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## Post Processing: Abundance and Distribution of Species in Open Vegetation Plots

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Protocol status: In development We are still developing and optimizing this protocol

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Protocol Integer ID: 30097

Keywords: open vegetation, virtual point frames, SamplePoint, DJI drone,



### Abstract

Here we describe the standardised protocol used by the <u>Canadian Airborne Biodiversity Observatory</u> (CABO) to obtain an estimation of the abundance and distribution of plant species surveyed in the open vegetation plots in sites where small drone pictures are taken using the DJI Mavic Air, being Mer Bleue Bog (Ontario) and Parc national des Îles-de-Boucherville (Québec) in 2019. The *SamplePoint* program is used to process the small drone pictures, where a virtual point frame grid is overlapped to the subplot pictures. The grid is made of 100 crosshairs, representing one crosshair every 10 cm. Every crosshair is then associated to a ground cover. This process results in an Excel spreadsheet where we can extract a percent cover for each species (measure of abundance), and see for each of the 100 crosshairs per subplot what percent cover is present (measure of distribution).

### Attachments



### **Photo Annotations**

- 1 If the different species are difficult to tell apart visually, annotate the drone pictures.
- 1.1 From *Fulcrum*, download on your computer the small drone pictures from the 9 subplots of a given plot by following Vegetation Surveys: Herbs and Shrubs → Cover Estimates: Subplots → Subplots → Record [# from 1 to 9] → Vegetation Photos: Subplot → Download → Original.

۲	Vegetation Surveys: Herbs and Shrubs	Ø	$\bigcirc$
	1 record, July 19, 2019	8	≡
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۲	Plant Taxa	12 Items	
List - Spi - Spi - Po - Ma - Ka - Rh - Lai - Va - Eri - Va - Ch - Va	of scientific names available: hagnum magellanicum Brid. hagnum papillosum Lindb. lytrichum strictum Menzies ex Brid. nianthemum canadense Desfontaines lmia angustifolia Linnaeus ododendron groenlandicum (Oeder) Kron & Judd rix Iaricina (Du Roi) K. Koch ccinium oxycoccos Linnaeus iophorum vaginatum Linnaeus ccinium myrtilloides Michaux amaedaphne calyculata (Linnaeus) Moench ccinium angustifolium Aiton		
⊙	Cover Estimates: Subplot		
۲	Subplots	9 Items	

۲	Vegetation Surveys: Herbs and Shrubs	0
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۲	Cover Estimates	9 Items	
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Leaf	Litter Cover (%): Subplot		0
Tota	l Cover (%): Subplot		0
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1.2 Open the 9 pictures in a single PowerPoint file, with each slide corresponding to one subplot.

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1.3 Use the species list from  $Fulcrum \rightarrow$  Vegetation Surveys: Herbs and Shrubs  $\rightarrow$  Subplot Record  $\rightarrow$  Cover Estimates to locate each plant species, paying attention to the Canopy Remarks (abundance and distribution).

۲	Vegetation Surveys: Herbs and Shrubs	Ø	$\odot$
	1 record, July 19, 2019	1	≡
۲	Species List		^
۲	Plant Taxa	12 Items	
List - Spi - Spi - Poi - Ma - Ka - Ch - Ch - Va - Ch	of scientific names available: hagnum magellanicum Brid. hagnum papillosum Lindb. lytrichum strictum Menzies ex Brid. aianthemum canadense Desfontaines lmia angustifolia Linnaeus ododendron groenlandicum (Oeder) Kron & Judd rix Iaricina (Du Roi) K. Koch ccinium oxycoccos Linnaeus iophorum vaginatum Linnaeus ccinium myrtilloides Michaux amaedaphne calyculata (Linnaeus) Moench		
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Kalı	mia angustifolia Linnaeus	View >						
Vac	cinium oxycoccos Linnaeus	View 📏						
Vac	cinium angustifolium Aiton	View 💙						
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۲	Cover Estimates		Ø	$\bigcirc$
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۲	Metadata			
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Upd	ated Location	45.409157, -75.516622 (3m accuracy, 1.5m from the record)		
۲	Taxon Cover			
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NOTES ON COVER REMARKS:

Each subplot is divided in areas identified with direction acronyms (S = south, N = north, O or W = west, E = east, C = center). If relevant, they also have a note on the number of individuals for a given species.

1.4 For all of the species or specimens that are difficult to identify at first sight, in PowerPoint, in a white font, note the intials of the species (generally, format is first letter of genra + first letter of species) on top of its occurences.



1.5 Save all PowerPoint slides (1 slide = 1 subplot) in .tif to your computer and name them in the format PlotNo.SubplotNo.

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1.6 Crop all photos so that their shape is a tight square around the PVC pipes delimiting the subplot.

Example for subplot 1:



1.7 Save the cropped photos back to:

1) their original *Fulcrum* subplot record, under Vegetation Surveys: Herbs and Shrubs  $\rightarrow$  Subplots  $\rightarrow$  Record [# from 1 to 9]  $\rightarrow$  Vegetation Photos: Subplot,

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Sub	plot •	44083370-44100544, 1	0	
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or 2) to a Google Photos folder, with all photos labelled with PlotNo.SubplotNo, shared with the Veg Crew Leader.

![](_page_13_Picture_1.jpeg)

### **Virtual Point Framing**

2 Classify 100 non-random crosshairs per subplot using the *SamplePoint* program, in order to obtain species distribution and abundance to the closest percent.

Note

Save everything related to *SamplePoint* (photos to classify (see 1.7), databases (see 2.2) and buttons (see 2.8) that will be created) in the same computer directory.

2.1 Indicate in the Veg\_Crew\_overview Google Doc on what plot(s) you will be working on that day, by writing the date and your initial next to the plot number.

![](_page_14_Picture_1.jpeg)

2.2 Create a Database in *SamplePoint*, under Options  $\rightarrow$  Database Wizard - Create DB.

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2.3 Name the database with an acronym for the site and the plot number.

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2.4 Populate the database by selecting all 9 annotated .tiff or .tif pictures of this plot.

#### Note

Select All files from the menu in order to have access to the .tiff and .tif files.

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![](_page_16_Picture_2.jpeg)

2.5 Select Done and OK to complete.

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2.6 Follow Options  $\rightarrow$  Select DataBase, and select the file that you want to fill, then OK to open your database in *SamplePoint*.

#### Note

Warning: if you select a database that has already been used, you will overwrite your data. Therefore we are using one separate database per plot.

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2.7 Create, upload or edit a *SamplePoint* button file for classifying the plot.

For every plot, using the plot species list in *Fulcrum*, under Vegetation Surveys: Herbs and Shrubs  $\rightarrow$  [Appropriate plot]  $\rightarrow$  Species List, all the species\* must appear as a button in *SamplePoint*.

Note

SamplePoint allows for a maximum of 30 classification buttons.

- \*: If there are more than 30 species in your list, add a button named Other that you will edit appropriately afterwards in the plot Excel Database. Make notes of the species of these Other-classified points in each subplot where they occur.
- Always include one button named Unknown, used for when you are not sure of the plant ID (for ex.: because of shade).
- If necessary, add buttons named Ground or Water.
- If necessary, add a button named Dry for cases where a plant is unidentifiable because only a dry stem remains.

⊗	Vegetation Surveys: Herbs and Shrubs	
	1 record, July 9, 2019	State 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
⊙	Species List	
۲	Plant Taxa	20 Items
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⊙	Cover Estimates: Subplot	

2.8 Create a new set of buttons in *SamplePoint* by following Options  $\rightarrow$  Custom Buttons  $\rightarrow$  Create Custom Button Files.

![](_page_21_Picture_1.jpeg)

2.9 Fill in the button names (4 letters, see buttons\_explanations joined file) and descriptions (latin or common name; no single quotation marks) for every ground cover that will be used (ex.: species, bare ground, water, unknown, or other).

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utton 15	FRM	Fageta vignaria		Button 30	unknow	unknown	0		
					NOTE	description can contain any ch	sractor EXCEPT the ', It must also be less than	255 characters.	

4 letter names in caps lock can be seen more clearly and thus are more convenient.

2.10 If a set of buttons already exists for the site, use it as a base to create this new set by clicking on Load Existing. Make the required edits by renaming the appropriate button names and descriptions.

Note

The original button file will remain intact if the new one is given a new name.

SamplePoint     Junior Custom Puttons		- 0 X									
Description (optional)	Short	nCut Note: You need the 1.47 or greater database to create shoricutal Description (ontional) ShortCut									
Button 1		Button 16 NOTE: To create a									
Button 2		Button 17 enter the button labels in the corresponding									
Button 3		Button 18 fields as shown. A blank field will result									
Button 4		Button 19									
Button 5		Button 20									
Button 6		Button 21 loaded, use the menu item to select a									
Button 7		Custom Button File to Ioad the definition into									
		Button 22 After the button is									
Button 8		Button 23 O loaded into the database, it will be									
Button 9		Button 24 used for classification and statisticial									
Button 10		Button 25 Also and that the									
Button 11		Button 26 Uad' Button can be used to edit an									
Button 12		Button 27 existing set of buttons. They still need to be									
Button 13		Button 28 O Note that the ShortOat									
Button 14		Button 29									
Button 15		Button 30									
		N N N N N N N N N N N N N N N N N N N									
Concel Load Sava NOTE: a description can contain any character EXCEPT Me <sup>1</sup> . It must also be less than 256 characters.											
Existing	Guve	NOTE: Y, y, N, and n are NOT allowed as ShortCuts!									

SamplePoi	nt									- 0 X		
🖳 Define Cu	stom Button	5								×		
		Description (optional)	ShortC	ut Note: You	need the 1.47	7 or greater database	to create shortcuts!	Description (optional)	ShortCut			
Button 1	LYSA	Lythrum salicaria		Button 16	PLMA	Plantago major	Plantain majeur			NOTE: To create a custom button file.		
Button 2	ASCSY	Asclepias syriaca Asclépiade commune		Button 17	POAL	Poa alsodes	Pâturin des bosquets			enter the button labels in the corresponding fields as shown. A		
Button 3	CALCA	Calamagrostis canadensis Calamagrostide du Canada		Button 18	POPR	Poa pratensis	Pâturin des prés			blank field will result in an invisible button.		
Button 4	CARL	Carex L		Button 19	RUID	Rubus idaeus	Framboisier rouge			Save the definition into a file. After a		
Button 5	CORSE	Comus sericea Comouiller hart-rouge		Button 20	GEAL	Geum aleppicum		1		database has been loaded, use the menu		
Button 6	FRPE	Fraxinus pennsylvanica		Button 21	VICR	Vicia cracca	Vesce jargeau	:		Custom Button File to load the definition into		
Button 7	EQVA	Equisetum variegatum Prêle panachée		Button 22	SOAL	Solidago altissima	Verge dor haute	1		the database. After the button is		
Button 8	EUGR	Euthamia graminfolia Verge dor à feuilles de graminée		Button 23	SONCH	Sonchus arvensis	Laiteron des champs	1		loaded into the database, it will be		
Button 9	GATR	Galum trfidum		Button 24	SOGI	Solidago gigantea	Verge dor géante			used for classification and statisticial		
Button 10	ONSE	Onoclea sensibilis		Button 25	ARLA	Arctium lappa				Also note that the		
Button 11	CIRAR	Cirsium arvense		Button 26	VIRIP	Vitis riparia	Vigne des rivages			'Load' Button can be used to edit an existing set of buttons		
Button 12	APOAN	Apocynum androsaemifolium		Button 27	ANSY	Anthriscus sylvestris	1			They still need to be saved when done.		
Button 13	PHAU	Phragmites australis (Cavanilles) Trinius ex Steudel subsp. Australis Roseau commun		Button 28	TAXOF	Taraxacum officinal	e Pissenit officinal			Note that the ShortCut		
Button 14	agrgig	Agrostis gigantea Agrostide blanche		Button 29	PHLA	Phalaris arundinace	a			alphabetic e.g. A-Z or a-z.		
Button 15	FRVI	Fragaria virginiana		Button 30	unknow	unknown		(				
	Cancel Load Existing Save NOTE: a description can contain any character EXCEPT the'. It must also be less than 255 characters. NOTE: Y, y, N, and n are NOT allowed as StortCute!											

M SamplePo	int								- 0 X				
🛃 Define Cu	ustom Butto	ns							×				
		Description (optional)	Short	Note: You	need the 1,47	or greater database to create shortcuts!	Description (optional)	ShortCut					
Button 1	CAIN	Carex intumescens		Button 16	PLMA	Plantago major Plantain majeur			NOTE: To create a custom button file,				
Button 2	ASCSY	Asclepias syriaca Asclépiade commune		Button 17	POAL	Poa alsodes Pâturin des bosquets	0		enter the button labels in the corresponding fields as shown A				
Button 3	CALCA	Calamagrostis canadensis Calamagrostide du Canada		Button 18	POPR	Poa pratensis Pâturin des prés	$\sim$		blank field will result in an invisible button.				
Button 4	CARL	Carex L		Button 19	RUID	Rubus idaeus Framboisier rouge	0		Save the definition into a file. After a				
Button 5	CORSE	Comus sericea Comouller hart-rouge		Button 20	GEAL	Geum aleppicum	0		database has been loaded, use the menu				
Button 6	FRPE	Fraxinus pennsylvanica		Button 21	VICR	Vicia cracca Vesce jargeau	0		Custom Button File to load the definition into				
Button 7	EQVA	Equisetum variegatum Prêle panachée		Button 22	SOAL	Solidago altissima Verge dor haute	0		the database.				
Button 8	EUGR	Euthamia graminfolia Verge dor à feuilles de graminée		Button 23	SONCH	Sonchus arvensis Laiteron des champs	0		loaded into the database, it will be				
Button 9	GATR	Galium trfidum		Button 24	SOGI	Solidago gigantea Verge dor géante	0		used for classification and statisticial				
Button 10	agrgig	Agrostis gigantea Agrostide blanche		Button 25	ARLA	Arctium lappa	0		Also note that the				
Button 11	CIRAR	Cirsium arvense		Button 26	VIRIP	Vitis riparia Vigne des rivages	0		"Load" Button can be used to edit an existing set of buttons				
Button 12	APOAN	Apocynum androsaemifolium		Button 27	ANSY	Anthriscus sylvestris	0		They still need to be saved when done.				
Button 13	PHAU	Phragmites australis (Cavanilles) Trinius ex Steudel subsp. Australis Roseau commun		Button 28	TAXOF	Taraxacum officinale Pissenit officinal	0		Note that the ShortCut				
Button 14	ground	ground		Button 29	PHLA	Phalaris arundinacea	0		alphabetic e.g. A-Z or a-z.				
Button 15	dry	dayl O		Button 30	unknow	unknown	0						
	Lond         NOTE: a description can contain any character EXCEPT the'. It must also be less than 255 characters.           Existing         Save         NOTE: Y, y, N, and n are NOT allowed as ShortCutal           Back 1         PDMA1         PDMA1         PDMA1												

2.11 Save and name this new custom button file.

construction of the second sec			×	A7 or greater backage to create short day Description (optional	d) ShortCut	
->	v & Rechercher dans	:Boucherville J	PLMA	Partago najor Partan najeur		NOTE: To create a custom button file.
rganiser = Nouveau dossier		10 × 4	POAL	Poe alsodes Páturin des bosqueta		enter the button lai in the corresponde
E Images # A Nom	Modifié le	Туря	^ POPR	Paa prateriais Páturin des prés		blank field will res
SamplePoint #	2019-06-28 11-10	Fichier 8TN				in an invisible buth
Bouchenille bou2.8th	2019-08-28 1/22 PM	Fichier 8TN	RUID	Rubus daeus Rramboisier rouge		Save the definition
Bouchenville boul.Btn	2019-08-28 2:55 PM	Fichier BTN	GEAL	Deurs alessinum		database has bee
Boucherville boul.8th	2019-08-14 5:36 PM	Fichier 8TN	in the second			loaded, use the m
Medieut bouilith	2019-08-16 3-05 PM	Fichier 8TN	VICR	Voa oracca Vesce jargeau		Custom Button Fi
bou10.8tn	2019-08-19 4:44 PM	Fichier 8TN	Con al	Enter a second sec		load the definition
OneDrive  BOU11.8te	2019-08-21 3:56 PM	Fichier 8TN	SOAL	Doldago allissma Verge dor haute		the database.
CaPC boul2.8tm	2019-08-22 10:58	Fichier BTN	SONC	Sonchus anveneis Lateron des champs		After the button is londed into the
Bureau Douris.Btn	2019-06-22 12:09	Fichier 8TN				database, it will b
Decuments	2019-06-22 2:34 PM	Fichier IITN	* SOGI	Solidago pipartina Verge dor pliarite		used for classific and statisticial
			-	The first sectors		analysis.
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Type: Custom Button Files (*.8tn,*8TN)			VIRIP	Vite spara Vigne des rivages		"Lond" Button car
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IS PHALI Progrates autouts Covarilles) Timus or Strudel subsp	Autula Roseau ~	Button	28 TAXO	Taraxacun ofionale Preerit ofional		Saved when done
commun	×.				<u>x</u>	Note that the Sho characters must
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an 15 day day	A	Button	30 Junkno	Leterone .		
int in the second se	Ψ.		Janacio		× •	
		1				

2.12 In *SamplePoint*, follow Options  $\rightarrow$  Custom Buttons  $\rightarrow$  Load Custom Button File to select and load the buttons that you will be using to classify the photos from your database.

Note

The Button File selected needs to remain untouched for the whole database.

![](_page_25_Picture_1.jpeg)

#### SamplePoint

<ul> <li>Ouvrir</li> <li>         ← → &lt; ↑</li></ul>	Boucherville C Rechercher dans : Boucherville P C Rechercher dans : Boucherville P C Rechercher dans : Boucherville P C C Recherville P C Rechercher dans : Boucherville P C C Rechercher dans : Boucherville P C C Recherville P C Recher
<ul> <li>← → · ↑ • · CABO &gt; SamplePoint</li> <li>Organiser ▼ Nouveau dossier</li> <li>♥ Téléchargem * ↑ Nom</li> <li>֎ Documents * • bou1.8tn</li> <li>■ Images * • bou2.8tn</li> </ul>	Boucherville     C     Rechercher dans : Boucherville     P     BEE     Modifié le     Type     2019-08-28 11:10     Fichier BTN     2019-08-28 1:22 PM     Fichier BTN     2019-08-28 1:22 PM     Fichier BTN     P
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MerBleue	2019-08-19 4:44 PM Fichier BTN
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bou16.8tn	2019-08-23 10:05 Fichier BTN ¥
Documents V C	3
Nom du fichier : bou4.8tn	✓ Custom Button Files (*.8tn,*BT ✓
	Ouvrir Annuler

![](_page_26_Picture_1.jpeg)

2.13 Edit the picture as needed. The rotation has to be done once only, before classification. The rest can be done at any point and undone by clicking on R.

### Note

Use the buttons on the left menu to Rotate\*, Darken, Lighten, reset (R), increase contrast (>> Cont), or lower contrast (<< Cont) of the picture. Key indicates the Subplot number. Leave Block Zoom ticked. Only untick it if your computer performances are slow.

\*: Use the subplot number (title of the picture) and compare the picture in *SamplePoint* to its copy in *Fulcrum*\*\* to know what rotation is needed. \*\*: Especially useful for subplot no. 5.

![](_page_27_Picture_1.jpeg)

2.14 Under Options  $\rightarrow$  Select Grid Size, select 10×10 = 100. This means that we are using a 10×10 grid of points (100 crosshairs) to classify each subplot.

SamplePoint									
Options Help NOTE: Rotate Image First	t, the	n adjust image parameters!							
Change Crosshair Color >	1				Next Image	Begin	Comment		
Create Statistics Files								 	
Custom Buttons >									
Database Wizard - Create DB									
Dual Monitor >									
GoTo Image									
Launch SPTracker									
Preload the Next Image >									
Select DataBase									
Select Grid Size >		5X5 = 25							
SnapZoom >		6x6 = 36							
we will		7x7 = 49							
<< Cont		8X8 = 64							
		9x9 = 81							
Classify	~	10X10 = 100							
CTrain		12X12 = 144							
		15X15 = 225							
		Random Points							
	_								

2.15 Click on Begin to start classifying. The 100 crosshairs are now regularly placed on the image, and one crosshair at a time (the red one) will be activated. To classify it, click on one of the 30 buttons of the lower menu.

#### Note

The meaning of each button is indicated in the joined buttons\_explanations Excel file. The Zoom can be adjusted by rotating the wheel of a wheel mouse. The Point field indicates the point (#/100) you are currently classifying. The Back button is used to correct a previous crosshair classification.

![](_page_28_Picture_3.jpeg)

![](_page_28_Picture_4.jpeg)

2.16 To classify each crosshair, help yourself by opening (ideally on a different monitor) the *Fulcrum* Vegetation Survey: Herbs and Shrubs of that specific plot. Before starting to work on each subplot, open in two different tabs 1) the species list for the subplot and 2) the Original picture (not annotated) of that subplot.

#### Note

Compare the *Fulcrum* species list to the annotated picture on *SamplePoint* to locate where the different species are. Use the zoom in the Original picture, as well and the Lighten, Darken, and contrast options in *SamplePoint* to help identify less obvious plants.

۲	Subplots	Ø	$\oslash$
	I record / Cover Estimates (7 Items)		1
Ascle	epias syriaca Linnaeus	Vie	w >
Phal	aris arundinacea Linnaeus	Vie	w >
Vicia	e cracca Linnaeus	Vie	w >
Salix	interior Rowlee	Vie	w >
Equi	setum variegatum Schleicher ex F. Weber & D. Mohr	Vie	w >
Poa	pratensis Linnaeus	Vie	w >
Poa	alsodes A. Gray	Vie	w >

![](_page_30_Picture_1.jpeg)

2.17 When the 100 points of an image have been classified, click on Next Image, then Begin to start again for the next image (= key = subplot).

Note

You can stop working on a plot at any time (at the end of a plot, at the end of a subplot, or through a subplot) by clicking on the Exit button in the lower right corner of the screen. Make a note of the point where you stopped.

To start back where you left, click Next image on the top menu until you reach the desired image. Then, enter the number of the point in the point field in the left menu and hit RST (restart).

![](_page_31_Picture_1.jpeg)

![](_page_31_Figure_2.jpeg)

![](_page_32_Picture_1.jpeg)

![](_page_32_Figure_2.jpeg)

### **Data Combining**

3 Combine all the databases into one. Keep the originals as a backup.

📙   🛃 📑 =   Boucher	rville											
Fichier Accueil Pa	artage Affichage											
Épingler à Copier Colle Accès rapide	Couper Copier le chemin d'acci er Coller le raccourci	ès Déplacer Cop vers ▼ ver	Dier Suppi	rimer Renommer	Nouvea dossier	Nouvel é T Accès raj u	lément <del>*</del> pide	Propriétés	<b>Ouvrir ▼</b> Modifier Historique	Sélection Aucun Inverser la	ner tout a sélection	
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		BOUID.Bth	···· 9.2	I 14 1	19.7	E 22.J	E 25.4	20.1	1.0	<b>N</b> 7.0	12.4	17.2
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Boucherville	BOU10	bou16 Btn	···· 9.0	<b>m</b> 14.5	20.2	22.5	■ 25.8	20.5	2.5	a 8.2	13.0	17.0
Boucherville	BOU11	bou17 Btn		<b>14.5</b>	20.5	23.2	<b>E</b> 25.9	28.7	25	a 83	15.5	17.8
MerBleue	BOU12	bou18 Btn		<b>a</b> 14.7	20.5	23.3	<b>2</b> 26 1	28.8	2.5	84	15.2	179
_	BOU13	BOU19.Btn	III 10.1	<b>a</b> 14.8	20.6	23.4	<b>26.2</b>	28.9	2.7	8.5	15.3	boucherville
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Ce PC	BOU15	BOU21.Btn	10.3	<b>a</b> 18.1	20.8	23.6	a 26.4	<b>29.2</b>	2.9	8.7	15.5	
Bureau	BOU16	12.2	<b>a</b> 10.4	<b>a</b> 18.2	<b>20.9</b>	<b>23.7</b>	<b>a</b> 26.5	<b>29.3</b>	5.1	8.8	15.6	
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i bocuments	BOU18	17.2	<b>a</b> 10.6	<b>a</b> 18.4	<b>a</b> 21.2	<b>23.9</b>	<b>a</b> 26.7	<b>29.5</b>	5.3	12.1	15.8	
images	BOU19	17.3	<b>a</b> 10.7	<b>a</b> 18.5	<b>21.3</b>	<b>24.1</b>	<b>a</b> 26.8	<b>29.6</b>	5.4	12.2	15.9	
Musique	BOU20	<b>6.1</b>	<b>a</b> 10.8	<b>a</b> 18.6	<b>21.4</b>	<b>24.2</b>	<b>a</b> 26.9	<b>29.7</b>	5.5	12.3	16.1	
📜 Objets 3D	BOU21	<b>6.2</b>	10.9 📧	<b>8</b> 18.7	<b>21.5</b>	<b>24.3</b>	<b>a</b> 27.1	<b>29.8</b>	5.6	12.4	16.2	
🕂 Téléchargement	BOU22	<b>6.3</b>	<b>a</b> 11.1	<b>a</b> 18.8	<b>a</b> 21.6	<b>24.4</b>	<b>a</b> 27.2	<b>29.9</b>	5.7	🖬 12.5	16.3	
Vidéos	BOU23	<b>6.4</b>	<b>a</b> 11.2	<b>a</b> 18.9	<b>a</b> 21.7	<b>24.5</b>	<b>a</b> 27.3	🖬 1.1	5.8	🖬 12.6	🖬 16.4	
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n 288 élément(s) 22 éléi	bou2.Btn ments sélectionnés 2.99 Mo	<b>a</b> 6.6	📧 11.4	<b>a</b> 19.2	<b>a</b> 21.9	24.7	<b>a</b> 27.5	🖬 1.3	🖬 7.1	🖬 12.8	🖬 16.6	

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7 6	5.6.tiff					100	POAL, 132, 139	, EUGR, 167,	1SOGI, 112	2, 13 SOGI, 87	, 117 SOGI, 52, 74	4, FRVI, 73, 9	1, FRVI, 45, 4	41
8 7	5.7.tiff					100	SOGI, 142, 168,	(SOGI, 110,	1: CALCA, 1	35, SOGI, 12	2, 14 CALCA, 88,	1CALCA, 1	53, CALCA, 88	8,
9 8	5.8.tiff					100	FRPE, 129, 156	, POAL, 100,	1 SOGI, 158	8, 1{ SOGI, 17	5, 2( EQVA, 104,	1EQVA, 87,	95 EQVA, 55,	8
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4 In Excel, create another version of the existing species per dot per subplot table, that doesn't contain the RGB values. To do so, copy the name of the image column and the

point numbers row. Then, for a given point \* subplot cell, write the formula =LEFT(E3,4). This new table must contain 900 cells (100 points \* 9 subplots).

E3 being the name of the original cell, and 4 being the amount of characters kept, starting from the left.

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- 5 In Excel, create a final table to calculate the percent cover (abundance) of each species in each subplot.
  - The subplot numbers are now used as the top row, and the species button names as the left column.

• In each new cell, write the formula =COUNTIF(E\$12:CZ\$12, C23) where E\$12:CZ\$12 is the list of the 100 buttons for the given subplot, and C23 is the name Excel is searching for.

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18					1.7.tiff	POPR	POPR	VICR	POPR	POAL	PHLA
19					1.8.tiff	ASSY	SAIN	SAIN	SAIN	SAIN	SAIN :
20					1.9.tiff	UNKW	UNKV	EUGR	UNKW	SAIN	SAIN :
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24		1	CACA		0.0	0.0	0.0	0.0	0.0	0	0 00

• The value that will appear in the new cell is the relative abundance of the given species in the given subplot.

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15								1.4.tiff	SAIN
16								1.5.tiff	SAIN
17								1.6.tiff	SAIN
18								1.7.tiff	POPR
19								1.8.tiff	ASSY
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23		0.5			ASSY			3.0	
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 At the end of the table, add one row to calculate the sum of the relative abundances. The sum should be of 100.

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27 ELRE 0.0 28 EQVA 2.0	0.0 5.0
29 EUGR 0.0	0.0
31 GATB 0.0	0.0
32 GEAL 0.0	0.5
33 IMCA 0.0	0.0
35 PHAU 0.0	0.0
36 PLMA 0.0	0.0
37 PUAL 0.5 28 POPR 0.5	2.0
39 BUID 0.0	0.0
40 SAIN 69.0	31.0
41 SOAL 0.0	0.0
43 SOGI 0.0	2.0
44 SORU 0.0	0.0
45 SYNA 0.0	0.0
47 VICB 10	0.0
48 VIRI 0.0	0.0
49 TRRE 0.0	0.0
51 UNKV 180	20.0
52 LYSA 0.0	0.0
53 PHLA 7.0	37.0
50 PHPB 0.0	0.0
57 QHMA 0.0	0.0
58 TRDU 0.0	0.0
59 PHPB 0.0	0.0
61 SAU 00	0.0
62 CARL 0.0	0.0
63 0 D22:D62	101.0
64 7 65	9

 Add one last row under the previous one, containing the number of species per subplot. The formula to enter is

=COUNTIF(D22:D62, ">0")

where the cells D22:D62 are the percent cover values across all species within the subplot, and >0 accounts for presence.

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27				ELRE	0.0	0.0
28				EUCR	0.0	0.0
30				FRVI	0.0	0.0
31				GATR	0.0	0.0
32				GEAL	0.0	0.0
33				IMCA	0.0	0.0
34				AGGI	84.0	87.0
35				PHAU	1.0	0.0
36				PLMA	0.5	1.0
37				POAL	0.0	0.0
30				DUID	0.0	0.0
40				SAIN	0.0	0.0
41				SOAL	0.0	0.0
42				SOAR	0.0	2.0
43				SOGI	1.0	0.0
44				SORU	0.0	0.0
45				SYNA	0.0	0.0
46				TAOF	0.0	1.0
4/				VICR	0.0	0.0
40					0.0	0.5
50				OTHR	0.0	0.0
51				UNKW	0.0	0.0
52				FRPE	3.0	2.0
53				CARL	0.0	0.0
54				BEPO	0.0	0.0
55				CACR	0.0	0.0
56				0	0.0	0.0
57				0	100.5	100.5
58					ר <u>ט</u> לי)	7

6 Species that occur within the *Fulcrum* subplot species list BUT that are not observed by the point frame are assigned an abundance value of 0.5% in the Excel spreadsheet to account for their presence.

#### Note

The last column (no. of species per subplot) of the table generated at step 5 is useful to compare your data to the *Fulcrum* records, when looking for absent species. Ground covers that are not species should be left out of the count.

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33		IMCA		0.0
34		AGGI		0.0
35		PHAU		0.0
36		PLMA		0.0
37		PORL		0.0
39		BUID		0.0
40		SAIN		69.0
41		SOAL		0.0
42		SOAR		0.0
43		SOGI		0.0
44		SURU		0.0
45		TADE		0.0
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48		VIBI		0.0
49		TRRE		0.0
50		OTHR		0.0
51		UNKV		18.0
52		DLE A		0.0
55		PHPR		0.0
56		ASIN		0.0
57		QHMA		0.0
58		TRDU		0.0
59		PHPR		0.0
60		EUMA		0.0
61		SALL		0.0
62		CARL	0	100.0
64				50.0
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The Excel spreadsheet generated from *SamplePoint* only contains 5 species, while the orignal *Fulcrum* record contains 7 in the same subplot.

8 Subplots	2
Cover Estimates (7 Items)	8
Asclepias syriaca Linnaeus	View >
Phalaris arundinacea Linnaeus	View >
Vicia cracca Linnaeus	View >
Salix interior Rowlee	View >
Equisetum variegatum Schleicher ex F. Weber & D. Mohr	View >
Poa pratensis Linnaeus	View >
Poa alsodes A. Gray	View >

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33	IMCA	0.0
34	AGGI	0.0
35	PHAU	0.0
36	PLMA	0.0
37	POAL	0.5
39	BUD	0.5
40	SAIN	69.0
41	SOAL	0.0
42	SOAR	0.0
43	SOGI	0.0
44	SORU	0.0
40	SYNA	0,0
47	VICE	10
48	VIBI	0.0
49	TRRE	0.0
50	OTHR	0.0
51	UNKW	18.0
52	LYSA	0.0
03 EE	PHLA	7.0
56	ASIN	0.0
57	QHMA	0.0
58	TROU	0.0
59	PHPR	0.0
60	EUMA	0.0
61	SALL	0.0
62	CAPL	0.0
63		0 101.0
01		

The species that were absent from the Excel spreadsheet generated from *SamplePoint* but present in the original *Fulcrum* record are given a value of abundance of 0.5% to account for their presence even though they were not targeted by the 100 crosshairs.