 0.5; Gadwall, +; Wilson's Phalarope, +; E. Kingbird, +. **Total:** 9 species; 7.5 territorial males or females (154/km², 63/100 acres). **Visitors:** Am. Coot, Com. Snipe, Willet, Marbled Godwit, Barn Swallow, Com. Yellowthroat, Am. Goldfinch. — **DOUGLAS H. JOHNSON and J. MICHAEL CALLOW, Northern Prairie Wildlife Research Center, Jamestown, N. D. 58401.**

BREEDING BIRDS OF SELECTED GRASSLANDS AND SHRUBLANDS IN THE NORTH DAKOTA BADLANDS

The following 5 census plots are located near Medora in Theodore Roosevelt Nat'l Park, along the Little Missouri River. This area is mostly unglaciated or only moderately affected, including scattered buttes, eroded sedimentary bedrock and clay-scoria slopes and rolling upland grasslands. The plots sample the grasslands and shrublands, which are the predominant habitat types. Average annual precipitation is about 14 in. Average July temperature is 72°F; census temperatures ranged from 35-72°F. The weather was mostly dry, clear and calm. Until the park was established in 1947 this area was heavily grazed by cattle. Some of the plateau regions have been plowed. There were sawmills operating along the Little Missouri River and evidence of timber cuttings can be seen throughout the park. Currently about 250 buffalo and 46 feral horses graze the grasslands. This study was supported by Nat'l Park Service grants CX-1200-8-B030 and CX-1200-9-B037. — **R. B. HOPKINS, Biology Dept., Univ. of South Dakota, Vermillion, S. D. 57069.**

91. MIXED PRAIRIE I. — **Location:** North Dakota; Billings Co., SE quarter of Sec. 3, T140N, R101W, Theodore Roosevelt Nat'l Park (South Unit), USGS. **Continuity:** New.



Census 91. Mixed Prairie I. Photo/J. B. Hopkins.

Size: 6.1 ha = 15.06 acres (square, 270 yds, surveyed). **Description of Plot:** This grassland is dominated by Needle-and-thread (*Stipa comata*) and Prairie June Grass (*Koeleria pyramidata*). Other grasses are W. Wheat Grass (*Agropyron smithii*), Green Needle Grass (*S. viridula*), Cheat Grass (*Bromus tectorum*) and Blue Grama (*Bouteloua gracilis*). Grasses that may be locally abundant are Little Bluestem (*Andropogon scoparius*), Slender Wheat Grass (*A. caninum*) and Prairie Sandreed (*Calamovilfa longifolia*). Threadleaf Sedge (*Carex filifolia*) forms a dense ground cover over much of the plot. There is a single Rocky Mountain Cedar (*Juniperus scopulorum*), some patches of Wolfberry (*Symphoricarpos occidentalis*), and a few Silver Sage (*Artemisia canal*). This plot probably receives some light grazing from a herd of Buffalo. **Edge:** Mostly similar grasslands on the N and W; a short distance to the E, some scattered thickets of trees and shrubs; on the S a paved road. **Topography:** Rolling hills, sloping slightly to the NE. **Elevation:** About 2600 ft. **Coverage:** May 13; June 13; July 15; 0530-0900. Total man-hours: 4.5. **Census:** Grasshopper Sparrow, 7 (115, 46); W. Meadowlark, 2; Clay-colored Sparrow, 2; Savannah Sparrow, 1; Vesper Sparrow, +. **Total:** 5 species; 12 territorial males (197/km², 80/100 acres). **Visitors:** Marsh Hawk, Sharp-tailed Grouse, Com. Crow. **Remarks:** A small knoll at about the center of the plot was used by Sharp-tailed Grouse as a courtship area.

92. MIXED PRAIRIE II. — Location: North Dakota: Billings Co., NW quarter Sec. 16, T140N, R102W, Theodore Roosevelt Nat'l Park (S Unit), USGS. **Continuity:** New. **Size:** 6.1 ha = 15.06 acres (square, 270 yds, surveyed). **Description of Plot:** Dry elevated grassland dominated by Needle-and-thread, Prairie June Grass and Green Needle Grass. Other grasses are W. Wheat Grass, Prairie Sandreed and Three Awn (*Aristida longiseta*). Threadleaf Sedge is abundant. Low shrubs are Skunkbush Sumac (*Rhus aromatica*), Wolfberry and Silver Sage. An unpaved trail crosses from W to E. **Edge:** Similar grasslands. A short distance from the S boundary are some scattered thickets of trees and shrubs. A fence line parallels the W edge. **Topography:** Essentially level. **Elevation:** About 2700 ft. **Coverage:** May 16; June 11; July 13; 0545-0800. Total man-hours: 4.5. **Census:** W. Meadowlark, 4 (66, 27); Grasshopper Sparrow, 3 (49, 20); Clay-colored Sparrow, 1. **Total:** 3 species; 8 territorial males (131/km², 53/100 acres). **Visitors:** Sharp-tailed Grouse, Black-billed Magpie. **Remarks:** This plateau

region was used by Sharp-tailed Grouse as a courtship area.

93. MIXED PRAIRIE III. — Location: North Dakota: Billings Co., NE quarter Sec. 29, T140N, R100W, Theodore Roosevelt Nat'l Park (S Unit), USGS. **Continuity:** New. **Size:** 6.1 ha = 15.06 acres (square, 270 yds, surveyed). **Description of Plot:** The dominant grasses are Needle-and-thread, W. Wheat Grass and Prairie June Grass. Other grasses found throughout the plot are Green Needle Grass, Slender Wheat Grass, Inland Blue Grass (*Poa interior*) and Fowl Blue Grass (*P. palustris*). Grasses locally common on dry slopes are Little Bluestem and Six-weeks Fescue (*Festuca octoflora*). Sedges of regular occurrence are Threadleaf Sedge and Needleleaf Sedge (*C. eleocharis*). Shrubs are Wolfberry and Silver Sage. This grassland receives moderate grazing by a herd of feral horses. **Edge:** Similar grasslands. A gravel road and fence parallel the E boundary; a short distance away are tame pastures, several stock ponds and a shelterbelt. **Topography:** Gently rolling hills, sloping slightly to the E. **Elevation:** About 2760 ft. **Coverage:** May 16; June 11; July 14; 0630-0930. Total man-hours: 4.5. **Census:** W. Meadowlark, 4 (66, 27); Bobolink, 2; Savannah Sparrow, 1; Grasshopper Sparrow, 1; Chestnut-collared Longspur, 1; Lark Bunting, +. **Total:** 6 species; 9 territorial males (148/km², 60/100 acres). **Visitors:** Gadwall, Marsh Hawk, Sharp-tailed Grouse, Mourning Dove, Red-winged Blackbird. **Remarks:** A Marsh Hawk was frequently seen flying low over the plot.

94. SILVER SAGE FLAT I. — Location: North Dakota: Billings Co., SE quarter of Sec. 1, T140N, R102W, Theodore Roosevelt Nat'l Park (S Unit), USGS. **Continuity:** New. **Size:** 6.1 ha = 15.06 acres (rectangular, 210 x 347 yards, surveyed). **Description of Plot:** This plot follows a terrace on a stabilized floodplain. The dominant shrub is Silver Sage. Other shrubs of regular occurrence are Wolfberry, Skunkbush Sumac, and Big Sagebrush (*Artemisia tridentata*). The predominant grass is W. Wheat Grass. Other grasses found throughout the plot are Green Needle Grass, Prairie Sandreed, Smooth Brome (*Bromus inermis*), Crested Wheat Grass (*A. cristatum*), Cheat Grass, Slender Wheat Grass, Fowl Blue Grass and Inland Blue Grass. **Edge:** A paved road parallels the E boundary near which is a sparsely vegetated slope with many rock outcrops. The sage flat continues to the N and S with similar vegetation. An ephemeral stream, bordered by Cottonwood (*Populus deltoides*), parallels the W boundary. **Topography:** Essentially level. **Elevation:** About 2280 ft.



Census 94. Silver Sage Flat I. Photo/J. B. Hopkins.

Coverage: May 14; June 17, 25; 0630-0900. **Total man-hours:** 4.5. **Census:** Field Sparrow, 8 (131, 53); Rufous-sided Towhee, 7 (115, 46); W. Meadowlark, 3 (49, 20); Com. Yellowthroat, 3; Grasshopper Sparrow, 1. **Total:** 5 species; 22 territorial males (361/km², 146/100 acres). **Visitors:** Marsh Hawk, Ring-necked Pheasant, Mourning Dove, Com. Flicker, Say's Phoebe, Com. Crow, Mountain Bluebird, Brown-headed Cowbird. **Remarks:** A Marsh Hawk nested atop a rock outcrop near the E boundary and was frequently seen flying low over the plot. The Grasshopper Sparrow showed a substantial decrease from last year (5 to 1). Absent from this year's census were the Yellow-breasted Chat and Clay-colored Sparrow. A number of other community types were censused during this study and the two Silver Sage Flats appear to support the largest populations of Field Sparrows.

95. SILVER SAGE FLAT II. — Location: North Dakota: Billings Co., SE quarter of Sec. 1, T140N, R102W, Theodore Roosevelt Nat'l Park (S Unit), USGS. **Continuity:** New. **Size:** 6.1 ha = 15.06 acres (rectangular, 190 x 384 yds, surveyed). **Description of Plot:** Within a coulee that originates in the upland prairie. The predominate shrubs are Silver Sage and Wolfberry. Other shrubs of common occurrence are Coke Cherry (*Prunus virginiana*), Skunkbush Sumac, Wood's Rose (*Rosa woodsii*), Buffalo Currant (*Ribes odoratum*), and Rocky Mountain Cedar. The dominant grasses are W. Wheat Grass and Six-weeks Fescue. Other grasses commonly found are Green Needlegrass, Prairie Sandreed, Little Bluestem and Smooth Brome. **Edge:** Similar on the E and W. A sparsely vegetated slope with rock outcrops parallels the N boundary. An ephemeral stream parallels the S boundary and a short distance away are scattered thickets of Green Ash (*Fraxinus pennsylvanica*) and Rocky Mountain Cedar (*Juniperus scopulorum*). **Topography:** Essentially level, sloping slightly to the NW. **Elevation:** About 2280 ft. **Coverage:** May 14; June 17, 25; 0600-0915. Total man-hours: 4.5. **Census:** Field Sparrow, 7 (115, 46); Rufous-sided Towhee, 6 (98, 40); Com. Yellowthroat, 4 (66, 27); W. Meadowlark, 2; Yellow-breasted Chat, 1; Song Sparrow, +. **Total:** 6 species; 20 territorial males (328/km², 133/100 acres). **Visitors:** Brown-headed Cowbird.

96. 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; 8 consecutive years. **Size:** 10 ha = 24.7 acres. **Description of Plot:** See AB 26:972 (1972). All wetlands were restored by precipitation prior to census period. **Weather:** See Census 90. **Coverage:** May 25, 28-29; June 1, 8, 22; 7 trips, 0540-1105, CDT. Total man-hours: 6. **Census:** Blue-winged Teal, 7 (70, 28); Clay-colored Sparrow, 4 (40, 16); Red-winged Blackbird, 3.5 (35, 14); Com. Yellowthroat, 2.5; Brown-headed Cowbird, 2.5 (females); Am. Coot, 1.5; Gadwall, 1; N. Shoveler, 1; E. Kingbird, 1; Willow Flycatcher, 1; Yellow Warbler, 1; Bobolink, 1; W. Meadowlark, 1; Savannah Sparrow, 0.5; Gray Catbird, +. **Total:** 15 species; 28.5 territorial males or females (285/km², 115/100 acres). **Visitors:** Mallard, Pintail, Swainson's Hawk, Sharp-tailed Grouse, Killdeer, Com. Snipe, Marbled

Godwit, W Kingbird, Com Grackle, Am Goldfinch — *DOUGLAS H JOHNSON and J MICHAEL CALLOW*, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401

97. 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; 8 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 again on June 4, 1979. We completed 8 censuses before this year's burn. **Weather:** See Census 90. **Coverage:** May 25, 28-29, 31; June 1, 4, 8 trips, 0615-1000, CDT. Total man-hours 4. **Census:** Blue-winged Teal, 3 (49, 20); Red-winged Blackbird, 3; Bobolink, 2; W. Meadowlark, 1; Brown-headed Cowbird, 1 (female); N. Shoveler, 0.5; Am. Coot, 0.5; Yellow-headed Blackbird, 0.5; Com. Snipe, +; Upland Sandpiper, +; Com. Yellowthroat, +; Savannah Sparrow, +; Clay-colored Sparrow, + **Total:** 13 species; 11.5 territorial males or females (189/km², 76/100 acres). **Visitors:** Gadwall, Killdeer, Willet, Marbled Godwit, Wilson's Phalarope, E. Kingbird, Barn Swallow, Cliff Swallow, Com. Grackle. **Remarks:** In visits after the burn, on June 8 and 22, we observed Blue-winged Teal, Swainson's Hawk, Killdeer, Willet, Marbled Godwit (a flock of 20 on June 22), Ring-billed Gull (25 on June 22), W. Meadowlark, Yellow-headed Blackbird, Red-winged Blackbird and Com. Grackle. — *DOUGLAS H. JOHNSON and J. MICHAEL CALLOW*, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401

98. 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; 8 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:973 (1972). **Weather:** See Census 90. **Coverage:** May 25, 28-29, 31; June 1, 6, 11, 22, 9 trips, 0650-1200 hours, CDT. Total man-hours 4. **Census:** Bobolink, 1.5; W. Meadowlark, 1.5; Clay-colored Sparrow, 1; Brown-headed Cowbird, 0.5 (♀); Grasshopper Sparrow, 0.5; Blue-winged Teal, +; Upland Sandpiper, +; Red-winged Blackbird, +. **Total:** 8 species; 5 territorial males or females (82/km², 33/100 acres). **Visitors:** N. Shoveler. — *DOUGLAS H. JOHNSON and J. MICHAEL CALLOW*, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.

99. 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; 8 consecutive years. **Size:** 6.1 ha = 15.06 acres. **Description of Plot:** See AB 26:973-974 (1972). This plot was burned again just prior to the census period on May 24, 1979, which reduced most upland vegetation to ash. The plot was mostly devoid of standing vegetation during the census period. All wetlands contained water and were largely unaffected by the fire. **Weather:** See Census 90. **Coverage:** May 28, 31; June 1, 6, 8, 13; 6 trips, 0630-1145, CDT. Total man-hours: 2.5. **Census:** Red-winged Blackbird, 1.5; Killdeer,

1, Brown-headed Cowbird, 1 (female), Blue-winged Teal, 0.5, Upland Sandpiper, + **Total:** 5 species; 4 territorial males or females (66/km², 27/100 acres). **Visitors:** Gadwall, Com. Snipe, Willet, Black Tern, Barn Swallow, W. Meadowlark, Yellow-headed Blackbird. — *DOUGLAS H. JOHNSON and J. MICHAEL CALLOW*, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.

100. 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; 8 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 90. **Coverage:** June 4, 6, 8; 0555-0900, CDT. Total man-hours: 2. **Census:** Brown-headed Cowbird, 2.5 (females); Bobolink, 1.5; Grasshopper Sparrow, 1; E. Kingbird, 0.5; W. Meadowlark, 0.5; Clay-colored Sparrow, 0.5; Baird's Sparrow, +. **Total:** 7 species; 6.5 territorial males or females (107/km², 43/100 acres). **Visitors:** Upland Sandpiper, Barn Swallow, Brown Thrasher, Com. Grackle. **Remarks:** This plot was subjected to a prescribed burn on June 11, 1979, so we had but a short period between the time the road to the plot became passable and the time of the burn. — *DOUGLAS H. JOHNSON and J. MICHAEL CALLOW*, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.

101. 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; 4 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 contained water throughout the period. **Weather:** See Census 90. **Coverage:** May 28-29, 31; June 1, 7-8, 13; 0530-1040, CDT. Total man-hours: 5. **Census:** Blue-winged Teal, 6 (69, 28); Red-winged Blackbird, 3.5 (40, 16); Am. Coot, 2; W. Meadowlark, 1.5; Gadwall, 1; Pintail, 1; N. Shoveler, 1; Brown-headed Cowbird, 1 (female); Mallard, +; Sharp-tailed Grouse, +; Savannah Sparrow, +; Clay-colored Sparrow, +. **Total:** 12 species; 17 territorial males or females (195/km², 79/100 acres). **Visitors:** Redhead, Bobolink. **Remarks:** The plot contained a Sharp-tailed Grouse dancing ground, apparently recently established, with up to 7 counted. — *DOUGLAS H. JOHNSON and J. MICHAEL CALLOW*, Northern Prairie Wildlife Research Center, Jamestown, N.D. 58401.

102. MIXED PRAIRIE. — Location: North Dakota; Billings Co., 3 mi W Medora; SE 1/4, SE 1/4, Sec. 19, T140N, R102W; 46°55'N, 103°36'W, Medora Quadrangle, USGS. **Continuity:** New. **Size:** 4.05 ha = 10 acres (rectangular, measured with compass and tape). **Description of Plot:** Western mixed-grass prairie site. Dominant grasses are W. Wheat Grass (*Agropyron smithii*), Blue Gramma (*Bouteloua gracilis*), Needle-and-thread (*Stipa comata*), Thread-leaved Sedge (*Carex filifolia*), Saltgrass (*Distichlis stricta*), Plains Muhly (*Muhlenbergia cuspidata*), Big Sand Grass (*Calamovilfa longifolia*), and Thickspike Wheat

Grass (*Dasystachyum*) Dominant shrubs are Dwarf Sagebrush (*Artemisia cana*), and Creeping Juniper (*Juniperus horizontalis*) Ground cover 30%. Grasses comprise 80% of ground cover, forbs 5%, and shrubs 15%. **Edge:** Bordered on the N by Andrews Creek, the E by an eroded coulee, on the W and S by similar prairie habitat. **Topography:** Rolling **Elevation:** 2350 ft. **Weather:** Dry throughout period. Skies overcast to mostly clear. No precipitation during any census. Temperatures 55-70°F. **Coverage:** June 15, 18-19, 21, 23-25, between dawn and 1035. Total man-hours: 8.25. **Census:** W. Meadowlark, 1; Vesper Sparrow, 1; Killdeer, +; Brewer's Blackbird, +; Rufous-sided Towhee, +. **Total:** 5 species, 2 territorial males or females (49/km², 20/100 acres). **Visitors:** Marsh Hawk, Mourning Dove, Barn Swallow, Brown-headed Cowbird, Am. Goldfinch. **Remarks:** This site is located within the Little Missouri Nat'l Grasslands and is periodically grazed. Thanks to Greg Hiemenz for assistance in censusing. — *J. M. WIEHE and FARRON WALLACE*, Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.

103. FLOODPLAIN TALLGRASS PRAIRIE. — Location: Kansas; Douglas Co., portion of Baker Wetlands Research Area (Baker Univ., Baldwin). It occupies much of the NW ¼ of the SW¼ of Sec. 18, T13N, R20E, Lawrence East Quadrangle, USGS. **Continuity:** Established 1974; 4 intermittent years. **Size:** 10.1 ha = 25 acres. **Description of Plot:** See AB 28:1031-1032 (1974). **Weather:** For June, mean temperature 17.4-28.7°C total precipitation, 16.9 cm. **Coverage:** May 22 to July 20 (at 2-4 day intervals); usually 0700-1000. Total man-hours: 75. **Census:** Dickcissel, 15 (149, 60); Red-winged Blackbird, 6 (59, 24); Com. Yellowthroat, 5 (50, 20); E Meadowlark, 1; Bell's Vireo, 0.5; Brown Thrasher, 0.5; Brown-headed Cowbird, + **Total:** 7 species; 28 territorial males (277/km², 112/100 acres). **Remarks:** Visitors and aerial foragers included: Com. Grackle, Bobwhite, Chimney Swift, Ruby-throated Hummingbird, Barn Swallow, Purple Martin, Loggerhead Shrike, Am. Goldfinch, Nests found: Dickcissel, 15; Com. Yellowthroat, 1; Brown Thrasher, 1; Red-winged Blackbird, 7; also 7 cowbird eggs among nests examined. Woody vegetation along drainage ditches forming 2 boundaries of plot attracted many Red-wingeds and other visitors; the thrasher and vireo were regularly noted until early June in the small peninsula of woody vegetation extending from one boundary. The area had been mowed in Aug. 1978 as part of prairie management. Removal of hay bales early in spring caused noticeable effects to vegetation by damage to early growth of some plants and by tire ruts; 85 large hay bales remained in the area during the period until removal on July 20, again causing vegetation damage. Vegetation heights: May 9 = 20 cm; May 22 = 60 cm; June 10 = 100 cm; June 30 = 120 cm. Our thanks to Ivan Boyd for permission to study this area. — *PETER E. LOWTHER and CARYN T. STAHMANN-LOWTHER*, Museum of Natural History, Univ. of Kansas, Lawrence, Kan. 66045.

BREEDING BIRD CENSUSES IN THE FLINT HILLS OF KANSAS.

The following 4 breeding bird censuses were conducted on the Konza Prairie Research

Natural Area, a native bluestem prairie characterized by flat-topped uplands with steep flint-bearing limestone and shale. The soil on the ridge is shallow and rocky, defying cultivation. The uplands slope downward to streams from underground springs or valleys with deep permeable soil. Commercial cattle grazing is the major use. A number of burning and mowing treatments are being studied to approximate the pre-settlement ecosystem; 2 censuses were on annually burned prairie; 2 on unburned prairie. Precipitation averaged 3.09 in. in June and 5.55 in. in July. Temperatures ranged from 65-86°F. The weather information was prepared by the Kansas Agriculture Experiment Station. This study was sponsored by the National Science Foundation. Special thanks to John L. Zimmerman, Elmer Finck and Jerry Wilson for their assistance. — JAN J. KNODEL, Zoology Dept., N.D. State Univ. Fargo, N.D. 58102.

104. UNBURNED TALLGRASS PRAIRIE. — **Location:** Kansas; Geary Co., Konza Prairie Research Natural Area, 8 mi S of Manhattan on K-177 and 4.1 mi W on I-70; 39°4'15"N, 96°36'40"W, Swede Creek Quadrangle, USGS. **Continuity:** New. **Size:** 25.21 ha = 62.29 acres. **Description of Plot:** Ten random points and angles of a 5 m² circle were sampled at 13 random sub-plots to determine standing height and percent cover of grass, forb, and woody vegetation. The dominant species were determined by randomly walking the plot. Grasses composed 40.7%; the dominant ones were Green Foxtail (*Setaria viridis*), Big Bluestem (*Andropogon gerardi*), Little Bluestem (*A. scoparius*), Japanese Brome (*Bromus japonicus*), Buffalo Grass (*Buchloe dactyloides*), Windmill Grass (*Chloris verticillata*), Barnyard Grass (*Echinochloa crusgalli*), Canada Wild Rye (*Elymus canadensis*), Virginia Wild Rye (*E. virginicus*), June Grass (*Koeleria cristata*), Switch Grass (*Panicum virgatum*), and Prairie Dropseed (*Sporobolus heterolepis*). Forbs; composed 43.1%. Woody vegetation 4.7% consisted of Prairie Rose (*Rosa arkansana*) and Buckbrush (*Symphoricarpos orbiculatus*). The remaining 11.5% was open ground. The mean standing height was 45.5 cm. A dried wetland in the lowland contained Rush (*Juncus torreyi*) and Fox Sedge (*Carex vulpinoidea*). Approximately 30 trees circled the wetland and extended into the lowland, including Cottonwood (*Populus deltoides*), Peach-leaved Willow (*Salix amygdaloides*), Am. Elm (*Ulmus americana*), Rough-leaved Dogwood (*Cornus drummondii*), Smooth Sumac (*Rhus glabra*), and Winged Sumac (*R. copallina*). The vegetation analysis was conducted in mid-July. **Edge:** Bordered by a fire-guard on all edges except the W, which is next to a grazed pasture. **Elevation:** 1300-1400 ft. **Coverage:** June 14, 20, 25-26; July 2, 9, 18, 24; 0715-0815, CDT. Total man-hours: 8. **Census:** Dickcissel, 5 (20, 8); Grasshopper Sparrow, 5; E. Meadowlark 4 (16, 6); E. Kingbird, 2; Upland Sandpiper, 1; Mourning Dove, 1; Com. Nighthawk, 1; Brown-headed Cowbird, 1; Com. Yellowthroat, +; Red-winged Blackbird, +; Orchard Oriole, +. **Total:** 11 species; 20 territorial males or females (79/km², 32/100 acres). **Visitors:** Red-tailed Hawk, Swainson's Hawk, Greater Prairie Chicken, Bobwhite, Killdeer, Yellow-billed Cuckoo, Com. Flicker, Barn Swallow, Brown Thrasher, Loggerhead Shrike, N. Oriole, Com. Grackle,

Am Goldfinch **Remarks:** Nests found Mourning Dove, Orchard Oriole. A flock of 32± Greater Prairie Chickens was observed throughout July's census period. The large number of visitors indicates that the area was frequently used for feeding by species that nested elsewhere.

105. ANNUALLY BURNED TALLGRASS PRAIRIE I. — **Location:** Kansas; Geary Co., Konza Prairie Research Natural Area, 8 mi S of Manhattan on K-177 and 3.9 mi W on I-70; 39°4'15"N, 96°36'30"W, Swede Creek Quadrangle, USGS. **Continuity:** New. **Size:** 35.05 ha = 86.61 acres. **Description of Plot:** Ten random points and angles of a 5 m² circle were sampled at 24 random sub-plots to determine standing height and percent cover of grass, forb, and woody vegetation. The dominant species were determined by walking at random. The dominant grasses (57.5%) consisted of Big Bluestem, Little Bluestem Side-oats Grama (*Bouteloua curtipendula*), Blue Grama (*B. gracilis*), Hairy Grama (*B. hirsuta*), Switch Grass, Buffalo Grass, Windmill Grass, June Grass, Little Barley (*Hordeum pusillum*), Indian Grass (*Sorghastrum nutans*), and Prairie Dropseed. Forbs composed 20.5%. The remaining 22% was open ground. The mean standing height was 45.5 cm. Scattered trees (approximately 12) found in the lowland, consisted of Cottonwood, Peach-leaved Willow, Smooth Sumac, and Am. Elm. The vegetation analysis was conducted in mid-July. **Edge:** Boundary fence of the Konza Prairie along I-70 forms the S edge. Fire-guard borders the remaining edges. **Elevation:** 1300-1400 ft. **Coverage:** June 14, 20, 25-26; July 2, 9, 18, 24; 0615-0715, CDT. Total man-hours: 8. **Census:** Dickcissel, 6 (17, 7); Grasshopper Sparrow, 6; E. Meadowlark, 4 (11, 5); Upland Sandpiper, 2.5; Mourning Dove, 2; Com. Nighthawk, 2; E. Kingbird, 1; Brown-headed Cowbird, 1; Killdeer, 0.5; Red-winged Blackbird, +. **Total:** 10 species; 25 territorial males or females (71/km², 29/100 acres). **Visitors:** Greater Prairie Chicken, Bobwhite, Com. Flicker, Rough-winged Swallow, Barn Swallow, Loggerhead Shrike, Com. Grackle, Am. Goldfinch. **Remarks:** Nests found: Mourning Dove, Com. Nighthawk, Dickcissel.

106. ANNUALLY BURNED TALLGRASS PRAIRIE II. — **Location:** Kansas; Geary Co., Konza Prairie Research Natural Area, 8 mi S of Manhattan on K-177 and 1.9 mi W on I-70; 39°4'15"N, 96°34'30"W, Swede Creek Quadrangle, USGS. **Continuity:** New. **Size:** 12.22 ha = 30.20 acres. **Description of Plot:** Ten random points and angles of a 5 m² circle were sampled at 12 random sub-plots to determine standing height and percent cover of grass, forb, and woody vegetation. The dominant species were determined by walking at random. The dominant grasses (51.7%) consisted of Big Bluestem, Side-oats Grama, and Switch Grass. Forbs composed 10.5%. The remaining 37.8% was open ground. The mean standing height was 26.9 cm. A lowland stream contained Cottonwood, Peach-leaved Willow, and Am. Elm. The vegetation analysis was conducted in late June. **Edge:** Boundary fence of the Konza Prairie along I-70 forms the S edge. The remaining edges are bordered by fire-guard. **Elevation:** 1300-1400 ft. **Coverage:** June 11, 19, 24, 26; July 3, 12, 19, 26; 0615-0700, CDT. Total man-hours: 6. **Census:**

Dickcissel, 5 (41, 17), Red-winged Blackbird, 3 (25, 10), E. Meadowlark, 2, Grasshopper Sparrow, 2; Upland Sandpiper, 1; Mourning Dove, 1; Com. Nighthawk, 1; E. Kingbird, 1, Com. Yellowthroat, 1; Brown-headed Cowbird, 1; Am. Goldfinch, +. **Total:** 11 species, 18 territorial males or females (147/km², 60/100 acres). **Visitors:** Bobwhite, Killdeer, Com. Snipe, Yellow-billed Cuckoo, Barn Swallow, Brown Thrasher, Com. Grackle. **Remarks:** Nests found: Mourning Dove, Brown Thrasher. The higher bird density in this census may be attributed to the influence of a stream. Barn Swallows frequently fed over the area and were observed nesting in a nearby underpass outside the area.

107. UNBURNED UPLAND TALLGRASS PRAIRIE. — **Location:** Kansas, Riley Co., Konza Prairie Research Natural Area, 8 mi S of Manhattan on K-177 and 1 mi W on I-70; 39°4'30"N, 96°33'W, Swede Creek Quadrangle, USGS. **Continuity:** New. **Size:** 38.61 ha = 95.41 acres. **Description of Plot:** Ten random points and angles of a 5 m² circle were sampled at 36 random sub-plots to determine standing height and percent cover of grass, forb, and woody vegetation. The dominant grasses consisted of Big Bluestem, Little Bluestem, Side-oats Grama, Canada Wild Rye and Kentucky Blue Grass (*Poa pratensis*). Forbs composed 21.8%. The remaining 43.5% was open ground. The mean standing height was 28.42 cm. Few trees were present in the lowland except an Am. Elm, Honey Locust (*Gleditsia triacanthos*), and Smooth Sumac. The vegetation analysis was conducted in late June. **Edge:** Grazed pasture borders the S edge. A fire-guard surrounds the remaining edges of the study area. **Elevation:** 1400-1454 ft. **Coverage:** June 7, 12, 19, 24, 26; July 3, 12, 19, 26; 0730-0900, CDT. Total man-hours 13.5. **Census:** Grasshopper Sparrow, 10 (26, 10); Dickcissel, 8 (21, 8); Brown-headed Cowbird, 4 (10, 4); Henslow's Sparrow, 4, E. Meadowlark, 3 (8, 3); Upland Sandpiper, 2, Mourning Dove, 2; Com. Nighthawk, 1, E. Kingbird, 1; Red-winged Blackbird, +. **Total:** 10 species; 35 territorial males or females (91/km², 37/100 acres). **Visitors:** Greater Prairie Chicken, Bobwhite, Great Horned Owl, Com. Flicker, Rough-winged Swallow, Short-billed Marsh Wren, Brown Thrasher, Bobolink, W. Meadowlark, Com. Grackle, Am. Goldfinch. **Remarks:** Nests found: Mourning Dove, E. Kingbird, E. Meadowlark, Grasshopper Sparrow. The large number of visitors indicates that the area was frequently used for feeding by species that nested elsewhere.

108. 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:** New. **Size:** 9.11 ha = 22.5 acres (measured from aerial photograph, about 660 × 1300 ft). **Description of Plot:** Formerly a wooded plateau bordered by steep slopes. Pasture cleared in 1969, now open except for a few scattered trees and piles of tree tops and stumps. Surrounding area consists of oak-pine forest. The dominant canopy trees are Blackjack Oak (*Quercus marilandica*), Post Oak (*Q. stellata*), White Oak (*Q. alba*), and Shortleaf Pine (*Pinus echinata*). Major understory plants in the woods are small oaks, small hickories (*Carya* spp.), and Tree Huckleberry (*Vaccinium arboreum*)

The ground cover is dominated by Virginia Creeper (*Parthenocissus quinquefolia*), Lowbush Blueberry (*Vaccinium vacillans*), and panic grasses (*Panicum* spp.). In the pasture the understory plants are found in patches of small pines, Pokeweed (*Phytolacca americana*), and blackberries (*Rubus* spp.). The ground cover is dominated by planted legumes, principally Large Hop Clover (*Trifolium campestre*), Korean Lespedeza (*Lespedeza stipulacea*), Japanese Lespedeza (*L. striata*), and Bermuda Grass (*Cynodon dactylon*). A quantitative survey of the vegetation gave the following results: Trees 3 in. diameter and over, based on 6 circular samples, 103/acre; total basal area, 46.4 ft²/acre. Species comprising 90% of the total number of trees: Blackjack Oak, 34, 33, 10, 17; Post Oak, 18, 17, 4, 17; White Oak, 18, 17, 25, 50; Shortleaf Pine, 16, 16, 22, 50; dead trees, 10, 10, 8, 17. Trees by diameter size class A (3-6 in.), 62, 61, 6, 2, 14; B (6-9 in.), 16, 16, 4.8, 10; C (9-15 in.), 13, 12, 10.2, 22; D (15-21 in.), 10, 9, 17.3, 37; E (27-33 in.), 1.6, 1.6, 7.8, 17. Shrub stems/acre 2967; ground cover 47%; canopy cover 32%, average canopy height 25 ft (range 0-60). **Edge:** Bounded on 3 sides by similar forests, on 1 side by continuation of pasture and by a county road. **Topography:** A plateau sloping to the N, surrounded by narrow ridges and deep ravines with slopes as much as 80%. **Elevation** 990-1040 ft. **Weather:** Generally favorable with adequate rainfall and mild temperatures. **Coverage:** May 21, 28; June 4, 11, 18, 24; July 1, 9, 16; between 0600-1000 or 1830-2030 hours. Total man-hours: 45. **Census:** Indigo Bunting, 8 (88, 36); Cardinal, 7 (77, 31); Tufted Titmouse, 6 (66, 27); Great Crested Flycatcher, 5 (55, 22); Yellow-billed Cuckoo, 4 (44, 18); Brown-headed Cowbird, 4; Summer Tanager, 4; Chipping Sparrow, 4; E. Wood Pewee, 3 (33, 13); Starling, 3; Field Sparrow, 3; Carolina Chickadee, 2; E. Bluebird, 2; Yellow-throated Warbler, 2; Pine Warbler, 2; Prairie Warbler, 2; Killdeer, 1; Red-bellied Woodpecker, 1; Downy Woodpecker, 1; E. Kingbird, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; E. Meadowlark, 1; Blue Grosbeak, 1; Am. Goldfinch, 1. **Total:** 25 species; 70 territorial males (769/km², 311/100 acres). **Visitors:** Bobwhite, Mourning Dove, Hairy Woodpecker, Scissor-tailed Flycatcher, E. Phoebe, Blue Jay, Com. Crow, Am. Robin, Red-winged Blackbird, Com. Grackle, Lark Sparrow. **Remarks:** Nests found E. Kingbird (1), Chipping Sparrow (1). — PAUL B., JR. and MIDA G. GROVER, and FREDERICK M. BAUMGARTNER, Little Lewis Whirlwind Nature School and Sanctuary, Rte. 2, Jay, Okla. 74346.

109. MIXED HABITAT - DISTURBED BOTTOMLAND. — **Location:** Oklahoma; Washington Co., Dewey, 2 mi W of intersection of Ninth St. and Hwy 75 and 0.3 mi N on E bank of Caney River; 36°48'N, 95°58'W, Tulsa Quadrangle, USGS. **Continuity:** Established 1972; 8 consecutive years. **Size:** 40.47 ha = 100 acres. **Description of Plot:** See AB 26 976-977 (1972). **Weather:** Mild. Count days were clear to partly cloudy with temperature extremes of 41°-92°F. **Coverage:** Apr. 26; May 1, 12, 22, 25; June 1, 16, 22, 27; July 2; 0630-1150 and 1325-1740. Man-hours: 35.2. **Census:** Blue-gray Gnatcatcher 17 (42, 17); Indigo Bunting, 16.5 (41, 17); Red-winged Blackbird, 10 (25, 10); Cardinal, 9 (22, 9); Com. Yellow-

throat, 8 (20, 8), Yellow-billed Cuckoo, 6.5 (16, 7), Yellow-breasted Chat, 6 (15, 6), Brown-headed Cowbird, 6; Ruby-throated Hummingbird, 5 (12, 5); Field Sparrow, 5; Red-eyed Vireo 4.5 (11, 5); E. Wood Pewee, 3.5 (9, 4); Dickcissel, 3 (7, 3); Am. Goldfinch, 3; Red-bellied Woodpecker, 2.5; Red-headed Woodpecker, 2.5; Downy Woodpecker, 2; Carolina Chickadee, 2; Tufted Titmouse, 2; N. Parula, 2; Acadian Flycatcher, 1.5; White-breasted Nuthatch, 1.5; Killdeer, 1; Great Crested Flycatcher, 1; Blue Jay, 1; Gray Catbird, 1; Brown Thrasher, 1; Bell's Vireo, 1; Prothonotary Warbler, 1; Kentucky Warbler, 1; Painted Bunting, 1; Barred Owl, 0.5; Pileated Woodpecker, 0.5; Hairy Woodpecker, 0.5; N. Oriole, 0.5; Green Heron, +; Com. Crow, +; Warbling Vireo, +; Orchard Oriole, +. **Total:** 39 species; 130 territorial males (321/km², 130/100 acres). **Remarks:** Many hackberry trees were defoliated by the cankerworm in Apr. and May. — ELLA DELAP, 409 N. Wyandotte, Dewey, Okla. 74029.

110. OAK - PINE RAVINE FOREST WITH CLEARINGS. — **Location:** Oklahoma; Delaware Co., 4 mi S of Jay; 36°22'N, 94°48'W, Lake Eucha East Quadrangle, USGS. **Continuity:** New. **Size:** 7.4 ha = 18.3 acres (measured from aerial photograph, about 400 × 200 ft.). **Description of Plot:** Includes about 4.8 acres of bottomland forest bordering an intermittent stream, 10.7 acres of small second growth upland forest and brush, and 2.8 acres of cleared land formerly cultivated. About 10 deep, water erosion gullies run down from a county road to the stream bed. Less severe erosion has resulted from old logging roads and fire breaks. The varied drainage patterns along with cutting, clearing, and construction of wood roads have produced a larger variety of plant species than found on any local area of comparable size. The dominant canopy trees are oaks (*Quercus* spp.), Short-leaf Pine (*Pinus echinata*), and Bitternut Hickory (*Carya cordiformis*). Dominant understory plants include Coralberry (*Symphoricarpos orbiculatus*) and Spicebush (*Lindera benzoin*) in the bottomland forest; small Shortleaf Pines and Tree Huckleberry (*Vaccinium arboreum*) on the wooded slopes. Major ground plants are Tick Trefoils (*Desmodium* spp.), Virginia Creeper (*Parthenocissus quinquefolia*), and spring ephemerals on the stream bottom and Lowbush Blueberry (*Vaccinium vacillans*) and panic grasses (*Panicum* spp.) on the slopes. A quantitative survey of the vegetation gave the following results: Trees 3 in. diameter and over, based on 5 circular samples, 94/acre; total basal area 42.8 ft²/acre. Species comprising 90% of the total number of trees: Bitternut Hickory, 30, 32, 14, 40; Shortleaf Pine, 26, 28, 6, 40; Flowering Dogwood (*Cornus florida*), 8, 9, 15, 40; Sugar Maple (*Acer saccharum*), 6, 6, 15, 20; N. Red Oak (*Quercus rubra*), 4, 4, 27, 40; Black Oak (*Q. velutina*), 4, 4, 18, 20; Post Oak (*Q. stellata*), 4, 4, 18, 40; Chinkapin Oak (*Q. muehlenbergii*), 4, 4, 1, 20; Am. Elm (*Ulmus americana*), 2, 2, 4, 20; dead trees, 2, 2, 4, 20. Trees by diameter size class: A (3-6 in.) 72, 77, 7.8, 18; B (6-9 in.) 4, 4, 1.2, 3; C (9-15 in.) 10, 11, 8, 18; D (15-21 in.) 2, 2, 3.6, 9; E (21-27 in.) 4, 4, 12.4, 29; F (27-33 in.) 2, 2, 9.8, 23. Shrub stems/acre 6,740; ground cover 52%; canopy cover 59%; average canopy height 26 ft (range

14-70) **Edge:** Bordered on 3 sides by similar forests, on 1 side by county road and pasture **Topography:** A ravine with steep slopes to the flood plain. **Elevation:** 840-890 ft. **Weather:** Generally favorable with frequent rains and mild temperatures. **Coverage:** Apr. 15; May 17, 23, 30; June 6, 13, 20, 27; July 4, 11; between 0600-1000 or 1900-2100 hours. Total man-hours: 58. **Census:** Tufted Titmouse, 6 (81, 33); Cardinal, 6; Indigo Bunting, 6; Yellow-billed Cuckoo, 5 (68, 27); White-breasted Nuthatch, 5; Blue-gray Gnatcatcher, 5; E. Wood Pewee, 4 (54, 22); Carolina Chickadee, 4, Whip-poor-will, 3 (41, 16); Blue Jay, 3; N. Parula, 3; Kentucky Warbler, 3; Brown-headed Cowbird, 3; Summer Tanager, 3, Red-bellied Woodpecker, 2; Great Crested Flycatcher, 2; White-eyed Vireo, 2; Black-and-white Warbler, 2; Mourning Dove, 1; Chuck-will's-widow, 1; Ruby-throated Hummingbird, 1; Downy Woodpecker, 1. **Total:** 22 species; 71 territorial males (959/km², 388/100 acres). **Visitors:** Broad-winged Hawk, Pileated Woodpecker, Hairy Woodpecker, E. Phoebe, Red-eyed Vireo, Com. Grackle, Blue Grosbeak. **Remarks:** Two families of Carolina Chickadees and a female Indigo Bunting feeding a young cowbird were noted; a nest of the White-eyed Vireo was found. — PAUL B., JR. and MIDA G. GROVER and FREDERICK M. BAUMGARTNER, Little Lewis Whirlwind Nature School and Sanctuary, Rte. 2, Jay, Okla. 74346.

111. MATURE (1946) FOUR-ROW BELT. — **Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Station, Poultry Section, 0.8 mi S of County Road 42; 44°43'N, 93°03'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.698 ha = 1.72 acres (14.0 × 498.4 m measured). **Description of Plot:** The belt is L-shaped and runs in both an E-W and a N-S direction. Row 1, Cottonwood (*Populus deltoides*), average height 71 ft, density 78/acre; rows 1 and 2, Am. Elm (*Ulmus americana*), 28 ft, 415/acre; row 2, Red Pine (*Pinus resinosa*), 36 ft, 207/acre; row 3, Jack Pine (*P. banksiana*), 35 ft, 267/acre; rows 3 and 4, White Spruce (*Picea glauca*), 35 ft, 356/acre, and Colorado Blue Spruce (*P. pungens*), 24 ft, 52/acre; row 4, White Cedar (*Thuja occidentalis*), 26 ft, 296/acre. Dominant understory growth consists of grasses, Black Raspberry (*Rubus occidentalis*), and Red-berried Elder (*Sambucus pubens*); ground cover 70%; canopy cover 58%. **Edge:** Bordered on the N by a pea field, on the E by a cornfield, a mowed lawn, and farm buildings, on the S and the W by a soybean field. **Topography:** Flat; elevation 951 ft. **Weather:** Spring was about 3 weeks later than normal. Mean temperatures during census periods 60°F (range 31-88°). **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25; June 1, 4-5, 8, 11-12; July 10-12; 0530-1230. Total man-hours: 17. **Census:** Com. Grackle, 11 (1580, 640; nesting females); Mourning Dove, 4 (575, 233); Song Sparrow, 4; Blue Jay, 1; Gray Catbird, 1; Brown Thrasher, 1; Am. Robin, 1; Brown-headed Cowbird, 1; Great Horned Owl, +; E. Kingbird, +; Chipping Sparrow, +. **Total:** 11 species 24 territorial males or females (3448/km², 1395/acre). **Visitors:** Am. Kestrel, Ring-necked Pheasant, Ruby-throated Hummingbird, Com. Flicker, Least Flycatcher, Barn Swallow, Purple Martin, Com. Crow, Black-capped Chickadee, House Wren, Cedar Wax-

wing, Starling, Warbling Vireo, Yellow Warbler, Com Yellowthroat, House Sparrow, Red-winged Blackbird, N. Oriole, Rose-breasted Grosbeak, Am. Goldfinch, Savannah Sparrow, Vesper Sparrow. **Remarks:** Nests found (37): Horned Owl, 1; Mourning Dove, 7; Blue Jay, 1; Gray Catbird, 2; Brown Thrasher, 2; Am. Robin, 3; Com. Grackle, 17; Chipping Sparrow, 2; Song Sparrow, 2. — **RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.**

112. MATURE (1948) FIVE-ROW BELT.

— **Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Station, North Beef Section, 0.5 mi S of County Road 42; 44°44'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.706 ha = 1.74 acres (21×336 m, measured). **Description of Plot:** The belt is L-shaped and runs in both an E-W and a N-S direction; all sectors of the belt except about ½ of the E-W sector is regularly mowed. Row 1, Colorado Blue Spruce (*Picea pungens*), average height 13 ft, density 120/acre; rows 1 and 2, Green Ash (*Fraxinus pennsylvanica*), 34 ft, 388/acre; rows 2 and 3, Silver Maple (*Acer saccharinum*), 36, 323/acre; rows 3 and 4, Cottonwood (*Populus deltoides*), 41, 170/acre; row 4, *Caragana arborescens*, 11 ft, 906/acre; row 5, Ural Willow (*Salix purpurea*), 12, 798/acre. Dominant understory growth consists of grasses, Black Raspberry (*Rubus occidentalis*), and Boxelder (*Acer negundo*); ground cover 73%; canopy cover 29%. **Edge:** Bordered on the N and the E by farm buildings, on the S by a cornfield, and on the W by an alfalfa field. **Topography:** Flat; elevation 953 ft. **Weather:** See Census 111. **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25; June 1, 4-5, 8, 11-12; July 10-12; 0530-1230. Total man-hours: 12. **Census:** Com. Grackle, 58 (8237, 3333; nesting females); Mourning Dove, 5 (710, 287); Am. Robin, 2; Starling, 1; Warbling Vireo, 1; House Sparrow, 1; Chipping Sparrow, 1. **Total:** 7 species; 69 territorial males or female (9799/km², 3966/100 acres). **Visitors:** Com. Flicker, Least Flycatcher, Barn Swallow, Black-capped Chickadee, Gray Catbird, Brown Thrasher, Yellow Warbler, Com. Yellowthroat, W. Meadowlark, Red-winged Blackbird, Orchard Oriole, N. Oriole, Brown-headed Cowbird, Rose-breasted Grosbeak, Am. Goldfinch, Savannah Sparrow. **Remarks:** Nests located (103): Mourning Dove, 18; Am. Robin, 6; Starling, 1; House Sparrow, 1; Com. Grackle, 76; Chipping Sparrow, 1. — **RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.**

113. MATURE (1949) EIGHT-ROW BELT.

— **Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Station, Sewage Section, 3.7 mi S of County Road 42; 44°41'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.37 ha = 0.91 acre (23 × 162 m, measured). **Description of Plot:** The belt runs in a N-S direction. Rows 1 and 2, *Caragana arborescens*, average height 11 ft, density 190/acre; rows 3 and 4, Cottonwood (*Populus deltoides*), 78 ft, 94/acre; row 5, Green Ash (*Fraxinus pennsylvanica*), 28 ft, 132/acre; rows 6 and 7, Red Pine (*Pinus resinosa*), 35 ft, 108/acre; row 8, White Spruce (*Picea glauca*), 37 ft, 64/acre.

Dominant understory growth consists of grasses, ground cover 53%, canopy cover 77%. **Edge:** Bordered on the N by a hayfield on the E by a dirt road, a small woodlot, and a mowed lawn, on the S by a cornfield, and on the W by a cornfield, a mowed lawn, and 2 sewage sludge ponds. **Topography:** Essentially flat; elevation 983 ft. **Weather:** See Census 111. **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25; June 1, 4-5, 8, 11-12, July 10-12; 0530-1230. Total man-hours: 8. **Census:** Com. Grackle, 31 (8418, 3407; nesting females); Mourning Dove, 2; Am. Robin, 1; E. Kingbird, +; Brown Thrasher, +; Warbling Vireo, +; Com. Yellowthroat, +. **Total:** 7 species; 34 territorial males or females (9232/km², 3736/100 acres). **Visitors:** Am. Kestrel, Ring-necked Pheasant, Yellow-billed Cuckoo, Downy Woodpecker, Great Crested Flycatcher, Least Flycatcher, Barn Swallow, Black-capped Chickadee, Gray Catbird, House Sparrow, Red-winged Blackbird, N. Oriole, Brown-headed Cowbird, Rose-breasted Grosbeak, Am. Goldfinch, Chipping Sparrow. **Remarks:** Nests located (58): Mourning Dove, 6; Brown Thrasher 1; Am. Robin, 3; Com. Grackle, 15. — **RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.**

114. MATURE (1951) THREE-ROW BELT.

— **Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Station, Forestry Section, 1.5 mi S of County Road 42; 44°43'N, 93°06'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.32 ha = 0.80 acres (14.8 × 219.2 m, measured). **Description of Plot:** The belt runs in an E-W direction, and a nature trail traverses the E half between rows 2 and 3. Row 1, Tartarian Honeysuckle (*Lonicera tatarica*), average height 8 ft, density 72/acre; row 2, Ponderosa Pine (*Pinus ponderosa*), 23 ft, 102/acre; row 3, Colorado Blue Spruce (*Picea pungens*), 44 ft, 56/acre. Dominant understory growth consists of grasses, and a few Siberian Elm (*Ulmus pumila*) occur in row 3; ground cover 27%; canopy cover 22%. **Edge:** Bordered on the N by a conifer block planting, on the E by a row of shrubs and the Station Office, on the S by a secondary road and a soybean field, and on the W by a dirt road and a mowed field. **Topography:** Flat; elevation 948 ft. **Weather:** See Census 111. **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25; June 1, 4-5, 8, 11-12; July 10-12; 0530-1230. Total man-hours: 6. **Census:** Com. Grackle, 6 (1853, 750; nesting females); Mourning Dove, 1; Gray Catbird, 1; Chipping Sparrow, 1; Brown Thrasher, +; Am. Robin, +. **Total:** 6 species; 9 territorial males or females (2780/km², 1125/100 acres). **Visitors:** Ring-necked Pheasant, Com. Flicker, E. Kingbird, Least Flycatcher, Barn Swallow, Blue Jay, Com. Crow, Black-capped Chickadee, House Wren, Starling, Com. Yellowthroat, House Sparrow, Brown-headed Cowbird, Rose-breasted Grosbeak, Indigo Bunting, Am. Goldfinch, Vesper Sparrow, Song Sparrow. **Remarks:** Nests found (14): Mourning Dove, 2; Gray Catbird, 1; Am. Robin, 2; Com. Grackle, 8; Chipping Sparrow, 1. — **RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.**

115. IMMATURE (1961) NINE-ROW BELT.

— **Location:** Minnesota; Dakota Co.,

Univ of Minn Rosemount Agricultural Experiment Station, Agricultural Engineering Section, 1.5 mi S of County Road 42; 44°43'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.787 ha = 1.94 acres (26.7 × 294.6 m, measured). **Description of Plot:** The belt runs in an E-W direction. Row 1, Tartarian Honeysuckle (*Lonicera tatarica*), average height 11 ft, density 27/acre, and Amur Maple (*Acer ginnala*), 13 ft, 63/acre; row 2, Com Lilac (*Syringa vulgaris*), 11 ft, 129/acre; row 3, Honey Locust (*Gleditsia triacanthos*), 24 ft, 51/acre; rows 3 and 7, Green Ash (*Fraxinus pennsylvanica*), 20 ft, 90/acre; rows 4 and 5, Cottonwood (*Populus deltoides*), 39 ft, 25/acre, row 6, Silver Maple (*A. saccharinum*), 21 ft, 56/acre; row 8, Ponderosa Pine (*Pinus ponderosa*), 19 ft, 72/acre; row 9, White Spruce (*Picea glauca*), 17 ft, 45/acre. Dominant understory growth consists of grasses; ground cover 74%, canopy cover 61%. **Edge:** Bordered on the N by a cornfield, on the E by an old field, on the S by a secondary road and a cornfield, and on the W by an apple orchard. **Topography:** Flat, elevation 950 ft. **Weather:** See Census 111. **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25, June 1, 4-5, 8, 11-12; July 10-12; 0530-1230. Total man-hours: 9. **Census:** Com. Grackle, 20 (2547, 1031; nesting females); Mourning Dove, 5 (637, 258); Am. Robin, 1; Chipping Sparrow, 1; Gray Catbird, +; Brown Thrasher, +; Indigo Bunting, +. **Total:** 7 species, 27 territorial males or females (3439/km², 1392/100 acres). **Visitors:** Am. Kestrel, Com. Flicker, E. Kingbird, Least Flycatcher, Barn Swallow, Blue Jay, Black-capped Chickadee, House Wren, Starling, Com. Yellowthroat, House Sparrow, W. Meadowlark, Red-winged Blackbird, Brown-headed Cowbird, Rose-breasted Grosbeak, Am. Goldfinch, Savannah Sparrow, Song Sparrow. **Remarks:** Nests found (67): Mourning Dove, 2; Am. Robin, 3; Com. Grackle, 30; Gray Catbird, 1; Chipping Sparrow, 1. — **RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.**

116. IMMATURE (1966) FOUR-ROW BELT.

— **Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Station, Plant Pathology Section, 2.6 mi S of County Road 42; 44°41'N, 93°06'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.298 ha = 0.736 acres (13 × 229.3 m, measured). **Description of Plot:** L-shaped, in both an E-W and a N-S direction; the N-S sector is regularly mowed. Row 1, Laurel-leaved Willow (*Salix pentandra*), average height 17 ft, density 13/acre; rows 1 and 2, Buffalo Berry (*Shepherdia argentea*), 9 ft, 24/acre, Choke Cherry (*Prunus virginiana*), 15 ft, 158/acre, and Red-osier Dogwood (*Cornus stolonifera*), 11 ft, 14/acre; row 2, Gray Dogwood (*C. racemosa*), 5 ft, 26/acre, and High-bush Cranberry (*Viburnum trilobum*), 9 ft, 13/acre; rows 2 and 3, Russian Olive (*Elaeagnus angustifolia*), 14 ft, 36/acre, and S. Arrowwood (*Viburnum dentatum*), 8 ft, 35/acre; row 3, Green Ash (*Fraxinus pennsylvanica*), 21 ft, 27/acre, and Amur Maple (*Acer ginnala*), 16 ft, 43/acre, row 4, Ponderosa Pine (*Pinus ponderosa*), 16 ft, 22/acre, Colorado Blue Spruce (*Picea pungens*), 16 ft, 30/acre, and Black Hills Spruce (*P. glauca albertiana*), 16 ft, 53/acre. Dominant understory growth consists of grasses; ground cover 87%; canopy cover 44%. **Edge:** Bordered on the N by an alfalfa field, on the E by a

mowed lawn and farm buildings, on the S by a small soybean field and 2 rice ponds, and on the W by a sunflower field. **Topography:** Flat; elevation 951 ft. **Weather:** See Census 111. **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25; June 1, 4-5, 8, 11-12; July 10-12; 0530-1230. Total man-hours: 9. **Census:** Com. Grackle, 13 (4365, 1766; nesting females); Mourning Dove, 3 (1007, 408); Am. Robin, 3; Gray Catbird, 1, Brown Thrasher, 1; Chipping Sparrow, 1, Com. Yellowthroat, +. **Total:** 7 species, 22 territorial males or females (7386/km², 2989/100 acres). **Visitors:** Sharp-shinned Hawk, Yellow-billed Cuckoo, Com. Flicker, E. Kingbird, Least Flycatcher, Barn Swallow, Blue Jay, Black-capped Chickadee, Cedar Waxwing, Starling, Yellow Warbler, House Sparrow, Bobolink, W. Meadowlark, Red-winged Blackbird, N. Oriole, Brown-headed Cowbird, Am. Goldfinch, Savannah Sparrow, Vesper Sparrow, Song Sparrow. **Remarks:** Nests found (36): Mourning Dove, 9; Gray Catbird 1; Brown Thrasher, 2; Am. Robin, 4; Com. Grackle, 24. — RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.

117. IMMATURE (1974) THREE-ROW BELT. — **Location:** Minnesota; Dakota Co., Univ. of Minn. Rosemount Agricultural Experiment Station, Swine Sheep Section, 0.4 mi S of County Road 42; 44°44'N, 93°05'W, Coates Quadrangle, USGS. **Continuity:** New. **Size:** 0.21 ha = 0.515 acres (10.3 × 202.2 m, measured). **Description of Plot:** The belt runs in an E-W direction; mowed once between rows. Row 1, Douglas-fir (*Pseudotsuga taxifolia*), average height 7 ft, density 148/acre; row 2, Norway Spruce (*Picea abies*), 8 ft, 171/acre; row 3, White Cedar (*Thuja occidentalis*), 6 ft, 163/acre. Dominant understory growth consists of grasses; ground cover 89%; canopy cover 1%. **Edge:** Bordered on the N by an alfalfa field, on the E by a paved secondary road, and on the S and the W by farm buildings and mowed lawns. **Topography:** Flat; elevation 953 ft. **Weather:** See Census 111. **Coverage:** Apr. 26-27; May 3, 13, 16, 18, 23-25; June 1, 4-5, 8, 11-12; July 10-12; 0530-1230. Total man-hours: 5. **Census:** Am. Robin, 3 (1439, 583); Com. Grackle, 3; Chipping Sparrow, +. **Total:** 3 species; 6 territorial males or females (2878/km², 1165/100 acres). **Visitors:** Ring-necked Pheasant, Barn Swallow, Brown Thrasher, Starling, House Sparrow, W. Meadowlark, Red-winged Blackbird, Brown-headed Cowbird, Savannah Sparrow. **Remarks:** Nests located (8): Am. Robin, 3; Com. Grackle, 4, Chipping Sparrow, 1. — RICHARD H. YAHNER, Dept. of Ent., Fisheries and Wildlife, Univ. of Minn., St. Paul, Minn. 55108.

118. FLOODPLAIN COTTONWOOD FOREST. — **Location:** Colorado; Jefferson Co., about 10 mi SW of Denver; NE/4, Sec. 14, T6S, R69W, 6th P.M.; 39°32'N, 105°5'W, Littleton Quadrangle, USGS. **Continuity:** Established 1971; 9 consecutive years. **Size:** 9.7 ha = acres. **Description of Plot:** See AB 25: 966 (1971). **Weather:** May and June precipitation of 5.92 in. was 30% above normal; Apr. was 73% and July 45% of normal. A few wet snowstorms occurred in May and June. **Coverage:** Feb. 24; Mar. 10; Apr. 6, 21, 28; May 5, 14, 19, 26; June 2, 10; July 4, 7, 16, 21, 23; Aug 1, 22; 0715-2030 hours. Total man-hours 39. Trips through May 14 by foot; from

May 19 on, by foldboat. **Census:** Great Blue Heron, 71 (731, 296), House Wren, 39 (402, 163); Com. Grackle, 20 (206, 83); Starling, 15 (154, 63); Tree Swallow, 8 (82, 33); Yellow Warbler, 8; Am. Robin, 7 (72, 29); N. Oriole, 7; Double-crested Cormorant, 5 (51, 21); Downy Woodpecker, 4 (41, 17); Black-billed Magpie, 4; Red-winged Blackbird, 3.5 (36, 15); Am. Kestrel, 2; Mourning Dove, 2; Com. Flicker, 2; E. Kingbird, 2; W. Meadowlark, 2; Song Sparrow, 2; Canada Goose, 1; Mallard, 1; Great Horned Owl, 1; Warbling Vireo, 1; Am. Goldfinch, 1; Brown-headed Cowbird, +. **Total:** 24 species; 199.5 territorial males (2054/km², 831/100 acres). Excluding the colonial nesting herons and cormorants, 123.5 territorial males, 1272/km², 515/100 acres). **Visitors:** Osprey, Belted Kingfisher, Spotted Sandpiper, W. Wood Pewee, Barn Swallow, Black-capped Chickadee. **Remarks:** At last Chatfield Reservoir filled to its permanent pool level, and the plot was completely flooded. Water storage began about May 7; half the plot flooded by May 14; water totally covered it by May 19. The lake reached full capacity in mid-June, with 7-10 ft in the grove. Ground-nesting birds, and low shrub nesters, obviously suffered from the immediate flooding. Previously discovered nests of the Mallard and Canada Goose were flooded out by May 14, of a blackbird by May 26. By the latter date no catbirds, Com. Yellowthroats, Yellow-breasted Chats, meadowlarks, Lazuli Buntings, or Song Sparrows remained (only the meadowlark and sparrow had been present long enough to establish nesting territories by census standards). An apparent subsequent impact of the flooding was the attraction of cormorants; from 20 to 110 used the grove for roosting, and nested for the first time (unsuccessfully). The number of nesting herons increased again, but by the lowest proportion in the 9 years of the study. About July 1 the Colorado Parks Department opened the lake to boats. Although off-limits, the grove received almost constant daytime boat traffic, the occupants fishing or sightseeing. By July 1 most herons had young in the nests so that the boats probably had only a limited effect upon them. The cormorants flushed whenever boats came to within 75 ft of their roost sites; the sitting birds flushed with them frequently enough to probably cause nest abandonment. The 8 Tree Swallow pairs represent a significant increase. Grackles (17) built nests in the shelter of heron nests. The debris of fallen trees, which congregated in the grove during the first 2 months of flooding, provided a good feeding ground. We found 147 nests, including 71 herons, 20 grackles, 14 Starlings, 9 wrens, 7 swallows, 6 orioles, 5 cormorants, 4 magpies, 3 robins, and 1 each of Mallard, goose, kestrel, owl, Downy Woodpecker, flicker, kingbird, and blackbird. The cooperation of Park Superintendent Gene Schmidt and his staff has been terrific, both in support of the study and in providing access and boat storage. — FRANK and JAN JUSTICE, URLING and HUGH KINGERY (compiler), 869 Milwaukee St., Denver, Colo. 80206.

119. GAMBEL'S OAK - MOUNTAIN MAHOGANY WOODLAND. — **Location:** Colorado; El Paso County, T14S, R67W. S-E corner of Sec. 16 and N-E corner of Sect. 21, off the Gold Camp Road; 38°49'N, 104°53'W, Manitou Springs Quadrangle (7.5 min),

USGS. **Continuity:** New. **Size:** 18.4 ha = 45.5 acres (irregular rectangle, approximately 2000 by 980 ft, measured on a USGS map). **Description of Plot:** The dominant canopy flora are Gambel's Oak (*Quercus gambelii*) and Mountain Mahogany (*Cercocarpus montanus*). Gambel's Oak comprises 54% of the ground cover, and Mountain Mahogany 36%, 5% is covered with various forbs and grasses, and 5% is bare ground. Common forbs are Blue Yucca (*Yucca baccata*), Plains Pricklypear Cactus (*Opuntia polyacantha*), Paintbrush (*Castilleja integra*), Mullein (*Verbascum thapsus*), Pasture Sagebrush (*Artemisia frigida*), and Narrow-leaf Penstemon (*Penstemon linarioides*). **Edge:** Bordered on the WS-W and the E sides by similar forest with occasional Ponderosa Pine (*Pinus ponderosa*) and Engelmann Spruce (*Picea engelmannii*). The W side contains some cliffs and the S-E corner is bordered by the Gold Camp Road. **Topography:** On an E-facing, 60° slope, but with meadow area level. **Elevation:** 6600 ft. **Weather:** Warm and sunny with occasional afternoon showers. Rainfall average. Temperatures in the upper 80s and 90s F, normal for the area. **Coverage:** July 20, 22, 24-25, 28, 31, Aug. 1, 4-8, 19, 26; 0530-0830 or 1700-2000 hours. Total man-hours: 57. **Census:** Rufous-sided Towhee, 14 (76, 31); Broad-tailed Hummingbird, 9 (49, 20); Scrub Jay, 3 (16, 7); Am. Robin, 3; House Sparrow, 2; Gray Flycatcher, 1; White-breasted Nuthatch, 1; Solitary Vireo, 1; Black-headed Grosbeak, 1. **Total:** 9 species; 35 territorial males (190/km², 77/100 acres). **Visitors:** Com. Crow, W. Bluebird, W. Tanager, House Finch. **Remarks:** On 3 occasions large flocks of Com. Crows (up to 17) were observed visiting the area. There was a marked absence of Rufous-sided Towhees and Broad-tailed Hummingbirds in the meadow area. The plot is part of a nature trail that was newly established after erosion claimed the old one. The new trail and part of the old were used to census the area. The area is frequented by horse-back riders and hikers; however, other people were observed on only two occasions. — ERICK JACKSON and SHERRENE ST. HELENS, 895 Westmoreland, Colorado Springs, Colo. 80907.

120. DECIDUOUS OAK WOODLAND. — **Location:** California; Monterey Co., Hastings Reservation, 2.5 mi E of Jamesburg; 36°23'N, 121°33'W, Rana Creek Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 5.67 ha = 14 acres. **Description of Plot:** See AB 33:82-83 (1979). **Weather:** The rainfall was normal during the winter of 1978-79 with 21.1 in. (mean 20.2 in.). April was slightly cooler (mean temperature 50.4°F) than the mean for the last 40 years (51.8°F). Precipitation was 0.74 in. for Apr. and 0.44 in. for May compared with a mean for the last 10 years of 1.57 in. for Apr. and 0.26 in. for May. **Coverage:** Apr. 21, 27; May 10, 20, 26, 28-29, 31; June 10; 0500-0845, PST. Total man-hours: 12. **Census:** Blue-gray Gnatcatcher, 3 (53, 21); Dark-eyed Junco, 2.5; Plain Titmouse, 2; W. Bluebird, 1.5; Chipping Sparrow, 1.5; Ash-throated Flycatcher, 1; Scrub Jay, 1; Mourning Dove, 0.5; Anna's Hummingbird, 0.5; White-breasted Nuthatch, 0.5; Barn Owl, +. **Total:** 11 species; 14 territorial males or females (247/km², 100/100 acres). **Visitors:** Black-chinned Hummingbird, Com. Flicker, Acorn Woodpecker, Hairy Woodpecker, W.

Flycatcher, W Wood Pewee, Violet-green Swallow, Yellow-billed Magpie, Com Crow, Bewick's Wren, Am. Robin, Hutton's Vireo, Warbling Vireo, Brown-headed Cowbird, N. Oriole, Black-headed Grosbeak, Lazuli Bunting, Purple Finch, Lesser Goldfinch, Brown Towhee. **Remarks:** Nests found: Plain Titmouse, 1; W. Bluebird, 1. — **PAMELA L. WILLIAMS, Hastings Reservation, Univ. of Calif., Star Route Box 80, Carmel Valley, Calif. 93924.**

121. SYCAMORE-COAST LIVE OAK-RIPARIAN WOODLAND. —

Location: California; San Diego Co., Kit Carson Park in Escondido; 33°05'N, 117°03'W, Escondido Quadrangle, USGS. **Continuity:** New. **Size:** 6.15 ha = 15.2 acres (canyon slopes, 300 × 2200 ft; as measured on aerial map, scale 1:2400). **Description of Plot:** Riparian woodland lining a narrow canyon. South-flowing stream bisecting plot has run continuously since December 1977. Dominant canopy trees are Coast Live Oak (*Quercus agrifolia*) and California Sycamore (*Platanus racemosa*). Understory consists of young oaks and Poison Oak (*Toxicodendron diversilobum*); California Manroot (*Marah fabaceus*), Rippgut Brome (*Bromus rigidus*), and Bedstraw (*Galium aparine*) are the most prominent species comprising the ground cover. A quantitative survey of the vegetation gave the following results: Trees 3-in. diameter and over based on five 0.1 acre circular samples, 142/acre; total basal area 143.3 ft²/acre. Species comprising 100% of the total number of trees: Coast Live Oak, 102, 79, 71, 100; Calif. Sycamore, 18, 13, 22, 40; dead trees, 12, 8, 7, 80. Trees by diameter size class: A (3-6 in.) 48, 34, 17.2, 12; B (6-9 in.) 18, 13, 11, 8; C (9-15 in.) 12, 8, 10.3, 7; D (15-21 in.) 16, 11, 18.4, 13 E (21-27 in.) 22, 15, 30.6, 21; F (27-33 in.) 18, 13, 35, 24; G (33-40 in.) 6, 4, 14.8, 10; H (41-46 in.) 2, 1, 6, 4. Shrub stems/acre, 1080; ground cover 60%; canopy cover 85%; average canopy height 50 ft (estimated). **Edge:** Bordered on the E and W by disturbed coastal sage, citrus groves, and residential areas; on the N and S by contiguous riparian woodland. **Topography:** Shallow canyon, slope is steeper on the W. **Elevation:** 460-560 ft. **Weather:** Typical for season — overcast mornings, clear afternoons. **Coverage:** Apr. 21, 28; May 5, 12, 19, 26; June 2, 9; 0500-1000, PST. Total man-hours: 13. **Census:** House Wren, 20 (325, 132); Rufous-sided Towhee, 10 (163, 66); Mourning Dove, 7.5 (122, 49); Brown Towhee, 6.5 (106, 43); W. Flycatcher, 6 (98, 39); Starling, 6; Black-chinned Hummingbird, 5 females (81, 33); Bushtit, 5; Black-headed Grosbeak, 5; Orange-crowned Warbler, 4 (65, 26); Scrub Jay, 3 (49, 20); Hutton's Vireo, 3; Com. Flicker, 2; Acorn Woodpecker, 2; Bewick's Wren, 2; Lesser Goldfinch, 2; Ash-throated Flycatcher, 1.5; Nuttall's Woodpecker, 1; W. Wood Pewee, 7; Plain Titmouse, 7; Wren-tit, 7; Red-shouldered Hawk, +; Black Phoebe, +; Mockingbird, +; California Thrasher, +. **Total:** 25 species; 94.5 territorial males and females (1536, 622). **Visitors:** California Quail, Anna's Hummingbird, Com. Crow, Swainson's Thrush, Warbling Vireo, Nashville Warbler, Townsend's Warbler, Wilson's Warbler, N. Oriole, Brown-headed Cowbird, W. Tanager, House Finch. **Remarks:** Illegal aliens have established several temporary

camp within the census area. They contribute much litter to the area around their camps, but appear to have little overall effect on the plot. — **KENNETH L. WEAVER, 1339 Taylor Pl., Escondido, Calif. 92027.**

122. OPEN ASPEN GROVE-SCATTERED CONIFERS. —

Location: Colorado; Larimer Co., Rocky Mountain Nat'l Park, NE ¼, Sec. 31, T5N, R73W; 40°22'N, 105°37'W, Long's Peak Quadrangle, USGS. **Continuity:** Established 1976; 4 consecutive years. **Size:** 14 ha = 34.6 acres. **Description of Plot:** See AB 31:72-3 (1977). **Weather:** Windy, wet spring; water in area through July. **Coverage:** May 28; June 2, 16, 30; July 1, 7; 0530-1100. Total man-hours: 30. **Census:** House Wren, 13 (93, 38); Tree Swallow, 11 (79, 32); Warbling Vireo, 4 (29, 12); Dusky Flycatcher, 3 (21, 9); Mountain Chickadee, 3; Pygmy Nuthatch, 3; Am. Robin, 3; Williamson's Sapsucker, 2.5; Broad-tailed Hummingbird, 2; W. Wood Pewee, 2; White-breasted Nuthatch, 2; Mountain Bluebird, 2; Cassin's Finch, 2; Chipping Sparrow, 2; Lincoln's Sparrow, 2; Brown-headed Cowbird, 1.5; W. Tanager, 1.5; Green-tailed Towhee, 1.5; Gray-headed Junco, 1.5; Com. Flicker, 1; Yellow-bellied Sapsucker (Red-naped race), 1; Hairy Woodpecker, 1; Olive-sided Flycatcher, 1; Townsend's Solitaire, 1; Goshawk, 0.5; Yellow-rumped Warbler, 0.5; Pygmy Owl, +; Downy Woodpecker, +; Steller's Jay, +; Brown Creeper, +; Ruby-crowned Kinglet, +; Evening Grosbeak, +; Pine Siskin, +. **Total:** 33 species; 68.5 territorial males (489/km², 198/100 acres). **Remarks:** Nests found: 38. Best nesting year; lush vegetation and abundant water. Nat'l Audubon Soc. conventioners helped locate nests. — **PAULA L. HANSLEY, 750 S. 41st, Boulder, Colo. 80303.**

123. PONDEROSA PINE-SCRUB OAK-MT. 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; 12 consecutive years. **Size:** 9.09 ha = 20 acres. **Coverage:** June 5, 11, 20, 29; July 8, 17, 28; Aug. 7, 16, 23; 0800-2030 hrs. Total man-hours: 60. **Census:** W. Bluebird, 13 (161, 65); Broad-tailed Hummingbird, 2; Brown-headed Cowbird, 2 (female); Black-headed Grosbeak, 2; House Finch, 2; Lesser Goldfinch, 2; W. Wood Pewee, 1; Solitary Vireo, 1; W. Tanager, 1; Rufous-sided Towhee, 1. **Total:** 10 species; 27 territorial males or females (334/km², 135/100 acres). **Visitors:** Cooper's Hawk, Mourning Dove, Rufous Hummingbird, Com. Flicker, Hairy Woodpecker, Steller's Jay, Scrub Jay, Com. Crow, Black-capped Chickadee, Mountain Chickadee, Pygmy Nuthatch, Am. Robin, Yellow Warbler, Lark Sparrow, Chipping Sparrow. **Remarks:** There were 14 nests in boxes used by Western Bluebirds (13) and White-breasted Nuthatch (1). Survival rate was about normal. — **MILDRED O. SNYDER, 161 Del Mar Circle, Aurora, Colo. 80011.**

124. SCRUB OAK-PONDEROSA PINE ASSOCIATION. —

Location: Colorado; El Paso Co. 800 ft NE of Dwire Hall, Univ. of Colorado campus, Colorado Springs; 38°52'N, 104°47'W, Pikeview Quadrangle, USGS. **Continuity:** New. **Size:** 8 ha = 19.7 acres (polygon,

surveyed) **Description of Plot:** The dominant vegetation is comprised of dense clumps of Scrub Oak (*Quercus gambelli*) bordered by open stands of Ponderosa Pine (*Pinus ponderosa*). Prominent shrubs are Mountain Mahogany (*Cercocarpus montanus*) and Skunkbrush (*Rhus trilobata*). The ground cover includes Pasture Sagebrush (*Artemisia frigida*), Prickly-pear Cactus (*Opuntia compressa*), and Blue Grama (*Bouteloua gracilis*). This vegetation type is not conducive to conventional quantitative survey methods, so analysis was accomplished through the use of several 100 m transects and an aerial photograph. 40% of the plot is open with a well-developed herbaceous layer, 26% is comprised of shrub, 24% is covered by Scrub Oak and 10% is Ponderosa Pine. **Edge:** Bordered to the N, S and W by similar vegetation. The E edge has a lower proportion of Ponderosa Pine and a higher proportion of grass. **Topography:** A box canyon that broadens to an open valley on the E edge. The slopes of the canyon are rocky, floor is flat with 4 ft wide ravine that carries water after heavy rain. **Elevation:** 6200 ft. **Weather:** Cool and wet until mid-June, including 3 snowstorms that dropped at least an inch of snow; warm and dry thereafter. **Coverage:** Apr. 21, 23-24; May 1, 4, 7, 11, 13-15, 25, 29; June 2, 4, 6, 10-11, 19, 25, 28; 0530-0900 and 1650-1800. Total man-hours 35. **Census:** Black-billed Magpie, 4 (50, 20), Rufous-sided Towhee, 4; Scrub Jay, 3 (38, 15), Black-capped Chickadee, 3; Virginia's Warbler, 3; Mourning Dove, 2; Am. Robin, 2, Rock Wren, 1; Brown Thrasher, 1; Brown-headed Cowbird, 1. **Total:** 10 species, 24 territorial males (301/km², 122/100 acres). **Visitors:** Red-tailed Hawk, Com. Flicker, Hairy Woodpecker, White-breasted Nuthatch, Starling, W. Meadowlark, W. Tanager, Black-headed Grosbeak, House Finch, (Green-backed) Lesser Goldfinch. **Remarks:** The severity of the spring weather hampered the onset of the breeding season. Flocks of Scrub Jays, Black-billed Magpies and robins were prevalent by the end of June. Special thanks to Chuck Warner for assistance in surveying the plot. — **NANCY WARNER, 23 Cragmor Village Rd., Colorado Springs, Colo. 80907.**

125. DOUGLAS-FIR-MADRONE-TAN-BARK OAK FOREST. —

Location: Oregon, Josephine Co., 3 mi E of I-5, at Exit 76 from Wolf Creek; 42°41'N, 123°20'W, Glendale Quadrangle, USGS. **Continuity:** New. **Size:** 7.49 ha = 19.3 acres (rectangular, paced, with compass, 700 E-W × 1200 ft N-S). **Description of Plot:** Mixed evergreen forest set back in the canyon known as Foley Gulch. Most of the plot is densely wooded second-growth, with a few large seed trees, many large stumps and rotting logs on ground; some small clearings, many stiff thickets and tangles. The dominant canopy trees are Douglas-fir (*Pseudotsuga menziesii*), Madrone (*Arbutus menziesii*), and Tan-bark Oak (*Lithocarpus densiflora*). A small creek flows across the plot for most of the year, but dries to small pools in late summer. A quantitative survey of vegetation, as described in *AFN* 24:727-737, (1970), gave the following data, based on 5 randomly centered circles, 0.1 acre in extent: Trees 3-in. diameter and over, 458/acre; total basal area 131.4 ft²/acre. Species comprising 95% of the total number of trees (figures after each give num-

ber of trees/acre, relative density in %, relative dominance, frequency, in that order) Douglas-fir, 182, 40, 57, 100, Tan-bark, Oak 122, 27, 12, 100; Madrone, 78, 17, 20, 80; Giant Chinquapin (*Castanopsis chrysophylla*), 24, 5, 4, 60; California Black Oak (*Quercus kelloggii*), 20, 5, 2, 40. Trees by diameter size class A (3-6 in.) 318, 70, 31.8, 24; B (6-9 in.) 62, 13.2, 18.6, 14; C (9-15 in.) 62, 13.2, 49.6, 38, D (15-21 in.) 14, 3.3, 25.2, 19; E (21-27 in.) 2, 1.3, 6.2, 5. Shrub stems/acre 30,600; ground cover (est.) 60%; canopy cover (est.) 80%, average canopy height 71 ft (range 35-100). Besides tree sapling stems less than 3 in. diameter, shrub stems are of the following species Hazelnut (*Corylus cornuta*), *Ceanothus* spp., Blackberry (at least 3 *Rubus* spp.), Thimbleberry (*R. parviflorus*), Red Bilberry (*Vaccinium parviflorum*), Oregon Grape (*Berberis aquifolium*), Mountain Oregon Grape (*B. nervosa*), Dogwood (*Cornus nuttalli*), Ocean Spray (*Holodiscus discolor*). **Edge:** Bordered on all sides by similar forest, some of it near a block of uncut forest. **Topography:** The center of plot, a former log-landing, is flattish, but all 4 corners slope upward, steeply in places, in SW-facing canyon, with skid trails as main access. **Elevation:** Ca. 1700 ft going up to about 2000 ft. **Weather:** Cloudy and cool **Coverage:** Apr. 8, 26; May 15; June 6, 8, 15, 20, 24; 0440-0730. Total man-hours: 16. **Census:** Nashville Warbler, 9 (115, 47); Black-headed Grosbeak, 7.5 (96, 39); Orange-crowned Warbler, 6 (77, 31); Steller's Jay, 5 (64, 26); Chestnut-backed Chickadee, 5; MacGillivray's Warbler, 5; Rufous-sided Towhee, 4.5 (58, 23); Dark-eyed Junco, 3 (38, 16); Hermit Thrush, 2.5; Rufous Hummingbird, 2; Bushtit, 2; Olive-sided Flycatcher, 1.5; Purple Finch, 1.5; Com. Flicker, 1; Hutton's Vireo, 1; Pygmy Owl, 0.5; Pileated Woodpecker, +. **Total:** 17 species; 67 territorial males or females (730/km², 295/100 acres). **Visitors:** All of which breed in adjoining woodland: Cooper's Hawk, Ruffed Grouse, Mountain Quail, Great Horned Owl, N. Spotted Owl, Yellow-bellied Sapsucker, W. Flycatcher, W. Wood Pewee, Red-breasted Nuthatch, Brown Creeper, Am. Robin, Golden-crowned Kinglet, Hermit Warbler, W. Tanager. **Remarks:** Although Nashville Warblers nested plentifully, their attempts appeared to have suffered much predation. The shrubs, now being shaded out from skid trails and openings, are mostly berry and nut producers. Some of the species listed as visitors, particularly Ruffed Grouse, Mountain Quail, Yellow-bellied Sapsucker, W. Flycatcher, W. Wood Pewee, and Hermit Warbler, may well have had breeding territory partly on the plot; it was too difficult to tell. Cooper's Hawk, Am. Robin, Scrub Jay were each present on several occasions, in mid-season, but could not conclusively be linked to a territory. Wilson's Warblers were a surprise; usually only migrants here, they were repeatedly found in early to mid-June — probably non-breeding vagrants. Hutton's Vireos may have occupied more territories than recorded, as their song period is mainly during Mar. and Apr then again, post-breeding, in late June and July. Special thanks to Jan Burnham and Boyd Peters for their assistance. — ELEANOR A. PUGH, *Lichen, 3050 Coyote Creek Road, Wolf Creek, Orc. 97497.*

126. PONDEROSA PINE I. — **Location:** North Dakota; Slope Co., 11 mi NW Amidon,

NW¼, NW¼, Sec 21, T136N, R102W, 46° 35'N, 103°30'W, U S Forest Service, Little Missouri Nat'l Grasslands map. **Continuity:** New. **Size:** 20.25 ha = 50 acres (rectangular, borders determined by compass and measuring tape). **Description of Plot:** Canopy almost entirely mature Ponderosa Pine (*Pinus ponderosa*). Prominent shrubs are: Buckbrush (*Symphoricarpos occidentalis*) and Creeping Juniper (*Juniperus horizontalis*). Major grasses are: Little Bluestem (*Andropogon scoparius*), Side-oats Gramma (*Bouteloua curtipendula*), Big Sandgrass (*Calamovilfa longifolia*), W. Wheat Grass (*Agropyron smithii*), Plains Muhly (*Muhlenbergia cuspidata*), Thread-leaved Sedge (*Carex filifolia*), Needle-and-thread (*Stipa comata*), Red Three-awn (*Aristida longiseta*), and Bluebunch Wheat Grass (*A. spicatum*). A quantitative analysis of the area showed the following: Trees 3 in. diameter and over based on 30 points from the point-center method, 105.64 trees/acre (260.93/ha); total basal area 50.8 ft²/acre. Species comprising 100% of the total number of trees (trees/acre, relative density (%), relative dominance, and frequency in that order): Ponderosa Pine, 100, 36, 95, 97.5, 100; Green Ash (*Fraxinus pennsylvanica*), 44, 4, 2.34, 13.3; Rocky Mountain Red Cedar (*Juniperus scopulorum*), 0.88, 1, 0.15, 3.3. Trees by diameter size class (trees/acre, relative density (%), basal area in square/acre, and relative dominance in that order): A (3-6 in.) 35.2, 33.3, 4.9, 2.3; B (6.1-9 in.) 30, 28.3, 10.2, 5.6; C (9.1-15 in.) 37, 35, 28.2, 12.7; D (15.1-21 in.) 2.6, 2.5, 5.1, 32.2; E (21.1-27 in.) 0.9, 0.8, 2.5, 47.2. Ground cover 30%. Grasses comprise 75% of cover, forbs 5%, and shrubs 20%. Canopy cover about 35%. Canopy 20-50 ft, average height about 40 ft. **Edge:** Bordered on S by a pine-to-open prairie transition; on other 3 sides by similar habitat. **Topography:** Series of pine covered ridges and slopes. Ridges moderately to steeply sloping into draws between ridges. Elevation 2550-2600 ft. Rocky outcrops frequent on area. **Weather:** Fairly dry throughout, except for high winds and heavy rainfall the night of June 18-19. No rain during any census. **Coverage:** June 9, 12-20; 0355-1010 and 2000-2155. Total man-hours: 41. **Census:** Chipping Sparrow, 18 (89, 36); Ovenbird, 12 (59, 24); Rufous-sided Towhee, 6.5 (32, 13); Black-and-white Warbler, 5 (25, 10); Black-capped Chickadee, 4 (20, 8); Com. Yellowthroat, 3 (15, 6); Yellow-rumped Warbler, 2.5; Mourning Dove, 1.5; Marsh Hawk, 1; Com. Crow, +. **Total:** 10 species; 53.5 territorial males and females (264/km², 107/100 acres). **Visitors:** Merlin, Turkey, Great Horned Owl, Poor-will, Com. Nighthawk, Com. Flicker, House Wren, Am. Robin, Mountain Bluebird, W. Meadowlark, Red Crossbill. **Remarks:** Nest found: Marsh Hawk, 1. A female Turkey attacked one of us, but no nest or young could be located. Several young of the year were observed with their parents, especially Chipping Sparrows. Farron Wallace and Greg Hiemenz helped lay out the area. — J. FRANK CASSEL, JAY CASSEL, and J. M. WIEHE, *Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

127. PONDEROSA PINE II. — **Location:** North Dakota; Slope Co., 9.5 mi NW, Amidon; NE¼, SW¼, Sec. 14, T136N, R102W; 46°35'N, 103°28'W, Rocky Ridge Quadrangle, USGS. **Continuity:** New. **Size:** 4.05 ha = 10 acres (square, measured with

compass and tape) **Description of Plot:** Mature Ponderosa Pine (*Pinus ponderosa*) stand forming canopy. Prominent shrubs are Creeping Juniper (*Juniperus horizontalis*) and Buckbrush (*Symphoricarpos occidentalis*) Major grasses and forbs are Little Bluestem (*Andropogon scoparius*), Side-oats Gramma (*Bouteloua curtipendula*), Plains Muhly (*Muhlenbergia cuspidata*), Bluebunch Wheat Grass (*Agropyron spicatum*), Big Sand Grass (*Calamovilfa longifolia*), and Yellow Sweet Clover (*Melilotus officinalis*). A quantitative analysis of the area showed the following: Trees 3 in. diameter and over based on 30 points from point-center method, 153.71/acre (379.67/ha); total basal area 383.46 ft²/acre Species comprising 100% of the total number of trees (trees/acre, relative density (%), relative dominance, and frequency in that order): Ponderosa Pine 152.43, 99.2, 99.7, 100, Green Ash (*Fraxinus pennsylvanica*) 1.28, 0.08, 0.03, 3.3. Trees by diameter size class (trees/acre, relative density (%), basal area in square ft/acre, and relative dominance in that order): A (3-6 in.) 61.5, 40, 7.5, 4.3; B (6.1-9 in.) 46.1, 30, 13.8, 10.6; C (9.1-15 in.) 42.3, 27.5, 31.8, 26.6; D (15.1-21 in.) 3.8, 2.5, 6.3, 58.6. Ground cover 25%. Grasses comprise 35% of cover, forbs 5%, and shrubs 60% Canopy cover about 50%; canopy height 20-40 ft, average height about 30 ft. **Edge:** Bordered on NE and SE sides by pine-to-prairie transition. Bordered on NW and SW sides by similar Ponderosa Pine habitat. **Topography:** Series of high pine-covered ridges and slopes Moderate to steep slopes into NW draining draws. Rocky outcrops frequent on area **Weather:** Fairly dry throughout period. Skies mostly partly cloudy. No precipitation during any census. Temperatures 35-85°F. **Coverage:** June 9, 13-19; between dawn and 1100 and 2050-2140. Total man-hours: 12.42. **Census:** Chipping Sparrow, 3.5 (86, 35); Rufous-sided Towhee, 2.5; Com. Nighthawk, +. **Total:** 3 species; 6 territorial males or females (148/km², 60/100 acres). **Visitors:** Mourning Dove, Great Horned Owl, Poor-will, Com. Flicker, Black-billed Magpie, Black-and-white Warbler, Yellow-rumped Warbler, W. Meadowlark. **Remarks:** Turkey scat were seen on the area frequently. Thanks to Farron Wallace for assistance in censusing. — JAY CASSEL, J. FRANK CASSEL, and J. M. WIEHE, *Zoology Dept., N.D. State Univ., Fargo, N.D. 58105.*

128. PINYON-JUNIPER-PONDEROSA PINE ECOTONE. — **Location:** New Mexico, McKinley Co., Cottonwood Gulch, 7 mi S of Thoreau; SE¼, Sec. 34, T13N, R13W; 35° 19'N, 108°12'W, Pine Canyon Quadrangle, USGS. **Continuity:** Established 1977; 3 consecutive years. **Size:** 15 ha = 36.9 acres **Description of Plot:** See AB 33:85 (1979) **Weather:** See Census 132. **Coverage:** Apr. 18, 29-30; May 11-13, 24, 26; June 4, 11; July 3, 17; 0400-2400, MST. Total man-hours: 20 **Census:** Violet-green Swallow, 5 (33, 14); Gray Flycatcher, 4.5 (30, 12); W. Bluebird, 4 (27, 11); Com. Flicker, 1; Ash-throated Flycatcher, 1; Mountain Chickadee, 1; White-breasted Nuthatch, 1; Pygmy Nuthatch, 1; Solitary Vireo, 1; Brown-headed Cowbird, 1; Chipping Sparrow, 1; W. Tanager, 0.5; Com. Nighthawk, +; Hairy Woodpecker, +; Steller's Jay, +. **Total:** 15 species; 22 territorial males or females (147/km², 60/100 acres). **Visitors:**

Goshawk, Broad tailed Hummingbird, Scrub Jay, Com. Raven, Piñon Jay, Plain Titmouse, Grace's Warbler, Black-headed Grosbeak. **Remarks:** Nests found: Com. Flicker, 2; Ash-throated Flycatcher, White-breasted Nuthatch, 1 each. Total population density was 54% of 1978s. Especially hard hit, presumably by the severe winter, were small resident insectivores, the Parids and Sittids. This appeared to be a regional phenomenon. W. Bluebirds had a productive breeding season. — *D. ARCHIBALD McCALLUM, Cottonwood Gulch Foundation, Box 969, Thoreau, N.M. 87323.*

129. ROCKY MOUNTAIN JUNIPER – LIMBER PINE – GRASSLAND. — **Location:** Montana; Jefferson Co.; 9 mi W of Three Forks on Milligan Canyon Rd.; 45°45'N, 111°30'15"W, R1W, T2N, Sec 36, Three Forks Quadrangle, USGS. **Continuity:** New. **Size:** 20 ha = 49.4 acres (rectangular, 400 × 500 m, measured). **Description of Plot:** Several narrow, steep sided coulees separated by broad, flat top ridges. The coulees drain from the NE into a main drainage on the W edge. This ephemeral tributary draining S into Milligan Canyon Creek is dry except briefly during spring snow melt and during intense summer thunderstorms. Rocky Mountain Juniper (*Juniperus scopulorum*) and Limber Pine (*Pinus flexilis*) grow along the coulee and creek bottoms. Sagebrush (*Artemisia tridentata*) is also found along the drainage bottoms. The ridges are dry grassland habitat consisting in part of Blue Grama (*Bouteloua gracilis*), Needle-and-thread (*Stipa comata*), W. Wheat Grass (*Agropyron smithii*) and Brome (*Bromus* sp.). The grasses extend into the creek and coulee bottoms although the steeper slopes, particularly those facing S and W, are poorly vegetated. Limber Pine, 43%, average 3-7 m tall with a maximum of 12 m. Juniper, 55%, average 2-4 m tall with a maximum of 6 m. Dead snags, 2%, were too small to provide significant habitat for cavity nesters. Rocky outcrops occur in the NW corner and become larger and more rugged as the creek bottom

runs N Rocky outcrops also occur just off the E boundary. A seldom used road overgrown with vegetation runs N-S on the E side. The area is grazed by cattle each year beginning about the last week in June. **Elevation:** 4280-4480 ft. **Weather:** Temperatures 3-12°C. No precipitation occurred during observation periods; there was light to no wind. **Coverage:** May 11, 19-20, 26; June 2-3, 9, 16, 30; 0545-0930. Total man-hours: 22.5. **Census:** Vesper Sparrow, 5 (25, 10); Rufous-sided Towhee, 4.5 (23, 9); Chipping Sparrow, 4 (20, 8); W. Meadowlark, 3.5 (18, 7); Lark Sparrow, 1.5; Gray Partridge, 1; Mourning Dove, 1; Com. Flicker 1; Black-billed Magpie, 1; Rock Wren, 1; Red-tailed Hawk, +; Mountain Bluebird, +. **Total:** 12 species; 23.5 territorial males or females (118/km², 48/100 acres). **Visitors:** Turkey Vulture, Am. Kestrel, Great Horned Owl, Piñon Jay, Clark's Nutcracker, Mountain Chickadee, Am. Robin, Starling, Green-tailed Towhee. **Remarks:** Nests located (3): Com. Flicker, Black-billed Magpie and Lark Sparrow. Thanks to the Steingruber families for allowing access to the property. — *RONALD F. LANG, and DANIEL SULLIVAN (compiler), RR 2, Box 185, Manhattan, Mont. 59741.*

130. SCATTERED MIXED CONIFEROUS FOREST IN SUBALPINE MEADOWS AND SPRUCE BOGS. — **Location:** Oregon; Grant Co., Bates, ¼ mile E of Indian Rock Lookout; 44°45'N, 118°45'W, Desolation Butte Quadrangle, USGS. **Continuity:** Established 1973; 7 consecutive years. **Size:** 32.38 ha = 80 acres. **Description of Plot:** See AB 27: 1002-1003 (1973). **Weather:** Temperatures 32°-64°F; clear on 6 censuses and cloudy on 4. Rain amounted to 0.61 in. during period. Fall and winter precipitation was below normal but spring was above normal with record-breaking cold during winter, resulting in a large snow pack in the census area until it all melted by July 1. **Coverage:** June 16, 20, 25, 30; July 2-3, 5, 7, 9, 14; 0518-0820 and 1735-1920 hours. PDST. Total man-hours: 22. **Cen-**

sus Chipping Sparrow 12 (37 15) White crowned Sparrow, 6 (19, 8); Ruby-crowned Kinglet, 4 (12, 5); Yellow-rumped Warbler, 3; Cassin's Finch, 3; Fox Sparrow, 3; Lincoln's Sparrow, 3; Mountain Bluebird, 2; Mountain Chickadee, 1; Am. Robin, 1; Varied Thrush, 1. **Total:** 11 species; 39 territorial males (120/km², 49/100 acres). **Visitors:** Spotted Sandpiper, Com. Flicker, Steller's Jay, Clark's Nutcracker, Pine Siskin, Red Crossbill, Dark-eyed Junco. **Remarks:** Nests located: Mountain Bluebird, 1; Chipping Sparrow, 1; White-crowned Sparrow, 1; Census continued to show a continuing decline in territorial males, but is holding at the same 11 species as found in 1978. Spotted Sandpipers missed breeding for the second time in 7 years. I am grateful to the Malheur Nat'l Forest for their cooperation. — *ROBERT A. HUDSON, P.O. Box 81, Bates, Ore. 97817.*

131. GHOST TOWN, ORCHARDS AND PASTURES. — **Location:** Utah, Washington Co., old Grafton townsite; 37°10'N, 113°5'W; SE¼ & E½ of SW¼ of NW¼, Sec. 3, T42S, R11W, Salt Lake B&M; Zion Nat'l Park topographic map (Zion Canyon Section); USGS. **Size:** 24.28 ha = 60 acres (rectangular, 440 yards N-S × 660 yards; surveyed & fenced). **Continuity:** New. **Description of Plot:** Irrigated farmland with unoccupied homes, barns and a church; some buildings are falling down. Riparian woodland along the Virgin River at the N edge covers 3.8 acres. The pastures originally covered about 35 acres, but one-third of this has reverted to annual grasses. Orchard Grass (*Dactylis glomerata*), Alfalfa (*Medicago sativa*), White Dutch Clover (*Trifolium repens*) and Red Clover (*T. pratense*) are the main pasture crops; one pasture has naturalized Kentucky Blue Grass (*Poa pratensis*). The most common weeds are Buckhorn Plantain (*Plantago lanceolata*) and Poison Milkweed (*Asclepias subverticillata*). Orchards, totaling 10.65 acres, are: Apple (*Malus sylvestris*), 7 acres; Pecan (*Carya illinoensis*), 2.25; Peach (*Prunus persica*), 1.4. Scattered fruit trees are Apricot (*Prunus armeniaca*), Almond (*P. amygdalus*), White Mulberry (*Morus alba*) and English Walnut (*Juglans regia*). All fruit trees are mature; the peach orchard is dying for lack of water, with about half of the trees dead. The orchards are planted to the same ground cover as the pastures. The riparian woodland has Fremont Cottonwood (*Populus fremontii*), Velvet Ash (*Fraxinus velutina*), Russian Olive (*Elaeagnus angustifolia*), Siberian Elm (*Ulmus pumila*) and Tamarix (*T. pentandra*). Eight acres above the irrigation canal are not cultivated and covered by Russian Thistle (*Salsola kali*), Foxtail Barley (*Hordeum jubatum*), Cheat Grass (*Bromus tectorum*) and Big Sagebrush (*Artemisia tridentata*). **Topography:** Gradual slope to the N toward the Virgin River. The SE corner has a low knoll. **Elevation:** 3650-3750 ft. **Edge:** Bordered on the E and W by similar farmland; the Virgin River runs just N of the plot, and a talus slope capped by a 300-ft cliff borders the S edge. **Weather:** Above average winter and spring storms continued through May 26, but there was no rain after that date. **Coverage:** May 13, 20, 28; June 7, 10, 18, 21, 24; July 1, 7, 15; 0545-0950, MDT. Total man-hours: 27. **Census:** House Finch, 12 (49, 20); Am. Robin, 7 (29, 12); Starling, 6 (25, 10); N. Oriole, 6; Brown-headed Cowbird, 5 (21, 8); Phainopepla,



Census 129. Rocky Mountain Juniper-Limber Pine-Grassland.

45 (19, 8), Black-headed Grosbeak, 4 (16, 7), Rock Wren, 35 (14, 6), Say's Phoebe, 3 (12, 5), Blue Grosbeak, 3, Mourning Dove, 2, hummingbird (Black-chinned or Costa's), 2; W Kingbird, 2; Ash-throated Flycatcher, 2; Bewick's Wren, 2; Lucy's Warbler, 2; Yellow Warbler, 2; W. Meadowlark, 2; Lesser Goldfinch, 2, Black-throated Sparrow, 2; Am. Kestrel, 1, Spotted Sandpiper, 1; Com. Flicker, 1; Black Phoebe, 1; W. Wood Pewee, 1; Rough-winged Swallow, 1; Mockingbird, 1; Bell's Vireo, 1, House Sparrow, 1; Song Sparrow, 1; Great Horned Owl, +; Com. Raven, +. **Total:** 32 species; 84 territorial males and female hummingbirds (346/km², 140/100 acres). **Visitors:** Turkey Vulture, Prairie Falcon, Gambel's Quail, Killdeer, Violet-green Swallow, Bushtit, Cañon Wren, W. Bluebird, Cedar Waxwing, W. Tanager, Sage Sparrow. **Remarks:** All of the Am. Kestrel, Say's Phoebe and Starling nests were found in the old, abandoned buildings of the ghost town. There were no woodpeckers on our census, with the exception of the Com. Flicker. —*J. L. CRAWFORD, JEROME L. GIFFORD, LOUISE EXCELL, P.O. Box 10, Springdale, Utah 84767.*

132. MIXED - MESOPHYTIC CANYON BOTTOM. — **Location:** New Mexico; McKinley Co., Cottonwood Gulch, 7 mi S of Thoreau; Sec. 34, T13N, R13W; 35°19'N, 108°12'W, Pine Canyon Quadrangle, USGS. **Continuity:** Established 1959; 4 intermittent years. **Size:** 12.14 ha = 30 acres. **Description of Plot:** See AB 32:93 (1978). **Weather:** A cold and wet winter and spring continued into mid-June, making the landscape atypically green. Perhaps because of coldness, insect populations were not unusually high. The onset of the summer rainy season was retarded, not coming until Aug. 7, but sufficient soil moisture remained to prevent desiccation of the spring growth of herbage. **Coverage:** Mar. 17-18, Apr. 16, 27; May 5, 10, 13, 23-24, 27; June 2, 4, 9, 12, 25; July 1, 3, 4-6, 14-15, 22, 25, 0400-2400, MST. Total man-hours: 34. **Census:** Cliff Swallow, 8 (66, 27); Violet-green Swallow, 7 (58, 23); Am. Robin, 6 (49, 20); Dusky Flycatcher, 5 (41, 17); W. Wood Pewee, 5, Lesser Goldfinch, 5; Broad-tailed Hummingbird, 4 (33, 13); Rufous-sided Towhee, 4; Grace's Warbler, 3 (25, 10); Green-tailed Towhee, 3; Pygmy Nuthatch, 2; Solitary Vireo, 2, Virginia's Warbler, 2; Black-headed Grosbeak, 2, Mountain Chickadee, 1.5; Sharp-shinned Hawk, 1; Flammulated Owl, 1; Great Horned Owl, 1; W. Bluebird, 1; Brown-headed Cowbird, 1; W. Tanager, 1; Chipping Sparrow, 1; Ash-throated Flycatcher, +; Scrub Jay, +. **Total:** 24 species; 66.5 territorial males or females (548/km², 222/100 acres). **Visitors:** Mallard, Turkey Vulture, Red-tailed Hawk, Am. Kestrel, Com. Flicker, Hairy Woodpecker, Gray Flycatcher, Steller's Jay, Com. Raven, Com. Crow, Piñon Jay, Gray Catbird, Am. Redstart, Brewer's Blackbird, House Finch, Red Crossbill. **Remarks:** Nests found (21): Cliff Swallow, 8; Violet-green Swallow, 5; Broad-tailed Hummingbird, 3; Mountain Chickadee, 2; Sharp-shinned Hawk, Great Horned Owl, and Am. Robin, 1 each. Total population density was 64% of 1978s, partially because of a presumably weather-induced crash of Parids and Sittids. Two local Cliff Swallow colonies were not occupied. Sapsuckers, Brewer's Blackbirds,

and Long-eared and Saw-whet Owls did not return this year. The two towhee species again showed indications that they are interspecifically territorial. A ♂ and a ♀ Am. Redstart were present from July 5 until the end of Aug. I appreciate the help of Mark Hart, Rankine Forrester, Brian Malcolm, and Tim Lord with banding and censusing. —*D. ARCHIBALD McCALLUM, Cottonwood Gulch Foundation, Box 969, Thoreau, N.M. 87323.*

133. 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:** New. **Size:** 8.76 ha = 21.65 acres (2400 × 400 ft). **Description of Plot:** See AB: WB-PS 42, p. 35. An intermittent stream cuts through the plot in a NE-SW direction, water is usually present December through June. The narrow belt of riparian vegetation is bordered on either side by oak savanna. **Weather:** See Census 120. **Coverage:** Apr. 12, 14, 22, 29; May 11, 16, 29; June 2; 0445-0955, PST. Total man-hours: 16. **Census:** House Wren, 6 (68, 28); Warbling Vireo, 3 (34, 14); W. Flycatcher, 2.5; N. Oriole, 1.5; Anna's Hummingbird, 1; Nuttall's Woodpecker, 1; Plain Titmouse, 1; Bushtit, 1; Am. Robin, 1; Starling, 1; Hutton's Vireo, 1; Yellow Warbler, 1; Black-headed Grosbeak, 1; House Finch, 1; Brown Towhee, 1; Dark-eyed Junco, 1; Acorn Woodpecker, 0.5; Scrub Jay, 0.5; Purple Finch, 0.5; Rufous-sided Towhee, 0.5; Song Sparrow, 0.5; California Quail, +; Com. Flicker, +; Hairy Woodpecker +; Downy Woodpecker, +; Steller's Jay, +; Bewick's Wren, +; W. Bluebird, +; Solitary Vireo, +; Orange-crowned Warbler, +; Black-throated Gray Warbler, +, Lesser Goldfinch, +; Lawrence's Goldfinch, +; Chipping Sparrow, +. **Total:** 34 species; 27.5 territorial males or females (314/km², 127/100 acres). **Visitors:** Cooper's Hawk, Red-shouldered Hawk, Yellow-billed Magpie, Com. Crow, White-breasted Nuthatch, Blue-gray Gnatcatcher, Wilson's Warbler, Brewer's Blackbird, W. Tanager. **Remarks:** Nests found (12): House Wren, 3; N. Oriole, 2; Nuttall's Woodpecker, 1; Acorn Woodpecker, 1; Plain Titmouse, 1; Robin, 1; Starling, 1; Hutton's Vireo, 1; House Finch, 1. The plot included parts of the territories of 2 groups of Acorn Woodpeckers, one with 3 birds and one with 2 birds. —*PAMELA L. WILLIAMS, Hastings Reservation, Univ. of Calif., Star Route Box 80, Carmel Valley, Calif. 93924.*

134. SEMI-DISTURBED RIPARIAN WOODLAND. — **Location:** California; Tehama Co., on the W bank of the Sacramento River, N edge of Red Bluff, NW¼ of NW¼ of Sec. 20, T27N, R3W; 40°11'N, 122°14'W, Red Bluff Quadrangle, USGS. Part of Dog Island and Samuel Ayer City Park. **Continuity:** New. **Size:** 17.7 ha = 43.7 acres. **Description of Plot:** See AB 33:24-25. **Weather:** Cool spring with evenly spaced rains until mid-May when it suddenly turned hot for the rest of the month. June was again cooler than normal. The nesting season was for the most part without wind. **Coverage:** Mar. 14, 21, 28; Apr. 4, 9, 18, 25; May 2, 9, 17, 23, 30; June 6, 13, 20, 27; July 4, 11, 18, 25; 0700-1140, PDT. Total man-hours: 65. **Census:** Black-headed Grosbeak, 24 (136, 55); Bushtit, 11 (62, 25); Bewick's Wren, 10 (57, 23); Scrub

Jay, 9 (51, 21), N Oriole, 9, Nuttall's Woodpecker, 8 (45, 18), W Wood Pewee, 7 (40, 16), Downy Woodpecker, 6 (34, 14), Am. Robin, 6, Rufous-sided Towhee, 5 (28, 11); California Quail, 3 (17, 7); Starling, 3; Yellow-breasted Chat, 3; Brown-headed Cowbird, 3; Brown Towhee, 3; Anna's Hummingbird, 2; Ash-throated Flycatcher, 2; Black Phoebe, 2; Tree Swallow, 2; Plain Titmouse, 2; White-breasted Nuthatch, 2; House Finch, 2; Wood Duck, 1; Red-shouldered Hawk, 1; Mourning Dove, 1; Black-chinned Hummingbird, 1, Belted Kingfisher, 1; Acorn Woodpecker, 1, House Wren, 1; Yellow Warbler, 1; Lesser Goldfinch, 1; Great Blue Heron, +; Green Heron, +; Turkey Vulture, +; Red-tailed Hawk, +; Am. Kestrel, +; Killdeer, +; Spotted Sandpiper, +; Great Horned Owl, +; Cliff Swallow, +; Mockingbird, +. **Total:** 41 species; 133 territories (752/km², 304/100 acres). **Remarks:** Nests found: Black-headed Grosbeak, 8; Bushtit, 7; W. Wood Pewee, 3, Am. Robin, 3; N. Oriole, 2; Red-shouldered Hawk, 1; Anna's Hummingbird, 1; Downy Woodpecker, 1; House Wren, 1. Fledgling Brown-headed Cowbirds were being fed by W Wood Pewee and Black-headed Grosbeak. Special thanks to Karen Cartier for help on the surveys. —*STEPHENA LAYMON, 3290 Ackley Road, Lakeport, Calif. 95453.*

135. SUBURBAN NATURE CENTER. — **Location:** California; Los Angeles Co., El Dorado Nature Center, Long Beach, 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 consecutive years. **Size:** 34.4 ha = 85 acres. **Description of Plot:** See AB 31:78 (1976) censuses no. 131 and 132; see also AB 25:656 (1971) census no. 39. **Weather:** Most days clear with some low cloudiness in the mornings; mean daily temperature in April 64°F (range 47°-85°); in May 65.9° (range 48°-101°); no rain during the period. **Coverage:** Apr. 1, 4, 15, 18, 26; May 7, 11, 14, 17, 24; 0530-0800. Total man-hours: 40. **Census:** Mockingbird, 26.5 (77, 31); Song Sparrow, 26 (76, 31); Anna's Hummingbird, 12 (35, 14); Starling, 12; Mourning Dove, 9 (26, 11); N. Oriole, 9; Loggerhead Shrike, 8.5 (25, 10); Black-chinned Hummingbird, 6.5 (19, 8); Spotted Dove, 6 (17, 7); House Finch, 6; Am. Coot, 4 (12, 5); Bushtit, 4; Am. Robin, 4; Scrub Jay, 3 (9, 4); Red-winged Blackbird, 3; Brown-headed Cowbird, 3; Lesser Goldfinch, 3; Mallard, 1; Black Phoebe, 1; Barn Swallow, 1. **Total:** 20 species; 145.5 territorial males or females (423/km², 171/100 acres). **Visitors:** Com. Crow, Brazilian Cardinal. **Remarks:** Nests found (35): Starling, 12; Loggerhead Shrike, 5; Am. Robin, 4; Anna's Hummingbird, 3; Black-chinned Hummingbird, 2; Bushtit, 2; N. Oriole, 2; Am. Coot, 1; Black Phoebe, 1; Barn Swallow, 1; Mockingbird 1; Red-winged Blackbird, 1. —*BARBARA W. MASSEY and DOROTHY D. RYPKA, CSU Long Beach, Dept. of Biology, Long Beach, Calif. 90840.*

136. URBAN WOODLAND PARK. — **Location:** California; Los Angeles Co., Long Beach. Recreation Park, bordered by 7th Street and 10th Street on S and N, by Park Avenue and a Municipal Golf Course W and E; bisected by Federation Drive, which extends from 10th to 7th Streets; 33°47'N, 118°08'W, Long Beach Quadrangle. USGS.

Continuity: New **Size:** Approximately 13.5 ha = 33.5 acres (determined from Long Beach Park Dept. Survey Maps). **Description of Plot:** See AB 33:52-53 (1979). A severe windstorm in March of 1978, toppled a large number of the taller Blue Gum Eucalyptus trees. The L. B. Park Dept. has replaced them with smaller trees of the same variety. **Weather:** Generally fair and warm with overcast mornings, and sunny afternoons. Average temp. 65°-75°F (high of 90+°) with low humidity marked the period of May 7-13. **Coverage:** Mar. 24-25; Apr. 7-8, 14-15, 28-29; May 12-13, 19-20. Total of 12 trips, 8 (0600-0900) and 4 (1500-1800). Total man-hours: 72. **Census:** Starling, 29 (214, 87); Mourning Dove, 18 (133, 54); House Sparrow, 14 (103, 42); House Finch, 13 (96, 39); Anna's Hummingbird, 10 (74, 30); Spotted Dove, 6 (44, 18); Com. Crow, 3 (22, 9); Am. Kestrel, 1; Scrub Jay, 1; Com. Flicker, +, Song Sparrow +. **Total:** 11 species; 95 territorial males (701/km²; 284/100 acres). **Visitors:** Rock Dove, Sharp-shinned Hawk. **Remarks:** This habitat appears to attract a number of nesting birds because of the high density of full-foliaged trees, and ready accessibility of food. The Canary Island Date Palms seem to be a favorite nesting site of Starlings. It is suspected that the Anna's Hummingbirds were already on their second brood of the year as there were a number of fledgling birds around, and several males were still fiercely protecting their territories against all intruders. Several dove nests were seen, but the contents not noted. The number of breeding Starlings found in the park is rather disturbing, particularly since their numbers have increased since the Winter Bird Survey of 1978. It is not known how this increase is affecting other birds, but does seem highly unfavorable to native cavity-nesters, especially the Com. Flicker. — R. DENISE and DAVID L. LUCAS; 1021 Roswell Ave. #2; Long Beach, Calif. 90804.

137. SHORTGRASS UPLANDS - RELIC SAGEBRUSH. — **Location:** Idaho; Canyon Co., between Boise and Payette River Valleys, approx. 23 mi W of Boise and 5.5 mi N of Middleton. E ½ of the E ½ of Sec 7, T5N, R2W, Emmett Quadrangle, USGS. 43°47'30"N, 116°37'30"W. **Continuity:** New. **Size:** 64.8 ha = 160 acres. **Description of Plot:** Except for a few relic plots of Big Sagebrush (*Artemisia tridentata*), this heavily grazed, rolling upland is dominated by relatively short perennial and annual grasses and forbs that cover 82% of the area. Vegetation outside the sagebrush areas was analyzed by measuring plants in 80 randomly placed 0.1 m² frames. This spring 50.8% of the vegetative cover was standing dead, left from the unusually lush 1978 season. Percent cover (standing dead in parentheses) was: Medusahead Wildrye (*Elymus caput-medusae*) 20.1 (46.2), Cheat Grass (*Bromus tectorum*) 17.1 (4.9), unidentified standing dead (2.8), Claspings Peppergrass (*Lepidium perfoliatum*) 2.7, Prickly Lettuce (*Lactuca serriola*) 2.3, Stork's-bill (*Erodium cicutarium*) 1.8, Jim Hill Mustard (*Sisymbrium altissimum*) 1.2. Additional plants that are not important in percent cover and were not included in any of the 80 frames, but which are visually conspicuous include Red Three-awn (*Aristida longiseta*), Giant Wildrye (*E. cinereus*), Russian Thistle (*Salsola kali*), and others. Several small relic areas of Big Sage-

brush occupy approx 18% of the plot and a few large (3 m) Bitter-brush (*Purshia tridentata*) occur in two of these Twenty-five random points along each of three 100 m transects served as centers for 4 quarters; distance to, ht, and diameter of the nearest woody plant in each quarter was measured. Percent coverage was: Big Sagebrush 67.6, Bitter-brush 8.2, Rabbit-brush (*Chrysothamnus* sp.) 1.9, remaining 22.3 was covered with grasses and forbs as described above. **Edge:** Bounded on E and W by similar habitat, frequency of sage patches decreases to E, increases to W. Large open irrigation ditch about 50 m S of plot with mixed agriculture S of ditch. Power line along E edge, bare farmyard adjoins NE corner. **Topography:** Gently rolling, slopes N and S from low-lying ridge that runs through middle of plot. **Elevation:** 2600 ft. **Weather:** Spring was colder and wetter than average, summer was hotter and drier. Average annual rainfall at Caldwell, 8 mi S, is 9.7 in., of which most falls from Nov. through Feb.; annual average temperature 51°F. **Coverage:** Apr. 5-7, 20; May 17, 19, 23, 30-31; 0600-2100. Total man-hours: 40. **Census:** W. Meadowlark, 23 (36, 14); Horned Lark, 18 (28, 11); Black-billed Magpie, 4 (6, 3); Mallard, 1; Ring-necked Pheasant, 1; Long-billed Curlew, 1; Mourning Dove, 0.5; Short-eared Owl, 0.5. **Total:** 8 species; 49 territorial males, females or pairs (76/km², 31/100 acres). **Visitors:** Marsh Hawk, Am. Kestrel, Gray Partridge, Killdeer, Mourning Dove, W. Kingbird, Starling, House Sparrow, Lark Sparrow, Brewer's Sparrow. **Remarks:** Most Mourning Doves and House Sparrows, all Starlings and W. Kingbirds were seen on the power line along the E edge. Black-billed Magpies wander throughout area and do most of their foraging off the plot. All magpie nesting occurred in scattered Bitter-brush within the relic stands of Big Sagebrush; 4 nests produced 10 fledglings (3, 3, 2, and 2). Lark Sparrows and Brewer's Sparrows were associated with Sagebrush area. This census was done in conjunction with a study of Long-billed Curlews sponsored by the Boise District Office, Bureau of Land Management. — DONALD A. JENNI and THOMAS K. BICAK, College of Forest Resources, Univ. of Wash., Seattle, Wash. 98195.

138. DESERT SHRUB. — **Location:** Utah, Washington Co., SW corner of Zion Nat'l Park; 37°10'30"N, 113°5'W; Zion Nat'l Park Topographic Map (Zion Canyon Section) USGS. **Continuity:** Established 1974, 2 intermittent years. **Size:** 64.75 ha = 160 acres. **Description of Plot:** See AB 28:1044-45 (1974). **Weather:** Above average winter and spring storms continued through May 26, but there was no rain after that date. **Coverage:** Apr. 15, 22, 29; May 6, 13, 20-21, 27; June 3, 9-10, 18-19, 24-25; July 1-2; 0555-1245, MDT. Total man-hours: 49.75. **Census:** Black-throated Sparrow, 28 (43, 18); Rock Wren, 5 (8, 3); House Finch, 3.5 (5, 2); Rough-winged Swallow, 3 (5, 2); Say's Phoebe, 2.5; Mourning Dove, 2; Ash-throated Flycatcher, 2; Cañon Wren, 2; Bewick's Wren, 2; N. Oriole, 2; Black-headed Grosbeak, 2; Lesser Goldfinch, 2; hummingbird (Black-chinned or Costa's), 1; Blue-gray Gnatcatcher, 1; Solitary Vireo, 1; Blue Grosbeak, 1. **Total:** 16 species; 60 males and female hummingbird (93/km², 38/100 acres). **Visitors:** Prairie Falcon, Am. Kestrel,

Roadrunner **Remarks:** Rough-winged Swallow and Solitary Vireo were new this year W. Meadowlark, present in 1974, was not found. Although Black-throated Sparrows jumped from 17 in 1974 to 28, the increase probably reflects better coverage of the dry hillsides where they nest rather than an increase in bird numbers. Hummingbirds dropped from 3 to 1. — JEROME L. GIFFORD, P.O. Box 85, Springdale, Utah 84767.

139. PYGMY FOREST-CHAPARRAL. — **Location:** Utah, Kane Co., Zion Nat'l Park, East Entrance; 37°14'N, 112°52'30"W, Zion Nat'l Park Topographic Map (Zion Canyon Section) USGS. **Size:** 16.19 ha = 40 acres **Continuity:** Established 1977, 3 consecutive years. **Description of Plot:** See AB 32 96-97 (1978). **Weather:** Dry, the only rain during the period coming on May 24. **Coverage:** May 22, 30; June 2, 8, 16, 23, 30; July 7, 17, 22; 0545-0905, MDT. Total man-hours: 21. **Census:** Black-throated Gray Warbler, 5 (31, 13), Chipping Sparrow, 5; Mourning Dove, 4 (25, 10); W. Bluebird, 4; Cassin's Finch, 4, Rufous-sided Towhee, 4; Ash-throated Flycatcher, 3 (19, 8); Plain Titmouse, 3; Bushtit, 3, Hairy Woodpecker, 2; Cassin's Kingbird, 2, Steller's Jay, 2; Green-tailed Towhee, 2, Broad-tailed Hummingbird, 1; Say's Phoebe, 1; Gray Flycatcher, 1; Scrub Jay, 1; White-breasted Nuthatch, 1; Blue-gray Gnatcatcher, 1; Gray Vireo, 1; Solitary Vireo, 1. **Total:** 21 species; 51 males and female hummingbird (315/km², 128/100 acres). **Visitors:** Red-tailed Hawk, White-throated Swift, Rufous Hummingbird, Violet-green Swallow. **Remarks:** Blue-gray Gnatcatcher was new this year Black-headed Grosbeak, present last year, was not found. Cassin's Finch dropped from 6 last year to 4, while Broad-tailed Hummingbird dropped from 3 to 1. Chipping Sparrows increased from 3 to 5. — JEROME L. GIFFORD, P.O. Box 85, Springdale, Utah 84767.

140. BLUE GRAMA - RABBITBRUSH GRASSLAND. — **Location:** New Mexico, McKinley Co., Cottonwood Gulch, 7 mi S of Thoreau; SW ¼, SW ¼, Sec. 26, T13N, R13W; 35°19'N, 108°11'W. Pine Canyon Quadrangle, USGS. **Continuity:** Established 1977; 3 consecutive years. **Size:** 16.2 ha = 40 acres. **Description of Plot:** See AB 32 96 (1978). **Weather:** See Census 132. **Coverage:** Mar. 17; Apr. 17, 26-29; May 10-11, 25, 27-30, June 1-3, 11-14, 17, 21, 29; July 1-9, 0530-2000, MST. Total man-hours: 87. **Census:** Vesper Sparrow, 11 (68, 28); Brewer's Sparrow, 8 (49, 20); Horned Lark, 2; W. Meadowlark, 2; Green-tailed Towhee, 2; Say's Phoebe, +. **Total:** 6 species; 25 territorial males (154/km², 63/100 acres). **Visitors:** Red-tailed Hawk, Am. Kestrel, Killdeer, Mourning Dove, Broad-tailed Hummingbird, W. Kingbird, Cassin's Kingbird, Violet-green Swallow, Barn Swallow, Cliff Swallow, Com. Raven, Com. Crow, Piñon Jay, Am. Robin, W. Bluebird. **Remarks:** Nests found (5): Vesper Sparrow, 4; Brewer's Sparrow, 1. The count of Vesper Sparrows doubled from 5 last year. The increase may result, however, from more coverage in late April and early May, when these birds sing most ardently, and from an intense color-banding effort, rather than from a real change in numbers. Two banded ♂ Vesper Sparrows and three Brewer's Sparrows occu-

ped the same territories they used in 1978 — *D ARCHIBALD McCALLUM and DENA LEIBMAN, Cottonwood Gulch Foundation, Box 969, Thoreau, N.M. 87323.*

141. ALKALI SINK COMMUNITY. — **Location:** California; San Luis Obispo Co., Carrizo Plains, 8 mi SE of California Valley; 200 yards SE of San Diego Creek Rd; NW quarter of Sec. 35, T30S, R19E, Simmler Quadrangle, USGS; 35°16'N, 119°54'W. **Continuity:** New (1978). **Size:** 12.25 ha = 30.27 acres (square, 350 × 350 m, compass and steel tape) **Description of Plot:** An alkali sink association with approximately 1 acre of open water (Soda Lake) projecting into the NE corner. Two 25 m line transects were made to determine species composition and percent cover. Plant coverage was composed of 25.9% Redstem Filaree (*Erodium cicutarium*), 23.1% Depauperate Clover (*Trifolium depauperatum*), 22.2% Pepper Grass (*Lepidium dictyotum*, *L. jaredii*, *L. nitidum*), 11.8% grasses: Salt Grass (*Distichlis spicata*), Brome (*Bromus* sp.), Barley (*Hordeum* sp.), Fescue (*Festuca* sp.) and Annual Hair Grass (*Deschampsia danthonoides*), 7.4% Saltbush (*Atriplex coronata*, *A. spumifera*), and the remaining 9.6% composed of the following: Iodine Bush (*Allenrolfea occidentalis*), Alkali Heath (*Frankenia grandifolia*), *Haplopappus acradenioides*, Tidy Tips (*Layia munzii*), Goldfields (*Lasthenia ferrisiae*), Wild Onion (*Allium lacunosum*), *Brodiaea* sp., Sea Blite (*Suaeda fruticosa*), Sand Spurrey (*Spergularia* sp.), Larkspur (*Delphinium parishii*), and Shepherd's Purse (*Capsella bursa-pastoris*). **Edge:** Bordered on all sides with similar habitat, with a frequently used gravel road 200 yd W and the main body of Soda Lake ¼ mi SE. **Topography:** Essentially flat valley floor, sloping slightly downhill, S-N. **Elevation:** 1919 ft. **Weather:** 1.92 in. of rain in Apr. none in May or June. Frosts and fog were common in early morning hours during Apr. and May with an average 36-79°F; mornings were warm and clear in June, with an average of 44-90°. **Coverage:** Apr. 22, 29; May 6, 13, 28, June 3, 11, 18, 24; 0545-0945. Total man-hours 14. **Census:** Horned Lark, 16 (131, 53); W Meadowlark, 5 (41, 17); Sage Sparrow, 3 (24, 10), Am. Coot, 2. **Total:** 4 species; 26 territorial males or females (212/km², 86/100 acres) **Visitors:** Pintail, Mallard, Cinnamon Teal, Green-winged Teal, Golden Eagle, Killdeer, Am. Avocet, Black-necked Stilt, Com. Raven. **Remarks:** The plot received 20.39 in. of rain for the 77-78 season; the average precipitation is 8.69 in. The abundance of water undoubtedly allowed for a higher-than-normal number of breeding waterfowl in the adjacent areas. Golden Eagles were highly conspicuous during the observation times. Nests found: Am. Coot, 2; Sage Sparrow, 1. Black-necked Stilts exhibited breeding behavior in and around the plot, but no nests were found. Special thanks to Craig Woods and Roger Gambus for their assistance. — *LARRY HURST, P.O. Box 532, Santa Margarita, Calif 93453.*

142. CREOSOTEBUSH SCRUB I. — **Location:** California; Inyo Co., 50 m S of Coso Rd, 3.9 mi E of junction of Coso Rd. and US 395, mostly in the NW corner of S4 and NE corner of S5, T22S, R38E; 36°03'N, 117°53'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 25.5 ha = 63 acres.

Description of Plot: See AB 33:33 (1979) **Weather:** Clear on all trips. Temperatures 35-95°F. Measurable precipitation fell on 3 days. **Coverage:** Mar. 11, 25; Apr. 14, 29, 30; May 13-14, 27; 0730-1300. Total man-hours: 8. **Census:** Black-throated Sparrow, 12 (47, 19); Sage Sparrow, 5 (20, 8); Horned Lark, 3 (12, 5); Brewer's Sparrow, 3. **Total:** 4 species; 23 territorial males (90/km², 37/100 acres). **Visitors:** Costa's Hummingbird, Ash-throated Flycatcher, Com. Raven, House Finch. **Remarks:** 3 Black-throated Sparrow nests found. This study was supported by the U.S. Bureau of Land Management, Bakersfield District. — *DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.*

143. CREOSOTEBUSH SCRUB II. — **Location:** California; Inyo Co., 12 mi N of Little Lake, ¼ mi W of US 395, just N of Johnson Canyon; S15, T21S R37E; 36°06'N, 117°58'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 25.5 ha = 63 acres (rectangular, 850 × 300 m, paced). **Description of Plot:** See AB 33:32 (1979). **Weather:** Temperatures 40-100°F. Slight precipitation early in the period. **Coverage:** Mar. 11, 25; Apr. 14, 29-30; May 13-14, 27; 0645-1230. Total man-hours: 8. **Census:** Sage Sparrow, 24 (94, 38); Black-throated Sparrow, 12 (47, 19); Brewer's Sparrow, 2; Mourning Dove, 1; Blue-gray Gnatcatcher, 1. **Total:** 5 species; 40 territorial males (157/km², 63/100 acres). **Visitors:** Am. Kestrel, Costa's Hummingbird, Com. Raven, Scott's Oriole, Brown-headed Cowbird. **Remarks:** Nests found: 3 Sage Sparrow, 2 Black-throated Sparrow. All 3 species of sparrows were initially found in large numbers, numbers decreased as territories were formed, and territorial singing stopped while eggs and young were in the nest, recommencing after fledging. This study was supported by the U.S. Bureau of Land Management, Bakersfield District. — *DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.*

144. DESERT SCRUB. — **Location:** California; Inyo Co., 100 m SW of Haiwee Spring, within the boundaries of China Lake Naval Weapons Center; S15, T21S, R39E; 36°07'N, 117°45'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 25.5 ha = 63 acres (rectangular, 850 × 300 m, paced). **Description of Plot:** See AB 33:34 (1979). **Weather:** Temperatures 35-90°F. Measurable precipitation fell on 3 days. **Coverage:** Mar. 10, 24; Apr. 14, 28-29; May 12-13, 26; 0700-1500. Total man-hours: 9. **Census:** Black-throated Sparrow, 10 (39, 16); Horned Lark, 9 (35, 14); Brewer's Sparrow, 3 (12, 5); Costa's Hummingbird, 1; Sage Sparrow, 1. **Total:** 5 species; 24 territorial males (94/km², 38/100 acres). **Visitors:** Chukar, Com. Raven, House Finch. **Remarks:** Nests found: Sage Sparrow, 1; Black-throated Sparrow, 3. Area heavily overgrazed by burros. This study was supported by the U.S. Bureau of Land Management, Bakersfield District. We thank the personnel at China Lake Naval Weapons Center for their cooperation. — *DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.*

145. 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; 3 consecutive years. **Size:** 15.38 ha = 38 acres **Description of Plot:** See AB 32:113 (1977) **Weather:** Mostly clear, warm to hot days, usually 50-75°F. **Coverage:** Apr. 14-15, 27, May 1, 23, 25; June 2, 7; dawn to 0830. Total man-hours: 27. **Census:** Bewick's Wren, 11 (72, 29); Lesser Goldfinch, 9 (59, 24); Starling, 8 (52, 21); Gambel's Quail, 6 (39, 16); Costa's Hummingbird, 5 (33, 13); N. Oriole, 5; Ash-throated Flycatcher, 4 (26, 11); House Finch, 4; Virginia Rail, 3 (20, 8); Anna's Hummingbird, 3; House Wren, 3; Lucy's Warbler, 3; Rufous-sided Towhee, 3; Song Sparrow, 3; Ladder-backed Woodpecker, 2; Nuttall's Woodpecker, 2; Brown-headed Cowbird, 2 (females); Summer Tanager, 2; Indigo Bunting, 2; Cooper's Hawk, 1; Am. Kestrel, 1; Am. Coot, 1; Barn Owl, 1; Great Horned Owl, 1; Black-chinned Hummingbird, 1; Scrub Jay, 1; Verdin, 1; Bushtit, 1; Phainopepla, 1; Blue-gray Gnatcatcher, 1; Bell's Vireo, 1; Yellow-breasted Chat, 1; Hooded Oriole, 1; Blue Grosbeak, 1; Red-tailed Hawk, +; Vermilion Flycatcher, +; Wied's Crested Flycatcher, +; Black Phoebe, +; Brown Towhee, +; Lawrence's Goldfinch, +. **Total:** 40 species; 95 territorial males or females; (618/km², 250/100 acres). **Visitors:** Mourning Dove, White-winged Dove, Spotted Dove, Roadrunner, White-throated Swift, Cassin's Kingbird, W. Kingbird, Mockingbird, Lazuli Bunting, Black-chinned Sparrow, Black-throated Sparrow. **Remarks:** Nests located (26): Cooper's Hawk, 1; Am. Kestrel, 1; Barn Owl, 1; Great Horned Owl, 1; Costa's Hummingbird, 2; Ladder-backed Woodpecker, 2; Nuttall's Woodpecker, 1; Ash-throated Flycatcher, 1; Black Phoebe, 1; Vermilion Flycatcher, 1; House Wren, 2; Bewick's Wren, 1; Starling, 5; Lucy's Warbler, 3; Hooded Oriole, 1; N. Oriole, 1; Lesser Goldfinch, 1. Special thanks to the San Bernardino Valley Audubon Society for providing travel funds. — *SHARON GOLDWASSER, EUGENE A. CARDIFF, JESSIE KNIFFEN, San Bernardino County Museum, 2024 Orange Tree Lane, Redlands, Calif., 92373.*

146. HIGH DESERT HOT SPRINGS. — **Location:** California; Inyo Co., 11.5 mi E of US 395 on Coso Rd., in the China Lake Naval Weapons Center; S4, T22S, R39E; 36°03'N, 117°47'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 33.2 ha = 82.1 acres. **Description of Plot:** See AB 33:34-35 (1979). **Weather:** Clear on all trips. Temperatures 40-100°F. Slight precipitation early in Mar. **Coverage:** Mar. 10, 24; Apr. 14, 28-29; May 12-13, 26; 0700-1700. Total man-hours: 10. **Census:** Say's Phoebe, 3 (9, 4); Costa's Hummingbird, 1; Black-throated Sparrow, 1; Sage Sparrow, 1; Brewer's Sparrow, 1. **Total:** 5 species; 7 territorial males (21/km², 9/100 acres). **Visitors:** Mourning Dove, Com. Raven, Loggerhead Shrike. **Remarks:** Sparrows were found in *Atriplex-Hymenoclea* association. Phoebes nested in buildings (ruins of a resort) and ravens nested in similar buildings just off plot. Mourning Dove and House Finch were daily visitors to water on the plot as were up to 50 burros. This study was supported by the

U S Bureau of Land Management, Bakersfield District Thanks to the personnel at China Lake Weapons Center for their cooperation. — DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif., 91711.

147. HIGH DESERT RESERVOIR AND SHORELINE. — **Location:** California; Inyo Co., 8 mi S of Coso Jct. on E side of US 395, across from the Little Lake Hotel, also small ponds W of US 395; S8 and 17, T23S, R38E; 35°56'N, 117°54'W, Little Lake Quadrangle, USGS. **Continuity:** New. **Size:** 25 ha = 61.7 acres of grassy meadow. [31.9 ha = 78.8 acres of open water present but not included in the census.] **Description of Plot:** See AB 33:35 (1979). **Weather:** Temperatures 35-95°F. Measurable precipitation fell on 3 days in Mar. **Coverage:** Mar. 10, 24; Apr. 14, 28; May 12-13, 26; 0700-1800. Total man-hours: 14.5. **Census:** (open water acreage excluded) Ruddy Duck, 17 (68, 28); Brewer's Blackbird, 15 (60, 24); Red-winged Blackbird, 15; Mallard, 6 (24, 10); Killdeer, 6; Starling, 5 (20, 8); House Sparrow, 5; Cinnamon Teal, 4 (16, 6); Am. Coot, 4; Pied-billed Grebe, 2; Gadwall, 2; Violet-green Swallow, 2; Com. Gallinule, 1; Sora, 1; W. Kingbird, 1; Black Phoebe, 1; Say's Phoebe, 1; Com. Yellowthroat, 1. **Total:** 18 species; 89 territorial males (356/km², 144/100 acres). **Visitors:** Prairie Falcon, Com. Raven, Rock Wren. **Remarks:** Nests found: 2 Mallard, 2; Ruddy Duck 12; Broods seen: coot 4; Mallard 1. The 3 visitor species nest on cliffs above lake. Although 200 coot and 50 Ruddy Ducks were on the lake throughout the period, few were nesting. Say's Phoebe, Starling and House Sparrow nested in a stable near the lake. This study was supported by the U.S. Bureau of Land Management, Bakersfield District. — DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.

148. HIGH DESERT SPRING. — **Location:** California; Inyo Co., 5.5 mi N of Coso Hot Springs by rough dirt road, within the boundaries of China Lake Naval Weapons Center; S 10 and 15, T21S, R39E; 36°07'N, 117°45'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 5.5 ha = 13.6 acres. **Description of Plot:** See AB 33:34 (1979). **Weather:** Clear on all trips. Temperatures 35-90°F. Measurable precipitation fell on 3 days. **Coverage:** Mar. 10, 24; Apr. 14, 28-29; May 12-13, 26; 0700-1500. Total man-hours: 9. **Census:** Lesser Goldfinch, 8 (145, 59); Costa's Hummingbird, 4 (73, 29); Mourning Dove, 2; Lazuli Bunting, 2; Ash-throated Flycatcher, 1; Blue-gray Gnatcatcher, 1. **Total:** 6 species; 18 territorial males (327/km², 132/100 acres). **Visitors:** Chukar, Long-eared Owl, Com. Raven, Rock Wren, House Finch, Black-throated Sparrow. **Remarks:** 2 Lesser Goldfinch nests found. Long-eared Owls roosted at the spring for the duration of this study. Chukar, Rock Wren and House Finch nested in nearby rocks and were daily visitors. Up to 40 burros water daily at the spring. This study was supported by the U.S. Bureau of Land Management, Bakersfield District. Thanks to the personnel at China Lake Naval Weapons Center for their cooperation. — DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.

149. JOSHUA TREE WOODLAND. — **Location:** California, Inyo Co., 3.9 mi E on Coso Rd. from U.S. 395, then 4.6 mi N to end of old mine road; S10 & 11, T21S, R38E; 36°07'N, 117°51'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 26.25 ha = 64.86 acres (rectangular 1050 × 250 m, paced). **Description of Plot:** See AB 33:33 (1979). **Weather:** Clear on all trips. Temperatures 35-95°F. Measurable precipitation fell on 2 days. **Coverage:** Mar. 11, 25; Apr. 14, 29-30; May 13-14, 27; 0630-1300. Total man-hours: 8. **Census:** Black-throated Sparrow, 16 (61, 25); Brewer's Sparrow, 3 (11, 5); Cactus Wren, 2; House Finch, 2; Ladder-backed Woodpecker, 1; W. Kingbird, 1; Ash-throated Flycatcher, 1; Scott's Oriole, 1. **Total:** 8 species; 27 territorial males (103/km², 42/100 acres). **Visitors:** Com. Raven, Say's Phoebe, Bewick's Wren, Loggerhead Shrike. **Remarks:** Nests found (3): Black-throated Sparrow, 2; Cactus Wren, 1. This study was supported by the U.S. Bureau of Land Management, Bakersfield District. — DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.

150. LOWER SONORAN GRASSLAND. — **Location:** California; San Luis Obispo Co., Carrizo Plains, 15 mi SE of California Valley, 1.5 mi S of Kern Co.; Sec. 12, T31S, R20E; 35°35'14'N, 119°47'W, Painted Rock Quadrangle, USGS. **Continuity:** New (1978). **Size:** 20.25 ha = 50.04 acres (450 × 450 m, compass and steel tape). **Description of Plot:** The percent cover and species composition of this saltbush-grassland community was determined by four 25 m line transects. The E side had a coverage of nearly 100% Locoweed (*Astragalus* sp.), while the majority (5/6 of the total area) had a coverage composition of: 55% grasses: Brome Grass (*Bromus* sp.), Fescue (*Festuca* sp.), Foxtail (*Hordeum* sp.); 19.5% Red-stem Filaree (*Erodium cicutarium*), 12.9% Saltbush (*Atriplex polycarpa*, *A. spinifera*), 8.7% bare ground, and 3.9% various forbs and shrubs. Plants occurring but not recorded on the line transects included: *Ephedra californica*, Boxthorn (*Lycium andersonii*), Prince's Plume (*Stanleya pinnata*), Winter Fat (*Eurotia lanata*), *Eastwoodia elegans*, *Coreopsis calliopsidea*, California Poppy (*Eschscholzia lemmonii*), Blazing Star (*Mentzelia affinis*), Desert Candle (*Caulanthus inflatus*), and California Buckwheat (*Eriogonum fasciculatum*). **Edge:** Bordered on all sides by similar habitat. Within 100 ft of the W side is a dirt road; the N side is at the base of the Panorama Hills. **Topography:** A slightly sloping alluvial plain with a narrow wash in the SE corner and a 3 m deep arroyo crossing the SW corner. **Elevation:** 2200 ft. **Weather:** 1.92 in. rain in Apr., none in May or June. Frosts and fog common in Apr. and May; June had clear skies and average temperatures of 44-90°F. **Coverage:** 1978: Apr. 23, 30; May 7, 14, 27; June 4, 25; 0555-0900. Total man-hours: 9.25. **Census:** Horned Lark, 15 (74, 30); W. Meadowlark, 9 (44, 18); Sage Sparrow, 3 (15, 6). **Total:** 3 species; 27 territorial males or females (133/km², 54/100 acres). **Visitors:** Le Conte's Thrasher. **Remarks:** One Horned Lark nest was found. The average precipitation for the Carrizo Plains is 8.69 in., but during the census year (1978) the area received 20.39 in. of rain, the most recorded in 40 years. Special thanks to Craig Woods and

Roger Gamba for their assistance and suggestions — LARRY HURST, P.O. Box 532, Santa Margarita, Calif. 93453.

151. OCOTILLO - CHOLLA. — **Location:** California; Riverside Co., Santa Rosa Mtns., about 5.5 mi S of State Hwy 74/State Hwy 111 junction in Palm Desert, beginning E of Hwy 74; in the NE ¼ Sec. 18, T6S, R6E, and extending into the SE ¼ Sec. 7, SW ¼ Sec. 8 and NW ¼ Sec. 17; 33°40'N, 116°25'W, Palm Desert Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 16.2 ha = 40 acres. **Description of Plot:** See AB 33:94 (1979). **Weather:** Temperatures 58-94°F. For the second year in a row, this area has received more than the average winter rainfall. **Coverage:** Apr. 7, 12, 19, 24; May 10, 19, 28; June 9; 0445-1130, PST Total man-hours: 32.5. **Census:** Black-throated Sparrow, 13 (80, 33); Costa's Hummingbird, 6 (37, 15); House Finch, 4 (25, 10); Mourning Dove, 3.5 (22, 9); Gambel's Quail, 3 (19, 8); Rock Wren, 2; Bewick's Wren, 2; Cactus Wren, 1; Verdin, 1; Loggerhead Shrike, 1. **Total:** 10 species; 36.5 territorial males or females (225/km², 91/100 acres). **Visitors:** Sharp-shinned Hawk, Red-tailed Hawk, White-winged Dove, Vaux's Swift, White-throated Swift, Anna's Hummingbird, Rufous Hummingbird, W. Kingbird, Cassin's Kingbird, Ash-throated Flycatcher, Say's Phoebe, Hammond's Flycatcher, W. Wood Pewee, Barn Swallow, Com. Raven, Blue-gray Gnatcatcher, Warbling Vireo, Orange-crowned Warbler, Nashville Warbler, Yellow-rumped Warbler, Townsend's Warbler, Wilson's Warbler, Scott's Oriole, N. Oriole, W. Tanager, Black-headed Grosbeak, Lazuli Bunting, Lesser Goldfinch, Chipping Sparrow. **Remarks:** Nests found (16): Black-throated Sparrow, 8; Loggerhead Shrike, 2; House Finch, 2; Rock Wren, 1; Cactus Wren, 1; Bewick's Wren, 1; Verdin, 1; Gambel's Quail young, less than one week old, were also observed. I thank Ruth C. Yoder for assistance with the surveys. The plot is part of the Boyd Deep Canyon Reserve. — BARBARA A. CARLSON, P.O. Box 1015, Upland, Calif. 91786.

152. SALTBUSSH SCRUB. — **Location:** California; Inyo Co., 1 mi E of US 395 (Coso Junction), 0.4 mi S of Coso Rd.; S6, T22S, R38E, and S1, T22S, R37E; 36°03'N, 117°55'W, Haiwee Reservoir Quadrangle, USGS. **Continuity:** New. **Size:** 25.5 ha = 63 acres. (rectangular 300 × 850 m, paced). **Description of Plot:** See AB 33:32-33 (1979). **Weather:** Temperatures 40-100°F. Measurable precipitation on 2 days of Mar. **Coverage:** Mar. 11, 25; Apr. 14, 29-30, May 13-14, 27; 0830-1300. Total man-hours 8. **Census:** Horned Lark, 14 (55, 22), Sage Sparrow, 9 (35, 14); Black-throated Sparrow, 3 (12, 5); Brewer's Sparrow, 3. **Total:** 4 species; 29 territorial males (114/km², 46/100 acres). **Visitors:** Mourning Dove, Costa's Hummingbird, Com. Raven, Brown-headed Cowbird. **Remarks:** Nests found: 2 Sage Sparrow, 2 Horned Lark. This study was supported by the U.S. Bureau of Land Management, Bakersfield District — DANIEL A. and KATHRYN GUTHRIE, Joint Science Dept., Claremont Colleges, Claremont, Calif. 91711.

153. 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°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1971, 7 intermittent years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 25:1003-1004 (1971). **Weather:** Overcast skies or coastal fog prevailed on 54% of the census mornings, the remainder being mostly clear. West-erly or SW winds of about 5-10 mph prevailed on most mornings but were generally a bit lighter and more southerly than most years. Morning temperatures, 50-77°F (generally 55-65°) and were, perhaps, a bit higher than most years. Rainfall during Apr. and May was about normal (2.50 in.) but total rainfall for fiscal year 1978-79 (26.44 in.) was somewhat below normal. **Coverage:** Apr. 3, 7, 9-10, 12-18, 20, 23-24, 27-28; May 2, 4, 8; 530-1230. Total man-hours: 45. **Census:** Wren-tit, 9 (111, 45); Rufous-sided Towhee, 8 (99, 40); Song Sparrow, 7.5 (93, 38); White-crowned Sparrow, 7 (86, 35); Allen's Hummingbird, 4.5 (56, 23); Bewick's Wren, 3.5 (43, 18); Bushtit, 1.5; Orange-crowned Warbler, 1; Am. Goldfinch, 1; Rufous-crowned Sparrow, 1; Scrub Jay, 0.5; House Finch, 0.5; Red-tailed Hawk, +; California Quail, +; Com. Flicker, +; Purple Finch, + **Total:** 16 species; 45 territorial males (556/km², 225/100 acres). **Remarks:** The total density of territorial males was nearly identical to the mean for the previous 6 years (564/km²), despite the somewhat more thorough coverage (compared to the previous 6-year mean of 30.8), and may reflect an inherent stability to the breeding bird community of the mature coastal scrub habitat. Somewhat less than 25% of all breeding individuals of all species utilizing any part of the plot were color banded in 1979. This proportion was comparable to that in previous years. Nests found (6): Bushtit, 2; Bewick's Wren, 2; Rufous-sided Towhee, 1; Song Sparrow, 1. Contribution No. 207, P.R.B.O. — **DAVE DESANTE, ED GOOD, MARSHA HEIDT, TEYA McELROY, TOM STIERHOFF, KEN WARHEIT, SALLY WEISEL, and BRUCE WILLI-FORD, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, Calif. 94970.**

154. 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°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1972; 7 intermittent years. **Size:** 4.7 ha = 11.6 acres. **Description of Plot:** See AB 26 987-988 (1972). **Weather:** See Census 153. **Coverage:** Apr. 2, 5-6, 9, 12-13, 15, 18-20, 24-25, May 2-4, 7-11, 13-14, 18, 20, 22, 24-25, 30-31, 0530-1330. Total man-hours: 91. **Census:** Song Sparrow, 8 (170, 69); Wren-tit, 2.5; Am. Goldfinch, 2.5; California Quail, 2; Bushtit, 2; White-crowned Sparrow, 2; Allen's Hummingbird, 1.5; Rufous-sided Towhee, 1.5; Scrub Jay, 0.5; Bewick's Wren, 0.5; Red-tailed Hawk, +; Com. Flicker, +; Am. Robin, +, Orange-crowned Warbler, +; House Finch, + **Total:** 15 species; 23 territorial males (490/km², 198/100 acres). **Remarks:** The total density of territorial males was about 1.4 times as high as the mean for the previous 6 years (346/km²). This increase is attributed to several factors. Foremost among them are the more thorough coverage compared to the previous 6-year mean of 29 man hours, and the somewhat greater proportion of color banded birds. Over 50% of all breeding individuals of all

species utilizing any part of the plot were color banded in 1979. However, this plot, which is adjacent to the location of the mist nets operated daily as part of P.R.B.O.'s migration and dispersal study, has always had a substantial proportion of color banded birds. Thus, the increase in the proportion of color banded birds was less than the corresponding increase that occurred on Census 155. As a result, the observed increase in the density of territorial males was greater on Census 155, than on this census. These data indicate that standard spot-mapping census techniques may tend to underestimate the abundance of very dense species such as Song Sparrow. Of probably lesser importance to the increased breeding bird density found on this census was the gradual succession of the vegetation toward a more mature coastal scrub which is known to support a higher density of breeding birds. Nests found (13): Bushtit, 2; Wren-tit, 2; Am. Goldfinch, 2; White-crowned Sparrow, 3; Song Sparrow, 4. One of the territorial ♂ White-crowned Sparrows was bigamous; each of his mates built a nest but only one of them successfully raised young. Contribution No. 208, P.R.B.O. — **DAVE DESANTE, LIBBY CREELMAN, MARGARET HETHERINGTON, and JENNY PRICE, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, Calif. 94970.**

155. 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°55'N, 122°45'W, Bolinas Quadrangle, USGS. **Continuity:** Established 1971; 8 intermittent years. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 25:1002-1003 (1971). **Weather:** See Census 153. **Coverage:** Apr. 2, 5-6, 9-10, 12-13, 15, 17-20, 24-25, 27; May 2-4, 7-11, 14-15, 18, 20, 22, 24-25, 30-31; 0530-1330. Total man-hours: 84. **Census:** Song Sparrow, 14.5 (179, 73); White-crowned Sparrow, 6.5 (80, 33); Am. Goldfinch, 5.5 (68, 28); Rufous-sided Towhee, 2.5; Allen's Hummingbird, 2; Wren-tit, 1.5; California Quail, 1; Bushtit, 1; Bewick's Wren, 0.5; Com. Flicker, +; Scrub Jay, +; Am. Robin, +; W. Bluebird, +; Starling, +; Brown-headed Cowbird, +; House Finch, +; Brown Towhee, +. **Total:** 17 species; 35 territorial males (432/km², 175/100 acres). **Remarks:** The total density of territorial males was nearly twice as high as the mean for the previous 7 years (230/km²). This is attributed to a number of factors including (1) a much higher proportion of color banded birds (over 45% of all breeding individuals of all species utilizing any part of the plot were color banded in 1979) which allowed a more accurate determination of breeding territories, especially for very dense species such as Song Sparrow, (2) a more thorough coverage compared to the previous 7 year mean of 21.4 man hours, and (3) the gradual succession of the vegetation toward a more mature coastal scrub which is known to support a higher density of breeding birds. Nests found (23): Bushtit, 2; House Finch, 1; Am. Goldfinch, 5; Rufous-sided Towhee, 1; White-crowned Sparrow, 5; Song Sparrow, 9. One of the territorial male White-crowned Sparrows was bigamous; each of his mates built a nest but only one of them successfully raised young. Contribution No. 209, P.R.B.O. — **DAVE DESANTE, JOHN BLACKHAM, BETSY**

BUSH, STUART JOHNSON, NANCY PETERSEN, and PETER SAWYER, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, Calif. 94970.

156. ARCTIC LOW FOOTHILLS TUN-DRA. — **Location:** Alaska; North Slope Borough, 5 km ESE of Atkasook; 70°27'N, 157°19'W, Meade River Quadrangle, USGS. **Continuity:** Established 1977; 3 consecutive years. **Size:** 25 ha = 61.8 acres. **Description of Plot:** See AB 32:115-116 (1978). **Weather:** Temperatures in May warmer by comparison with previous year, producing a relatively early melt-off. 50% of the surface area was snow-free before May 29 while in 1978 this stage of melt-off was not reached until June 3. Snow cover gone by June 8. **Coverage:** May 29; June 2, 8, 10, 13-14, 17-18, 19, 23, 26; July 2. Total man-hours: 109. **Census:** Lapland Longspur, 10 (40, 16); Semipalmated Sandpiper, 7 (28, 11); W. Sandpiper, 5 (20, 8); Oldsquaw, 4 (16, 6); Pectoral Sandpiper (nesting females), 3 (12, 5); N. Phalarope, 3; Red Phalarope, 2; Black-bellied Plover, 1.5; Dunlin, 1.5; Savannah Sparrow, 1.5; Willow Ptarmigan, 1; Arctic Loon, +; Pintail, +; Greater Scaup, +. **Total:** 14 species; 39.5 territorial males or females (158/km², 64/100 acres). **Visitors:** King Eider, Am. Golden Plover, Long-billed Dowitcher, Long-tailed Jaeger, Parasitic Jaeger, Arctic Tern, Short-eared Owl. **Remarks:** See AB 29 1135 (1975) re calculations of Pectoral Sandpiper density. Two Pectoral Sandpiper males defended territories throughout June, thus the total species density changes to 38.5 territorial males (154/km², 62/100 acres) if calculations are based on males instead of females. This year's data reflect a continued downward trend in total species and total breeding density (see AB 22:101). The drop in species number, a net loss of 4 from 1977, is not linked to any particular group. Two new species, Greater Scaup and N. Phalarope, were added to the breeding list. The decrease in breeding density (down 16% from 1978 and 42% from 1977) was largely from a continued decline in Lapland Longspurs (off 26% and 58% from 1978 and 1977, respectively). Western Sandpiper, Semipalmated Sandpiper, and Red Phalarope also dropped appreciably, 1977-1979. Last year we interpreted the low total density of 1978 compared to 1977 as a possible result of flooding during the break-up of the Meade River. As no such flooding occurred this year the continued reduction in breeding density resulted from some other factor. Because of the overwhelming numerical importance of Lapland Longspurs (35% of breeding individuals in 1977) and their sharp decline from 1977-1979, the drop in total density might be largely a result of factors peculiar to that species, one known to undergo dramatic multi-year trends in population density in northern Alaska (Custer and Pitelka 1977, *Auk* 94 505-525). Calculating the percent decline in total breeding density for all species except Lapland Longspurs reveals a 12% and a 33% decline from 1978 and 1977, respectively. Thus the decrease is from more general causes. Nests found (number successfully hatched in parentheses): Willow Ptarmigan 2 (0), Black-bellied Plover 1 (1), Pectoral Sandpiper 3 (3), Dunlin 1 (1), Semipalmated Sandpiper 8 (6), W. Sandpiper 1 (1), Red Phalarope 2 (1), N. Phalarope 2 (2), Lapland Longspur 10 (9). This work was funded by the D.O.E. as

part of a study of shorebird ecology. We thank the Naval Arctic Research Laboratory and especially Terry Hall for logistic support. — *J. P. MYERS, W. D. SHUFORD, J. EVENS, and F. A. PITELKA, Museum of Vertebrate Zool., Univ. of Calif., Berkeley, Calif. 94720.*

157. INLAND COASTAL TUNDRA. —

Location: Alaska; North Slope Borough, 69 km S of Prudhoe Bay; 69°41'N, 148°42'W; Sagavanirktok (C-3) Quadrangle, USGS. **Continuity:** New. **Size:** 100 ha = 247.1 acres. (2500 × 400 m, surveyed and gridded). **Description of Plot:** Located on gently sloping, continuous tundra approximately 0.5 km W of Sagavanirktok River and 1.5 km W of Franklin Bluffs; a mixture of well-drained xeric tundra and polygonized low, wet tundra. Plot extends westward away from river across flat terraces connected by sloping ridges and creek banks. Dry areas characterized by gentle slope, tussocks and broken ground. Low wet areas flat, with polygons 15-20 m dia. and rim-center distance less than 0.5 m. Two ephemeral streams, essentially dry by July 15, cross the plot. Vegetation mapped according to analysis of Prudhoe Bay flora in Webber and Walker, 1975 (Special Rep. No. 2, Univ. of Alaska, Ecological Investigations of the Tundra Biome in the Prudhoe Bay Region, Alaska). Percentages of vegetation types, associated habitats and dominant species as follows: Type 1, 7.5% (ridges, creek bluffs and dry sloping areas), *Dryas integrifolia*, *Saxifraga oppositifolia*, *Eriophorum angustifolium*, *Oxytropis* sp., *Astragalus* sp. and *Thamnolia subuliformis*; Type 2, 10.0% (dry polygon rims, well-drained areas), *D. integrifolia*, *E. angustifolium*, *Carex aquatilis*, *Pedicularis* sp., *Parrya mucicalis* and *Cetraria* sp.; Type 3, 28.5% (polygon rims, elevated polygon centers and areas not continually wet), *Salix lanata*, *C. aquatilis*, *Saxifraga hirculus*, *Silene acaulis*, *Pedicularis* sp. and *Brynum* sp.; Type 4, 20.0% (centers of low-centered polygons, troughs and poorly drained areas), *C. aquatilis*, *Pedicularis sudetica*, *Brynum* sp. and *Drepanocladus lycopodioides*; Type 5, 14.5% (wet areas with shallow standing water throughout summer), *C. aquatilis* and *Scorpidium scorpioides*; Type 13, 15.0% (stream and pond margins), *S. lanata*, *Salix reticulata*, *C. aquatilis* and *Pedicularis* sp. Water coverage on the plot decreased from 28% on June 1 to 2% on July 15. Plot bisected by trans-Alaska pipeline (pipe buried, pad gravel, 1 m high, 10-12 m wide) and pipeline haul road (gravel, 2 m high, 12-15 m wide). Haul road and pipe pad occupy 1 ha maximum. There is a slight impoundment of water west of the haul road due to the blockage of drainage. **Edge:** Continuation of similar habitat; E edge grades into riparian habitat bordering a former Sagavanirktok channel. **Topography:** Gently sloping E-W, approximately 1% grade overall. **Elevation:** 425 ft. **Weather:** Average daily temperature for June, 11° C; for July, 17°. Snow melt complete by June 4. Storm on June 25-26 dropped 3 cm of snow which remained on the ground less than 24 hrs. Weather in late June through July generally warm, cloudy and windy; thunder showers frequent. **Coverage:** May 27 - Aug. 10; 0900-1700. Total man-hours: 854. **Census:** Lapland Longspur, 29 (29, 12); Am. Golden Plover, 11 (11, 4); Willow Ptarmigan, 6 (6, 2); Buff-breasted Sandpiper, 5 (5, 2); Long-tailed Jaeger, 3; Semipalmated Sandpiper, 3 (3, 1);

Bar-tailed Godwit, 3, N Phalarope, 3, Redpoll sp., 3, Pectoral Sandpiper, 2, White-fronted Goose, 1, Rock Ptarmigan, 1; Stilt Sandpiper, 1; Parasitic Jaeger, 1; Pintail, +; Oldsquaw, +; Black-bellied Plover, +; Whimbrel, +. **Total:** 18 species; 72 territorial males or females (72/100 ha, 29/100 acres). **Visitors:** Arctic Loon, Whistling Swan, Rough-legged Hawk, Golden Eagle, Peregrine Falcon, Baird's Sandpiper, Red Phalarope, Pomarine Jaeger, Glaucous Gull, Arctic Tern, Yellow Wagtail, Savannah Sparrow. **Remarks:** Results of the 1978 work published in Hanson and Eberhardt, 1978 (D.O.E. Annual Report, Battelle Pacific Northwest Lab., Richland, Wash.). Relatively little change has occurred since 1978; a slight decrease in Buff-breasted Sandpipers (from 10-5) and an increase in Am. Golden Plovers (from 7-13). In 1978, large numbers of Buff-breasted Sandpipers bred in the Franklin Bluffs and Prudhoe Bay area; the 1979 decrease is felt to represent a return to more normal densities. The two known leks in the Franklin area were 5 km apart. Longspur density was similar to that in 1978 (23) but productivity reduced approximately 80% by the severe storm on June 25. Predation pressure was strong for all species. Use of plot by breeding birds fluctuated from display, incubation and fledging periods. Family groups congregated in low wet areas, some moved off the plot and some species not breeding there moved onto the plot (Long-billed Dowitcher, Whimbrel, Black-bellied Plover). Single nests of the dowitcher and plover were found in 1978. This census contrasts with Census 161 conducted 45 km N. Striking differences are evident in both breeding species and overall densities. Species diversity appears slightly higher but relative and overall densities are much lower, most noticeably in calidridine sandpipers. Longspurs showed a three-fold increase in breeding density in Census 161 as compared to the Franklin Plot. Immediately evident habitat differences are the predominance of wet polygon tundra in Census 161 which contrasts with the drier, more upland tundra here. Work in previous years and observations in 1979 indicate that Census 161 is representative of most of the Prudhoe Bay coastal tundra and that the Franklin plot is similar to the inland belt immediately N of the Brooks foothills. Nests found: Nests found off the study site included if the male's territory extended into plot; re-nesting attempts included; (number successfully fledged in parentheses): 13 species, 64 (22) nests. Lapland Longspur, 26 (3); Am. Golden Plover, 13 (5); Willow Ptarmigan, 5 (5); Buff-breasted Sandpiper, 5 (1); Bar-tailed Godwit, 3 (0); N. Phalarope, 3 (2); Semipalmated Sandpiper, 2 (1); Long-tailed Jaeger, 2 (2); White-fronted Goose, 1 (0); Rock Ptarmigan, 1 (1); Stilt Sandpiper, 1 (1); Pectoral Sandpiper, 1 (1); Redpoll, 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. EY-76-C-06-1830. — *STEPHEN G. JONES, MELINDA A. PRUETT, and WAYNE C. HANSON, Ecosystems Dept., Battelle Pacific Northwest Laboratory, Richland, Wash. 99352.*

158. WET COASTAL PLAIN TUNDRA I.

— **Location:** Alaska; North Slope Borough, 3 km due S of Naval Arctic Research Labora-

tory, Barrow, 71°18'N, 156°42'W, Barrow Quadrangle, USGS. **Continuity:** Established 1975; 5 consecutive year. **Size:** 33 ha = 81.5 acres. **Description of Plot:** See AB 29:1135-6 (1975). **Weather:** Average temperature during June 29°F, - 0.6° departure from normal. Average wind speed during June, 11 mph. Weather data from NOAA, Barrow, Alaska, 3 km to W. Melt-off was early this year because of protracted warm weather during Apr and May; 50% snow-free date June 3, compared to June 5 in 1978. Snow-free by June 9; 1975, 1976, 1977, and 1978 snow-free dates were June 12, 14, 9, and 12, respectively. **Coverage:** May 29, June 3, 6, 12-13, 18-20, 22, 27-28, July 1. Total man-hours: 65. **Census:** Lapland Longspur, 14.5 (44, 18); Semipalmated Sandpiper, 10 (30, 12); Baird's Sandpiper, 6 (18, 7), Dunlin, 6; Red Phalarope, 5 (15, 6); Am. Golden Plover, 4.5 (14, 6); Pectoral Sandpiper (nesting females), 4 (12, 5); Pintail, 1; Long-billed Dowitcher, 1; Ruddy Turnstone, 1, Snow Bunting, 1; Steller's Eider, +; White-rumped Sandpiper, +; Com. Snipe, +; Parasitic Jaeger, +; Hoary Redpoll, +; Savannah Sparrow, +. **Total:** 17 species; 54 territorial males or females (164/km², 66/100 acres). **Visitors:** N. Phalarope, Pomarine Jaeger. **Remarks:** See AB 29:1135 (1975) re calculations of Pectoral Sandpiper density; 4 males defended territories so if total breeding density is calculated based on males instead of females the total remains unchanged. Total species is 42% above the 5-year average (12 species). Brown Lemmings were too scarce to support breeders of either of their two major predators, Snowy Owl or Pomarine Jaeger. The increase in breeding species parallels a jump in breeding density, although the new species comprise an insignificant fraction of the individuals breeding on the plot. Total density is the second highest recorded (within 2% of the maximum recorded in 1976) and is 15% above the 5-year average; 10 species increased above last year's total while 3 decreased. Among the most striking increases were Baird's Sandpiper (up 200%), Red Phalarope (150%), Am. Golden Plover (126%), Pectoral Sandpiper (100%), and Lapland Longspur (22%). The increases in Am. Golden Plover and Lapland Longspur reflect area wide expansions of these two species (see next two Censuses) and, together with the increase in Baird's Sandpiper, constitute a significant increase in 3 of 4 of the main upland breeding species. In AB 32:116-117 (1978) we speculated that regional melt-off patterns in relation to the timing of bird migration played a significant role in inter-year variations in breeding bird density. We elaborate that hypothesis here: sites away from the arctic coast clear of snow earlier than the coastal strip because of their distance from the Arctic Ocean. The timing of melt-off varies among years, however, because of changes in temperatures regimes. During years with early coastal melt-off, migration onto the North Slope will occur when more habitat is available in the coastal zone, and individuals that might otherwise have bred farther to the south will instead continue to the coast. Thus, in early melt-off years, coastal sites will have relatively high densities and those inland relatively low, compared to their long-term means. This year's data from our coastal and inland plots are consistent with this prediction. The hypothesis also predicts that inter-

year variability in density should be greater in species such as Pectoral Sandpipers with reduced philopatry. Nests found (number successfully hatched in parentheses): Pintail 1 (0), Am Golden Plover 5 (0), Ruddy Turnstone 1 (0), Pectoral Sandpiper 1 (1), Dunlin 6 (6), Baird's Sandpiper 2 (1), Semipalmated Sandpiper 8 (7), Red Phalarope 4 (3), Hoary Redpoll 1 (1), Lapland Longspur 9 (8), Snow Bunting 1 (1). This work was funded by the D.O.E. as part of a study of shorebird ecology. — J. P. MYERS, C. W. SWARTH, and F. A. PITEKKA. *Museum of Vertebrate Zool., Univ. of Calif., Berkeley, Calif. 94720.*

159. WET COASTAL PLAIN TUNDRA II.

— **Location:** Alaska; North Slope Borough, 3 km SSW of Naval Arctic Research Laboratory, Barrow; 71°18'N, 156°43'W; Barrow Quadrangle, USGS. **Continuity:** Established 1975; 5 consecutive years. **Size:** 36 ha = 88.9 acres. **Description of Plot:** See AB 29:1136 (1975). **Weather:** See Census 158. **Snow-melt schedule:** surface area 50% snow free by June 5, 100% by June 12. **Coverage:** May 29; June 3, 6, 12-13, 18-19, 24, 27; July 3. Total man-hours: 60. **Census:** Lapland Longspur, 25 (69, 28); Dunlin, 6 (17, 7); Am. Golden Plover, 5 (14, 6); Pectoral Sandpiper (nesting females), 5; Semipalmated Sandpiper, 5; Red Phalarope, 4 (11, 4); Baird's Sandpiper, 3 (8, 3), Ruddy Turnstone, 2.5; Steller's Eider, 2; Pintail, 1; Oldsquaw, 1; Long-billed Dowitcher, 1, Snow Bunting, 1; White-rumped Sandpiper, +; Com. Snipe, +; N. Phalarope, +; Parasitic Jaeger, +. **Total:** 17 species; 61.5 territorial males or females (171/km², 69/100 acres). **Remarks:** See AB 29:1135 (1975) re calculations of Pectoral Sandpiper density; 6.5 Pectoral males defended territories on the grid. Thus total breeding density using Pectoral male instead of female numbers would be 63 territorial males (175/km², 71/100 acres). Most changes on this plot parallel patterns apparent in Census 158. Total number of breeding species was up 31% over the 5-year average, while breeding density was up 22%. Ten species increased and only 4 decreased. The most dramatic increases were Pectoral Sandpiper (no females nested last year), Am. Golden Plover (+360%), Baird's Sandpiper (+170%), and Lapland Longspur (+150%). In contrast with the previous census, however, Red Phalaropes declined sharply (~65%). Nests found (number successfully hatched in parentheses): Am. Golden Plover 4 (0), Ruddy Turnstone 3 (0), Dunlin 5 (4), Baird's Sandpiper 2 (1), Semipalmated Sandpiper 6 (3), Red Phalarope 2 (1), Longspur 5 (2). This work was funded by the D.O.E. as part of a study of shorebird ecology. — J. P. MYERS, B. J. McCAFFERY, and F. A. PITEKKA. *Museum of Vertebrate Zoology, Univ. of Calif., Berkeley, Calif., 94720.*

160. WET COASTAL PLAIN TUNDRA III.

— **Location:** Alaska; North Slope Borough, 3 km SSE of Naval Arctic Research Laboratory, Barrow; 71°18'N, 156°38'W; Barrow Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 25 ha = 61.8 acres. The size of this plot was reduced from last year's 36 ha by cutting a 50 m wide strip off each edge. The strip removed was very similar to the remaining plot in habitat characteristics. **Description of Plot:** See AB 33:102 (1979). **Weather:** See Census 158. **Snow-melt schedule:** surface area

50% snow-free by June 3, 100% snow free by June 14. The melt-off schedule differs from our other two Barrow area plots (see previous two Censuses) in that area clear very early along the exposed upland ridge but pockets remain snow-covered later because of deep polygon troughs. **Coverage:** May 30; June 3, 6, 8, 12, 18-19, 22, 28; July 4. Total man-hours: 47. **Census:** Lapland Longspur, 22 (88, 36); Dunlin, 6 (24, 10); Pectoral Sandpiper (nesting females), 4 (16, 6); Am. Golden Plover, 3.5 (14, 6); Red Phalarope, 2; Baird's Sandpiper, 1.5; Long-billed Dowitcher, 1; Semipalmated Sandpiper, 0.5. **Total:** 8 species; 40.5 territorial males or females (162/km², 66/100 acres). **Remarks:** See AB 29:1135 (1975) re calculations of Pectoral Sandpiper density. 5.5 Pectoral males defended territories; thus the total breeding density changes to 42 territorial males (168/km², 68/100 acres) if calculations are based on males instead of females. In contrast to the previous two censuses the total number of species breeding fell from 11 in 1978. This involved the absence of Pintail, Snow Bunting, and two lemming predators, Snowy Owl and Pomarine Jaeger. Total breeding density, however, rose by 82%. Lapland Longspurs (up 105%) accounted for half of this increase while the rest was spread among many species, especially Red Phalaropes (+166%), Pectoral Sandpipers (+166%), and Am. Golden Plovers (+133%). Of the 8 breeding species this year, 7 increased above their density last year. Nests found (number successfully hatched in parentheses): Am. Golden Plover 3 (1), Pectoral Sandpiper 1 (0), Dunlin 4 (4), Baird's Sandpiper 2 (0), Long-billed Dowitcher 1 (0), Red Phalarope 1 (0), Lapland Longspur 15 (8). This work was funded by the D.O.E. as part of a study of shorebird ecology. — J. P. MYERS, S. T. GELLMAN, and F. A. PITEKKA. *Museum of Vertebrate Zool., Univ. of Calif., Berkeley, Calif. 94720.*

161. WET COASTAL PLAIN TUNDRA.

— **Location:** Alaska; 13.8 km SSW of Deadhorse; 70°5'N, 148°30'W; Beechy Point Quadrangle (A-3), USGS. **Continuity:** New. **Size:** 100 ha = 247.1 acres (approximately rectangular, surveyed and gridded at 50 m intervals). **Description of Plot:** Located 1.3 km W from the Trans Alaska pipeline haul road and Sagavanirktok River; longitudinally bisected by the Trans Alaska pipeline and pipe-pad (50% above ground, 50% below ground) from N-S. Vegetation mapped according to analysis of Prudhoe Bay flora in Webber and Walker, 1975 (Special report No. 2, University of Alaska - Ecological Investigations of the Tundra Biome in the Prudhoe Bay Region, Alaska). Percentages of vegetation types, associated habitats, and dominant species as follows: Type 2, 1.5% (dry polygon rims, well drained areas), *Dryas integrifolia*, *eriophorum angustifolium*, *Pedicularis* spp., *Cetraria* spp. Several other fruticose lichens and sedges; Type 3, 30% (Polygon rims, elevated polygon centers, area not continuously wet), *Salix lanata*, *Carex aquatilis*, *Saxifraga hirculus*, *Silene acaulis*, *Pedicularis* spp., *Brynum* sp.; Type 4, 55% (centers of many low-centered polygons, troughs and poorly drained areas, such as pond margins), *Carex aquatilis*, *Pedicularis sudetica*, *Brynum* sp., *Drepanocladus lycopodioides*; Type 5, 10% (wet areas with shallow standing water throughout summer)

C. aquatilis, *scorpidium scorpioides*, Type 13, 3.5% (stream and pond margins), *S. lanata*, *S. reticulata*, *C. aquatilis*, *Pedicularis* spp. Maximum vegetation height 30-40 cm. Microtopography of the plot E of the Trans Alaska pipeline is dominated by polygon ridges and frost medallions, resulting from the annual freeze-thaw cycles, and interactions with permafrost. The W side of the pipeline is dominated by Type 4 and 5 habitats; low center polygons, troughs, and areas that have shallow water throughout the summer. Polygon diameters range up to 15 m; however, most of the polygons are broken and erratic in shape. Height of polygons (trough to top), averages from 30-40 cm, maximum to 80 cm. There are 8 lakes and small ponds on the plot ranging in size from 0.5 ha to 4.5 ha. Total area of lakes 15 ha (not included in plot area). Depths of lakes varies from 60 cm to greater than 1m. Percent water cover as follows: E side of pipeline, May 27, 30% June 7, 10% July 1 1%; W side of pipeline, May 27, 80%; June 23, 50%; July 19, 20%. The W side stayed considerably wetter than the E side as a result of the impoundment of water by the pipeline pad. Snow cover persisted an extra 9 days along the pipeline due to the "snow fence effect" from the prevailing NE winds. The snow covered an area of 50-75 m on both sides of the pipeline. **Edge:** Essentially the same habitat except for dry mesic tundra on the NE side of the pipeline and numerous large lakes 25 ha and greater. **Elevation:** 30.5 m. **Weather:** Average temperatures for last five days of May: 40.3°F, June 46°F, July 59.5°F, August 51.8°F. Temperature range 29-80.0°F. The tundra was 70% snow free by May 27, and completely free by June 2. A snow storm June 25 left approximately 1 in. on the tundra until 1200 hrs when it melted. **Coverage:** May 27-31; June 1-30; July 1-10; 11-31; Aug. 1-10. Total man-hours: 1088. **Census:** Lapland Longspur, 45 (45, 18); Pectoral Sandpiper, 30 (30, 12) (nesting females); Semipalmated Sandpiper, 22 (22, 9); Dunlin, 6 (6, 2); Red Phalarope, 5 (5, 2); N. Phalarope 5; Arctic Loon, (3, 1); Stilt Sandpiper, 3; White-fronted Goose, 2; Willow Ptarmigan, 2; Am. Golden Plover, 1; Black-bellied Plover, 1; Long-billed Dowitcher, 1. **Total:** 13 species; 126 territorial males or females (126/km², 51/100 acres). **Visitors:** Whistling Swan, Canada Goose, Brant, Pintail, Oldsquaw, King Eider, Golden Eagle, Marsh Hawk, Peregrine Falcon, Hudsonian Godwit, Bar-tailed Godwit, Ruddy Turnstone, Buff-breasted Sandpiper, Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Glaucous Gull, Sabine's Gull, Arctic Tern, Snowy Owl, Short-eared Owl, Com Raven, Yellow Wagtail, Hoary Redpoll, Snow Bunting. **Remarks:** The objective of the study is to evaluate the ecological consequences of the Trans Alaska pipeline specifically looking at the effects on the birds and small mammals. Approximately 4 ha of habitat was lost to the site that the pipeline, pad, and access road occupied. Early in the breeding season another 14 ha of habitat was unavailable to the nesting birds because of the accumulation of snow and water from the "snow fence effect" of the elevation portion of pipeline. However, late in the season the wet areas adjacent to the pipeline pad became an important feeding area for adults and young. Observations were made of movements up to 1 km of family groups moving their young to

these wet areas. Of the 121 nests, re-nests, and probable nests on the plot, 42 (35%) successfully fledged young. The principal predators were: Arctic fox, Parasitic Jaegers, Long-tailed Jaegers, and probably Glaucous Gulls and Com. Ravens. On two occasions a Parasitic Jaeger was observed capturing and killing juvenile shorebirds. Nests located (number hatched successfully in parentheses): Lapland Longspur, 39 (6), 12 re-nested (5); Pectoral Sandpiper, 28 (7); Semipalmated Sandpiper, 20 (11); Dunlin, 5 (3), 2 re-nested (1); Red Phalarope, 4 (2); N. Phalarope, 3 (1); Arctic Loon 3 (3); White-fronted Goose 2 (2); Stilt Sandpiper 2 (2). This work is part of a long-term ecological study on the impacts of north slope petroleum resource development funded through D.O.E. Contract EY-76-C-06-1830 to Battelle Laboratory. — CRAIG J. HOHENBERGER, ANNE HENDRICK, WAYNE C. HANSON, *Ecological Science Dept., Battelle Pacific Northwest Laboratory, Richland, Wash. 99352.*

The Impact of Forest Cutting on Boreal Bird Populations

Each year almost one half million acres of the boreal forest of Ontario are cut. As part of its Migratory Birds Programme the Ontario Region of the Canadian Wildlife Service is studying the effect of forest harvesting practices on migratory bird populations. The following 22 censuses are part of that study. The study area, Mildred Township, is a privately owned 9 × 9 mile township on the northern edge of the Precambrian Shield within the Chapeau Crown Game Preserve. It is about 105 km south of Hearst, Ontario in the Missinaibi-Cabonga Section (B-7) of the Boreal Forest (Rowe, J.S., *Forest Regions of Canada*, Canadian Forestry Service, Ottawa, 1977) and is characterized by gently to sharply rolling terrain with generally shallow till overburden and some alluvial deposits in major river and lake basins. Most uplands forests are mixedwoods of Black Spruce (*Picea mariana*), White Spruce (*Picea glauca*), Balsam Fir (*Abies balsamea*), White Birch (*Betula papyrifera*) and Quaking Aspen (*Populus tremuloides*). The lowlands are dominated by Black Spruce and Larch (*Larix laricina*). Jack Pine (*Pinus banksiana*) is common on better drained fine-textured sediments. In Mildred Township, upland forests are all older than 200 years and are a particularly rich example of the mixedwood type. Forest cutting began there in 1953 and the area provides a good chronosequence of cutting history up to the present. The census plots are representative of both upland and lowland sites and span early successional stages from 3 years to 24 years as well as

uncut forest. The intensity of cutting varies from selective logging of mature conifers to total clearcutting. A cooperative study of vegetative succession and tree regeneration by Canadian Wildlife Service and Canadian Forestry Service provided much of the vegetation data for these reports. In addition to the effect of cutting, all the forests within the area are now subject to severe defoliation of Balsam Fir and White Spruce by Spruce Budworm (*Choristaneura fumiferana*). The present 12-year old outbreak in Ontario has resulted in moderate to severe defoliation of Balsam Fir over an area of 150,000/km². (57,900 mi²) (Howse G. M., A. A. Hearndon, 1978 Spruce Budworm Situation in Ontario, Canadian Forestry Service, Sault Ste. Marie, 1979). The Mildred Breeding Bird plots demonstrate that the combination of high density Spruce Budworm populations with complex early seral vegetation structure can result in an exceptionally rich and abundant avifauna. To facilitate comparison of these censuses with others, some of our vegetation data from other studies was reworked to parallel as closely as we could the results from James and Shugart procedures. Our density estimates are derived from a modified distance procedure (Batcheler, C.L., 1973, Proc. New Zealand Ecological Society, 20: 131-147.) and consequently there are no frequency measurements. In all cases the basal area estimates for whole site, species, and diameter class 6, should be considered minimal because of an averaging procedure we used that minimizes the contribution from size class 6 (trees >10 in dbh). The estimates are included because we felt the minimum values would be preferable to none. The canopy closure estimates are based on 40 readings in each stand with a spherical densiometer (Lemmon P.F., 1956, A special densiometer for estimating forest overstorey density. *Forest Science*, 2: 314-320). Our cover estimates were made by species, not life form, hence the cover value for tree species includes all sizes, not only fully grown trees. Our census interpretation procedure generally follows the International Standard, except for grouse and woodpeckers, for which we also allow two records within the first 4 censuses to count as a territory. We have used "visitor" in the usual way to include species that regularly visited our plots and were thought to breed in adjacent similar habitat and also for those species regularly singing on the plot but

with insufficient cues to allow them to be counted as territorial. Following standard interpretation procedures we regularly lose 5-20 species per census plot in Mildred Township. The problem appears to result from infrequent singing by some less common species on high bird density plots as well as the probability that we missed cues because of the din caused by so many singing birds. Two plot shapes were utilized (except plots 177 and 183 - see plot descriptions) both covering 9 ha. (22.24 acres). The most frequently used was a 300 m × 300 m square, the other was an elongated plot composed of two 100 m = wide rows side by side with one row of 400 m and the other 500 m long. The study required about 200 man-days, including days lost to inclement weather, in the field of which 50 were required to lay out the plots and 150 to conduct the censuses. We acknowledge the assistance and kindness of the landowner, Newaygo Timber Co. Ltd., Mead, Ontario, and particularly Mr. N. F. Melnychuk, Woodlands Manager, and many other company staff. Without their assistance the study would have been impossible. Dr. A. J. Erskine independently analyzed a duplicate data set for several of the high density species and achieved results similar to ours; we appreciate his assistance. Most of the bird census mapping was conducted by Donald R. Fillman, Sue Ellen Fast, and Peter W. Fournier, Rip Fletcher and Frank Brazeau helped set out the plots. Sue Ellen Fast helped with the preliminary interpretation of the maps. Ann Macaulay assisted with many phases of the study from plot layout and vegetation survey through assistance in the compilation of the final results. The field work was completed while both authors were based at Great Lakes Forest Research Centre in Sault Ste. Marie, Ontario. DANIEL A WELSH, DONALD R. FILLMAN, Canadian Wildlife Service, Ontario Region, 1725 Woodward Drive, Ottawa, Ontario K1G 3Z7, Canada.

162. BOREAL MIXEDWOOD-24-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°46'N, 83°56'W; NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A mixed-aged stand of White Birch (*Betula papyrifera*), Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*), Black Spruce (*P. mariana*) and Quaking Aspen (*Populus tremuloides*). The original 200 year-old overmature forest was selectively logged in

1954 for large spruce with additional removal of some good quality White Birch and Quaking Aspen. The development of pre-cut advanced growth and subsequent regeneration has resulted in an almost continuous canopy from ground to 10 m with scattered 15-254 m old growth towering above. The ground cover is dominated by large-leaf Aster (*Aster macrophyllus*), Bluebead Lily (*Clintonia borealis*), False Lily-of-the-valley (*Maianthemum canadense*), Naked Mitrewort (*Mitella nuda*), Rose Twisted-stalk (*Streptopus roseus*), Barren Strawberry (*Waldsteinia fragaroides*), Bluejoint (*Calamagrostis canadensis*), Feather Moss (*Pleurozium schreberi*), Spinulose Woodfern (*Dryopteris spinulosa*), and club-mosses. Leaf litter and logs cover much of the ground. The lower 3 m is crowded by Mountain Maple (*Acer spicatum*), and Beaked Hazel (*Corylus cornuta*), with occasional clumps of Speckled Alder (*Alnus rugosa*) in small perched drainages. Small amounts of Bush Honeysuckle (*Diervilla lonicera*), Wild Black Currant (*Ribes hudsonianum*), Red Raspberry (*Rubus strigosus*), and Blueberry (*Vaccinium angustifolium*) also occur. Regeneration of tree species is dominated by Balsam Fir with some spruce and White Birch. A quantitative survey of the tree species gave: Trees >4 in. dbh; 138 stems/acre, total basal area 38.6 ft²/acre. Species comprising arboreal class White Birch, 49, 35, 44; Balsam Fir, 42, 30, 31; White Spruce, 30, 22, 16; Black Spruce, 13, 10, 5; Quaking Aspen, 4, 3, 4. Trees by diameter class: 3 (4-6 in. dbh), 73, 53, 10, 0, 26; 4 (6-8 in. dbh), 26, 19, 6, 9, 18; 5 (8-10 in. dbh), 18, 13, 8, 1, 21; 6 (>10 in. dbh), 21, 15, 13, 5, 35. Shrub stems/acre (shrub species >20 in. ht.), 5742; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1127; small tree stems/acre (1 in. to 4 in. dbh), 797. Total vegetation cover, 83%; ground cover (excluding trees and shrubs), 39%; low shrub cover, 3%; tall shrubs cover, 29%; tree cover, 12% (Balsam Fir 9%, White Birch 2%, Black Spruce 1%); canopy closure, 98%. **Edge:** Bordered on all sides by similar habitat for several hundred metres. **Topography:** Relatively flat upperslope and crest of long (3 km) N-S ridge of 1 km width. Terrain drops abruptly about 150 m W of plot. **Elevation:** 1350 ft, ca. 150 ft above local lowland. **Weather:** Varying 4-27°C, clear to overcast except light rain for less than half of one survey, fog one day, winds nil to light. **Coverage:** 1978; May 30; June 5, 12, 18, 23, 28, July 9, 12; between 0500-1130 hrs. EDT. Total man-hours: 22.5. **Census:** Magnolia Warbler, 8.5 (94, 38); Swainson's Thrush, 7 (78, 31); Red-eyed Vireo, 6.5 (72, 29); Black-and-white Warbler, 6.5; Tennessee Warbler, 6.5, Black-throated Green Warbler, 6 (67, 27); Ovenbird, 6; Blackburnian Warbler, 4.5 (50, 20), Bay-breasted Warbler, 3 (33, 13); Canada Warbler 3; Cape May Warbler, 2.5; Yellow-bellied Sapsucker, 2; Chestnut-sided Warbler, 2; White-throated Sparrow, 2; Ruffed Grouse, 1.5; Black-capped Chickadee, 1.5; Winter Wren, 1; Philadelphia Vireo, 1; Nashville Warbler, 1; Black-throated Blue Warbler, 1; Yellow-rumped Warbler, 1; Least Flycatcher, 0.5; Spruce Grouse, +. **Total:** 23 species, 74.5 territorial males or females (828/km², 335/100 acres). **Visitors:** Yellow-bellied Flycatcher, Alder Flycatcher, Blue Jay, Ruby-crowned Kinglet, Solitary Vireo, N. Waterthrush, Mourning Warbler, Scarlet Tanager, Rose-breasted Grosbeak, Evening Grosbeak,

Purple Finch, Pine Siskin, Dark-eyed Junco **Remarks:** A severe Spruce Budworm (*Choristoneura fumiferana*) infestation has resulted in extensive total defoliation of many Balsam Fir and White Spruce. A survey of Balsam Fir of all sizes showed 49 of 54 trees with >95% removal of current year's growth. A ♀ Ruffed Grouse with 5 young was present in late June.

163. BOREAL CONIFER-24-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°46'N, 83°57'W; NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A slightly rolling shallow-soil lowland site of rapidly changing moisture regimes. The dry ridge areas are principally Black Spruce (*Picea mariana*) and Jack Pine (*Pinus banksiana*) with occasional White Birch (*Betula papyrifera*) and Quaking Aspen (*Populus tremuloides*) and some lichen-covered bedrock openings. The valleys are dominated by Black Spruce and *Sphagnum* mosses with occasional small (10-200 m²) ponds. The original stand of Black Spruce (85%), Jack Pine (5%), Balsam Fir (*Abies balsamea*) (4%), Quaking Aspen (3%) and White Birch (3%) was clearcut in 1954 and almost all mature conifers were removed leaving only scattered patches of Black Spruce and Balsam Fir advanced growth and uncut deciduous trees. The ground cover is classic dry boreal Black Spruce type with Feather Moss (*Pleurozium schreberi*), Broom Moss (*Dicranium* sp.), Hair-cap Moss (*Polytrichum commune*), Bunchberry (*Cornus canadensis*), and Reindeer Lichens, particularly *Cladonia mitis*, and *C. rangiferina*. The low shrub strata is dominated by Blueberry (*Vaccinium angustifolium* and *V. myrtilloides*), Labrador Tea (*Ledum groenlandicum*) and Trailing Arbutus (*Epigaea repens*). The scattered tall shrubs component is predominantly Juneberry (*Amelanchier* spp.), Pin Cherry (*Prunus pensylvanica*), willows (*Salix* spp.) and Mountain Ash (*Sorbus* spp.) with very occasional dense clumps of Speckled Alder (*Alnus rugosa*). Tree regeneration is mostly Black Spruce, Balsam Fir, Quaking Aspen, and White Birch. A quantitative survey of the trees species gave: Trees > 4 in. dbh; 77 stems/acre, total basal area 14.7 ft²/acre. Species comprising the arboreal class: Black Spruce, 26, 34, 30; Balsam Fir, 23, 30, 26; Jack Pine, 15, 20, 22; Quaking Aspen, 7, 10, 13; White Birch, 5, 6, 9. Trees by diameter Class: 3 (4-6 in. dbh), 60, 78, 8.3, 56; 4 (6-8 in. dbh), 10, 13, 2.7, 18, 5 (8-10 in. dbh), 4, 6, 1.9, 13; 6 (>10 in. dbh), 3, 4, 1.9, 13. Shrub stems/acre (shrub species >20 in. ht.), 2541; Sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 789; small trees /acre (1 in. to 4 in. dbh), 312. Total vegetative cover, 86%; ground cover excluding trees and shrubs, 31%; low shrub cover, 40%; tall shrubs cover, 3%; tree cover, 12% (Black Spruce 7%, Quaking Aspen 3%, Balsam Fir 1%, White Birch 1%); canopy closure, 56%. **Edge:** Surrounded on all sides by similar vegetation; abandoned logging road 175 m S of plot. **Topography:** Relatively flat with undulating local relief of ± 5 m. Lands slopes very gradually to the west. **Elevation:** 1250 ft; almost lowest land within immediate area. **Weather:** Varying-2-27°C; clear to overcast on all days; light snow for part of June 13 survey, winds nil to light except windy for last

half of one survey **Coverage:** 1978 May 30, June 4, 13, 16, 23, 27, July 6, 9, between 0500-0900 hours, EDT. Total man-hours: 19. **Census:** Tennessee Warbler, 44 (489, 198), Magnolia Warbler, 15 (167, 67); White-throated Sparrow, 11.5 (128, 52); Cape May Warbler, 10.5 (117, 47); Nashville Warbler, 7 (78, 31); Swainson's Thrush, 6 (67, 27); Least Flycatcher, 5.5 (61, 25); Hermit Thrush, 5.5, Bay-breasted Warbler, 5.5; Black-and-white Warbler, 4.5 (50, 20); Red-eyed Vireo, 4 (44, 18); N. Waterthrush, 3.5 (39, 16); Blackburnian Warbler, 3 (33, 13); Yellow-bellied Sapsucker, 2.5; Dark-eyed Junco, 2.5; Am Robin, 1.5; Yellow-bellied Flycatcher, 1; Solitary Vireo, 1; Am. Redstart, 1; Purple Finch, 1; Alder Flycatcher, 0.5. **Total:** 21 species, 136.5 territorial males or females (1517/km², 614/100 acres). **Visitors:** Com. Nighthawk, Com. Flicker, Pileated Woodpecker, Downy Woodpecker, Blue Jay, Boreal Chickadee, Winter Wren, Veery, Ruby-crowned Kinglet, Cedar Waxwing, N. Parula, Yellow-rumped Warbler, Chestnut-sided Warbler, Mourning Warbler, Canada Warbler, Rose-breasted Grosbeak, Evening Grosbeak, Chipping Sparrow **Remarks:** A Com. Merganser nest with 11 eggs was found. Spruce budworm infestation was extreme with all Balsam Fir experiencing >95% removal of current years growth.

164. BOREAL MIXEDWOOD-19-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°45'N, 83°55'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A White Birch (*Betula papyrifera*) dominated flat hilltop of uneven age composition with dense understory vegetation. The original overmature stand of White Birch (45%), Balsam Fir (*Abies balsamea*) (19%), White Spruce (*Picea glauca*) (18%), and Quaking Aspen (*Populus tremuloides*) (17%) was selectively cut for large spruce in 1959. Steep terrain prevented removal of all but quality logs and the residual stand is still quite heavily stocked. Much of the birch has suffered top die-back and large dead or moribund trees are frequent. The dense tall shrub layer has greatly impeded regeneration of tree species. In general there is very dense continuous vegetation from ground to 5 m with overdispersed mature trees extending to 15 m. The ground cover is dominated by Large-leaf Aster (*Aster macrophyllus*), Lady Fern (*Athyrium filix-femina*), Bristly Clubmoss (*Lycopodium annotinum*), Ground Pine (*L. obscurum*), and Bluebead Lily (*Clintonia borealis*) with significant cover of Wild Sarsaparilla (*Aralia nudicaulis*). Bunchberry (*Cornus canadensis*) and Starflower (*Trientalis borealis*). The low shrub layer is predominantly Red Raspberry (*Rubus strigosus*) with some Bush Honeysuckle (*Diervilla lonicera*). Mountain Maple (*Acer spicatum*) co-dominates the shrub layer with Beaked Hazel (*Corylus cornuta*) and scattered Mountain Ash (*Sorbus* spp.). Tree regeneration is predominantly White Birch, Balsam Fir, and Quaking Aspen. A quantitative survey of the tree species gave: Trees >4 in. dbh; 94 stems/acre, total basal area 41.1 ft²/acre. Species comprising arboreal class; White Birch, 44, 47, 49; White Spruce, 28, 30, 24; Balsam Fir, 15, 16, 13; Quaking Aspen, 7, 7, 13. Trees by diam-

eter class, 3 (4-6 in dbh), 19, 20, 2.5, 6, 4 (6-8 in dbh), 19, 19, 4.9, 12, 5 (8-10 in dbh), 17, 18, 7.4, 18; 6 (>10 in dbh), 39, 42, 25.9, 64. Shrub stems/acre (shrub species >20 in. ht.), 4901; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 654; small tree stems/acre (tree species 1 in. to 4 in. dbh), 403. Total vegetation cover, 157%; ground cover excluding trees and shrubs, 68%; low shrub cover, 11%; tall shrub cover, 40%; tree cover, 38% (White Birch 24%, White Spruce 7%, Balsam Fir 5%, and Quaking Aspen 2%); canopy closure, 91%. **Edge:** Surrounded on all sides by similar vegetation for 200 m, except to the SE where the land abruptly drops to a road at 45° to the axis of the plot. The low area is mostly White Cedar (*Thuja occidentalis*) with grasses and Cat-tails (*Typha latifolia*) in open areas. **Topography:** Relatively flat hill top dropping moderately to the NE beyond the boundary and abruptly to a small valley SE of the plot. **Elevation:** 1375 ft; ca. 150 ft above local lowland. **Weather:** Varying 8-22°C; generally clear except light rain on second survey; winds nil to light except heavy gusts on latter half of July 12 census. **Coverage:** 1978; May 25; June 2, 13, 18, 27, 29; July 12, 14; between 0500-1115 hrs., EDT. Total man-hours: 22. **Census:** Black-throated Green Warbler, 19.5 (217, 88); Black-throated Blue Warbler, 11.5 (128, 52); Red-eyed Vireo, 9 (100, 40); Magnolia Warbler, 9; Chestnut-sided Warbler, 6.5 (72, 29); Ovenbird, 6.5; Black-and-white Warbler, 4.5 (50, 20); Tennessee Warbler, 4 (44, 18); Mourning Warbler, 4; Swainson's Thrush, 3.5 (39, 16); Blackburnian Warbler, 3; Ruffed Grouse, 3 (33, 13); Cape May Warbler, 2; Canada Warbler, 1.5; Yellow-bellied Sapsucker, 1; Black-capped Chickadee, 1; Veery, 1; Nashville Warbler, 1; N. Parula, 1; Scarlet Tanager, 1; Purple Finch, +. **Total:** 21 species; 94 territorial males or females (1044/km², 423/100 acres). **Visitors:** Hairy Woodpecker, Downy Woodpecker, Alder Flycatcher, Least Flycatcher, Blue Jay, Red-breasted Nuthatch, Am. Robin, Cedar Waxwing, Philadelphia Vireo, Yellow-rumped Warbler, Bay-breasted Warbler, N. Waterthrush, Rose-breasted Grosbeak, Evening Grosbeak, Dark-eyed Junco, White-throated Sparrow, Lincoln's Sparrow. **Remarks:** A Ruffed Grouse hen with 4 chicks was present. The combination of a heavy shrub layer released after selective cutting and a number of tall White Spruce and deciduous tree residuals provides good habitat for both Black-throated Green Warblers and Black-throated Blue Warblers. The high number of the latter species is uncommon in the area. The co-occurrence of several other species not usually found together in abundance can also be attributed to the mix of selectively cut patches, uncut clumps and dense understory.

165. BOREAL MIXEDWOOD-19-YEAR-OLD LOWER SLOPE CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°45' N, 83°54' W, NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (elongate type with a 50 m flagged grid, set up with chain and compass). **Description of Plot:** A rich and diverse ecotonal area between Black Spruce (*Picea mariana*) lowland and mixedwood upland. A moderately decreasing moisture gradient from W to E is apparent in a gradual change from Black Spruce and open-grown large Speckled Alder

(*Alnus rugosa*) and Pussy Willow (*Salix discolor*) to a mixture of Balsam Fir (*Abies balsamea*) and Balsam Poplar (*Populus balsamifera*) and eventually White Spruce (*Picea glauca*) and Quaking Aspen (*Populus tremuloides*). The original stand of Balsam Poplar (25%), spruce (24%), Balsam Fir (20%), Quaking Aspen (17%), and White Birch (14%) was selectively cutover in 1959 with all merchantable White Spruce and some Black Spruce being removed while still leaving the area well wooded. Opening of the stand associated with cutting has resulted in an extremely dense shrub and sapling layer of two strata; an almost solid layer from 0 to 2 m and a sparser layer from 2 to 5 m. The shrub and sapling layers are overtopped by a more open third layer of trees. In addition to abundant leaf litter there is an exceptionally diverse ground cover of which the major components are Wood Anemone (*Anemone quinquefolia*), Goldthread (*Coptis groenlandicum*), Bunchberry (*Cornus canadensis*), False Lily-of-the-valley (*Maianthemum canadensis*), Starflower (*Trientalis borealis*), violets (*Viola* spp.), Bluejoint (*Calamagrostis canadensis*), Reindeer Lichen (*Cladonia rangiferina*), *Sphagnum* mosses, Oak Fern (*Dryopteris disjuncta*), Spinulose Woodfern (*D. spinulosa*), and *Carex vaginata*. The low shrub layer is also diverse containing Red Osier Dogwood (*Cornus stolonifera*), Creeping Snowberry (*Gaultheria hispida*), Labrador Tea (*Ledum groenlandicum*), Buckthorn (*Rhamnus alnifolia*), Swamp Red Currant (*Ribes triste*), Prickly Rose (*Rosa acicularis*), Dwarf Blackberry (*Rubus pubescens*), Red Raspberry (*R. strigosus*) and Blueberry (*Vaccinium myrtilloides*). Tree regeneration is mostly Balsam Fir with small numbers of Black Spruce, White Spruce, and Quaking Aspen. A quantitative survey of the tree species gave: Trees >4 in. dbh; 155 stems/acre, total basal area 40.0 ft²/acre. Species composing the tree class: Black Spruce, 48, 31, 24; Balsam Fir, 44, 28, 18; White Birch, 39, 25, 21; Quaking Aspen, 19, 12, 27; Balsam Poplar, 4, 2, 7; White Spruce, 2, 2, 3. Trees by diameter class: 3 (4-6 in. dbh), 96, 61, 12.8, 32; 4 (6-8 in. dbh), 27, 17, 7.2, 18; 5 (8-10 in. dbh), 9, 6, 3.6, 10; 6 (>10 in. dbh), 24, 16, 16.0, 40. Shrub stems/acre (shrub species >20 in. ht.), 6896; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 3703; small tree stems/acre (tree species 1 in. to 4 in. dbh), 1611. Total vegetative cover, 138%; ground cover excluding trees and shrubs, 41%; low shrub cover, 23%; tall shrub cover 20%; tree cover, 54% (Balsam Fir 35%, White Birch 8%, Black Spruce 9%, Quaking Aspen 2%); canopy closure, 80%. **Edge:** Black Spruce lowland bog to N and W, similar but dryer vegetation to E for 150 m, and a large beaver pond and creek 75 m S of the boundary. **Topography:** Relatively flat with local minor depressions, plot rises gradually (1.5m) from its lowest point in NW corner to highest on the E edge. **Elevation:** About 1190 ft. **Weather:** Generally clear with occasional cloud, light intermittent rain on second survey, wind nil to slight except strong on last survey, temperature 0-22°C. **Coverage:** 1978; May 25, 28; June 4, 15, 24; July 7, 9, 11; between 0440-1100, EDT. Total: 20 man-hours. **Census:** Tennessee Warbler, 71.5 (794, 321); Magnolia Warbler, 22.5 (250, 101); White-throated Sparrow, 22 (244, 99); Swainson's Thrush, 14.5 (161, 65); Nashville Warbler, 7 (78, 31); Least Flycatcher, 5.5 (61, 25);

Purple Finch, 5 (56, 22), Hermit Thrush, 4 (44, 18), Cape May Warbler, 3.5 (39, 16), Alder Flycatcher, 3 (33, 13); Chestnut-sided Warbler, 3; Ovenbird, 3; Ruby-crowned Kinglet, 2.5; Yellow-rumped Warbler, 2.5; N. Waterthrush, 2.5; Red-eyed Vireo, 2; Yellow-bellied Sapsucker, 1.5; Spruce Grouse, 1; Boreal Chickadee, 1; Veery, 1; Com. Flicker, 0.5, Black-and-white Warbler, 0.5; Bay-breasted Warbler, 0.5; Com. Yellowthroat, 0.5, Hairy Woodpecker, +; Blue Jay, +. **Total:** 26 species; 180.5 territorial males or females (2005/km², 812/100 acres). **Visitors:** Am. Bittern, Ruffed Grouse, Downy Woodpecker, Yellow-bellied Flycatcher, Olive-sided Flycatcher, Winter Wren, Am. Robin, Cedar Waxwing, Solitary Vireo, Philadelphia Vireo, Black-throated Blue Warbler, Black-throated Green Warbler, Blackburnian Warbler, Mourning Warbler, Wilson's Warbler, Canada Warbler, Red-winged Blackbird, Rusty Blackbird, Scarlet Tanager, Rose-breasted Grosbeak, Pine Grosbeak, Lincoln's Sparrow, Swamp Sparrow. **Remarks:** The rich and abundant avifauna parallels the highly productive and diverse plant community. High Spruce Budworm density; as indicated by the fact that all 54 Balsam Fir of 2-7 in. dbh sampled had at least 75% of current year's growth removed, is undoubtedly a major factor in the high density of Tennessee Warblers and presumably accounts for the presence and high numbers of several other species.

166. BOREAL CONIFER-19-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst, 48°45' N, 83°55' W, NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** Lowland Black Spruce (*Picea mariana*) swamp with scattered bog patches. The present stand of young Black Spruce with scattered E Cedar (*Thuja occidentalis*) and Larch (*Larix laricina*) originated from advance growth and regeneration following clearcutting of the original stand in 1959. Tree growth is in patches interspersed with open bog and heath, Pitcher Plants (*Sarracenia purpurea*) and orchids are common. The ground cover is dominated by *Sphagnum* mosses and Feather Moss (*Pleurozium schreberi*) with Goldthread (*Coptis groenlandicum*), Bunchberry (*Cornus canadensis*), Twinflower (*Linnaea borealis*), Bluejoint (*Calamagrostis canadensis*), violets (*Viola* spp.) and *Carex vaginata* adding significant cover. The low shrub layer of Leatherleaf (*Chamaedaphne calyculata*), Creeping Snowberry (*Gaultheria hispida*), Swamp Laurel (*Kalmia polifolia*), Labrador Tea (*Ledum groenlandicum*), Dwarf Blackberry (*Rubus pubescens*), and Small Cranberry (*Vaccinium oxycoccus*) dominates the vegetation. The tall shrub layer is principally Glandular Birch (*Betula glandulosa*) with scattered willows (*Salix* spp.) and Speckled Alder (*Alnus rugosa*). Tree regeneration is mostly Black Spruce with a few Balsam Fir (*Abies balsamea*), Larch and cedar. A quantitative survey of trees >4 in. diam. was impractical due to their very low density. A plot count (36 mil acre plots) indicated about 28 stems/acre with a high error estimate. Most are in size class 3 (4-6 in. dbh). Shrub stems/acre (shrub species > 20 in. ht.), 9413; saplings stems/acre (tree species 20 in. ht. to 1 in. dbh), 2076; small tree

stems/acre (tree species 1 in to 4 in dbh), 178. Total vegetative cover, 120%, ground cover excluding trees and shrubs, 64%; low shrub cover, 32%; tall shrubs cover, 13%; trees, 11% cover (Black Spruce 10%, Larch 1%); canopy closure, 9%. **Edge:** Surrounded on the W and the N by similar habitat and on the S by an only partially cutover cedar and Black Spruce swamp; edge abuts Census 165. **Topography:** Flat. **Elevation:** About 1185 ft; lowest land in immediate area. **Weather:** Generally clear except fog on one survey, varying 020°C; winds nil to light except last survey. **Coverage:** 1978: May 25; June 5, 15, 17, 24; July 7, 9, 11; between 0430-1100 hrs, EDT. Total: 20 man-hours. **Census:** Tennessee Warbler, 61 (678, 274), White-throated Sparrow, 23 (256, 103); Com Yellowthroat, 22 (244, 99); Alder Flycatcher, 18 (200, 81); Magnolia Warbler, 12.5 (139, 56), Lincoln's Sparrow, 12 (133, 54); Swainson's Thrush, 6 (67, 27); Nashville Warbler, 4.5 (50, 20); N. Waterthrush, 4 (44, 18); Least Flycatcher 3.5 (39, 16); Yellow-rumped Warbler, 2.5; Hermit Thrush, 2; Ruby-crowned Kinglet, 2; Cape May Warbler, 2; Purple Finch, 1.5, Wilson's Warbler, 1. **Total:** 16 species; 177.5 territorial males and females (1972/km², 798/100 acres). **Visitors:** Yellow-bellied Sapsucker, Hairy Woodpecker, Yellow-bellied Flycatcher, Blue Jay, Boreal Chickadee, Winter Wren, Cedar Waxwing, Solitary Vireo, Red-eyed Vireo, Black-and-white Warbler, Chestnut-sided Warbler, Scarlet Tanager, Rose-breasted Grosbeak, Pine Siskin, Chipping Sparrow, Swamp Sparrow. **Remarks:** One Magnolia Warbler nest found. The bird community is typical of wet boreal lowlands in the area except that the high number of Tennessee Warblers and several other species appears to be a reflection of their success in surrounding lower slope sites.

167. BOREAL MIXEDWOOD-17-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst, 48°47'N, 83°50'W, NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A flat upland crest site totally dominated by dense Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) released by the opening of the stand when it was selectively cut in 1961. The original overmature stand of Quaking Aspen (*Populus tremuloides*) (34%), White Birch (*Betula papyrifera*), (22%), White Spruce (*Picea glauca*) (20%), Jack Pine (*Pinus banksiana*) (11%), Balsam Fir (*Abies balsamea*) (8%), and Black Spruce (*Picea mariana*) (5%) had most of the conifers removed leaving a tall (25 m) open, predominantly deciduous stand with heavy young tree growth in the mid strata and an almost solid lower strata below 5 m. Ground cover is mostly Large-leaf Aster (*Aster macrophyllus*) and Bluebead Lily (*Clintonia borealis*) with Wild Sarsaparilla (*Aralia nudicaulis*), Three-flowered Bedstraw (*Galium triflorum*), Rose Twisted-stalk (*Streptopus roseus*), Wood Reed (*Cinna latifolia*), Interrupted Fern (*Osmunda claytoniana*) and Bracken (*Pteridium aquilinum*). The poorly developed low shrub layer is mostly Red Raspberry (*Rubus strigosus*), with some Dwarf Blackberry (*R. pubescens*) and Bristly Black Currant (*Ribes lacustre*). Tree regeneration is mostly Balsam Fir and White Birch in the sapling state and Quaking Aspen,

White Birch, and Balsam Fir in the small tree strata. A quantitative survey of the vegetation gave: Trees >4 in. diam.; 60 stems/acre, total basal area 27.1 ft²/acre. Species comprising the arboreal class; White Birch, 33, 55, 61; White Spruce, 14, 23, 21; Quaking Aspen, 8, 14, 12; Black Spruce, 4, 7, 4; Balsam Fir, 1, 2, 2. Trees by diameter class: 3 (4-6 in. dbh), 15, 24, 1.9, 7; 4 (6-8 in. dbh), 8, 13, 2.2, 8; 5 (8-10 in. dbh), 8, 14, 3.8, 14; 6 (>10 in. dbh), 29, 49, 19.3, 71. Shrub stems/acre (shrub species >20 in. ht.), 9725; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1603; small tree stems/acre (tree species 1 in. to 4 in. dbh), 356. Total vegetative cover, 144%; ground cover excluding trees and shrubs, 63%; low shrub cover, 10%; tall shrub cover, 43%; and tree cover 28% (Balsam Fir 8%, White Birch 6%, White Spruce 10%, Quaking Aspen 4%); canopy closure, 78%. **Edge:** Surrounded on all sides by similar habitat for several hundred metres. **Topography:** Hilltop with relatively little relief, dropping moderately to E just beyond the plot. **Elevation:** 1300 ft, ca. 150 ft above local lowland. **Weather:** Varying 0-22°C, winds nil to light, clear and sunny on all days except the first which had intermittent rain, sometimes heavy. **Coverage:** 1978: June 4, 10, 15, 19, 27; July 1, 5, 12; between 0450-1130 hrs, EDT. Total: 27.5 man-hours. **Census:** Magnolia Warbler, 11 (122, 49); Chestnut-sided Warbler, 10.5 (117, 47); Red-eyed Vireo, 9.5 (106, 43); Veery, 6.5 (72, 29); Ovenbird, 5.5 (61, 25); Black-and-white Warbler, 4 (44, 18); Black-throated Blue Warbler, 3.5 (39, 16); Am. Redstart, 3.5; Mourning Warbler, 3 (33, 13); Canada Warbler, 3; Ruffed Grouse, 2.5; Tennessee Warbler, 2; Scarlet Tanager, 1.5; Wood Thrush, 1; Blackburnian Warbler, 1; Rose-breasted Grosbeak, 1; Evening Grosbeak, 1; Yellow-bellied Sapsucker, 0.5. **Total:** 18 species; 70.5 territorial males or females (783/km², 317/100 acres). **Visitors:** Downy Woodpecker, Yellow-bellied Flycatcher, Alder Flycatcher, Blue Jay, Red-breasted Nuthatch, Brown Creeper, Swainson's Thrush, Solitary Vireo, Philadelphia Vireo, Warbling Vireo, Nashville Warbler, Cape May Warbler, Yellow-rumped Warbler, Black-throated Green Warbler, Purple Finch, White-throated Sparrow. **Remarks:** This is one of the most densely vegetated plots surveyed. The underbrush reduced visibility to 2 m in most areas. Spruce Budworm has removed much of the current year's growth on half of the Balsam Fir and their larvae undoubtedly contribute somewhat to the richness of the avifauna but proportionately Balsam Fir is not an important species. The structure of the bird community principally reflects the combination of the heavy deciduous shrub layer and a super-imposed arboreal strata. A Rose-breasted Grosbeak and a Magnolia Warbler nest were found.

168. BOREAL MIXEDWOOD-17-YEAR-OLD LOWER SLOPE CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°47'N, 83°49'W, NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (elongate type with a 50 m flagged grid, set up with chain and compass). **Description of Plot:** A predominately coniferous rich lower slope site with high plant diversity. The original site of Black Spruce (*Picea mariana*) (75%) and Balsam Fir (*Abies balsamea*) (18%), with small amounts of several other tree species was almost totally cut in 1961 leaving very

scattered large White Birch (*Betula papyrifera*) and Balsam Poplar (*Populus balsamifera*) with some small patches of Black Spruce advanced growth. The combination of an exceptional degree of disturbance during cutting activities particularly from landings and roads, and the ecotonal position of the site has resulted in a very patchy and immensely rich site. The almost totally closed lower strata below 2 m opens very quickly between 2 to 5 m and there is very little development of an upper strata above 5 m. The ground cover is dominated by Large-leaf Aster (*Aster macrophyllus*), Bluebell (*Mertensia paniculata*), Bluejoint (*Calamagrostis canadensis*), Plum Moss (*Hylacomium splendens*), Feather Moss (*Pleurozium schreberi*), *Carex vaginata*, Com. Horsetail (*Equisetum arvense*) with significant cover of Bunchberry (*Cornus canadensis*), Wild Strawberry (*Fragaria virginiana*), Twinflower (*Linnaea borealis*), Naked Mitrewort (*Mitella nuda*), Black Snakeroot (*Sanicula marilandica*) and Starflower (*Trientalis borealis*). The dense low shrub layer is mostly Meadow Rose (*Rosa blanda*), Swamp Red Currant (*Ribes triste*), Bristly Black Currant (*R. lacustre*), Dwarf Blackberry (*Rubus pubescens*) with some Red Raspberry (*R. strigosus*), Red Osier Dogwood (*Cornus stolonifera*), Hairy Honeysuckle (*Lonicera hirsuta*) and Black Honeysuckle (*L. involucrata*). Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) co-dominate the shrub layer with occasional patches of Speckled Alder (*Alnus rugosa*) and willows (*Salix* spp.). Tree regeneration is dominated by Balsam Fir and Black Spruce with scattered White Spruce, E. Cedar (*Thuja occidentalis*), Larch (*Larix laricina*), White Birch, and Balsam Poplar. A quantitative survey of trees gave: Trees >4 in. dbh; 98 stems/acre, total basal area 26.1 ft²/acre. Species comprising arboreal class; Black Spruce, 52, 53, 30, White Spruce, 13, 14, 12; E. Cedar, 9, 20; Balsam Poplar, 9, 9, 20; Balsam Fir, 8, 8, 9, White Birch, 7, 7, 9. Trees by diameter class: 3 (4-6 in. dbh), 42, 43, 5.5, 21; 4 (6-8 in. dbh), 35, 36, 8.9, 35; 5 (8-10 in. dbh), 7, 7, 2.9, 11; 6 (>10 in. dbh), 14, 14, 8.6, 33. Shrub stems/acre (shrub species >20 in. ht.), 6847; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 2108; small trees stems/acre (tree species 1 in to 4 in. dbh), 688. Total vegetative cover, 203%; ground cover excluding tree and shrub species, 99%; low shrub cover, 47%; tall shrub cover, 25%; and tree species cover, 32% (Balsam Fir 16%, Black Spruce 8%, Balsam Poplar 6%, White Spruce 1%, White Spruce 1%), canopy closure, 66%. **Edge:** Rapidly changing to drier more deciduous upland to W and wetter Black Spruce swamp (Census 169) to the E. Similar vegetation on N and S sides. **Topography:** Gently sloping to the E. **Elevation:** 1200 ft, ca. 5-10 ft above local lowland. **Weather:** Temperature ranged from 2-22°C, winds nil to light, light rain on part of first survey. **Coverage:** 1978: May 29; June 5, 10, 14, 28; July 1; between 0500-1045 hrs, EDT. Total: 20 man-hours. **Census:** Tennessee Warbler, 55.5 (617, 250); White-throated Sparrow, 19 (211, 85); Nashville Warbler, 18.5 (206, 83); Magnolia Warbler, 16 (178, 72); Swainson's Thrush, 5 (56, 22); Least Flycatcher, 4 (44, 18); Winter Wren, 4; Chestnut-sided Warbler, 3.5 (39, 16); Purple Finch, 3.5; Cape May Warbler, 3 (33, 13); Black-and-white Warbler, 2, Yellow-rumped Warbler, 2; Alder Flycatcher, 1.5; Red-eyed Vireo, 1.5; Mourning Warbler,

15. Com. Flicker, 1, Yellow-bellied Sapsucker, 1, Yellow-bellied Flycatcher, 1, Ruby-crowned Kinglet, 1; Hermit Thrush, 0.5. **Total:** 20 species; 145 territorial males or females (1611/km², 652/100 acres). **Visitors:** Spruce Grouse, Gray Jay, Blue Jay, Am. Robin, Wood Thrush, Veery, Orange-crowned Warbler, Black-throated Blue Warbler, Bay-breasted Warbler, Ovenbird, N. Waterthrush, Com. Yellowthroat, Canada Warbler, Am. Redstart, Rose-breasted Grosbeak, Evening Grosbeak, Lincoln's Sparrow. **Remarks:** One of the most striking aspects of this site is the extensive Balsam Fir regeneration which seems present almost everywhere. After a slow start in May and early June the Spruce Budworm quickly devastated all dense regenerating stands. Of 196 Balsam Fir trees sampled from 2.5 to 20 cm dbh, 191 had more than 95% of their current year's growth removed and a large percentage were totally defoliated. The high number of individuals and species is due to the combination of complex habitat and Spruce Budworm. Nests found include White-throated Sparrow and Com. Merganser.

169. BOREAL CONIFER-17-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°47'N, 83°49'W, NTS map 42B/13, Minnipuka. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A flat lowland valley with a small creek through the centre and open water (100 m²) above a beaver dam at the bottom (E) end. The original Black Spruce (*Picea mariana*) stand has been replaced, following clearcutting, by dense Speckled Alder (*Alnus rugosa*) with only scattered regenerating trees except along the drainage way where a string of small Larch (*Larix laricina*) parallels the creek. The vegetation is almost totally closed below 2 m but thins rapidly with only scattered growth above 5 m. The ground cover is mostly *Sphagnum* mosses and Bluejoint (*Calamagrostis canadensis*) reflecting respectively the original site type and the disturbance due to cutting. Additional important species are Naked Mitrewort (*Mitella nuda*), Three-leafed Solomon's Seal (*Smilacina trifolia*), Twinflower (*Linnaea borealis*), Feather Moss (*Pleurozium schreberi*), Hair-cap Moss (*Polytrichum juniperum*), and Two-seeded Sedge (*Carex disperma*). The rich low shrub layer is mostly Labrador Tea (*Ledum groenlandicum*) and Red Raspberry (*Rubus strigosus*) with Red Osier Dogwood (*Cornus stolonifera*), Creeping Snowberry (*Gaultheria hispida*), Bush Honeysuckle (*Diervilla lonicera*), Bristly Black Currant (*Ribes lacustre*), Swamp Red Currant (*R. triste*), Meadow Rose (*Rosa blanda*), Prickly Rose (*R. acicularis*), Dwarf Blackberry (*Rubus pubescens*) and Blueberry (*Vaccinium angustifolium*). The tall shrub layer is almost totally Speckled Alder with occasional clumps of willow (*Salix* spp.). The limited tree regeneration is mostly Black Spruce with some balsam fir (*Abies balsamea*), Larch and E. Cedar (*Thuja occidentalis*). A quantitative survey of trees gave: Trees >4 in. dbh; 110 stems/acre, total basal area 22.5 ft²/acre. Species comprising the arboreal class; Larch, 50, 45, 20; Balsam Fir, 25, 23, 27; Black Spruce, 21, 19, 32; E. Cedar, 12, 11, 21; Balsam Poplar (*Populus balsamifera*), 2, 0.3, 1. Trees by diameter class; 3 (4-6 in dbh), 70, 64, 9.7, 4.3; 4 (6-8 in.

dbh), 30, 27, 7.9, 3.5, 5 (8-10 in dbh), 8, 7, 3.4, 1.5, 6 (>10 in. dbh), 2, 2, 1.6, 7. Shrub stems/acre (shrub species >20 in. ht.), 7644; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1209; small tree stems/acre (tree species 1 in. to 4 in. dbh), 194. Total vegetative cover, 157%; ground cover excluding tree and shrub species, 72%; low shrubs cover, 42%; tall shrubs, 27%; and tree species, 16% (Black Spruce 8%, Larch 3%, Cedar 3%, Balsam Fir 2%); canopy closure, 40%. **Edge:** Surrounded on N and S by similar habitat for at least 500 m. Abuts Plot 168 to W and very similar habitat to the E. **Topography:** Essentially flat. **Elevation:** Approximately 1190 ft; lowest land in immediate area. **Weather:** Temperature ranged from -2-22°C, winds nil to light with rain on part of 2 surveys. **Coverage:** 1978: May 29; June 5, 15, 18, 28; July 2, 4-5; between 0500-1200 hrs, EDT. Total: 19 man-hours. **Census:** Tennessee Warbler, 25.5 (283, 115); White-throated Sparrow, 24 (267, 108); Magnolia Warbler, 7.5 (83, 34); Nashville Warbler, 6 (67, 27); Cape May Warbler, 6; Least Flycatcher, 4 (44, 18); Alder Flycatcher, 3.5 (39, 16); Purple Finch, 3 (33, 13); Hermit Thrush, 2.5; Lincoln's Sparrow, 2.5; Wilson's Warbler, 2; Swainson's Thrush, 1.5; Yellow-bellied Flycatcher, 1; Winter Wren, 1; Ruby-crowned Kinglet, 1; Yellow-rumped Warbler, 1; Com. Yellowthroat, 0.5; Swamp Sparrow, 0.5. **Total:** 18 species; 93 territorial males or females (1033/km², 418/100 acres). **Visitors:** Com. Snipe, Black-billed Cuckoo, Cedar Waxwing, Black-throated Green Warbler, Palm Warbler, N. Waterthrush, Mourning Warbler, Le Conte's Sparrow. **Remarks:** The less complex vegetation of this Speckled Alder-Black Spruce lowland in comparison to the adjacent lower slope is dramatically reflected in the reduced abundance and richness of the avifauna. Although Balsam Fir is not common it has still suffered serious defoliation (of 86 trees from 5 to 20 cm dbh 79 had >95% removal of current year's growth).

170. BOREAL MIXEDWOOD - 13 YEAR OLD UPLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°44'N, 83°52'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A White Birch (*Betula papyrifera*) and Balsam Poplar (*Populus balsamifera*) dominated upland cutover with dense Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) understory. All mature conifer was removed from the original stand of White Spruce (*Picea glauca*) (33%), White Birch (24%), Balsam Fir (*Abies balsamea*) (22%), and Balsam Poplar (21%) in 1965. Cutting released the already well developed shrub layer resulting in a dense 2 to 5 m lower strata and an open deciduous arboreal layer. The limited tree regeneration is predominantly small trees already established at cutting time with some subsequent seeding-in of White Spruce and Balsam Fir in the clearings around blowdowns. The ground cover is dominated by Large Leaf Aster (*Aster macrophyllus*) with significant cover of Three-flowered Bedstraw (*Galium triflorum*), Rose Twisted-stalk (*Streptopus roseus*), Bluejoint (*Calamagrostis canadensis*), Bluebead Lily (*Clintonia borealis*), Wild Sarsaparilla (*Aralia nudicaulis*), and Fireweed (*Epilobium angustifolium*). Red Rasp-

berry (*Rubus strigosus*) and Swamp Red Currant (*Ribes triste*) dominate the sparse low shrub layer. The tall shrub layer is mostly Mountain Maple and Beaked Hazel with frequent clumps of Red Elderberry (*Sambucus opulus*). A quantitative survey of the trees gave: Trees >4 in. dbh; 86 stems/acre, total basal area 42.3 ft²/acre. Species comprising large tree class: White Birch, 35, 41, 46, Balsam Poplar, 32, 37, 35; White Spruce, 17, 22, 19. Trees by diameter class: 3 (4-6 in. dbh), 16, 19, 2.1, 5; 4 (6-8 in. dbh), 13, 15, 3.4, 8; 5 (8-10 in. dbh), 5, 6, 2.1, 6; 6 (>10 in. dbh), 52, 60, 34.3, 81. Shrub stems/acre (shrub species >20 in. ht), 7519; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 482; small tree stems/acre (tree species 1 in. to 4 in. dbh), 728. Total vegetation cover, 123%; ground cover excluding trees and shrubs, 30%; low shrub cover, 21%; tall shrub cover, 47%; and tree cover, 25% (Balsam Poplar 18%, White Birch 4%, Balsam Fir 2%, White Spruce 1%); canopy closure, 99%. **Edge:** Surrounded on all sides by similar habitat except for a logging road cut through the area about 30 m N of the plot. **Topography:** Flat hilltop dropping gradually to the E beyond the boundary. **Elevation:** 1250 ft, ca. 100 ft above local lowland. **Weather:** Temperatures varying from 2-30°C, winds nil to light except moderate on latter half of last survey, mostly clear to slight overcast except intermittent heavy rain on 1 survey. **Coverage:** 1978: May 23; June 2, 14, 19, 25, 28; July 11-12; between 0500-1030 hrs, EDT. Total man-hours: 19.5. **Census:** Black-throated Green Warbler, 18.5 (206, 83); Magnolia Warbler, 16.5 (183, 74); Chestnut-sided Warbler, 15 (167, 67); Red-eyed Vireo, 11 (122, 49); Mourning Warbler, 9 (100, 40); Ovenbird, 8 (89, 36); Black-throated Blue Warbler, 7.5 (83, 34); Yellow-bellied Sapsucker, 3 (33, 13); Blackburnian Warbler, 3; Canada Warbler, 2.5, Veery, 2; Rose-breasted Grosbeak, 2; Ruffed Grouse, 1.5; Tennessee Warbler, 1.5; Least Flycatcher, 1; Swainson's Thrush, 1; Yellow-rumped Warbler, 1; Bay-breasted Warbler, 1, Purple Finch, 1; White-throated Sparrow, 1, Winter Wren, 0.5. **Total:** 21 species; 107.5 territorial males or females (1194/km², 483/100 acres). **Visitors:** Hairy Woodpecker, Downy Woodpecker, Blue Jay, Black-capped Chickadee, Red-breasted Nuthatch, Am. Robin, Hermit Thrush, Solitary Vireo, Philadelphia Vireo, Black-and-white Warbler, Nashville Warbler, N. Parula, Cape May Warbler, N. Waterthrush, Wilson's Warbler, Am. Redstart, Scarlet Tanager, Evening Grosbeak. **Remarks:** Balsam Poplar is a lowland, rich soil species in most of the boreal. Its occurrence on upland sites in Mildred Township is associated with the presence of a well developed, almost impervious hardpan 1 to 2 m below the surface. The Mountain Maple and Beaked Hazel shrub layer is so dense that it forms a totally closed canopy which effectively eliminates tree regeneration. This seems to result in a successional dead end, for at least the foreseeable future. The Black-throated Green Warbler appears to be utilizing the large deciduous trees in a similar manner to spruce on sites where they normally breed. It is likely that they are a residual species from the pre-cut period.

171. BOREAL CONIFER-13-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst,

48°44'N, 83°51'W, NTS map 42B/12, Greenhill River **Continuity:** New **Size:** 9 ha = 22.24 acres (elongate type with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A flat lowland valley originally dominated by Black Spruce (*Picea mariana*) in wetter areas and Jack Pine (*Pinus banksiana*) on slightly drier cross ridges. The original stand (Black Spruce 75%, Jack Pine 25%) was clearcut in 1965 leaving no large trees. The site is presently dominated by Speckled Alder (*Alnus rugosa*) with regenerating Jack Pine on the low ridges. The structure of the stand is a single almost solid stratum to 2 m with only a few stems protruding above the shrub layer. Ground cover is mostly *Sphagnum* mosses and Bluejoint (*Calamagrostis canadensis*), with Naked Mitrewort (*Mitella nuda*), Wood Anemone (*Anemone quinquefolia*), *Mniun* spp., Three-leaved Solomon's Seal (*Smilacina trifolia*), Fireweed (*Epilobium angustifolium*), and *Carex stricta*. The low shrub layer is Labrador Tea (*Ledum groenlandicum*), Red Osier Dogwood (*Cornus stolonifera*), Fly Honeysuckle (*Lonicera villosa*), Smooth Gooseberry (*Ribes hirtellum*), Swamp Red Currant (*R. triste*), Dwarf Blackberry (*Rubus pubescens*), and Red Raspberry (*R. strigosus*). The tall shrub layer is almost totally Speckled Alder with occasional clumps of willow (*Salix* spp.) and a few Juneberry (*Amelanchier* spp.). Tree regeneration is mostly Black Spruce and Balsam Fir (*Abies balsamea*) with some Jack Pine, Larch (*Larix laricina*), E. Cedar (*Thuja occidentalis*), Quaking Aspen (*Populus tremuloides*) and Balsam Poplar (*P. balsamifera*). A quantitative survey of the vegetation showed no large trees. Shrub stems/acre (shrub species >20 in. ht.), 7916; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1093; small tree stems/acre (tree species 1 in. to 4 in. dbh), 380. Total vegetative cover, 131%; ground cover, 61%, low shrubs, 18%; tall shrubs, 47%; and tree species, 5% (Black Spruce 3%, Larch 2%); canopy closure, 38%. **Edge:** Surrounded by similar habitat on all sides except for a cedar swamp close to the edge along the central third of the W side. **Topography:** Relatively flat lowland with minor (0.5 m) raised ridges at right angles to the drainage flow. Land rises gradually to the E and the W. **Elevation:** 1140 ft, lowest land in the immediate area. **Weather:** Varying temperatures from 7-25°C. Clear to moderate overcast except rain for last survey. Winds nil to light except strong gusts on May 31 and July 12. **Coverage:** 1978: May 23, 31; June 14, 17, 19, 25; July 11-12; between 0430-1300 hrs, EDT. Total man-hours: 22. **Census:** Tennessee Warbler, 56 (622, 252); Com. Yellowthroat, 20 (222, 90); White-throated Sparrow, 19 (211, 85); Alder Flycatcher, 18.5 (206, 83); Lincoln's Sparrow, 12 (133, 54); Nashville Warbler, 6 (67, 27); Magnolia Warbler, 6; Swainson's Thrush, 4.5 (50, 20); N. Waterthrush, 4.5; Wilson's Warbler, 4 (44, 18); Yellow-rumped Warbler, 2.5; Least Flycatcher, 2; Purple Finch, 1.5; Am. Bittern, 1; Spruce Grouse, 1; Ruby-crowned Kinglet, 1; Yellow-bellied Flycatcher, 0.5. **Total:** 17 species; 160 territorial males or females (1778/km², 719/100 acres). **Visitors:** Com. Flicker, Yellow-bellied Sapsucker, Blue Jay, Black-capped Chickadee, Boreal Chickadee, Winter Wren, Am Robin, Hermit Thrush, Cedar Waxwing, Red-eyed Vireo, Orange-crowned Warbler, Cape May Warbler, Chestnut-sided Warbler, Mourning Warbler, Am. Redstart, Scarlet

Tanager, Rose-breasted Grosbeak, Chipping Sparrow, Swamp Sparrow **Remarks:** The mixture of Black Spruce and Jack Pine is a common boreal forest association on flat alluvial deposits. In this lowland site with a high water table the Jack Pine occurs only on the better drained ridges. It is notable that none of the regenerating Balsam Fir showed signs of budworm infestation yet the Tennessee Warbler population is almost as high as on dense Spruce Budworm sites. A Spruce Grouse with 8 young was present during the latter half of June.

172. BOREAL MIXEDWOOD-11-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°44'N, 83°53'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A predominantly hardwood hilltop dominated by dense White Birch (*Betula papyrifera*) and Quaking Aspen (*Populus tremuloides*) with patches of Balsam Poplar (*P. balsamifera*) and Black Spruce (*Picea mariana*). Release of understory growth following opening of the canopy by selective cutting of conifers in 1967 has resulted in a dense 3 m high Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) shrub layer. Logging removed about half of the original stand (White Birch 29%, Balsam Fir (*Abies balsamea*) 23%, White Spruce (*Picea glauca*) 22%, Quaking Aspen 9%, Black Spruce 8%) leaving a patchwork of small conifers and large deciduous trees. Tree regeneration parallels the composition of the stand with Quaking Aspen, White Birch, and Balsam Poplar dominating except for heavy recent seeding in of Balsam Fir (10 cm - 50 cm ht.). Ground cover is sparse with a heavy litter layer throughout. The most important species are Bluejoint (*Calamagrostis canadensis*), Large-leaf Aster (*Aster macrophyllus*), Lindley's Aster (*Aster ciliolatus*), and *Carex vaginata* with significant amounts of Three-flowered Bedstraw (*Gallium triflorum*), Wood Anemone (*Anemone quinquefolia*), and Rose Twisted-stalk (*Streptopus roseus*). Red Raspberry (*Rubus strigosus*) patches are the only low shrubs. The tall shrub layer is very dense Mountain Maple and Beaked Hazel with some Choke Cherry (*Prunus virginiana*), Mountain Ash (*Sorbus* spp.) and willow (*Salix* spp.). A quantitative survey of the trees gave: Trees >4 in. dbh; 88 stems/acre, total basal area 42.2 ft²/acre. Species comprising large trees class: White Birch, 32, 36, 42; E. Cedar (*Thuja occidentalis*), 25, 28, 28; Black Spruce, 9, 10, 2; Quaking Aspen, 8, 9, 7; White Spruce, 8, 9, 5; Balsam Poplar, 6, 7, 14. Trees by diameter class: 3 (4-6 in. dbh), 10, 11, 1.4, 3; 4 (6-8 in. dbh), 19, 22, 5.1, 12; 5 (8-10 dbh), 12.6, 14, 5.6, 13; 6 (>10 in. dbh), 46, 52, 30.2, 72. Shrub stems/acre (shrub species >20 in. ht.) 6902; saplings stems/acre (tree species 20 in. ht. to 1 in. dbh), 1050; small tree stems/acre (tree species 1 in. to 4 in. dbh), 425. Total vegetative cover, 132%, including 27% ground cover, 26% low shrubs, 60% tall shrubs and 19% trees (Quaking Aspen 7%, White Birch 4%, E. Cedar 4%, Balsam Fir 3%, Balsam Poplar 1%); canopy closure, 82%. **Edge:** Surrounded on all sides by similar vegetation for 200 m except for a logging cut parallel to and 50 m from the NE edge. **Topography:** An upper-slope and hilltop plot gently sloping to the NW

and dropping more abruptly 150 m beyond the boundary **Elevation:** 1250 ft, and ca 75 ft above local lowland. **Weather:** Temperatures varying from 0-20°C, winds nil to light, clear to slight overcast except light rain on 3 days **Coverage:** 1978: May 23; June 2, 5, 10, 14, 18, 24; July 2; between 0435-1000 hrs, EDT. Total man-hours: 22. **Census:** Chestnut-sided Warbler, 36.5 (406, 164); Red-eyed Vireo, 10 (111, 45); Am. Redstart, 9.5 (106, 43); White-throated Sparrow, 6.5 (72, 29); Veery, 6 (67, 27); Magnolia Warbler, 5.5 (61, 25); Mourning Warbler, 5.5; Yellow-bellied Sapsucker, 4.5 (50, 20); Tennessee Warbler, 4 (44, 18), Black-and-white Warbler, 2.5; Ovenbird, 2.5, Ruffed Grouse, 2; Yellow-bellied Flycatcher, 1.5; Com. Flicker, 1; Alder Flycatcher, 1, Least Flycatcher, 1; Blue Jay, 1; Black-throated Blue Warbler, 1; Black-throated Green Warbler, 1; Canada Warbler, 1; Rose-breasted Grosbeak, 1; Nashville Warbler, 0.5 **Total:** 22 species; 105 territorial males or females (1167/km², 472/100 acres). **Visitors:** Am. Kestrel, Downy Woodpecker, Olive-sided Flycatcher, Black-capped Chickadee, Red-breasted Nuthatch, Winter Wren, Am. Robin, Hermit Thrush, Swainson's Thrush, Ruby-crowned Kinglet, Solitary Vireo, Philadelphia Vireo, Warbling Vireo, N. Parula, Cape May Warbler, Bay-breasted Warbler, Wilson's Warbler, Scarlet Tanager, Evening Grosbeak, Purple Finch, Lincoln's Sparrow. **Remarks:** A very similar site to Census 170 except for the much more patchy and younger vegetation. There is no obvious Spruce Budworm on the site.

173. BOREAL CONIFER-11-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst, 48°44'N, 83°54'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (elongate type, with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A heterogeneous low-slope and lowland site. The original stand (Black Spruce (*Picea mariana*) 80%, Balsam Poplar (*Populus balsamifera*) 12%, and Larch (*Larix laricina*) 8%) had all mature Black Spruce (575 stems/acre) removed in 1967 leaving scattered young conifers and a few large mature Balsam Poplar. Tree regeneration is limited to advance growth clumps of Black Spruce and some Balsam Fir (*Abies balsamea*) that has seeded-in on the drier areas. The site is dominated by Speckled Alder (*Alnus rugosa*) which forms a dense layer to 1 m over much of the site. The diverse ground cover is dominated by *Sphagnum* mosses and Bluejoint (*Calamagrostis canadensis*) with significant cover of Lindley's Aster (*Aster ciliolatus*), Large-leaf Aster (*Aster macrophyllus*), Bunchberry (*Cornus canadensis*), Wild Strawberry (*Fragaria virginiana*), Naked Mitrewort (*Mitella nuda*), Three-leaf Solomon's Seal (*Smilacina trifolia*), violets (*Viola* spp.), Brownish Sedge (*Carex brunescens*), and Com. Horsetail (*Equisetum arvense*). The rich low shrub layer is mostly Red Osier Dogwood (*Cornus stolonifera*) and Labrador Tea (*Ledum groenlandicum*), with Fly Honeysuckle (*Lonicera villosa*), Prickly Rose (*Rosa acicularis*), Red Raspberry (*Rubus strigosus*), Dwarf Blackberry (*R. pubescens*), and Blueberry (*Vaccinium myrtilloides*). The tall shrub layer is Speckled Alder except for scattered clumps of willow (*Salix* spp.). A quantitative survey of the large trees gave

Trees >4 m dbh, 158 stems/acre, total basal area 50.9 ft²/acre. Species comprising tree class: Balsam Poplar, 61, 39, 57; Balsam Fir, 38, 24, 11; Black Spruce, 36, 22, 18; Quaking Aspen (*Populus tremuloides*), 12, 8, 2; White Spruce (*Picea glauca*), 5, 3, 1; E. Cedar (*Thuja occidentalis*), 4, 2, 5; Larch, 2, 1, 5; White Birch (*Betula papyrifera*), 1, 1, 1. Trees by diameter class: 3 (4-6 in. dbh), 73, 46, 10.7, 21; 4 (6-8 in. dbh), 32, 20, 8.6, 17; 5 (8-10 in. dbh), 12, 8, 5.6, 11; 6 (>10 in. dbh), 41, 26, 26.0, 51. Shrub stems/acre (shrub species >20 in. ht.), 10, 182; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1127; small tree stems/acre (tree species 1 in. to 4 in. dbh), 233. Total vegetative cover, 144% of which 50% is ground cover, 38% low shrubs, 44% tall shrubs and 12% tree species (Balsam Fir 4%, Larch 3%, Balsam Poplar 2%, White Birch 1%, Black Spruce 1%, Quaking Aspen 1%); canopy closure, 31%. **Edge:** Similar habitat to the NW and SE, changing gradually to a Balsam Poplar and Quaking Aspen lower slope to the NE and rather quickly to a stag Black Spruce swamp to the SW. **Topography:** Low and flat dropping only slightly (1/1000) to the SW beyond the boundary. **Elevation:** 1175 ft; almost the lowest land in immediate area. **Weather:** Temperatures varying from 6-15°C, clear to 40% overcast except for heavy rain on 1 survey and light rain on 1. Winds nil to light. **Coverage:** 1978: May 23, 31; June 5, 10, 14, 18, 22; July 2; between 0445-1115 hrs, EDT. Total man-hours: 21.5. **Census:** Tennessee Warbler, 19.5 (217, 88); White-throated Sparrow, 16.5 (183, 74); Alder Flycatcher, 12 (133, 54); Com. Yellowthroat, 12; Magnolia Warbler, 9.5 (106, 43); Wilson's Warbler, 7.5 (83, 34); Nashville Warbler, 4.5 (50, 20); Lincoln's Sparrow, 4.5; Swainson's Thrush, 2; Purple Finch, 1.5; Boreal Chickadee, 1; Yellow-rumped Warbler, 1; Veery, 0.5. **Total:** 13 species; 92 territorial males or females (1022/km², 414/100 acres). **Visitors:** Spruce Grouse, Ruffed Grouse, Com. Snipe, Com. Flicker, Yellow-bellied Sapsucker, Yellow-bellied Flycatcher, Least Flycatcher, Red-breasted Nuthatch, Winter Wren, Am. Robin, Ruby-crowned Kinglet, Cedar Waxwing, Red-eyed Vireo, Black-and-white Warbler, N. Parula, Cape May Warbler, Chestnut-sided Warbler, Ovenbird, N. Waterthrush, Mourning Warbler, Am. Redstart, Rusty Blackbird. **Remarks:** There is almost no Spruce Budworm on the site. The preponderance of moist habitat species such as Com. Yellowthroat, Wilson's Warbler, Nashville Warbler, and Lincoln's Sparrow along with Swainson's Thrush, Purple Finch, and Boreal Chickadee reflect the ecotonal position of the site dominated by lowland with an upland influence.

174. BOREAL MIXEDWOOD - 9-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°41'N, 83°54'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A steep White Birch (*Betula papyrifera*) dominated upper slope and crest. The original mature somewhat open stand (White Birch 40%, White Spruce (*Picea glauca*) 30%, Balsam Fir (*Abies balsamea*) 10%, Quaking Aspen (*Populus tremuloides*) 10%, Black Spruce (*Picea mariana*) 10%) was selectively logged for mature conifers in 1969. Further

opening of the canopy by cutting released the dense Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) understory resulting in a tall shrub dominated community. Advance growth clumps of Balsam Fir have also grown well but little regeneration of trees has occurred since cutting except for a few White Birch and Quaking Aspen. The ground cover dominated by Bunchberry (*Cornus canadensis*), Bristly Clubmoss (*Lycopodium annotinum*), Ground Pine (*L. obscurum*) and Blue-bead Lily (*Clintonia borealis*) with some Wild Sarsaparilla (*Aralia nudicaulis*), Large-leaf Aster (*Aster macrophyllus*), Buckwheat (*Polygonum ciliolatus*), Broom Moss (*Dicranum* spp.), and Running Pine (*L. clavatum*) is typical of dry upland ridges. A quantitative survey of trees gave: Trees >4 in. dbh; 89 stems/acre, total basal area 31.4 ft²/acre. Species comprising the large tree class: White Birch, 44, 49, 46; Balsam Fir, 20, 22, 11; Quaking Aspen, 15, 17, 35; White Spruce, 7, 8, 5; Black Spruce, 3, 4, 2. Trees by diameter class: 3 (4-6 in. dbh), 39, 44, 5.3, 17; 4 (6-8 in. dbh), 14, 16, 3.8, 12; 5 (8-10 in. dbh), 7, 8, 3.1, 10; 6 (>10 in. dbh), 29, 32, 19.2, 61. Shrub stems/acre (shrub species >20 in. ht.), 3873; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 797; small tree stems/acre (tree species 1 in. to 4 in. dbh), 356. Total vegetative cover, 131%; ground cover excluding trees and shrubs, 33%; low shrub cover, 30%; tall shrubs cover, 18%; and tree species cover, 50% (Balsam Fir 29%, White Birch 13%, White Spruce 4%, and Quaking Aspen 4%); canopy closure, 61%. **Edge:** Site saddles the crest of a long (2 km) steep N-S ridge. The W and E sides drop abruptly (1 m in 4 to 5 m). **Elevation:** 1350 ft at highest point on site dropping to almost 1200 ft at lowest; about 175 ft above local lowland. **Weather:** Varying temperatures from 1-22°C. Generally clear to light overcast except for light rain on 1 survey. Winds nil to light except strong gusts on 2 days. **Coverage:** 1978: May 28; June 3, 10, 13, 24, 30; July 11, 17; between 0450-1045 hrs, EDT. Total man-hours: 23.5. **Census:** Chestnut-sided Warbler, 24.5 (272, 110); Magnolia Warbler, 17.5 (194, 79); Black-and-white Warbler, 6.5 (72, 29); Red-eyed Vireo, 5.5 (61, 25); Ovenbird, 5 (56, 22); Nashville Warbler, 4.5 (50, 20); Canada Warbler, 4.5; Veery, 4 (44, 18); White-throated Sparrow, 4; Ruffed Grouse, 3 (33, 13); Rose-breasted Grosbeak, 2.5; Philadelphia Vireo, 2; Am. Redstart, 2; Least Flycatcher, 1.5; Mourning Warbler, 1.5; Yellow-bellied Sapsucker, 1; Blue Jay, 1; Downy Woodpecker, 0.5; Swainson's Thrush, 0.5; Tennessee Warbler, 0.5. **Total:** 20 species; 92 territorial males or females (1022/km², 414/100 acres). **Visitors:** Goshawk, Black-billed Cuckoo, Hairy Woodpecker, Great Crested Flycatcher, Yellow-bellied Flycatcher, Alder Flycatcher, Olive-sided Flycatcher, Black-capped Chickadee, Winter Wren, Am. Robin, Hermit Thrush, Solitary Vireo, Yellow Warbler, Yellow-rumped Warbler, Bay-breasted Warbler, N. Waterthrush, Scarlet Tanager, Evening Grosbeak, Purple Finch. **Remarks:** One Magnolia Warbler was found. There was a Ruffed Grouse with 4 young through June. The steep nature of the slope provides almost continuous edge on both sides of the hill. The shrub layer is totally closed to 2 m throughout with 75% lateral closure from 2 to 5 m and little above that. The dense Balsam Fir regeneration is lightly infested with Spruce Budworm

with 50 of 73 trees having >10% and <25% current year's growth defoliated and none having 50% defoliation.

175. BOREAL MIXEDWOOD - 9-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°41'N, 83°55'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** Flat open alluvial terrace site from which the original stand (Black Spruce (*Picea mariana*) 60%, Quaking Aspen (*Populus tremuloides*) 23%, White Spruce (*Picea glauca*) 10%, Jack Pine (*Pinus banksiana*) 5%, and Balsam Poplar (*Populus balsamifera*) 2%) was mostly clear-cut in 1969 leaving only a small Quaking Aspen stand centered in the plot and occasional advance-growth trees. The present site is tightly closed to 1 m, opens considerably by 2 m and has very little growth above that height. The ground vegetation is interspersed with abundant logs and dead grasses. The major cover plants are Lindley's Aster (*Aster ciliolatus*), Wild Strawberry (*Fragaria virginiana*), Bluejunt (*Calamagrostis canadensis*), *Carex castanea*, *C. vaginata*, Three-seeded Sedge (*C. trisperma*), Feather Moss (*Pleurozium schreberi*), False Melic (*Schizachne purpurascens*), and Wood Rush (*Luzula acuminata*). The low shrub layer is predominantly Labrador Tea (*Ledum groenlandicum*), Bristly Black Currant (*Ribes lacustre*), Blueberry (*Vaccinium angustifolium* and *V. myrtelloides*), Red Raspberry (*Rubus strigosus*), and Prickly Rose (*Rosa acicularis*). The sparse tall shrub layer is Speckled Alder (*Alnus rugosa*) with scattered Juneberry (*Amelanchier* spp.), willows (*Salix* spp.) and Glandular Birch (*Betula glandulosa*). Tree regeneration is of Black Spruce saplings and both Balsam Fir (*Abies balsamea*) and Black Spruce in the small tree class. The only large trees are concentrated in a small (0.5 ha) residual Quaking Aspen stand of 35-40 trees of 20 m height. There is a dense strata of about 100 smaller (10 m) Balsam Fir under the aspen. Shrub stems/acre (shrub species >20 in. ht.), 2331; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 846; small tree stems/acre (tree species 1 in. to 4 in. dbh), 206. Total vegetative cover, 78%, including 42% ground cover, 20% low shrub cover, 11% tall shrub cover, and 5% cover by tree species (Black Spruce 3%, Quaking Aspen 2%); canopy closure, 19%. **Edge:** Surrounded on all sides by similar vegetation for at least 150 m. A river parallels the W and N boundary at 150 to 200 m, with similar habitat beyond. **Topography:** Flat alluvial terrace near the Fire River headwaters. **Elevation:** About 1160 ft; lowest land in immediate area. **Weather:** Temperature varying 2-22°C, mostly clear and sunny except light intermittent rain May 30, winds nil to light except for heavy gusts June 17. **Coverage:** 1978: May 30; June 3, 8, 13, 17, 24, 30, July 14; between 0450-1100 hrs, EDT. Total man-hours: 18.5. **Census:** White-throated Sparrow, 20.5 (228, 92); Com. Yellowthroat, 9.5 (106, 43); Lincoln's Sparrow, 9 (100, 40); Alder Flycatcher, 7.5 (83, 34); Tennessee Warbler, 7 (78, 31); Nashville Warbler, 6 (67, 27); Magnolia Warbler, 3.5 (39, 16); Wilson's Warbler, 3.5; Mourning Warbler, 3 (33, 13); Chestnut-sided Warbler, 1.5; Ruffed Grouse, 1; Yellow-bellied Sapsucker, 1; Red-eyed Vireo, 1; Black-and-white Warbler, 1; Swamp Sparrow,

1, Chipping Sparrow, 0.5, Merlin, +, Spruce Grouse, + **Total:** 18 species, 76.5 territorial males or females (850/km², 344/100 acres). **Visitors:** Com. Merganser, Killdeer, Com. Snipe, Com. Flicker, Boreal Chickadee, Red-breasted Nuthatch, Cedar Waxwing, Yellow-rumped Warbler, N. Waterthrush, Canada Warbler, Rusty Blackbird, Com. Grackle, Purple Finch, Song Sparrow. **Remarks:** The abundant small Balsam Fir have all been somewhat defoliated; of 51 examined 29 had more than 50% of the current year's growth removed by Spruce Budworm. The open nature of the site is a reflection of both its early seral stage and the absence of a well established understory before cutting (a common feature of well stocked predominantly coniferous forests). A Spruce Grouse hen with 5 young was present. A White-throated Sparrow nest found.

176. BOREAL MIXEDWOOD - 6-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°41'N, 83°57'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A Balsam Fir (*Abies balsamea*) and White Birch (*Betula papyrifera*) dominated upland site. Following heavy defoliation by Spruce Budworm in 1970 and 1971 the original stand (White Birch 30%, White Spruce (*Picea glauca*) 25%, Quaking Aspen (*Populus tremuloides*) 18%, Balsam Fir 10%, Jack Pine (*Pinus banksiana*) 5%, Black Spruce (*Picea mariana*) 5%, Balsam Poplar (*Populus balsamifera*) 4%) was selectively harvested in an attempt to salvage merchantable spruce. Cutting removed only 90 stems/acre but the associated ground disturbance and opening of the stand created optimal conditions for tree regeneration; with an abundant seed source still available the stand has experienced remarkable regeneration particularly of Balsam Fir. Mortality caused by the early budworm outbreak and by cutting disturbance is resulting in considerable blowdown as well which is further opening the stand. The ground cover is dominated by Bracken (*Pteridium aquilinum*), Bristly Clubmoss (*Lycopodium annotinum*), Bluejoint (*Calamagrostis canadensis*), Bunchberry (*Cornus canadensis*), Bluebead Lily (*Clintonia borealis*), Large-leaf Aster (*Aster macrophyllus*), Feather Moss (*Pleurozium schreberi*), Interrupted Fern (*Osmunda claytoniana*), Twinflower (*Linnaea borealis*) and Ground Pine (*Lycopodium obscurum*). The low shrub layer is almost exclusively Red Raspberry (*Rubus strigosus*) and Blueberry (*Vaccinium angustifolium*). The tall shrub layer is dominated by Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) with scattered Juneberry (*Amelanchier* spp.), Green Alder (*Alnus crispa*) and Mountain Ash (*Sorbus* spp.). Tree regeneration is more than 50% Balsam Fir with some White Birch and White Spruce. A quantitative survey of the tree species gave: Trees >4 in dbh; 93 stems/acre, total basal area 37.2 ft²/acre. Species comprising the large tree class Balsam Fir, 55, 59, 56; White Birch, 26, 28, 32, White Spruce, 9, 10, 6; Black Spruce, 1, 2, 2; Jack Pine, 1, 1, 4. Trees by diameter class 3 (4-6 in. dbh), 21, 23, 3.0, 8; 4 (6-8 in. dbh), 24, 26, 5.3, 17; 5 (8-10 in. dbh), 16, 17, 6.0, 19; 6 (>10 in. dbh), 32, 34, 17.6, 56. Shrub stems/acre (shrub species >20 in. ht.), 3715;

sapling stems/acre (tree species 20 in. ht to 1 in. dbh), 2586, small tree stems/acre (tree species 1 in. to 4 in. dbh), 388; total vegetative cover, 153%, ground cover excluding trees and shrubs contributes, 74%; low shrubs, 9%; tall shrubs, 35%; and tree shrubs, 35% (Balsam Fir 22%, White Birch 9%, and White Spruce 4%); canopy closure, 72%. **Edge:** Surrounded on all sides by similar habitat for 200 m. There is a narrow overgrown logging road cut 50 m N of plot edge. **Topography:** Crest and upper slope of a hill; most of the plot is on moderate E facing slope and continues to drop gradually for another 1 km to the E. **Elevation:** 1300 ft; ca. 140 ft above local lowland. **Weather:** Temperature varying -1-22°C, sunny to light overcast, winds nil except last half of 1 survey. **Coverage:** 1978: May 24; June 3, 8, 13, 17, 20, 30; July 3; between 0445-1040 hrs, EDT. Total man-hours: 26.5. **Census:** Chestnut-sided Warbler, 29 (322, 130); Tennessee Warbler, 16.5 (183, 74); Mourning Warbler, 13.5 (150, 61); Canada Warbler, 11.5 (128, 52); Magnolia Warbler, 10.5 (117, 47); White-throated Sparrow, 9.5 (106, 43); Yellow-bellied Sapsucker, 6.5 (72, 29); Red-eyed Vireo, 6.5; Ovenbird, 6.5; Blackburnian Warbler, 5.5 (61, 25); Nashville Warbler, 4 (44, 18); N. Parula, 4; Swainson's Thrush, 3.5 (39, 16); Ruffed Grouse, 3 (33, 13); Black-and-white Warbler, 3; Rose-breasted Grosbeak, 3; Winter Wren, 2.5; Veery, 2; Olive-sided Flycatcher, 1.5; Am. Robin, 1.5; Scarlet Tanager, 1.5; Evening Grosbeak, 1.5; Com. Flicker, 1; Blue Jay, 1; Solitary Vireo, 1; Yellow-rumped Warbler, 1; Bay-breasted Warbler, 1; Alder Flycatcher, 0.5; Cedar Waxwing, 0.5; Purple Finch, +. **Total:** 30 species; 152.5 territorial males or females (1694/km², 686/100 acres). **Visitors:** Com. Merganser, Hairy Woodpecker, Downy Woodpecker, Yellow-bellied Flycatcher, Least Flycatcher, Gray Jay, Black-capped Chickadee, Red-breasted Nuthatch, Hermit Thrush, Philadelphia Vireo, Cape May Warbler, Black-throated Blue Warbler, Black-throated Green Warbler, Blackpoll Warbler, Wilson's Warbler, Am. Redstart, Rusty Blackbird, Chipping Sparrow, Lincoln's Sparrow. **Remarks:** Nests of a Swainson's Thrush and of a Rose-breasted Grosbeak were found. The combination of a well-developed shrub and young tree layer, abundant dead trees and a dense overstory has resulted in a particularly rich bird population. Spruce Budworm has removed >95% of the current year's growth from more than half of the Balsam Fir on the site. Many of the mature Balsam Fir have been dead for almost a decade.

177. BOREAL CONIFER - 6-YEAR-OLD LOWLAND CLEARCUT. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°41'N, 83°56'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (irregular part of a 300 × 500 m block out of which a 245 × 245 m square forms Census 183, with a 50 m flagged grid, set up with chain and compass). **Description of Plot:** A lowland Black Spruce (*Picea mariana*) site from which the original stand (Black Spruce 92%, Balsam Fir (*Abies balsamea*) 2%, Jack Pine (*Pinus banksiana*) 2%, White Birch (*Betula papyrifera*) 2%, Balsam Poplar (*Populus balsamifera*) 2%) was clearcut in 1972 leaving almost no mature trees standing. The generally open site is mostly closed to 1 m, has less

than 25% closure between 1 and 2 m and almost no vegetation above 2 m. The ground cover is dominated by Bluejoint (*Calamagrostis canadensis*), and *Carex stricta* with subdominant Lindley's Aster (*Aster ciliolatus*), Fireweed (*Epilobium angustifolium*), Wild Strawberry (*Fragaria virginiana*), Rough Bedstraw (*Galium asprellum*), Twinflower (*Linnaea borealis*), aquatic mosses (particularly *Mnium* spp.), *Sphagnum* mosses, *Carex capillaris*, *C. stricta*, and Cat-tail (*Typha latifolia*). The scattered low shrubs include Labrador Tea (*Ledum groenlandicum*), Bristly Black Currant (*Rubus lacustris*), Dwarf Blackberry (*Rubus pubescens*) and Red Raspberry (*R. strigosus*). The tall shrub layer is Speckled Alder (*Alnus rugosa*) except for a few willow (*Salix* spp.) clumps. There is no tree regeneration and not enough large trees to accurately sample (<5 stems/acre). Shrub stems/acre (shrub species >20 in. ht.), 4512. Total vegetative cover, 112%, of which 62% is ground cover, 31% low shrub, and 19% tall shrub. There is no canopy. **Edge:** The Fire River parallels and frequently forms the E boundary, the other 3 sides grade quickly into selectively cut mixed wood lower slope. The plot is wrapped around 3 sides of a 6 ha square of uncut Black Spruce. **Topography:** Flat lowland alluvial terrace of the Fire River. **Elevation:** About 1160 ft; lowest land in immediate area. **Weather:** Temperature varying from -1-24°C, mostly clear except light rain on May 27, winds nil except strong gusts on 1 survey. **Coverage:** 1978: May 27; June 3, 8, 13, 17, 21, 29; July 3; between 0445-1245 hrs, EDT. Total: Est. 11 man-hours. **Census:** Com. Yellowthroat, 10 (111, 45); Tennessee Warbler, 9.5 (106, 43); White-throated Sparrow, 7 (78, 31); Chestnut-sided Warbler, 6.5 (72, 29); Lincoln's Sparrow, 6 (67, 27); Alder Flycatcher, 5 (56, 22); Magnolia Warbler, 5, Yellow-bellied Sapsucker, 1; Winter Wren, 1, Mourning Warbler, 1; Wilson's Warbler, 1, Swamp Sparrow, 1; Am. Robin, 0.5; Nashville Warbler, 0.5; Song Sparrow, 0.5; Red-eyed Vireo, +; Yellow-rumped Warbler, +. **Total:** 17 species; 55.5 territorial males or females (617/km², 250/100 acres). **Visitors:** Com. Snipe, Pileated Woodpecker, Yellow-bellied Flycatcher, Least Flycatcher, Olive-sided Flycatcher, Gray Jay, Black-capped Chickadee, Boreal Chickadee, Hermit Thrush, Swainson's Thrush, Veery, Ruby-crowned Kinglet, Cedar Waxwing, Black-and-white Warbler, Cape May Warbler, Ovenbird, N. Waterthrush, Canada Warbler, Am. Redstart, Purple Finch, Chipping Sparrow. **Remarks:** The severing of a large plot into clearcut and uncut components causes less problem than would be expected because the edge is very abrupt and most species respect it exactly. The major problem is in the small size of the areas, particularly the uncut; unfortunately no others of this age were available.

178. BOREAL MIXEDWOOD - 5-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of Hearst; 48°42'N, 83°57'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A White Birch (*Betula papyrifera*) and Quaking Aspen (*Populus tremuloides*) dominated upperslope and crest. The original

stand of White Birch (45%), White Spruce (*Picea glauca*) (30%), Balsam Fir (*Abies balsamea*) (15%), Quaking Aspen (7%), and Balsam Poplar (*Populus balsamifera*) (3%) was selectively logged for large conifers in 1972. Since the stand has been opened up Beaked Hazel (*Corylus cornuta*) and Quaking Aspen suckers have multiplied greatly resulting in a very dense lower strata (to 1.5 m) with only scattered trees projecting above. Tree regeneration is mostly Quaking Aspen with some White Birch. The only conifers are some White Spruce advance growth that survived cutting. Ground cover is predominantly Large-leaf Aster (*Aster macrophyllus*) with some Bluebead Lily (*Clintonia borealis*), Bunchberry (*Cornus canadensis*), Three-flowered Bedstraw (*Gallium triflorum*) and Rose Twisted-stalk (*Streptopus roseus*). The only low shrub is Red Raspberry (*Rubus strigosus*). Tall shrubs are Mountain Maple (*Acer spicatum*) and Beaked Hazel. A quantitative survey of the tree species gave: Trees >4 in. dbh; 38 stems/acre, total basal area 20.3 ft²/acre. Species comprising the tree class: White Birch, 21, 55, 52; Quaking Aspen, 13, 34, 44; Balsam Fir, 3, 8, 2; White Spruce, 1, 3, 2. Trees by diameter class: 3 (4-6 in. dbh), 4, 11, 0.6, 3; 4 (6-8 in. dbh), 6, 15, 1.4, 7; 5 (8-10 in. dbh), 2, 5, 0.8, 4; 6 (>10 in. dbh), 27, 70, 17.5, 86; shrub stems/acre (shrub species >20 in. ht.), 15,791; sapling stems/acre (tree species 20 in. ht to 1 in. dbh), 1095; small tree stems/acre (tree species 1 in. to 4 in. dbh), 360. Total vegetative cover, 113%, of which ground cover excluding trees and shrubs is 43%, low shrub cover, 16%, tall shrub cover, 45% and tree species cover, 9% (Quaking Aspen); canopy closure, 60%. **Edge:** Surrounded for 150 m on all sides by similar habitat. Two narrow skidding roads cross the plot. **Topography:** A gently sloping S-facing slope and flat-topped hill. The terrain drops sharply to the W 150 m from the edge of the plot and at 250 m N of the plot. **Elevation:** 1350 ft; about 160 ft above local lowland. **Weather:** Temperatures varying -1-15°C, winds nil to very light, generally clear except heavy overcast 2 days. **Coverage:** 1978: May 26; June 3,-4, 16, 19, 29; July 3, 9; between 0500-1000 and 2030-2200 hrs, EDT. Total man-hours: 22. **Census:** Chestnut-sided Warbler, 33.5 (372, 151); White-throated Sparrow, 13 (144, 58); Magnolia Warbler, 11 (122, 49); Mourning Warbler, 9 (100, 40); Black-and-white Warbler, 6 (67, 27); Red-eyed Vireo, 3.5 (39, 16); Yellow-bellied Sapsucker, 3 (33, 13); Ruffed Grouse, 2.5; Alder Flycatcher, 2.5; Am. Kestrel, 1; Blue Jay, 1; Solitary Vireo, 1; Am. Redstart, 1; Lincoln's Sparrow, 1; Canada Warbler, 0.5; Scarlet Tanager, 0.5. **Total:** 16 species; 90 territorial males or females (1000/km², 405/100 acres). **Visitors:** Hairy Woodpecker, Downy Woodpecker, Brown Creeper, Winter Wren, Swainson's Thrush, Veery, Tennessee Warbler, Yellow-rumped Warbler, Blackpoll Warbler, Com. Yellowthroat, Rose-breasted Grosbeak, Purple Finch. **Remarks:** There is almost no Spruce Budworm on the site. The low open habitat supports numerous Mourning Warblers while the developing shrub layer is already providing abundant habitat for Chestnut-sided Warblers.

179. BOREAL MIXEDWOOD - 5-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario; Mildred Township, ca. 105 km S of

Hearst, 48°41'N, 83°57'W, NTS map 42B/12, Greenhill River **Continuity:** New **Size:** 9 ha = 22.24 acres (elongate type with 50 m flagged grid set up with chain and compass). **Description of Plot:** A wet lowland site with a small raised ridge (lateral moraine) along the W edge. The original stand of Black Spruce (*Picea mariana*), 80%; Balsam Fir (*Abies balsamea*), 10%; Quaking Aspen (*Populus tremuloides*), 5%; and White Birch (*Betula papyrifera*), 5%, was almost totally cut in 1972. The resulting site is heterogeneous with extensive Speckled Alder (*Alnus rugosa*) growth over most of the extensive low lying area and Quaking Aspen suckers and Beaked Hazel (*Corylus cornuta*) developing on the better drained ridge with the few remaining trees. The area is becoming more swampy apparently as a result of disturbance of the drainage pattern during harvesting. The diverse ground cover is predominantly Bunchberry (*Cornus canadensis*), Twinflower (*Linnaea borealis*), Bluejoint (*Calamagrostis canadensis*), Sphagnum moss, Two-seeded Sedge (*Carex disperma*), and Woodland Horsetail (*Equisetum sylvaticum*). The low shrub layer is dominated by Laborador Tea (*Ledum groenlandicum*), Leatherleaf (*Chamaedaphne calyculata*), Creeping Snowberry (*Gaultheria hispidula*), Blueberry (*Vaccinium angustifolium*), and Red Raspberry (*Rubus strigosus*). The only trees are scattered Quaking Aspen over <5% of the plot in the NW corner. Shrub stems/acre (shrub species >20 in. ht.), 5326; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1888. There are too few small trees to accurately estimate. Total vegetative cover is 76% including 36% ground cover, 19% low shrub cover, 5% tall shrub cover, and 16% tree species cover (Balsam Fir 7%, Quaking Aspen 5%, White Birch 2%, Black Spruce, 2%). Canopy closure is 22%. **Edge:** Similar habitat to the N for 100 m then changing to a lower slope after crossing a logging haul road. The change to lower slope mixed woods is more rapid to the E and the W. There is uncut Black Spruce about 25 m S of the plot. **Topography:** Relatively flat except for slight ridges (<5 m) along the W edge. **Elevation:** 1190 ft; lowest land in the immediate area. **Weather:** Temperatures 2-22°C, sunny and clear for 5 surveys, light to intermittent rain on 2, and rain turning to sleet on 1. Winds nil to slight except for high gusts on 1 survey. **Coverage:** 1978: May 30; June 3, 12, 16, 25; July 6, 9, 11; between 0500-1145 hrs, EDT. Total man-hours: 18. **Census:** Com. Yellowthroat, 13.5 (150, 61); White-throated Sparrow, 10 (111, 45); Tennessee Warbler, 8.5 (94, 38); Lincoln's Sparrow, 7 (78, 31); Alder Flycatcher, 6 (67, 27); Swamp Sparrow, 5 (56, 22); Wilson's Warbler, 4.5 (50, 20); Chestnut-sided Warbler, 4 (44, 18); Magnolia Warbler, 2; Nashville Warbler, 1; Le Conte's Sparrow, 1; Killdeer, +. **Total:** 12 species; 62.5 territorial males or females (694/km², 281/100 acres). **Visitors:** Spruce Grouse, Yellow-bellied Sapsucker, Downy Woodpecker, Least Flycatcher, Blue Jay, Cedar Waxwing, Red-eyed Vireo, Black-and-white Warbler, Ovenbird, Mourning Warbler, Rusty Blackbird, Brown-headed Cowbird, Rose-breasted Grosbeak. **Remarks:** Owing to an exceptionally high Black Fly (*Simuliidae*) density it was frequently impossible to hear any but the loudest songs. There is almost no Spruce Budworm on this site. A Spruce Grouse hen and .3 young lived on the plot.

180. BOREAL MIXEDWOOD - 3-YEAR-OLD UPLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°42'N, 83°51'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (elongate type with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A slightly raised flat ridge dominated by an open residual stand of Quaking Aspen (*Populus tremuloides*). The raised area of about 20 ha, including the plot, is effectively an island in the midst of a large clearcut (ca. 1500 ha). The ridge originated from aeolian reworking of glacial lacustrine deposits on the extreme S edge of Pleistocene Lake Objibway. The original stand of Jack Pine (*Pinus banksiana*) (47%), Quaking Aspen (28%), Black Spruce (*Picea mariana*) (18%), White Spruce (*Picea glauca*) (4%) had all mature conifers removed for sawlogs and about half of the Quaking Aspen for plywood veneer in 1975. The resultant stand has subsequently experienced more tree loss through blowdown and is quite open. The present structure consists of shrub and sucker growth closing the lower strata to about 1.5 m with scattered White Spruce and Balsam Fir (*Abies balsamea*) advance growth to 5 m and a few Quaking Aspen stems to 20 m. Tree regeneration is confined to Quaking Aspen suckers and an occasional Balsam Fir seedling except for conifers established before harvesting. Ground cover is predominately Wild Sarsaparilla (*Aralia nudicaulis*), Lindley's Aster (*Aster ciliolatus*), Large-leaf Aster (*A. macrophyllus*), Bluebead Lily (*Clintonia borealis*), Bunchberry (*Cornus canadensis*), Fireweed (*Epilobium angustifolium*), Bluebell (*Mertensia paniculata*), Bluejoint (*Calamagrostis canadensis*) and Woodland Horsetail (*Equisetum sylvaticum*). The low shrub layer is mostly Bush Honeysuckle (*Diervilla lonicera*), Skunk Currant (*Ribes glandulosum*), Red Raspberry (*Rubus strigosus*), and Small Cranberry (*Vaccinium oxycoccus*). The only tall shrubs are Beaked Hazel (*Corylus cornuta*) and scattered clumps of Speckled Alder (*Alnus rugosa*). A quantitative survey of the trees gave: Trees >4 in. dbh; 44 stems/acre, total basal area 24 ft²/acre. Species comprising the tree class: Quaking Aspen, 29, 67, 86; Balsam Fir, 8, 17, 4, White Spruce, 6, 15, 6; White Birch, 1, 1, 3. Trees by diameter class: 3 (4-6 in. dbh), 6, 12, 0.7, 3; 4 (6-8 in. dbh), 5, 11, 1.2, 5; 5 (8-10 in. dbh), 2, 5, 1.0, 4; 6 (>10 in. dbh), 32, 72, 21, 88. Shrub stems/acre (shrub species >20 in. ht.), 8013; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 4512; small tree stems/acre (tree species 1 in. to 4 in. dbh), 186, total vegetative cover, 70% including 39% ground cover, 10% low shrub cover, 5% tall shrub cover, and 26% cover by tree species (Quaking Aspen 22%, Balsam Fir 4%); canopy closure, 36%. **Edge:** 1150 ft; about 10 ft above local lowland. **Weather:** Temperature varying -1-20°C, clear except partial overcast July 4, winds nil to extremely light. **Coverage:** 1978 May 31; June 10, 15, 23, 25, 28; July 1, 4, between 0500-0915 hrs, EDT. Total: 16 man-hours. **Census:** Chestnut-sided Warbler, 21.5 (239, 97); Mourning Warbler, 12 (133, 54); White-throated Sparrow, 8.5 (94, 38); Magnolia Warbler, 5 (56, 22); Alder Flycatcher, 4 (44, 18); Red-eyed Vireo, 4; Yellow-bellied Sapsucker, 3.5 (30, 16); Lincoln's Sparrow, 3.5; Ruffed Grouse, 2; Black-and-white Warbler, 1.5; Winter Wren, 1; Canada Warbler,

1, Evening Grosbeak, 1, Com Merganser, 0.5, Com Flicker, 0.5, Olive-sided Flycatcher, 0.5, Am. Redstart, 0.5; Com. Yellowthroat, +. **Total:** 18 species; 70.5 territorial males or females (783/km², 317/100 acres). **Visitors:** Ruby-throated Hummingbird, Yellow-bellied Flycatcher, Least Flycatcher, Blue Jay, Swainson's Thrush, Cedar Waxwing, Solitary Vireo, Tennessee Warbler, Nashville Warbler, Yellow-rumped Warbler, N. Waterthrush, Wilson's Warbler, Red-winged Blackbird, Pine Siskin, Le Conte's Sparrow, Chipping Sparrow, Song Sparrow. **Remarks:** The high open Quaking Aspen canopy made survey impossible in winds >5 mph. Of 41 Balsam Fir examined all had some Spruce Budworm defoliation but none exceeded 50% removal of current year's growth. Nests found include Com. Merganser and Yellow-bellied Sapsucker.

181. BOREAL CONIFER - 3-YEAR-OLD LOWLAND CUTOVER. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst, 48°42'N, 83°50'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 18 ha = 44.48 acres (a polygon composed of two 300 × 300 m square plots abutting along 200 m of edge, with a 50 m flagged grid, set up with chain and compass). **Description of Plot:** A large meadow-like clearcut. The original stand of Black Spruce (*Picea mariana*) (62%), Jack Pine (*Pinus banksiana*) (19%), Balsam Fir (*Abies balsamea*) 7%, Quaking Aspen (*Populus tremuloides*) (7%), Balsam Poplar (*Populus balsamifera*) (3%), and White Birch (*Betula papyrifera*) (2%) extends over many square kilometers on the basin of glacial Lake Objubway. Several thousand hectares in Mildred Township were clearcut in 1975. Since harvesting there has been some development of the shrub community. The only tree regeneration is of a few advanced growth Black Spruce saplings and some Quaking Aspen suckers. There are no trees. The diverse ground cover is predominately Lindley's Aster (*Aster ciliolatus*), Fireweed (*Epilobium angustifolium*), Wild Strawberry (*Fragaria virginiana*), Bluejoint (*Calamagrostis canadensis*), Sphagnum moss, Brownish Sedge (*Carex brunnescens*), Three-seeded Sedge (*C. trisperma*), Wood Rush (*Luzula parviflora*), and Woodland Horsetail (*Equisetum sylvaticum*). The low shrub layer consists of Labrador Tea (*Ledum groenlandicum*), Prickly Rose (*Rosa acicularis*), Dwarf Blackberry (*Rubus pubescens*), and Red Raspberry (*R. strigosus*). The sparse tall shrub category is dominated by Speckled Alder (*Alnus rugosa*) with occasional stems of Juneberry (*Amelanchier* spp.) and Glandular Birch (*Betula glandulosa*). Shrub stems/acre (shrub species >20 in. ht.), 1376; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 282. There are no small trees. Total vegetative cover, 53%; ground cover excluding tree and shrub species, 39%; low shrub cover, 13%; and tall shrubs cover, 1%. There is no canopy. **Edge:** Surrounded on all sides by similar habitat. The NE corner touches the bank of the Fire River. **Topography:** Flat old lake basin with essentially no relief. **Elevation:** About 1140 ft; lowest land in the immediate area. **Weather:** Temperature varying 2-20°C, generally clear except heavy cloud twice and fog once. Winds nil to light. **Coverage:** 1978: Each square half of the plot was surveyed separately, each half being visited eight times. The W half was covered May 26; June 8, 15, 19, 24, 27; July

1, 5, and the E half May 26, June 8, 16, 23, 25, 28, July 4, 7, between 0440-0950 hrs, EDT. **Total:** 27.5 man-hours. **Census:** Lincoln's Sparrow, 11 (61, 25); Savannah Sparrow, 6 (33, 13); Song Sparrow, 4.5 (25, 10); White-throated Sparrow, 2.5; Com. Yellowthroat, 2; Wilson's Warbler, 2; Am. Robin, 1.5; Killdeer, 1; Com. Snipe, 1; Mourning Warbler, 1; Swamp Sparrow, 1; Spotted Sandpiper, 0.5; Am. Redstart, 0.5; Red-winged Blackbird, 0.5. **Total:** 14 species; 35 territorial males or females (194/km², 79/100 acres). **Visitors:** Belted Kingfisher, Com. Flicker, E. Kingbird, Alder Flycatcher, Olive-sided Flycatcher, Com. Crow, Brown Thrasher, Swainson's Thrush, Tennessee Warbler, Nashville Warbler, Magnolia Warbler, Chestnut-sided Warbler, N. Waterthrush, Rusty Blackbird, Com. Grackle, Rose-breasted Grosbeak. **Remarks:** The open wet meadow-like character is clearly reflected by the dominance of Lincoln's Savannah, Song, and White-throated Sparrows. Nests found were Killdeer, Com. Snipe, and White-throated Sparrow.

182. BOREAL MIXEDWOOD - UNCUT UPLAND. — **Location:** Ontario, Makawa Township, ca. 105 km S of Hearst; 48°40'N, 83°56'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 9 ha = 22.24 acres (square with 50 m flagged grid, set up with chain and compass). **Description of Plot:** A rich, overmature mixedwood upperslope and crest. There are many large trees (25 m ht.) as well as a thick shrub and tree regeneration layer. The largest and oldest trees in the area are about 250 years old but there are also several younger age classes down to new seedlings. There is dense undergrowth to 2 m, with heavy cover to 5 m and moderate cover to the highest crowns owing to the uneven age and size composition of the stand. The ground cover is typical of open boreal mixedwood dominated by Bunchberry (*Cornus canadensis*), Bracken (*Pteridium aquilinum*), Bluebead Lily (*Clintonia borealis*) and Bristly Clubmoss (*Lycopodium annotinum*) with significant cover of Goldthread (*Coptis groenlandicum*), False Lily-of-the-valley (*Maianthemum canadensis*), Starflower (*Trientalis borealis*), Feather Moss (*Pleurozium schreberi*), Interrupted Fern (*Osmunda claytoniana*), and Ground Pine (*L. obscurum*). The sparse low shrub layer is Bush Honeysuckle (*Diervilla lonicera*) and Blueberry (*Vaccinium angustifolium*). Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*) dominate the tall shrub layer with some Green Alder (*Alnus crispa*), Juneberry (*Amelanchier* spp.) and Mountain Ash (*Sorbus* spp.). Regeneration is principally Balsam Fir (*Abies balsamea*) with some Black Spruce (*Picea mariana*) White Spruce (*P. glauca*), Quaking Aspen (*Populus tremuloides*), and White Birch (*Betula papyrifera*). A quantitative survey of the trees gave: Trees >4 in. dbh; 151 stems/acre, total basal area 66.9 ft²/acre. Species comprising the large tree class: Black Spruce, 34, 22, 19; Quaking Aspen, 21, 14, 21; White Birch, 18, 12, 10; Jack Pine (*Pinus banksiana*), 13, 9, 12. Trees by diameter class; 3 (4-6 in. dbh), 26, 17, 3.3, 5; 4 (6-8 in. dbh), 27, 18, 7.4, 11; 5 (8-10 in. dbh), 40, 26, 17.4, 26; 6 (>10 in. dbh), 59, 39, 38.8, 58. Shrub stems/acre (shrub species >20 in. ht.), 5192; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 1218; small tree stems/acre (tree species 1 in. to 4 in. dbh), 227. Total vegetative

cover, 126%, ground cover excluding trees and shrubs, 46%, low shrubs cover 6%, tall shrub cover 30%, and tree species cover 44% (Quaking Aspen 14%, Balsam Fir 11%, White Spruce 7%, Black Spruce 6%, White Birch 6%); canopy closure, 85%. **Edge:** Surrounded on all sides by similar habitat for at least 50 m. Changing to cutover 75 m to the N and to wetter lower slope habitat to the E. **Topography:** Half of the plot is on a relatively flat crest, the rest on a 10-15° slope to the E with occasional steeper pitches. **Elevation:** 1300 ft; ca. 140 ft above local lowland. **Weather:** Temperature varying 2-27°C. Heavy overcast for 3 surveys, and light rain for 1; otherwise clear and sunny. Winds nil to light. **Coverage:** 1978: May 24, June 8, 12, 16, 21, 27, 30; July 5; between 0445-1030 hrs, EDT. **Total:** 24.5 man-hours. **Census:** Tennessee Warbler, 25 (278, 112), Magnolia Warbler, 20 (222, 90); Nashville Warbler, 14 (156, 63); Blackburnian Warbler 11 (122, 49); Evening Grosbeak, 9 (100, 40), Cape May Warbler, 7.5 (83, 34); White-throated Sparrow, 6.5 (72, 29); Least Flycatcher, 5 (56, 22); Black-and-white Warbler, 4 (44, 18); Canada Warbler, 4; Swainson's Thrush, 3 (33, 13); Yellow-rumped Warbler, 3; Yellow-bellied Sapsucker, 2.5; Ruby-crowned Kinglet, 2.5; Ovenbird, 2.5; Yellow-bellied Flycatcher, 2; Red-eyed Vireo, 2; Ruffed Grouse, 1.5, Red-breasted Nuthatch, 1.5; Brown Creeper, 1.5; Winter Wren, 1.5; Blue Jay, 1; Bay-breasted Warbler, 1; Purple Finch, 1; Dark-eyed Junco, 1; Solitary Vireo, 0.5; Blackpoll Warbler, 0.5; Mourning Warbler, 0.5; Scarlet Tanager, 0.5; Rose-breasted Grosbeak, 0.5. **Total:** 30 species; 136 territorial males or females (1511/km², 612/100 acres). **Visitors:** Black-backed Three-toed Woodpecker, N Three-toed Woodpecker, Alder Flycatcher, E Wood Pewee, Olive-sided Flycatcher, Gray Jay, Black-capped Chickadee, Boreal Chickadee, Am. Robin, Hermit Thrush, Veery, Cedar Waxwing, N. Parula, Black-throated Blue Warbler, Black-throated Green Warbler, Chestnut-sided Warbler, Am. Redstart, Pine Siskin, Lincoln's Sparrow. **Remarks:** The exceptionally dense Balsam Fir regeneration is almost totally destroyed by Spruce Budworm with 148 of 154 sampled trees having >95% of current year's growth removed and most were totally defoliated. Many of the very large 30-40 cm dbh Balsam Fir died from defoliation during the survey period. The diverse nature of overmature mixedwoods with a multiple age stand is clearly shown in this plot. A White-throated Sparrow nest was found, and a Ruffed Grouse with 6 chicks was on the plot during June. The recurring problem of what to do with non-territorial species is clearly shown by the Evening Grosbeaks. They were present on all 8 surveys with the composite map showing 4 distinct activity centres; each of which had 5 or more records. The number of birds in the groups remained quite constant (best estimates of 2, 4, 6, and 6) so we have assumed at least 18 breeding birds. Although it is unlikely the sex ratio was equal we were unable to get accurate sex ratios and have used 9 as an estimate of the minimum number of breeders.

183. BOREAL CONIFER-UNCUT LOWLAND. — **Location:** Ontario, Mildred Township, ca. 105 km S of Hearst; 48°41'N, 83°56'W, NTS map 42B/12, Greenhill River. **Continuity:** New. **Size:** 6 ha = 14.8 acres (a square of uncut timber within Census 177 with

a 50 m flagged grid, set up with chain and compass). **Description of Plot:** A residual island of almost pure Black Spruce (*Picea mariana*) in the midst of a clearcut. The stand is dense but the average tree size is small (<15 m) and the trees were left for further growth when the surrounding timber was cut in 1972. The heavy ground cover has abundant *Sphagnum* mosses and Feather Moss (*Pleurozium schreberi*) with frequent Goldthread (*Coptis groenlandicum*), Twinflower (*Linnaea borealis*), Plume Moss (*Hylocomium splendens*), *Mnium* spp., *Ptilium crista castrensis*, and Two-seeded Sedge (*Carex disperma*). Low shrub cover is Dwarf Blackberry (*Rubus pubescens*), Labrador Tea (*Ledum groenlandicum*), Red Osier Dogwood (*Cornus stolonifera*) and Creeping Snowberry (*Gaultheria hispida*). The only tall shrub is Speckled Alder (*Alnus rugosa*). Tree regeneration is almost totally Black Spruce with occasional small Balsam Fir (*Abies balsamea*). A quantitative survey of the large trees gave: Trees >4 in. dbh; 562 stems/acre, total basal area 106.9 ft²/acre. Species comprising the tree class: Black Spruce, 562, 100, 100. Trees by diameter class: 3 (4-6 in. dbh), 350, 62, 48.1, 45; 4 (6-8 in. dbh), 197, 35, 52.4, 49; 5 (8-10 in. dbh), 15, 3, 6.4, 6. Shrub stems/acre (shrub species >20 in. ht.), 4435; sapling stems/acre (tree species 20 in. ht. to 1 in. dbh), 134; small tree stems/acre (tree species 1 in. to 4 in. dbh), 348. Total vegetative cover is 133%, including 73% ground cover, 11% low shrub cover, 18% tall shrub cover, and 31% cover by tree species (Black Spruce 31%); canopy closure, 96%. **Edge:** Surrounded on all sides by clearcut with the Fire River forming the E boundary and extensive cutting beyond. **Topography:** Flat alluvial terrace of the Fire River. **Elevation:** About 1160 ft; lowest land in the immediate area. **Weather:** Temperature varying from -1-24°C, mostly clear except light rain on May 27, winds nil except for strong gusts on 1 survey. **Coverage:** 1978: Surveyed together with Plot 177 on May 27; June 3, 8, 13, 17, 21, 29; July 3; between 0445-1245 hrs, EDT. Total: Est. 11 man-hours. **Census:** Tennessee Warbler, 6 (100, 41); Yellow-rumped Warbler, 4 (67, 27); Spruce Grouse, 3 (50, 20); Least Flycatcher, 3; Nashville Warbler, 3; Cape May Warbler, 3; Ruby-crowned Kinglet, 2; Alder Flycatcher, 1.5; White-throated Sparrow, 1.5; Lincoln's Sparrow, 1.5; Yellow-bellied Flycatcher, 1; Cedar Waxwing, 1; Magnolia Warbler, 1; Blackburnian Warbler, 1; Com. Yellowthroat, 1. **Total:** 15 species; 33.5 territorial males or females (559/km², 226/100 acres). **Visitors:** Gray Jay, Swainson's Thrush, Chestnut-sided Warbler, Blackpoll Warbler, Palm Warbler, N. Waterthrush, Mourning Warbler, Wilson's Warbler, Dark-eyed Junco. **Remarks:** The abrupt edge between the uncut and surrounding clearcut is recognized by most species. This stand is the only accessible Black Spruce lowland left in the area. Although many of the species are typical of the habitat there are undoubtedly some missing that would be found in larger stands and the edge species are naturally somewhat overabundant. The major value of the plot is as an example of what remains in a small remnant island.

184. WHITE SPRUCE FOREST. — Location: Alberta; Sheep River at Bluerock Creek, 33.4 km, WSW of Turner Valley, 50°36' N, 114°44' W, Mount Rae mapsheet 1:50,000

scale, Dept Energy, Mines and Resources **Continuity:** New. **Size:** 14.8 ha = 36.6 acres (trapezoidal, measured by steel tape, sides 22.50 × 21.64 × 12.05 × 22.29 chains; W (longest) and E (shortest) sides were parallel and ran N-S, N side followed azimuth 104° (284°), S side 74° (254°). **Description of Plot:** Situated on a terrace above the confluence of the Sheet River and Bluerock Creek. Although three coniferous species dominated the plant communities, a few deciduous trees, Quaking Aspen (*Populus tremuloides*) and Balsam Poplar (*P. balsamifera*) occurred in isolated patches along the S and N boundaries. Although the conifers were usually well interspersed, pine was dominant in the SW corner. Successional trends appear to be occurring toward establishment of a forest of Subalpine Fir over spruce, which are together regenerating to replace the decadent pine. Shrubs that were not detected using standard procedures (shorter than shoulder height) include Canadian Buffalo Berry (*Shepherdia canadensis*), Alder (*Alnus crispa*), Ground Juniper (*Juniper communis*), Prickly Rose (*Rosa acicularis*) and Low Bilberry (*Vaccinium myrtillus*). Buffalo Berry, the most abundant shrub, and Juniper were widely distributed, whereas Alder occurred in patches up to approx. 0.1 acre in size in a few low, open sites. The understory was dominated largely by Feathermoss (*Hylocomium splendens*), which formed a spongy mat throughout much of the plot, especially in moist, low, shaded, or flat portions. No standing water occurred. A quantitative survey of the vegetation gave the following results: Trees 3 in. in diameter and over based upon six 0.1 acre circular samples, 389/acre; total basal area 110.3 ft²/acre. Species comprising 100% of the total number of trees (figures after each species give the number of trees/acre, relative density (%), relative dominance and frequency in that sequence): White Spruce (*Picea glauca*) 306, 79, 77, 100; Lodgepole Pine (*Pinus contorta*) 40, 10, 12, 100; Subalpine fir (*Abies lasiocarpa*) 43, 11, 11, 100. Total trees by diameter size class (figures after each class give number of trees/acre, relative density (%), basal area in ft²/acre, and relative dominance in that sequence): A (3-6 in.) 192, 49, 19.2, 17; B (6-9 in.) 136, 35, 40.8, 37; C (9-15 in.) 59, 15, 47.4, 43; D (15-21 in.) 2, 0, 2.9, 3. Shrub stems per acre, 325 (using corrected formula). In nearly all cases shrubs counted were young fir or spruce. Ground cover 87.5%; canopy cover 61%; average canopy height 66 ft (range 53-76 ft). Core boring of the largest tree in each sample plot showed a mean age of 142 years and a range of 100-184 years. Dead, standing trees were numerous and many live trees had been downed recently (neither were counted in samples). **Edge:** Similar forest along all but W and WN edges, which graded into more open forest with a higher percentage of pine. Dirt roads paralleled the S and N edges, generally away from the boundaries but contacted the plot at the central S edge and cut through the NE corner. Ground cover vegetation was not noticeably different at these roadsides, and bird territories bridged the small road transecting the corner. **Topography:** The land rose toward the W, was bounded by a marked N-facing slope on the W-N edge, by a marked S-facing slope on the W-S edge, and was relatively flat in the E half. A series of ridges and unconnected hills were oriented usually in an E-W direction over much of the plot. **Eleva-**

tion: 5275-5400 ft **Weather:** Temperature was usually mild, 5-15°C (ranged 1-20°); wind was mostly calm to light, usually W or NW, cloud cover was generally clear; storms allowed only partial coverages twice and interrupted temporarily a third (a brief snowstorm, May 31). **Coverage:** May 31; June 3, 10-11, 17, 19, 26, 27, 29-30; July 6: 0500-1100 and 1330-1945. Total: 29.5 (1 or 2 persons) party-hours, 38.5 man-hours. **Census:** Golden-crowned Kinglet, 9 (61, 25); Ruby-crowned Kinglet, 8 (54, 22); Swainson's Thrush, 7.5 (51, 20), Dark-eyed Junco, 7 (47, 19); Yellow-rumped Warbler, 6.5 (44, 18); Boreal Chickadee, 4 (27, 11); Gray Jay, 3 (20, 8); Am. Robin, 3; Brown-headed Cowbird, 3; Townsend's Warbler, 2.5; Chipping Sparrow, 2; Spruce Grouse, 1; Red-breasted Nuthatch, 1; Pine Grosbeak, 1, Pileated Woodpecker, 0.5; N. Three-toed Woodpecker, 0.5; Townsend's Solitaire, + **Total:** 17 species; 59.5 territorial males (402/km², 163/100 acres). **Visitors:** Com. Flicker, W. Flycatcher, W. Wood Pewee, Barn Swallow, Com. Raven, Am. Redstart, Pine Siskin, Red Crossbill, White-winged Crossbill **Remarks:** Nests found: Dark-eyed Junco, (1) and Pine Grosbeak (1). Because of earlier breeding seasons neither the territories of Gray Jays nor owls (not observed) were defined Gray Jays had mobile young during the study Pine Siskins were numerous but rarely showed territorial behavior. Spruce Grouse were more numerous than indicated (probably 2 or 3 territorial males) but male 'clapping', i.e. detectability, ceased midway in the study. Arrivals of Chipping Sparrows and most thrushes occurred after the study was well under way. Another 4 species were detected with regularity near the edges of the plot, including Olive-sided Flycatcher, Varied Thrush, Hermit Thrush, and Warbling Vireo. Poplar and alder were only fully leafed-out in the final stages of the study Thanks to the Fish and Wildlife Division-Kananaskis Country Planning Team, Alberta Forest Service, University of Alberta, R B Miller, Biol. Station, Univ. of Calgary, Kananaskis Experiment Station and to Jamie Podlubny and A. N. Wiseley. —ALLEN N. WISELEY, Fish and Wildlife Division, #100-140 - 1st Ave. SW, Calgary, Alberta, Canada T2P 0A5.

185. ASPEN FOREST. — Location: Manitoba; Morton Municipality; near Boissevain, 322 m E of Hwy. 446 on the N boundary of Turtle Mountain Prov. Park, Sect. 31, R20, T1; 49°05' N, 100°08' W, Deloraine 62 F/1. **Continuity:** Established 1977; 3 consecutive years. **Size:** 16 ha = 39.5 acres. **Description of Plot:** See AB 33:96-97 (1979). **Weather:** Temperatures and precipitation were near normal during June Heavy snowfall during the extremely long and cold winter caused flooding in the sedge meadows and parts of the forest floor **Coverage:** June 4, 6, 8, 12-13, 15, 25, 28, 30, 0500-0740, CDT. Total man-hours: 16. **Census:** Least Flycatcher, 19.5 (122, 49); Red-eyed Vireo, 11 (69, 28); Ovenbird, 9 (56, 23); House Wren, 3 (19, 8); N. Waterthrush, 2.5; Great Crested Flycatcher, 2; Com. Yellowthroat, 2, Am. Redstart, 2; Veery, 1.5; Brown-headed Cowbird, 1; Broad-winged Hawk, +; Hairy Woodpecker, +. **Total:** 12 species; 53.5 territorial males/females (335/km², 135/100 acres). **Visitors:** Mallard, Blue-winged Teal, Ruffed Grouse, Black-billed Cuckoo, E

Kingbird, E Wood Pewee, Blue Jay, Com Crow, Black-capped Chickadee, Cedar Waxwing, Mourning Warbler, N. Oriole, Rose-breasted Grosbeak. **Remarks:** Most species appear to be recovering from a decrease in population from 1977 to 1978. Least Flycatchers continued to increase with a population more than double that found in 1978 and three times the 1977 total. Some of these changes may be related to the less widespread defoliation of the canopy by forest tent caterpillars than in the two previous years. Common Yellowthroat and Veery numbers continued to decline, possibly a result of the deep water in willow (*Salix* spp.) patches and the flooding of parts of the forest floor. — **DAN GUINAN**, Dept. of Mines, Natural Resources and Environment, 1495 St. James Street, Winnipeg, Canada R3H 0W9.

186. ASPEN FOREST. — **Location:** Manitoba, Mantagao Wildlife Management Area, 7.7 mi NW of the junction of provincial road 325 and S Mantagao Lake Road; 51°17'N, 97°58'W, Hecla 62P/4. **Continuity:** New. **Size:** 16 ha = 39.5 acres. **Description of Plot:** The dominant canopy tree is Quaking Aspen (*Populus tremuloides*). Beaked Hazel (*Corylus cornuta*), Saskatoon (*Amelanchier alnifolia*), Choke Cherry (*Prunus virginiana*) and Downy Arrowwood (*Viburnum rafinesqueanum*), predominated among the higher shrubs. The lower shrubs were dominated by Beaked Hazel, Saskatoon, raspberry, rose and Snowberry (*Symphoricarpos occidentalis*). The ground cover was composed largely of various grasses and vetches with Sarsaparilla (*Aralia nudicaulis*) and strawberry the most common. A quantitative survey of 10 vegetation subplots (10 × 10 m each) gave the following results for trees: 582/acre; total basal area 552 cm²/acre. Quaking Aspen was the only tree encountered. Trees by diameter size class: A (2-5 cm), 28.7, 5, 30, B (5-10 cm), 292, 72, 23, 80; C (10-15 cm), 183, 45, 40, 90; D (15-20 cm), 77, 19, 34, 50, E (20-30 cm), 4, 1, 3, 10. Shrub stems/acre, 1899; ground cover, 78.9%; canopy cover, 55.5%; average canopy height, 33.5 ft. **Edge:** Bordered on all sides by similar habitat. Several small meadows are located in the SE corner and central portion of the plot. **Topography:** Flat. **Elevation:** About 875 ft. **Weather:** Basically clear and warm. **Coverage:** June 4, 7, 15, 17, 25-26, 29; July 6; 0500-0830. Total man-hours: 20. **Census:** Least Flycatcher, 12 (75, 30); Red-eyed Vireo, 6 (38, 15); Ovenbird, 3 (19, 8); House Wren, 3; Mourning Warbler, 3, Great Crested Flycatcher, 2; Clay-colored Sparrow, 2; Black-capped Chickadee, 1; Tennessee Warbler, 1; Veery, 1; Philadelphia Vireo, 1; Rose-breasted Grosbeak, 1; White-throated Sparrow, 1; N. Oriole, +. **Total:** 14 species; 37 territorial males (231/km², 94/100 acres). **Visitors:** Tree Swallow, Blue Jay, Cedar Waxwing, Chestnut-sided Warbler, Brown-headed Cowbird, Am. Goldfinch. **Remarks:** Nests found (2); Great Crested Flycatcher, Veery. — **NICHOLAS J. FOY**, Dept. of Mines, Natural Resources and Environment, 1495 St. James Street, Winnipeg, Canada, R3H 0W9.

187. 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, 13 intermittent years. **Size:** 8.09 ha = 20 acres. **Description of Plot:** See AFN 19:625-627 (1965). **Coverage:** May 16, 27; June 3, 9-10, 18. Total hours: 17.5. **Census:** Red-winged Blackbird, 20 (247, 100); Swamp Sparrow, 14 (173, 70); Yellow Warbler, 9 (111, 45); Virginia Rail, 8 (99, 40); Mallard, 4 (49, 20); Willow Flycatcher, 4; Long-billed Marsh Wren, 4; Cedar Waxwing, 2; Com. Yellowthroat, 2; Am. Goldfinch, 2; Canada Goose, 1; Mallard-Black Duck, 1; Wood Duck, 1; E. Kingbird, 1; Tree Swallow, 1. **Total:** 15 species; 74 territorial males (914/km², 370/100 acres). **Remarks:** Compared to 1978, there was a spectacular decline in species, from 24 to 15, and in number of territorial males, from 194.5 to 74, owing primarily to the greatest flooding in 13 years of censusing. A secondary cause of decline was the kill-off of higher vegetation and thinning of the basic Buttonbush (*Cephalanthus occidentalis*), Meadowsweet (*Spiraea alba*), and willow (*Salix* sp.) from harsh winters, deep ice, and high water conditions. On May 16, the general numbers seemed normal according to past years. On May 27, following heavy rain on May 23-25, the entire census area was 3 ft under water, canoeable all over. Only 2 Swamp Sparrows out of an approximate 50 remained. Evacuation of this species and of Virginia Rails was most dramatic. All passerines were in a state of retreat or withdrawal. Numbers are based on subsequent visits showing limited return, as the water level dropped to normal; most species never recovered. Only Red-winged Blackbirds attained more than half their normal density. Swamp Sparrows were reduced from 50 to 14. Song Sparrow (formerly 8), Brown-headed Cowbird (formerly 4), and Alder Flycatcher, (formerly 2) were eliminated entirely. Thanks to Jim Cavanaugh. — **ANDREW MAGEE**, 34 Hobson St., Springfield, Mass. 01109.

Breeding Bird Censuses in Wetlands of the St. Louis River Estuary, Wisconsin - Minnesota.

The following 12 breeding bird censuses were conducted, at the extreme western end of Lake Superior, to collect baseline information on breeding birds of shoreline-wetland communities. The primary wetland type was composed predominantly of sedge (Cyperaceae, mostly *Carex* spp.), intermixed to varying degrees with several other species. The plots were established each within a relatively homogeneous area throughout the estuary; size was determined by the minimum wetland segment under investigation with allowance for a minimum 10 m buffer from the shoreline edge and a 25 m buffer from a different habitat type.

The plots were divided into two equal groups, each censused between 0445-1030, CDT. The census of each plot per group was rotated by time of day, and the duration of each census was alter-

nated by either a 30 or 45 minute census depending on whether an interior or peripheral route (perimeter of plot) was taken. No censuses were taken when either the wind exceeded 16 km/hr or when precipitation exceeded a light drizzle. Temperatures varied from 8-21°C (most between 12-15°).

Vegetation samples were taken along two randomly chosen transects with plant cover sampled on 1-m² plots at 5 m intervals and, when shrubs were present, shrub stems counted on 16m² plots at 10 m intervals. On the 1-m² plots ground surface cover of each plant species and dead vegetation were recorded in 5% increments or by a 1 if present in trace amounts. Since some of the plots contained much low-lying Sweet Gale (*Myrica gale*) and Dwarf Birch (*Betula pumila*), shrubs had to be >1.5 m high. Water depths were measured at random in June. Plot names were based on the predominant plant species (>15% relative cover).

Two important factors had a potential impact on the breeding bird populations. First, the breeding season was preceded by an exceptionally late spring, which delayed foliation and flowering of plants by 2-3 weeks. Second, Lake Superior had abnormally high water levels during June and July. The water levels for June of 1979 were about 20 cm above average (1900 to 1978) and only about 5 cm lower than the June maximum 1951.

Thanks to JoAnn Hanowski, Bonnie Niemi, the Lake Superior Basin Studies Center, and the Department of Biology at the University of Minnesota, Duluth, for providing assistance, facilities, and equipment. — **GERALD J. NIEMI**, Dept. of Biological Science, Florida State Univ., Tallahassee, Fla. 32306.

188. CALLA-SEDGE WETLAND. — **Location:** Wisconsin; Douglas Co., S end of Spirit Lake on the St. Louis River; 46°39'37"N, 92°12'2"W, West Duluth, Minn.-Wis Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland that varied in depth from 0.1 to 0.9 m. The plot was composed of both Wild Calla and sedge with scattered Com. Cat-tail. The vegetation height varied from 0.7 m in uniform Wild Calla patches (usually deep water) to 1 m in sedge-dominated areas and up to 1.5 m where Com Cat-tail were found. Twenty-two m² sub-plots were measured and by cover showed 79% green vegetation, 7% dead vegetation, and 14% open water. Predominant plant species, which comprised 88% relative cover of all green vegetation, were Wild Calla (30% relative cover, 15% relative frequency), sedge (25, 17),

Com Cattail (12, 14), Broad-leaved Arrowhead (9, 10), Marsh Cinquefoil (6, 7), and Bur-reed (6, 5). Eight 16m² sub-plots were measured and showed 78 shrub stems/ha. These were primarily sparsely distributed willows. **Edge:** Bordered on the W side (10-30m) by non-persistent emergent wetland and the open water of the St. Louis River. Similar vegetation was a minimum of 25 m on all other sides. **Topography:** Similar to census 193 except residential development was about 150 m away. **Elevation:** 185m. **Weather:** See introduction. **Coverage:** June 11, 14, 19, 23, 30; July 6, 13, 19; 0500-0935, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 45 (450, 182); Virginia Rail, 1; Long-billed Marsh Wren, 0.5. **Total:** 3 species; 6 territorial males or females (600/km², 243/100 acres). **Visitors:** Am. Bittern, Mallard, Blue-winged Teal, Sora, Tree Swallow, Bank Swallow, Barn Swallow, Cliff Swallow. **Remarks:** Nests found: Red-winged Blackbird 13. The Virginia Rail observations were associated with Sweet Gale and Dwarf Birch found at the E edge.

189. CAT-TAIL-BUR-REED WETLAND. — **Location:** Wisconsin; Douglas Co., between Hog Island and mainland in the Superior Harbor Basin of the Duluth Superior Harbor; 46°42'9"N, 92°02'11"W, Superior, Wis.-Minn. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (rectangular 111 × 90 m, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland which varied in depth from 0.2 to 1 m. The plot was primarily cat-tail with Bur-reed, Broad-leaved Arrowhead, and sedge. Vegetation height varied from the 1 m arrowhead and sedge to the 1.8 m cat-tail and Bur-reed. Thirty-two m² sub-plots were measured and by cover showed 68% green vegetation, 10% dead vegetation, and 22% open water. Predominant plant species, which comprised 92% relative cover of all green vegetation, were Com. Cat-tail (22% relative cover, 16% relative frequency), Bur-reed (19, 12), Broad-leaved Arrowhead (14, 14), Sedge (14, 8), Narrow-leaved Cat-tail (10, 10), Sweet-flag (*Acorus calamus*) (8, 5), and Wild Calla (*Calla palustris*) (5, 8). No shrubs were found. **Edge:** Bordered on the E side (10-20m) by non-persistent emergent wetland and a small bay of the Superior Harbor Basin. Semi-upland vegetation of alder (*Alnus rugosa*) and willow was a minimum of 10 m from the N and S edge. Similar vegetation was a minimum of 50 m on the W edge. **Topography:** Situated between a 15 ha island (Hog) and the mainland, 250 m from an abandoned ore dock to the E and 250 m from a 4 lane U.S. Highway and residential area to the SW. An infrequently used railroad line was about 100 m from the SW edge. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 8, 13, 18, 22, 28; July 5, 11, 18; 0515-0905, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 6 (600, 243); Mallard, 1. **Total:** 2 species; 7 territorial males or females (700/km², 283/100 acres). **Visitors:** Blue-winged Teal, Wood Duck, Tree Swallow, Cliff Swallow. **Remarks:** Nests found: Red-winged Blackbird, 2; Mallard, 1.

190. SEDGE-BOGBean-MYRICA WETLAND. — **Location:** Wisconsin; Douglas Co., S end of Allouez Bay in the Duluth-

Superior Harbor, 46°41'N, 91°59'54"W; Parkland, Wis.-Minn. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland which varied in depth from 0.1 to 1 m. The plot was primarily sedge intermixed with Bogbean (*Menyanthes trifoliata*) and Sweet Gale dominating the S edge. Vegetation height varied from the 1 m sedge layer to the 1.5 m sparsely distributed cat-tail. Thirty-two m² sub-plots were measured and by cover showed 82% green vegetation, 2% dead vegetation, and 16% open water. The predominant plant species, which comprised 87% relative cover of all green vegetation, were sedge (41% relative cover, 16% relative frequency), Bogbean (19, 8), Sweet Gale (9, 6), Broad-leaved Arrowhead (7, 10), Marsh Cinquefoil (6, 9), and Cat-tail (5, 6). Thirteen 16m² sub-plots were measured and showed 624 shrub stems/ha. These shrubs were primarily Dwarf Birch and willow (*Salix* spp.). **Edge:** Bordered on the N (10-30 m) by the open water of Allouez Bay. Similar wetland a minimum of 25 m on all other sides. **Topography:** Similar to census 195 except that the plot was 1 km from industrial or residential development and 1 km from the road. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 7, 13, 18, 22, 28; July 5, 11, 18; 0445-1030, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 6 (600, 243); Virginia Rail, 1.5; Swamp Sparrow, 1.5; Mallard, 1; Com. Yellowthroat, 1. **Total:** 5 species; 11 territorial males or females (1100/km², 445/100 acres). **Visitors:** Black Duck, Blue-winged Teal, Wood Duck, Black Tern, Tree Swallow, Bank Swallow, Barn Swallow, Cliff Swallow. **Remarks:** Nests found: Red-winged Blackbird, 5; Virginia Rail, 1. The Virginia Rail, Swamp Sparrow, and Com. Yellowthroat were associated with the woody Sweet Gale - Dwarf Birch portion of the plot.

191. SEDGE-BUR-REED WETLAND. — **Location:** Wisconsin; Douglas Co., SE end of Allouez Bay in the Duluth-Superior Harbor; 46°40'55"N, 91°59'25"W, Parkland, Wis.-Minn. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.3 to 1.2 m, primarily sedge intermixed with Bur-reed. Vegetation height varied from the 1 m sedge to 1 to 1.5 m Bur-reed and sparsely distributed 1.5 to 1.7 m cat-tail. Thirty-five m² sub-plots were measured and by cover showed 72% green vegetation, 8% dead vegetation, and 20%, open water. The predominant plant species, which comprised 91% relative cover of all green vegetation, were sedge (41% relative cover, 14% relative frequency), Bur-reed (20, 16), Marsh Cinquefoil (11, 11), Broad-leaved Arrowhead (10, 14), and cat-tail (9, 11); there were no shrubs. **Edge:** Bordered on the N and W (10-30 m) by non-persistent emergent wetland and the open water of the confluence of Bear Creek and Allouez Bay. Similar wetland a minimum of 50 m on the other two sides. **Topography:** Similar to census 195 except that the plot is more than 1 km from the road. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 7, 13, 18, 22, 28; July 5, 11, 18; 0500-0930, CDT. Total man-

hours 5. **Census:** Red-winged Blackbird, 55 (550, 223), Sora, 1.5; Long-billed Marsh Wren, 0.5. **Total:** 3 species; 7.5 territorial males or females (750/km², 304/100 acres). **Visitors:** Blue-winged Teal, Wood Duck, Black Tern, Rough-winged Swallow, Cliff Swallow, Purple Martin, Com. Yellowthroat. **Remarks:** Nests found: Red-winged Blackbird, 3; Sora, 1. One male Long-billed Marsh Wren moved onto the plot on July 11 after the majority of Red-winged Blackbird males had dispersed. Six pairs of Black Terns nested in the non-persistent emergent wetland about 10 m from the N edge.

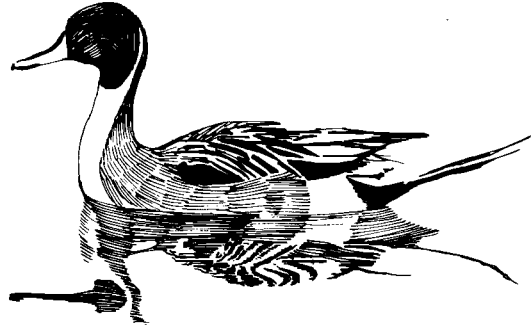
192. SEDGE-CALLA WETLAND. — **Location:** Minnesota; St. Louis Co., S edge of Mud Lake on the St. Louis River; 46°39'31"N, 92°12'28"W, West Duluth, Minn.-Wis. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.3 to 1.4 m, primarily sedge intermixed with Wild Calla and sparse Com Cat-tail. Vegetation height varied from 1 m sedge up to the 1.7 m cat-tail. Thirty-four m² sub-plots were measured and by cover showed 56% green vegetation, 4% dead vegetation, and 40% open water. Predominant plant species, which comprised 89% relative cover of all green vegetation were sedge (49% relative cover, 19% relative frequency), Wild Calla (21, 15), Com. Cat-tail (9, 11), Marsh Cinquefoil (5, 11), and Broad-leaved Arrowhead (5, 9). No shrubs were found. **Edge:** Bordered on the N (10-15m) by non-persistent emergent wetland and the open water of Mud Lake. Similar vegetation was a minimum of 25 m on all other sides. **Topography:** Part of an extensive wetland (100 + ha) adjacent to the St. Louis River. Mud Lake (about 40 ha) was a bay of the river and formed the nucleus of the wetland. The plot was about 100 m from an active railroad line and an adjacent frequently used road. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 11, 14, 19, 23, 30, July 6, 13, 19; 0505-0920, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 3 (300, 121); Long-billed Marsh Wren, 2.5, Swamp Sparrow, 2.5. **Total:** 3 species, 8 territorial males or females (800/km², 324/100 acres). **Visitors:** Mallard, E. Kingbird, Tree Swallow, Bank Swallow, Purple Martin, Short-billed Marsh Wren, Com. Yellowthroat, Yellow-headed Blackbird. Nests found: Red-winged Blackbird, 3; Long-billed Marsh Wren, 3. I had many registrations of Short-billed Marsh Wren during reconnaissance near this plot in the summer of 1978 but only recorded a singing male once this year. This apparent decrease in Short-billed Marsh Wren use may be a result of the abnormally high water levels that occurred this summer in the harbor area. The water levels may have limited the wrens from building their nests near the ground. Long-billed Marsh Wren territories were associated with those areas where Com. Cat-tail provided both song perches and nest substrate. Red-winged Blackbirds and Long-billed Marsh Wrens also showed some territorial exclusion on this plot.

193. SEDGE-CAT-TAIL-CALLA WETLAND. — **Location:** Wisconsin; Douglas Co., S end of Spirit Lake on the St. Louis River, 46°39'40"N, 92°12'4"W, West Duluth, Minn.-

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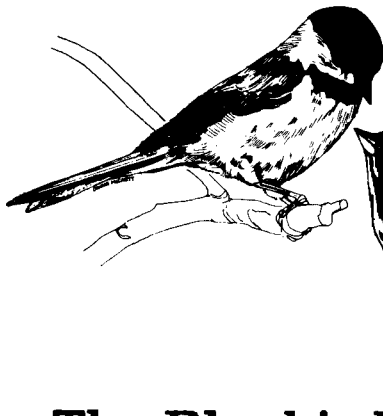
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Wis Quadrangle, USGS **Continuity:** New
Size: 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.3 to 1.3 m, primarily sedge with lesser amounts of Com. Cat-tail and Wild Calla. Vegetation height varied from the 0.9 to 1 m sedge to the 1.6 m Com. Cat-tail. Twenty-one m² sub-plots were measured and by cover showed 67% green vegetation, 5% dead vegetation, and 18% open water. The predominant plant species, which comprised 90% relative cover of all green vegetation, were sedge (42% relative cover, 18% relative frequency), Com. Cat-tail (16, 17), Wild Calla (13, 11), Marsh Cinquefoil (8, 11), Broad-leaved Arrowhead (7, 9), and Bur-reed (4, 4). No shrubs were found. **Edge:** Bordered on the W side (10-40m) by non-persistent emergent wetland and the open water of the St. Louis River. Similar vegetation was a minimum of 50 m on all other sides. **Topography:** Part of an extensive wetland area (100+ ha) adjacent to the relatively slow-moving St. Louis River, 1 km from industrial activity and 0.3 km from residential development. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 11, 14, 19, 23, 30; July 6, 13, 19; 0445-0995, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 6 (600, 243), Blue-winged Teal, 1; Sora, 1; Long-billed Marsh Wren, 1; Yellow-headed Blackbird, 0.5, Com. Yellowthroat, +. **Total:** 6 species; 9.5 territorial males or females (950/km², 385/100 acres). **Visitors:** Mallard, Black Duck, Wood Duck, Black Tern, Tree Swallow, Bank Swallow, Cliff Swallow. **Remarks:** Nests

found Red-winged Blackbird, 1, Sora, 1, Long-billed Marsh Wren, 1. Three muskrat houses were located on the plot and many of the waterfowl were associated with deeper water near these houses, especially the Blue-winged Teal. On July 11 more than 25 Bank Swallows were feeding over the plot or resting on old cat-tail heads.

194. SEDGE-CAT-TAIL WETLAND. — Location: Minnesota, St. Louis Co., SW end of Spirit Lake on the St. Louis River; 46°40'39"N, 92°11'56"W, West Duluth, Minn.-Wis. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.2 to 1.3 m, primarily sedge intermixed with both Narrow-leaved and Com. Cat-tail. Vegetation height varied from the 1 m sedge to the 1.5-1.8 m Cat-tail. Thirty-six m² sub-plots were measured and by cover showed 72% green vegetation, 10% dead vegetation, and 18% open water. Predominant plant species, which comprised 92% relative cover of all green vegetation, were Sedge (65% relative cover, 28% relative frequency), Narrow-leaved Cat-tail (10, 10), Com. Cat-tail (7, 14), Broad-leaved Arrowhead (5, 8), and Sweet Gale (5, 5). Fourteen 16m² sub-plots were measured and showed 490 shrub stems/ha. Shrubs were primarily Sweet Gale with some Meadow-sweet (*Spiraea alba*). **Edge:** Bordered on the N (10-20 m) by non-persistent emergent wetland and the open water of Spirit Lake. Similar

vegetation was a minimum of 25 m on all other sides. **Topography:** Situated in a small wetland area (12 ha) that was a peninsula off the Minnesota mainland. An abandoned railroad line ran adjacent to the W boundary. The plot was a minimum of 0.5 km from industrial activity. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 11, 14, 19, 23, 30; July 6, 13, 19; 0500-1000, CDT. Total man-hours: 5. **Census:** Long-billed Marsh Wren, 5 (500, 202); Red-winged Blackbird, 4 (400, 162); Virginia Rail, 1; Com Yellowthroat, 0.5; Swamp Sparrow, +. **Total:** 5 species; 10.5 territorial males or females (1050/km², 425/100 acres). **Visitors:** Great Blue Heron, Least Bittern, Am. Bittern, Mallard, Blue-winged Teal, Black Tern, Tree Swallow, Bank Swallow, Barn Swallow, Cliff Swallow. **Remarks:** Nests found: Red-winged Blackbird, 2. The Least Bittern was observed twice in the SW corner of the plot where Com Cat-tail was interspersed with open, deep water (1-1.5m). Long-billed Marsh Wren and Red-winged Blackbird territories showed very little overlap.

195. SEDGE - POTENTILLA - CAT-TAIL-PHRAGMITES WETLAND. — Location: Wisconsin; Douglas Co., SE end of Allouez Bay in the Duluth-Superior Harbor, 46°40'55"N, 91°58'27"W, Parkland, Wis.-Minn. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.1 to 1 m, primarily sedge intermixed with Marsh Cinquefoil (*Potentilla palustris*), Cat-tail, and Reed Grass (*Phragmites communis*). Vegetation height varied from 1 m sedge to 1.7 m patches of Com Cat-tail (*Typha latifolia*) and one 2 m patch (0.2 ha) of mixed Reed Grass and Narrow-leaved Cat-tail (*T. angustifolia*). Thirty-three m² sub-plots were measured and by cover showed 71% green vegetation, 9% dead vegetation, and 20% open water. The predominant plant species, which comprised 89% relative cover of all vegetation, were sedge (29% relative cover, 18% relative frequency), Marsh Cinquefoil (16, 12), Reed Grass (12, 6), Water Horsetail (*Equisetum fluviatile*) (10, 4), Narrow-leaved Cat-tail (9, 3), Broad-leaved Arrowhead (*Sagittaria latifolia*) (7, 11), and Com. Cat-tail (6, 6). Fourteen 16m² sub-plots were measured and showed 1607 shrub stems/ha. These shrubs were primarily Sweet Gale and Dwarf Birch about 1.5 to 2 m high. **Edge:** Bordered on the N side (10-30m) by non-persistent emergent wetland and open water of Allouez Bay. Similar wetland was a minimum of 25 m on all other sides. **Topography:** Part of an extensive wetland area (about 200 ha) sheltered from Lake Superior by a long (4 km), narrow (50-600 m) Sand Bar, Wisconsin Point. The plot was 2 km from any industrial or residential development and 0.3 km from a frequently-used road. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 7, 13, 18, 22, 28; July 5, 11, 18; 0545-0900, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 6 (600, 243); Long-billed Marsh Wren, 1; Com. Yellowthroat, 1; Swamp Sparrow, +. **Total:** 4 species; 8 territorial males or females (800/km², 324/100 acres). **Visitors:** Mallard, Sora, Tree Swallow, Bank Swallow, Cliff Swallow. **Remarks:** Nests found: Red-winged Blackbird, 3. The Long-billed Marsh

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Wren territory was associated with the Reed Grass portion of the plot. Com. Yellowthroat and Swamp Sparrow were associated with the Sweet Gale and Dwarf Birch.

196. SEDGE - POTENTILLA WETLAND I. — **Location:** Wisconsin; Douglas Co., S end of Spirit Lake on the St. Louis River; 46°39'48"N, 92°11'53"W, West Duluth, Minn.-Wis. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.2 to 1.2 m, primarily sedge intermixed with Marsh Cinquefoil. Vegetation height varied from the 0.8 to 1 m sedge up to the 1.5 m sparsely distributed Com. Cat-tail. Twenty-three m² sub-plots were measured and by cover showed 75% green vegetation, 6% dead vegetation, and 19% open water. Predominant plant species, which comprised 97% relative cover of all green vegetation, were sedge (54% relative cover, 18% relative frequency), Marsh Cinquefoil (13, 12), Com. Cat-tail (10, 15), Bur-reed (8, 14), Broad-leaved Arrowhead (7, 16), and Wild Calla (5, 9). Nine 16m² sub-plots were measured and showed 138 shrub stems/ha. These shrubs were primarily alder which were found in two small patches near the center of the plot. **Edge:** Bordered on the N (10-30m) by non-persistent emergent wetland and the open water of Spirit Lake. Similar vegetation was a minimum of 50 m on all other sides. **Topography:** See Census 193. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 11, 14, 19, 23, 30; July 6, 13, 19; 0505-0830, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 5 (500, 202), Sora, 1; Long-billed Marsh Wren, 1; Com. Yellowthroat, 1. **Total:** 4 species; 8 territorial males or females (800/km², 324/100 acres). **Visitors:** Mallard, Blue-winged Teal, Wood Duck, Black Tern, Tree Swallow, Bank Swallow, Barn Swallow, Yellow-headed Blackbird, Swamp Sparrow. **Remarks:** The Com. Yellowthroat territory was associated with the two small patches of alder.

197. SEDGE - POTENTILLA WETLAND II. — **Location:** Minnesota; St. Louis Co., 75 m S of the Oliver Bridge and adjacent to the St. Louis River; 46°39'20"N, 92°12'12"W, West Duluth, Minn. - Wis. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.1-0.8m, primarily sedge intermixed with Marsh Cinquefoil and several patches of Com. Cat-tail. Vegetation height varied from the 0.8-1 m sedge to 1.5 m Com. Cat-tail. Twenty-eight m² sub-plots were measured and by cover showed 81% green vegetation, 2% dead vegetation, and 17% open water. Predominant plant species, which comprised 98% relative cover of all green vegetation, were sedge (61% relative cover, 19% relative frequency), Marsh Cinquefoil (15, 13), Broad-leaved Arrowhead (9, 18), Com. Cat-tail (7, 13), and Wild Calla (6, 17). No shrubs were found. **Edge:** Bordered on the E (10-70m) by non-persistent emergent wetland and the open water of the St. Louis River. Similar vegetation was present a minimum of 25 m on all other sides. **Topography:** Similar to Census 192 except the marsh was on the south side of the railroad line and road

(about 75 m) **Elevation:** 185 m **Weather:** See introduction. **Coverage:** June 11, 14, 19, 23, 30; July 6, 13, 19; 0515-1000, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 3.5 (350, 142); Swamp Sparrow, 1.5. **Total:** 2 species; 5 territorial males or females (500/km², 202/100 acres). **Visitors:** Mallard, Virginia Rail, E. Kingbird, Tree Swallow, Bank Swallow, Barn Swallow. **Remarks:** Nest found: Red-winged Blackbird 1. This plot showed a definite patchiness in cat-tail vegetation and the Red-winged Blackbird territories were closely associated with the its distribution.

198. SEDGE WETLAND I. — **Location:** Wisconsin; Douglas Co., SE end of Allouez Bay in the Duluth-Superior Harbor; 46°40'55"N, 91°58'48"W, Parkland, Wis.-Minn. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with 25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.3 to 1 m, primarily sedge with small amounts of Broad-leaved Arrowhead and Marsh Cinquefoil. Vegetation height varied from the 1 m sedge to 1.5 m scattered Bur-reed (*Sparganium eurycarpum*) and Com. Cat-tail. Thirty-five m² sub-plots were measured and showed by cover 75% green vegetation, 2% dead vegetation, and 23% open water. The predominant plant species, which comprised 89% relative cover of all green vegetation were sedge (63% relative cover, 18% relative frequency), Broad-leaved Arrowhead (10, 18), Marsh Cinquefoil (10, 8), and Bur-reed (6, 17). There were no shrubs. **Edge:** Bordered on the E (10-50 m) by non-persistent

emergent wetland and the open water of Allouez Bay. Similar wetland a minimum of 50m on all other sides. **Topography:** Similar to Census 195 except the plot was 0.5 km from the road. **Elevation:** 185 m. **Weather:** See introduction. **Coverage:** June 7, 13, 18, 22, 28; July 5, 11, 18; 0445-1000, CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 5 (500, 202); Sora, 2.5; Mallard, 1; Am. Coot, 1; Long-billed Marsh Wren, +. **Total:** 5 species; 9.5 territorial males or females (950/km², 385/100 acres). **Visitors:** Great Blue Heron, Mallard, Black Duck, Blue-winged Teal, Am. Wigeon, Wood Duck, Virginia Rail, Black Tern, Tree Swallow, Cliff Swallow, Swamp Sparrow. **Remarks:** Nests found: Red-winged Blackbird, 4; Sora, 1; and Am. Coot, 1. The determination of Mallard "territory" was based on three separate day sightings of females and four separate day sightings of a males in a limited section of the plot. On June 18 about 250 ducks flew from the plot and adjacent area, primarily ♂ Mallard, Black Duck, Blue-winged Teal, and Am. Wigeon. During vegetation analysis on July 27, 2000+ Cliff, Bank, Barn, and Tree Swallows, and Purple Martins were observed sitting on Cat-tail heads and/or feeding over the plot and adjacent area.

199. SEDGE WETLAND II. — **Location:** Wisconsin; Douglas Co., mouth of the Nemadji River at confluence with the Superior Harbor Basin in the Duluth-Superior Harbor; 46°41'58"N, 92°01'40"W, Superior, Wis.-Minn. Quadrangle, USGS. **Continuity:** New. **Size:** 1 ha = 2.47 acres (square, measured with

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25 m rope and compass). **Description of Plot:** A persistent emergent wetland, which varied in depth from 0.1 to 1 m, primarily sedge in hummocks with small amounts of Bur-reed and patches of Wild Calla in deeper water. Vegetation height was predominantly between 0.7 and 1 m sedge and up to 1.5 m where the sparsely distributed Cat-tail patches were found. Thirty m² sub-plots were measured and by cover showed 55% green vegetation, 6% dead vegetation, and 39% open water. Predominant plant species, which comprised 92% relative cover of all green vegetation, were sedge (60% relative cover, 27% relative frequency), Bur-reed (13, 14), Wild Calla (9, 14), Com. Cat-tail (5, 9), and Marsh Cinquefoil (5, 14). Twelve 16m²/sub-plots were measured for shrubs and showed 104 shrub stems/ha. These shrubs were either alder or willow. **Edge:** Bordered on the E (10-30 m) by the Nemadji River. Similar vegetation was a minimum of 25 m on all other sides. **Topography:** Part of an extensive wetland area at the mouth of the Nemadji River; 300 m from an infrequently used railroad line, 500 m from a four-lane U.S. Highway, and 250 m from an active ore dock. **Elevation:** 185 m. **Weather:** See introduction. **Cover:** June 7, 13, 18, 22, 28; July 5, 11, 18; 0505-1005 CDT. Total man-hours: 5. **Census:** Red-winged Blackbird, 3.5 (350, 142). **Total:** 1 species; 3.5 territorial males or females (350/km², 142/100 acres). **Visitors:** Mallard, E. Kingbird, Tree Swallow, Purple Martin. **Remarks:** Nests found: Red-winged Blackbird, 2. The combination in the lack of cat-tail heads or other song posts, the lack of both

species and structural diversity in the vegetation, and the industrial noise from the ore dock probably influenced the density and diversity of bird species found on this plot.

200. 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; 5 consecutive years. **Size:** 40.47 ha = 100 acres. **Description of Plot:** See AB 31:84-85 (1976). **Weather:** All clear days with moderate breeze. **Coverage:** Apr. 17, 25; May 2, 22-23, June 1, 5, 28; July 1; between dawn and 1100. Total man-hours: 32. **Census:** Red-winged Blackbird, 27 (67, 27); Song Sparrow, 16 (40, 16); Yellow-headed Blackbird, 15 (37, 15); Tree Swallow, 10 (25, 10); Com. Yellowthroat, 10; Redhead, 9 (22, 9); Mallard, 8 (20, 8); Ring-necked Duck, 8; Willow Flycatcher, 8; Yellow Warbler, 8; Pine Siskin, 8; Canada Goose, 6 (15, 6); Black-capped Chickadee, 6; Am. Robin, 6; Brown-headed Cowbird, 6; Chipping Sparrow, 6; Wood Duck, 5 (12, 5); Am. Coot, 5; Red-breasted Nuthatch, 5; Barn Swallow, 4 (10, 4); Mountain Chickadee, 4; Swainson's Thrush, 4; Dark-eyed Junco, 4; Pied-billed Grebe, 3 (7, 3); Com. Goldeneye, 3; Osprey, 3; W. Flycatcher, 3; Long-billed Marsh Wren, 3; Ruby-crowned Kinglet, 3; Cassin's Finch, 3; Ruffed Grouse, 2; Mourning Dove, 2; Calliope Hummingbird, 2; Com. Flicker, 2; Olive-sided Flycatcher, 2; Hammond's Flycatcher, 2; Violet-green Swallow, 2; Townsend's Solitaire, 2; Varied Thrush, 2; Cedar Waxwing, 2; Yellow-

rumped Warbler, 2, Am. Redstart, 2, Evening Grosbeak, 2; Green-winged Teal, 1; Ruddy Duck, 1; Cooper's Hawk, 1; Prairie Falcon, 1; Am. Bittern, 1; Sora, 1; Com. Nighthawk, 1; Downy Woodpecker, 1; Dusky Flycatcher, 1; W. Wood Pewee, 1; Rough-winged Swallow, 1; Com. Raven, 1; Hermit Thrush, 1; Solitary Vireo, 1; Orange-crowned Warbler, 1; MacGillivray's Warbler, 1; Brewer's Blackbird, 1; W. Tanager, 1; White-crowned Sparrow, 1; Great Blue Heron, +; Belted Kingfisher, +; Pileated Woodpecker, +; Clark's Nutcracker, +; Black-billed Magpie, +; Chestnut-backed Chickadee, +. **Total:** 68 species; 254 territorial males or females (628/km², 254/100 acres). **Remarks:** Nests found: (29). Canada Goose, 5; Mallard, 2; Wood Duck, 1; Osprey, 3; Prairie Falcon, 1; Am. Coot, 2; Com. Flicker, 2; Willow Flycatcher, 1; Tree Swallow, 6; Yellow Warbler, 1; Com. Yellowthroat, 1; Yellow-headed Blackbird, 1; Red-winged Blackbird, 3. Additional fledglings seen: Pied-billed Grebe, 4; Mallard, 30; Wood Duck, 7; Redhead, 6; Ring-necked Duck, 3; Com. Goldeneye, 10; Am. Coot, 13; Song Sparrow, 4. — MARCELLA M. BISHOP, Shoreline Route, Polson, Mont. 59860.

201. CAT-TAIL-TULE MARSH. — **Location:** California; San Diego Co., Kit Carson Park in Escondido; 33°04'N, 117°03'W, Escondido Quadrangle, USGS. **Continuity:** New. **Size:** 2.79 ha = 6.89 acres (nearly rectangular, averaging 250 × 1200 ft, determined by compass and measured cord). **Description of Plot:** A freshwater marsh which lacks open water. Emergent vegetation occupies 75% of the plot; the remainder is sagebrush and wet meadow. Common Cat-tail (*Typha latifolia*) and Tule (*Scirpus acutus*) are dominant. Arroyo Willow (*Salix lasiolepis*) occurs as scattered specimens less than 15 ft high. Other prominent plants include Yerba Mansa (*Anemopsis californica*), *Juncus sparganium*, and *Carex*, spp. California Sagebrush (*Artemisia californica*) occupies the high ground on the E and W borders. **Edges:** Bordered by roads on the N and E, by graded fields on the W, and wet meadows on the S. **Topography:** 340-360 ft. S slope. **Weather:** Typical of the season following a winter of near-record rainfall. **Coverage:** Apr. 1, 7, 10, 21, 28; May 5, 12, 26; June 2, 9, 23; 0400-1600, PST. Total man-hours: 15. **Census:** Tricolored Blackbird, 350 non-territorial females (12,552, 5080); Com. Yellowthroat, 16 (574, 232); Song Sparrow, 12 (430, 174); Red-winged Blackbird, 8 females (287, 116). **Total:** 4 species; 386 non-territorial and territorial males and females (13,843, 5602); 34 territorial males and females (1219/km², 493/100 acres). **Remarks:** Most nearby marshland was inundated by Lake Hodges following last winter's rains. — KENNETH L. WEAVER, 1339 Taylor Pl., Escondido, Calif. 92027.

202. 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:** New. **Size:** Entire property: 7.87 ha = 19.46 acres; study area: 5 ha = 12.4 acres. The entire property was censused, but the plot will be changed when saltwater is allowed to reenter. Census numbers refer to the entire property. **Description of Plot:** Three types of areas are in the central study area: 1)

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highly disturbed with small barren patches of ground with a variety of escaped cultivated grasses, Brass-buttons (*Cotula coronopifolia*), Bird's-foot Trefoil (*Lotus formosissimus*), Salt Rush (*Juncus lesueurii*), Saltbush (*Atriplex patula* ssp. *hastata*) and Curly Dock (*Rumex crispus*); 2) a freshwater marsh, spring-fed but supplemented by precipitation from mid-autumn to mid-spring, with Com. Cat-tail (*Typha latifolia*), Red Alder (*Alnus oregona*), willow (*Salix* sp.), Water Celery (*Oenanthe sarmentosa*) and Marsh Pennywort (*Hydrocotyle ranunculoides*); 3) areas of remnant salt marsh with Pickleweed (*Salicornia virginica*), Salt Grass (*Distichlis spicata*), Arrow-grass (*Triglochin maritima*), Ditch-grass (*Ruppia maritima*) and Cord Grass (*Spartina foliosa*). Ground cover is approximately 60% disturbed, 30% freshwater marsh and 10% remnant salt marsh. Within the property but outside of the central study area, Freshwater Slough (tidal) borders on the E and N, and a cut bank and a hillside on the W. Along the fences or dikes outlining the property are Coyote Brush (*Baccharis pilularis* ssp. *consanguinea*), Wax-myrtle (*Myrica californica*) and California Blackberry (*Rubus vitifolius*). **Edge:** The S-W edge is within 0.1 mi of the residential area in a Redwood (*Sequoia sempervirens*), Douglas-fir (*Pseudotsuga menziesii*) and Sitka Spruce (*Picea sitchensis*) forest. A road and old storage buildings border to the S. The remainder is surrounded by pasturelands with marshy areas. **Topography:** Generally flat; sea level. **Weather:** Temperature 60-70°F. Most days were foggy. **Coverage:** June 12-14, 18, 20-23; 0630-1100. Total man-hours: 16. **Census:** Song Sparrow, 7 (89, 36); Long-billed Marsh Wren, 3 (38, 15); Brown-headed Cowbird (females), 3; Savannah Sparrow, 3; California Quail, 2; W. Flycatcher, 2; Com. Flicker, 1; Swainson's Thrush, 1; Starling, 1; Com. Yellowthroat, 1; House Sparrow, 1; Black-headed Grosbeak, 1; Black Phoebe, +; Chestnut-backed Chickadee, +; Am. Robin, +; Warbling Vireo, +; Orange-crowned Warbler, +; Wilson's Warbler, +; Red-winged Blackbird, +; Brewer's Blackbird, +; White-crowned Sparrow, +. **Total:** 21 species; 26 territorial males or females (330/km², 134/100 acres). **Visitors:** Species seen foraging in the area on at least two censuses: Great Blue Heron, Green Heron, Great Egret, Snowy Egret, Black-crowned Night Heron, Turkey Vulture, White-tailed Kite, Am. Kestrel, Virginia Rail, Mourning Dove, Vaux's Swift, Belted Kingfisher, Ring-billed Gull, Violet-green Swallow, Tree Swallow, Rough-winged Swallow, Barn Swallow, Cliff Swallow, Am. Goldfinch. **Remarks:** This area was originally salt marsh and grazing land. In the late 1930s a local mill put in some dikes along Freshwater Slough for access by trains. In the late 1950s another mill used the area as a log pond after building dikes in their present locations and equipping the northern dike with a tidegate. It was abandoned in 1967, and the land leveled in 1969. Although the dikes remain high enough to restrain the tidal action, the original tidegate does not hold out all of the salt water. Since abandoned, the pond has flooded with fresh water in winter and dried out in summer. The northern dike is expected to be breached in 1980. Saltwater will be allowed to reenter after the original dikes have been reinforced and a new dike built to

separate the freshwater marsh from the rest of the area. About 1-6 pairs of Am. Goldfinches nested after the censusing was completed. Special thanks to Dave Claycomb for the vegetation analysis. 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.

203. FRESHWATER MARSH. —

Location: California; Imperial Co., 5 mi NW of Calipatria, starting at bridge over Alamo River on Garst Rd., in the NE ¼ m of Sec. 22, T11S, R13E, Niland Quad., USGS 33°13'N, 115°35'W. **Continuity:** New. **Size:** 20 ha = 49.4 acres (rectangular, 200 × 1000 m, measured with steel tape). **Description of Plot:** Heavily polluted water of the Alamo River joins the saline water of the Salton Sea to produce a small area of marsh along each of two dikes. Estimates of subhabitat sizes are: *Typha* marsh 4 ha, *Tamarix* marsh 0.6 ha, mudflat 0.05 ha, riverbank 1 ha, open water 14 ha. Plant species present were Com. Cat-tail (*Typha latifolia*), Tamarisk (*Tamarix ramossissima*), Giant Reed (*Phragmites communis*), Four-winged Saltbush (*Atriplex canescens*), a few *Baccharis* sp., and the herbaceous weeds Heliotrope (*Heliotropium curassavicum*), Canary Grass (*Phalaris minor*), Saltgrass (*Distichlis spicata*), and Sorrel (*Rumex* sp.). Small distinct marshes were formed from stands of cat-tail and submerged Tamarisk. Several submerged dead Tamarisk trees provided roosting sites and a very small mudflat provided an area for wading birds. The midline of the plot has two long dredge-spoil dikes bordering the Alamo River. **Edge:** Open water on two long sides, similar brackish habitat on ends. **Topography:** Flat. **Elevation:** -230 ft. **Weather:** 70-100°F during census; clear and sunny, strong wind on two visits. **Coverage:** Apr. 8-9, 14-15; May 4-5, 11-12; 0500-0900, PST. Total man-hours: 32. **Census:** Long-billed Marsh Wren, 22 (110, 45); Com. Yellowthroat, 4 (20, 8); Song Sparrow, 4; Clapper Rail, 3 (15, 6); Brown-headed Cowbird, 3; Great-tailed Grackle, 2; Green Heron, 1.5; Least Bittern, 1; Virginia Rail, 1; Yellow-headed Blackbird, 1; Com. Gallinule, +. **Total:** 11 species; 42.5 territorial males or females (213/km², 86/100 acres). **Remarks:** The plot contained large numbers of non-breeding residents and migrant and wintering waterfowl and shorebirds. Visitors to plot (with maximum number/visit) were: (1) Non-breeding residents: Double-crested Cormorant 10, Great Blue Heron 2, Com. Egret 22, Snowy Egret 9, Black-crowned Night Heron 27, Fulvous Whistling Duck 1, Am. Coot 226, Killdeer 4, Black-necked Stilt 15, Forster's Tern 31, Caspian Tern 1, Mourning Dove 4, Ground Dove 1, Yellow-headed Blackbird 2,000, Red-winged Blackbird 16, House Sparrow 1. Disturbances during the census included bulldozing of dikes during early May and nighttime raccoon hunting with dogs in April and perhaps later. The latter may affect the breeding success of the endangered Yuma Clapper Rail. The increasing salinity of the marsh from irrigation runoff water in the Alamo River and the rising level of the Salton Sea both make this productive habitat very unstable. — LARRY LAPRE, Dept. of Biology, Univ. of Calif., Riverside, Calif. 92521.



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204. ABANDONED FIELD. — **Location:** Pennsylvania; Luzerne Co., 2.6 km NNE of Wapwallopen, Pa.; 41°05'N, 76°07'W, Sybertsville Quadrangle, USGS. **Continuity:** Established 1978 (1979). **Size:** 6 ha = 14.8 acres (irregular rectangle surveyed and measured with staff compass and 60 m tape). **Description of Plot:** An electrical switchyard is located 50 m to the E and an access road divides the plot approximately in half. The field has been abandoned about 10 years. **Vegetation:** A line-intercept method was used to determine species, percent cover, and frequency; 57 herbs, 8 tree seedlings, and 9 shrubs were encountered. Goldenrods (*Solidago rugosa* and *S. canadensis*), 15.6%; grasses, 7.8%; Cinquefoil (*Potentilla simplex*), 5.8%; and Sheep Sorrel (*Rumex acetosella*), 6.7%; were the most important herb species. Flowering Dogwood (*Cornus florida*), 43.6%; White Ash (*Fraxinus americana*), 25.6%; and Gray Birch (*Betula populifolia*), 7.7%; were the commonest tree seedlings present. Gray Dogwood (*C. racemosa*), 50.9%, and Blackberries (*Rubus* spp.), 21%, were the most common shrubs. **Edge:** Bordered on all sides by 16 m of the same habitat, then hardwood forest. **Topography:** Gently N sloping. **Elevation:** 700 ft. **Weather 1978:** Mostly clear with one morning of intermittent light rain, temperatures average 13°C. **Coverage:** May 8, 11, 13, 23, 30; June 1, 6. **Total man-hours:** 7. **Census:** Field Sparrow, 7.5 (125, 51); Song Sparrow, 4 (67, 27); Com. Yellowthroat, 3 (50, 20); Gray Catbird, 1.5; Yellow Warbler, 1.5; Yellow-breasted Chat, 1; Indigo Bunting, 1; Golden-winged Warbler, 0.5; Am. Goldfinch, 0.5; E. Kingbird, +; Brown Thrasher, +; Starling, +; Blue-winged Warbler, +. **Total:** 13 species; 20.5 territorial males (342/km², 139/100 acres). **Remarks:** Nests found (4): Gray Catbird, Yellow Warbler, Yellow-breasted Chat, Field Sparrow. **Weather 1979:** Foggy mornings with temperatures 3-20°C, averaging 11.5°. **Coverage:** May 2, 8, 15-16; June 6, 12-13. **Total man-hours:** 10. **Census:** Field Sparrow, 7 (118, 47); Com. Yellowthroat, 4.5 (76, 30); Song Sparrow, 3.5 (59, 24); Rufous-sided Towhee, 3 (50, 20); Yellow-breasted Chat, 2; Indigo Bunting, 2; Willow Flycatcher, 1; Blue-winged Warbler, 1; Am. Goldfinch, 1; Am. Robin, 0.5; Golden-winged Warbler, 0.5; Cardinal, 0.5; Gray Catbird, +; Starling, +. **Total:** 14 species; 26.5 territorial males (442/km², 179/100 acres). **Remarks:** Nests located (3): 1 Rufous-sided Towhee, 2 Field Sparrow. Special thanks to J. D. Montgomery for his botanical analyses and D. A. Gross for his assistance. The Pennsylvania Power and Light Company provided financial support for this study. — **ROBERT M. RUHE.** *Ichthyological Associates, Inc., R. D. 1. Bewick, Pa. 18603.*

205. OLD FIELD. — **Location:** Pennsylvania; Schuylkill Co., 1 mi SW of Weishample; 40°41'N, 76°27'W, Tremont Quadrangle, USGS. **Continuity:** Established 1974; 6 consecutive years. **Size:** 7.12 ha = 17.58 acres. **Description of Plot:** See AB 28:1053 (1974). **Weather:** Cool with temperatures 40°-65°F. Most count days were clear, 1 was cloudy with intermittent showers. **Coverage:** May 26-28; June 5, 12, 18-19, 26; 0530-0830. **Total man-hours:** 8. **Census:** Field Sparrow, 8 (112, 46); Rufous-sided Towhee, 4 (56, 23); House Wren, 3 (42, 17); Com. Yellowthroat, 3; Wood Thrush 2; Cardinal, 2; Indigo Bunting, 2; Gray Catbird, 1; Golden-

winged Warbler, 1, Blue-winged Warbler, 1, Am. Goldfinch, 1; Am. Woodcock, +; Red-eyed Vireo, +; Yellow Warbler, +; Yellow-breasted Chat, +; Brown-headed Cowbird, +. **Total:** 16 species; 28 territorial males or females (394/km², 159/100 acres). **Visitors:** Com. Flicker, Black-capped Chickadee, Tufted Titmouse, Am. Robin, Red-winged Blackbird, N. Oriole, Rose-breasted Grosbeak, Chipping Sparrow. **Remarks:** A Com. Yellowthroat nest was located. The Periodical Cicada (*Magicicada septendecim*) emerged this season and was present in large numbers on the plot and surrounding areas. — **ROLAND BERGNER,** *William Penn Memorial Museum, Box 1026, Harrisburg, Pa. 17120.*

206. 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; 5 consecutive years. **Size:** 6.3 ha = 15.6 acres. **Description of Plot:** See AB 29:1140 (1975). **Coverage:** Apr. 16; May 10, 17, 31; June 12-13, 21; July 5, 20; Aug. 9. **Total man-hours:** 4.5. **Census:** Field Sparrow, 5 (79, 32); Grasshopper Sparrow, 3 (48, 19); House Wren, 2; Indigo Bunting, 2; Gray Catbird, 1; Com. Yellowthroat, 1. **Total:** 6 species; 14 territorial males (222/km², 90/100 acres). **Remarks:** Nests found: House Wren, 2; catbird, 1; Indigo Bunting, 2; Field Sparrow, 2. House Wrens nested in bird boxes erected to attract a pair of E. Bluebirds. Field Sparrows decreased 50% from last year, probably as a result of severe weather this past Feb. — **PAUL W. WOODWARD,** *4117 Virginia St., Fairfax, Va. 22030.*

207. GRASSLAND. — **Location:** West Virginia; Preston Co.; 2.5 mi NNE from Terra Alta; starts at 39°28'18"N, 79°31'29"W, Terra Alta Quadrangle, USGS, and extends NNE. **Continuity:** New. **Size:** 6.07 ha = 15 acres (rectangular, 110 × 660 yds, measured). **Description of Plot:** The area immediately N of Terra Alta is open farmland. In past years Buckwheat was grown extensively but recently most fields have been converted to grassland as the raising of cattle has been more profitable. The plot is typical of the area: a series of fenced fields along a secondary gravel road as centerline, with 3 hayfields totaling 10.5 acres, 2 pastures totaling 4 acres and a half acre swamp. Listed in order of decreasing predominance the hayfields contained: 4.5 acres of Alfalfa (*Medicago sativa*) and Orchard Grass (*Dactylis glomerata*); 3.5 acres of Orchard and Brome Grass (*Bromus secalinus*) and 2.5 acres of Orchard, Brome and Canada Blue Grass (*Poa compressa*). All hayfields contained some weeds such as White Bedstraw (*Galium mollugo*). The only trees were two 18 in. dbh Red Maples (*Acer rubrum*) about 60 ft apart in one hayfield. Both pastures were about the same and contained Canada Blue Grass, Kentucky Blue Grass (*P. pratensis*), Sweet Vernal Grass (*Anthoxanthum odoratum*), and Red Clover (*Trifolium pratense*). There were shrubs in one pasture, several scattered plants and one 30 ft dia. clump of Speckled Alder (*Alnus rugosa*). **Edge:** All fields extended well beyond the limits of the plot. **Weather:** Variable; several showers both day and night during the period. Rather cool.

Coverage June 3-8, 10 trips between dawn and 0800, 2 in late morning and 2 in evening. Total party-hours: 10. **Census:** Red-winged Blackbird, 5 (82, 33); Savannah Sparrow, 4 (66, 27); Bobolink, 3 (49, 20); E. Meadowlark, 2; Song Sparrow, 2; Am. Robin, 1.5; Swamp Sparrow, 0.5; Mallard, +; Com. Flicker, +. **Totals:** 9 species; 18 territorial males (297/km², 120/100 acres). **Visitors:** Green Heron, Great Crested Flycatcher, Barn Swallow, Cliff Swallow, Am. Goldfinch. **Remarks:** The area of roadway was eliminated from the calculations by flagging the sides of the plot 165 ft from the fences instead of the centerline. The road and fences have an effect on the census if only to provide perches and concentrate song. The Bobolinks preferred the field that contained Alfalfa. A pair of Mallards were jumped 3 times from the edge of the swamp. — **GENE HUTTON, BOB RINE, EMILY WILLIAMS, JO WOOD, GEORGE KOCH (compiler), Brooks Bird Club, 707 Warwood Ave., Wheeling, W. V. 26003.**

208. ORCHARD GRASS-TALL FESCUE MEADOW. — **Location:** Illinois, McLean Co., 6 mi S Gridley; T25N, R2E, SE ¼, NW ¼, Sec 5; 40°40'N, 88°54'W, Normal Quadrangle, USGS. **Continuity:** Established 1976; 4 consecutive years. **Size:** 12.1 ha = 30 acres. **Description of Plot:** See AB 31:88-89 (1977). **Coverage:** June 1, 6, 10, 12, 14-15, 17, 19, 23-24; July 1; 0600-0800. Total man-hours: 12. **Census:** Red-winged Blackbird, 15 (124, 50); Dickcissel, 6 (49, 20); Com. Yellowthroat 2; E. Kingbird, 1; E. Meadowlark, 1; W. Meadowlark, 1; Bobolink, 1; Ring-necked Pheasant, +; Barn Swallow, +; Willow Flycatcher, +; Warbling Vireo, +; Am. Goldfinch, +. **Total:** 12 species; 27 territorial males (222/km², 90/100 acres). **Remarks:** The total population declined slightly from past years primarily because of a decrease in Red-winged Blackbirds. The Dickcissel population increased to the original level of 1976 after a population low of 1 bird in 1977. — **DALE E. BIRKENHOLZ, III, State Univ., Normal, Ill. 61761.**

209 SOYBEAN FIELD — **Location:** Indiana; Wabash Co., Pleasant Twp., 0.2 mi SE of Laketon between the Erie-Lackawanna Railroad, Roney Rd., Wabash-Laketon Rd., and Newton Rd. on property of Devon Ogden; 40°58'N, 85°50'W, N. Manchester South Quadrangle, USGS. **Continuity:** New. **Size:** 23.3 ha = 57.7 acres (rectangular, determined by aerial photo). **Description of Plot:** The dominant plant is Soybean (*Glycine max*). An herbicide had been applied at the time of planting and weeds consisted only of a few scattered milkweeds (*Asclepias* sp.) averaging 12 in. The soybeans were planted on May 28 in rows 30 in. apart. The field had not been disturbed since planting and the beans ranged 4-6 in. in height. **Edge:** Bordered on 2 sides by highway with brush-free edge, on 1 side by railroad with scattered brush and small tree edge, and on 1 side primarily by forest. A 200 ft long veal barn is in a corner of the rectangle adjacent to a pit into which manure is pumped. Three dwellings, as well as cornfields, a hayfield, and more forest are directly across highways and railway. **Topography:** Essentially flat, sandy loam soil. **Elevation:** 750 ft. **Weather:** Temperature and precipitation near normal. **Coverage:** June 17-22, 25; 0400-0845 and 1950-2150. Total man-hours: 20. **Census:** Vesper sparrow, 3 (13, 5); Killdeer, 1; Horned Lark, 1. **Total:** 3 species; 5 territorial males (21/km², 9/100 acres). **Visitors:** Am. Robin, Barn Swallow. — **DONALD B. and W. FRANKIE SNYDER, Dept. of Biol., Edinboro State College, Edinboro, Pa. 16444.**

210. ENGLISH WALNUT ORCHARD. — **Location:** California; Glenn Co., on the W bank of the Sacramento R., 3 mi S of Hamilton City (T22N, R1W), 39°44'N, 122°59'W, Ord Ferry Quadrangle, usgs. **Continuity:** New. **Size:** 4.05 ha = 10 acres. **Description of Plot:** Working orchard, all trees English Walnut (*Juglans regia*), spaced 33 ft apart. Lower limbs pruned to 6 ft above ground. No ground cover, shrub layer or understory. Bordered on N by rip-rap river bank and by orchard on other sides. Canopy height

20-30 ft Canopy cover 90% **Weather** Days averaged 5-10°F below normal until mid-July, when the temperatures rose to the normal 100+°. No rain fell; there was little wind. **Coverage:** Daily, 0630-1400 or later; June 1-Aug. 1. **Census:** Am. Robin, 6 (148, 60); Black-headed Grosbeak, 6; Am. Goldfinch, 6; Mourning Dove, 4 (99, 40); Lesser Goldfinch, 4; Yellow-billed Cuckoo, 2 (48, 20); Anna's Hummingbird, 2; Brown-headed Cowbird, 2; House Finch, 2; Lark Sparrow, 2; Downy Woodpecker, 1; (24, 10); W. Kingbird, 1; W. Wood Pewee, 1; Plain Titmouse, 1; N. Oriole, 1; Band-tailed Pigeon, +. **Total:** 16 species; 41 territorial males or females (1013/km², 410/100 acres). **Remarks:** Nests found: Am. Robin, 4; Black-headed Grosbeak, 4; Am. Goldfinch, 3; Mourning Dove, 3; Lesser Goldfinch, 3; Yellow-billed Cuckoo, 2; Anna's Hummingbird, 1. The Band-tailed Pigeon nest was not found, but they were calling and carrying nesting materials. This is the first nesting evidence for this species in the Sacramento Valley. The Yellow-billed Cuckoo nests are particularly significant since it is on the California rare species list and only two previous nests had been found in this region. This study was conducted as a part of an ecological study of the Yellow-billed Cuckoo, sponsored by the California Department of Fish and Game. Special thanks to Ira Compton for use of the orchard, and to Virginia Norris, whose help was invaluable. — **STEPHEN A. LAYMON, 3290 Ackley Road, Lakeport, Calif. 95453.**

211. SMALL TOWN, RESIDENTIAL AND COMMERCIAL AREAS. — **Location:** Canada; New Brunswick; Sackville; 45°54'N, 64°22'W, map sheet 21H/16W; bounded by Bridge, York, Landsdowne, Park, and Salem Streets and Queens Road, and vacant lots along Lorne Street. **Continuity:** New. **Size:** 50.5 ha = 124.8 acres (irregular shape, maximum dimensions approximately 1000 × 675 m, paced). **Description of Plot:** See AB 33:52 (1979). Quantitative sampling of cover (36 uniformly spaced 1/10-acre circles) gave:

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buildings 15%, paved 16%, gravel 5%, lawns 37%, gardens 5%, unmowed fields and margins 11%, hedges and shrubs 7%, trees 3%, cat-tail marsh 1%. Trees (over 5 m) averaged 77/ha = 31/acre, predominantly of exotic species—elm 22%, maples 18%, poplars 13%, birches 12%, spruces 8%, others (cherry, mountain ash, willow, horse chestnut, apple, pine) 29%. Shrubs and saplings averaged 36/ha = 15/acre, while hedges averaged 11/ha = 4/acre, largely of deciduous species.

Weather: May and June averaged slightly above normal temperatures; May was very wet, but June had record low precipitation. Surveys were mostly on fine days, but that on June 10 had mist and drizzle with one shower; 4 were on windy days, 2 with winds reaching force 4 (Beaufort) or more in gusts. Survey temperatures ranged from +1-+16°C. **Coverage:** May 9, 18, 23; June 7, 10, 13, 16, 24, 29; July 2, 4; 0525-0902. Total man-hours: 26. **Census:** House Sparrow, 68 (135, 54); Starling, 27 (53, 22); Am. Robin, 10.5 (21, 8); Com. Grackle, 10 (20, 8); Am. Redstart, 6 (12, 5); Chipping Sparrow, 5 (10, 4); Song Sparrow, 3.5 (7, 3); Red-eyed Vireo, 3 (6, 2); Tree Swallow, 2; Yellow Warbler, 2; Am. Goldfinch, 2; Rock Dove, 1.5; Downy Woodpecker, 1; E. Wood Pewee, 1; Tennessee Warbler, 1; Com. Crow, 0.5. **Total:** 16 species; 144 territorial males or pairs (285/km², 115/100 acres). **Visitors:** Of 13 other species recorded on count days, only Gray Catbird may have bred on the plot; Com. Flicker, Blue Jay, Black-capped Chickadee, and Brown-headed Cowbird might breed in some years, but not this year. **Remarks:** The House Sparrow density was almost the same as that determined in winter (AB 33:52, 1979), but far fewer Starlings were present than in winter. The abundance of Am. Redstarts was a surprise; other observers also reported this species as commoner than usual in the Maritimes in 1979. The Tennessee Warbler is thought unlikely to have bred, but it sang in the same block for nearly a month. — ANTHONY J. ERSKINE, *Canadian Wildlife Service, Sackville, N. B., Canada EOA 3CO.*

212. VILLAGE, RESIDENTIAL. — **Location:** Ohio, Wyandot Co.; Crawford Township, Carey, on the NW edge, S and E of the railroad, N of W Findlay St, approximately 40°57'N, 83°23'15"W; Carey Quadrangle, USGS (measured by pacing, and village map interpretation). **Continuity:** New. **Size:** Approx-

imately 12.1 ha = 30 acres. **Description of Plot:** See AB 31 91 (1977), AB 32 124 (1978) for a generalized village environment. Bounded partially on the E by an extension of West St. **Edge:** Supplied by streets, alleys, vegetation, and buildings; total edge, 2.56 mi, street-edge, 2.17 mi; street trees per mile of street-edge, 66.3; trees mostly Silver Maple (*Acer saccharinum*). **Topography:** Level. **Elevation:** 820 ft. **Coverage:** Almost daily. Total man-hours: 90. **Census:** House Sparrow, 12 (99, 40); Starling, 6 (49, 20); House Wren, 5 (41, 17); Am. Robin, 5; Chimney Swift, 3 (25, 10); Com. Grackle, 3; Song Sparrow, 3; Mourning Dove, 2; Cardinal, 2; Am. Goldfinch, 2; Chipping Sparrow, 2; Screech Owl, 1; Com. Flicker, 1; Downy Woodpecker, 1; Blue Jay, 1; Indigo Bunting, 1. **Total:** 16 species; 50 territorial males (412/km², 167/100 acres). **Remarks:** It is believed that the density of this census being less than the 238 pairs/100 acres in 1976 AB 31:91 (1977) and the 243 pairs/100 acres in 1977 AB 32:110 (1978) was a result of the much larger sizes of the lots and the general lack of dense shrubs or hedges. No cowbirds were observed. — A. H. CLAUGUS, 228 S. Lake St., Carey, Ohio, 43316.

Breeding Bird Populations of Selected Oak-Hickory Forests in Northeastern Kansas

This is the second year that breeding bird censuses have been made on the following six areas. Last year much of the early part of the breeding season was spent in establishing the grids, thus this year's census represents an earlier and, hopefully, more thorough census. Some of the more significant changes were decreases in Wood Thrush and Scarlet Tanager and increases in Kentucky Warbler and Ovenbird.

Weather data are available from a climatological station at the University of Kansas at Lawrence, 12 mi NW of the plots. Conditions were similar to last year. Temperatures were slightly above the norm with a mean low of 64°F and a

mean high of 84°F in June. Precipitation was normal for June with 6.7 in.

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 — ROGER L. BOYD and CALVIN L. CINK, *Biol. Dept., Baker Univ., Baldwin City, Kan. 66006.*

213. OAK - HICKORY FOREST I. — **Location:** Kansas; Douglas Co., on the Univ of Kansas Wall Biological Reserve. Predominantly on the NW ¼, SW¼, Section 28, T-14S, R-20E; 38°48'N, 95°12'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 33:66 (1979). **Coverage:** May 23, June 3, 15, 29; July 3, 6; 0650-1300. Total man-hours: 30.6. **Census:** Blue Jay, 6 (74, 30), Black-capped Chickadee, 6; Downy Woodpecker, 5 (62, 25); Great Crested Flycatcher, 5; E. Wood Pewee, 5; Rose-breasted Grosbeak, 5; Yellow-billed Cuckoo, 4 (49, 20), Red-headed Woodpecker, 4; Tufted Titmouse, 4; White-breasted Nuthatch, 3 (37, 15); Kentucky Warbler, 3; Summer Tanager, 3; Red-bellied Woodpecker, 2; Hairy Woodpecker, 2; Red-eyed Vireo, 2; Whip-poor-will, 1; Com. Flicker, 1; Wood Thrush, 1; Brown-headed Cowbird, 1; Cardinal, 1; Indigo Bunting, 1; Red-tailed Hawk, +; Chuck-will's-widow, +; Ovenbird, +; Louisiana Water-thrush, +; N. Oriole, +. **Total:** 26 species, 65 territorial males (803/km², 325/100 acres). **Visitors:** Bobwhite, Barn Swallow, Com Crow, Am. Robin, Swainson's Thrush, Black-and-white Warbler, Tennessee Warbler, Com Grackle. **Remarks:** Breeding activity observed Yellow-billed Cuckoo (flightless young), Com Flicker (nest), Red-bellied Woodpecker (female feeding young), Red-headed Woodpecker (2 nests), Downy Woodpecker (nest and another pair feeding young), Rose-breasted Grosbeak (male feeding young).

214. OAK - HICKORY FOREST II. — **Location:** Kansas; Douglas Co., on the Univ of Kansas Breidenthal Biological Reserve and Cedar Crest Wildlife Refuge (Cliff Woods)



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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. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 33:66 (1979). **Coverage:** May 1; June 1, 9, 17, 29; July 4; 0730-1330. Total man-hours: 15. **Census:** Downy Woodpecker, 5 (62, 25); Red-headed Woodpecker, 4 (49, 20); Blue Jay, 4; Yellow-billed Cuckoo, 3 (37, 15); Great Crested Flycatcher, 3; Tufted Titmouse, 3; White-breasted Nuthatch, 3; Hairy Woodpecker, 2; E. Wood Pewee, 2; Black-capped Chickadee, 2; Red-eyed Vireo, 2; Ovenbird, 2; Brown-headed Cowbird, 2; Kentucky Warbler, 1.5; Summer Tanager, 1.5; Indigo Bunting, 1.5; Red-tailed Hawk, 1; Mourning Dove, 1; Chuck-will's-widow, 1; Whip-poor-will, 1; Cardinal, 1; Barred Owl, +; Com. Flicker, +; Red-bellied Woodpecker, +; Com. Crow, +; N. Parula, +; Rose-breasted Grosbeak, +; Am. Goldfinch, +. **Total:** 28 species; 46.5 territorial males (575/km², 233/100 acres). **Visitors:** Broad-winged Hawk, Barn Swallow, Purple Martin, Swainson's Thrush, Black-throated Green Warbler, Com. Grackle, Scarlet Tanager. **Remarks:** Single nests found: Chuck-will's-widow, Summer Tanager, White-breasted Nuthatch was feeding young.

215. 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. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 33:66-67 (1979). **Coverage:** May 23; June 1, 5, 9, 11, 14, 19, 30; 0645-1240 and 1845-2015. Total man-hours: 25. **Census:** Great Crested Flycatcher, 5 (62, 25); Blue Jay, 5; Red-eyed Vireo, 5; Kentucky Warbler, 5; Yellow-billed Cuckoo, 4 (49, 20); Downy Woodpecker, 4; Black-capped Chickadee, 4; Tufted Titmouse, 4; Rose-breasted Grosbeak, 4; E. Wood Pewee, 3 (37, 15); White-breasted Nuthatch, 3; Brown-headed Cowbird, 3; Cardinal, 3; Red-headed Woodpecker, 2; Hairy Woodpecker, 2; Wood Thrush, 2; Ovenbird, 2; Louisiana Waterthrush, 2; Barred Owl, 1; Whip-poor-will, 1; Com. Flicker, 1; Red-bellied Woodpecker, 1; Brown Thrasher, 1; N. Parula, 1; N. Oriole, 1; Scarlet Tanager, 1; Summer Tanager, 1; Red-tailed Hawk, +; Black-billed Cuckoo, +; Screech Owl, +; Chuck-will's-widow, +; Ruby-throated Hummingbird, +; Am. Robin, +; Blue-gray Gnatcatcher, +; Indigo Bunting, +. **Total:** 35 species; 71 territorial males (877/km², 355/100 acres). **Visitors:** E. Phoebe, Willow Flycatcher, House Wren, Swainson's Thrush, Yellow-throated Vireo, Mourning Warbler, Am. Redstart, Com. Grackle. **Remarks:** Breeding activity observed: Yellow-billed Cuckoo (nest), Barred Owl (nest), Whip-poor-will (nest), Red-headed Woodpecker (nest), Louisiana Waterthrush (female carrying nesting material), Kentucky Warbler (1 nest, 2 other pairs feeding young), Rose-breasted Grosbeak (female carrying nest material).

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

Established 1978 **Size** 8.1 ha = 20 acres
Description of Plot: See AB 33:67 (1979). **Coverage:** May 25, 29; June 5, 12, 13, 20, 25, 29; 0700-1150. Total man-hours: 18. **Census:** Red-eyed Vireo, 5 (62, 25); Yellow-billed Cuckoo, 4 (49, 20); Great Crested Flycatcher, 4; E. Wood Pewee, 3 (37, 15); Blue Jay, 3; Tufted Titmouse, 3; White-breasted Nuthatch, 3; Whip-poor-will, 2; Downy Woodpecker, 2; Black-capped Chickadee, 2; Wood Thrush, 2; Kentucky Warbler, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Cardinal, 2; Chuck-will's-widow, 1; Red-bellied Woodpecker, 1; Red-headed Woodpecker, 1; Hairy Woodpecker, 1; N. Oriole, 1; Scarlet Tanager, 1; Rose-breasted Grosbeak, 1; Great Horned Owl, +; Mourning Dove, +; Com. Grackle, +. **Total:** 25 species; 48 territorial males (593/km², 240/100 acres). **Visitors:** Red-tailed Hawk, Bobwhite, Barn Swallow, Com. Flicker, Com. Crow, Am. Goldfinch. **Remarks:** Nests found: Yellow-billed Cuckoo, Whip-poor-will, Downy Woodpecker, Red-eyed Vireo and Cardinal.

217. 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°9'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 33:67 (1979). **Coverage:** May 28, 30; June 6, 10, 13, 17, 19, 24, 26; 0630-1430. Total man-hours: 22. **Census:** Blue Jay, 4 (49, 20); Red-eyed Vireo, 4; Yellow-billed Cuckoo, 3 (37, 15); Great Crested Flycatcher, 3; Tufted Titmouse, 3; Wood Thrush, 3; Ovenbird, 3; Kentucky Warbler, 3; Downy Woodpecker, 2; E. Wood Pewee, 2; Black-capped Chickadee, 2; White-breasted Nuthatch, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Cardinal, 2; Rose-breasted Grosbeak, 2; Whip-poor-will, 1; Red-headed Woodpecker, 1; Louisiana Waterthrush, 1; Scarlet Tanager, 1; Red-tailed Hawk, +; Mourning Dove, +; Com. Flicker, +; Red-bellied Woodpecker, +; Am. Robin, +; Blue-gray Gnatcatcher, +; N. Oriole, +. **Total:** 27 species; 46 territorial males (568/km², 230/100 acres). **Visitors:** Turkey Vulture, Chuck-will's-widow, Rough-winged Swallow, Carolina Wren, N. Parula, Gray Catbird, Indigo Bunting, Am. Goldfinch. **Remarks:** Nests found: Yellow-billed Cuckoo, Blue Jay, Wood Thrush, Red-eyed Vireo, Cardinal. Ovenbirds were observed feeding fledged young.

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218. OAK - HICKORY FOREST VI. —

Location: Kansas, Douglas Co., West Beisecker Woods. Predominantly on the SW ¼, NE ¼, Section 35, T-14S, R-20E; 38°48'N, 95°9'W, Baldwin City Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 8.1 ha = 20 acres. **Description of Plot:** See AB 33:67 (1979). **Coverage:** May 28, 30; June 6, 10, 13, 17, 19, 24, 26; 0630-1530. Total man-hours: 20. **Census:** Blue Jay, 4 (49, 20); Red-eyed Vireo, 4; Yellow-billed Cuckoo, 3 (37, 15); Great Crested Flycatcher, 3; Tufted Titmouse, 3; Cardinal, 3; Whip-poor-will, 2; Downy Woodpecker, 2; E. Wood Pewee, 2; Ovenbird, 2; Brown-headed Cowbird, 2; Summer Tanager, 2; Mourning Dove, 1; Chuck-will's-widow, 1; Red-bellied Woodpecker, 1; Hairy Woodpecker, 1; Black-capped Chickadee, 1; White-breasted Nuthatch, 1; Wood Thrush, 1; Rose-breasted Grosbeak, 1; Indigo Bunting, 1; Red-tailed Hawk, +; Great Horned Owl, +; Com. Flicker, +; Kentucky Warbler, +. **Total:** 25 species; 41 territorial males (507/km², 205/100 acres). **Visitors:** Purple Martin, Com. Crow, Am. Robin, Warbling Vireo, N. Oriole, Com. Grackle, Am. Goldfinch. **Remarks:** Nests found: Chuck-will's-widow, Whip-poor-will, Downy Woodpecker, E. Wood Pewee, Blue Jay, Tufted Titmouse, Red-eyed Vireo, and Cardinal.

219. WOODLAND ALONG STREAM ON PRAIRIE. —

Location: Kansas; Lyon Co., 3 mi NNE of Allen; 38°42'N, 96°09'W, Allen Quadrangle, USGS. **Continuity:** Established 1978. **Size:** 12.44 ha = 30.74 acres. **Description of Plot:** See AB 33:80 (1979). **Weather:** Generally wet and cool; temperatures somewhat below normal. The average annual precipitation in Emporia, 20 mi S, is 34 in.

Through July, 27 in had fallen or roughly 80% of the normal yearly amount. **Coverage:** May 28; June 3, 10, 17, 24; July 4. Total man-hours: 17.5. **Census:** House Wren, 15 (121, 49); Yellow-billed Cuckoo, 8 (64, 26); Cardinal, 6.5 (52, 21); Black-capped Chickadee, 5.5 (44, 18); Brown-headed Cowbird, 5 (40, 16); Indigo Bunting, 5; Red-headed Woodpecker, 4 (32, 13); Great Crested Flycatcher, 3.5 (28, 11); E. Wood Pewee, 3.5; N. Oriole, 3 (24, 10); Com. Flicker, 2.5 (20, 8); Blue Jay, 2.5; Rufous-sided Towhee, 2.5; Mourning Dove, 2; Tufted Titmouse, 2; Red-bellied Woodpecker, 1.5; Blue-gray Gnatcatcher, 1.5; Red-tailed Hawk, 1; Bobwhite, 1; Downy Woodpecker, 1; Com. Crow, 1; White-breasted Nuthatch, 1; Starling, 1; Red-eyed Vireo, 1; Green Heron, +; Black-billed Cuckoo, +; Barred Owl, +; Belted Kingfisher, +; Hairy Woodpecker, +; E. Phoebe, +; Willow Flycatcher, +; Warbling Vireo, +; Com. Yellowthroat, +; Blue Grosbeak, +. **Total:** 34 species; 80.5 territorial males or females (647/km², 262/100 acres). **Visitors:** Com. Nighthawk, Chimney Swift, E. Kingbird, Barn Swallow, Rough-winged Swallow, Brown Thrasher, E. Bluebird, Am. Goldfinch, Field Sparrow. **Remarks:** Nests found: Red-tailed Hawk; E. Wood Pewee, 2; House Wren; Cardinal, 2; Rufous-sided Towhee, with 2 towhee eggs and 1 cowbird egg. New to the count were Black-billed Cuckoo, Barred Owl, and Blue Grosbeak. Although these data are scant, certain resident species reflect a reduction in numbers compared with last year. These species include Bobwhite, Red-bellied Woodpecker, Downy Woodpecker, Black-capped Chickadee and Tufted Titmouse. The severe winter of 1979 is suspect. — LARRY HERBERT, Box 2, Allen Kans. 66833.

81st Audubon Christmas Bird Count

Saturday, December 20, 1980 through Sunday, January 4, 1981

A 16-day, three-weekend period

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Count form packets are mailed November 10 to compilers of record. Changes of compilers or addresses should be submitted by October 15, 1980.