



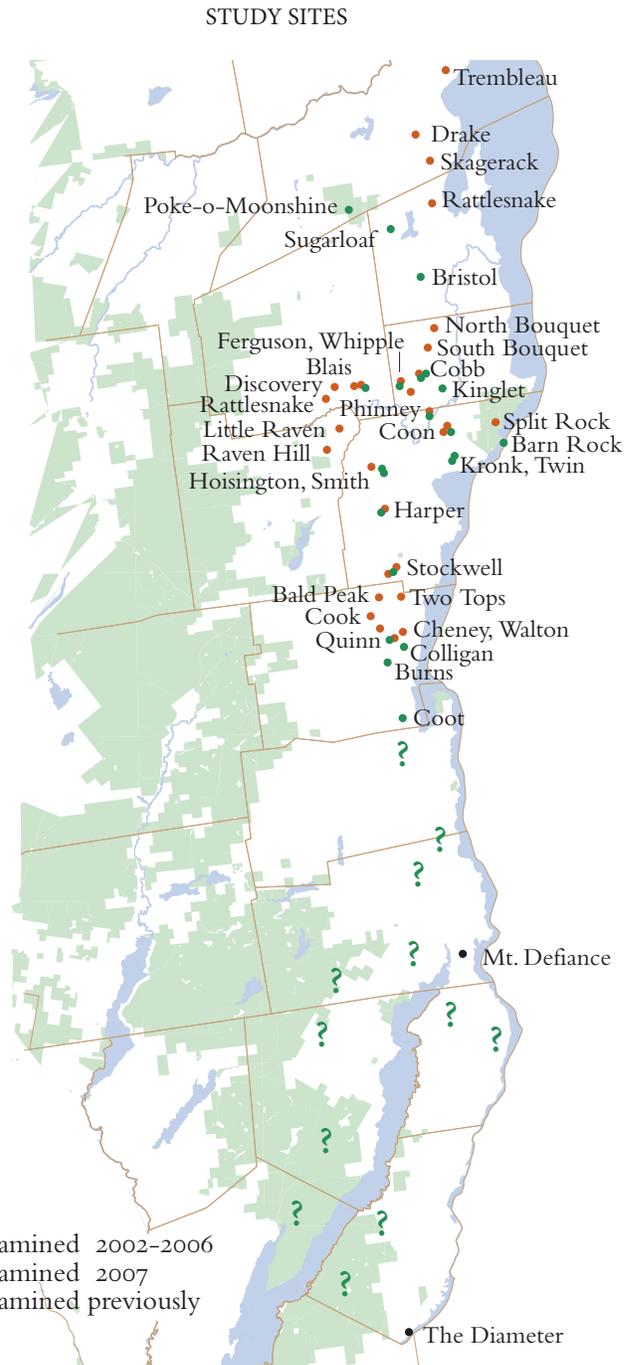
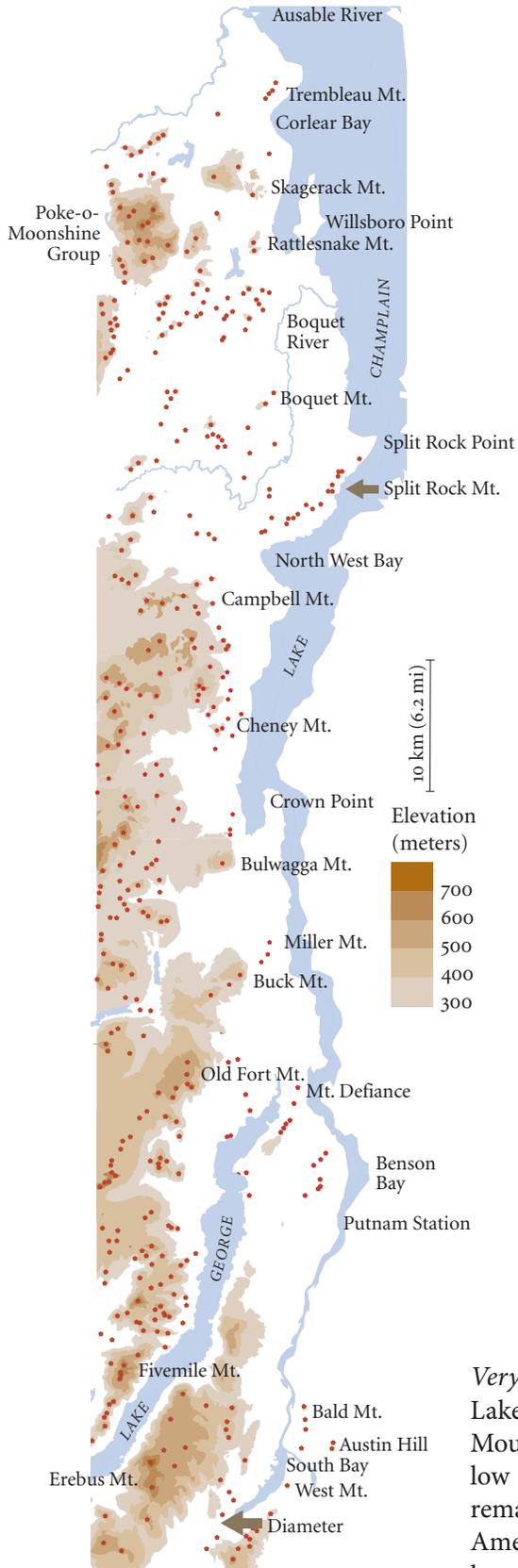
THE WEST CHAMPLAIN HILLS:
THE ADIRONDACK'S FOREST HOTSPOTS

Jerry Jenkins



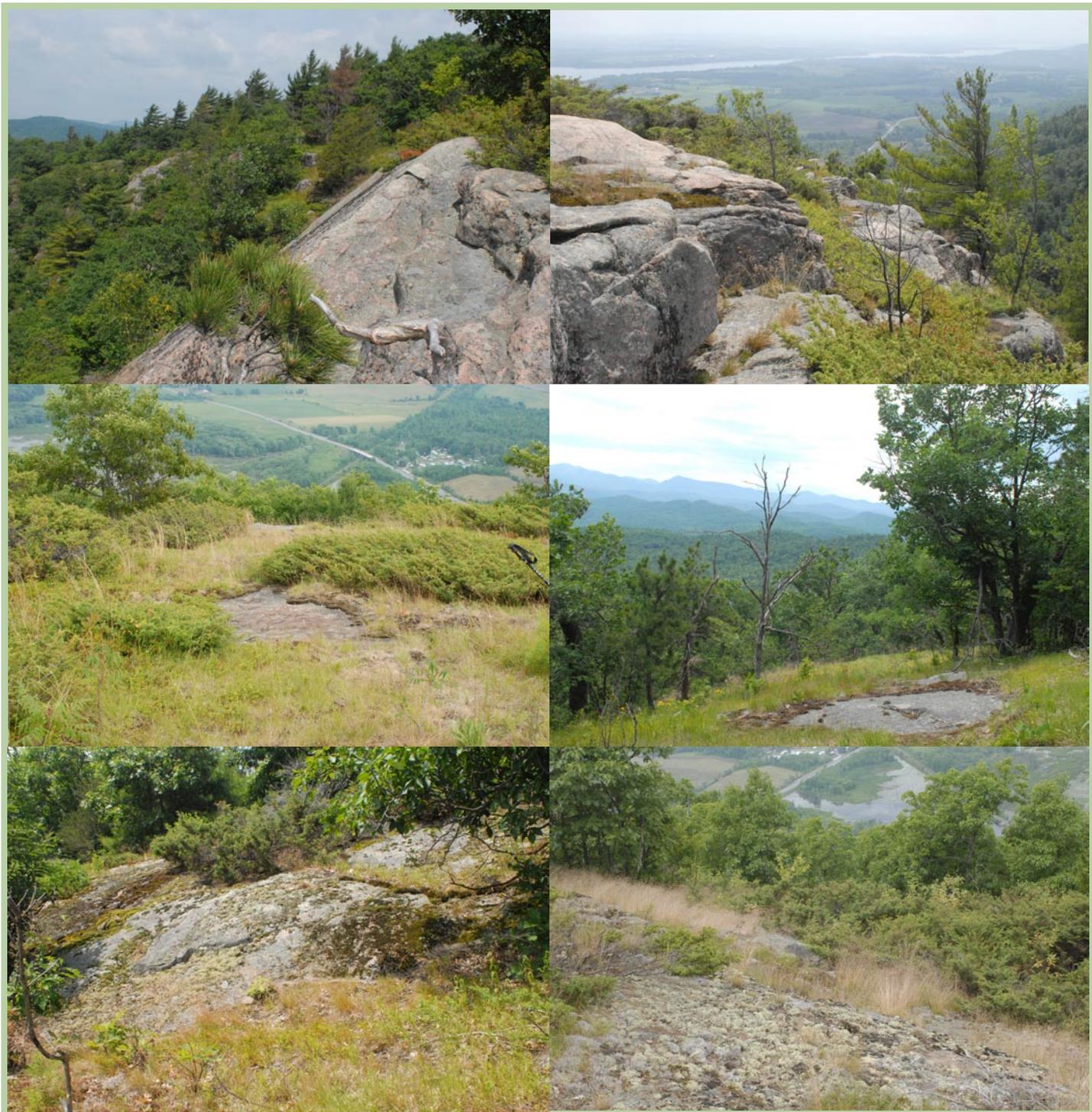
THE ADIRONDACK NATURE CONSERVANCY AND THE WILDLIFE CONSERVATION SOCIETY

MAY 2008



Very Special Hills On the west side of Lake Champlain, where Adirondack Mountains become foothills and low mountains, is to me one of the remarkable landscapes of North America, a mixture of farmed valleys, dense wooded slopes, and rocky hills. From these hills you can look up to the High Peaks to the west, down at the length of the lake before you, and over to the Green Mountains to the east.

In four years of research in these hills, we have discovered that they are as remarkable biologically as they are visually. They contain the richest forest and ledge communities in northern New York, with the most ecologically specialized species, and with more rare plants than any other Adirondack community, or perhaps even than all other Adirondack communities together.



Rocky Islands Many of the Champlain Hills have open summits. In the summer they are sky islands—rocky, picturesque, grassy, private, serene—places of juniper and lichens and stunted trees, lush in wet years, serene and fire-prone in dry ones. The diversity is not exceptional. They have some of the typical plants of acid Adirondack summits, and others that require lime and belong to the Champlain Hills community.

A few of the summits have trails and are favorite picnic spots. Most seem almost unvisited. The moss and lichen mats and the grasses and low shrubs on the rock slabs, all extremely fragile communities and intolerant of trampling, are often continuous and intact. Since the grasses and bryophytes are the barren-summit version of old growth, this is satisfying to the observer who knows what they mean, and how intact mats are elsewhere.



The Ruggedest Hills in the Northeast? The Champlain Hills are made from old, hard rocks that weather to round tops and sheer sides. From the air, with snow outlining the cliffs, their south sides look forbiddingly steep and barren. The steepness comes from glacial plucking, which is most intense on low, small hills. The barrenness from the almost complete lack of surface water, and the thin soils and frequent fires it generates. The two work together, plucking creating an exceptionally dry landscape, and dryness limiting the rockfall that effaces the cliffs of larger mountains. The combined effects are dramatic: taken as a whole, the Champlain Hills may be some of the rockiest small hills in the Northeast.

On the benches between and above the cliffs the terrain is less forbidding but still rugged. The ground is rocky, the forests low and patchy. There are many small trees, some young, some ice-damaged or stunted. There is much moss and grass, suggesting an interesting level of biological detail. And there are occasional big trees, often in notches or below ledges, where they are sheltered from fires and storms but still above where the loggers could reach. The big trees give the hilltop woods strength and weight: they are sparse and broken, certainly, but also old and rugged and lasting.



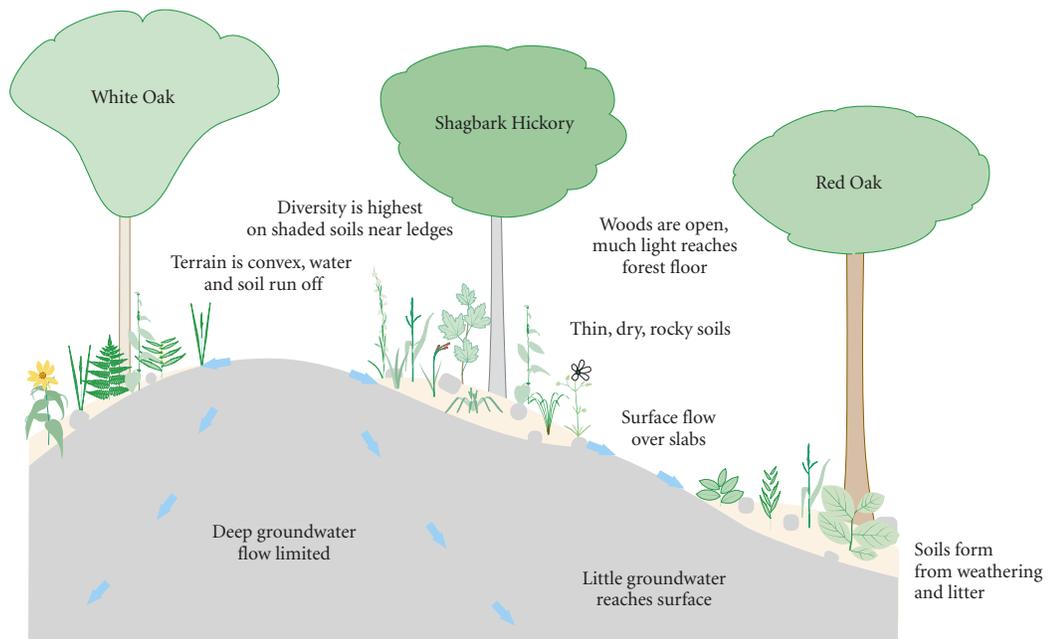
Bright, Rich Woods The late spring woods, in contrast, are park-like and almost lush, with dark slopes and bright glades. The big trees often stand by themselves in openings or in the deeper and moister soils below ledges. The smaller ones, especially the hornbeams stunted hickories, form groves on ledgetops. The ledges themselves, because surface water flows over them, are often surprisingly well vegetated with mosses. And even the isolated boulders, which are the driest microhabitats in the woods, are often capped with mosses or grass.

The most striking feature of these woods is the continuous grass and herb layer. Herb layers are found in almost all woods, but because of the broken canopy and bright forest floor they are particularly significant here. The ones shown are grass dominated, and contain in addition a rich mixture of grasses, sedges, ferns, and flowers—totaling over 25 species at an average site and over 50 at an exceptional one. Many of the species are ecological specialists, associated with limy sites, warm soils, summer drought, or some mixture of the three. No other Adirondack woodlands have a groundlayer flora this rich; few others have one half this rich.



VEGETATED SLAB WITH HICKORIES

RICH GRAMINOID COMMUNITIES

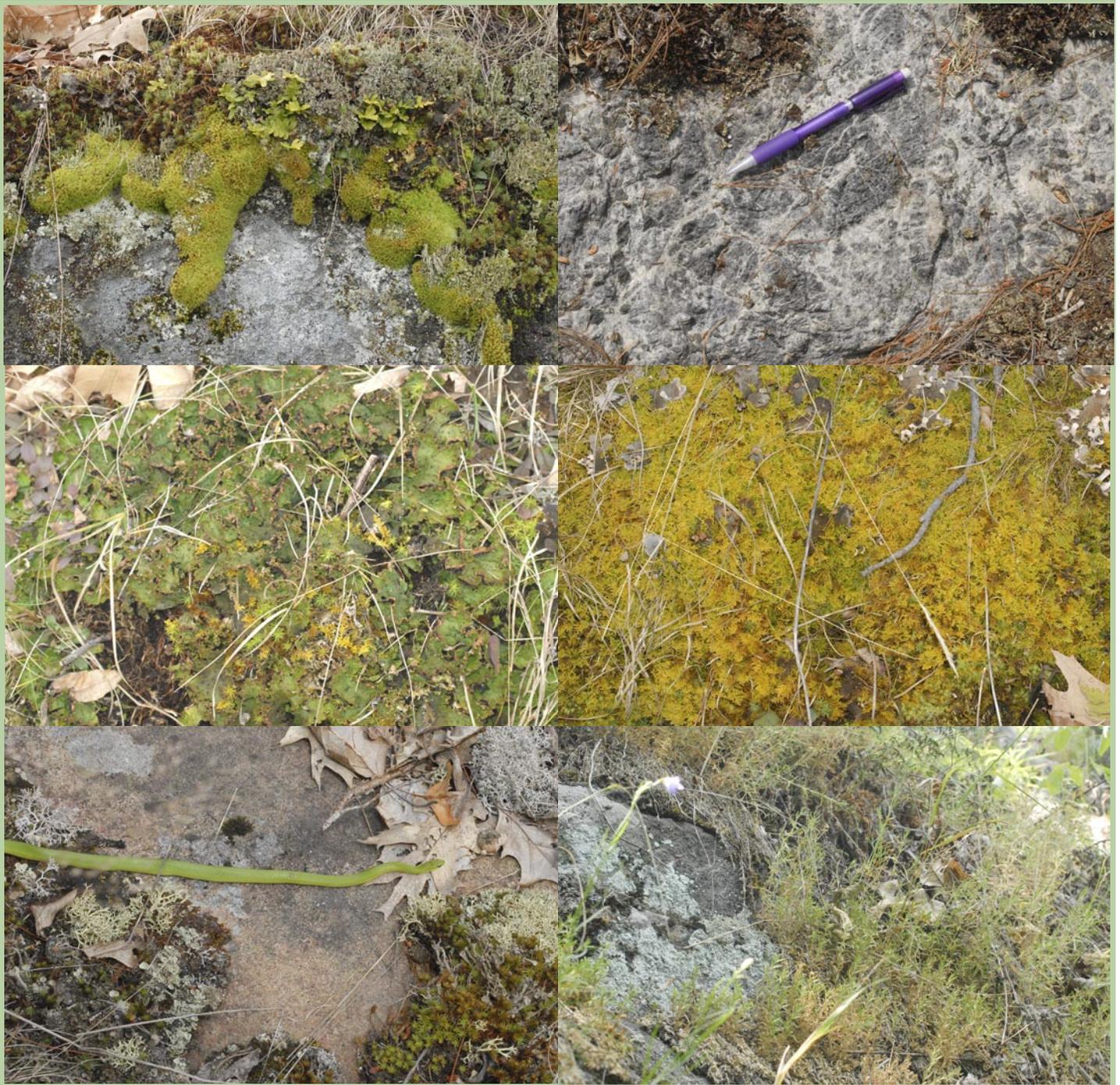


MOSS- AND LICHEN-COVERED LEDGES

OPEN WOODS WITH GLADES

The Champlain Hills Dry-Rich Community The resulting mixture of forests, outcrops and glades is what we call the Champlain Hills Dry-Rich Community. It is a community of dry, rocky and at least somewhat fertile terrain, marked by the wooded glades, oak-zone flora, diverse grass-herb layer, and the dominance of spe-

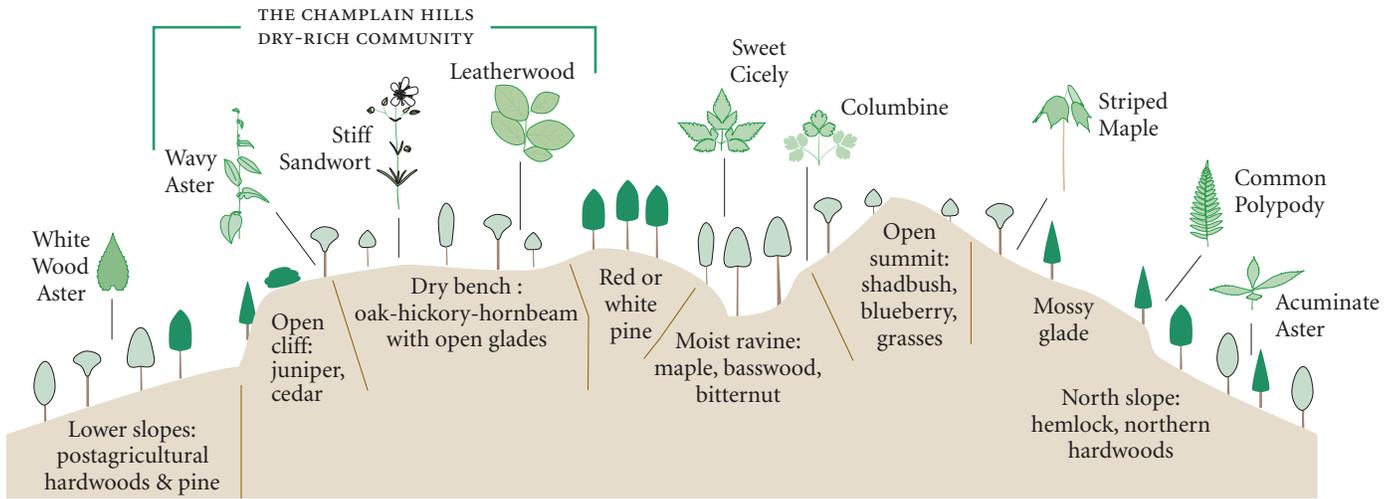
cies that need lime and tolerate extreme dryness. In the Champlain Hills it develops on old meta-igneous rocks. Communities of similar richness but much more limited extent, occur in Vermont on metasediments, and in Massachusetts on basalt.



Bare Rocks and Bare-Rock Plants In a community where soil is limited and water moves near the surface or not at all, the rock surfaces play a major ecological role. They are, like intertidal zones, intermittently wet and somewhat dangerous places, where large or solitary life-forms do poorly, but small colonial ones can prosper. Their plants, despite drought and disturbance, are surprisingly active. They form mats, intercept surface flows, store moisture, build soil, and probably, in time, provide the foundation community over which the larger plants establish. And in so doing they may—we are still not sure—generate ecological patterns that we can learn to read.

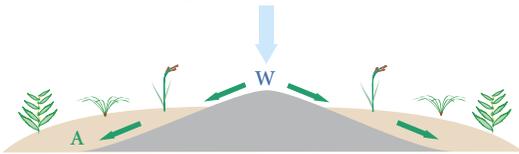
In many years studying this and similar communities, we have learned to attend carefully to the rock-contact plants. As botanists we are interested in their diversity, or, as here, their seeming lack of it. As ecologists we hope to learn something about how larger communities begin. And as naturalists we are nourished by the old image of moss creeping over stone, by the earth colors, and by the contact with small lovely things.

Above, from top left: apple moss, polytrichum, and cladonias; large anorthosite crystals; *Peltigera aphothsa*, with dried sedges; *Thuidium recognitum*, an uncommon moss; a green snake, with cladonia and polytrichum; and harebells and, behind them, a mat of the rare field chickweed.

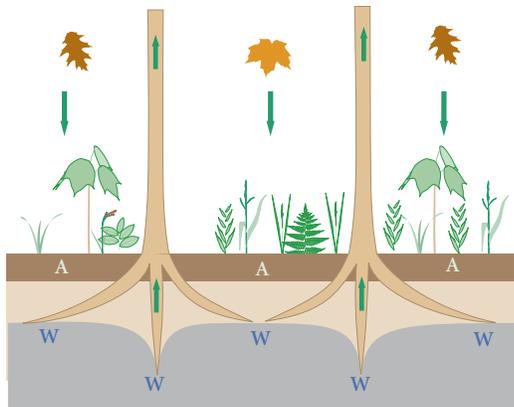


PROCESSES THAT MAY MOVE NUTRIENTS

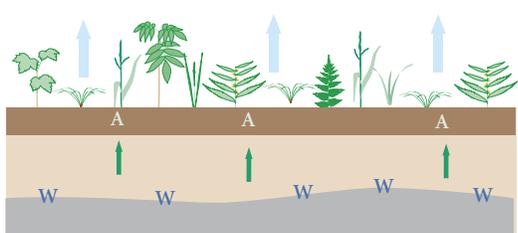
Surface weathering, lateral transport



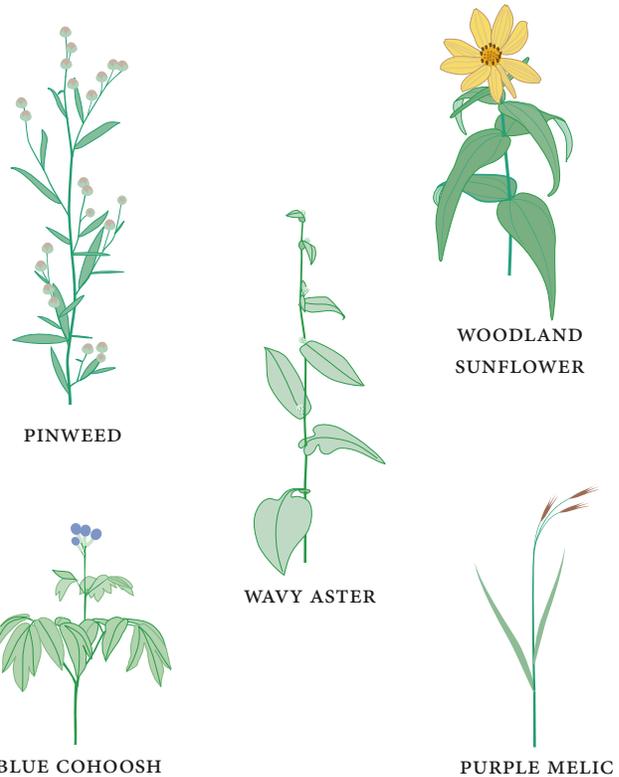
Deep weathering, uptake by vegetation, litterfall



Deep weathering, evapotranspiration

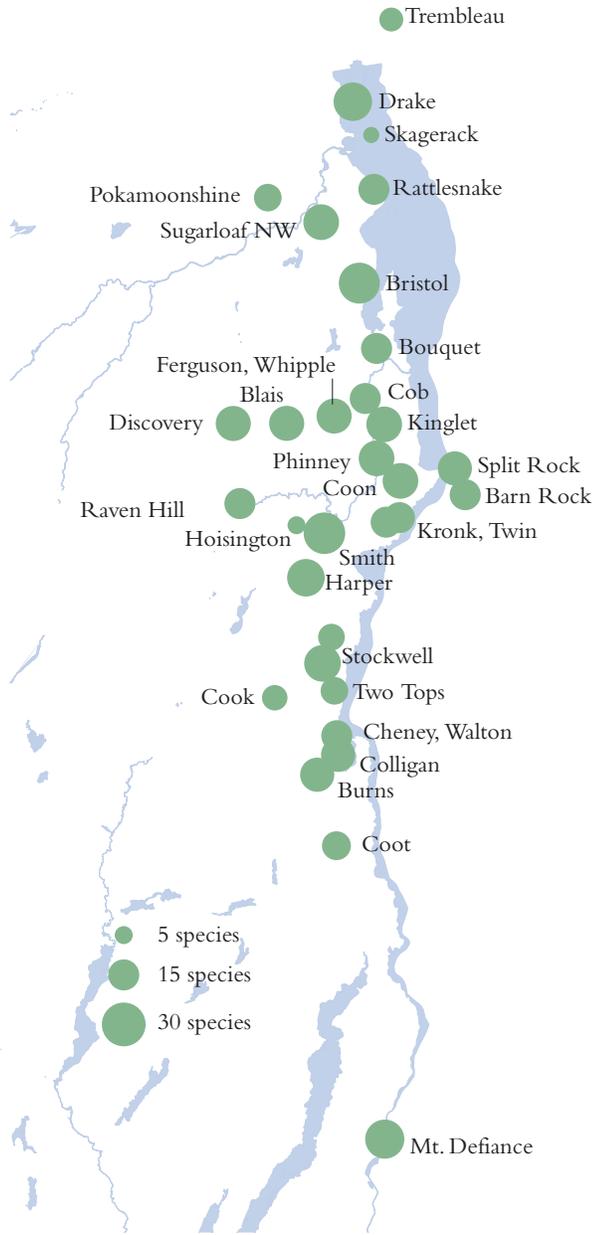


W Weathering A Accumulation in soil
 ← Movement of water → Movement of nutrients



Special Physiography, Special Plants and Processes The Champlain Hills community occurs in distinct places, has distinct plants, and is probably maintained by distinct processes. It is a south-slope community of convex terrain, often near steep slopes but not always on them. It has over 170 ecologically specialized species that do not occur in ordinary northern forests, and at least 70 species that, within the Adirondack region, are largely or completely restricted to this community. And it may, owing to the apparent lack of groundwater, derive a portion of its nutrients from deep weathering and vertical transport.

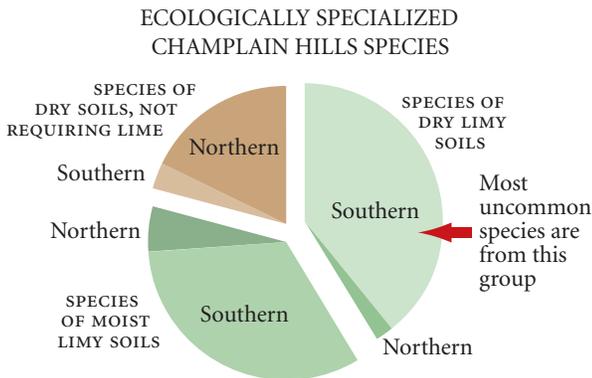
NUMBER OF RARE OR UNCOMMON SPECIES PER SITE



Rare and Uncommon Species Over 70 Champlain Hills species are rare or uncommon in the Adirondacks as a whole. Some, like Drummond's rockcress, are genuine rarities, found in small populations in the Champlain Hills and absent everywhere else. Others, like shagbark hickory and woodland sunflower, are locally plentiful in the Champlain Hills but absent or rare in the rest of the Adirondacks.

The uncommon species form an ecogeographic group. Most are southern, reaching their northern range limits either between here and the St. Lawrence. All are drought-tolerant, and many seem either to require lime or be limited to limy soils. They are thus specialized species and are here only because the Champlain Hills are specialized as well.

The numbers of uncommon species in this community are unprecedented. Most sites have 10 to 15, some 25 or more. Few communities have this many uncommon species at any site. No other one, to my knowledge, has them at this many sites.

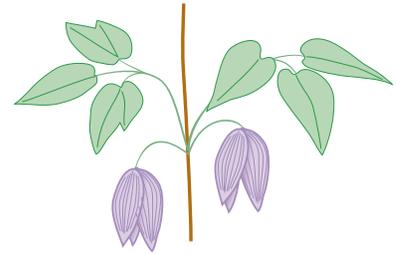


RECENT RECORDS FOR SOME
UNCOMMON CHAMPLAIN
HILLS SPECIES

ALLEGHENY VINE	2
AMERICAN PRICKLY ASH	1
BARREN STRAWBERRY	18
BICKNELL'S GERANIUM	3
BLUNT-LOBED WOODSIA	4
BRISTLY GOOSEBERRY	16
BUFFALO BERRY	1
Carex backii	14
Carex hitchcockiana	1
Carex peckii	1
Carex sprenghii	2
CUT-LEAVED CINQUEFOIL	9
DRUMMOND'S ROCKCRESS	2
DOUGLAS'S KNOTWEED	7
FIELD CHICKWEED	3
FOUR-LEAVED MILKWEED	14
FRAGRANT SUMAC	11
HAIRY BEARDTONGUE	3
HAIRY HONEYSUCKLE	3
HORSE GENTIAN	3
KALM'S BROMEGRASS	3
LEATHERWOOD	11
LIMBER HONEYSUCKLE	13
STIFF SANDWORT	16
LYRE-LEAVED ROCKCRESS	1
MISSOURI ROCKCRESS	1
PANICLED TICK-TREFOIL	13
PERFOLIATE BELLWORT	1
ROUND-LOBED HEPATICA	27
PELLITORY	3
PURPLE CLEMATIS	3
PURPLE MELIC	13
RAFINESQUE'S VIBURNUM	23
SHAGBARK HICKORY	31
SICKLEPOD MUSTARD	8
SMALL-FLOWERED BITTERCRESS	4
SPOTTED CORALROOT	4
SPRING FORGET-ME-NOT	1
SQUARROSE GOLDENROD	3
SQUAWROOT	1
WHITE OAK	26
WHITE SNOWBERRY	4
WOODLAND SUNFLOWER	28
WOOD LILY	6



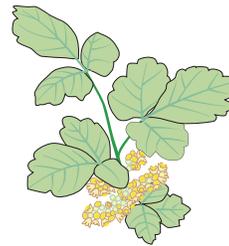
ALLEGHENY
VINE



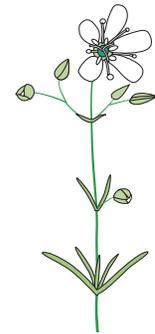
PURPLE CLEMATIS



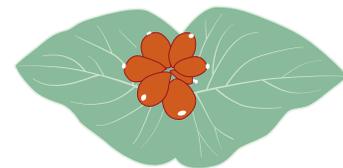
DOUGLAS'S
KNOTWEED



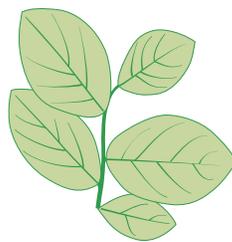
FRAGRANT SUMAC



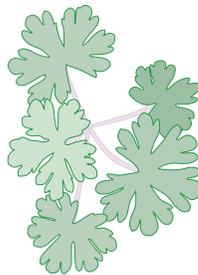
FIELD CHICKWEED



LIMBER HONEYSUCKLE

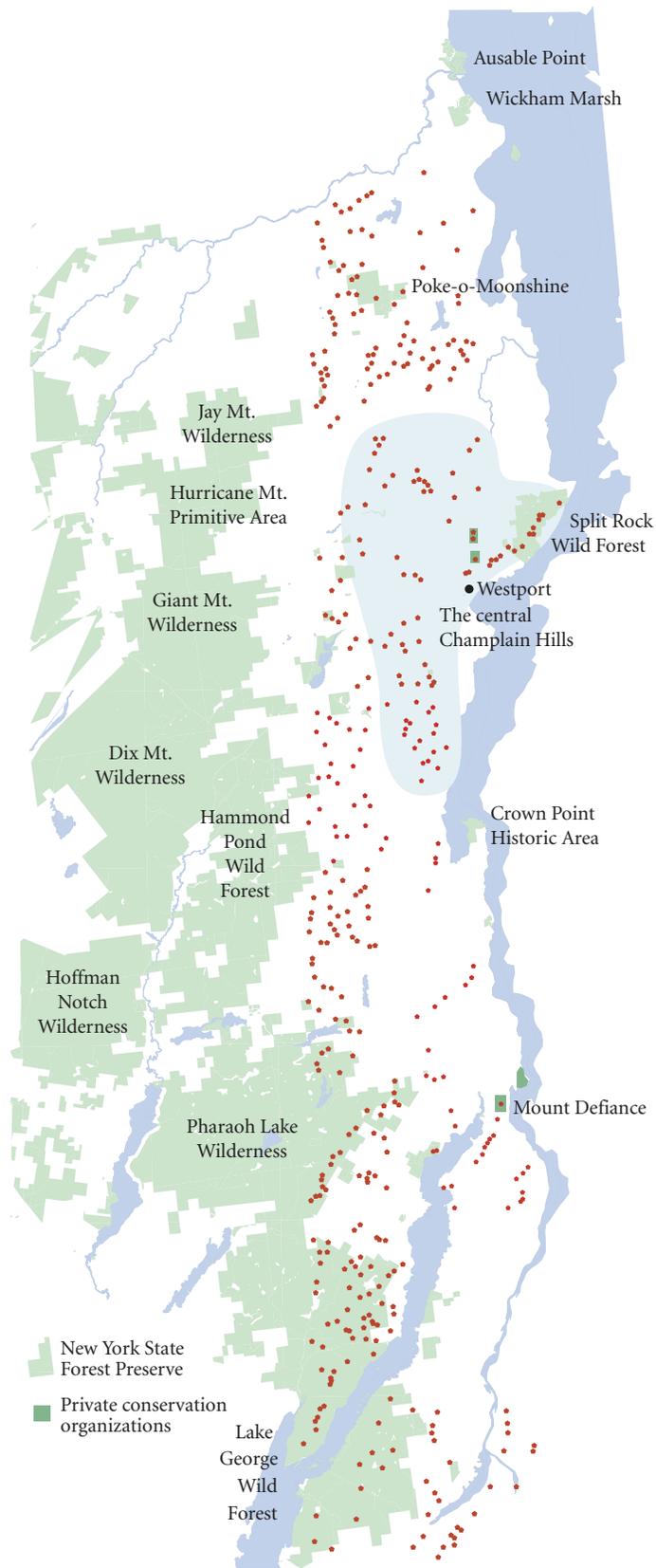


LEATHERWOOD



BICKNELL'S GERANIUM

Plants You Could See Here are eight Champlain Hills species that few Adirondack naturalists have seen. Leatherwood and fragrant sumac are shrubs, with tiny yellow flowers that appear in early spring. Purple clematis blooms in the midst of wildflower season and has pale flowers the color of the evening sky. Field chickweed is a June species, with small leaves and surprisingly big flowers. Limber honeysuckle and Bicknell's geranium are, with us at least, reluctant bloomers. I have almost never seen their flowers in the wild. Allegheny vine is a delicate climber that makes cascades of white flowers on ledge faces and talus in midsummer. It is so pale and slender that you can sometime look right at it and not see it. Douglas's knotweed is another slender annual, and one of our true rarities. It is a plant of the northwestern mountains and at the edge of its range here. It grows in moss tufts on dry slabs and flowers late, when most other flowers are dry or gone.



The Least Protected Adirondack Landscape The Adirondack Park was created to insure that the wildest and loveliest places in the north country would be protected and public. The original park lay in the west part of the Adirondacks, and has only gradually been expanded to include the Champlain Valley and the Adirondack foothills.

As a result, though the Champlain Hills are intact and, in many cases, almost pristine, they have little permanent protection and even less public access. New York State owns the spectacular Split Rock Wild Forest. The Nature Conservancy owns Coon Mountain and the Eddy Foundation owns Boquet Mountain and Kinglet Hill, all three important sites in the central Champlain Hills where the community seems to be best developed and richest. The Fort Ticonderoga Association owns Mount Defiance, a fine site at the north end of Lake George, and New York own several potential but as yet unresearched sites in the Lake George Wild Forest. A group of high-diversity between Crown Point and Westport are protected by a conservation easement that prevents development but does not restrict logging. With these exceptions, the community is privately owned and largely unprotected.

Thus far, private ownership has served the Champlain Hills community remarkably well. But there is no guarantee that it will continue to do so. And so it seems appropriate, indeed essential, that a representative group of sites be permanently protected, and that some of these become public land in the New York Forest Preserve. To fail to do so would leave some the Adirondacks most interesting and important forests, and its only true biological hotspot, unprotected and unavailable to the public. This would not have been the intention of the people who created the park, and it should not be ours.



More Information This document is a graphic summary of several longer papers about the Champlain Hills. Electronic copies of all of them, as well as additional information about the programs of the Adirondack Nature Conservancy and the Wildlife Conservation Society may be found at: www.nature.org/wherewework/northamerica/states/newyork/ ... and www.wcs.org/adirondacks.

Thanks and Gratitude to the Adirondack Nature Conservancy and the Adirondack Program of the Wildlife Conservation Society who supported this work; to the Eddy Foundation, one of the protectors of the Champlain Hills,

who provided us with a field base at Black Kettle Farm; to our 2006 and 2007 field assistants Barbara Lott, Peter Jenkins, Celia Evans, and Patti Smith (below); to Bill Brown, John Davis, Brett Engstrom, Leah Nelson, David Worier, and others who helped with field work; to Mary Roden-Tice for verifying our rock identifications; and to Harvard University for support during a Bullard Fellowship that allowed me to analyze the 2007 data and report on it.



TNC LOGO & ADDRESS



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