@style(spacing 2 lines)
@style(justification no)
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@center(August 5, 1985)
@center(@U{Black Rock Forest Inventory 1985})
@center(Kathleen Stearns Friday and James Boyd Friday)
@flushleft(PROCEDURE)

@flushleft{Original Stand Classification}

The University of Massachusetts prepared a stand map of the forest from 1981 aerial photographs without field checking. One hundred and forty-three stands were delineated and classified under 26 different cover types. Timber cover types were differentiated by canopy height, by 20-foot intervals; canopy cover, less than or greater than 80%; and composition (>80% hardwood, 80-50% hardwood, 50-80% softwood, or >80% softwood). Presumably stand composition was defined by canopy cover, so a "mostly softwood" stand could mean understory hemlock provided a great deal of cover, rather than that softwoods actually predominated in density, basal area or volume. Other cover types included "clearcut/open" and four wetland types. (For details, see Table I). Areas by stand and compartment were also given to the nearest acre. Comparisons of this mapping with forest records show that cuttings, treatments and disturbances were seldom reflected in the stand map.

@flushleft{Sampling Unit Reclassification}

As the inventory proceeded, it became evident that the photo interpretation had frequently mislabeled the stands. Once it was apparent that this had happened often, all timber (non-wetland) stands were visited and field checked before plotting sample points. This involved walking the length of the stand and stopping to observe heights and cover every chain. Heights were estimated visually and softwood cover was estimated by basal area. The stand was then reclassified into the appropriate category. After walking along several ridgetops, it was decided that any H4 stand (hardwood 60 to 80 feet) marked on a hilltop or ridgetop should be reduced to H3 (hardwood 40 to 60 feet). The trees on hilltops visited were invariable short and scrubby. To avoid confusion between the originally classified stands and the reclassification system, the reclassified areas are called "sampling units" or "units" on the data sheets and in this report.

Usually several small stands were grouped together into a sampling unit when
reclassified.
Because aerial photos were not available for examination and because it was not feasible to do a very thorough ground reconnaissance, stand boundaries were seldom redrawn.
Stands were only subdivided into different units when a clear boundary could be seen, e. g. a road or a trail. Thus the map was greatly

simplified.

No attempt was made to break smaller units out of the overall H3A stand, as to do this without bias would have involved systematically field checking the entire stand and drawing new stand boundaries. Hence the background "H3A" classification (hardwoods, full canopy, height 40-60 feet) is actually very heterogenous, with many stands of tall or scrubby trees.

Table II represents a list of what stands were reclassified and why.

This reclassification attempt represents a great improvement over the original stratification in that it has eliminated most outright misclassifications. However, it is not sure that this attempt will result in significant differences between categories either, since the original mapped stand boundaries were used and merely recategorized and no smaller units were broken out of the overall H3A stand.

Three recent clearcuts were stratified out. These were the cut at the top of Hulse road (C4), the cut on Sutherlaqnd Pond road just south of the pine plantations (C8), and the small deer habitat cut on Continental Road south of the Stone House (C23).

@flushleft[Plotting Points]

Sample points within the stand were plotted according the the prescribed Harvard Forest method. One or several axes were drawn in each stand so as to best sample that stand. Thus the axes might resemble a straight line, a "Y", a "T", a "Z", or an "11" to sample irregular shapes or to skip over an inclusion. After dropping off one chain at each end of the transect, the length was totalled and divided by three to find the plot interval. A random number was then chosen from a random number table in Avery and Burkhardt (1983) and multiplied by the plot interval to find the distance to the first plot. The next two plots followed at the plot interval going north to south.

The nearest landmark to any one of the plots was then chosen and a bearing and distance to the plot measured. The other two plots might be accessed from the first one visited or from other landmarks. Landmarks most frequently used were road and trail junctions and property boundary corners. Where a starting point was less well defined, for example a given distance along a road, a tree at that starting point was blazed with orange (rarely red) paint. Thirteen degrees magnetic declination was used. Table III gives a list of all the plots and directions to them. In relocating the plots, it would be wise to follow these directions precisely and not try to find a plot from another starting point. Unmapped bends in trails and roads may throw off plot location slightly, and another set of directions may appear correct on the map but miss the plot altogether.

@flushleft(Visiting Plots)

Distances from the landmark to the plot were paced. At the beginning of the summer pacing was calibrated by the use of a hip-chain, a distance measuring device. Throughout the summer, the hip-chain was used when the terrain was very steep or rugged or the distances were very long and it was thought that pacing would be less accurate. If a plot was more than 12 chains from a landmark, a tree was flagged with orange (rarely red) paint at the 10-chain (and 20-chain) interval.

A 2 foot by 3/4 inch pvc pipe was driven at each plot center. This was marked with the number of the compartment, the original stand number (@I{not} our reclassified stand), and the plot number on that transect. A few plots fell directly on rock ledges, and on these a circle with a dot inside was painted and plot stake driven nearby. These are noted on the data sheets and on the plot stakes. A good-sized tree near the plot center was blazed with orange (rarely red) paint unless the plot was easily visible.

@flushleft{@I[Tree tally]}

Trees greater than 2" DBH were tallied using a 10 basal area factor prism.
Borderline trees, usually 2 or 3 per plot, were checked using a 100' tape and a table of horizontal limiting distances from Avery and Burkhart (1983). For each tree, species, diameter at breast height, number of eight foot pieces, overall form, crown class, and any special notes were recorded.

Species were recorded according to Petrides (1972). The species list published by Raup (1938) was also consulted, but it was thought that Petrides had more modern names. Refer to Table IV for a list of the tree, shrub, and herbaceous species encountered. The abbreviation used was the first two letters of the genus and the first two letters of the species. Thus @I{Quercus rubra} became QURU.

Diameter at breast height was measured to the nearest 0.1 inch according to the rules described in Avery and Burkhart (1983). The most important of these are that DBH is measured on the uphill side of the tree and that it is measured 3.5 feet above the fork if the tree forks below breast height. The "fork" is defined at the lowest point at a crotch where a crease is visible, not where the bark of the two stems actually separates.

Eight foot pieces of the bole were counted to a 4 inch top. Most hardwoods broke up into branches long before they reached this limit. While only bole and not branches were counted, both sides of a fork were considered bole if they rose vertically rather than horizontally. Thus, by forking, one tree in a stand might have 6 eight foot pieces while its companions of the same overall height had only 4. Height estimates were checked in the morning and after lunch using a Haga altimeter. Especially tall trees were also often checked.

Tree forms were recorded as "G" (good), "P" (poor), or "C" (cull). Form itself was defined as being good if the tree had the potential to grow one 12 foot sawlog at or near the butt. If more than half of the 12 foot butt log (i. e. the first 6 feet) was defective, the tree was given poor form. Reasons for assigning poor form included sweep, crook, excessive branching, injury, and signs of heartrot. Leaning trees, if they had no other defects, were given good form. Trees which were too rotten to have value even for firewood were classified as culls.

Crown classes were defined as follows: trees receiving sidelight were "d" (dominant), trees receiving toplight only (or no toplight but a lot of sidelight) were "I" (intermediate), and trees receiving no direct sunlight were "O" (overtopped).

Once a tree was measured, the dbh line and tally number were painted on the side facing the plot center.

Lastly, the trees were mapped on a circular grid to aid in relocating. Trees were numbered sequentially, proceeding clockwise and beginning with north.

When a plot was close to the stand border, it was "mirrored" (Avery and Burkhart, 1983) so that trees outside the stand were not tallied but trees at the edge of the stand could possibly be tallied twice. This procedure was rarely necessary and no trees were ever tallied twice. At least once a large tree outside of the stand was not tallied although the prism indicated that it would be were it in the same stand.

@flushleft{@I[Regeneration tally]}

All trees less than 2 inches dbh were tallied within a 2 meter radius plot. For a list of which small woody species were considered trees and which shrubs consult Table IV. When there were more than 100 seedlings of one species in a plot, the plot was divided into quadrats and two quadrats were sampled. This only happened three or four times and only with spruce and hemlock.

Regeneration that reached breast height was tallied in a separate column and not included in first tally. It was thought that this would give a more realistic picture of what the state of the regeneration in the forest actually was, since almost all seedlings seemed to be browsed off year after year and never reached the sapling stage. Most softwoods did not seem to get beyond the cotyledon stage. To get a larger sample size, timber trees of greater than breast height but less than 2 inches dbh were also tallied in a plot extending from 2 to 4 meters radius (see Table IV for list of timber trees).
The data of the first and second columns can be added to get

total regeneration in a 2-meter plot; for timber species, the data of the second and third columns can be added to get the total large regeneration in a 4-meter plot.

@flushleft{@I[Shrub and herb tally]}

Shrubs and herbs were also tallied in a 2 meter plot. The percent cover due to each species was recorded, or if less than 10% the species was marked present. Identification was done according to Newcomb (1977) and Petrides (1972). Latin names were abbreviated the same as with trees. Plants that were not able to be identified were called UNID.
Some plants were identified only to genus. THere was some confusion in the genus @I(Vaccinium) and between this genus and @I(Gaylusssacia), and it would probably be better to lump the two groups together in analyzing the results. For a list of shrubs and herbaceous plants encountered, see Table IV.

@flushleft{Calculations}

Board foot volume was calculated for trees of "Good" form, 9.0 inches DBH and larger (the "10-inch" DBH class included trees of DBH 9.0-10.9). For hardwoods, Table V was used (Forbes, 1955), and for softwoods, Table VI (Forbes, 1955). Volumes for chestnut oak were reduced by 12% to account for Girard form class. These tables were intended to be used with a 6" minimum log diameter, but out heights were seldom actually to a 4" diameter.
Cordwood in the tops of sawtimber trees was computed with Table VII (provided by Dr. Gould). Again, the minimum log diameter was larger (8"), but because no other tables were available this one was used.

Bole cordwood was calculated for trees of "Poor" form and trees 4.5 inches DBH (5-inch cordwood size class) to 8.9 inches DBH (below 10-inch sawtimber size class), using Table VIII (Beers, 1964). In addition, limb cordwood was calculated for the tops of large trees of poor form in the same way as for large trees of good form (calculating nominal MBF in order to use Table VII but not adding the MBF to the tally, since bole wood was added to the tally as bole cordwood).

Tables of volume and other statistics were produced for the entire forest, for each compartment, and for each stand type, weighting each sample unit by its area.

On the computer disk, RAW1.DAT, RAW2.DAT, RAW3.DAT, RAW4.DAT, and RAW5.DAT are the raw data files, formatted very similarly to the tally sheets (see Table IX for explicit format instructions).

DATACHEC.BAS is a program which reads through the raw data files, checking them for problems. It lists the sampling units and sample points in UNITSTAT.MSS. If any errors are found, information is printed in ERROR.DAT which helps somewhat to locate them. Also printed in ERROR.DAT is a list of the species codes found, which may be checked against the species list. This program may be used as a basis for writing new programs to process the data.

AVERALL.BAS produced the tables summarizing the entire forest. It has performed its purpose by producing the reports for this inventory. Although it is computationally correct, its code is maze-like. Harvard would do better to buy a flexible commercial program than to adopt this program for future inventories, which will surely differ in their design from this year's.

Likewise, AVERCOMP.BAS and AVERTYPE.BAS produced the tables summarizing compartments and stand types. It needs files COMPLIST.DAT and TYPELIST.DAT to tell it what sampling units are to be averaged together: COMPLIST gives units and acreages under each compartment, and TYPELIST lists the cover types and tells how many units will be found of each cover type.

CALCULAT.BAS will print, for each individual sample unit in the forest, tables of the same format as those produced for the whole forest, for compartments, and for stand types. It would take a terribly long time to run.

In summary, these programs were written to serve a one-time purpose. To write a clearly documented program to be easily understood and revised by third persons to serve different purposes in the future, would require so much additional programming time that it is more cost-effective to buy commercially available programs. The exception is DATACHEC.BAS, which can be used by an experienced programmer as the input code for essentially new programs for the existing data.

@flushleft(DISCUSSION AND RECOMMENDATIONS)

@flushleft(Inventory Design)

The attempt at stratification was largely unsuccessful. The photo interpreters were unable to distunguish between topography and tree heights or softwoods and laurel. The photos used were also taken before a severe gypsy moth attack in 1983 which killed much of the hemlock in the forest. Even taking this into account, the interpreters vastly exaggerated the proportion of hemlock in the stands where hemlock actually was present (as opposed to the laurel patches). This may have been due to their looking only at winter photos to get softwood cover. A stand might have 80% softwood cover and thus be classed as a softwood stand (S3A) if only the winter photos were examined. What summer photos might have shown is a 100% hardwood cover over the hemlock canopy. Thus the true designation for the stand should have been HS3A - mixed, with hardwoods dominating.

The heterogeneity of the forest, both ecologically and with respect to timber value, makes stratification very desirable, and it would be worth while to attempt a new stratification. First,

a new effort should use current aerial photographs when they next become available. These would show the 1981 hemlock mortality. These photos should be available not only to consulting interpreters, but also to the forest manager and to the team carrying out the inventory. It would also be helpful to map the roads from the photos, as they are not well mapped at this time.
Second, topographic maps and ground-checking should be an integral part of the stratification process.
Third, the compartment maps now being prepared and updated by the forest management will be completed by the time of the next inventory, and should be integrated with it in the following ways: (1) as a source of information about forest history to guide stand delineation (2) as a place to map stand boundaries and plot locations.
Fourth, there is little need for detailed stratification in areas where there is little or no valuable timber.

It is recommended that a different method of laying out sample plots be used. The random-location-on-a-transect system was used in this inventory for uniformity with inventories conducted at the Petersham forest. Besides being simply difficult to apply to irregularly-shaped stands, there are inherent biases in the system. In a roughly circular stand, there is a tendency to oversample the middle. This became important in this inventory because the centers of compartments were often hilltops while the edges were coves with roads running through them. In irregularly shaped stands, one is given the choice of greatly oversampling long, thin arms by drawing a line through them or ignoring them altogether. This also is significant in that the long arms often represented streambanks or lake shores, two very different environments from the rest of the stand.

Systematic sampling (on a grid) has three disadvantages. It is somewhat difficult to apply when only a few sample points are desired in a sampling unit. It would not be possible to retain the permanent plots already laid out under a different system. Finally, it would not be possible to add more points later to an established grid system.

Purely random sampling is assuredly unbiased, can be intensified, and could be superimposed on the existing permanent plots, with a little exercise of judgement. In much of the forest, the trail network is dense enough that it would be just as easy to find these plots on the ground. The points may be located by overlaying the map with graph paper and choosing coordinates from a random number table.

The exercise of judgement would have to occur where, in a restratification, a smaller and therefore more intensively sampled stand were regrouped with a larger adjacent stand. Some plots could be dropped from the smaller stand or more plots could be added to the larger stand to bring them to the same intensity.

The sampling conducted this summer was also not done proportional to value. Cove hardwoods were sampled no more intensely than ridgetop chestnut oak. Since it is evident where the best timber is from the 1937 geologic/topogrophic map, it should be easy to stratify these areas out and sample them more intensely.

The next time any photo interpretation is done, the roads should also be plotted. There are many unmapped twists and bends in the road, and these often make locating plots difficult. Many hours of field time could be saved by having an accurate map of the roads.

Finally, the next inventory should use different definitions of merchantable height. Height to a 4" top is useful for firewood and pulpwood, but sawtimber (form "Good") trees should be measured to a larger DBH limit: for some tables, up to 8" or 10" DIB. Tables, equations or a prepared computer program should be chosen before field work starts, and sampling specifications determined accordingly.

@flushleft(Results of the Inventory)

No qualitative description of the forest will be attempted here, as the detailed knowledge of the forest manager would render this superfluous. It is hoped that the numbers will speak for themselves. Two points must be made, however.

The results of this survey indicate a stocking of 5.32 mbf/a, which is about twice that found by a survey done five years ago. A large part of the difference here can be traced to different methods and parameters. The diameter limit used in that survey was 12 in.; our lowest diameter class was 10 in., which included trees 9.0 to 10.9 in. These trees are quite common and make up .77 mbf/a in our estimate. One would also have to eliminate those trees in the 12 in. class that are less than 12 in. (.96 mbf/a / 2 = .48 mbf/a). Lastly, our average figure was for dry land only and did not include the 300 acres of lakes and wetlands. If spread over the entire area, our estimate would come down by .46 mbf/a. Just given these two differednces, then, our estimade could be reduced to 3.61 mbf/a. Other procedural differences sohould be checked to further explain the discrepancy.

The second finding is that there seems to be insufficient regeneration in the forest. The diameter distribution for oaks peaks in the 8 in. to 10 in. range, with relatively few trees below that (See Figures 1 and 2). While there are seedlings in abundance, few of these reach sapling stage. The major culprit seems to be deer browse. Extensive damage can bee observed on seedlings and stump sprouts.

To begin to get a handle on this problem, it is suggested that data begin to be gathered on the deer population. One inexpensive way to do this might be to encourage a wildlife student to undertake this as an independant project. Numerous small grants to fund local research are available to students in amounts form $100 to $500, which sould adequately cover the costs of such a study. Wildlife professors at the forestry schools at Syracuse, U Mass, and Yale could be contacted about this. Studies might include pellet counts, surveys of browse damage, and recommendations for a deer management plan.

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Beers, T. W. 1964. Composite hardwood volume tables. Research Bulletin No. 787. Purdue University Agricultural Experiment Station. Lafayette, Indiana.

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Raup, H. M. 1938. Botanical studies in the Black ROck Forest. The Black Rock Forest Bulletin No. 7. 161 pp.

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Forest cover types: "H3A", "SH2B", "H6", etc.

H  =  80-100% hardwood   2 = height 20-40'  A = canopy 80-100%
HS =  50- 80% hardwood   3 = height 40-60'  B = canopy < 80%
SH =  50- 80% softwood   4 = height 60-80' " "= canopy irregular
S  =  80-100% softwood   6 = height mixed       (height mixed)

Other cover types (not sampled):

CO = clearcut/open
W  = water
SS = shrub swamp
SF = seasonally flooded
SM = shallow marsh
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@newpage
@center(Table II)
@center(Stand Classifications Changed)

*Stand subdivided

@BEGIN(VERBATIM)

@U(From)	@U(To)	@U(For Stands)	@U(Why)
S3A	SH4A	6	Tall trees in vale
HS3A	H4A	7	Tall trees in vale, hemlock mortality
SH4A	H4A	9	Hemlock mortality
SH3A	HS3A	11, 15	Hemlock mortality
SH2A	HS3A	12	Tall trees in vale, hemlock mortality
SH4A	HS3A	13	Short trees on rise, hemlock mortality
SH3A	H3A	11*, 14, 29, 32*, 39, 54*, 64, 66	Laurel present, hemlock mortality
HS3A	H3A	16, 17, 27, 36, 43, 63, 65, 67, 72, 75, 84, 94, 100, 101, 111	Laurel present, hemlock mortality
SH2A	HS3A	18	
S2A	H4A	19	Tall trees in stream vale
HS4A	H4A	20	Hemlock mortality
HS2A	H3A	22	Hemlock mortality; trees 40' tall, although young
SH2A	H3A	23, 25	Small stand
SH3A	HS3A	28	Less hemlock
S2B	HS3A	30	
SH3B	H3A	31	"Heavy thinning" may have looked like broken canopy
SH3A	HS4A	32*	Tall trees in vale
H6	H2B	33*	Area cut
SH2A	H3A	34, 35	Hemlock mortality
H4A	H3A	37, 40, 56, 71, 76, 77, 80, 109, 112, 130, 131, 136, 140	Short trees on ridge
S4A	HS4A	45	Hardwood overstory

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                                                            over hemlock
S33A              HS3A              46, 49                  Hardwood
overstory
                                                            over hemlock
SH4A              H3A               85
SH4A              H3A               90                      Short trees on
ridge
SH2A              H4A               18, 24                  Small stands
S3A               SH3A              42                      Hemlock
mortality
HS2A              SH3A              41*                     Hemlock in vale
HS2A              H3A               41*                     Hemlock
mortality
SH2A              HS3A              44
S4A               SH3A              48                      Hemlock
mortality
SH4A              SH3A              52
SH2A              SH3A              55
SH2B              HS2B              57
S2A               H3A               53
S3A               H3A               61, 132, 135            Small stands
H4B               H2B               70*                     Stand cut
SH4A              H3A               85                      Hemlock
mortality
S2A               S3A               92
S3B               H3B               143                     Laurel present
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      * Regeneration sampled only in 2m plot; ignored in 4m plot

Code        Latin name                   Common name
----        ----------                   -----------
ACPE  *     Acer pensylvanica            Striped maple
ACRU  *     Acer rubra                   Red maple
ACSA        Acer saccharum                     Sugar maple
BEAL        Betula alleghensis                 Yellow birch
BELE        Betula lenta                       Black birch
BEPO  *     Betula populifolia                 Gray birch
CACA  *     Carpinus caroliniana         Blue beech, Ironwood
CACO        Carya cordiformis            Bitternut hickory
CADE  *     Castanea dentata             Chestnut
CAGL        Carya glabra                       Pignut hickory
CAOV        Carya ovata                  Shagbark hickory
COFL  *     Cornus florida                     Flowering dogwood
FAGR        Fagus grandifolia            Beech
FRAM        Fraxinus americana                 White ash
FRPE        Fraxinus pennsylvanica       Red ash
JUCI        Juglans cinerea              Butternut
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LITU       Liriodendron tulipifera          Tulip tree
NYSY       Nyssa sylvatica             Black gum
OSVI  *    Ostrya virginiana           Hop hornbeam
PIAB       Picea abies                 Norway spruce
PIGL       Picea glauca                     White spruce
PIRE       Pinus resinosa                   Red pine
PIRI  *    Pinus rigida                     Pitch pine
PIST       Pinus strobus                    White pine
PLOC       Platanus occidentalis       Sycamore
PODE       Populus deltoides           Common cottonwood
POGR       Populus grandidentata       Big-toothed aspen
PRSE       Prunus serotina             Black cherry
QUAL       Quercus alba                     White oak
QUCO       Quercus coccinea            Scarlet oak
QUPR       Quercus prinus                   Chestnut oak
QURU       Quercus rubra                    Red oak
QUVE       Quercus velutina            Black oak
SAAL       Sassafras albidum           Sassafras
TIAM       Tilia americana             Linden
TSCA       Tsuga canadensis            Eastern hemlock
ULRU       Ulmus rubra                 Slippery elm}
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@center{SHRUB and HERB species of Black Rock Forest, 1985 inventory}
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Code       Latin name                  Common name
----       ----------                  -----------
AMAR       Amelanchier arborea              Downy shadbush
ARAT       Arisaema atrorubens              Jack-in-the-pulpit
ARNU       Aralia nudicaulis           Wild sarsaparilla
BETH       Berbenis thunbergii              Japanese barberry
CISP       Circium sp.                 Unidentified thistle
COAM       Conopholis americanum       Squaw root
COPE       Comptonia peregrina              Sweetfern
EPRE       Epigea repens                    Partridgeberry
FERN       (unidentified fern)              (unidentified fern)
FRVE       Fragraria vesca             Wood strawberry
GAAS       Galium asprellum            Rough bedstraw
GABA       Gaylussacia baccata              Black huckleberry
GAPR       Gaultheria procumbens       Wintergreen
GRAS       (unidentified grass)        (unidentified grass)
HAVI       Hamamelis virginiana        Witch hazel
HEAM       Hepatica americana               Liverleaf
HYHI       Hypoxis hirsuita            Yellow stargrass
ILVE       Ilex verticiliata
IRSP       (unidentified iris)              (unidentified iris)
KAAN       Kalmia angustifolia              Sheep laurel
KALA       Kalmia latifolia            Mountain laurel
LIBE       Lindera benzoin             Spicebush
MACA       Maianthemum canadense       Canada mayflower
MEVI       Medeola virginiana               Indian cucumber root
MOSS       (unidentified moss)              (unidentified moss)
MOUN       Monotropa uniflora               Indian pipe
ONSE       Onoclea sensibilis               Sensitive fern
OXCO       Oxalis corniculata               Creeping wood sorrel
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OXEU       Oxalis europaea              Yellow wood sorrel
PAQU       Pathenocissus quinquefolia   Virginia creeper
PATR       Panax trifolium              Dwarf ginseng
PLSP       Plantago sp.                       (unidentified plantain)
POAC       Polystichum acrostichoides   fern
POSP       Polypodium sp.                     (unidentified polypodium)
QUIL       Quercus ilicifolia                 Scrub oak
RHRA       Rhus radicans                      Poison ivy
RHVI       Rhododendron viscosum        Swamp azalea
RUAL       Rubus allegheniensis         Common blackberry
RUFL       Rubus flagellaris            Prickly dewberry
RUHI       Rubus hispidus                     Bristly dewberry
RUID       Rubus idaeus                       Wild red raspberry
SMRA       Smilacina racemosa                 False Solomon's Seal
SPLA       Spiraea latifolia            Meadowsweet
SYVU       Syringa vulgaris             Common lilac
TRBO       Trientalis borealis                Starflower
UNID       (unidentified herb)                (unidentified herb)
UVPE       Uvularia perfoliata                Bellwort
UVSE       Uvularia sessilifolia        Wild oats
VAAN       Vaccinium angustifolium            Late low blueberry
VACO       Vaccinium corymbosum         Common highbush blueberry
VAVA       Vaccinium vacillans                Early low blueberry
VETH       Verbascum thapsus            Common mullein
VIAC       Viburnum acerifolium         Maple-leaved viburnum
VIAE       Vitis aestivalis var. argentifolia Silver-leaved grape
VIAL       Viburnum alnifolium                Hobblebush
VILE       Viburnum lentago             Nannyberry
VIRE       Viburnum recognitum                Northern arrowwood
VISP       Viola sp.                          (unidentified violet)
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@center(Table IX)
@center(Format of first raw data file)
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comment line 2
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UNITNAME, COVERTYPE, ACREAGE, #PLOTS
Description of sampling unit (Compartment, Stand, etc.)

PLOTID with date and location
#TREES
NUMBER,CODE,DBH,HT,FORM,CC
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#HERB/SHRUBSPECIES
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CODE,#,CODE,# ... (repeat CODE,# #SEEDLINGSPECIES(2m) times)
#SAPLINGSPECIES(2m)
CODE,#,CODE,# ... (repeat CODE,# #SAPLINGSPECIES(2m) times)
#SAPLINGSPECIES(4m)
CODE,#,CODE,# ... (repeat CODE,# #SAPLINGSPECIES(4m) times)

PLOTID with date and location
... (repeat plot data as described above, #PLOTS times)

UNITNAME
... (repeat unit data with plot data indefinitely)
}
```