

Witch Hazel, Spice Bush, and canopy species saplings occur. Canopy openings are not uncommon, particularly along the cliff bases. Those areas contain heavy growth of *Rubus* sp., Red-berried Elder, and Summer Grape. A quantitative vegetation survey following the method described by F.C. James and H.H. Shugart, Jr. (1970. *Aud. Field Notes* 24:727-736) yielded the following results: Trees, 8 cm diameter and over, based on five 0.04-ha circular samples, 430/ha; total basal area 19.7 m²/ha. Species comprising 90% of the total number of trees [figures after each are trees/ha, relative density (%), relative dominance (%), and frequency (%): Eastern Hemlock 168, 39, 36, 100; Tuliptree 84, 20, 24, 100; American Beech 39, 9, 14, 60; Sugar Maple 39, 9, 6, 80; Yellow Birch 35, 8, 7, 80; Cherry Birch 39, 9, 7, 60; Red Oak 10, 2, 5, 20. Trees by diameter size class [figures after each are trees/ha, relative density (%), basal area in m²/ha, and relative dominance (%): A (7.6–15.2 cm) 94, 22, 87.0, 2; B (15.2–22.9 cm) 74, 17, 2.1, 5; C (22.9–38.1 cm) 133, 31, 9.9, 25; D (38.1–53.3 cm) 94, 22, 15.7, 40; E (53.3–68.6 cm) 30, 7, 8.6, 22; F (68.6–83.8 cm) 5, 1, 2.2, 6. Shrub stems/ha, 9460; ground cover, 67%; canopy cover, 73%; average canopy height, 27.8 m (range 18–36 m). **Edge:** Same forest type to the N and S (hemlock ravine); to the E and W the plot is bounded by massive sandstone outcrops 3–15 m high. The forest type above the cliffs is mature oak-hickory. **Topography and Elevation:** A very small portion of level floodplain along a small stream which transects the plot lengthwise. From the stream to the base of the cliffs, the terrain consists of steep, rugged talus slopes. **Weather:** Mean temperature 15.5°C (range 10–24°C). Temperatures slightly below average, and rainfall slightly above average for the census period. **Coverage:** 29.5 h; 8 visits (morning); 20, 25, 28 May; 4, 11, 23, 30 June; 16 July. **Census:** Acadian Flycatcher, 21.0 territories (99/40 ha); Red-eyed Vireo, 9.0 (42); Ovenbird, 8.0 (38); Wood Thrush, 6.5 (31; 1N); Worm-eating Warbler, 5.5 (26); Black-and-white Warbler, 5.0 (24); Eastern Phoebe, 4.0 (19; 2N); Louisiana Waterthrush, 4.0 (1N); Scarlet Tanager, 3.5 (16); Brown-headed Cowbird, 3.0 (14); Hooded Warbler, 3.0; Black-throated Green Warbler, 2.5; Tufted Titmouse, 2.0; Hermit Thrush, 2.0; Northern Parula, 2.0; Kentucky Warbler, 1.5; Ruby-throated Hummingbird, 1.0; Ruffed Grouse, 1.0; Hairy Woodpecker, 1.0 (N); Pileated Woodpecker, 1.0; Blue Jay, 1.0; Carolina Chickadee, 1.0; Carolina Wren, 1.0; Northern Cardinal, 1.0; Cooper's Hawk, +; Wild Turkey, +; Red-bellied Woodpecker, +; Northern Rough-winged Swallow, +; Solitary Vireo, +; Indigo Bunting, +. **Total:** 30 species; 90.5 territories (426/40 ha). **Visitors:** Turkey Vulture, Red-tailed Hawk, White-breasted Nuthatch, Veery, Yellow-throated Vireo. **Acknowledgments:** Crane Hollow, Inc., and Bill and Jane Ann Ellis.

54. MATURE RED PINE FOREST WITH DECIDUOUS UNDERSTORY

BOSQUE MADURO DE PINO ROJO CON SOTOBOSQUE DECIDUO

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Location: Minnesota; Clearwater Co.; Itasca State Park Wilderness Sanctuary; 47°13'N, 95°12'W; Itasca State Park Quadrangle, USGS. **Continuity:** New. **Size:** 10.0 ha. **Description of Plot:** Part of a state wilderness sanctuary, the mature forest is composed of Red Pine and White Pine that form a 20–25 m canopy. Maple and Quaking Aspen form a fairly dense sub-canopy up to 10 m. The dense understory indicates a succession to deciduous forest, but White Pine seedlings are numerous, particularly along deer trails. Fairly heterogeneous understory opens up on the S edge of the plot where several clearings occur. A 1 ha sedge meadow is near the center. Fire has been absent in this area since the early part of this century. A quantitative vegetation survey following the method described by F.C. James and H.H. Shugart, Jr. (1970. *Aud. Field Notes* 24:727-736) yielded the following results: Trees, 7.6 cm diameter and over, based on 10 0.04-ha circular samples, 642/ha; total basal area 60.9 m²/ha. Species comprising 90% of the total number of trees [figures

after each are trees/ha, relative density (%), relative dominance (%), and frequency (%): Red Pine 138, 21.5, 58.0, 70; dead 118, 18.5, 13.8, 90; maple sp. 101, 15.8, 5.6, 60; Ironwood 94, 14.6, 2.2, 50; Balsam Fir 79, 12.3, 5.5, 70; birch sp. 37, 5.8, 1.9, 50; White Pine 32, 5.0, 10.7, 40. Trees by diameter size class [figures after each are trees/ha, relative density (%), basal area in m²/ha, and relative dominance (%): A (7.6–15.2 cm) 177, 27.7, 1.6, 2.7; B (15.2–22.9 cm) 156, 24.2, 4.3, 7.1; C (22.9–38.1 cm) 116, 18.1, 6.5, 10.6; D (38.1–53.3 cm) 47, 7.3, 4.4, 7.2; E (53.3–68.6 cm) 62, 9.6, 10.3, 16.9; F (68.6–83.8 cm) 42, 6.5, 12.0, 19.9; G (83.8–101.6 cm) 32, 5.0, 14.6, 24.0; H (> 101.6 cm) 10, 1.6, 7.0, 11.5. Shrub stems/ha, 3057; ground cover, 60%; canopy cover, 73%; average canopy height, 21 m. **Edge:** Bordered on W, N, and E by similar forest. **Topography and Elevation:** Basically flat with a few scattered inclines. Elevation 449 m. **Weather:** Mean temperature 9°C (range 7–27°C). **Coverage:** 97 h; 8 visits (7 mornings, 1 evening); 22, 26 June; 1, 3, 6, 8, 9, 10 July. **Census:** Ovenbird, 26.5 territories (106/40 ha); Pine Warbler, 21.5 (86); Black-throated Green Warbler, 12.5 (50); Red-eyed Vireo, 9.5 (38); Hermit Thrush, 7.5 (30); Chestnut-sided Warbler, 5.0 (20); Common Yellowthroat, 5.0; Canada Warbler, 4.0 (16); Eastern Wood-Pewee, 3.0 (12); Great Crested Flycatcher, 3.0; Red-breasted Nuthatch, 3.0; Hairy Woodpecker, 2.5; Scarlet Tanager, 2.5; Ruffed Grouse, 2.0; Downy Woodpecker, 2.0; Mourning Warbler, 1.5; Black-backed Woodpecker, 1.0; Pileated Woodpecker, 1.0; Black-capped Chickadee, 1.0; Brown Creeper, 1.0; Northern Parula, 1.0; Pine Siskin, 1.0; Winter Wren, 0.5; Broad-winged Hawk, +. **Total:** 24 species; 117 territories (470/40 ha). **Visitors:** Blue Jay, American Robin, Black-billed Cuckoo, Yellow-bellied Sapsucker, Gray Jay, Black-and-white Warbler, Song Sparrow, Purple Finch. **Remarks:** Common Yellowthroats were found in the sedge meadow and bog, and Mourning Warblers were restricted to the thick, concentrated deciduous growth. **Other Observers:** David Blockstein. **Acknowledgements:** Anne Braunschwig.

55. MIXED OAK–PINE FOREST I

BOSQUE MIXTO DE ROBLE–PINO I

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Location: Pennsylvania; Luzerne Co.; Wapwallopen; Council Cup Forest; 41°4'N, 76°7'W; Sybertsville Quadrangle, USGS. **Continuity:** Established 1977; 14 yr. **Size:** 6.0 ha. **Description of Plot:** See *Am. Birds* 33:70 (1979). Since 1977 the forest has matured, but the major components remain similar. Dogwoods have declined as a result of leaf anthracnose dieback. **Weather:** Mean temperature 15°C (range 7–25°C). Precipitation during each month was above average. **Coverage:** 24.5 h; 9 visits (mornings); 27 April; 3, 18, 25 May; 6, 12, 20 June; 3, 19 July. **Census:** Black-capped Chickadee, 7.0 territories (47/40 ha); Red-eyed Vireo, 6.5 (43); Ovenbird, 6.0 (40); Eastern Wood-Pewee, 5.0 (33); Brown-headed Cowbird, 5.0; Tufted Titmouse, 4.5 (30); Scarlet Tanager, 4.0 (27); Blue Jay, 3.0 (20); Cedar Waxwing, 3.0; Wood Thrush, 2.5; Downy Woodpecker, 2.0; American Robin, 2.0; Rose-breasted Grosbeak, 2.0; Chipping Sparrow, 2.0; White-breasted Nuthatch, 1.5; Northern Flicker, 1.0; Great Crested Flycatcher, 1.0; Brown Creeper, 1.0; Northern Cardinal, 1.0; Ruffed Grouse, 0.5; Hairy Woodpecker, 0.5; Pileated Woodpecker, 0.5; American Crow, 0.5; Red-tailed Hawk, +; Yellow-billed Cuckoo, +; Black-and-white Warbler, +; Indigo Bunting, +; Northern Oriole, +. **Total:** 28 species; 62 territories (413/40 ha). **Visitors:** Ruby-throated Hummingbird, Mourning Dove, Eastern Kingbird, Blue-gray Gnatcatcher, Common Grackle, American Goldfinch. **Remarks:** Gypsy Moth defoliation was severe in sections of the plot where oaks dominate. Many trees suffered complete defoliation, but most were partially refoliated by 19 July. Many species were observed feeding on Gypsy Moth caterpillars, especially during early and mid-May. A Blue Jay was observed consuming an Ovenbird fledgling on 12 June. A raccoon was actively searching tree cavities and leaf litter on 6 June. **Acknowledgments:** Thanks to Pennsylvania Power and Light Company for support of this project.