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VERMONT

The extent of uncut upper-elevation spruce-fir forest in Vermont has apparently not been thoroughly investigated; and opinions vary. H. W. Vogelmann, retired from the University of Vermont, thinks that the spruce-fir forest, which begins at an elevation of around 2800 feet, has been little cut, especially in the north (1993). On the other hand, according to Diane Burbank of Green Mountain National Forest, one would, as a general rule, be hard pressed to find unlogged upper-elevation sites other than krummholz. For example, a hotel was located just below the summit of Mount Abraham, to which people traveled in carriages; and the forest in the vicinity of the hotel and road was cut (1993). Diane Strohm in the Forest's Manchester District told us that in this district loggers worked as high as 4000 feet, and livestock grazed the sides of the mountain. She thinks that probably the district has unlogged areas at higher elevations, but has not identified specific sites (1993). Timothy Perkins of the University of Vermont, who has studied spruce decline at upper elevations of the state, has become familiar with unlogged areas only on Camel's Hump (1993).

From the Rochester District of Green Mountain National Forest, Bruce Reid reports that it is extremely difficult to distinguish areas that were logged in past centuries from never-cut areas, because recent events have masked past disturbances. Whether a particular area was cut depended on such factors as who was living there and what trails led off the mountain. Generalization on upper elevation forest is therefore not possible, he thinks. In the autumn when visibility is good, he finds traces of horse trails that indicate cutting; and he has found in aerial photographs taken in 1935 evidence of logging at "very high" elevations. Some high-elevation areas were even clear cut.

Nevertheless, Reid believes it is possible to identify upper-elevation spruce-fir areas that have probably experienced minimal human disturbance, although within these areas people may have cut small pockets of trees. The locations include the upper elevations of Mount Ellen, Cutts Peak, Nancy Hanks Peak, Lincoln Peak, and Mount Abraham; the upper elevation forest stretching from just south of Lincoln Gap through Mount Grant, Mount Cleveland, Gillepsie Peak, and Cape Lookoff Mountain, to Mount Horrid; the area around the peak of Goshen Mountain; ridge forest from just south of the Rutland County border through Farr Peak to Bloodroot Mountain; Bear Loaf Mountain, Battell Mountain, Boyce Mountain, Kirby Peak, and Burnt Hill; the area adjacent to and north of the peak of Hat Crown; and high-elevation forest on Worth Mountain. These areas are on or near the Long Trail which runs from north to south through Vermont. Ski runs have been constructed on Mount Ellen, but away from the actual runs the forest has not been disrupted (Reid 1993).

According to the report Significant Features of the Appalachian Trail Corridor in Vermont, the state has at least 10 documented examples of krummholz, twisted and dwarfed trees found near the treeline (Nongame 1991). The database of the Nongame and Natural Heritage Program contains information on only four sites, as the Program has never systematically inventoried this type of community. Most of the krummholz sites in Vermont are dominated by Balsam Fir under six feet in height, accompanied by smaller amounts of birch and Red or Black Spruce. Most of the sites are largely intact, but roads,

trails, ski areas, and radio towers have damaged some (Marshall 1993). Areas with krummholz include Mount Mansfield, Jay Peak in Jay Peak State Forest, Killington and Little Killington Peaks, Pico Peak in Coolidge State Park, Camel's Hump in Camel's Hump State Park, and Mount Ellen (Marshall 1993, Nongame 1991).

The Vermont Nongame and Natural Heritage Program did a significant features inventory of Green Mountain National Forest for the US Forest Service (USFS) between 1990 and 1997. Researchers visited all stands that, according to USFS records, were 150 years or older. In the spring of 2002, USFS released a Notice of Intent to revise the management plan for the Green Mountain Forest (Burbank 2000 and 2002).

In 2002 the Nongame and Natural Heritage Program studied limestone bluff cedar-pine forests along Lake Champlain. In early 2003 they are in the process of writing up their findings. At this point, we can state that a few small patches of remnant forest were found on the tops of inaccessible cliffs near the lake (Sorenson 2003).

The sites described in our text below include a few areas with spruce-fir forest and krummholz. Lower elevation sites of actual and potential old growth, in addition to the sites below, include: **Lords Hill State Natural Area** (Washington County): 13 acres of old-growth beech-birch-maple forest, at least part of which may have been used as a sugar bush, within a 25-acre Natural Area, owned by the Vermont Department of Forests, Parks, and Recreation (VFPR) (Marshall 1993); **Black Island** (Orleans County): approximately 10 acres of Eastern Hemlock, White Pine, and northern hardwoods that comprise a potential (Marshall 1993) or actual (Vogelmann 1993) old-growth site, owned by The Nature Conservancy; **Pitch Pine*** (Windham County), almost 10 acres on the eastern peak of Black Mountain, with the oldest trees dating from between 1790 and 1815 (Holt 1996); **Vernon Black Gum Swamp** (Windham County): an 8-acre old-growth Black Gum-Red Maple swamp, owned by the town of Vernon (Marshall 1993); **McCullough Woods** (Bennington County): 7 acres of potential old-growth rich northern hardwoods, dominated by Sugar Maple, American Beech, and Red Oak, owned by the Vermont Land Trust and The Nature Conservancy (Marshall 1993); **Granville Gulf State Natural Area** (Addison County): within the Natural Area, a 6-acre potential old-growth hemlock-Red Spruce forest, owned by the Vermont Department of Forests, Parks and Recreation (Marshall 1993); **Willard Mountain** (Essex County): roughly 4 acres of Red Pine community, approximately 180 years old, on steep slopes, ledges, and small cliffs overlooking the Connecticut River (Marshall 1993); **Quechee Gorge** (Windsor County): a few acres of old-growth Eastern Hemlock, White Pine, and northern hardwoods (Leverett 1992).

We have not listed as old growth the Fisher-Scott Memorial Pines (Bennington County), although they are often described as old growth. They were found to have grown up in an abandoned field (Leverett 1993, Marshall 1993). Charles Cogbill, who questioned the old growth status of these pines, also has questioned that of the White Pine-hemlock forest in the 22-acre **Cambridge Pines State Natural Area** (Lamoille County) (Marshall 1993).

GREEN MOUNTAIN NATIONAL FOREST

--**The Cape**, also known as Lookoff Mountain, southwestern Vermont (Rutland County). A 295-acre Research Natural Area with approximately 100 acres of old-growth rich northern hardwoods forest (Burbank 2000). The location is a ridge top and a steep slope that faces west. On the ridge top the dominant species are American Beech, Sugar Maple, and Yellow Birch. Red Spruce and Yellow Birch dominate the upper slopes; Sugar Maple, the middle and lower slopes, which have deep soils and abundant wildflowers.

--**White Rocks National Recreation Area**, southwestern Vermont (Rutland County). Approximately 270 acres of Red Spruce on steep talus slopes within the National Recreation Area. Trees are up to 25 inches in diameter, though most are 6 to 11 inches in diameter. Ages of older trees range from 145 to 155 years. Significant Ecological Features of the Appalachian Trail Corridor describes the site as old-growth (Nongame 1991), but the Vermont Natural Heritage Program says that more research is needed to determine the site's status (Marshall 1993).

--**Downer Glen**, in Lye Brook Wilderness Area (Bennington County). One hundred acres of possible old-growth rich northern hardwoods forest in the deep gorge of Bourn Brook. Mature, large hardwoods and hemlock grow on the lower slopes of the gorge. Further research is needed to determine whether the site is old growth.

--**West of Mount Tabor**,* in Big Branch Wilderness, south-central Vermont (Bennington County). Fifty to eighty acres of old-growth mesic northern hardwoods on a steep and "extremely rocky" site. Dominant trees are Sugar Maple and Yellow Birch. Red Spruce, American Beech, and Paper Birch are scattered through the area. In the understory, beech saplings, spruce, Hobble Bush, and Striped Maple are among the dominants. Jennifer Ramstetter of the Vermont Natural Heritage Program conducted a field survey of the site for USFS in 1995 (Burbank 2000).

--**Monastery Mountain**, west-central Vermont (Addison County). Beech-birch-maple forest of unknown acreage on slopes varying from moderate to steep and ledgy. Preliminary research by Charles Cogbill, Chris Fichtel, and Charles Johnson indicates that the site is old-growth forest. Sugar Maple and Yellow Birch, accompanied by lesser amounts of American Beech and White Ash, dominate the site as a whole, but Red Spruce and Eastern Hemlock grow on ledges and the steepest slopes. Tree saplings and Hobble Bush compose the shrub layer (Marshall 1993).

--**French Hollow**,* town of Winhall (Bennington County). Three areas of old growth on a knoll of less than twenty acres. On the north, are large and presumably old Eastern Hemlock, Red Spruce, and Yellow Birch. Saplings of spruce, Balsam Fir, American Beech, and Sugar Maple are present. At the top of the knoll the hemlock are mixed with Sugar Maple, and fir is occasionally present. The understory here shows little regeneration of tree species and is composed mostly of Hobble Bush and Striped Maple. On the south slope, Sugar Maple is the dominant species; hemlock and Yellow Birch are also common. Red Spruce, American Beech, and Sugar Maple are regenerating in the understory, which they share with Hobble Bush. All three areas have large living trees, abundant dead trees, tip ups, hummocks, and snags. The site contains no evidence of logging but logging has occurred recently to the north (Burbank 2000).

Camel's Hump State Forest, west-central Vermont (Chittenden County)

A 10- to 15-acre patch of virgin forest plus extensive old-growth acreage, all on the west side of the mountain. H. W. Vogelmann reports that a doctoral student at the University of Vermont discovered the uncut and unburned area in the spruce-fir zone, after conducting a meticulous study of the cutting history of the mountain. In the spruce-fir zone as a whole (2800 feet to 4000 feet), the cutting occurred in the mid-19th century and was selective, with only a few trees picked. More cutting was done in the hardwoods, but the last cut was in 1954 and 1955 and was selective. The mountain at both the lower and higher elevations has the characteristics and the feel of old growth, Vogelmann says (1990).

Charles Vile, State Lands Forester, writes that during a period of almost 20 years, he has "cruised much of the park below" 2800 feet and walked over much of the rest, but has encountered no "stands," "not cut or disturbed by non-aboriginal people," only some individual trees more than 125 years old. There may, he says, be "isolated clumps of old trees high on the mountains" (Vile 1990).

The Audubon Society Field Guide to Natural Places of the Northeast: Inland, and the Maine State Planning Office both express a point of view similar to that of Vogelmann: "Up to 2600 feet the mountain is covered with a northern hardwood forest in a near-virgin condition. Sugar maple is widespread along with beech and yellow birch. Hobblebush, mountain maple, and striped maple are common shrubs of the understory" (Kulik et al. 1984). "The upper western slopes (2800-3900 feet) . . . support a relatively undisturbed montane boreal forest. The dominant trees vary from red spruce with balsam fir and paper birch at the lower elevation to pure balsam fir at the higher elevation" (Maine Critical Areas 1983).

Battell Biological Preserve, west-central Vermont (Addison County)

Two hundred acres of old-growth hemlock forest on the steep slope of South Mountain. Pockets of hemlock are more than 300 years old; most of the forest is about 180 years old. Sugar Maple, American Beech, and Yellow Birch occur in coves with deeper soil and in forest gaps. The forest has a long history of fire. Middlebury College owns the Preserve (Vogelmann 1964, Marshall 1993).

East Mountain, northeastern Vermont (Essex County)

A 150-acre, old-growth spruce-fir forest on a southwestern slope. At the upper elevation the trees are stunted. Lower down, the stand includes Balsam Fir to 12 inches in diameter, scattered Red Spruce from 16 to 24 inches in diameter, and some old Mountain Paper Birch. Most of the uneven-aged spruce are between 170 and 260 years in age. The only sign of disruption is a telephone right of way. The site is privately owned, and access is by permission from the owners only (Marshall 1993).

Shrewsbury Peak, southwestern Vermont (Rutland County)

Stunted spruce-fir forest. At least a 100-acre protected zone on the summit may be uncut (Nongame 1991).

Mount Mansfield, north-central Vermont (Lamoille County)

More than 100 acres of krummholz, the largest example of krummholz in the state (Marshall 1993). Charles Cogbill has remarked that Mount Mansfield has old growth, especially on the east side (1992). The summit of the mountain is owned by the University of Vermont; the spruce-fir slopes below are in Mount Mansfield State Forest (Vogelmann 1964). Mount Mansfield has been severely fragmented by a ski area.

Killington and Little Killington Peaks, southwestern Vermont (Rutland County).

Krummholz and montane forest. A ski area has been constructed on the mountain, but there are no trails on the west side. The upper western slopes have good stands of montane forest and krummholz (Vogelmann 1993). Marshall (1993) and the report on Significant Ecological Features (Nongame 1991) mention the krummholz.

Hunter Mountain, central Vermont (Washington County)

Old growth on the upper slopes. The mountain is owned by the state (Vogelmann 1993).

Mayo Mountain, northwestern Vermont (Chittenden County)

Sixty acres of possible old growth on the top and steep sides of the mountain. Northern Red Oak and Eastern Hemlock, estimated to be 180 to 240 years old, dominate the site. The oak are up to 43 inches in diameter, and many measure more than 30 inches. The hemlock are 25 inches to 30 inches in diameter. Sugar Maple and American Beech appear with the oak and hemlock in the overstory, which is 60 feet tall on flat and concave areas and 40 feet tall on steep slopes. Eastern Hophornbeam dominates a well-developed understory. On exposed bedrock outcrops, White Pine and very stunted Northern Red Oak appear. Apparently the site underwent grazing in the past. More research is needed to determine its status. The site is privately owned, and access is only by permission of the owner (Marshall 1993).

Daniel's Notch,* north-central Vermont (Lamoille County)

Approximately 50 acres of montane Yellow Birch-Red Spruce forest with old growth characteristics. This forest is at an elevation of 2300 to 2400 feet and includes Sugar Maple, Yellow Birch, Red Spruce, and American Beech. Red spruce is the most abundant species by stem density; individuals were aged at 108 to 232 years. The site is owned by VFPR (Baldwin et al. 1994, Vermont Nongame 2002).

Norton Pond Northwest Arm Swamp,* northeastern Vermont (Essex County)

A 40 acre Northern White-cedar swamp, with scattered White Pine and White Spruce emerging from the canopy. This mature cedar swamp has been selectively logged in the past for White Pine and White Spruce, but has a canopy of cedar trees 140 to 180 years old. The swamp is owned by Vermont Fish and Wildlife Department (Vermont Nongame 2002).

Merck Forest and Farmland Center,* southwestern Vermont (Bennington County)

Two stands of old growth within a 3130-acre center of forests and farmland, owned by a non-profit organization.

Approximately 13 acres of never-logged hemlock on a steep north-facing slope. A wind storm in 1999 blew down part of the stand.

Some 20 or 30 acres of old growth within a larger stand of mixed northern hardwoods dominated by Northern Red Oak. The old growth is mostly red oak and includes 180-year-old trees. Apparently the old-growth portion of the stand was never cleared.

The organization was founded by George Merck, former CEO of Merck and Company, but is not itself associated with the pharmaceutical firm. Although its mission is to teach sustainable forestry and farmland management, it preserves its old growth and other rare habitats (Smith 2002).

Roy Mountain Wildlife Management Area, northern Vermont (Caledonia County)

Two old-growth sites within the 1590-acre Wildlife Management Area, owned by the Vermont Fish and Wildlife Department.

--A 20-acre Northern White-cedar swamp,* with small amounts of Black Ash and Balsam Fir. This mature white-cedar swamp has cedars 191 years old and mature forest structure, although there is evidence of selective logging in approximately 1880 (Vermont Nongame 2002, Alexander 2003).

-- A 37-acre tract, described by the Fish and Wildlife Department as a natural area, with an 8-acre stand of old-growth Red Pine on the upper part of a southwest-facing slope. On the moister soils, the Red Pine is accompanied by Eastern Hemlock; on the rocky ledges, by White Pine. Most of the Red Pine are 6 to 12 inches in diameter; one is 23 inches. Some of the Red Pine are likely to be about 200 years in age. Lower on the slope, northern hardwoods with hemlock replace the pine (Marshall 1993, Vogelmann 1969, Alexander 2003).

Lamphere Woods, southwestern Vermont (Rutland County)

Twenty acres of privately owned potential old-growth hemlock-northern hardwoods forest. The dominant tree is hemlock. Thus the shrub and ground layer are sparse. Much of the history of the forest is unknown, and additional research is necessary to determine if it is actually old growth. However, it appears not to have been disrupted for at least 100 years (Marshall 1993).

Tinker Brook State Natural Area, southeastern Vermont (Windsor County)

Fifteen acres of spruce-fir/northern hardwoods forest on the walls of a steep ravine. Red Spruce, up to 20 inches in diameter, dominates. Hemlock, to 3 feet in diameter, is common in the overstory; Yellow Birch and American Beech in the understory. Trees are up to 240 years old. VFPR owns the site (Marshall 1993).

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