The Development of the JAES LVI Calculator Version 4, rev 1a

Concept, Development, Implementation, and Operation of the LVI Calculator

By

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Orange→County Environmental Protection Division

Constructs for JAES LVI Calculator v 4

- Fore, L. 2007. Assessing the Biological Condition of Florida Lakes: Development of the Lake Vegetation Index (LVI)
- F.A.C §62-303
- 2011 (LVI 2200) DEP-SOP 003-11 Lake Vegetation Index Determination – Index Calculation
- Common Software (Accessibility) MS Excel®
- Simple and Familiar Data Entry Process (Field Data Sheet **FD9000-27 LVI_Data_Sheet_6-21-11**)

New Features of Version 4

Notable New Features: SYN column, DropDown quadrant list.

- Place an “X” in the SYN column if the field biologist identified a synonym of the listed species. Synonyms described on the “All taxa” worksheet.
- Click on the DropDown list in the upper right corner to select your 4 quadrants; automatic population of columns
- Default taxa present on calculator worksheet reflect FD9000-27
- New CofC values for all taxa; reflected on both worksheets. Synonyms present for field biologist’s assistance on All Taxa Worksheet.

Changes made to previous version calculation pursuant to New SOP:

- FLEPPC Category 1 must be the status of the taxa to count toward the metric, rather than FLEPPC categories 1 and 2.
- Nativity metric is split into North and South formulas, with different constants than previous versions.
- Different constants used in FLEPPC1 Invasive metric calculation
- Different constants used in Sensitive taxa metric for both North and South equations.
- Different constants used if CofC Dominant metric for both North and South equations.

Data Sheet FD 9000-27

Lake Vegetation Index Data Sheet (10-19-06)

Waterbody:	Date:	County:
Analyst:	INTORSET	Signature:

Lake tissue level (circle 1): high normal low — Algal bloom present (circle 1): yes no — Lake units sampled (circle one group): 1, 4, 7, 10 / 2, 5, 8, 11 / 3, 6, 9, 12

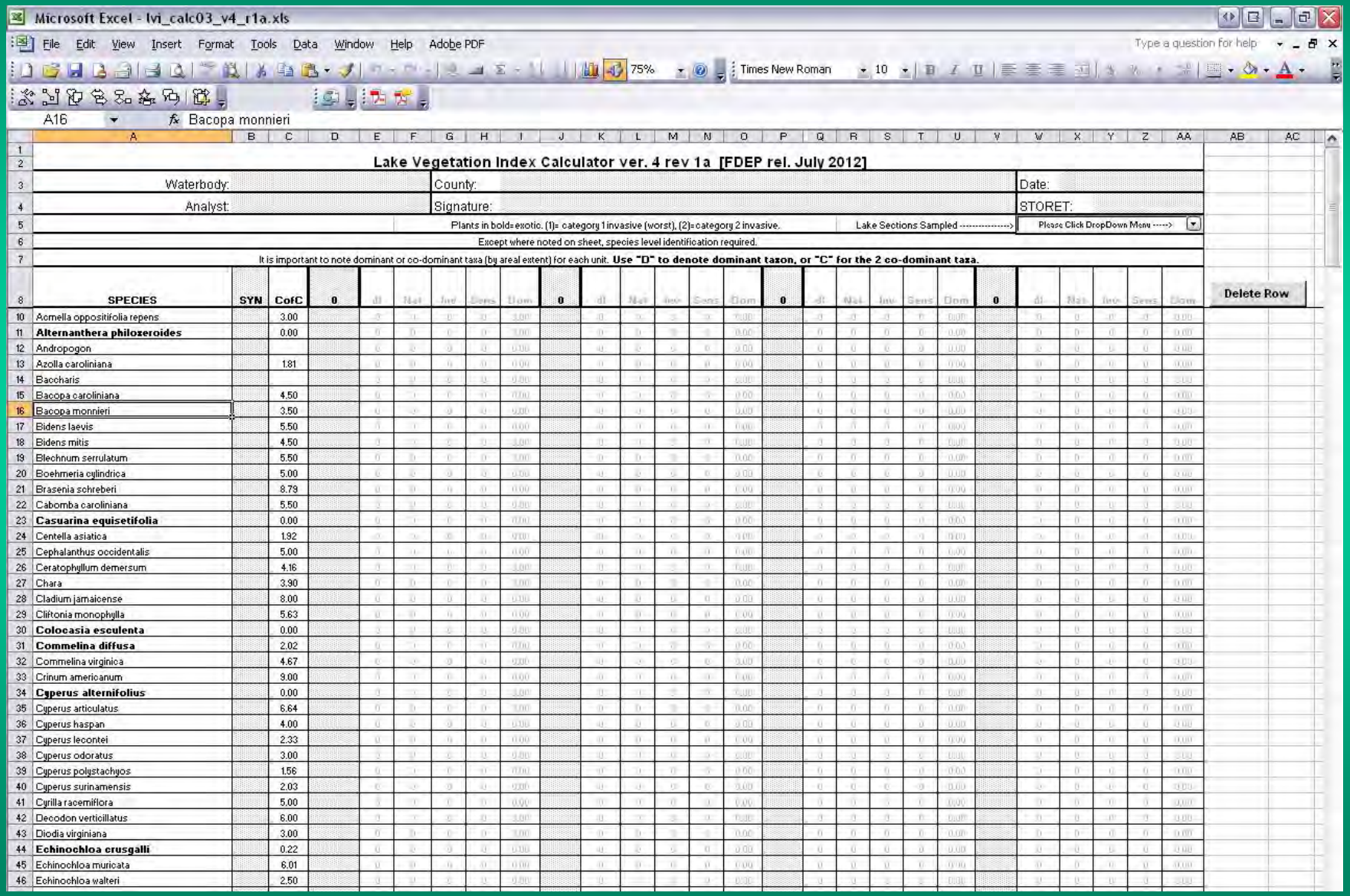
Please mark down to: 0 = no access; 1 = invasive (+cont); 2 = access; 3 = invasive.
Except where noted on sheet, species level identification required.

To be important to new dominance or codominance, the proportional for each spp. Use "D" to denote dominant taxon, or "C" for the 2 codominant taxa.

SPECIES	C of C	1	2	3	4	Specimen collected (check)	Approx. water depth	SPECIES	C of C	1	2	3	4	Specimen collected (check)	Approx water depth
Acer rubrum	4.65							Habenaria repens	4.18						
Alnus serrulata x alnifolia nothe (2)	0.00							Hydrilla verticillata (L)	0.00						
Aralia canadensis	1.81							Hydrocotyle ranunculoides (Limnobium	4.79						
Berchemia scandentifolia	6.12							Hydrocotyle umbellata	1.82						
Betula caroliniana	5.31							Hygrophila polysperma (L)	0.00						
Betula nigra	4.48							Hypericum fasciculatum	7.27						
Betula lenta	7.18							Hypericum hypericoides	5.44						
Betula nana	8.21							Hypericum myrtifolium	8.28						
Bidens aristosa	7.31							Ilex cassine	7.66						
Boehmeria cylindrica	5.81							Ipomoea aquatica (L	0.00						
Brasenia schreberi	0.00							Iresine celosia	6.42						
Brunnia albiflora	8.78							Iva frutescens	7.58						
Calycanthus floridus	5.67							Juncus effusus	3.23						
Carex albolutescens (C. longii)	5.47							Juncus marginatus	3.80						
Carex vernacula	7.87							Juncus megacephalus	4.76						
Carpinus caroliniana	1.92							Juncus repens	6.81						
Castalia odorata	9.55							Lachnanthes caroliana	3.74						
Castanea pumila var. pumila	4.18							Lemna biscutella	7.81						
Ceratophyllum demersum	2.93							Lemna minor	3.77						
Cirsium sp.	3.90							Leucothoe racemosa	9.44						
Cladium jamaicense	8.04							Limnobium spongia	4.79						
Clethra alnifolia	5.63							Limnophila sessiliflora (L	0.00						
Clethra macrophylla	5.63							Lindernia anagallidea	5.68						
Coleataenia anceps (L	0.00							Ludwigia arcuata	2.22						
Commelina diffusa	5.02							Ludwigia hexapetala	3.47						
Crinum americanum	8.47							Ludwigia leptocarpa	4.68						
Cyperus alternifolius (C. involucratus	0.00							Ludwigia peruviana	0.42						
Cyperus articulatus	8.64							Ludwigia repens	5.20						
Cyperus haspan	7.68							Lycopus rubellus	8.39						
Cyperus laxiculatus	5.04							Lycopus virginicus	8.47						
Cyperus polystachyos	5.58							Lyonia lucida	7.06						
Cyperus strigosus (2)	0.00							Magnolia virginiana	8.44						
Cyperus surinamensis	5.03							Mikania floridana	8.45						
Decodon verticillatus	8.20							Mitreola petiolata (L	0.00						
Desmodium rotundifolium	7.80							Myriophyllum aquaticum	5.82						
Diodia virginiana	4.84							Myriophyllum heterophyllum	5.64						
Echinochloa crusgalli	0.22							Najas guadalupensis (L	1.86						
Eclipta alba	none							Najas marina (L	0.00						
Eleocharis dentata	8.49							Najas minor	2.82						
Eleocharis elongata (2)	0.00							Nelumbo lutea	6.28						
Eleocharis fallax	2.82							Nitella sp.	7.46						
Eleocharis fallax	7.80														
Eleocharis quadrangulata	8.16														
Eleocharis tenuicincta	7.80														
Eleocharis tricostata	8.27														
Eriocaulon compressum	7.50														
Eriocaulon decangulare	7.20														
Eupatorium capillifolium	6.83														
Fuirena breviseta	7.40														
Fuirena scirpoidea	8.05														
Gratiola hispida	8.03														

SPECIES	C of C	1	2	3	4	Specimen collected (check)	Approx. water depth	SPECIES	C of C	1	2	3	4	Specimen collected (check)	Approx. water depth
Gratiola sp.	4.84							Salix nigra (provisional)	9.20						
Hemianthus micranthemoides	7.18							Sambucus simpsonii var.	8.59						
Hemianthus nuttallii	6.00							Sparganium americanum	7.94						
Hibiscus aculeatus var. laevis	6.84							Sparganium fluctuans	1.96						
Hottonia inflata	8.10							Spiraea alba var. latifolia	8.95						
Hottonia sp.	8.10							Spiraea corymbosa	none						
Hottonia sp.	8.94							Taxodium ascendens	7.21						
Hydrocotyle bonariensis	5.82							Taxodium distichum	7.21						
Hydrocotyle umbellata	0.00							Thalia geniculata	7.32						
Hypericum fasciculatum	6.26							Thelypteris palustris	none						
Hypericum fraseri	5.54							Toxicodendron vernicifluum	8.16						
Hypericum sp.	6.60							Typha sp.	1.80						
Hypericum virgatum	0.00							Utricularia biflora	8.37						
Itea virginica	7.31							Utricularia floridana	8.34						
Juncus biflorus var. ozarkanus (L	0.00							Utricularia foliosa	8.44						
Juncus effusus	4.10							Utricularia inflata	5.85						
Juncus elliottii	4.21							Utricularia purpurea	6.50						
Juncus megacephalus (L	0.00							Utricularia vulgaris	7.45						
Kalmia latifolia	4.96							Utricularia volubilis	8.01						
Kalmia sp.	5.27							Vallisneria americana	7.78						
Lachnanthes caroliana	5.32							Virginia virginica	none						
Lachnanthes tinctoria	4.82							Woodwardia areolata (2)	0.00						
Lachnocaulon anceps	4.82							Woodwardia sp.	8.47						
Lemna cyclostasa	5.28							Woodwardia virginica	6.2						
Ludwigia alternifolia	7.14							Zizania aquatica	8.69						
Ludwigia leptocarpa	6.84							Zizaniopsis miliacea	8.21						
Ludwigia linearis	5.86														
Ludwigia repens	7.80														
Ludwigia sphaerocarpa	5.50														
Lycopus rubellus	6.84														
Lycopus virginicus	4.54														
Magnolia virginiana	5.55														
Mikania scandens	4.84														
Mitreola petiolata	4.55														
Myrica cerifera	1.74														
Najas guadalupensis	4.81														
Najas marina	1.90														
Najas minor	5.35														
Nuphar advena	6.75														
Nuphar sagittifolia	4.96														
Nymphaea odorata	6.56														
Nymphoides aquatica	5.53														
Osmunda cinnamomea	2.91														
Osmunda regalis	2.82														
Panicum hemitomon	3.48														
Panicum verrucosum (L	0.00														
Peltandra sagittifolia	7.21														
Peltandra virginica x sagittifolia (L	0.00														
Persea palustris	6.56														
Persicaria hydropiperoides	5.81														
Persicaria punctata	4.82														
Persicaria setacea	5.28														
Pinckneya bracteata	7.14														
Pinckneya pubens	6.84														
Pinus elliottii	7.80														
Pinus palustris	7.80														
Pinus serotina	5.50														
Pluchea camphorata	5.28														
Pluchea rosea	6.78														
Pluchea sp.	6.01														
Polygonum hydropiperoides	4.84														
Polygonum punctatum	4.55														
Pontederia cordata	1.74														
Proserpinaca palustris	4.81														
Quercus laurifolia	1.90														
Quercus nigra	5.35														
Sagittaria australis	6.75														
Sagittaria calycina	4.96														
Sagittaria latifolia	6.56														
Sagittaria papillosa	5.53														
Salix caroliniana	2.91														
Salvinia minima	2.82														
Sambucus canadensis	3.48														
Sapium sebiferum (L	0.00														
Saururus cernuus	7.21														
Schinus terebinthifolius (L	0.00														
Scirpus americanus	6.56														
Scirpus californicus	6.01														
Scirpus cyperinus	3.77														
Scirpus robustus	5.53														

JAES LVI Calculator Worksheet v 4



Microsoft Excel - lvi_calc03_v4_r1a.xls

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Type a question for help

75% Times New Roman 10

A16 Bacopa monnieri

Lake Vegetation Index Calculator ver. 4 rev 1a [FDEP rel. July 2012]

Waterbody:		County:	Date:
Analyst:		Signature:	STORET:

Plants in bold=exotic. (1)= category 1 invasive (worst), (2)= category 2 invasive. Lake Sections Sampled ----------> Please Click DropDown Menu ----->

Except where noted on sheet, species level identification required.

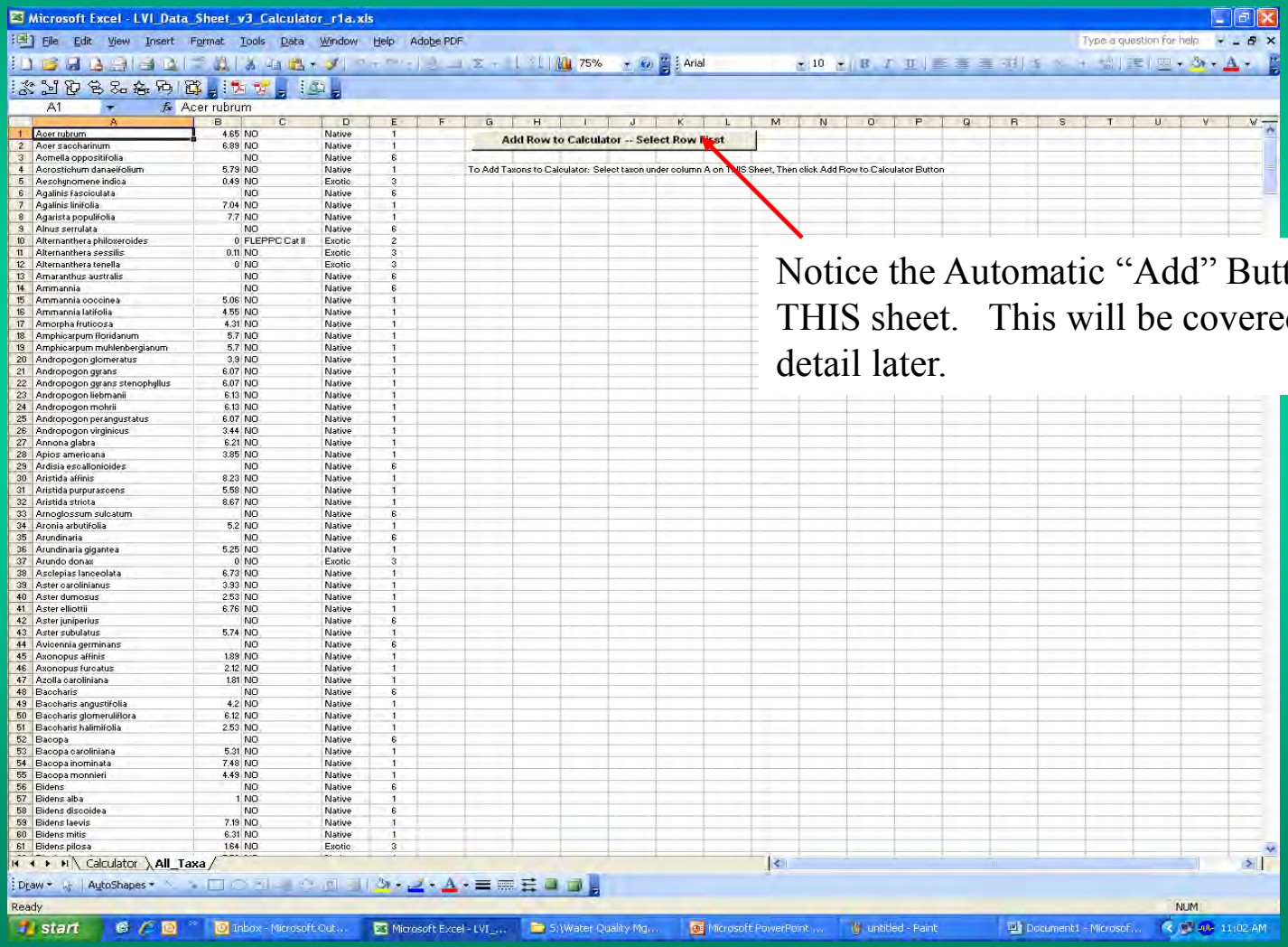
It is important to note dominant or co-dominant taxa (by areal extent) for each unit. **Use "D" to denote dominant taxon, or "C" for the 2 co-dominant taxa.**

SPECIES	SYN	CofC	0	dI	Nat	Inv	Sens	Dom	0	dI	Nat	Inv	Sens	Dom	0	dI	Nat	Inv	Sens	Dom	0	dI	Nat	Inv	Sens	Dom
Acmella oppositifolia repens		3.00																								
Alternanthera philoxeroides		0.00																								
Andropogon																										
Azolla caroliniana		1.81																								
Baccharis																										
Bacopa caroliniana		4.50																								
Bacopa monnieri		3.50																								
Bidens laevis		5.50																								
Bidens mitis		4.50																								
Blechnum serrulatum		5.50																								
Boehmeria cylindrica		5.00																								
Brasenia schreberi		8.79																								
Cabomba caroliniana		5.50																								
Casuarina equisetifolia		0.00																								
Centella asiatica		1.92																								
Cephalanthus occidentalis		5.00																								
Ceratophyllum demersum		4.16																								
Chara		3.90																								
Cladium jamaicense		8.00																								
Clitonia monophylla		5.63																								
Colocasia esculenta		0.00																								
Commelina diffusa		2.02																								
Commelina virginica		4.67																								
Crinum americanum		9.00																								
Cyperus alternifolius		0.00																								
Cyperus articulatus		6.64																								
Cyperus haspan		4.00																								
Cyperus lecontei		2.33																								
Cyperus odoratus		3.00																								
Cyperus polystachyos		1.56																								
Cyperus surinamensis		2.03																								
Cyrilla racemiflora		5.00																								
Decodon verticillatus		6.00																								
Diodia virginiana		3.00																								
Echinochloa crusgalli		0.22																								
Echinochloa muricata		6.01																								
Echinochloa walteri		2.50																								

Delete Row

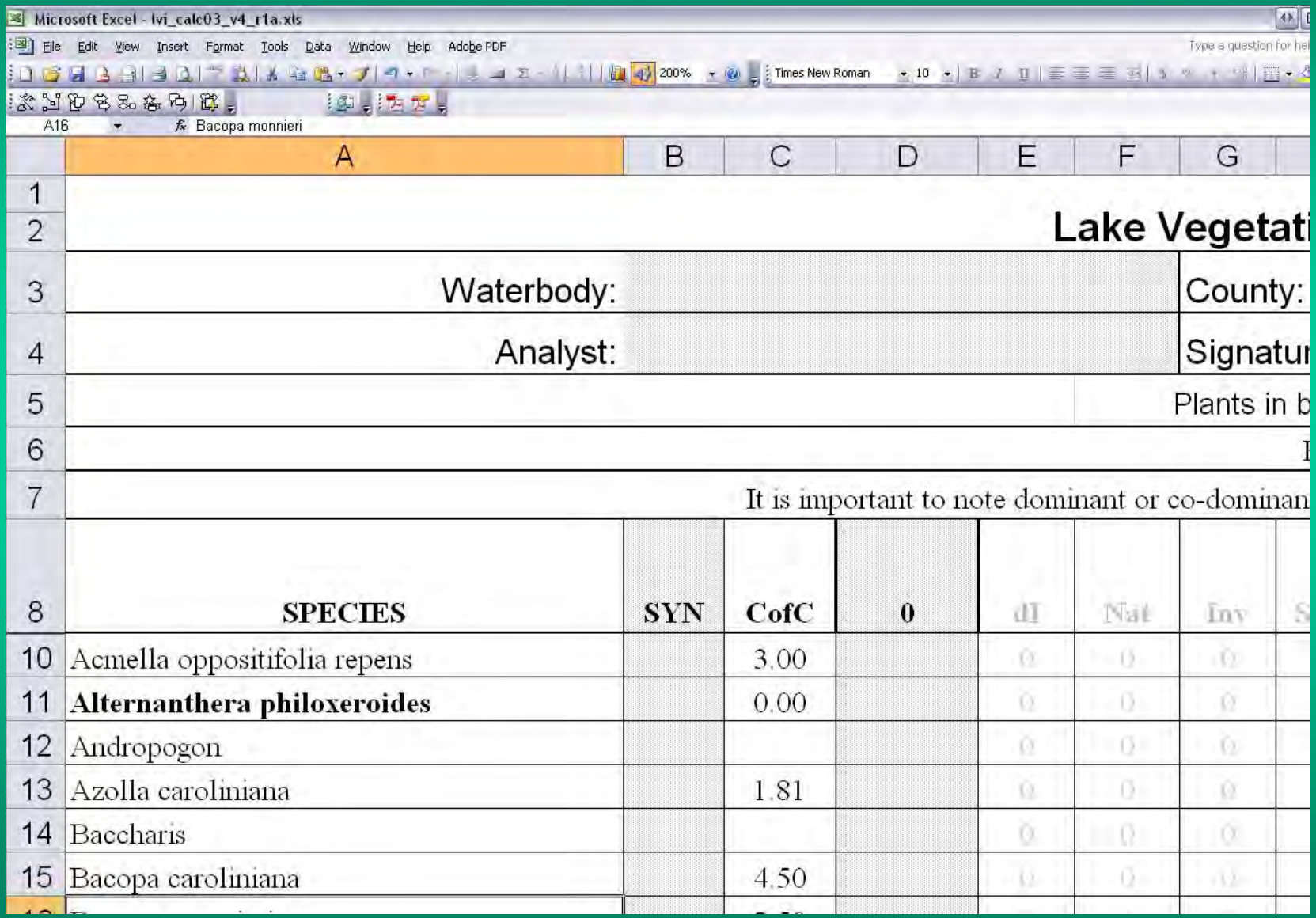
JAES LVI All_Taxa Worksheet

This is the Second Worksheet Included with the JAES Calculator. It's basically Appendix LVI 1000-1 with a column of calculations to figure out formulas.



Notice the Automatic "Add" Button on THIS sheet. This will be covered in detail later.

Closer Look Calculator Sheet – Upper Left



Microsoft Excel - lvi_calc03_v4_r1a.xls

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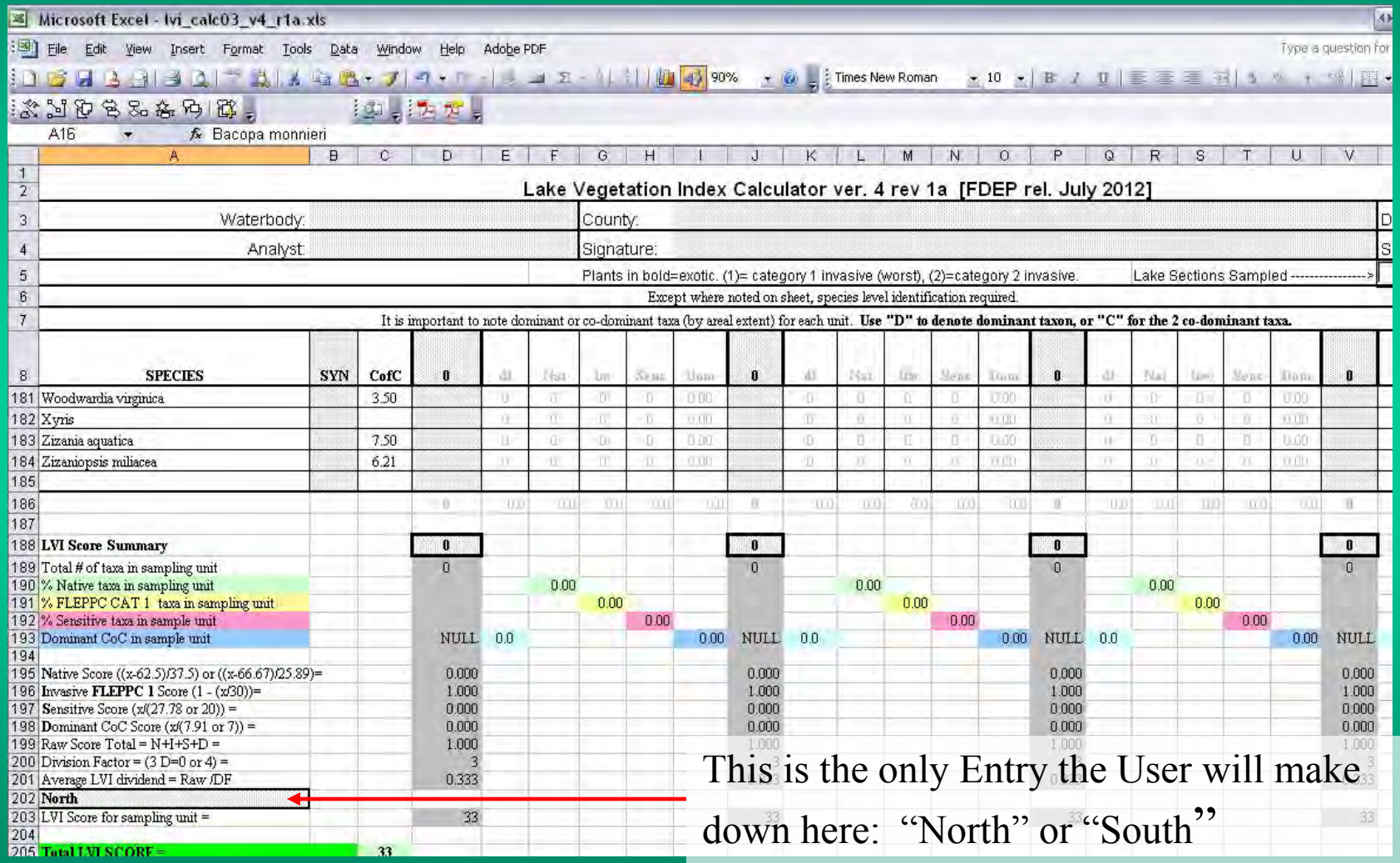
A16 Bacopa monnieri

	A	B	C	D	E	F	G
1							
2							Lake Vegetati
3	Waterbody:						County:
4	Analyst:						Signatur
5							Plants in b
6							
7							It is important to note dominant or co-dominan
8	**SPECIES**	**SYN**	**CofC**	**0**	dI	Nat	Inv
10	Acmella oppositifolia repens		3.00		0	0	0
11	**Alternanthera philoxeroides**		0.00		0	0	0
12	Andropogon				0	0	0
13	Azolla caroliniana		1.81		0	0	0
14	Baccharis				0	0	0
15	Bacopa caroliniana		4.50		0	0	0

Closer Look Calculator Sheet – Lower Left



Microsoft Excel - lvi_calc03_v4_r1a.xls

Lake Vegetation Index Calculator ver. 4 rev 1a [FDEP rel. July 2012]

Waterbody: | County:

Analyst: | Signature:

Plants in bold=exotic. (1)= category 1 invasive (worst), (2)=category 2 invasive. | Lake Sections Sampled ---------->

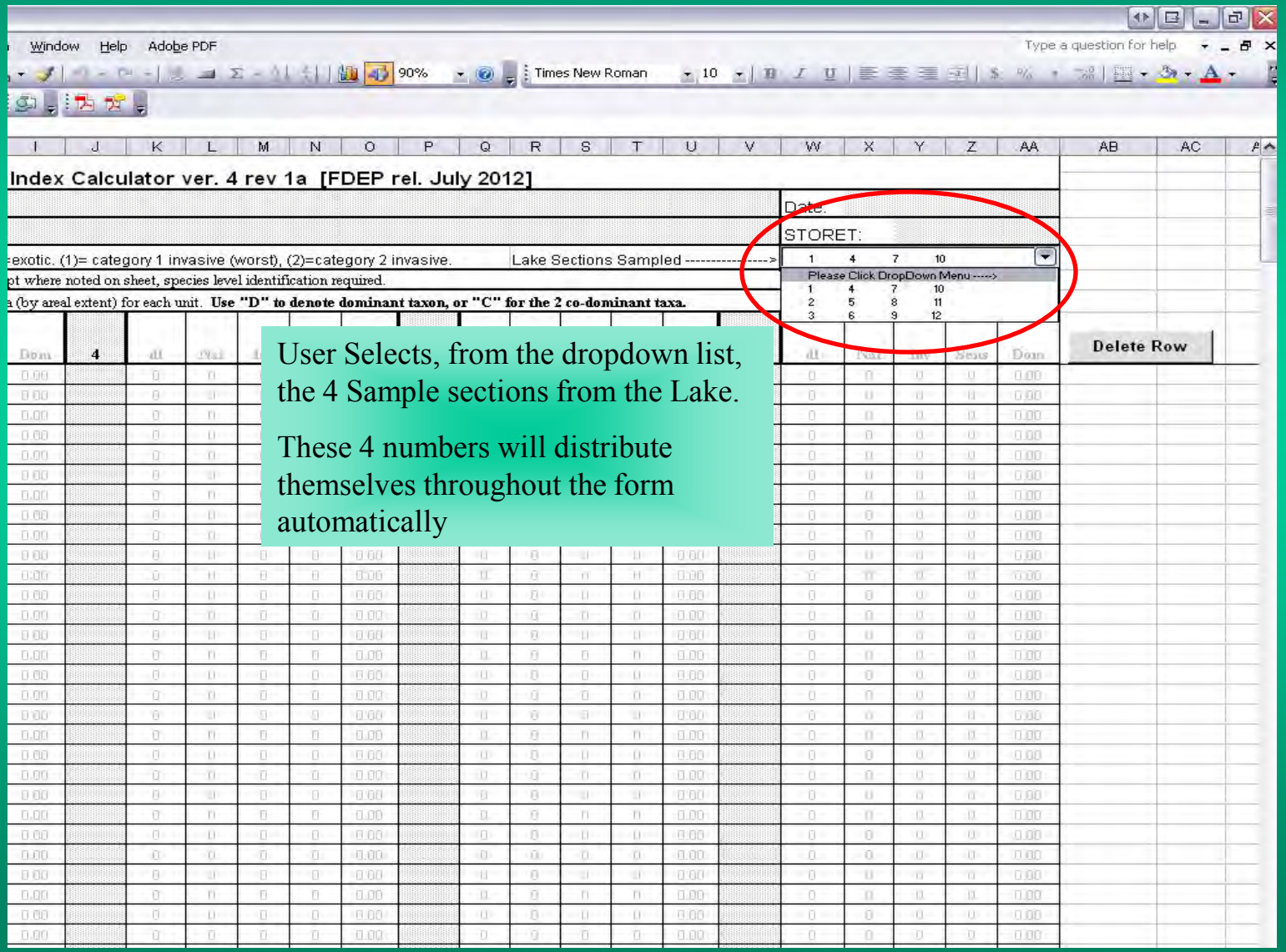
Except where noted on sheet, species level identification required.

It is important to note dominant or co-dominant taxa (by areal extent) for each unit. **Use "D" to denote dominant taxon, or "C" for the 2 co-dominant taxa.**

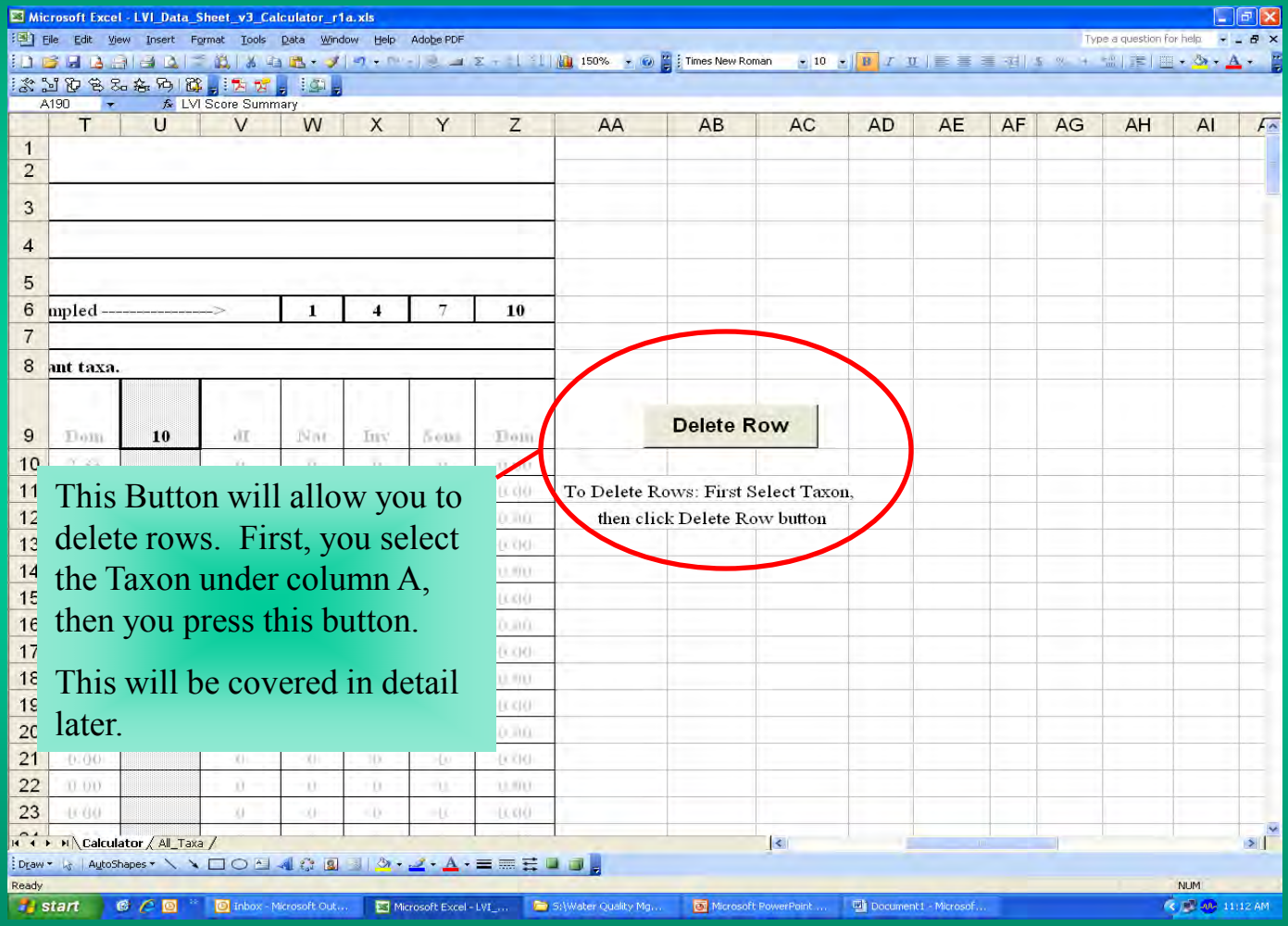
	SPECIES	SYN	CofC	0						0						0						0
181	Woodwardia virginica		3.50		0	0	0	0	0.00		0	0	0	0	0.00		0	0	0	0	0.00	
182	Xyris				0	0	0	0	0.00		0	0	0	0	0.00		0	0	0	0	0.00	
183	Zizania aquatica		7.50		0	0	0	0	0.00		0	0	0	0	0.00		0	0	0	0	0.00	
184	Zizaniopsis miliacea		6.21		0	0	0	0	0.00		0	0	0	0	0.00		0	0	0	0	0.00	
185																						
186				0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0
187																						
188	**LVI Score Summary**			**0**						**0**						**0**						**0**
189	Total # of taxa in sampling unit			0						0						0						0
190	% Native taxa in sampling unit					0.00						0.00						0.00				
191	% FLEPPC CAT 1 taxa in sampling unit						0.00						0.00						0.00			
192	% Sensitive taxa in sample unit							0.00						0.00						0.00		
193	Dominant CoC in sample unit			NULL	0.0				0.00	NULL	0.0				0.00	NULL	0.0				0.00	NULL
194																						
195	Native Score ((x-62.5)/37.5) or ((x-66.67)/25.89)=			0.000						0.000						0.000						0.000
196	Invasive **FLEPPC 1** Score (1 - (x/30))=			1.000						1.000						1.000						1.000
197	**Sensitive** Score (x/(27.78 or 20)) =			0.000						0.000						0.000						0.000
198	**Dominant** CoC Score (x/(7.91 or 7)) =			0.000						0.000						0.000						0.000
199	Raw Score Total = N+I+S+D =			1.000						1.000						1.000						1.000
200	Division Factor = (3 D=0 or 4) =			3						3						3						3
201	Average LVI dividend = Raw /DF			0.333						0.333						0.333						0.333
202	**North**																					
203	LVI Score for sampling unit =			33						33						33						33
204																						
205	**Total LVI SCORE =**		33																			

This is the only Entry the User will make down here: "North" or "South"

Top Right of Form – Lake Sections

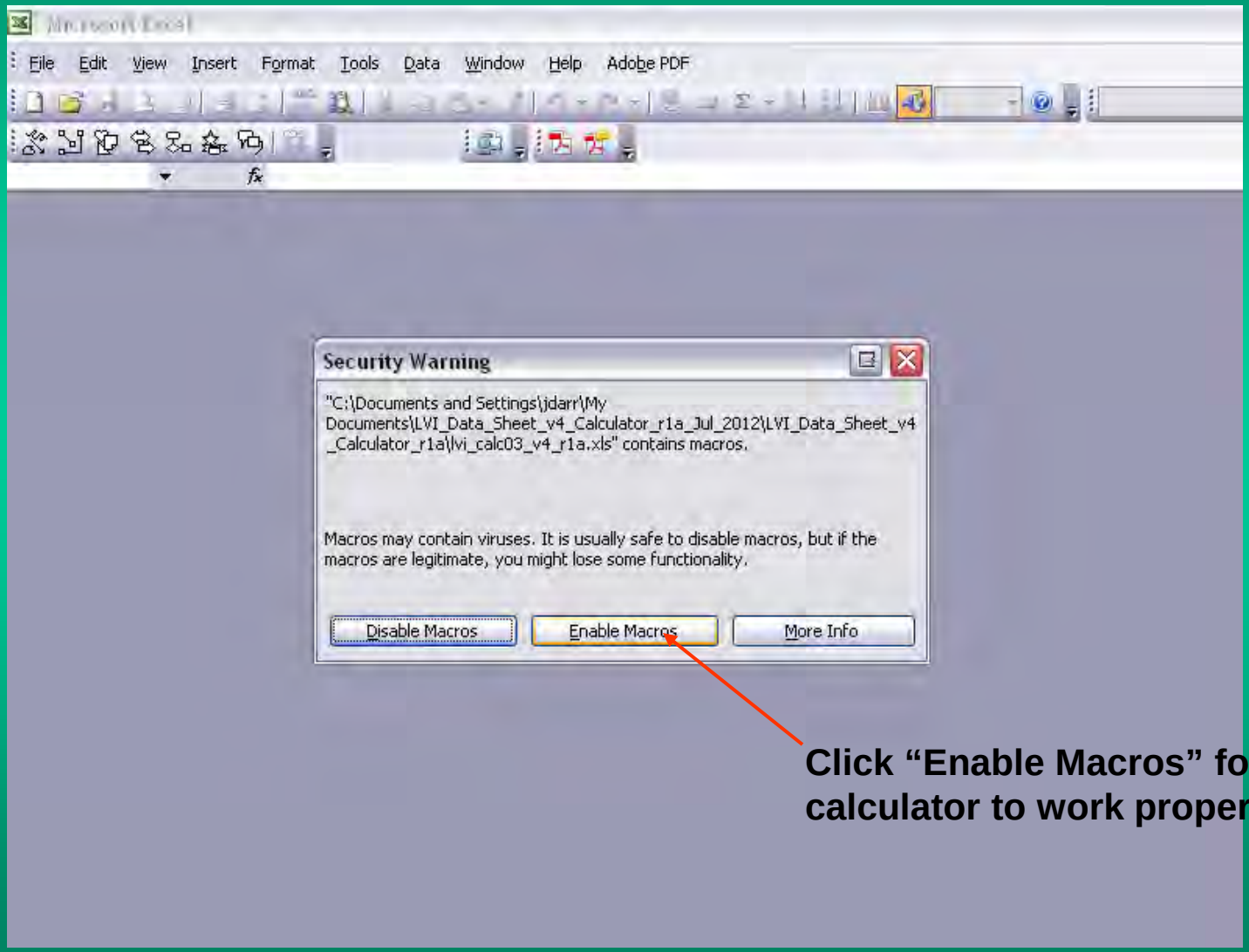


Top Right of Form – Lake Sections

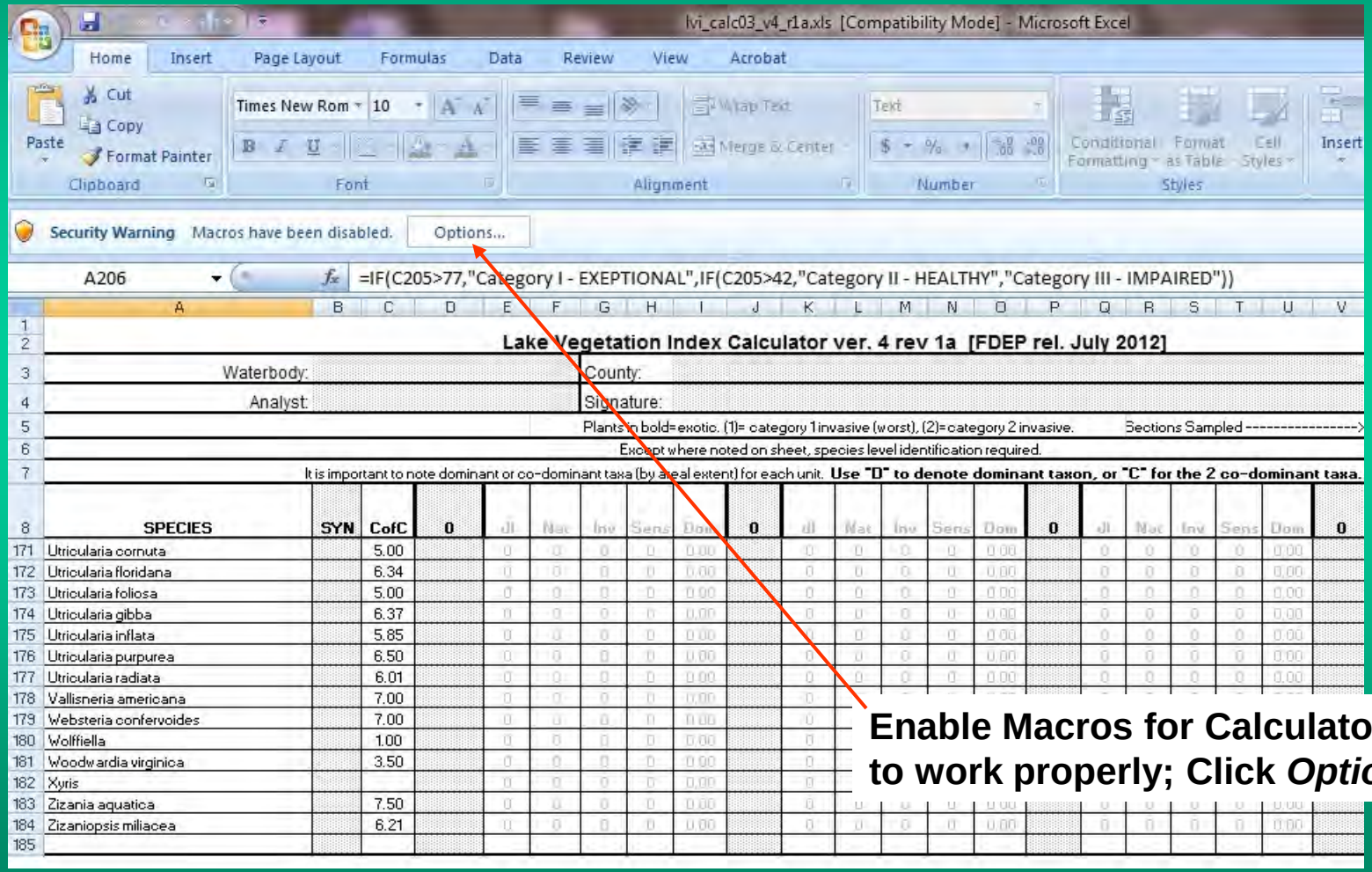


Starting the Calculator

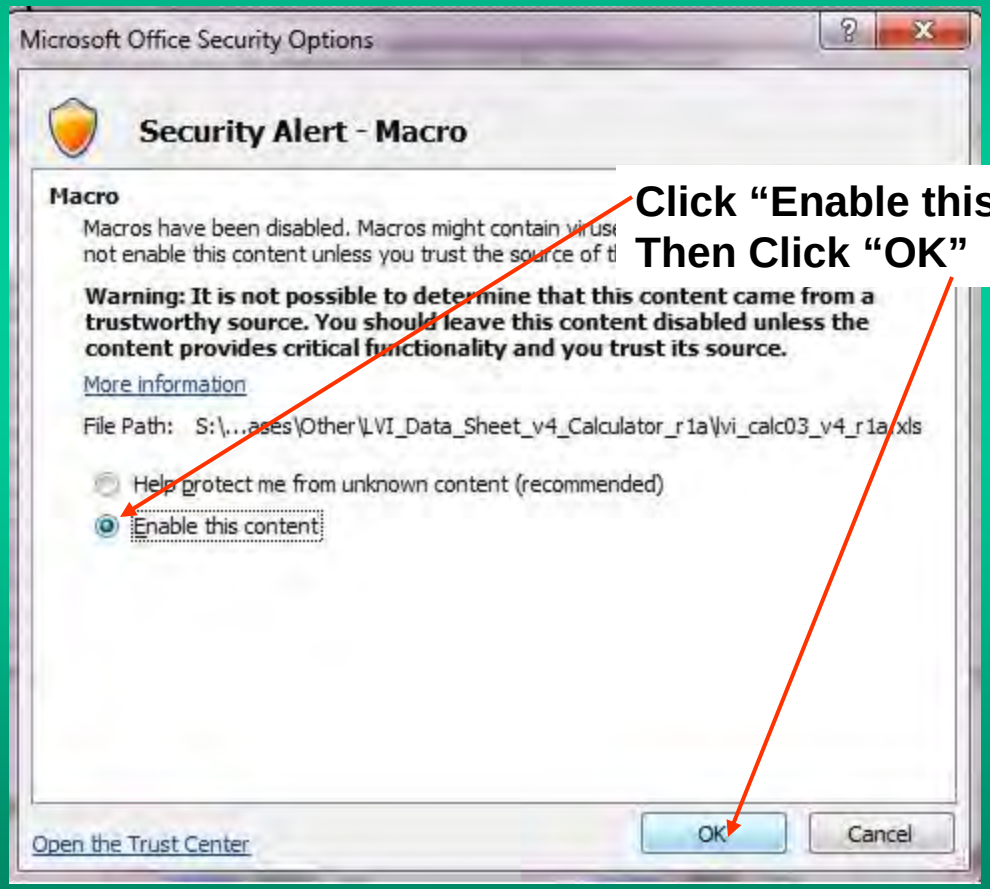
Enable Macros; Excel (1997-2003)



Enable Macros; Excel (2007-2010) Step 1

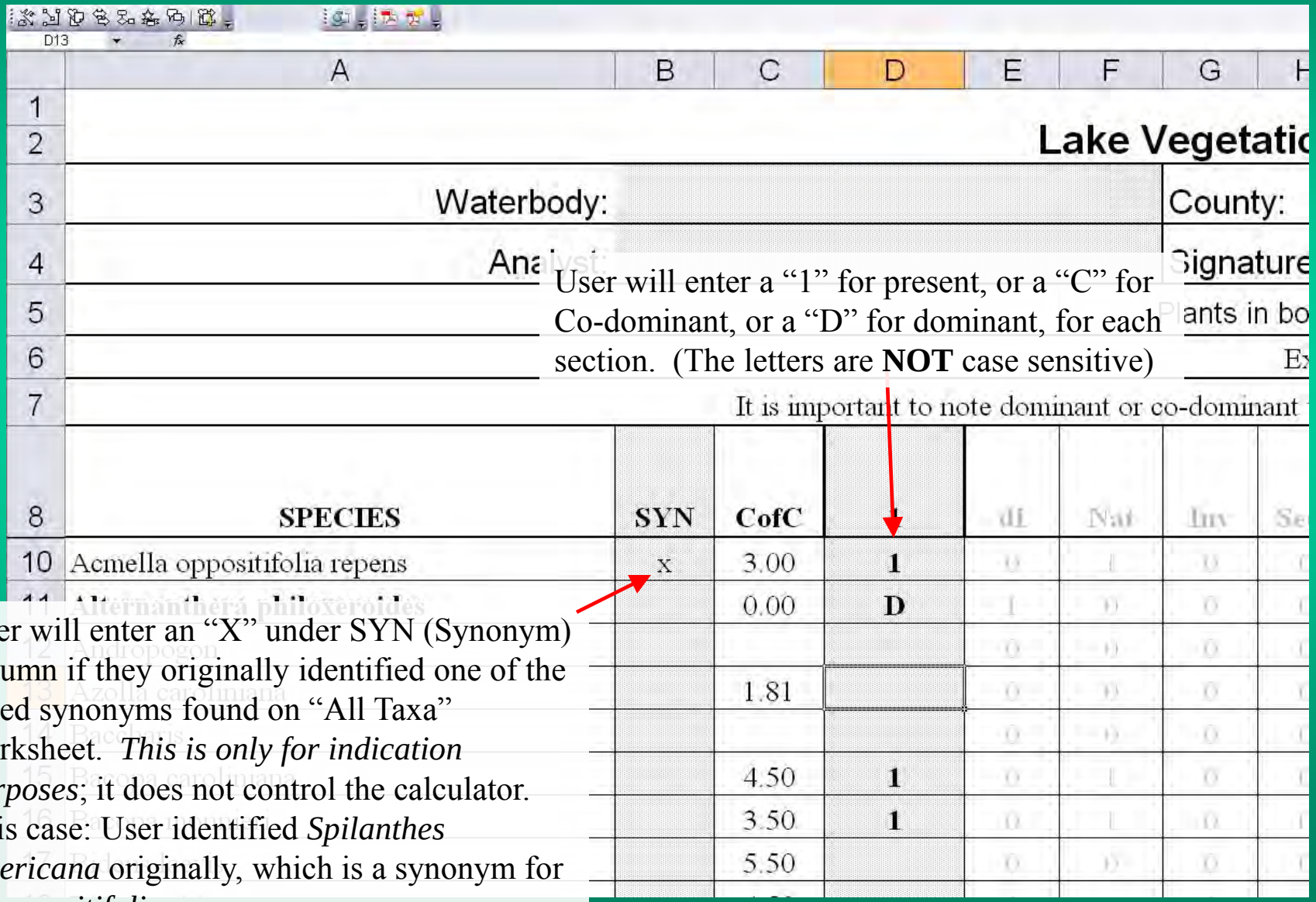


Enable Macros; Excel (2007-2010)
Step 2



Using the Calculator

Mark taxa in Section Column



	A	B	C	D	E	F	G	H
1								
2							Lake Vegetatio	
3		Waterbody:					County:	
4		Analyst:					Signature	
5							ants in bo	
6							Ex	
7				It is important to note dominant or co-dominant				
8	SPECIES	SYN	CofC		dE	Nat	Inv	Se
10	Acmella oppositifolia repens	x	3.00	1	0	1	0	0
11	Alternanthera philoxeroides		0.00	D	1	0	0	0
12	Andropogon				0	0	0	0
13	Azolla caroliniana		1.81		0	0	0	0
14	Bacopa				0	0	0	0
15	Bacopa caroliniana		4.50	1	0	1	0	0
16	Bacopa monnieri		3.50	1	0	1	0	0
17	Baldellia		5.50		0	0	0	0

User will enter a "1" for present, or a "C" for Co-dominant, or a "D" for dominant, for each section. (The letters are **NOT** case sensitive)

User will enter an "X" under SYN (Synonym) column if they originally identified one of the listed synonyms found on "All Taxa" worksheet. *This is only for indication purposes*; it does not control the calculator. This case: User identified *Spilanthes americana* originally, which is a synonym for *A. oppositifolia repens*

Missing C of C Scores - CoDominance

(Pay ATTENTION to THIS)

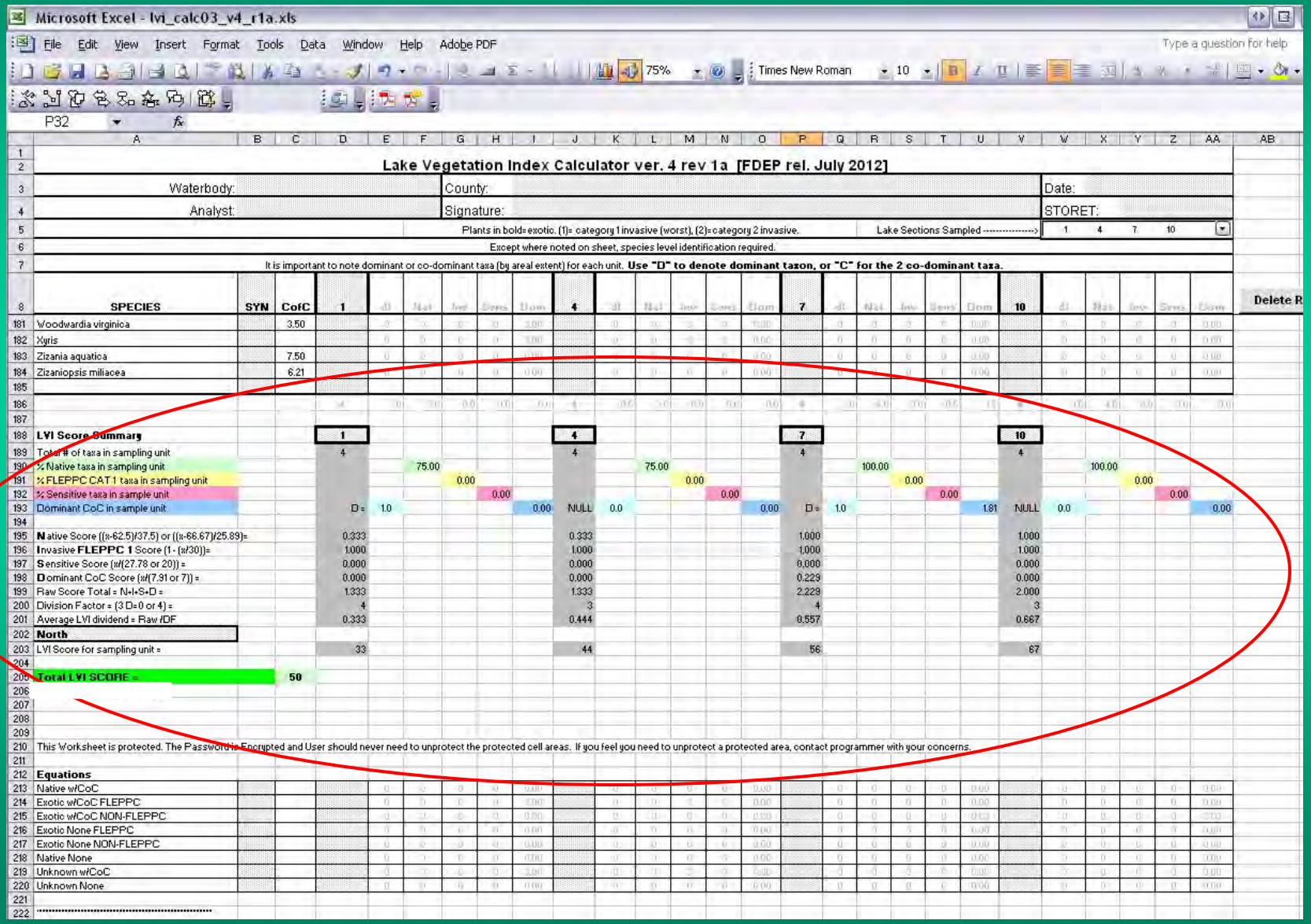
Pursuant to FDEP SOP LVI 2200 5.4: *If the C of C is only listed for 1 of 2 co-dominant taxa, then the Dominant C of C metric values shall be the C of C of the co-dominant that has a C of C score.*

To Achieve this in the Calculator: Use a "**D**" for the co-dominant taxon that **has** the CofC, and put a "**C**" for the taxon that is missing the CofC. (Again, letters are *not* case-sensitive)

If the calculator sees both a "D" and a "C" in a column it understands that you are attempting to show that one of the co-dominants does not have a CofC, and you want to use the CofC from the taxon that **does** have a value; the one marked with a "D".

14	Baccharis			C	0	1	0	0	0.00	
15	Bacopa caroliniana		4.50	D	1	1	0	0	4.50	

Scores are automatically calculated



Microsoft Excel - lvi_calc03_v4_r1a.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Lake Vegetation Index Calculator ver. 4 rev 1a [FDEP rel. July 2012]

Waterbody: County: Date:

Analyst: Signature: STORET:

Plants in bold=exotic. (1)= category 1 invasive (worst), (2)=category 2 invasive. Lake Sections Sampled ----------> 1 4 7 10

Except where noted on sheet, species level identification required.

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SPECIES	SYN	CofC	1	4	7	10
Woodwardia virginica		3.50				
Xyris						
Zizania aquatica		7.50				
Zizaniopsis miliacea		6.21				
LVI Score Summary			**1**	**4**	**7**	**10**
Total # of taxa in sampling unit			4	4	4	4
% Native taxa in sampling unit			75.00	75.00	100.00	100.00
% FLEPPC CAT 1 taxa in sampling unit			0.00	0.00	0.00	0.00
% Sensitive taxa in sample unit			0.00	0.00	0.00	0.00
Dominant CoC in sample unit			D= 1.0 0.00	NULL 0.0 0.00	D= 1.0 1.81	NULL 0.0 0.00
Native Score ((x-62.5)/37.5) or ((x-66.67)/25.89)=			0.333	0.333	1.000	1.000
Invasive **FLEPPC 1** Score (1-(x/30))=			1.000	1.000	1.000	1.000
Sensitive Score (x/(27.78 or 20)) =			0.000	0.000	0.000	0.000
Dominant CoC Score (x/(7.91 or 7)) =			0.000	0.000	0.229	0.000
Raw Score Total = N+I+S+D =			1.333	1.333	2.229	2.000
Division Factor = (3 D=0 or 4) =			4	3	4	3
Average LVI dividend = Raw /DF			0.333	0.444	0.557	0.667
North						
LVI Score for sampling unit =			33	44	56	67
Total LVI SCORE =		**50**				

This Worksheet is protected. The Password is Encrypted and User should never need to unprotect the protected cell areas. If you feel you need to unprotect a protected area, contact programmer with your concerns.

Equations

Native w/CoC
Exotic w/CoC FLEPPC
Exotic w/CoC NON-FLEPPC
Exotic None FLEPPC
Exotic None NON-FLEPPC
Native None
Unknown w/CoC
Unknown None

Adding New Taxa

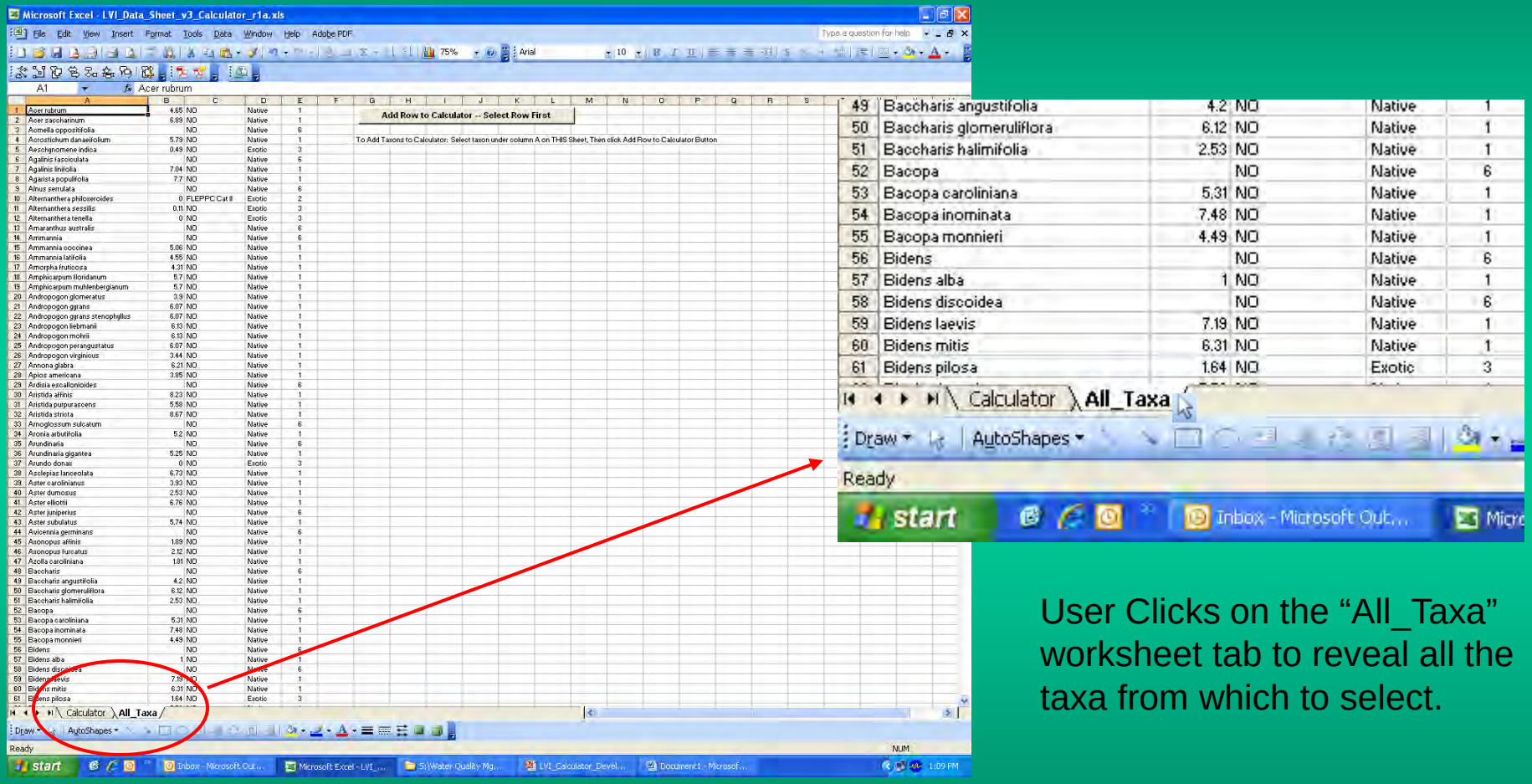
Adding Taxon Data

- *Aeschynomene indica*

At some point, the user will need to enter taxa that are not listed on the calculator. This calculator has two worksheets included in it. The first is the calculator worksheet, the second is the complete list of taxa from the FDEP SOP Appendix LVI 1000-1 (6-21-11).

In our example here, the user wants to add *Aeschynomene indica* to the calculater worksheet. The next screens will show the steps on how to do this.

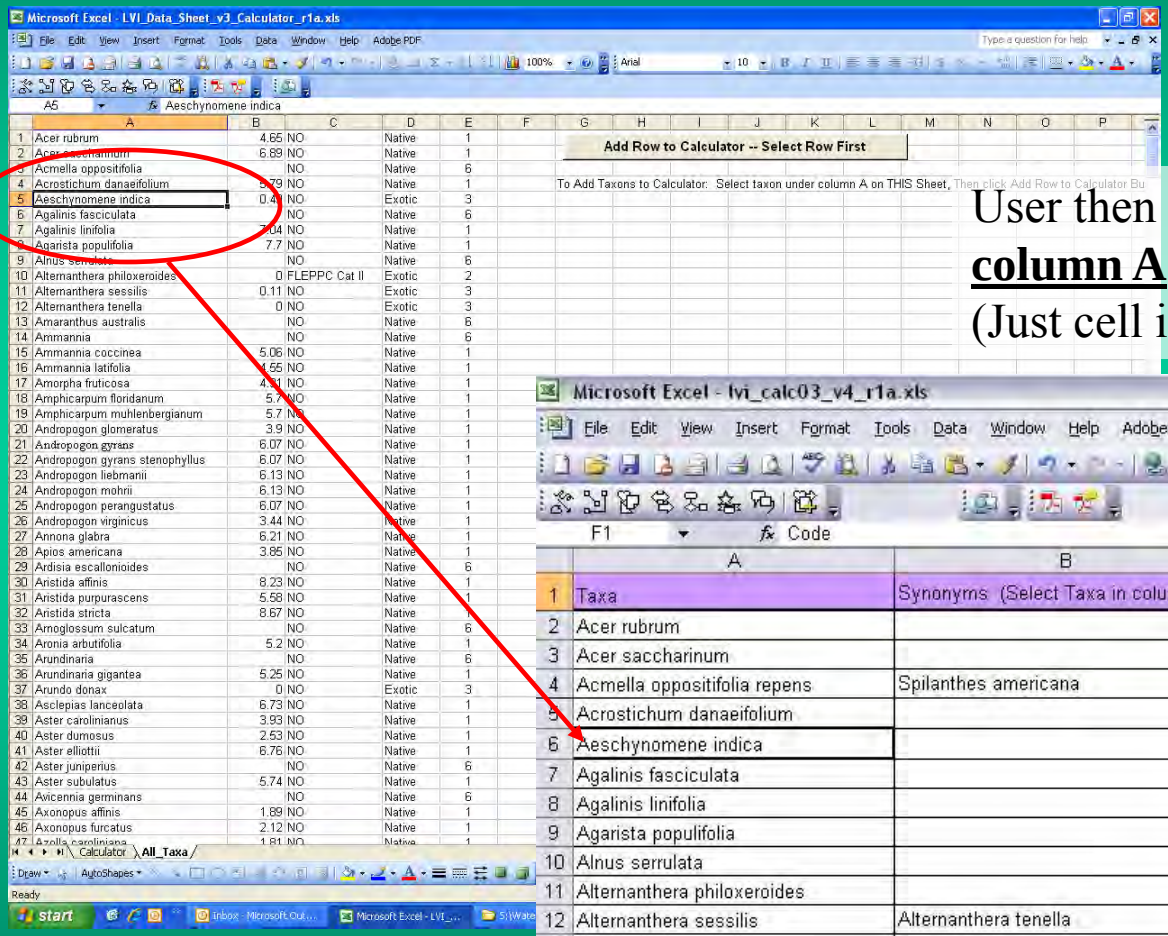
Adding Taxa: Step 1



49	Baccharis angustifolia	4.2	NO	Native	1
50	Baccharis glomeruliflora	6.12	NO	Native	1
51	Baccharis halimifolia	2.53	NO	Native	1
52	Bacopa		NO	Native	6
53	Bacopa caroliniana	5.31	NO	Native	1
54	Bacopa inominata	7.48	NO	Native	1
55	Bacopa monnieri	4.49	NO	Native	1
56	Bidens		NO	Native	6
57	Bidens alba	1	NO	Native	1
58	Bidens discoidea		NO	Native	6
59	Bidens laevis	7.19	NO	Native	1
60	Bidens mitis	6.31	NO	Native	1
61	Bidens pilosa	1.64	NO	Exotic	3

User Clicks on the “All_Taxa” worksheet tab to reveal all the taxa from which to select.

Adding Taxa: Step 2



User then finds the desired taxon **<u>under column A</u>**, and "Clicks" **<u>on the taxon</u>**. (Just cell in Column A -- **NOT** whole row)

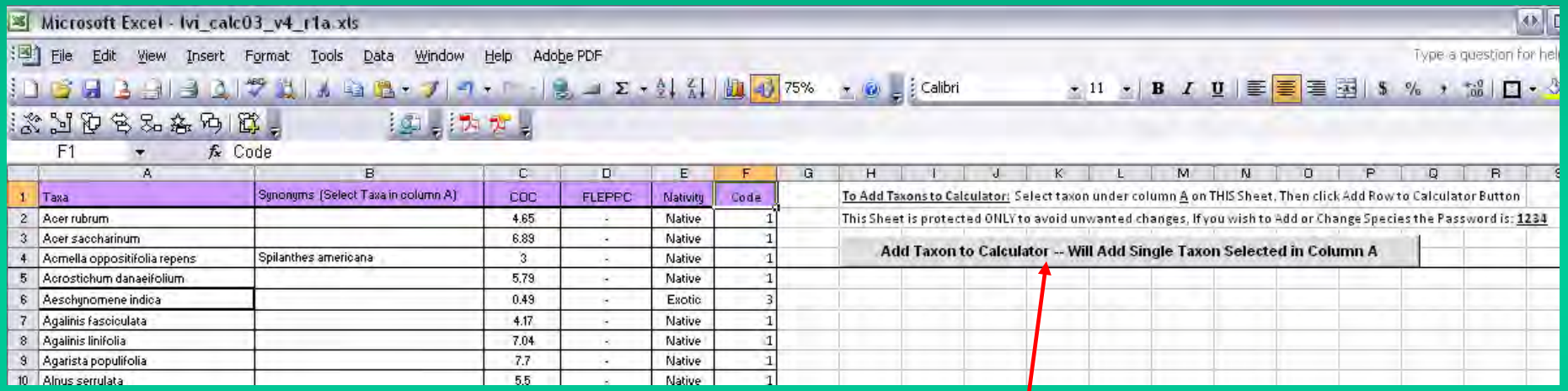
Microsoft Excel - lvi_calc03_v4_r1a.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

F1 fx Code

	A	B	C	D	E	F	G	H
1	Taxa	Synonyms (Select Taxa in column A)	COC	FLEPPC	Nativity	Code		To Add Taxo
2	Acer rubrum		4.65	-	Native	1		This Sheet i
3	Acer saccharinum		6.89	-	Native	1		
4	Acmella oppositifolia repens	Spilanthes americana	3	-	Native	1		
5	Acrostichum danaeifolium		5.79	-	Native	1		
6	Aeschynomene indica		0.49	-	Exotic	3		
7	Agalinis fasciculata		4.17	-	Native	1		
8	Agalinis linifolia		7.04	-	Native	1		
9	Agarista populifolia		7.7	-	Native	1		
10	Alnus serrulata		5.5	-	Native	1		
11	Alternanthera philoxeroides		0	Category 2	Exotic	3		
12	Alternanthera sessilis	Alternanthera tenella	0.11	-	Exotic	3		
13	Amaranthus australis		1	-	Native	1		
14	Ammannia		-	-	Native	6		
15	Ammannia coccinea		5.06	-	Native	1		
16	Ammannia latifolia		4.55	-	Native	1		
17	Amorpha fruticosa		4.31	-	Native	1		
18	Amphicarpum muhlenbergianum		5.7	-	Native	1		

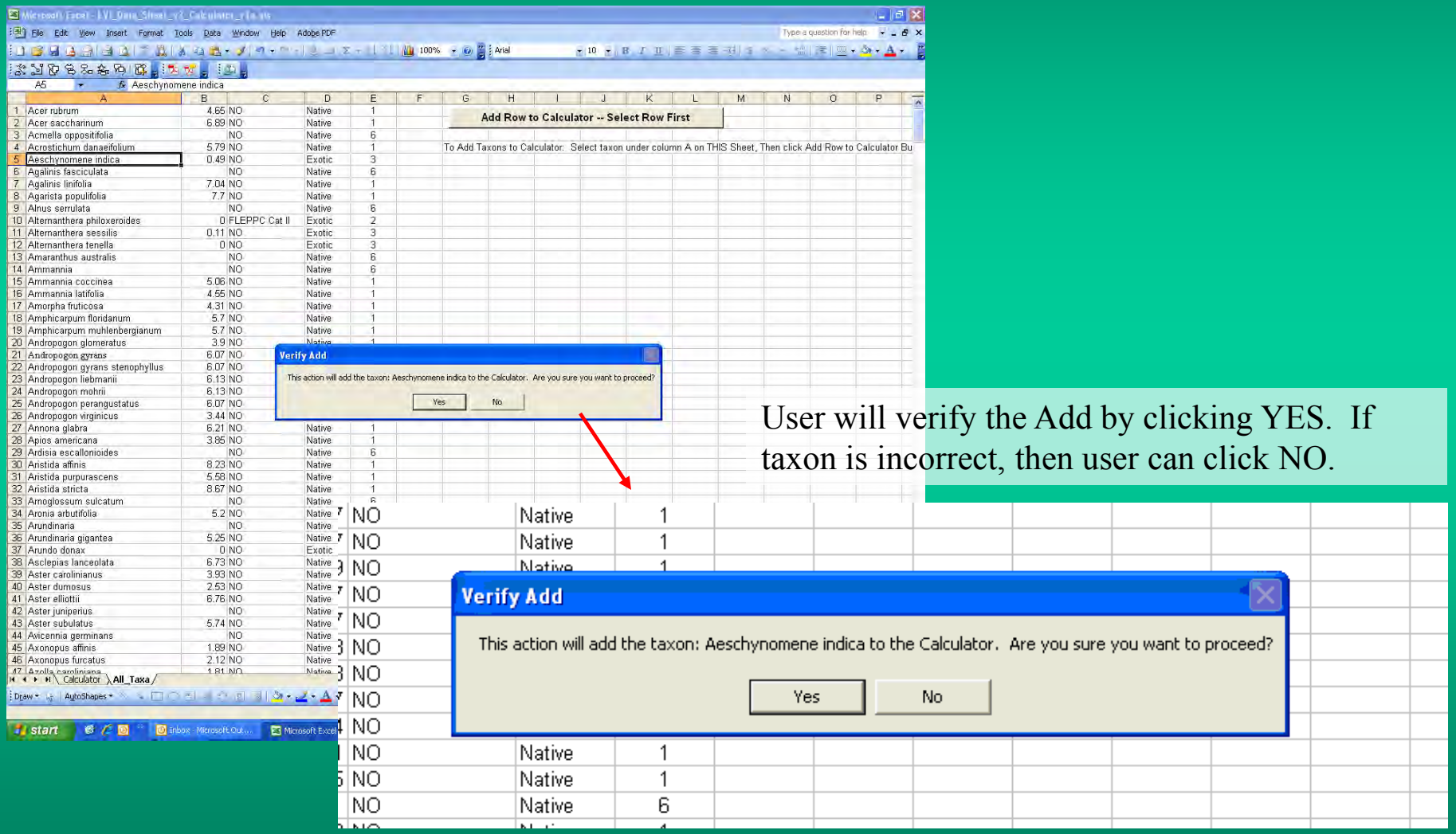
Adding Taxa: Step 3



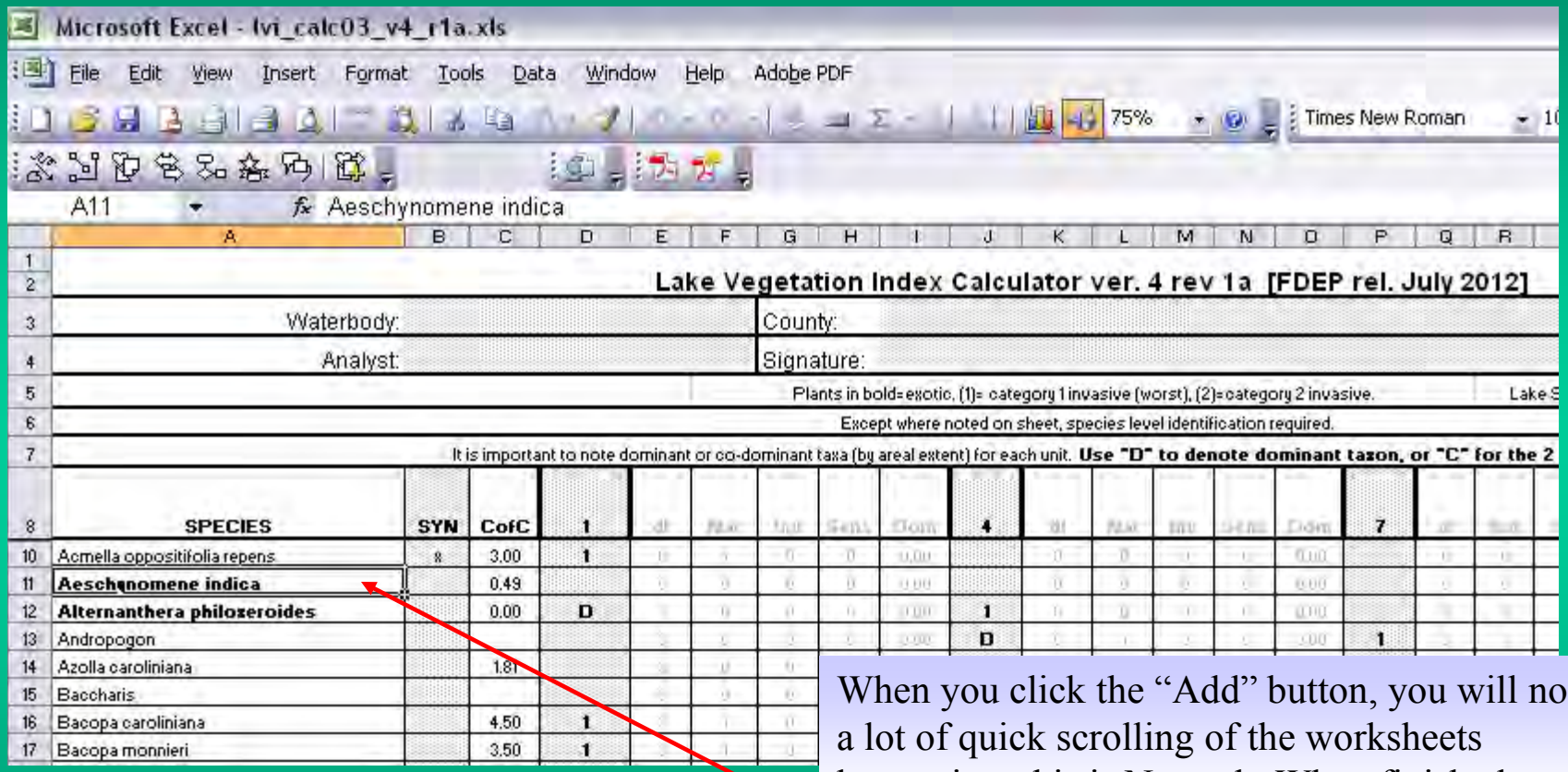
	A	B	C	D	E	F
1	Taxa	Synonyms (Select Taxa in column A)	COC	FLEPPC	Nativity	Code
2	Acer rubrum		4.65	-	Native	1
3	Acer saccharinum		6.89	-	Native	1
4	Acmella oppositifolia repens	Spilanthes americana	3	-	Native	1
5	Acrostichum danaeifolium		5.79	-	Native	1
6	Aeschynomene indica		0.49	-	Exotic	3
7	Agalinis fasciculata		4.17	-	Native	1
8	Agalinis linifolia		7.04	-	Native	1
9	Agarista populifolia		7.7	-	Native	1
10	Alnus serrulata		5.5	-	Native	1

User then “Clicks” on “Add Taxon to Calculator” button.

Adding Taxa: Verifying Add



Adding Taxa: Complete



When you click the "Add" button, you will notice a lot of quick scrolling of the worksheets happening; this is Normal. When finished, you will notice the new taxon inserted alphabetically in the calculator. It will automatically have the correct formulae embedded into its row. You are finished with the Add.

Deleting Taxa

Deleting Taxa within a Protected Document

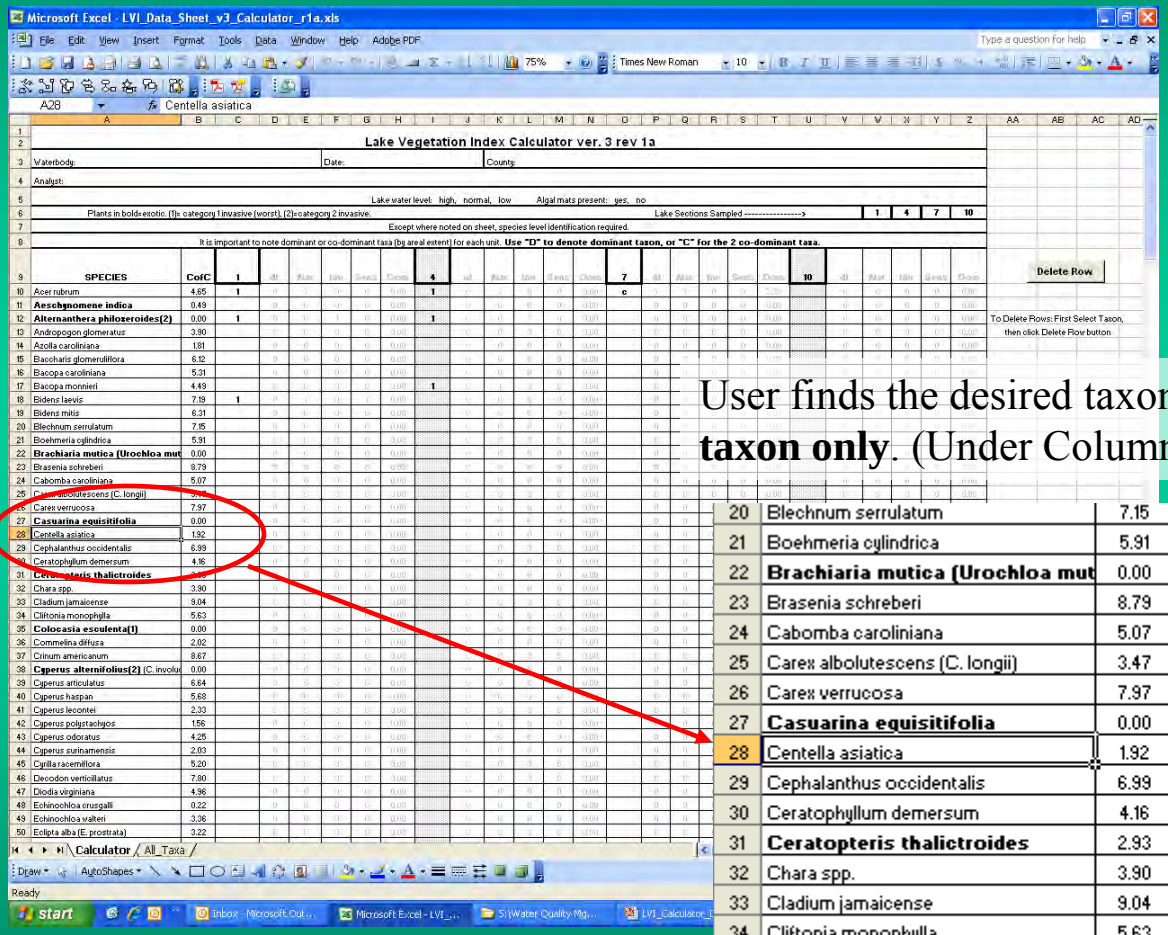
The JAES LVI Calculator worksheet is protected by password to keep unauthorized changes from happening to cells that calculate the score.

Consequently, the user cannot delete any taxa within the worksheet without using the delete button included in the upper right corner of the calculator worksheet.

If we wanted to delete a taxon that we don't want anymore in the calculator, we can use the delete button, and delete as many taxa as we want, one at a time.

The following slides will show the easy 2 step process and verification step to delete a taxon.

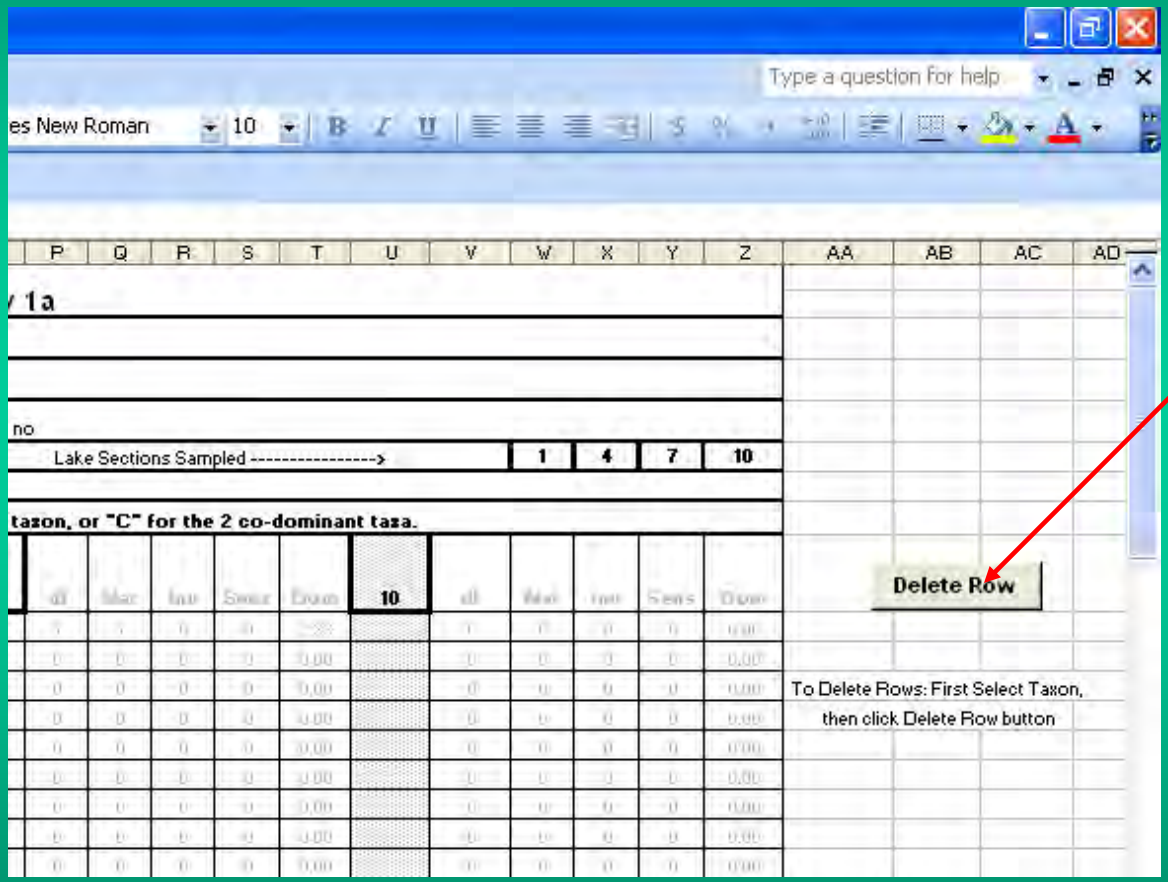
Deleting Taxa (Rows): Step 1



User finds the desired taxon to delete, and then "Clicks" **on the taxon only**. (Under Column A – **NOT** the whole row)

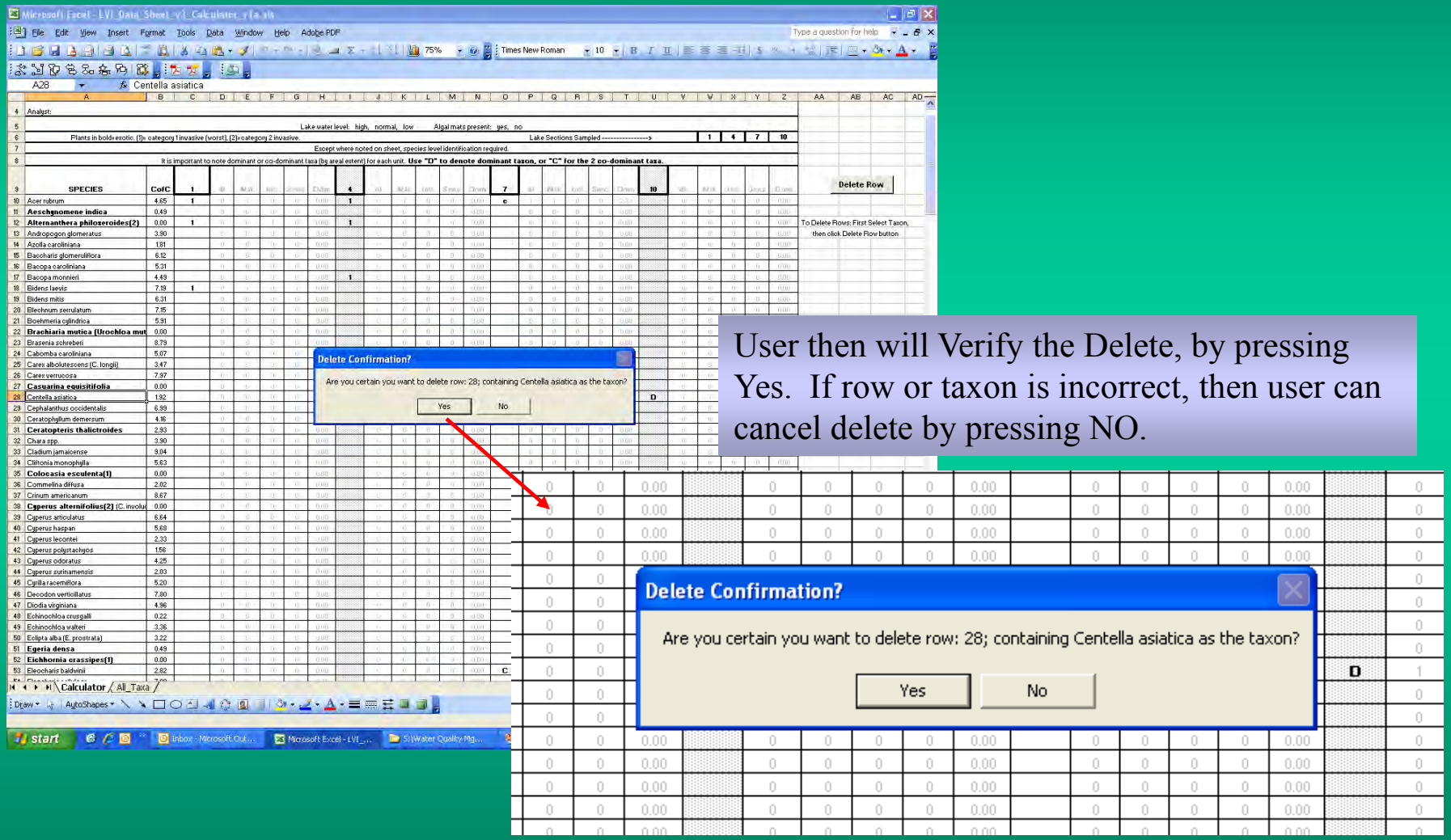
20	Blechnum serrulatum	7.15		0	0	0	0	0.00
21	Boehmeria cylindrica	5.91		0	0	0	0	0.00
22	**Brachiaria mutica (Urochloa mut**	0.00		0	0	0	0	0.00
23	Brasenia schreberi	8.79		0	0	0	0	0.00
24	Cabomba caroliniana	5.07		0	0	0	0	0.00
25	Carex albolutescens (C. longii)	3.47		0	0	0	0	0.00
26	Carex verrucosa	7.97		0	0	0	0	0.00
27	**Casuarina equisitifolia**	0.00		0	0	0	0	0.00
28	Centella asiatica	1.92		0	0	0	0	0.00
29	Cephalanthus occidentalis	6.99		0	0	0	0	0.00
30	Ceratophyllum demersum	4.16		0	0	0	0	0.00
31	**Ceratopteris thalictroides**	2.93		0	0	0	0	0.00
32	Chara spp.	3.90		0	0	0	0	0.00
33	Cladium jamaicense	9.04		0	0	0	0	0.00
34	Cliftonia monophylla	5.63		0	0	0	0	0.00
35	**Colocasia esculenta(1)**	0.00		0	0	0	0	0.00
36	Commelina diffusa	2.02		0	0	0	0	0.00
37	Crinum americanum	8.67		0	0	0	0	0.00

Deleting Taxa (Rows): Step 2



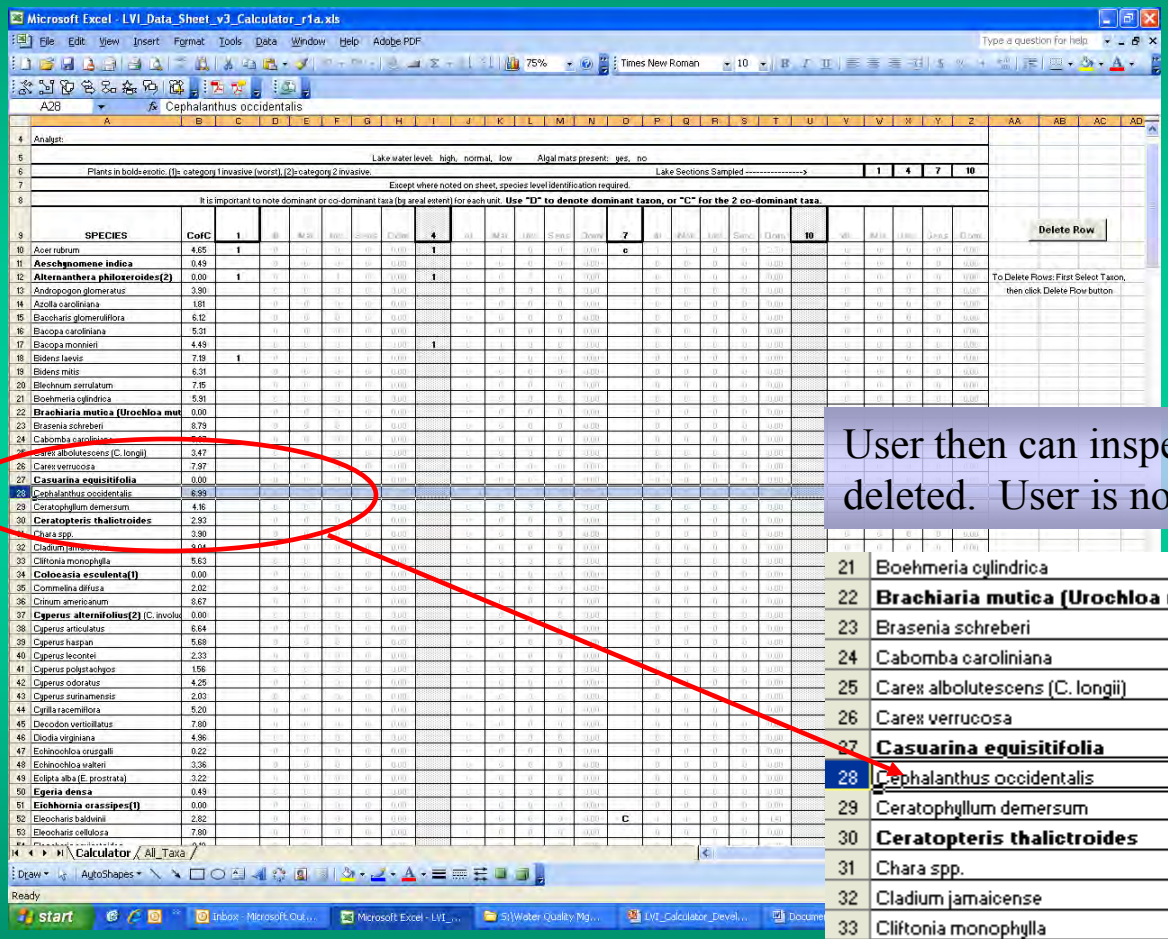
User then “Clicks” on the “Delete Row” button in the upper right corner of the worksheet.

Deleting Taxa (Rows): Verify Delete



User then will Verify the Delete, by pressing Yes. If row or taxon is incorrect, then user can cancel delete by pressing NO.

Deleting Taxa (Rows): Complete



User then can inspect that the taxon (row) has been deleted. User is now finished with Delete.

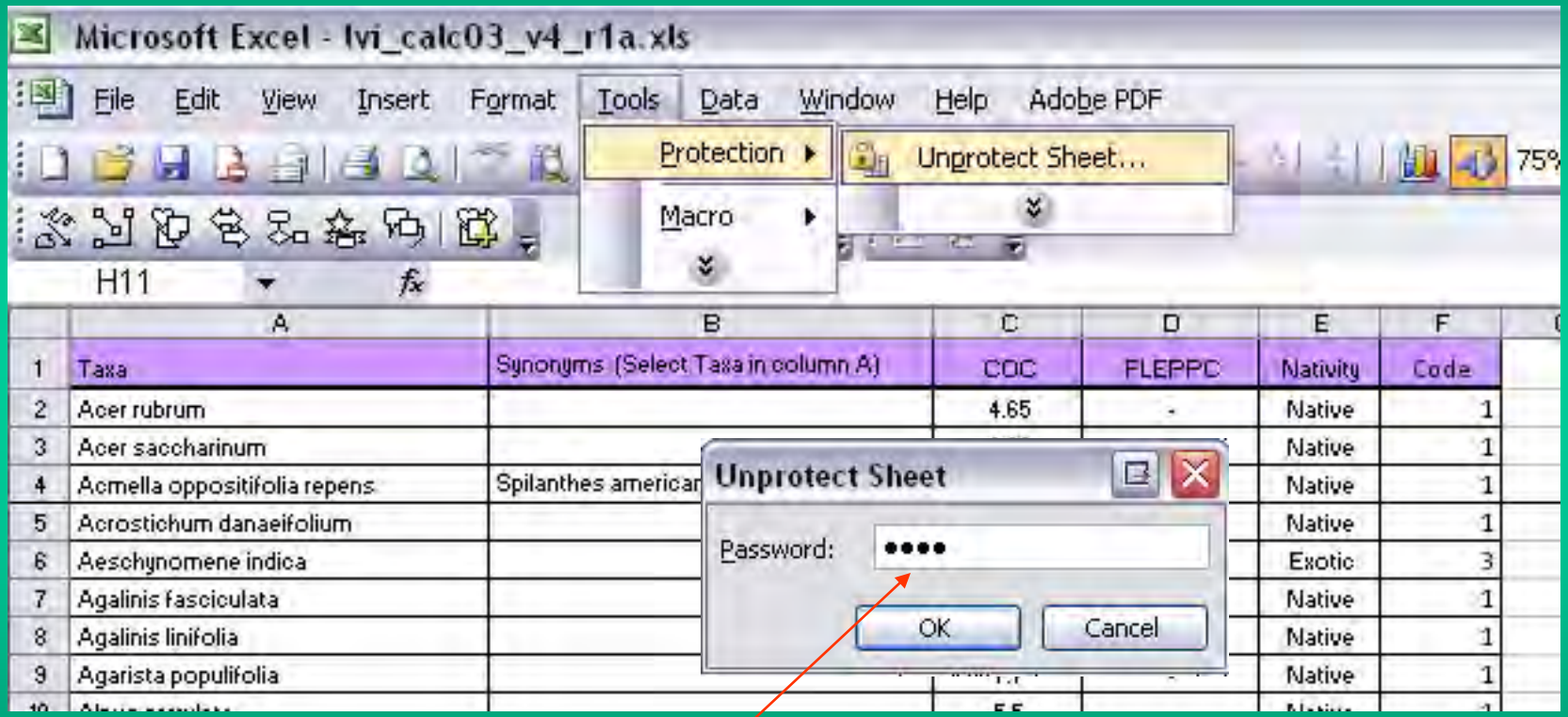
21	Boehmeria cylindrica	5.91		0	0	0	0	0.00
22	**Brachiaria mutica (Urochloa mut**	0.00		0	0	0	0	0.00
23	Brasenia schreberi	8.79		0	0	0	0	0.00
24	Cabomba caroliniana	5.07		0	0	0	0	0.00
25	Carex albolutescens (C. longii)	3.47		0	0	0	0	0.00
26	Carex verrucosa	7.97		0	0	0	0	0.00
27	**Casuarina equisitifolia**	0.00		0	0	0	0	0.00
28	Cephalanthus occidentalis	6.99		0	0	0	0	0.00
29	Ceratophyllum demersum	4.16		0	0	0	0	0.00
30	**Ceratopteris thalictroides**	2.93		0	0	0	0	0.00
31	Chara spp.	3.90		0	0	0	0	0.00
32	Cladium jamaicense	9.04		0	0	0	0	0.00
33	Cliftonia monophylla	5.63		0	0	0	0	0.00
34	**Colocasia esculenta(1)**	0.00		0	0	0	0	0.00
35	Commelina diffusa	2.02		0	0	0	0	0.00
36	Crinum americanum	8.67		0	0	0	0	0.00

Updating “All Taxa” Worksheet

Please keep in mind: We are talking about the “All_Taxa” worksheet, **NOT** the Calculator. Updating this sheet is reserved for when there are new taxa found that are not on the master “All_Taxa” worksheet, or modifications need to be made to the CofC’s or invasive or native status’ of taxa.

DO NOT ATTEMPT to Add or Delete Taxa from the **Calculator** using the following techniques. This is **only** for updating the “All_Taxa” master list worksheet.

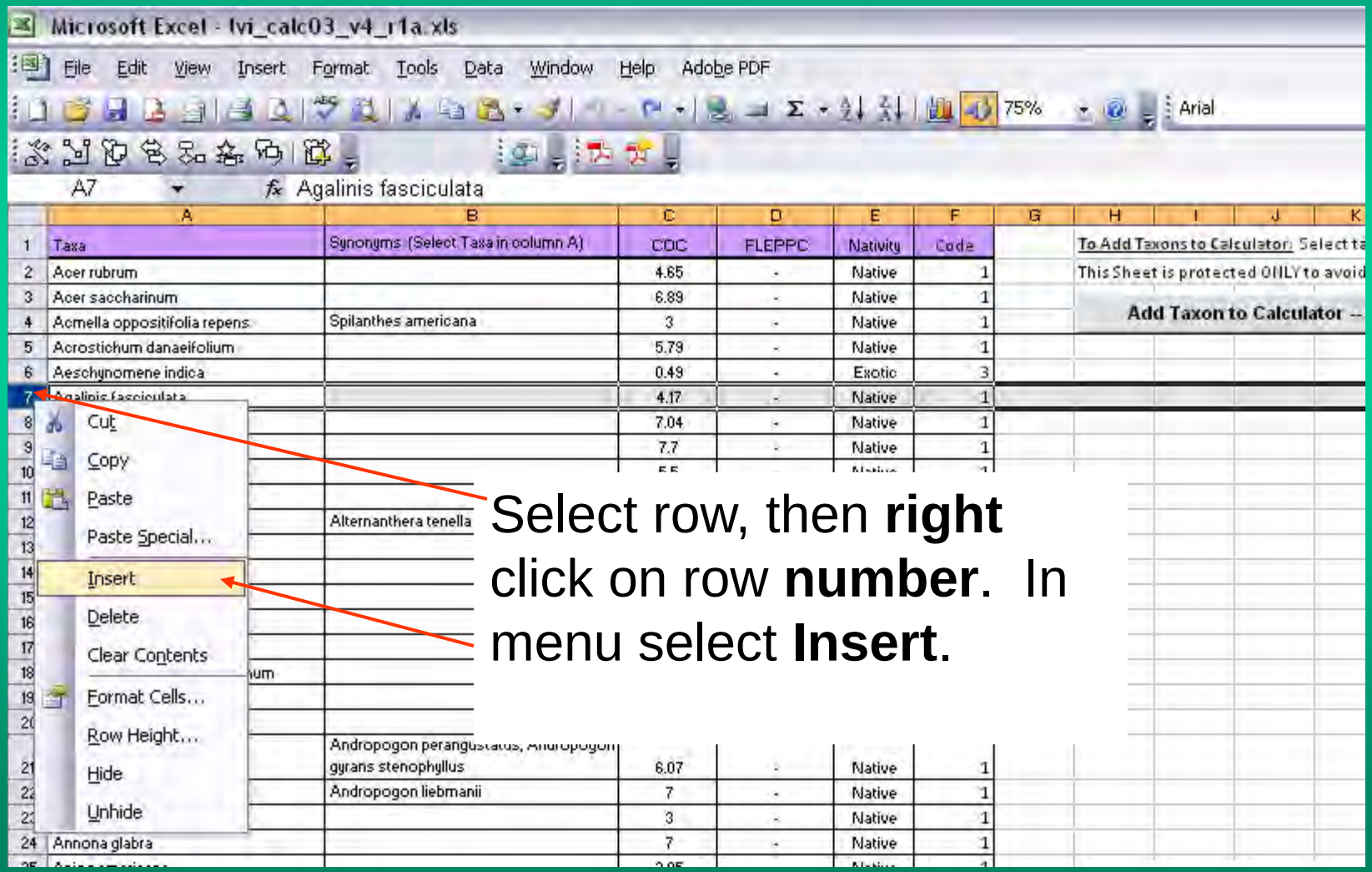
Step 1: Unprotect Sheet



	A	B	C	D	E	F
1	Taxa	Synonyms (Select Taxa in column A)	COC	FLEPPC	Nativity	Code
2	Acer rubrum		4.65	-	Native	1
3	Acer saccharinum				Native	1
4	Acmella oppositifolia repens	Spilanthes americar			Native	1
5	Acrostichum danaeifolium				Native	1
6	Aeschynomene indica				Exotic	3
7	Agalinis fasciculata				Native	1
8	Agalinis linifolia				Native	1
9	Agarista populifolia				Native	1

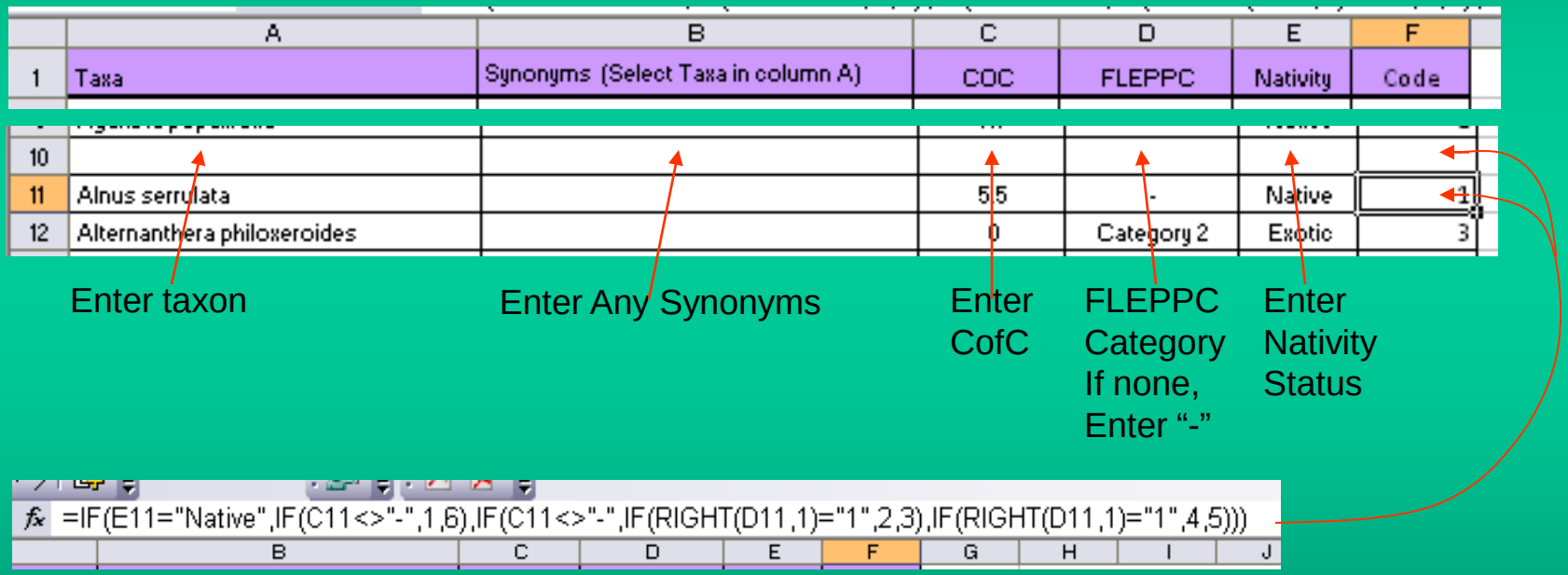
Password to Unprotect Sheet is: **1234**

Step 2: Insert Row



Select row, then **right** click on row **number**. In menu select **Insert**.

Step 3: Enter Taxon Information



	A	B	C	D	E	F
1	Taxa	Synonyms (Select Taxa in column A)	COC	FLEPPC	Nativity	Code
10						
11	Alnus serrulata		5	-	Native	1
12	Alternanthera philoxeroides		0	Category 2	Exotic	3

Enter taxon

Enter Any Synonyms

Enter CofC

FLEPPC Category If none, Enter "-"

Enter Nativity Status

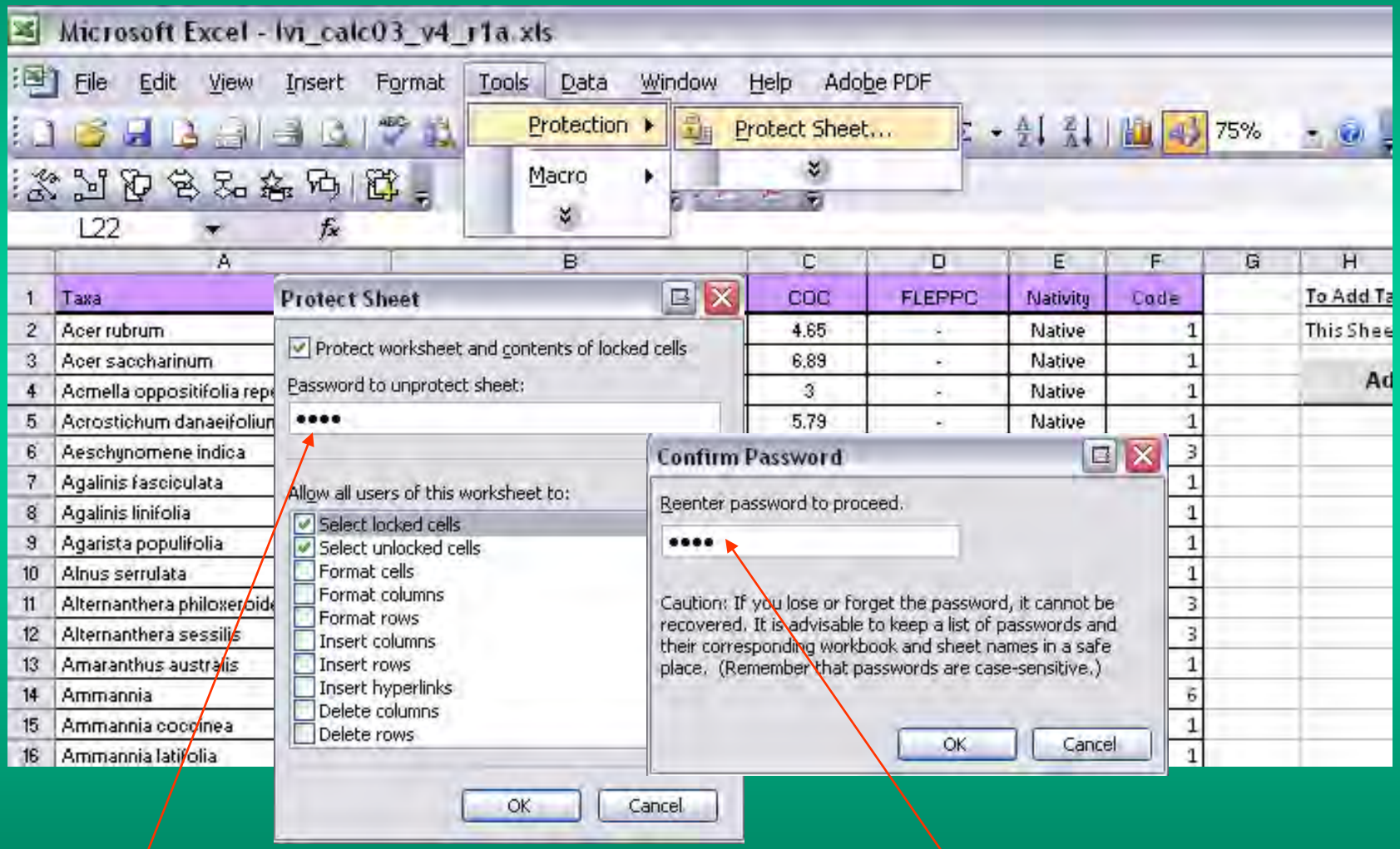
=IF(E11="Native",IF(C11<>"-",1,6),IF(C11<>"-",IF(RIGHT(D11,1)="1",2,3),IF(RIGHT(D11,1)="1",4,5)))

Finally, <u>MOST IMPORTANTLY</u>: Replicate the Formula Code Equation from a row immediately above, or immediately below the inserted row. You simply do this by selecting the cell above or below it; F11 in this case. Copy it, (Ctrl-C), then select the destination cell, F10 in this case, and paste it, (Ctrl-V). The software will automatically adjust the values in the equation to be appropriate for the new row.

Inspect: Properly Completed Row

10	Agarista populifolia		7.7	-	Native	1

Final Step: Protect Sheet



Password to Protect Sheet is: **1234**

Re-enter Password to Confirm: **1234**

Program Development

- Embedded formulae
- Index Calculation
- Metric Calculation
- Disclaimer
- References

(This is all Technical and Legal Stuff)

Most of you can ignore the following slides, as just legal technical mumbo jumbo, and it might really put you to sleep, a very deep sleep.

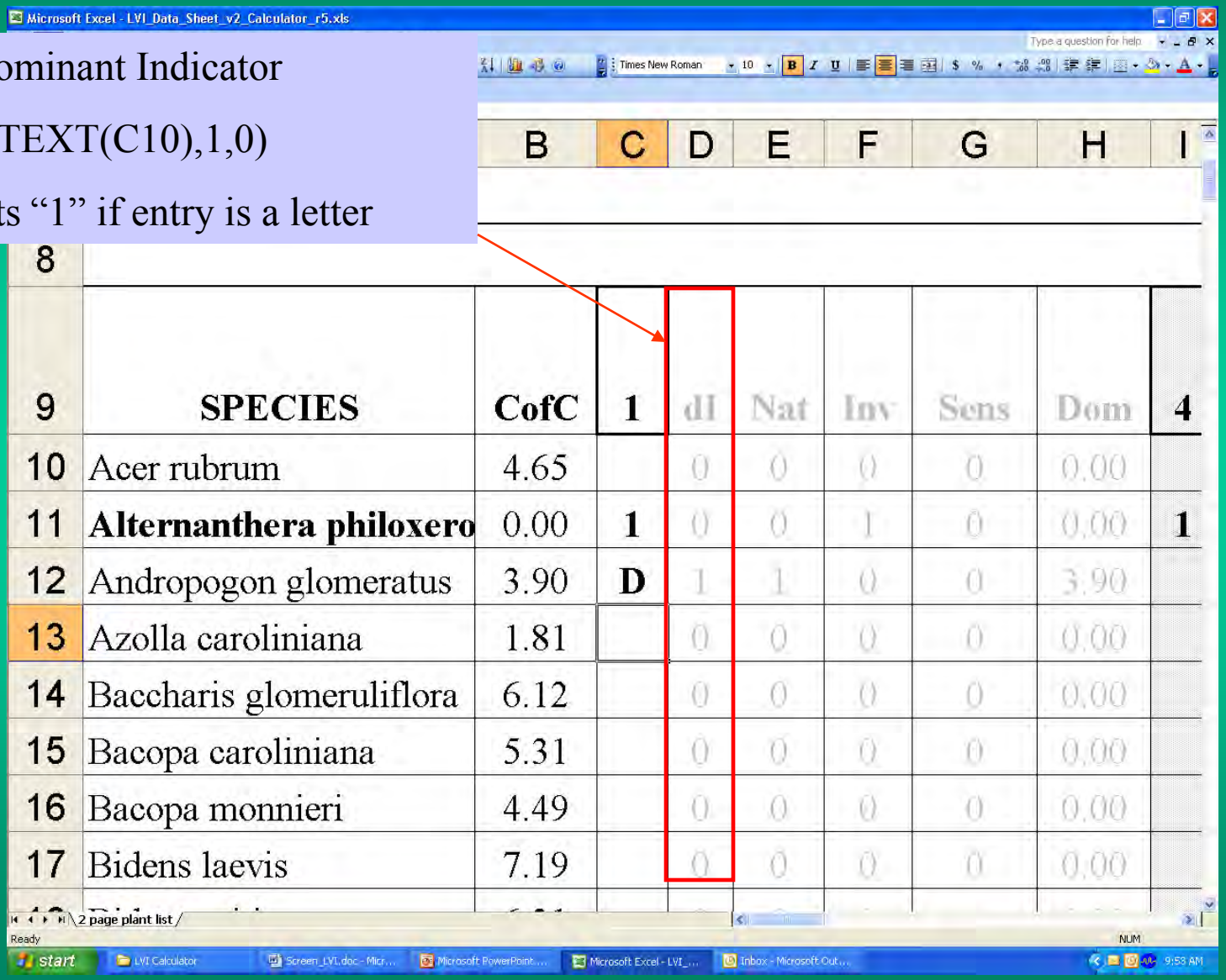
Embedded Formulae

Embedded formulae – Dominance

dI = Dominant Indicator

=IF(ISTEXT(C10),1,0)

Reflects "1" if entry is a letter

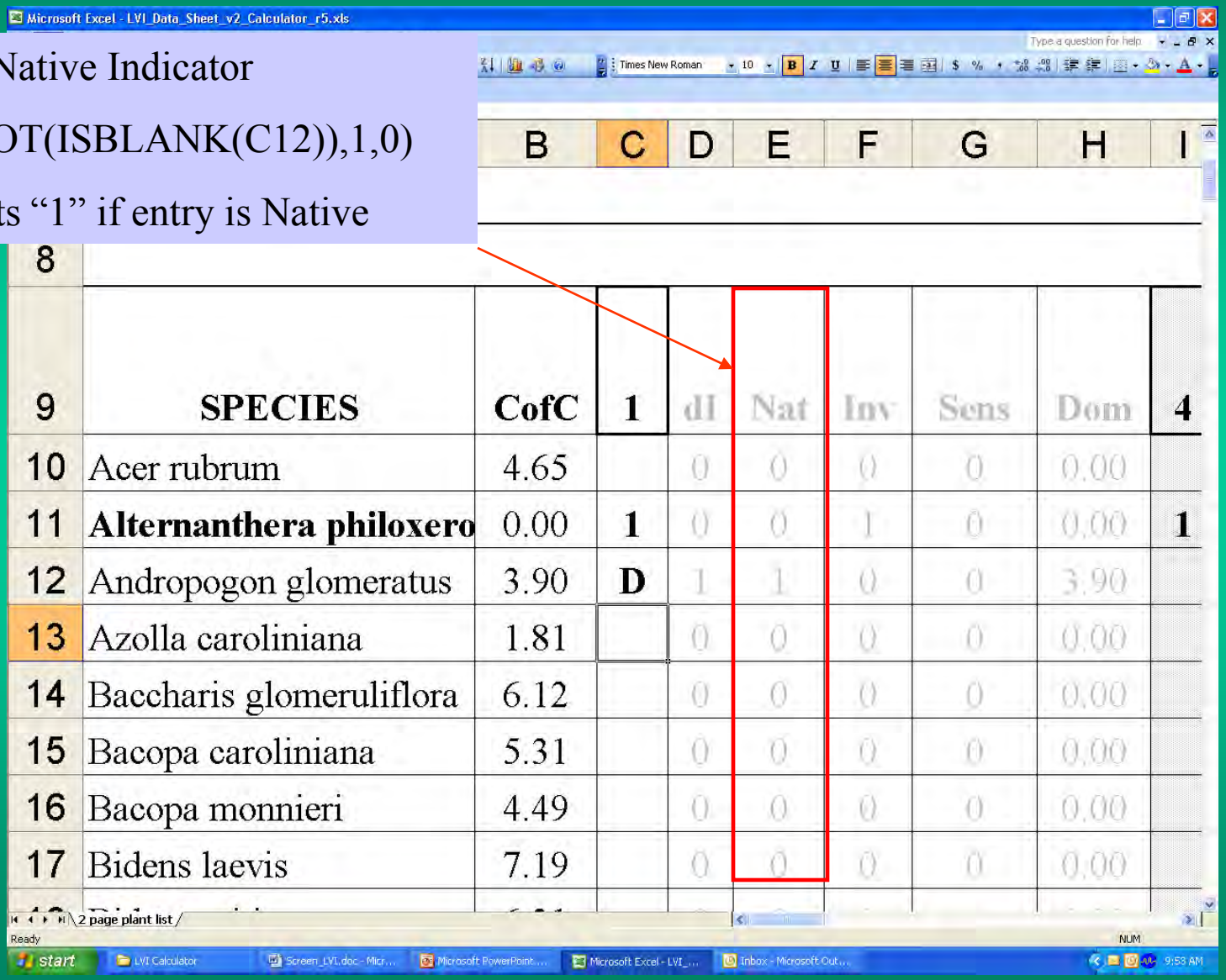


Embedded formulae – Native Indicator

Nat = Native Indicator

=IF(NOT(ISBLANK(C12)),1,0)

Reflects "1" if entry is Native

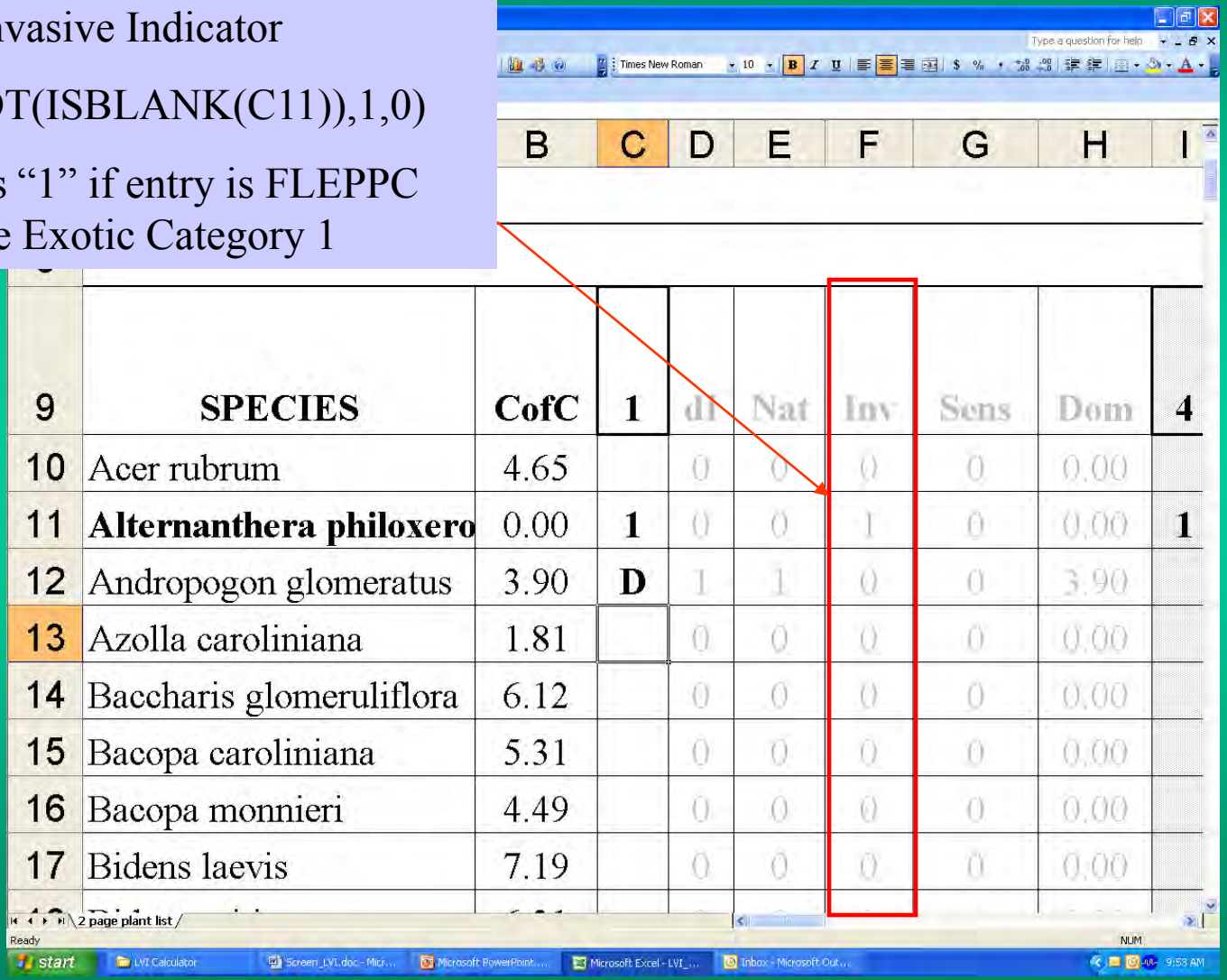


Embedded formulae – FLEPPC Invasive 1 Indicator

Inv = Invasive Indicator

=IF(NOT(ISBLANK(C11)),1,0)

Reflects “1” if entry is FLEPPC Invasive Exotic Category 1

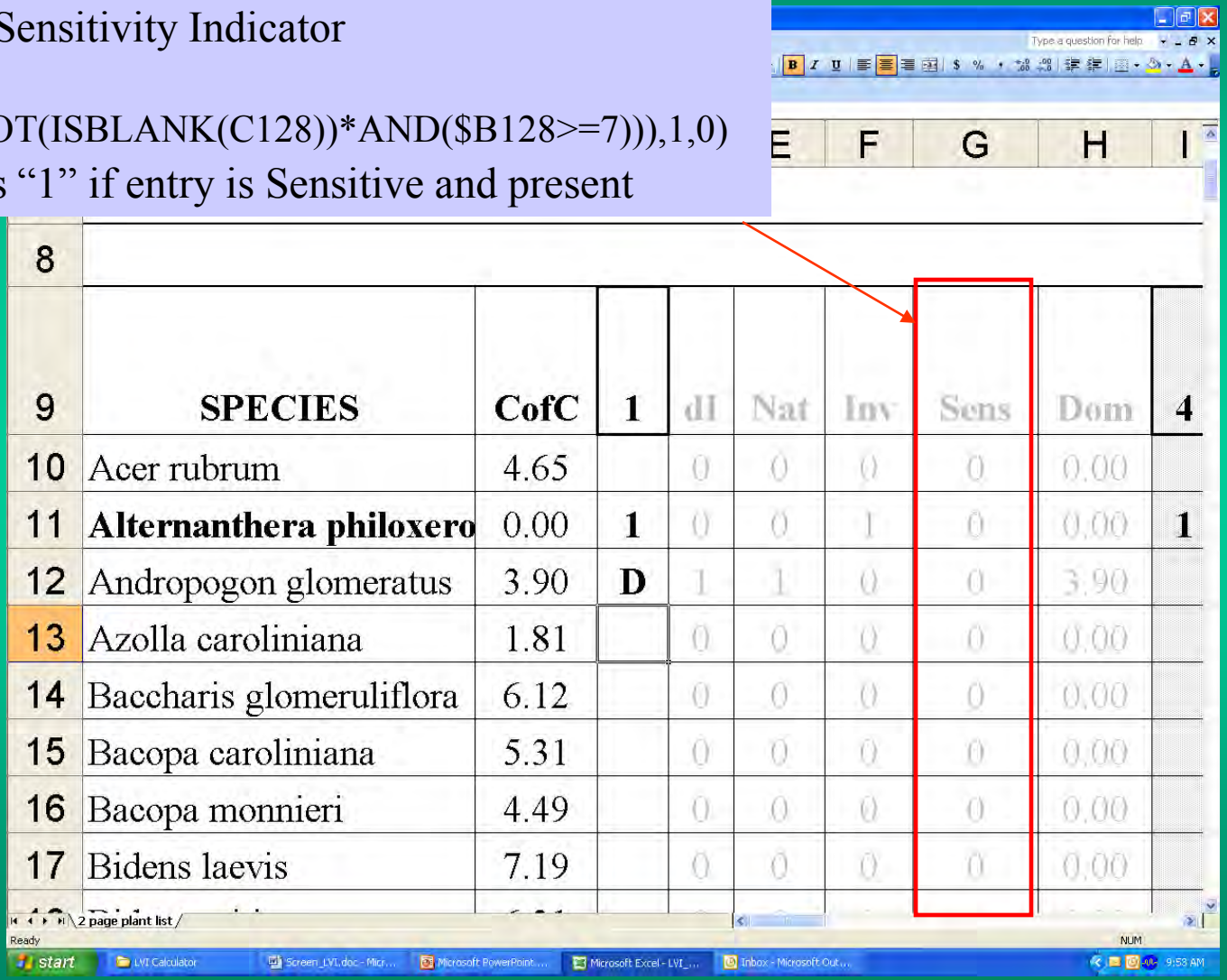


	B	C	D	E	F	G	H	I
9	SPECIES	CofC	1	dI	Nat	Inv	Sens	Dom	4
10	Acer rubrum	4.65		0	0	0	0	0.00	
11	**Alternanthera philoxero**	0.00	**1**	0	0	1	0	0.00	**1**
12	Andropogon glomeratus	3.90	**D**	1	1	0	0	3.90	
13	Azolla caroliniana	1.81		0	0	0	0	0.00	
14	Baccharis glomeruliflora	6.12		0	0	0	0	0.00	
15	Bacopa caroliniana	5.31		0	0	0	0	0.00	
16	Bacopa monnieri	4.49		0	0	0	0	0.00	
17	Bidens laevis	7.19		0	0	0	0	0.00	

Embedded formulae – Sensitivity Indicator

Sens = Sensitivity Indicator

=IF(((NOT(ISBLANK(C128))*AND($B128>=7))),1,0)
Reflects “1” if entry is Sensitive and present



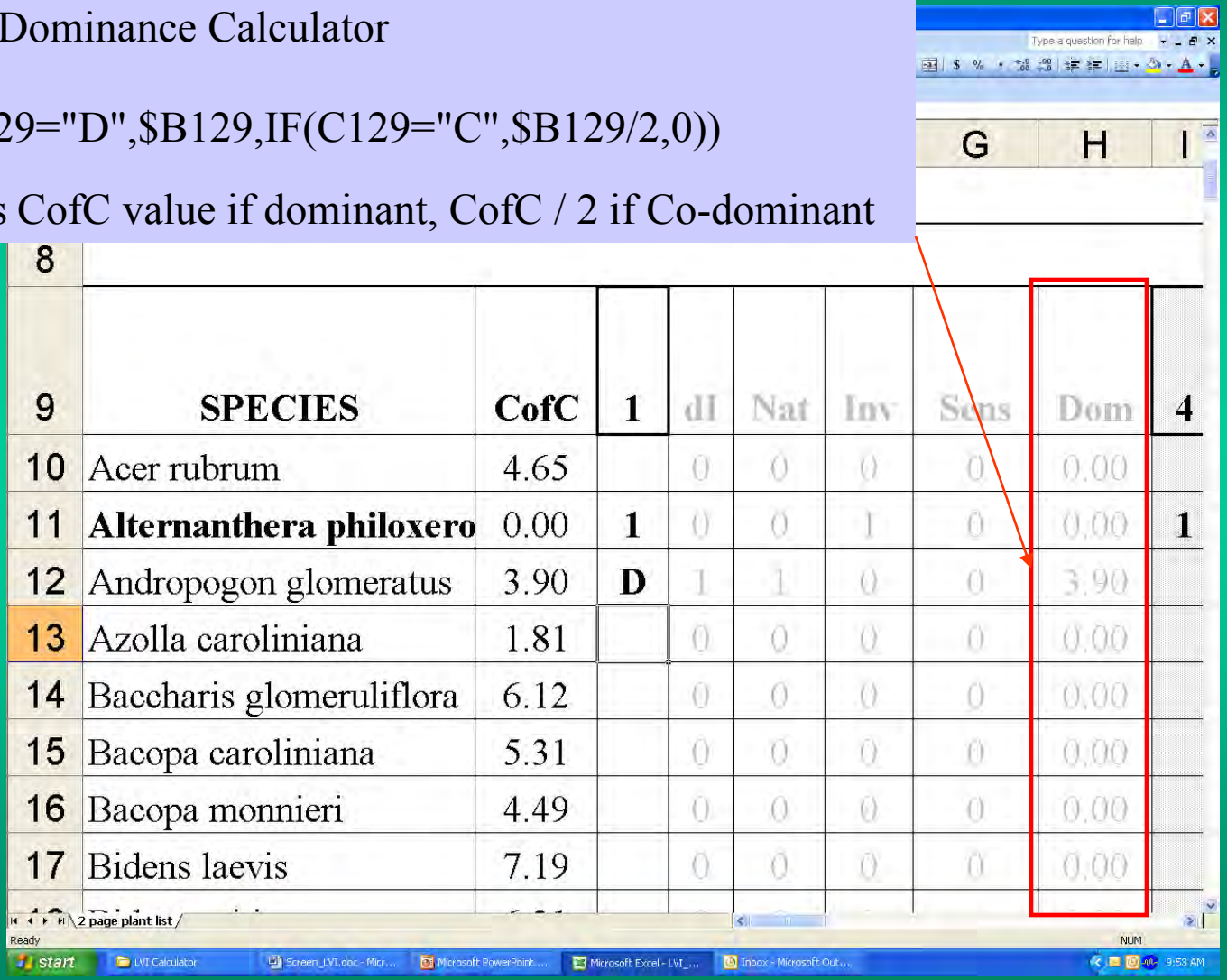
	E	F	G	H	I
8					
9	SPECIES	CofC	1	dI	Nat	Inv	Sens	Dom	4
10	Acer rubrum	4.65		0	0	0	0	0.00	
11	**Alternanthera philoxero**	0.00	**1**	0	0	1	0	0.00	**1**
12	Andropogon glomeratus	3.90	**D**	1	1	0	0	3.90	
13	Azolla caroliniana	1.81		0	0	0	0	0.00	
14	Baccharis glomeruliflora	6.12		0	0	0	0	0.00	
15	Bacopa caroliniana	5.31		0	0	0	0	0.00	
16	Bacopa monnieri	4.49		0	0	0	0	0.00	
17	Bidens laevis	7.19		0	0	0	0	0.00	

Embedded formulae – Dominance Calculator

Dom = Dominance Calculator

=IF(C129="D",$B129,IF(C129="C",$B129/2,0))

Reflects CofC value if dominant, CofC / 2 if Co-dominant

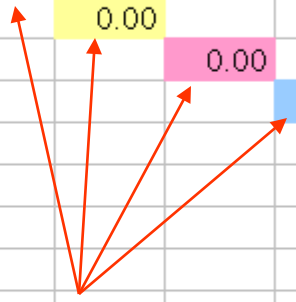


	SPECIES	CofC	1	dI	Nat	Inv	Sens	Dom	4
10	Acer rubrum	4.65		0	0	0	0	0.00	
11	**Alternanthera philoxero**	0.00	**1**	0	0	1	0	0.00	**1**
12	Andropogon glomeratus	3.90	**D**	1	1	0	0	3.90	
13	Azolla caroliniana	1.81		0	0	0	0	0.00	
14	Baccharis glomeruliflora	6.12		0	0	0	0	0.00	
15	Bacopa caroliniana	5.31		0	0	0	0	0.00	
16	Bacopa monnieri	4.49		0	0	0	0	0.00	
17	Bidens laevis	7.19		0	0	0	0	0.00	

Index Calculation

Index Calculation – Nat/Inv/Sens/Dom

188										
189	**LVI Score Summary**		1							4
190	Total # of taxa in sampling unit		4							4
191	% Native taxa in sampling unit				75.00					
192	% FLEPPC CAT 1 taxa in sampling unit					0.00				
193	% Sensitive taxa in sample unit						0.00			
194	Dominant CoC in sample unit		D =	1.0				0.00		NULL
195										
196	Native Score ((x-62.5)/37.5) or ((x-66.67)/25.89)=		0.333							0.333
197	Invasive **FLEPPC 1** Score (1 - (x/30))=		1.000							1.000
198	Sensitive Score (x/(27.78 or 20)) =		0.000							0.000
199	Dominant CoC Score (x/(7.91 or 7)) =		0.000							0.000
200	Raw Score Total = N+I+S+D =		1.333							1.333
201	Division Factor = (3 D=0 or 4) =		4							3
202	Average LVI dividend = Raw /DF		0.333							0.444
203	**North**									
204	LVI Score for sampling unit =		33							44
205										
206	**Total LVI SCORE =**	50								



Percent Native – FDEP SOP **LVI 2200** 5.1

5.1 Calculate the % native taxa in a single sampling unit (pie slice) by dividing the number of native taxa by the total number of taxa in that sampling unit. Nativity status is determined by the Plant Atlas from the Institute for Systematic Botany and is listed in Appendix LVI 1000-1.

=IF($A203="South",IF(F191>=92.56,1,IF(F191<66.67,0,
(F191-66.67)/25.89)), IF(F191>=100,1,IF(F191<62.5,
0,(F191-62.5)/37.5)))

Percent FLEPPC Invasive Cat 1 – FDEP SOP LVI 2200 5.2

5.2 Calculate the % FLEPPC (Florida Exotic Pest Plant Council) Category 1 invasive exotic taxa in a single sampling unit (pie slice) by adding the number of FLEPPC Category I taxa and then dividing by the total number of taxa in that sampling unit. Refer to Appendix LVI 1000-1 to determine which plants are on the FLEPPC Category 1 list.

=IF((G192>30),0,1-(G192/30))

Percent Sensitive – FDEP SOP **LVI 2200** 5.3

5.3 Calculate the % sensitive taxa in a single sampling unit by summing the number of taxa with a C of C (Coefficient of Conservatism) score >= 7 and then dividing by the total number of taxa in that sampling unit. Refer to Appendix LVI 1000-1 for a list of C of C scores.

=IF($A203="South", IF(H193>20,1,H193/20),IF(H193>27.78,1,H193/27.78))

C of C Dominance – FDEP SOP **LVI 2200** 5.4

5.4 Calculate the Dominant C of C for a single sampling unit by inserting the C of C for the dominant taxon or the average C of C for the 2 co-dominant taxa. If no dominant taxon was identified, this metric will be null, not zero. Refer to Appendix LVI 1000-1 for a list of C of C scores. If the dominant taxon is not included in Appendix LVI 1000-1 or if no C of C is listed in the table, then the metric should be null.

If the C of C is only listed for 1 of 2 co-dominant taxa, then the Dominant C of C metric values shall be the C of C of the co-dominant that has a C of C score.

=IF($A203="South",IF(I194>7,1,I194/7),IF(I194>7.91,1,I194/7.91))

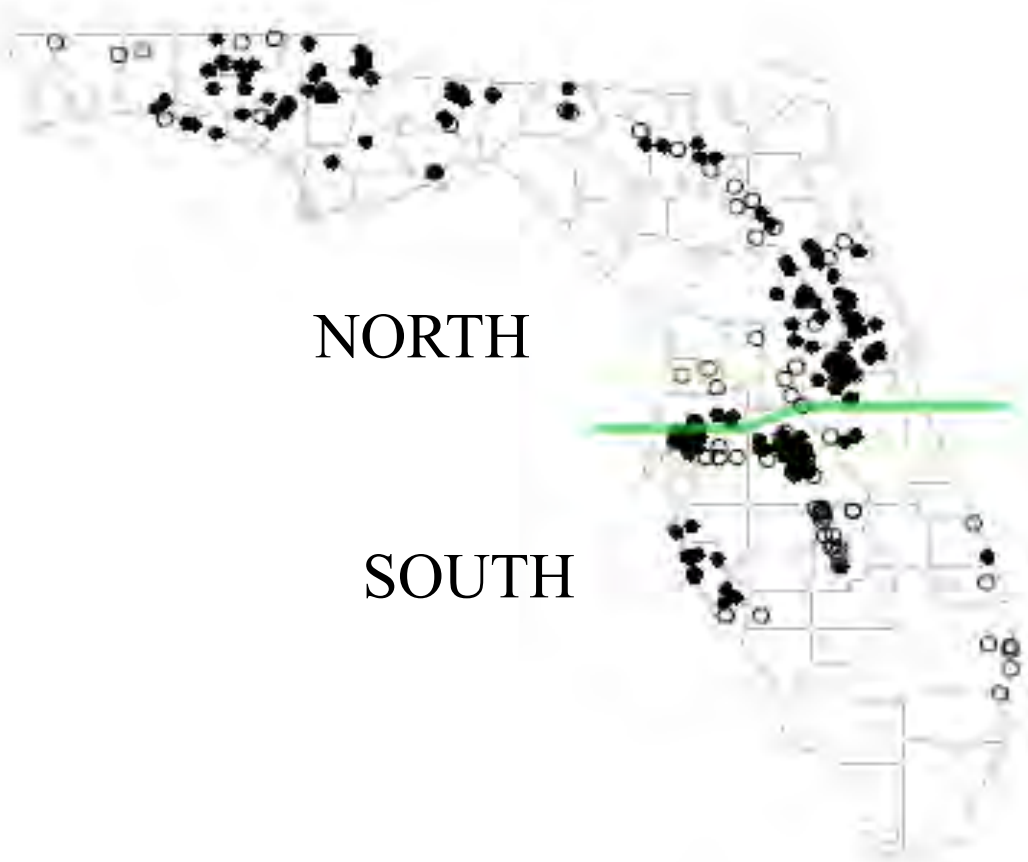
Metric Calculations

Metric Scoring – FDEP SOP **LVI 2200** 5.5

187				4	1.0	3.0	0.0	0.0	0.0	4	
188											
189	**LVI Score Summary**			**1**						**4**	
190	Total # of taxa in sampling unit			4						4	
191	% Native taxa in sampling unit					75.00					
192	% FLEPPC CAT 1 taxa in sampling unit						0.00				
193	% Sensitive taxa in sample unit							0.00			
194	Dominant CoC in sample unit			D =	1.0				0.00	NULL	0.0
195											
196	Native Score ((x-62.5)/37.5) or ((x-66.67)/25.89)=			0.333						0.333	
197	Invasive **FLEPPC 1** Score (1 - (x/30))=			1.000						1.000	
198	Sensitive Score (x/(27.78 or 20)) =			0.000						0.000	
199	Dominant CoC Score (x/(7.91 or 7)) =			0.000						0.000	
200	Raw Score Total = N+I+S+D =			1.333						1.333	
201	Division Factor = (3 D=0 or 4) =			4						3	
202	Average LVI dividend = Raw /DF			0.333						0.444	
203	**North**										
204	LVI Score for sampling unit =			33						44	
205											
206	**Total LVI SCORE =**		**50**								

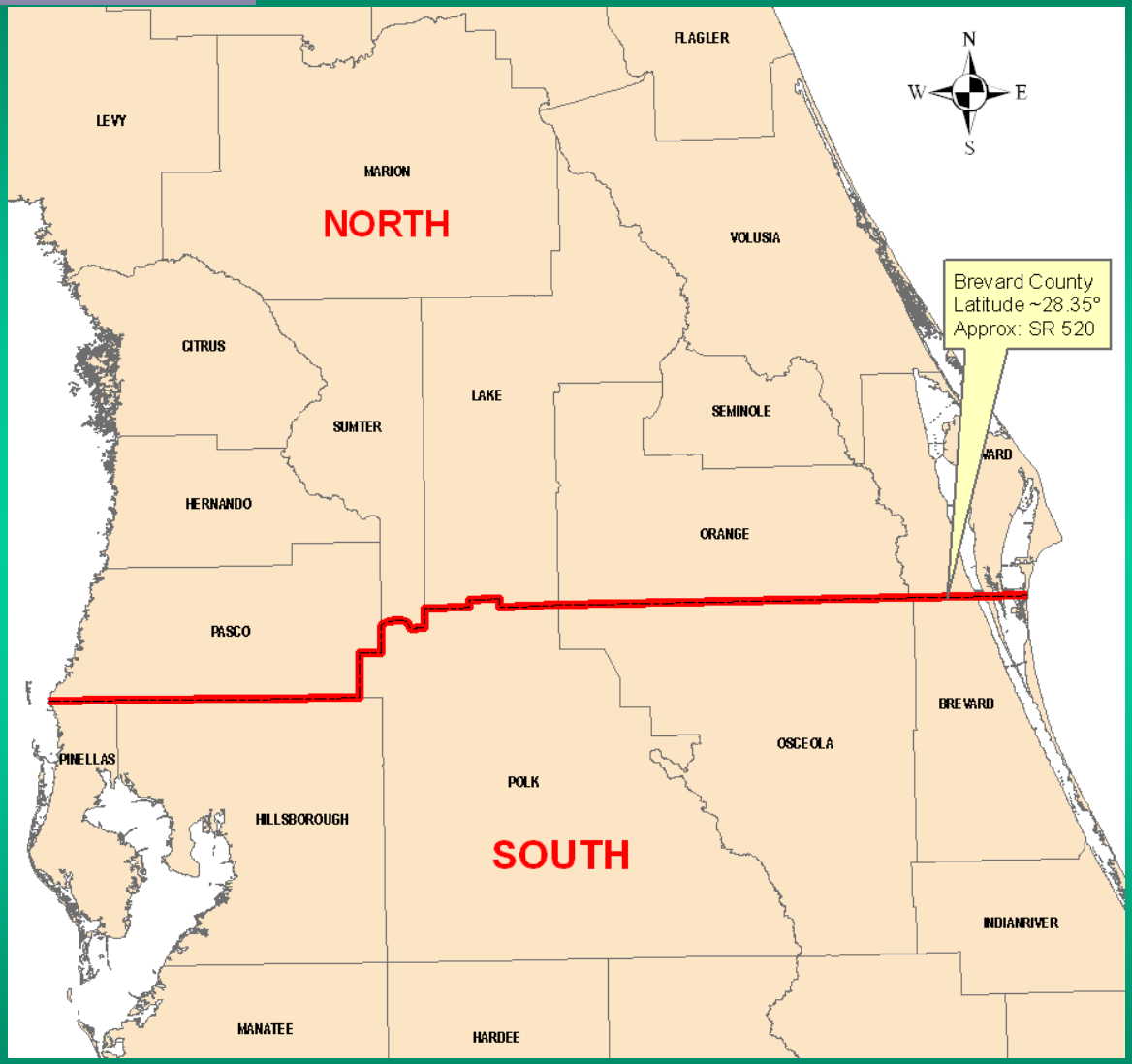
5.5. Calculate the metrics according to the following table, where x = the values calculated in 5.1-5.4. If any result is less than zero, replace with zero; if a score is greater than 1, replace with 1. Make sure you use the correct equation for % native, % sensitive taxa, and dominant C of C, depending on the LVI region in which the lake was located. The North LVI region includes Pasco, Sumter, Lake, and Orange Counties, and all points north, and portions of Brevard County north of latitude 28.348°. The South LVI region includes Pinellas, Hillsborough, Polk, and Osceola Counties, and portions of Brevard County south of latitude 28.348°.

	LVI Region	**Scoring Rule**
% Native Taxa	North	(x-62.5)/37.5
	South	(x-66.67)/25.89
% FLEPPC 1 Taxa	North and South	1-(x/30)
% Sensitive Taxa	North	x/27.78
	South	x/20
C of C Dominant Taxa	North	x/7.91
	South	x/7



App. Figure 6.1. Lake locations for the original data collected in 2000–2003 (open circles) and the more recent data used here that were collected in 2005–2006 (closed circles). The line dividing northern and southern lakes is shown. **(Fore L.S., 2007 pp 97)**

Closer Look…


FLAGLER
N
W
E
S
LEVY
MARION
NORTH
VOLUSIA
Brevard County
Latitude ~28.35°
Approx: SR 520
CITRUS
LAKE
SEMINOLE
SUMTER
HERNANDO
ORANGE
PASCO
BREVARD
OSCEOLA
PINELLAS
POLK
HILLSBOROUGH
SOUTH
INDIANRIVER
MANATEE
HARDEE

Averaging Results Based on Existence of Dominance

(N + I + S + D) ÷ 3 or 4

5.6 Average the results for the metrics within an individual sampling unit and multiply by 100. Note that you divide by 3 instead of 4 if the dominant (or co-dominant) C of C was not available. The result of this calculation must be between 0 and 100.

5.7 Average the LVI's determined for all the sampling units (four units are sampled) to calculate the final LVI score for the lake.

Cooperative Agreement

- End User Acknowledges that the LVI calculator is only a convenient field tool used for instant results and is not a replacement for manual calculations or for formal submission to FDEP for official scoring.
- End User Recognizes and agrees that any score that would indicate a change in a status of a lake would require the data sheets be sent to FDEP for verification, and a manual calculation be done to check for accuracy.
- Owner of intellectual property (Orange County) and programmer (Jeff Darr) disclaims any liability for scores generated by calculator; users (Cooperative agencies) acknowledge that it is the user's responsibility to verify accuracy of results.
- This software can only be distributed free of charge, and no portion thereof can be copied or used in any fee based software. Add and Delete Macro code is owned by programmer, developed independently of distributor and can only be distributed freely within this calculator software.
- End user cannot claim loss or damage to property as a result of execution of software.
- End User agrees to always check the FDEP site for changes in Coefficient of Conservatism (C of C) scores. It is the agency's responsibility to check that all scoring rules and C of C values are official for the timeframe in which the LVI was performed.

Literature Cited

- 2007 Fore, L., R. Frydenborg, N. Wellendorf, J. Espy, T. Frick, D. Whiting, J. Jackson, J. Patronis. Assessing the Biological Condition of Florida Lakes: Development of the Lake Vegetation Index (LVI)
- Florida Administrative Code §62-303 (Impaired Waters Rule)
- 2011 FDEP SOP LVI 2200-5, 5.1- 5.7 Lake Vegetation Index Determination – Index Calculation
- 2011 FDEP Field Data Sheet FD 9000-27
- 2011 FDEP Appendix LVI 1000-1 Plant Attributes for LVI Calculation