Overmature stands typically contain a broad mixture of tree ages and species associates, as some of the older, very large trees have begun to die and create gaps for new growth. From an aerial photograph, the type will have a very rough, uneven canopy, a wide mixture of colors and crown textures, and a high percentage of dead stems. Stand **a** in Figure R is an example of an overmature RS type.

The WB type, typically small-crowned, slightly orange and very soft in both texture and color intensity on CIR photography, was on one occasion found to appear much more deeply colored and textured (Figure S). As this was clearly not a simple developing or exposure error, while being significantly different from the typical, it has been included as another example of how the WB type may appear.

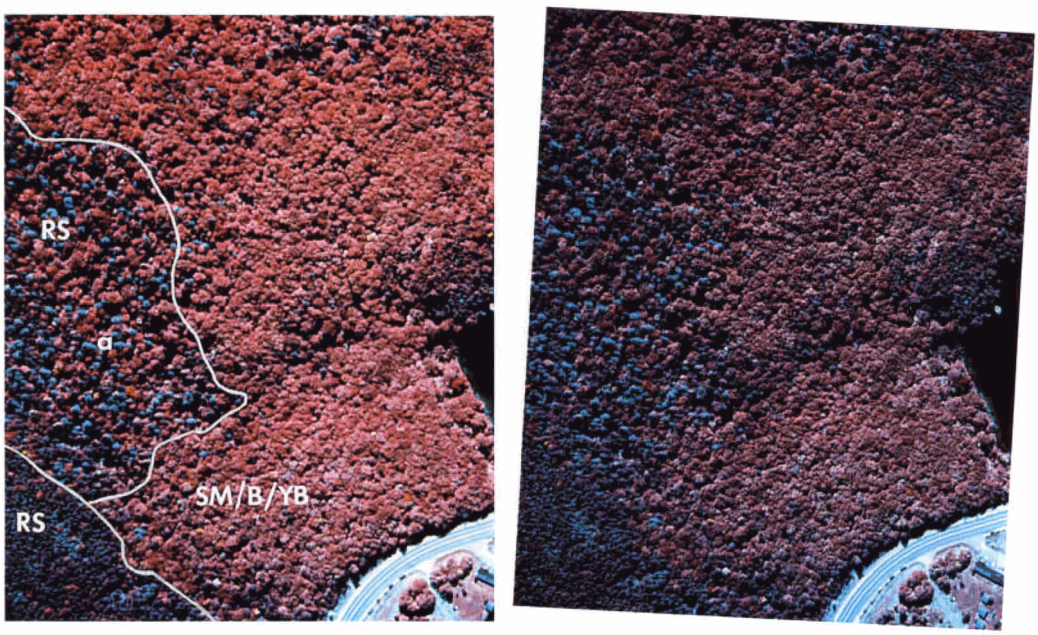

Figure R. Appearance of an overmature stand (RS example)--stand a. Near Crawford Notch, NH. 8/31/86. 1:6000.

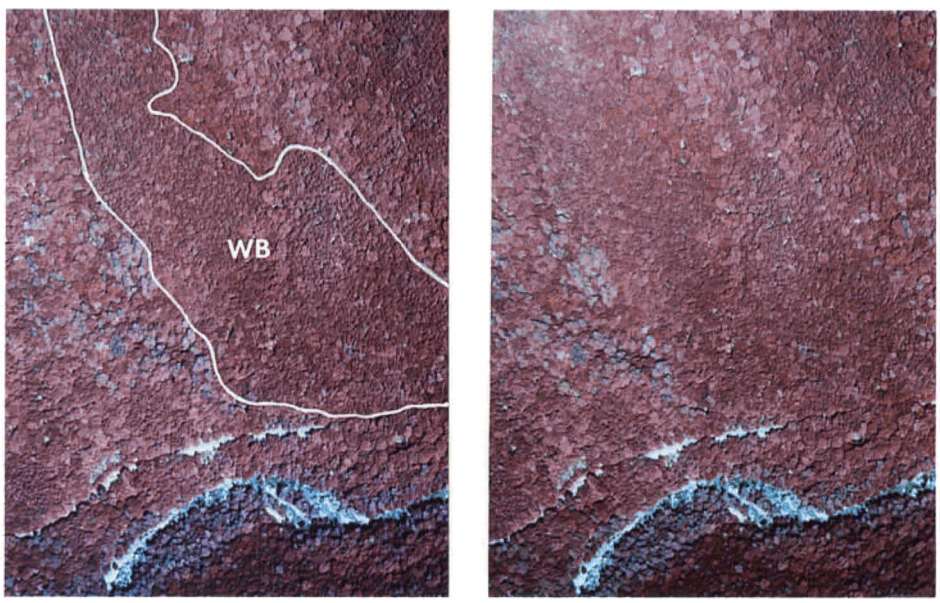

Figure S. A distinctly different example of WB. Near Bartlett, NH. 8/4/86. 1:6000.

RM and RO, both often intensely colored and well-defined types, can be distinguished. In direct comparison, red maple has a slightly softer and more pink crown than does red oak (Figure T).

The scrub variety of WO/BO/RO will take on a finer stand texture because of the smaller average crown size (Figure U).

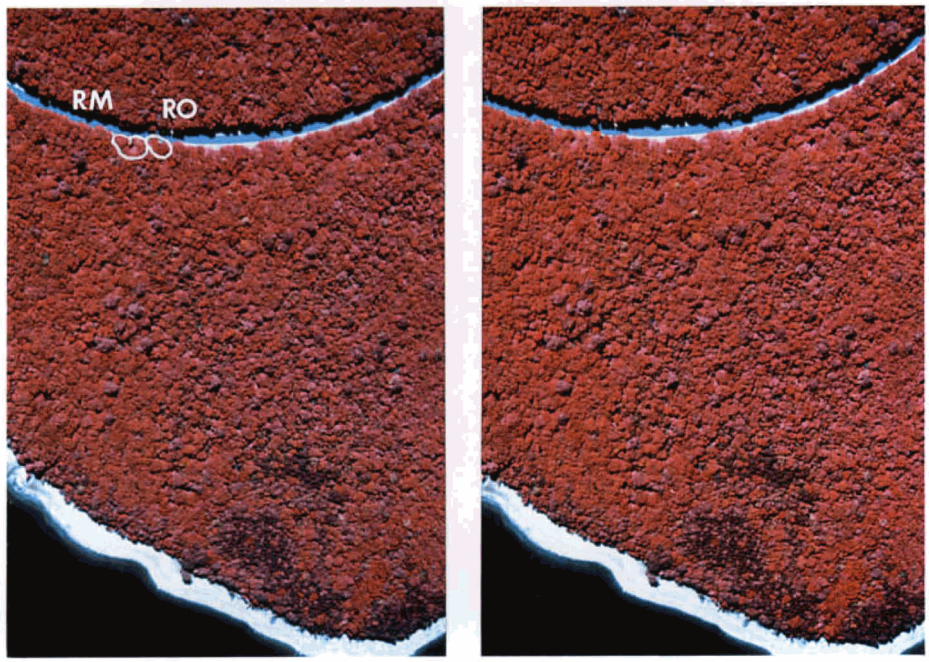

Figure T. Differentiating red maple from red oak. Particularly along the road, the orange-red red oak and the more lightly colored red maple are easily discernible. Quabbin Reservoir, MA. 8/31/86. 1:6000.

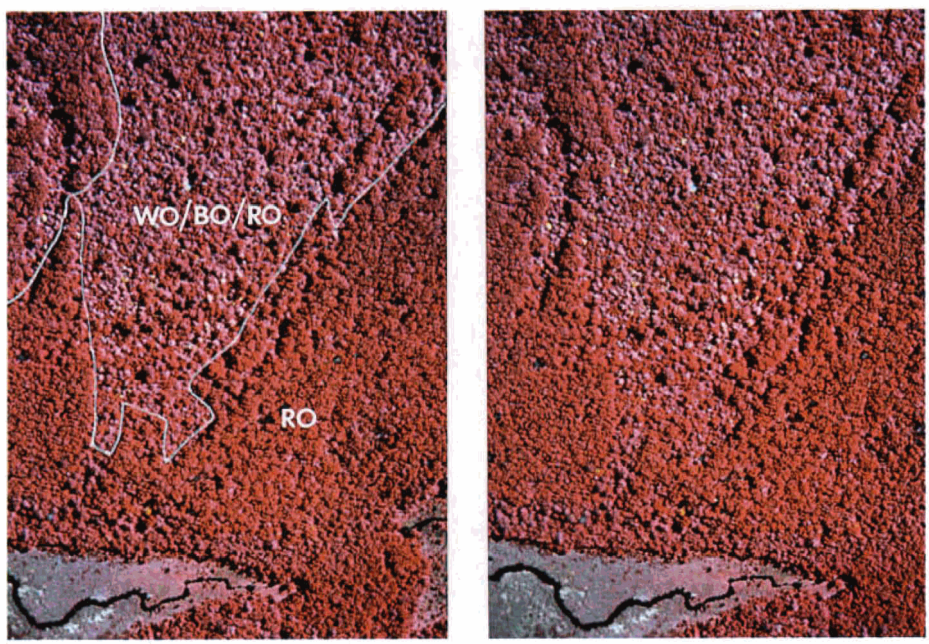

Figure U. Scrub version of WO/BO/RO. Bear Brook State Park, NH. 8/26/86. 1:6000.

Krummholz, that high altitude variety of RS/BF (or WB/RS/BF), also has a fine texture as a result of the small trees and small crowns. The type color is patchy and has a tendency to run much more toward the pink, even when there is no white birch component in the stand (Figure V).

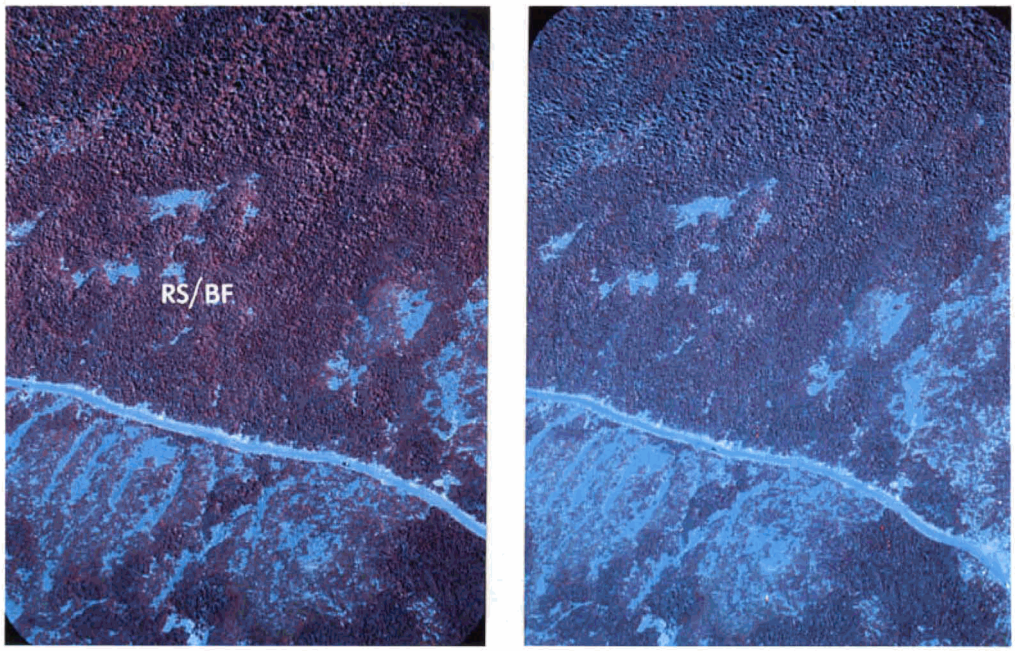

Figure V. Appearance of a krummholz version of RS/BF. Mt. Washington, NH. 8/31/86.

Forest Cover Type Index

Forest Cover Type
Key pages (designated by type abbreviation)
Reference pages (numbered)

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Appendix I

Development of the Ecological Relations Diagrams

It is often useful to know a species' requirements and tolerances to climatic and edaphic conditions. Once a plant community has been labeled as a particular forest cover type, information regarding each species' moisture, nutrient, heat, and light requirements further describes the community. Such information may also be part of the classification system. The forest cover types in the 1954 edition of *Forest cover types of North America* (Society of American Foresters 1954), for example, are listed according to their moisture requirements, and the 1980 edition (Eyre 1980) divides the sections roughly along the lines of heat requirements (boreal, northern, central, southern and tropical).

In a guide to forest cover types, such information should be valid, complete, and brief--that is, reduce the information to a few words or graphic representation. Species requirements in the literature, however, are usually presented in broad qualitative classes, and any quantitative data are scattered and necessarily refer to conditions of limited range (as species can vary greatly in their requirements over their entire range) (Lindeman 1942). Thus, other methods had to be investigated. Synecological coordinates--a method of combining the qualitative and quantitative data available into a scale of relative values--were chosen for this purpose. Developed by Bakuzis (1959) for Minnesota, synecological coordinates express, on a scale from 1 to 5, each species' requirements for "essential environmental factors ... within a certain plant-geographical region." The term "synecology," meaning "community ecology," emphasizes the fact that the values indicate a species' environmental requirements *when competing with other plants* and not under ideal circumstances such as the absence of competition. The four essential factors used to describe species site preferences are moisture, nutrients, heat, and light requirements.

In general, synecological coordinates, or environmental indices, are established for a particular region by evaluating previously published information and adjusting it to the local geographic region on the basis of field observations of community (stand) species composition. The original values can be either estimates from species descriptions in the literature or a set of values already calculated from another similar region. The plot data recorded during the field analysis for the guide supplied the community composition information used for adjusting Minnesota values to New England conditions. Following the methods used by Bakuzis (1959) in Minnesota and again by Brand (1985) in Michigan, the indices were adjusted in six stages for each of the four factors. Tables 5A and 5B demonstrate this procedure.

Step 1) Original relative values for each of the 4 factors--moisture, nutrients, heat, light--were assigned to each species. All numbers used for the original values were taken from the Minnesota set (Bakuzis 1959) where possible. A few species were not present in the Minnesota study and required new original values. Red spruce, Atlantic white-cedar, pitch pine, grey birch, and black birch were all assigned new values estimated from the literature and from personal experience. All species encountered in the field data were necessarily included in the calculations, even though only those species appearing in types in the key were finally included on the pages of the guide.

Step 2) Stand (community) synecological values were calculated simply as averages of the values of all species present. No regard was given to the relative importance (percent composition) of species unless they were considered rare--observed less than five times in the entire survey. In that situation, they were not part of the average.

Step 3) For each species, an "average-community" value was figured as an average of all the stands in which it occurred.

Step 4) All those species were grouped according to their original relative synecological values of 1, 2, 3, 4, and 5, respectively (with

values taken from Step 1). (In table 5B, their newly calculated average community values are carried along with each species in parentheses).

Step 5) The average of the species' average-community values was calculated for each group, creating a new value.

Step 6) Each species was reassigned to a category by matching its average community value (obtained in Step 3) with the closest mean value for the new group (obtained in Step 5). The new relative values were derived by reading back across the table.

Table 5A.--A sample tabulation of moisture values, illustrating the first three steps in adjusting synecological coordinates to local circumstances. (1) Species abbreviations and corresponding Minnesota moisture values appear in the first two rows. The left column lists photo and plot numbers. Checkmarks indicate which species were encountered on a given plot. (2) The right column contains "community values." (3) In the bottom row, new values appear for each species representing the average of all the community values of all the plots on which that species occurred.

Step 2 ▼

	Species	GB	WB	YB	Asp	BC	BF	H	RM	SM	BO	RO	WO	PP	RP	WP	RS	Community values
Step 1 ➤	Original value	2	3	4	2	2	4	4	2	3	2	1	2	1	1	2	3	
	Photo and Plot	(√'s incidate species occurrence on that plot)																
	O14B 1								√	√	√	√	√			√		2.0
	2								√	√		√	√			√		2.0
	O14A 1								√		√	√	√			√		1.8
	2	√	√					√	√	√		√	√			√		2.4
	O12B 1		√			√						√	√			√		2.0
	2								√			√	√					1.7
	P62 1													√				1.0
	P63 1											√		√		√		1.3
	2	√	√						√					√		√		2.0
	B14W 1			√		√	√		√									3.0
	2		√	√	√		√		√								√	3.0
	3		√		√	√	√		√								√	2.7
	4	√	√			√	√		√								√	2.7
	5		√		√		√		√								√	2.8
	P44 1													√	√	√		1.3
	2								√					√		√		1.5
	3								√		√	√		√	√	√		1.4
	M18 1													√		√	√	2.0
Step 3 ➤	Average of community values	2.37	2.51	3.00	2.83	2.60	2.84	2.40	2.21	2.13	1.73	1.83	1.98	1.50	1.35	1.79	2.64	