

Appendix E: Assessment Sub-Unit Guidelines

ASU Identification and Classification

- 1) **Identify Assessment Sub-Unit divisions** where there are visible changes on recent digital photography in the amount and/or type of vegetative cover in the AU.
 - ASUs must be large enough to be identified and delineated on aerial photography.
 - Areas smaller than 0.2 ha are not separate Sub-Units, those areas will be identified as microhabitats and recorded in Section C-1c of the data sheet.
 - Do NOT create a separate Sub-Unit for changes in species composition if the overall vegetation structure (cover of each layer) DOES NOT change (see example below).

- 2) **Identify and classify all Vegetated Wetland Sub-Units**
 - Vegetated Wetland Sub-Units must have 5% or more vegetation cover.
 - Classification is based on the tallest vegetation layer with at least 30% areal cover.
 - Classification of areas with mixed vegetation is determined by the taller layer.
 - Classification of areas where each vegetation layer has less than 30% cover, but two (or more) layers combined have at least 30% areal cover are determined by the shorter layer.
 - Classification of areas where total vegetation cover is less than 30%, (but at least 5% total areal cover) are determined by the shortest layer.

Examples

Tree Cover	Scrub-Shrub Cover	Emergent Cover	Classification
50%	60%	-	FORESTED
25%	60%	-	SCRUB-SHRUB
50% (mixed)		-	FORESTED
25%	25%	-	SCRUB-SHRUB
25%	20%	40%	SCRUB-SHRUB
15%	10%	10%	EMERGENT
5%	5%	5%	EMERGENT

- ➔ An area with 50% Tree Cover and 60% Scrub-Shrub Cover is classified as **FORESTED**.
- ➔ An area with 25% Tree Cover and 60% Scrub-Shrub Cover is classified as **SCRUB-SHRUB**.
- ➔ An area with 50% Mixed Tree and Scrub-Shrub Cover is classified as **FORESTED**.
- ➔ An area with 25% Tree Cover and 25% Scrub-Shrub Cover is classified as **SCRUB-SHRUB**.
- ➔ An area with 25% Tree Cover and 20% Scrub-Shrub Cover and 40% Emergent Cover is classified as **SCRUB-SHRUB**.
- ➔ An area with 15% Tree Cover and 10% Scrub-Shrub Cover and 10% Emergent Cover is classified as **EMERGENT**.
- ➔ An area with 5% Tree Cover and 5% Scrub-Shrub Cover and 5% Emergent Cover is classified as **EMERGENT**.

NOTE: Some assessment units may have multiple areas with the same classification type. See example below for explanation on when to combine Sub-Units and when to list them separately.

3) Identify and classify all Non-Wetland Sub-Units

- Non-Wetland Sub-Units are areas which are included in the Assessment Unit (see Appendix D guidelines) but have less than 5% vegetation cover AND/OR does not have wetland indicators (does not meet the definition of a wetland).
- Classification is based on the primary land cover (water or other).

Examples

Vegetation Cover	Wetland Indicators	Land Cover	Classification
4%	Hydrology	Shallow Pond	STANDING WATER
4%	Hydrology	Tidal Creek	FLOWING WATER
3%	Hydric Soils/Hydrology	Mud Flat	OTHER
15%	None	Beach/Dune Grass	OTHER
75%	None	Forested Upland	OTHER

- ➔ An area which is Semi-Permanently Flooded and has <5% Aquatic Bed Vegetation is classified as **STANDING WATER**.
- ➔ An area with Flowing Water and <5% Emergent Vegetation is classified as **FLOWING WATER**.
- ➔ An area which is Saturated, has Hydric Soils, and <5% Vegetation is classified as **OTHER**.
- ➔ An area which does NOT have Wetland Hydrology or Hydric Soils and has 15% Non-Hydrophytic Herbaceous Vegetation is classified as **OTHER**.
- ➔ An area which does NOT have Wetland Hydrology or Hydric Soils and has 75% Non-Hydrophytic Woody Vegetation is classified as **OTHER**.

Example - Combining Non-Wetland Sub-Units

SCENARIO: AU is entirely composed of salt marsh vegetation (> 95% cover)

Total # of Veg ASU = 1

- ➔ EMERGENT

SCENARIO: AU contains at least 3 areas of upland and multiple tidal creeks with < 5% vegetation.

All upland areas can be combined, and all tidal creeks can be combined.

Total # of Non-Wet ASU = 2

- ➔ FLOWING WATER
- ➔ OTHER



Figure 1: AU boundary

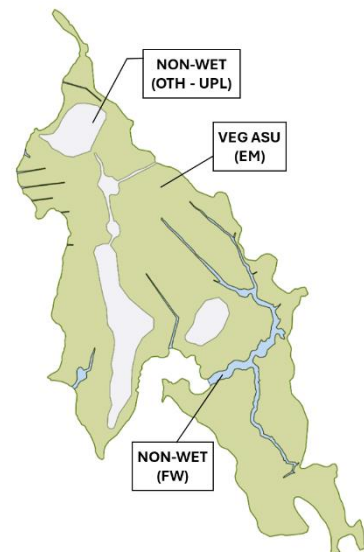


Figure 2: Sub-Unit Classification

Example - Combining Vegetated Wetland Sub-Units

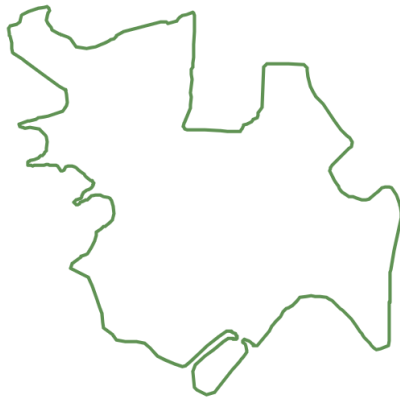


Figure 1: AU boundary

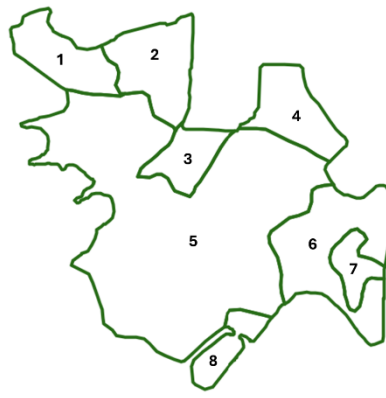


Figure 2: Sub-Unit Divisions

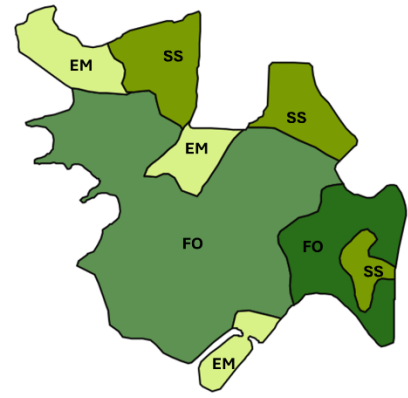


Figure 3: Sub-Unit Classification

SCENARIO: AU is divided into eight distinct areas (all vegetated). Classification is based on the **tallest layer** with **at least 30% cover**.

Area	Tree Cover	Scrub-Shrub Cover	Emergent Cover	Classification
1	<1%	5%	90%	EMERGENT
2	5%	30%	70%	SCRUB-SHRUB
3	<1%	5%	90%	EMERGENT
4	5%	30%	70%	SCRUB-SHRUB
5	90%	30%	1-4%	FORESTED
6	90%	10%	50%	FORESTED
7	<1%	5%	90%	EMERGENT
8	5%	30%	70%	SCRUB-SHRUB

Areas classified as Emergent

Area #	Emergent Veg	Scrub-Shrub	Trees	ASU Type
1	85-95% <i>Panicum virgatum</i>	1-4% <i>Salix discolor</i> <i>Amorpha fruticosa</i>	<1% <i>Populus deltoides</i>	EM
3	85-95% <i>Panicum virgatum</i>	1-4% <i>Salix discolor</i> <i>Amorpha fruticosa</i>	<1% <i>Populus deltoides</i>	EM
7	85-95% <i>Carex crinita</i> <i>Carex lurida</i> <i>Scirpus cyperinus</i> <i>Leersia virginica</i> <i>Arthraxon hispidus</i>	1-4% <i>Acer rubrum</i>	<1% <i>Acer rubrum</i>	EM

Areas 1, 3, and 7 can be combined into one Emergent ASU

- Areas 1 and 3 are identical in both species composition and structure.
- Area 7 has different species composition but **DOES NOT have different structure** (percent cover is identical to areas 1 and 3 for all layers).

Reminder: Do NOT create a separate Sub-Unit for changes in species composition if the vegetation structure DOES NOT change.

Areas classified as Scrub-Shrub

Area #	Emergent Veg		Scrub-Shrub		Trees		ASU Type
2	61-74%	<i>Phalaris arundinacea</i>	26-39%	<i>Clethra alnifolia</i>	1-4%	<i>Betula populifolia</i>	SS
4	61-74%	<i>Phalaris arundinacea</i>	26-39%	<i>Clethra alnifolia</i>	1-4%	<i>Betula populifolia</i>	SS
8	61-74%	<i>Lythrum salicaria</i>	26-39%	<i>Cephalanthus occidentalis</i> <i>Vaccinium corymbosum</i>	1-4%	<i>Salix nigra</i>	SS

Areas 2, 4, and 8 can be combined into one ASU

- Areas 2 and 4 are identical in both species composition and structure.
- Area 8 has different species composition but **DOES NOT have different structure** (percent cover is identical to areas 1 and 3 for all layers).

Areas classified as Forested

Area #	Emergent Veg		Scrub-Shrub		Trees		ASU Type
5	1-4%	<i>Leersia virginica</i>	26-39%	<i>Lindera benzoin</i> <i>Ilex verticillate</i> <i>Frangula alnus</i>	85-95%	<i>Fraxinus pennsylvanica</i> <i>Acer rubrum</i>	FO
6	40-60%	<i>Carex intumescens</i>	5-15%	<i>Lindera benzoin</i> <i>Ilex verticillate</i> <i>Rhamnus cathartica</i>	85-95%	<i>Pinus strobus</i> <i>Acer rubrum</i> <i>Betula alleghaniensis</i>	FO

Areas 5 and 6 can NOT be combined into one ASU

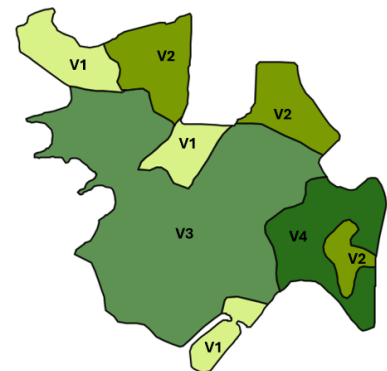
- Areas 5 and 6 both have 85-95% tree cover.
- Area 5 has much more shrub cover and less emergent cover than area 6.
- Area 5 and 6 **have different structure** and must be assessed separately.

Data Collection

Visually assessed ALL areas via meander transect to determine which ones can be combined and to record observations, but each copy of Part C should reflect the sub-unit as a whole.

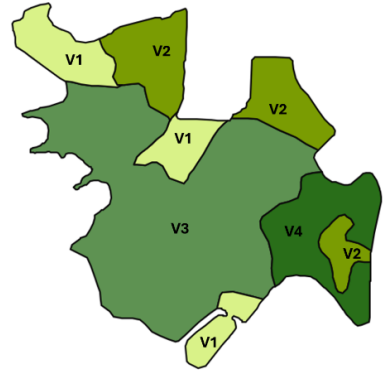
Document vegetation and wildlife data for each sub-unit:

- V1 = EMERGENT
- V2 = SCRUB-SHRUB
- V3 = FORESTED (A)
- V4 = FORESTED (B)



Use the notes section to record which areas have been combined and situations where it is not possible to access an area to conduct a meander transect, but it appears to be similar to the other areas of that sub-unit.

ASU Weighting Factor Calculation



1) Calculate the Size of Each ASU

- Using GIS finalize each Vegetated Wetland Sub-Unit polygon.
- Any areas that were combined to make a single sub-unit should be merged.
- Calculate the area of each Vegetated Wetland Sub-Unit (in hectares).
 - Record the area of each in section G-3a(3):

(1) ID #	V1	V2	V3	V4
(2) Type	<input checked="" type="checkbox"/> EM <input type="checkbox"/> SS <input type="checkbox"/> FO	<input type="checkbox"/> EM <input checked="" type="checkbox"/> SS <input type="checkbox"/> FO	<input type="checkbox"/> EM <input type="checkbox"/> SS <input checked="" type="checkbox"/> FO	<input type="checkbox"/> EM <input type="checkbox"/> SS <input checked="" type="checkbox"/> FO
(3) Size	1.95 ha(s)	10.00 ha(s)	23.75 ha(s)	4.15 ha(s)

2) Calculate the Total Vegetated Area

- Find the sum of the area of all Vegetated Wetland Sub-Unit polygons.
 - Record the total area in section G-3b:

39.85

 ha(s)

3) Calculate the Weighting Factor for Each ASU

- Divide the value recorded in each column of G-3a(3) by the value recorded in section G-3b
 - Record the results in section G-3c:

V1	V2	V3	V4
0.05	0.25	0.60	0.10

4) Use Weighting Factors for Variable Calculation

- Variables derived from ASU data are scored using a weighted average (see example below).
- The weighting factor is used for calculation of the following variables:
 - Simple variables: *HerbCov*, *Heterogeneity*, *Invasives*, *LiveBA*, *MicroFeat*, *Strata*, *TotalBA*, *TreeCount*, *TreeCov*, *Understory*, *VegCov*, *WildFeat*.
 - Composite variables: *CarbonBiomass*, *ET*, *ExportBiomass*, *HabFeat*, *NitrogenBiomass*, *StemDensity*, *VelocityReduct*

ASU Variable Weighting

SIMPLE VARIABLE EXAMPLE: HerbCov

1) Find Sub-Score for Each ASU

- Use the data recorded in section C-1b(1) and the scoring tables in Chapter 5 (or 6) to determine the HerbCov sub-score for each Sub-Unit.

COVER CLASS	SCORE	COVER CLASS	SCORE
None	0	40 – 60%	5
<1% (Trace)	0	61 – 74%	7
1 – 4%	0	75 – 84%	8
5 – 15%	1	85 – 95%	9
16 – 25%	2	> 95%	10
26 – 39%	3		

V1	Record absolute cover for each layer in the Sub-Unit	N/A	<1% (trace)	1-4%	5-15%	16-25%	26-39%	40-60%	61-74%	75-84%	85-95%	> 95%	Value: > 95% Sub-Score: 10
	(1) HERBACEOUS LAYER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

V2	Record absolute cover for each layer in the Sub-Unit	N/A	<1% (trace)	1-4%	5-15%	16-25%	26-39%	40-60%	61-74%	75-84%	85-95%	> 95%	Value: 40-60% Sub-Score: 5
	(1) HERBACEOUS LAYER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2) Calculate the Weighting Factor for Each ASU (as explained above)

1. Area of Assessment Unit/Wetland System
 a. SIZE OF ASSESSMENT UNIT: ha(s) b. AREA OF WETLAND SYSTEM: ha(s)

2. Non-Wetland Assessment Sub-Units
 a. TYPE AND SIZE
 Record type/size for each Non-Wetland ASU
NON-WETLAND ASU TYPE KEY:
 SW = STANDING WATER
 FW = FLOWING WATER
 Other = UPLAND/UNVEGETATED

(1) ID #	N1	N2
(2) Type	<input checked="" type="checkbox"/> SW <input type="checkbox"/> FW <input type="checkbox"/> Other	<input type="checkbox"/> SW <input type="checkbox"/> FW <input type="checkbox"/> Other
(3) Size	<input type="text" value="0.05"/> ha(s)	<input type="text"/> ha(s)

b. TOTAL NON-WETLAND AREA: ha(s)

3. Vegetated Wetland Assessment Sub-Units (ASU)
 a. TYPE AND SIZE
 Record type/size for each Veg. Wetland ASU
VEGETATED WETLAND ASU TYPE KEY:
 EM = EMERGENT WETLAND
 SS = SCRUB-SHRUB WETLAND
 FO = FORESTED WETLAND

(1) ID #	V1	V2
(2) Type	<input type="checkbox"/> EM <input type="checkbox"/> SS <input checked="" type="checkbox"/> FO	<input checked="" type="checkbox"/> EM <input type="checkbox"/> SS <input type="checkbox"/> FO
(3) Size	<input type="text" value="9.45"/> ha(s)	<input type="text" value="1.65"/> ha(s)

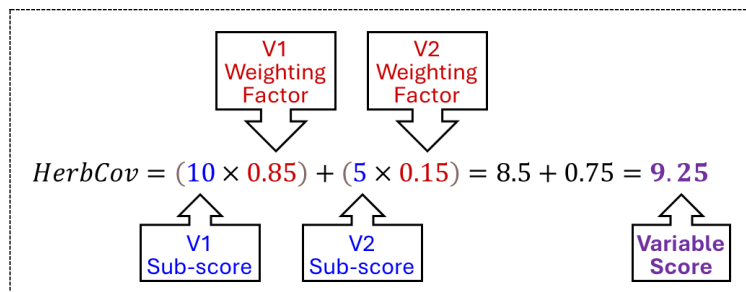
b. TOTAL VEGETATED WETLAND AREA: ha(s)

c. WEIGHTING FACTOR
 Calculate the weighting factor for each Vegetated Wetland Sub-Unit

V1	V2
<input type="text" value="0.85"/>	<input type="text" value="0.15"/>

3) Calculate a Weighted Average:

$$[SubScore(V1) \times Weight(V1)] + [SubScore(V2) \times Weight(V2)] = VariableScore$$



4) Record Variable Score (to be used for FCG calculation)

$$HerbCov = 9.25$$

COMPOSITE VARIABLE EXAMPLE: *StemDensity*

StemDensity is calculated by combining the sub-variables *TreeCount* and *TotalBA* in the following equation:

$$StemDensity = \sqrt[3]{TreeCount^2 \times TotalBA}$$

1) Find Sub-Variable Sub-Scores for Each ASU

➔ Determine the sub-scores for *TreeCount* and *TotalBA* for EACH Sub-Unit.

V1

a. DBH/BASAL AREA		NOTE: Add additional lines if there are more than 20 trees rooted in the 10m² plot.													
Record DBH for all trees rooted in the 10m ² plot. Check the box to indicate whether each tree is live or standing dead.															
(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	
1 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	12 cm(s)	0.0113	6 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	22 cm(s)	0.0380	11 <input type="checkbox"/> Live <input type="checkbox"/> Dead			16 <input type="checkbox"/> Live <input type="checkbox"/> Dead			2 <input type="checkbox"/> Live <input checked="" type="checkbox"/> Dead	10 cm(s)	0.0079	
2 <input type="checkbox"/> Live <input checked="" type="checkbox"/> Dead	10 cm(s)	0.0079	7 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	22 cm(s)	0.0380	12 <input type="checkbox"/> Live <input type="checkbox"/> Dead			17 <input type="checkbox"/> Live <input type="checkbox"/> Dead			3 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	10 cm(s)	0.0079	
3 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	10 cm(s)	0.0079	8 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	13 cm(s)	0.0133	13 <input type="checkbox"/> Live <input type="checkbox"/> Dead			18 <input type="checkbox"/> Live <input type="checkbox"/> Dead			4 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	29 cm(s)	0.0661	
4 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	10 cm(s)	0.0079	9 <input type="checkbox"/> Live <input type="checkbox"/> Dead			14 <input type="checkbox"/> Live <input type="checkbox"/> Dead			19 <input type="checkbox"/> Live <input type="checkbox"/> Dead			5 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	10 cm(s)	0.0079	
5 <input checked="" type="checkbox"/> Live <input type="checkbox"/> Dead	10 cm(s)	0.0079	10 <input type="checkbox"/> Live <input type="checkbox"/> Dead			15 <input type="checkbox"/> Live <input type="checkbox"/> Dead			20 <input type="checkbox"/> Live <input type="checkbox"/> Dead			b. TOTAL BASAL AREA			
												(1) LIVE Trees	(2) ALL Trees	NOTE: DBH to Basal Area conversions can be calculated in the office.	
												0.1823	0.1902		
c. TREE STEM COUNT														8	
Record the total number of trees (both live and standing dead) rooted in the 10m ² plot.															

V2

a. DBH/BASAL AREA		NOTE: Add additional lines if there are more than 20 trees rooted in the 10m² plot.													
Record DBH for all trees rooted in the 10m ² plot. Check the box to indicate whether each tree is live or standing dead.															
(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	(1) L/D	(2) DBH	(3) BA	
1 <input type="checkbox"/> Live <input type="checkbox"/> Dead			6 <input type="checkbox"/> Live <input type="checkbox"/> Dead			11 <input type="checkbox"/> Live <input type="checkbox"/> Dead			16 <input type="checkbox"/> Live <input type="checkbox"/> Dead			2 <input type="checkbox"/> Live <input type="checkbox"/> Dead			
2 <input type="checkbox"/> Live <input type="checkbox"/> Dead			7 <input type="checkbox"/> Live <input type="checkbox"/> Dead			12 <input type="checkbox"/> Live <input type="checkbox"/> Dead			17 <input type="checkbox"/> Live <input type="checkbox"/> Dead			3 <input type="checkbox"/> Live <input type="checkbox"/> Dead			
3 <input type="checkbox"/> Live <input type="checkbox"/> Dead			8 <input type="checkbox"/> Live <input type="checkbox"/> Dead			13 <input type="checkbox"/> Live <input type="checkbox"/> Dead			18 <input type="checkbox"/> Live <input type="checkbox"/> Dead			4 <input type="checkbox"/> Live <input type="checkbox"/> Dead			
4 <input type="checkbox"/> Live <input type="checkbox"/> Dead			9 <input type="checkbox"/> Live <input type="checkbox"/> Dead			14 <input type="checkbox"/> Live <input type="checkbox"/> Dead			19 <input type="checkbox"/> Live <input type="checkbox"/> Dead			5 <input type="checkbox"/> Live <input type="checkbox"/> Dead			
5 <input type="checkbox"/> Live <input type="checkbox"/> Dead			10 <input type="checkbox"/> Live <input type="checkbox"/> Dead			15 <input type="checkbox"/> Live <input type="checkbox"/> Dead			20 <input type="checkbox"/> Live <input type="checkbox"/> Dead			b. TOTAL BASAL AREA			
												(1) LIVE Trees	(2) ALL Trees	NOTE: DBH to Basal Area conversions can be calculated in the office.	
												0.0000	0.0000		
c. TREE STEM COUNT														0	
Record the total number of trees (both live and standing dead) rooted in the 10m ² plot.															

<i>TreeCount</i>	TreeCount Classes and Scores				V1 Value = 8 trees Sub-Score = 5
	COUNT CLASS	SCORE	COUNT CLASS	SCORE	
	None	0	10 – 12	7	
	1 – 3	1	13 – 15	9	
	4 – 6	3	> 15	10	
	7 – 9	5			V2 Value = 0 trees Sub-Score = 0

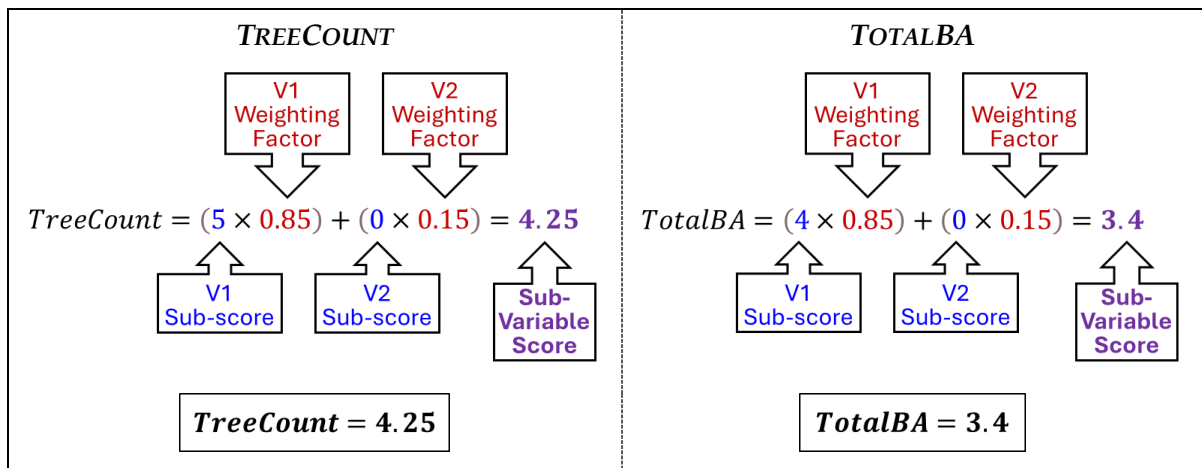
<i>TotalBA</i> Classes and Scores					
BASAL AREA		SCORE	BASAL AREA		SCORE
No Trees		0	0.2250 – 0.2749	5	
< 0.0250		0	0.2750 – 0.3249	6	
0.0250 – 0.0749		1	0.3250 – 0.3749	7	
0.0750 – 0.1249		2	0.3750 – 0.4249	8	
0.1250 – 0.1749		3	0.4250 – 0.4749	9	
0.1750 – 0.2249		4	≥ 0.4750	10	

V1 Value = **0.1902**
Sub-Score = **4**

V2 Value = **0.0000**
Sub-Score = **0**

2) Calculate the Sub-Variable Scores:

➔ Use weighting factors to calculate the scores for each sub-variable



3) Calculate Variable Score:

➔ Combine sub-variable scores in variable equation

$StemDensity = \sqrt[3]{(TreeCount)^2 \times TotalBA}$

$StemDensity = \sqrt[3]{(4.25)^2 \times 3.4}$

StemDensity = 3.9

COMPOSITE VARIABLE EXAMPLE: *StemDensity* (alternate method)

1) Find Sub-Variable Sub-Scores for Each ASU

➔ Determine the sub-scores for *TreeCount* and *TotalBA* for EACH Sub-Unit (same as above).

<i>TreeCount</i>	V1 Value = 8 trees Sub-score = 5	<i>TotalBA</i>	V1 Value = 0.1902 Sub-score = 4
	V2 Value = 0 trees Sub-score = 0		V2 Value = 0.0000 Sub-score = 0

2) Calculate Variable Sub-Score for EACH Sub-Unit:

$$StemDensity = \sqrt[3]{TreeCount^2 \times TotalBA}$$

V1 <i>TreeCount</i> = 5 <i>TotalBA</i> = 4	$StemDensity(V1) = \sqrt[3]{5^2 \times 4}$	StemDensity(V1) = 4.6
V2 <i>TreeCount</i> = 0 <i>TotalBA</i> = 0	$StemDensity(V2) = \sqrt[3]{0^2 \times 0}$	StemDensity(V2) = 0

3) Calculate Variable Score:

