

# AN ECOLOGICAL CLASSIFICATION SYSTEM FOR VEGETATIVE ANALYSIS

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*Abstract:* This paper presents a vegetative classification system based on photosynthetic layers (overstory, understory, etc.) that is easily applied to a variety of habitat types and can be used to evaluate a habitat for various wildlife species.

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A standard vegetative classification system was needed in the development of comprehensive management plans for Florida's two million hectares of wildlife management areas (WMA). Due to the large acreages involved, detailed analyses were not feasible, so the classification system had to provide much data for a minimum of field effort. Also, the system had to be flexible enough to be applied to a wide variety of habitats. The following system was developed to meet the need for a standard system applicable to all habitats which can classify a habitat quickly with an optimal amount of information for later evaluation.

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The classification symbol for a particular habitat is composed of four components in the fractional form (after Graham 1945)

$$\frac{(I) (II)}{(III) (IV)}$$

where: (I) describes the overstory, (II) midstory, (III) understory and (IV) ground cover. These four vegetative levels correspond to the number of photosynthetic layers generally found in plant communities in Florida. These layers are defined as:

Ground cover	vegetative layer 0 - 0.3 meters above ground.
Understory	vegetative layer 0.3 - 1.3 meters above ground.
Midstory	vegetative layer 1.3 - 5.0 meters or more above ground.
Overstory	the vegetative layer above the midstory anywhere from 3.3 - 33.0 meters above ground.

Each component of the numerator (overstory and midstory) is described by the general form

$$\left( A \frac{x_a/y_a}{z_a}, B \frac{x_b/y_b}{z_b} - N \right)$$

where:

- A dominant species (has greatest percent cover)
- $x_a$  number of stems per acre of species A
- $y_a$  diameter at breast height (DBH) of species A
- $z_a$  age class of species A
- B subdominant species (has second greatest percent cover)
- $x_b$  number of stems per acre of species B

Table 1. A Key to Vegetative Classification Symbols.

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Species<sup>1</sup>

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LL	Longleaf pine	BH	Bottomland hardwoods
SL	Slash pine	WM	Wax myrtle
PP	Planted pine	SP	Saw palmetto
CP	Cabbage palm	LT	Litter
CY	Cypress	FB	Forbs
RC	Red cedar	WG	Wiregrass
MG	Marsh Grasses	SG	Sawgrass
OF	Old field	GR	Grasses (other)
SM	Sea myrtle	ST	Spartina
GB	Gallberry	AP	Andropogons

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Stems per Acre (x)

1	0 - 50
2	51 - 100
3	101 - 150
4	151 - 200
5	Over 200

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Diameter at Breast Height (y)

1	0 - 10 cm
2	11 - 20 cm
3	21 - 30 cm
4	31 - 40 cm
5	Over 40 cm

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Age Class (z)

1	0 - 25 years
2	26 - 50 years
3	51 - 75 years
4	76 - 100 years
5	101 - 125 years
6	126 - 150 years
7	151 - 175 years
8	176 - 200 years

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Percent Cover (N)

1	0 - 10
2	11 - 20
3	21 - 30
4	31 - 40
5	41 - 50
6	51 - 60
7	61 - 70
8	71 - 80
9	81 - 90
10	91 - 100

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<sup>1</sup>This species list is only an example. The list for a specific area will reflect the species present there.

$y_b$  DBH of species B

$z_b$  age class of species B

N percent cover of total overstory or midstory

The x and y terms are separated by a slash "/", the A and B by a comma ",", and percent cover by a dash "-". If either one or two of the values for x, y or z are unknown or undetermined an "x" is entered; if all three are unknown these terms are omitted completely. If no subdominant species is present, its entire term is omitted, thus

$$\left( A \frac{x_a/y_a}{z_a} - N \right)$$

If a component (overstory, understory, etc.) is not present in the habitat, place an "0" in its space.

Each component term must have a key interpreting its specific value (Table 1). Values for stems per acre, DBH, age class and percent cover are standard and should be used as presented in Table 1 for all habitats. Species symbols, however, can be added or removed as needed to tailor the system to the particular area being typed. For example, in south Florida LL can be deleted since it does not occur and others, such as melaleuca, added.

An example of the classification of a north Florida flatwoods overstory might be

$$\left( LL \frac{1}{5} , SL \frac{1}{x} - 5 \right)$$

where:

Longleaf pine (LL) is the dominant overstory species with 0-50 stems/acre, 31 - 40 cm DBH and an age of 101-125 years. Slash pines are subdominant (having less stems/acre) with 0 - 50 stems/acre, 11 - 20 cm DBH and an unknown age. The total overstory canopy has a percent cover of 41 - 50.

The midstory is the second component of the numerator and has the same general form as described for overstory, i.e.

$$\left( A \frac{x_a/y_a}{z_a} , B \frac{x_b/y_b}{z_b} - N \right)$$

Continuing our flatwoods example, the numerator is

$$\left( LL \frac{1}{5} , SL \frac{1}{x} - 5 \right) \left( SL \frac{1}{1} , WM - 2 \right)$$

where:

The overstory is as previously described and the midstory is dominated by slash pine with 0 - 50 stems/acre, 0 - 10 cm DBH and 0 - 25 years of age. Wax myrtle is the subdominant (note that no values are given for stems/acre, DBH or age since these terms are meaningless for wax myrtle). Percent cover for the midstory is 11 - 20.

The denominator contains the two components representing understory and ground cover, where each is described by the general form

$$(A^{x_a}, B^{x_b}, C^{x_c} - N)$$

where:

A dominant species

$x_a$  number of stems per acre of species A

B second most dominant species

$x_b$  number of stems per acre of species B

C third most dominant species

$x_c$  number of stems per acre of species C

N Percent cover of the total understory or ground cover.

If four or more species are prominent, rather than listing each, lump them into one descriptive term such as "marsh grasses," assign it a symbol, and place it in the key. Note that it is neither necessary nor possible to include every species occurring in the understory or ground cover; just the more important.

The denominator for our flatwoods example might be

$$(SP, GB, SL^1 - 6) (WG, GR - 9)$$

where:

The understory is saw palmetto, gallberry, and slash pine (with 0-50 stems/acre) with a 51-60 percent cover. The ground cover is wiregrass and other grasses with a 81 - 90 percent cover.

Thus, the complete classification of our flatwoods example is:

$$\frac{(LL^{1/4}, SL_x^{1/2} - 5) (SL_1^{1/1}, WM - 2)}{(SP, GB, SL^1 - 6) (WG, GR - 9)}$$

A species may occur in one or more vegetative levels within a habitat as did slash pine in the flatwoods example. Also a species may be in one vegetative level in habitat M and in another in habitat P. For example, a 7-meter cabbage palm in a 17-meter slash pine stand is in the midstory, but in a live oak-cabbage palm hammock would be in the overstory.

Finally, all vegetative levels are not necessarily present in every habitat. For example, a sawgrass marsh would be classified:

$$\frac{(\emptyset) (\emptyset)}{(SG - 4) (\emptyset)}$$

#### LITERATURE CITED

GRAHAM, S. A. 1945. Ecological classification of cover types. *J. Wildl. Manage.* 9:182-190.