A Classification of Indiana Plant Communities

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Abstract

A hierarchical plant community classification was compiled for both the natural and modified plant communities of Indiana. The data source was the known published and unpublished stand attributes tables and qualitative descriptions of individual plant communities. The hierarchical taxa in sequence are: vegetation system (formation); environmental regime (habitat type); vegetation cover class (association); vegetation cover type (vegetation type) and community type (biotope). Natural plant communities include 55 forested, 7 savanna and glade, 7 shrub, 34 herbaceous and 8 cryptogamic cover types. Modified plant communities and land-use types total 93.

Introduction

The vegetation of a region consists of the total of the plants growing on its soils and in its waters (Curtis, 1959). Plant communities are subdivisions of that vegetation cover. Whenever more or less obvious spatial changes occur within vegetation, different communities may be recognized. These spatial changes in life form or dominant species may be apparent to even a casual observer so that it is often possible to recognize visually the correlation between different species combinations and changes in the environment. For example, in environments having steep gradients such as mountain slopes, lake margins and coastal dunes, the physiognomy and species composition are often so strikingly different from the adjacent plant cover that they are self-evident as different communities.

Depending on the nature of the vegetation and the environment, changes vary from abrupt to transitional to diffuse. As a result, plant communities may be self-evident to the field worker on first inspection, or they may become evident even to the experienced investigator only through careful quantitative analysis of the vegetation. Additionally, differences which appear obvious on first inspection may prove to be only successional stages or transitory phases of the regional plant community. Consistent and accurate recognition and definition of plant communities is a skill that can be acquired only through broad field experience and careful interpretation of sample data.

Since natural plant communities are often recognizable as separate entities, many vegetation ecologists have assumed that the component species are interdependent, have considerable influence upon one another, and that the whole is greater than the sum of its parts. An equally large and growing number of plant ecologists are convinced that communities are more accurately characterized as the chance meeting of several species whose tolerance ranges happen to overlap. Those holding this latter view assume little or no interdependence, and feel that the whole is not greater than the sum of the parts.

That vegetation does vary continually (and sometimes predictably) along environmental gradients has been pointed out convincingly by a growing number of ecologists for over 50 years. In fact, close examination reveals that every square meter of the Earth's surface does have a different biota from every other.

That "communities are not precise entities of fixed and unvarying composition," as Curtis (1959) stated, does not invalidate the community concept or reduce the utility of plant community classifications. The human mind does not respond as effectively to continuous variables as it does to sets of similar items grouped to facilitate learning, communication or use. Practical considerations, such as the teaching of ecology, land management, and the protection of endangered species and the habitats that support them, require that representative and usable plant community classifications and vegetation maps exist.

Classification System

This classification system was initially developed for use by the Indiana Natural Heritage Program in categorizing the natural plant communities of the State. My aim was to produce a classification applicable by field biologists in surveying the elements of Indiana's natural diversity, yet comprehensive enough to characterize the range of plant communities found in Indiana for research and teaching purposes.

The classification is hierarchical and open ended. New units can be added as discovered, and previously described or designated communities can be modified, divided or recombined as new information becomes available. An additional taxon could be added below the five basic taxa (Table 1) if more detailed community information becomes available in the future.

The basic classification hierarchy is similar to the system developed by staff ecologists at The Nature Conservancy's National Office. Hierarchical separations are based on physiognomy and species composition except for the Environmental Regime category which was included to characterize stand locations by habitat type and to facilitate recognition, separation and description of units in the field. The single environmental "taxon" presumes to be an integrative collective expression of all environmental factors which impinge upon and influence the nature and distribution patterns of the individual plant community. In instances where environmental data have been more thoroughly studied it might have been useful to subdivide the environmental regimes according to topographic position, soils, moisture conditions, pH, etc. Since differences in topographic position and moisture condition are generally recognizable in the field, these habitat characteristics were used in naming the environmental regimes. Most other environmental factors can be evaluated only by detailed measurement.

The lower three categories of Vegetation Cover Class, Vegetation Cover Type and Community Type are roughly comparable to taxonomic separation at the genus, species and variety levels, respectively. Most references to individual stands by vegetation scientists will be at the

Vegetation Cover Type level, just as species are the primary focus of plant taxonomists.

Organization of Units

The Classification was divided into two major sections: 1) Natural plant communities, and 2) Modified plant communities (Table 1). Natural communities are those in which the structure and species composition closely approximate presettlement conditions. They do not necessarily represent potential natural vegetation in the sense of Küchler's (1964) definition, or climax communities in the traditional sense. Modified communities range from recovery stages of stressed natural communities to landscape units which have been totally altered from their natural condition.

The physiognomic character of the upper stratum defines the units at the Vegetation System level, *i.e.*, forest, savanna and glade, shrub, herbaceous, and cryptogamic systems. These units are equivalent to formations of more traditional classifications. The dominant life form in an upper stratum is sufficient to characterize all vegetation systems

TABLE 1. *Hierarchical organization of plant community classification.*

Code	Hierarchical Unit	Scope or Control of Unit
	Section I. Natural Plant Communities	
A – – – –	Vegetation System (Formation)	I. Physiognomy of vegetation
AA – – –	Environmental Regime (Habitat Type)	A. Topographic position; drainage-aeration conditions; susceptibility to inundation; substrate type; soil characteristics; acid-base reaction; microclimatic variation, etc.
AAA – –	Vegetation Cover Class (Association)	1. Dominant genus/genera in upper stratum
AAAA –	Vegetation Cover Type (Vegetation Type)	a. Dominant species, plus subdominant/associated species
AAAAA	Community Type (Biotope)	1) Variations in presence or importance of dominant species; or the presence of unusual species assemblages in subordinant strata.
	Section II. Modified Plant Communities	
A – – – –	Land-Use System	I. Land-use type
AA – – –	Management Regime	A. Land-use practice; duration of usage; intensity of development; level of environmental attrition or contamination; degree of soil erosion or deposition; microclimatic alteration, etc.
AAA – –	Vegetation Cover Class/ General Land-use Class	1. Dominant life forms/genera of plants or land-use type
AAAA –	Vegetation Type/Specific Land-use Type	a. Dominant plant species or specific land use
AAAAA	Community Type/Land-use Pattern	1) Mosaic of variations within specific land use

except savanna and glade. The latter is a mosaic of scattered trees with less than 50% canopy cover within a grassland community.

Environmental Regimes within a given Vegetation System were arranged in roughly a xeric to hydric sequence and as either upland or lowland units. Moisture levels within the Environmental Regime categories are obviously relative to the range of conditions represented in Indiana, rather than throughout the biosphere.

Vegetation Classes were separated on the basis of dominant genera in the upper vegetation stratum. Data considered in Cover Class designations include importance value percentages (Curtis, 1959); frequency or presence data for communities not having importance value data; and stratum rank values (after Lindsey *et al.*, 1961) or other qualitative estimates when quantitative data were not available. Cover Classes for forest communities were usually based on dominant genera having a combined importance value greater than 50%, although for some units of a more mixed composition, the combined importance value used was as low as 25%. Associated species considered in Cover Class separations normally contributed 5% importance or more in at least one referenced stand. Cover Classes within non-forested communities were separated primarily on stratum rank or other qualitative data (*e.g.*, stand presence). Separation of cover classes was not made for modified communities. The Cover Class taxon reported here is equivalent to the association of traditional plant ecology.

Vegetation Cover Types were separated according to dominant species plus consideration of subdominant and associated species. Nomenclature for these units may or may not differ from that of their more inclusive cover classes. Cover types were arranged roughly according to the moisture gradient typical of their cover class, although this sequence is inferred from community structure, rather than interpretation of actual environmental measurements. Vegetation Cover Types are comparable to the traditional vegetation types of most classifications.

Subdivisions of Vegetation Cover Types were not made, but may be required in some communities to characterize local differences in dominant species, or the presence of unusual species assemblages in one or more of the subordinant strata. For example, a pure stand of water leaf in the groundlayer of a beech-maple cover type differs sufficiently from one dominated by jewel weed to be placed in a separate biotope.

Five digit alphabetic plant community codes were assigned for each community recognized within this classification for use in computer storage of data by the Heritage Program.

The order of hierarchical breakdown and sample units are listed in Table 2. Representative stands for each Vegetation Cover Type are available from the author, but were not included in Table 3 to conserve space.

Compilation

The foremost data source was the major plant ecological and taxonomic papers pertaining to the field botany and vegetation of Indiana. Almost all such papers written within the past century were

TABLE 2. *Examples of plant community classification system.*

Section I. Natural Plant Communities

I. Broadleaf Deciduous Forest System
  A. Xeric upland forest (well to excessively-drained ridge crests and slopes and/or over porous substrates).
    1. Oak (*Quercus*) Cover Class (Q. spp. > 50% IV; C. spp. < 10% IV)
      a. Scarlet oak-White oak (*Q. coccinea-Q. alba*) Vegetation Type
        Assoc. spp.—Qst, Qv, Qpr, Cg
        Example—Bluffs of Beaver Bend, Martin County
        1) Poverty grass (*Danthonia spicata*) Community Type in Groundlayer

Section II. Modified Plant Communities

I. Tree Management System
  A. Tree plantations
    1. Coniferous plantings
      a. White pine-Red pine stand
        1) Bluegrass access lanes in pine stand

located, indexed and searched for qualitative and quantitative descriptions. Personal research data and verbal descriptions by other field botanists supplemented the published data. The most useful single reference on the total range of Indiana plant communities was *Natural Areas in Indiana and Their Preservation* by Lindsey, Schmelz and Nichols (1969). Other sources of particular value include Gordon's (1936) map and classification of Indiana communities; Deam's (1940) *Flora of Indiana;* Braun's (1950) description of the *Eastern Deciduous Forest;* Curtis' (1959) *Vegetation of Wisconsin;* and Schmelz' (1969) dissertation on old-growth forests of Indiana.

Indiana plant communities described in sufficient detail to be fit into the hierarchical classification system are listed in their respective positions in Table 3. It is not proposed that this classification represents the best selection and grouping of units, or that it is a finished product as it stands. It represents a "state of the art" interpretation of the available information. Lack of complete and comparable sample data on known stands makes final determinations impossible at this time. Some community types (*e.g.*, many herbaceous and cryptogamic communities) are almost totally lacking in quantitative descriptions. There is also the problem of how much variation within a unit is permissable for a plant community to be entirely a "this" and not partially or wholly a "that". Obviously, there are as many interpretations of these separations as there are interpreters.

Community separations were accomplished by placing stand attributes tables for all high quality contemporary communities and those from presettlement forest communities (primarily from Crankshaw, 1964, and Qadir, 1964) on 5″ x 8″ McBee punch cards. Separation into progressively smaller units was made by placing cards into similar groups on the basis of physiognomy, ecological similarity of habitat, dominant genera, and importance values of dominant species. Charts were made for each group of cards by listing all the species and their respective quantitative values. An evaluation of repeating combinations

TABLE 3. *Classification of plant communities of Indiana.*

	Section I. Natural Plant Communities
A – – – –	Broadleaf Deciduous Forest System
AA – – –	Xeric Upland Forest
AAA – –	Oak Cover Class
AAAA –	Chestnut oak-American Chestnut Cover Type
AAAB –	Chestnut oak Cover Type
AAAC –	Scarlet oak-White oak Cover Type
AAAD –	Black oak Cover Type
AAAE –	Black oak-White oak Cover Type
AAB – –	Oak-Hickory Cover Class
AABA –	Black oak-White oak-Upland Hickory Cover Type
AB – – –	Dry Mesic Upland Forest
ABA – –	Oak Cover Class
ABAA –	White oak-Red oak Cover Type
ABAB –	Chinkapin oak-Red oak Cover Type
ABB – –	Oak-Hickory Cover Class
ABBA –	White oak-Red oak-Upland Hickory Cover Type
ABC – –	Oak-Maple Cover Class
ABCA –	White oak-Sugar maple Cover Type
ABCB –	Red oak-Sugar maple Cover Type
ABCC –	Red oak-Sugar maple-Basswood Cover Type
ABD – –	Oak-Beech Cover Class
ABDA –	White oak-American Beech Cover Type
ABE – –	Western Mesophytic Cover Class
ABEA –	Western Mesophytic Cover Type
AC – – –	Mesic Upland Forest
ACA – –	Mixed Mesophytic Cover Class
ACAA –	Mixed Mesophytic Cover Type
ACB – –	Beech-Maple Cover Class
ACBA –	American beech-Sugar maple Cover Type
ACBB –	American beech-Sugar maple-Tulip tree Cover Type
ACBC –	American beech-Sugar maple-Basswood Cover Type
AD – – –	Wet Mesic Upland Forest
ADA – –	Maple Cover Class
ADAA –	Sugar maple-Black maple Cover Type
ADAB –	Sugar maple-Black maple-American beech Cover Type
ADB – –	Beech Cover Class
ADBA –	American beech Cover Type
ADC – –	Oak-Elm-Ash Cover Class
ADCA –	Oak-Elm-Ash Cover Type
AE – – –	Hydric Upland Depressional and Flatwoods Forest
AEA – –	Maple Cover Class
AEAA –	Red maple Cover Type
AEAC –	Red maple-Ash Cover Type
AEAC –	Red maple-Yellow birch Cover Type
AEB – –	Beech Cover Class
AEBA –	American beech Cover Type
AEBB –	American beech-Wet site oak Cover Type
AEBC –	American beech-Black gum Cover Type
AEBD –	American beech-Sweet gum Cover Type
AEC – –	Oak-Gum Cover Class
AECA –	Pin oak-Sweet Gum Cover Type
AED – –	Aspen-Cottonwood Cover Class
AEDA –	Trembling aspen-Eastern cottonwood Cover Type

TABLE 3—Continued.

AF – – –	Mesic Lowland Forest
AFA – –	Beech-Maple Cover Class
AFAA –	American beech-Sugar maple-Black maple Cover Type
AFB – –	Maple Cover Class
AFBA –	Sugar maple Cover Type
AG – – –	Wet Mesic Lowland Forest
AGA – –	Sweet gum-Tulip tree Cover Class
AGAA –	Sweet gum-Tulip tree Cover Type
AGB – –	Oak-Hickory Cover Class
AGBA –	Shumard's red oak-Shellbark hickory Cover Type
AGBB –	Post oak Cover Type
AGBC –	Pin oak Cover Type
AH – – –	Hydric Lowland Forest
AHA – –	Elm-Soft maple-Hackberry Cover Class
AHAA –	American elm-Silver maple-Hackberry Cover Type
AHB – –	Soft Maple Cover Class
AHBA –	Silver maple-Cottonwood Cover Type
AHBB –	Silver maple-Black willow Cover Type
AHBC –	Silver maple-Green ash Cover Type
AHC – –	Cottonwood-Willow Cover Class
AHCA –	Cottonwood-Black willow Cover Type
B – – – –	Mixed Broadleaf Deciduous Forest-Needleleaf Forest System
BA – – –	Xeric Upland Forest
BAA – –	Oak-Pine Cover Class
BAAA	Chestnut oak-Virginia pine Cover Type
BAAB –	Black oak-White oak-Virginia pine Cover Type
BAAC –	Black oak-White oak-White pine Cover Type
BAAD –	Black oak-Jack pine Cover Type
BB – – –	Dry Mesic Upland Forest
BBA – –	Oak-Hemlock-Pine Cover Class
BBAA –	White oak-Hemlock Cover Type
BBAB –	Red oak-Hemlock-White pine Cover Type
BC – – –	Mesic Upland Forest
BCA – –	Beech-Maple-Hemlock Cover Class
BCAA –	American beech-Sugar maple-Hemlock Cover Type
BCAB –	American beech-Sugar maple-Hemlock-White pine Cover Type
BD – – –	Wet Mesic Upland Forest (Examples presently unknown)
BE – – –	Wet Mesic Lowland Forest (Examples presently unknown)
BF – – –	Hydric Lowland Forest
BFA – –	White cedar- ? Cover Class
BFAA –	*Northern white cedar- ? Cover Type
BFB – –	Soft maple-Ash-Tamarack Cover Class
BFBA	Red maple-Black ash-Tamarack Cover Type
BFC – –	Swamp oak-Tamarack Cover Class
BFCA –	Swamp white oak-Bur oak-Tamarack Cover Type
BFD – –	Ash-Soft maple-Cypress Cover Class
BFDA –	Green ash-Silver maple-Bald cypress Cover Type
BFE – –	Cypress Cover Class
BFEA –	Bald cypress Cover Type

TABLE 3—Continued.

C – – – –	Savanna and Glade Systems
CA – – –	Xeric Upland Savanna
CAA – –	Oak Cover Class
CAAA –	Black oak Savanna Cover Type
CAAB –	White oak Savanna Cover Type
CAAC –	Post oak-Blackjack oak Cover Type
CB – – –	Xeric Upland Glades
CBA – –	Oak-Red cedar Cover Class
CBAA –	Post oak-Eastern red cedar Glade Cover Type
CBAB –	Black oak-Eastern red cedar Glade Cover Type
CC – – –	Dry Mesic Upland Savanna
CCA – –	Oak-Beech Cover Class
CCAA –	*White oak-American beech Savanna Cover Type
CCB – –	Oak-Hickory Cover Class
CCBA –	*White oak-Black oak-Upland hickory Savanna Cover Type
D – – – –	Shrub System
DA – – –	Xeric Upland Shrubs
DAA – –	Cherry-Dogwood-Juniper Cover Class
DAAA –	Sand cherry-Red osier dogwood-Prostrate juniper Cover Type (High Foredunes)
DB – – –	Dry Mesic Upland Shrubs (Examples presently unknown)
DC – – –	Mesic Upland Shrubs
DCA – –	Sweet fern-Heath-Sumac-Spirea Cover Class
DCAA –	Sweet fern-Heath-Sumac-Spirea Cover Type
DD – – –	Wet Mesic Lowland Shrubs (Examples presently unknown)
DE – – –	Hydric Lowland Shrubs
DEA – –	Cinquefoil-Ninebark Cover Class
DEAA –	Bush cinquefoil-Ninebark Cover Type (Shrub Fen)
DEB – –	Dogwood-Cranberry-Sumac-Cinquefoil Cover Class (Tall Shrub Bog or Fen)
DEBA –	Red osier dogwood-Poison sumac-Cranberry Cover Type
DEBB –	Red osier dogwood-Bush cinquefoil Cover Type
DEC – –	Leatherleaf-Birch Cover Class (Low Shrub Bog or Fen)
DECA –	Leatherleaf-Dwarf birch Cover Type
DED – –	Buttonbush Cover Class (Shrub Swamp)
DEDA –	Buttonbush Cover Type
E – – – –	Herbaceous System
EA – – –	Xeric Upland Prairie
EAA – –	Little Bluestem Cover Class
EAAA –	Little bluestem-Grama grass-Porcupine grass Cover Type (Gravel or Limestone Prairie)
EAAB –	Little bluestem-June grass-Porcupine grass Cover Type (Sand Prairie)
EAAC –	Little bluestem-Sand cherry-Red osier dogwood Cover Type (Dune Sand Shrub Prairie)
EAB – –	Bluegrass-Poverty Grass Cover Class
EABA –	Canada bluegrass-Poverty grass Cover Type (Glacial Drift or Loess Hill Prairie-Disturbed)
EAC – –	Beachgrass-Reedgrass Cover Class
EACA –	Beachgrass-Reedgrass Cover Type (Dune Sand Prairie)

TABLE 3—Continued.

EB – – –	Dry Mesic Upland Prairie
EBA – –	Little Bluestem Cover Class
EBAA –	Little bluestem-Grama grass-Indian grass Cover Type (Glacial Drift or Loess Hill Prairie)
EBAB –	Little bluestem-Porcupine grass-Indian grass Cover Type (Sand, Gravel or Limestone Prairie)
EC – – –	Mesic Upland Prairie (Glacial Till Black Soil Prairie)
ECA – –	Big bluestem-Indian grass Cover Class
ECAA –	Big bluestem-Indian grass-Little bluestem Cover Type
ECAB –	Big bluestem-Indian grass-Prairie dropseed Cover Type
ECAC –	Big bluestem-Indian grass-Little bluestem-Shrubs Cover Type (Black Soil Shrub Prairie-Unburned)
ED – – –	Wet Mesic Depressional Prairie (Black Soil Prairie of Swales)
EDA – –	Big bluestem-Indian grass-Bluejoint-Prairie cordgrass Cover Class
EDAA-–	Big bluestem-Indian grass-Bluejoint-Prairie cordgrass Cover Type
EDB – –	Big bluestem-Prairie dock Cover Class
EDBA –	Big bluestem-Prairie dock Cover Type (Herbaceous Raised Fen)
EE – – –	Hydric Lowland Prairie
EEA – –	Prairie cordgrass Cover Class
EEAA –	Prairie cordgrass-Bluejoint Cover Type
EEAB –	Prairie cordgrass-Tufted hairgrass Cover Type
EF – – –	Hydric Lowland Forb (Mudflats and Stream Islands)
EFA – –	Giant ragweed-Bidens-Nettle Cover Class
EFAA –	Giant ragweed-Bidens-Nettle Cover Type
EFB – –	Dock-Smartweed-Lovegrass Cover Class
EFBA –	Dock-Smartweed-Lovegrass Cover Type
EFC – –	Jewelweed-Snakeroot-False nettle Cover Class
EFCA –	Jewelweed-Snakeroot-False nettle Cover Type
EG – – –	Hydric Lowland Sedge Meadow
EGA – –	Bluejoint-Sedge-Rush Cover Class (Calcareous Seep or Panne)
EGAA –	Bluejoint-Sedge-Rush Cover Type
EGB – –	Sedge-Marsh marigold-Skunk cabbage Cover Class (Seeps)
EGBA –	Sedge-Marsh marigold-Skunk cabbage Cover Type
EGC – –	Sedge-Rush-Spike rush Cover Class (Sedge Meadow)
EGCA –	Sedge-Rush-Spike rush Cover Type
EGD – –	Sedge-Nut sedge-Forb Cover Class (Sedge Meadow)
EGDA –	Sedge-Nut sedge-Forb Cover Type
EGE – –	Sphagnum-Sedge-Fern-Forb Cover Class (Herbaceous Bog)
EGEA –	Sphagnum-Sedge-Fern-Forb Cover Type
EH – – –	Hydric Lowland Emergent Aquatic (Marsh)
EHA – –	Cattail Cover Class
EHAA –	Cattail Cover Type
EHB – –	Cattail-Bulrush Cover Class
EHBA –	Cattail-Bulrush Cover Type
EHBB –	Cattail-Water parsnip Cover Type
EHC – –	Bulrush-Burreed-Loosestrife Cover Class
EHCA –	Bulrush-Burreed Cover Type
EHCB –	Bulrush-Loosestrife Cover Type
EI – – –	Hydric Lowland Floating-leaved Aquatics
EIA – –	Waterlily Cover Class
EIAA –	Yellow waterlily Cover Type
EIAB –	Yellow waterlily-White waterlily Cover Type
EIAC –	Yellow waterlily-Arrowhead-Water willow Cover Type
EIAD –	Yellow waterlily-Watershield Cover Type

TABLE 3—Continued.

EJ – – –	Hydric Lowland Submerged Aquatics
EJA – –	Pondweed Cover Class
EJAA –	Pondweed-Hornwort Cover Type
EJAB –	Pondweed-Hornwort-Stonewort Cover Type
EJAC –	Pondweed-Tapegrass-Waterweed Cover Type
F – – – –	Cryptogamic System
FA – – –	Xeric Sandstone Surfaces
FAA – –	Lichen Cover Class
FB – – –	Xeric Limestone Surfaces
FBA – –	Lichen Cover Class
FC – – –	Dry Mesic Sandstone Surfaces
FCA – –	Moss-Reindeer lichen Cover Class
FD – – –	Dry Mesic Limestone Surfaces
FDA – –	Moss-Cliff fern Cover Class
FE – – –	Mesic Sandstone Surfaces
FEA – –	Moss-Liverwort-Walking fern Cover Class
FF – – –	Mesic Limestone Surfaces
FFA – –	Moss-Fern-Forb Cover Class
FG – – –	Wet Mesic Sandstone Surfaces
FGA – –	Liverwort-Moss Cover Class
FH – – –	Wet Mesic Limestone Surfaces
FHA – –	Moss-Liverwort-Forb Cover Class
	Section II. Modified Plant Communities
M – – – –	Tree Management System
MM – – –	Managed Forest Lands
MMM – –	Timber production forests
MMN – –	Grazed woodlands
MMO – –	Farm woodlots
MN – – –	Tree Plantations
MNM – –	Deciduous plantings
MNN – –	Coniferous plantings
MNO – –	Mixed nursery plantings
MNP – –	Arboreta and formal gardens
MO – – –	Hedgerows and Windbreaks
MOM – –	Tree
MON – –	Shrub and bramble
MP – – –	Orchards and Vineyards
N – – – –	Agricultural System
NM – – –	Forage Crops
NMM – –	Pastures
NMN – –	Hay fields
NN – – –	Grain Crops
NNM – –	Small grains
NNN – –	Row crops
NO – – –	Animal Confinement Areas
NOM – –	Feed lots

TABLE 3—Continued.

O – – – –	Aquatic System
OM – – –	Small Private Units
OMM – –	Farm ponds
OMN – –	Drainage ditches
ON – – –	Large Public Projects
ONM – –	Reservoirs and impoundments
ONN – –	Strip-mine lakes and ponds
ONO – –	Highway borrow pit lakes
ONP – –	Channelized streams
OO – – –	Heavily Stressed Waters
OOM – –	Cooling lakes
OON – –	Mine washing ponds
OOO – –	Sewage lagoons
OOP – –	Excessively polluted streams
P – – – –	Reversionary System
PM – – –	Forest Lands
PMM – –	Abandoned tree plantings
PMN – –	Clear-cut areas
PN – – –	Agricultural Lands
PNM – –	Recently abandoned fields
PNN – –	Old field succession
PNO – –	Mid-seral communities
PNP – –	Late-seral communities
PNQ – –	Fence row successions
PO – – –	Aquatic Areas
POM – –	Dying farm ponds
PON – –	Filled reservoirs
PP – – –	Developed Lands
PPM – –	Abandoned homesites
PPN – –	Vacated urban lands
Q – – – –	Recreational System
QM – – –	Quasi-natural Lands
QMM – –	State parks (intensively used sections)
QMN – –	County and city parks
QMO – –	Youth camps
QMP – –	Campgrounds
QN – – –	Manicured Lands (mowings)
QNM – –	Lawns
QNN – –	Golf courses
QNO – –	Athletic fields
QO – – –	Developed Sites
QOM – –	Race tracks
QON – –	Amusement parks
R – – – –	Extraction System
RM – – –	Aggregate Recovery
RMM – –	Limestone quarries
RMN – –	Sand mines
RMO – –	Gravel pits
RN – – –	Strip-mining Lands
RNM – –	Active pits
RNN – –	Raw spoil areas
RNO – –	Unreclaimed seral spoil banks
RNP – –	Reclamation lands

TABLE 3—Continued.

RO – – –	Peat Mining Sites
RP – – –	Petroleum Recovery Sites
RQ – – –	Abused Farm Lands
RQM – –	Borrow pits
RQN – –	Eroded lands
RR – – –	Construction Sites (also depositional)
S – – – –	Depositional System
SM – – –	Social Alluvium
SMM – –	Agricultural wastes
SMN – –	Sawdust and wood processing wastes
SMO – –	Refuse dumpings
SMP – –	Landfills
SMQ – –	Scrap holding and processing yards
SMR – –	Junkyards
SN – – –	Sedimentations
SNM – –	Terrestrial
SNN – –	Aquatic
T – – – –	Transportation System
TM – – –	Vehicular Traffic
TMM – –	Railroad rights-of-way
TMN – –	Highway borders and medians
TMO – –	Streets and parkways
TMP – –	Airports
TMQ – –	Vehicle storage areas
TN – – –	Flowage Traffic
TNM – –	Utility corridors
TNN – –	Pipeline corridors
U – – – –	Residential System
UM – – –	Rural
UMM – –	Farmsteads
UMN – –	Country homes
UN – – –	Suburban
UO – – –	Urban
UOM – –	Single dwelling homes
UON – –	Condominiums
UOO – –	Apartment complexes
UOP – –	Motel-hotel units
V – – – –	Municipal-Industrial System
VM – – –	Recreational Sites
VMM – –	Theatres
VMN – –	Sports arenas
VN – – –	Educational Units
VNM – –	Schools
VNN – –	Colleges
VNO – –	Universities
VO – – –	Medical Complexes
VP – – –	Governmental Units
VQ – – –	Business Centers
VQM – –	Shopping centers
VQN – –	Small businesses
VR – – –	Light Industrial Areas
VRM – –	Construction firms
VRN – –	Service industries

TABLE 3—Continued.

VS – – –	Heavy Industrial Areas
VSM – –	Steel manufacturing
VSN – –	Petro-chemical refining
VSO – –	Heavy manufacturing

* Known only from presettlement forest data.

of dominant genera and the constancy of their quantitative values permitted the grouping of stands into Vegetation Classes according to the method described by Phillips (1959).

Subdivision of Vegetation Cover Classes into Vegetation Cover Types resulted from separations according to similarities in dominant and subdominant species, plus consideration of patterns within subordinant strata.

A lack of consistency among stand table data taken by so many botanists using such different methods over so many years of field work precluded the use of more objective mathematical approaches to taxa separation. Subjective interpretations based both on available quantitative data and field experience in studying Indiana vegetation seemed to be the best approach in this initial effort to develop a plant community classification for the State.

Refinement of this classification system will become much easier once comparable stand table data are generated for large numbers of communities representing all physiognomic systems of the State's vegetation. Your suggestions and comments for improving this classification are welcomed.

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