SITE CLASSIFICATION FIELD GUIDE

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Overview

This field guide uses soil characteristics to classify forest land into five categories of decreasing productivity (class 1 is the highest level) for spruce and fir in Maine. A schematic representation is provided as well as photographs of representative soil profiles from each class. Finally, supporting documentation for productivity differences among classes is provided.

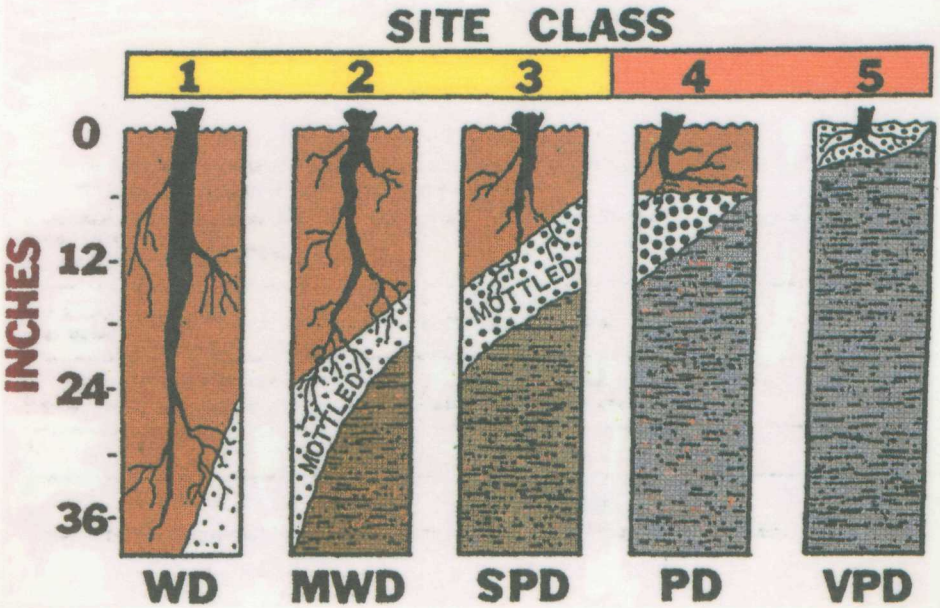
Above-ground productivity of vegetation increases with increasing site quality, which is determined by the quantity and quality of the soil that is potentially available for root growth and development. Effective rooting volume may be reduced by shallow depth to bedrock, to dense basal till, or to the presence of a seasonally high water table during the growing season. Given adequate rooting volume, soil quality can be limited by low water holding capacity and/or low fertility as is the case for sandy soils. Soil drainage class, which reflects the combined effects of soil aeration, moisture, texture, and depth, is a useful indicator of site quality.

Research conducted during the past 40 years has consistently demonstrated that growth and development of spruce and fir in Maine is strongly related to soil drainage class. Height growth rates of spruce and fir in even-aged, unmanaged stands increase substantially as soil drainage class improves from poorly to well drained; expression of dominance occurs earlier in stand development on the better drained soils. Consequently, even-aged, unmanaged spruce-fir stands on poorly drained soils are characterized by larger numbers of stems, smaller average stand dbh, and slower growth rates relative to those on better drained soils.

Differences in tree growth rates among soil drainage classes are even more pronounced in managed stands. Tree growth response to precommercial thinning increases markedly as soil drainage class improves from poorly to well drained. A detailed list of references documenting the supporting research utilized for development of this field guide is provided at the end.

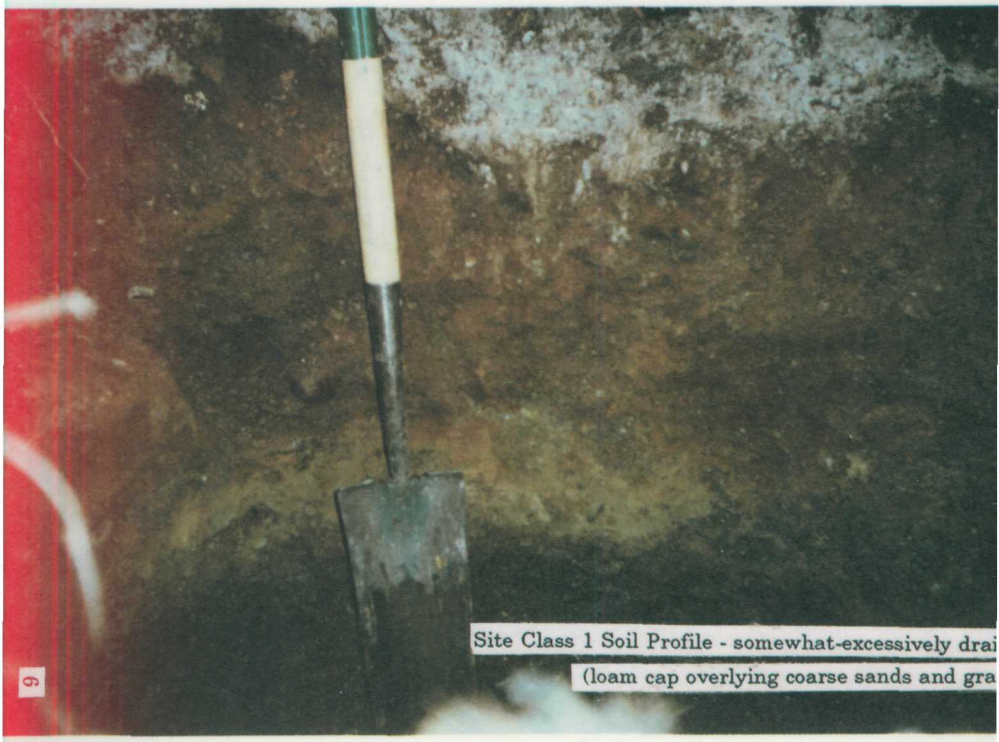
	Site Class									
	1		2		3	4		5		
Drainage Class:	Well	Somewhat Excessive	Somewhat Excessive	Moderately Well	Somewhat Poorly	Poorly Drained	Excessive[1]	Very Poor		
Mottling Depth[2]:	>24"	--	--	16 - 24"	8 - 16"	4 - 8	--	<4"		
Thickness Loam Cap:	--	>12"	8 - 12"	--	--	--	--	--		

[1] Shallow to bedrock (<12") or coarse sand and gravel.
[2] Depth to the seasonal high water table is indicated by depth to low chroma mottles (or gley).

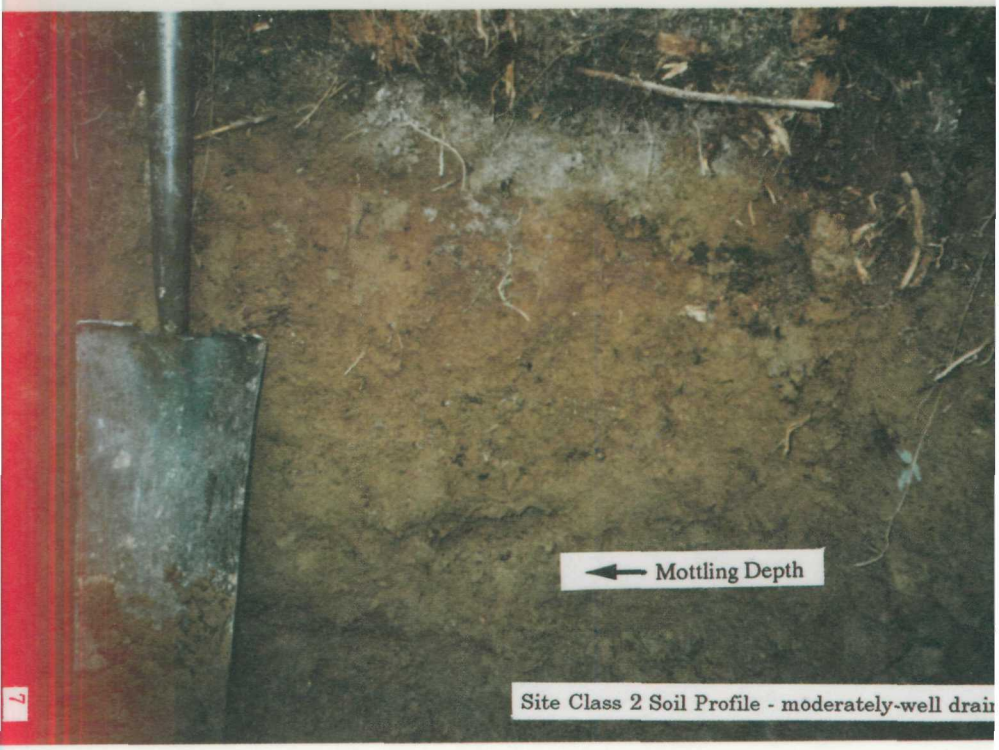


Adapted from Stone et al. (1963)

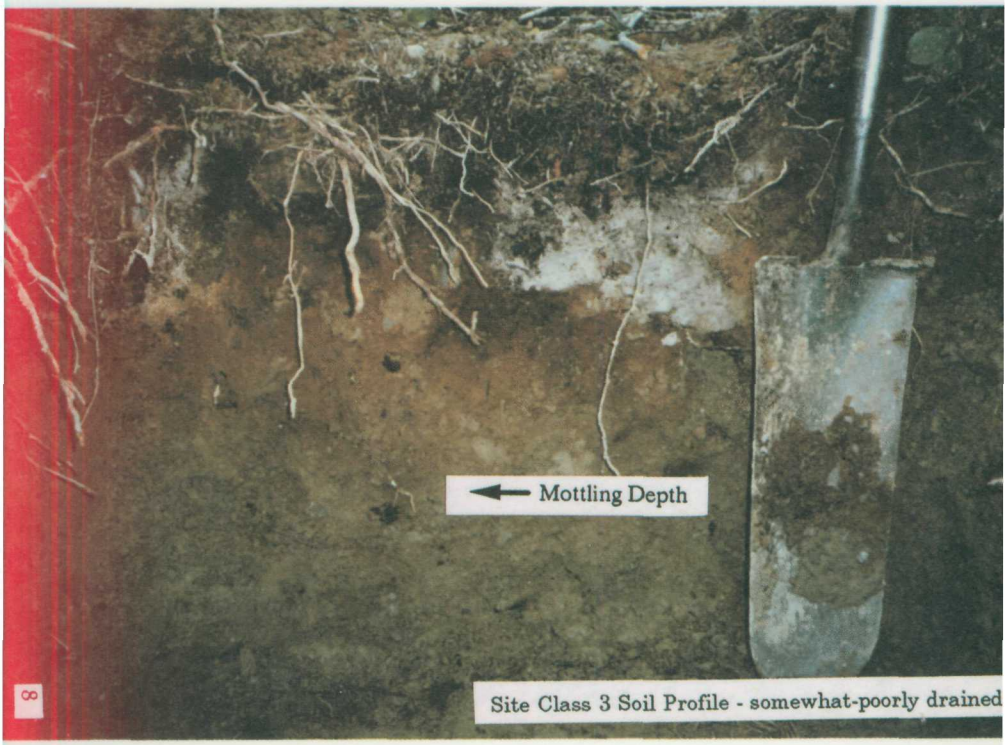
Site Class 1 Soil Profile - well drained.


Site Class 1 Soil Profile - somewhat-excessively drai
(loam cap overlying coarse sands and gra

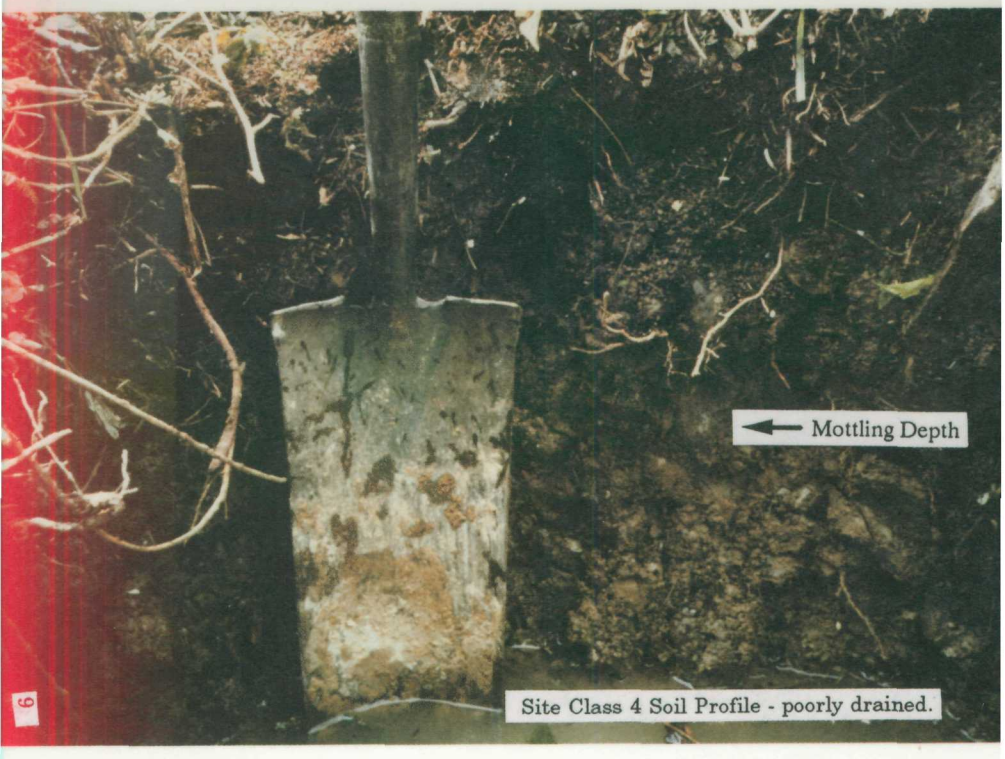
6


Mottling Depth
Site Class 2 Soil Profile - moderately-well drai

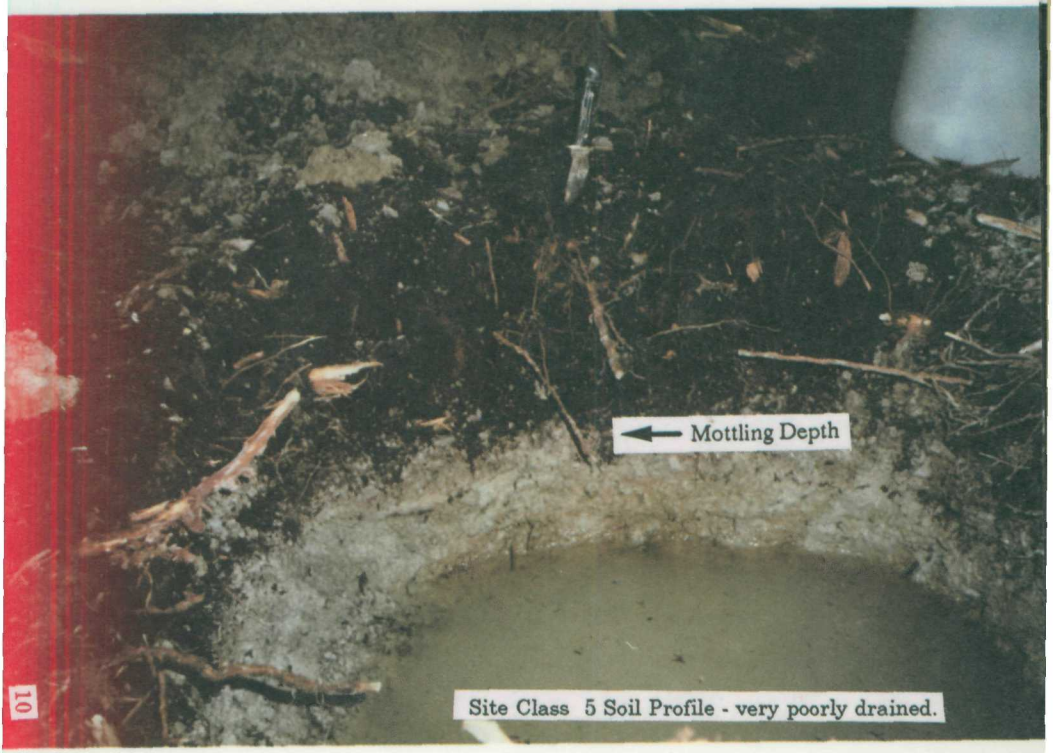
7



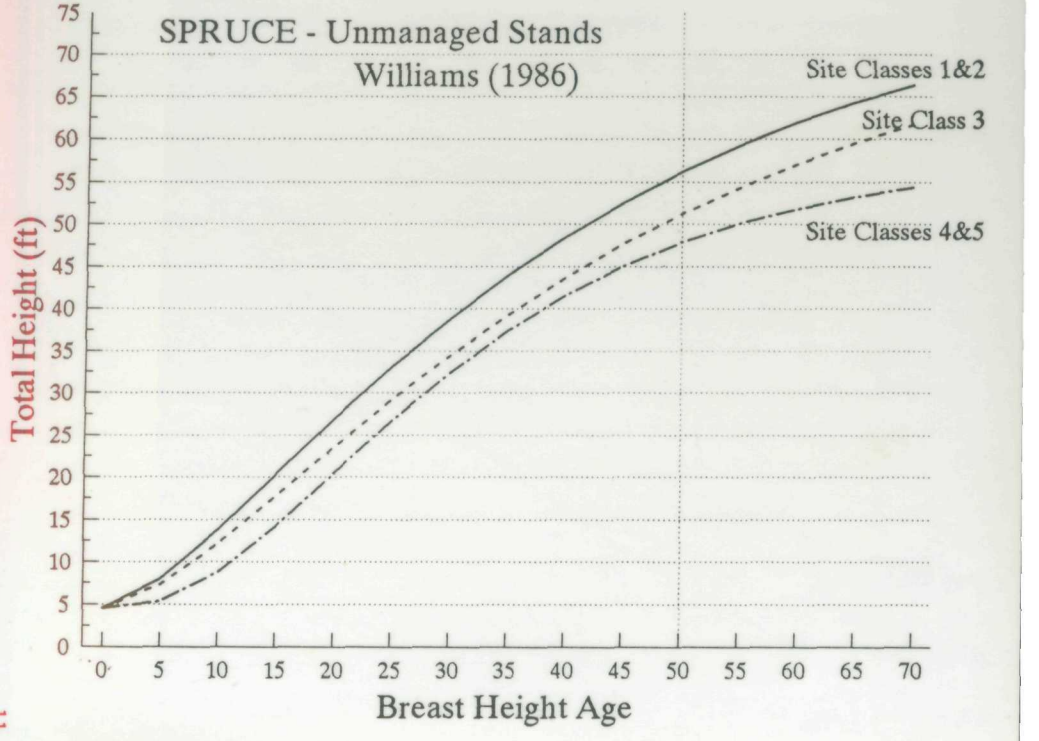
Site Class 3 Soil Profile - somewhat-poorly drained

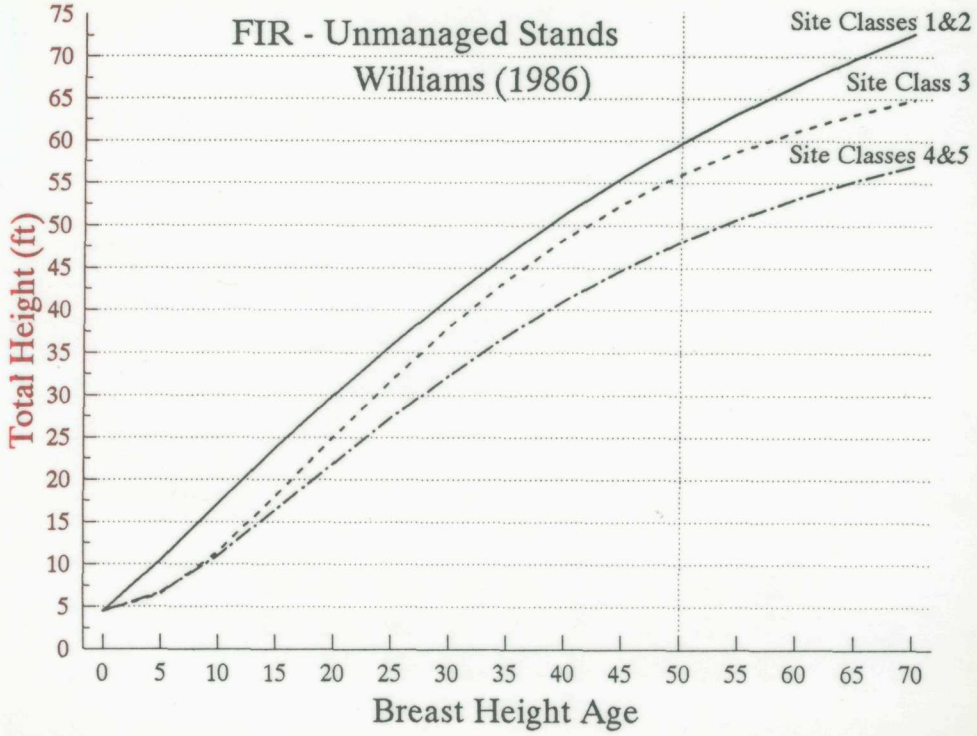


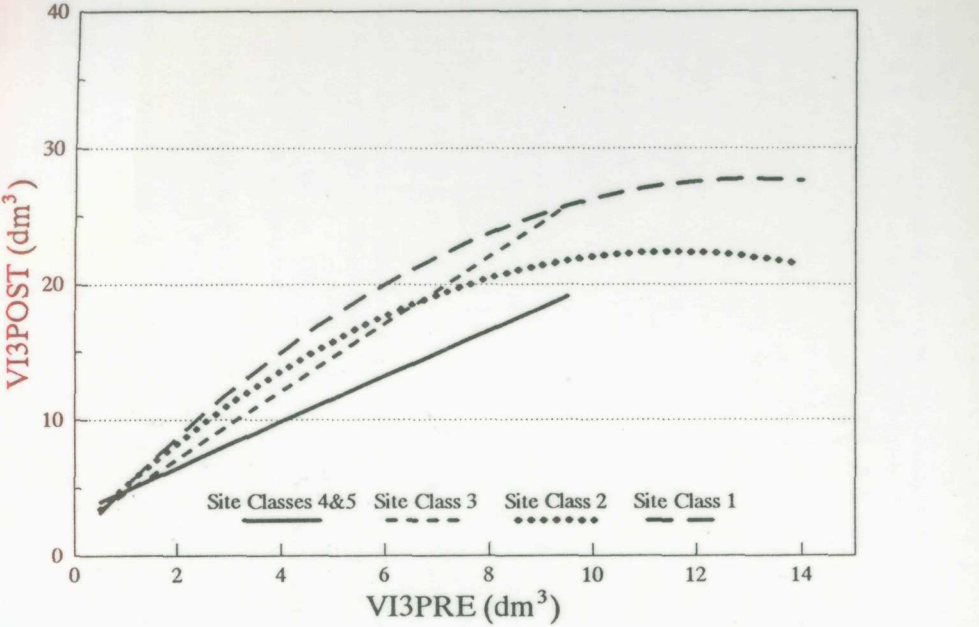
Site Class 4 Soil Profile - poorly drained.



Site Class 5 Soil Profile - very poorly drained.







Site effects on the relationship between balsam fir 3-year volume increment following (VI3POST) and prior to (VI3PRE) precommercial thinning.

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Acknowledgements

A quick scan of the references reveals that research on the relationship between soil characteristics and aboveground productivity of spruce and fir has been ongoing in Maine since the early work of Drs. Harold Young and Tom McLintock in the 1950s. The U.S. Forest Service became interested in the issue once again in the mid-1960s when Dr. Larry Safford initiated his study. Brian Grisi and Harvey Schlitz, working for the Soil Conservation Service, documented the relationships between soil drainage class, stand stocking, and development for unmanaged spruce-fir stands across the Chesuncook catena. Roger Williams extended that work for his Ph.D. dissertation.

During the period 1960-1980 more than a dozen graduate students studied stand stocking, growth and soil-site relationships in fully stocked, even-aged, unmanaged spruce-fir stands under the direction of Dr. Ralph Griffin here at the University of Maine. Dr. Jim Steinman performed a comprehensive analysis of that entire data base for his Ph.D. dissertation. This historical data base formed the foundation for evaluation of the impacts of site quality on the growth response of balsam fir to precommercial thinning and subsequent development of this field guide.

Finally, the technical staff, graduate students and field assistants associated with the Soil-Site Research Program worked effectively as a team in which the whole was greater than the sum of its parts. Ron Lemin, Assistant Scientist, attended to the day-to-day field activities, subsequent transfer of data to computer files, and assisted in data analysis. Rick Dionne's and Joe Pitcheralle's seemingly inexhaustible supply of energy in both field and lab were a tremendous asset. Peter Caron was responsible for graphics.