

MAPPING THE MOVEMENTS OF OVERWINTERING WESTERN MONARCH BUTTERFLIES (*DANAUS PLEXIPPUS*) AT THE PISMO BEACH MONARCH BUTTERFLY GROVE USING ARCGIS SOFTWARE

A RESEARCH ARTICLE

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Purpose

Dr. Villablanca of the Cal Poly Biology Department commissioned this project with the goal of tracking Monarch Butterfly spatial redistribution in anticipation of or response to severe weather events. We believe that Monarchs cluster non-preferentially on introduced Eucalyptus trees until midwinter when they begin to cluster preferentially on native conifers. Based on the efforts of a previous group of students, it has been determined that, over a two-week time period in mid-winter, Monarchs spend the majority of their time on native conifers. We set out to clearly demonstrate Monarch Butterfly spatial redistribution in either anticipation of or response to severe weather.

Overview

Severe weather events occurred on October 31,2014 when 1.04" of rainfall fell on Pismo Beach in a 24hour period. A cold front and light showers moved over San Luis Obispo County on Nov. 13, and on Nov. 19, about 1/10" fell on the Pismo Coastal area. Relative to the span of our study, low barometric pressure was observed around Nov. 1 and Nov. 10 to 11 (Fig. 1).

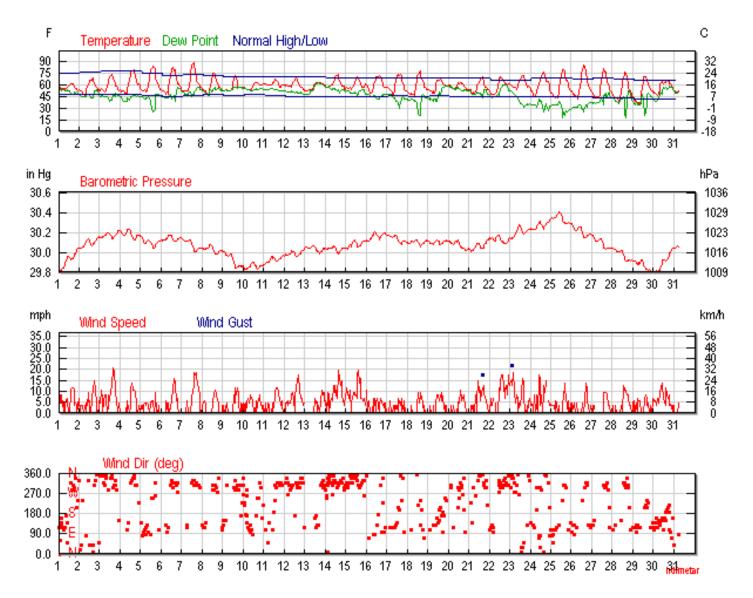


Figure 1. Meteorological data for the Pismo area November 2014 (weatherunderground.com).

Methods

Equipment:

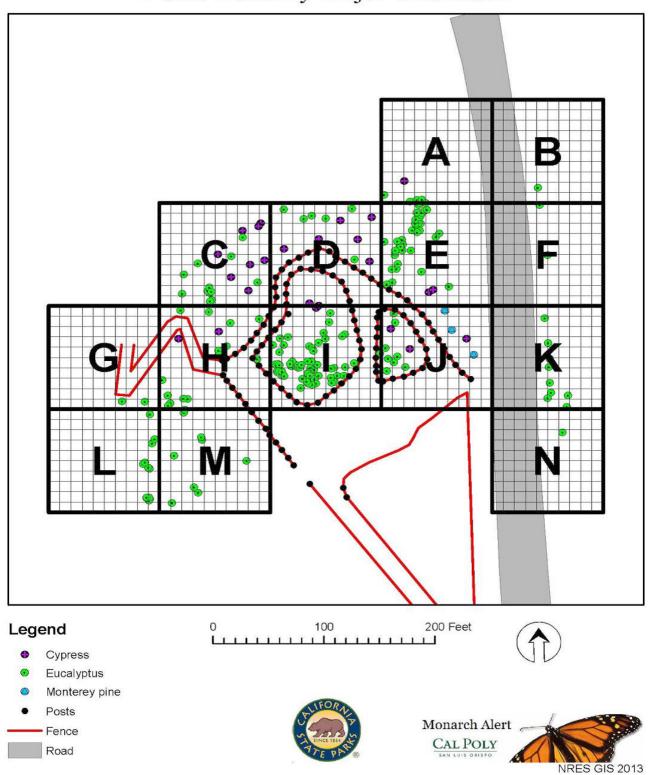
- Binoculars
- Rangefinder
- Data sheets
- Anemometer
- Spotting telescope
- Pismo Grove map
 - Major Grid (Fig. 3)
 - Minor Grid (Fig. 4)

Data was collected by teams of 1 to 4 researchers at sunrise for 23 consecutive days, beginning Nov. 1, 2014 and ending Nov. 23, 2014. Using standardized counting techniques taught to us by State Parks Interpreter Danielle Patterson, we estimated the size, location, and height of each cluster of butterflies observed in the Pismo Monarch Butterfly Grove (PMBG) (Fig. 2).

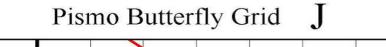


Figure 2. Pismo Monarch Butterfly Grove

Each cluster of butterflies was assigned a height estimate at the top and bottom of the cluster to the nearest meter. Hand-held rangefinders were used to determine this height value from directly underneath the cluster. A count estimate was then performed by two individuals so an average value could be assigned. We limited our estimations to a 20% margin of error between counter or a recount was performed. Using previously generated grid maps (created by a previous group of students), we determined the individual trees on which each cluster of butterflies was located. We first examined the Major Grid (Fig. 3) and decided which Major Cell the cluster resided in. Each Major Cell contained a Minor Grid (Fig. 4). We estimated the location of each cluster to the nearest 10' x 10' cell of the Minor Grid. We then recorded every cluster's Major and Minor Grid location, butterfly count estimate, tree identifier, and height on our data sheets.



Pismo Butterfly Major Grid Index





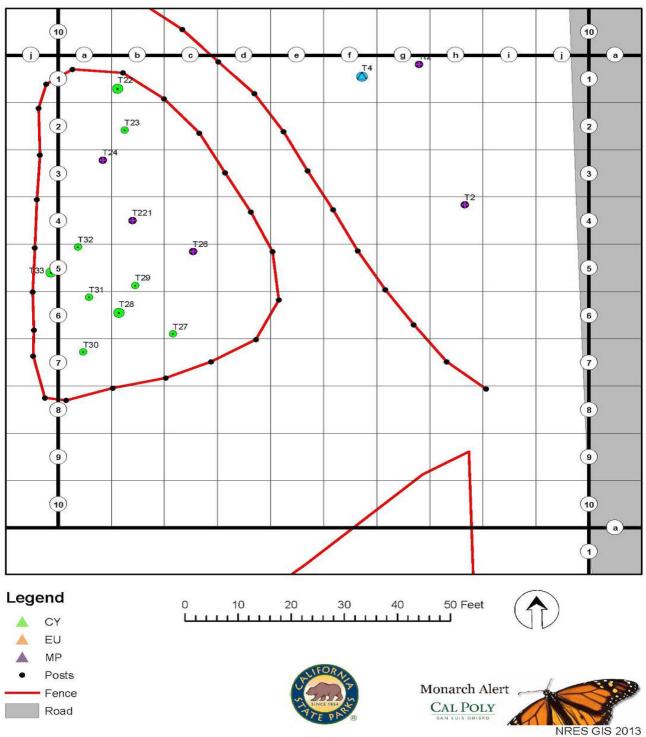


Figure 4. Minor Grid

Collected data was entered into one Excel spreadsheet, saved as a .csv file type, and imported into ArcMap. The Major and Minor Grids, roads, and fences created in ArcMap by the previous student research groups were reused and added in as base layers. We then used several tools available in ArcMap to display butterfly density redistribution.

The "Table to Table" tool was used to convert the .csv file into a .dbf file (Fig 5). This file type can be added into ArcMap as an attribute table (Fig. 6).

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Figure 5. "Table to Table" tool

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	_								

Figure 6. Attribute Table

 $\square \times$

The "Create Address Locator" tool was used to assign each unique 10' x 10' cell in the Minor Grid to a field labeled "ZoneCell" (Fig. 7). Our Minor Grid layer was used as the primary table and the attribute field "MinorGridLabel" was used as the Key Field.

General - Single Field						
Reference Data						
			- 🖻			
Reference Data		Role	+			
Minor Grid		Primary Table				
Minor Grid		Primary Table	×			
			↓			
•	111		•			
Field Map						
Field Name	Alias 1	Name				
Feature ID	<non< td=""><td>e></td><td></td></non<>	e>				
*KeyField		GridLabel				
Additional Field	<non< td=""><td>e></td><td></td></non<>	e>				
Altname JoinID	<non< td=""><td colspan="5"><none></none></td></non<>	<none></none>				
Output Address Locator						
L:\Shared\BJohnson\ButterflyProjec	t2014winter\Final Report\	FinalGDB.odb\Addressl.ocator				
Configuration Keyword (optional)		,				
configuration Reyword (optional)			-			

Figure 7: "Create Address Locator" tool

We then geocoded the addresses assigned to each individual cluster to the newly created addresses using the "Geocode Addresses" tool (Fig 8). This process linked the recorded "ZoneCell" data to the addresses on the Minor Grid. We set geocoding options for spelling sensitivity to be 100% (Fig. 9). This resulted in 100% matched addresses (Fig. 10).

MB_data Input Address Locator					
L:\Shared\BJohnson\B	utterflyProject2014wi	nter\Final Rep	ort\FinalGDB.g	db\AddressLocat	to 🔽 🔁
Input Address Fields Single Field	Multiple Field	ls			
Field Name		Alias Na	ame		
Single Line Input		ZoneCe	ell		
Output Feature Class					1
L:\Shared\BJohnson\But	terflyProject2014winter	\Final Report\Fi	inalGDB.gdb\Ge	code_Address	
Dynamic Output Featu	re Class (optional)				
ojnamo odipar i odio	ie olavo (optional)				

Figure 8: "Geocode Addresses" tool

Geocoding Options

Matching Options	
Place Name Alias Table	<none></none>
Spelling sensitivity:	100
Minimum candidate score:	10
Minimum match score:	80
Intersections	
Connectors:	Separate connectors by a
	space, e.g. "& @ , /"
Output Options	
Side offset:	20 Feet -
End offset:	3 Percent
Match if candidates tie	
Output Fields	
X and Y coordinates	Standardized address
📝 Reference data ID	Percent along
	OK Cancel

Figure 9: Geocoding Options

23

Geocoding Addresses			×
	Matched: Tied: Unmatched:	961 (100%) 0 (0%) 0 (0%)	
	100%	6	
Ave	Comple age speed: 5,380	ted),000 records/hour	
	Rematch	Close	

Figure 10: Geocoding Matches

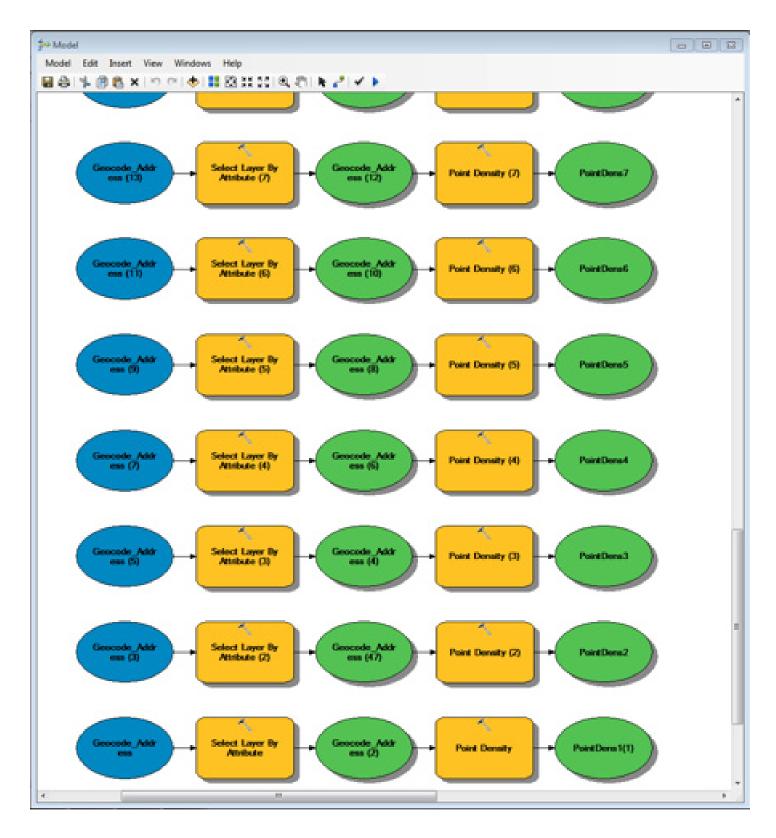


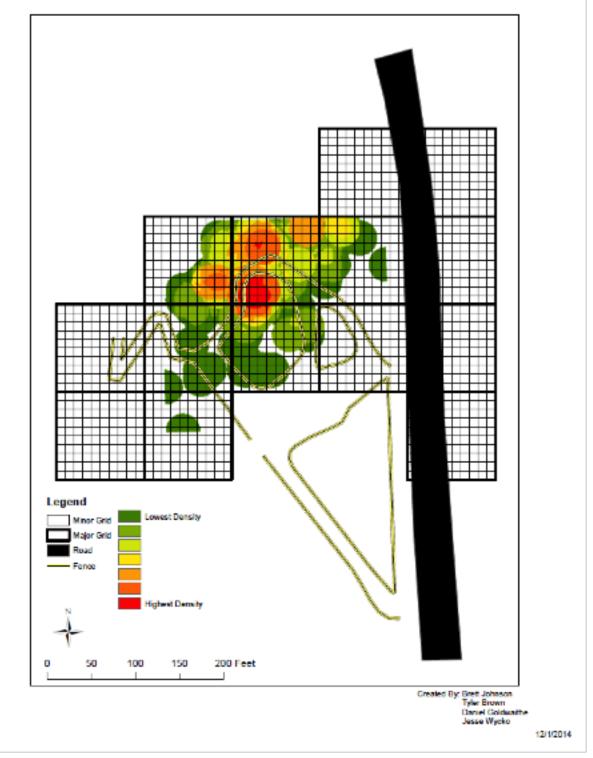
Figure 11: Model Builder

We began creation of the model by adding the "Geocode_Address" layer to our blank model. We then used the "Select Layer by Attribute" tool to select the first date, Nov. 1. Then we took the output of this tool and used the "Point Density" tool to display butterfly density in the PMBG on Nov. 1. From there, we replicated this model for each of the other twenty-two dates. Then, we went to each line of the model and changed the "Select by Attribute" tool query to select each individual date. We then renamed each of the final outputs to correlate with the date of interest. This model supplied us with twenty-three point density maps—one for each day of our study (Appendix A).

We then created a point density map for the entirety of the study period using the "Point Density" tool (Fig. 12). This yielded the PMBG Point Density Map (Fig. 13).

Input point feal	tures		Neighborhood (optional)
Geocode_Ad	dress		- E
Population field			Dictates the shape of the area around each cell that is used to
MB_Count			 around each cell that is used to calculate the density value.
Output raster			
G: ButterflyPr	oject2014winter (Butt	terflyProject2014winter\P	IGDB.gdb/Point_Density
Output cell size	(optional)		shaped) neighborhood defined
0.9533885433	967386		by an inner and outer radius.
Weighborhood (optional)		Circle—A circular
Orde			neighborhood with the given radius. This is default where
Neighborhood	Settings		the radius is the shortest of the width or height of the
Radius:	20.000000		extent of the input point
			features, in the output spatial reference, divided by 30.
Units:	() Cel	@ Map	Rectangle—A rectangular neighborhood with the given height and width. Wedge—A wedge-shaped
			neighborhood. A wedge is
Area units (opt SQUARE_MAP			specified by a start angle, an end angle and a radius. The
			wedge extends

Figure 12: "Point Density" tool



November 2014 - Pismo Monarch Grove Population Density

Figure 13: Pismo Beach Monarch Butterfly Grove point density map

We used the "Feature to 3D By Attribute" tool to convert our "Height" attribute field into a Z-value useable in ArcScene (Fig. 14).

Feature To 3D By Attribute			
Input Features			Feature To 3D By
Geocode_Address	- 2	5	Attribute
Output Feature Class			
L:\Shared\BJohnson\ButterflyProject2014winter\Final Report\FinalGD8.gdb\Geocode_Address_Z	2		Creates 3D features using height values derived from the attribute
teight Field			of the input features.
Height	•	-	
To Height Field (optional)		_	
		•	
OK Cancel Environments	<< Hide H	eip	Tool Help

Figure 14: "Feature to 3D By Attribute" tool

We then opened ArcScene 10.2.2 and added in our base layers: the road, fence, and Major/Minor grids (Fig. 15).

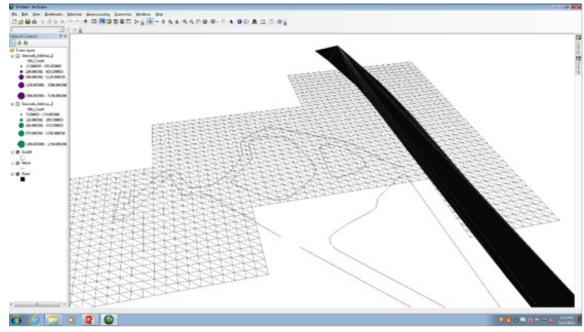


Figure 15: ArcScene Base Layers

We took the output of the "Feature to 3D by Attribute" tool, a layer named "Geocode_Address_Z," and opened that layer in ArcScene (Fig. 16). We duplicated this layer and used Definition Query (found under properties) to nullify Cypress trees in the first layer and Eucalyptus trees in the second. This allowed us to show Cypress and Eucalyptus trees in the grove at the same time as different colors. We enabled time and elevation from features for both of these layers.

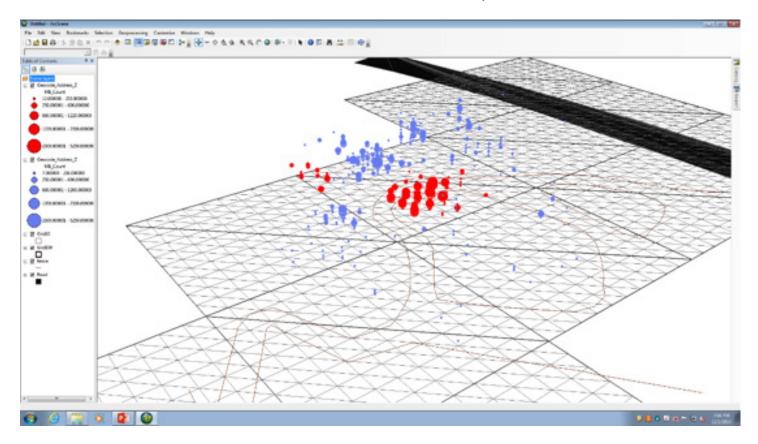


Figure 16: ArcScene Layers

To create a video animation with time enabled, we opened the Animation Manager and shot several keyframes (Fig. 17). Our animation is available in supplemental materials.

eyf	frames of	Type: Time Animati	on 🔹	In Tradi:	Time Animation track 1	-	
	Time	Name	Time	Interval	Units		View
0	0.000	Time Animation keyframe 1	0	1	Days		Update
1	0.111	Time Animation keyframe 2	0	1	Days		Opdate
2	0.222	Time Animation keyframe 3	0	1	Days		Create
3	0.333	Time Animation keyframe 4	0	1	Days		
4	0.444	Time Animation keyframe 5	0	1	Days		Properties
5	0.556	Time Animation keyframe 6	0	1	Days		6
6	0.667	Time Animation keyframe 7	0	1	Days		Remove
7	0.778	Time Animation keyframe 8	0	1	Days		Remove All
8	0.889	Time Animation keyframe 9	0	1	Days		
9	1.000	Time Animation keyframe 10	0	1	Days		
	Reset To	Distribute time st			Change temporal order:	T	

Figure 17: Animation Manager

Results

Over the course of our study, the number of Monarchs in the grove grew dramatically. On November 1, we saw about 3,400 individuals, and on November 23, we saw just over 13,000 individuals. We noticed that clustering on the central Cypress tree became the densest by the end of our study, housing the most Monarchs. We also noticed that many of the clusters moved to greater heights as time went on, which we attribute to decreasing temperatures. Additionally, the butterflies tended to cluster in the center of the grove, leading us to believe that their affinity for the Cypress tree may be a result of its location rather than its physical characteristics. Perhaps the protection of the surrounding Eucalyptus trees is more important to Monarch survival than any benefits of clustering on a Cypress tree. The central location of the Cypress led us to believe that it is the most sheltered from outside winds. We were able to produce many useable products in both ArcMap and ArcScene. We created a Point Density map for each day of our study and the study period as a whole. We show cluster redistribution from day-to-day in ArcScene, taking into account the height of each cluster. We also provided twenty-three days of useful count estimates at the PMBG.

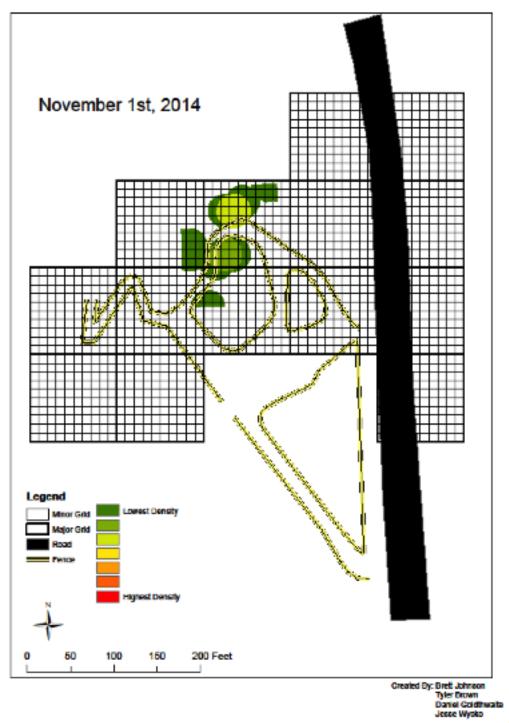
Acknowledgements

We would first like to thank Dr. Francis Villablanca of the Cal Poly Biology department for providing inspiration and guidance to both our group and our predecessors. We would also like to thank David Yun for organizing the project and introducing us to the topic, as well as providing valuable guidance in using ArcGIS. We would like to thank Danielle Patterson of California State Parks for training our group in data collection techniques and providing us with specific information on the Pismo Monarch Butterfly Grove. We would like to thank the Cal Poly Wildlife Club for allowing us to present our project to their members. Finally, we would like to thank the following people for committing valuable time and effort into helping us collect the vital field data that made this project possible:

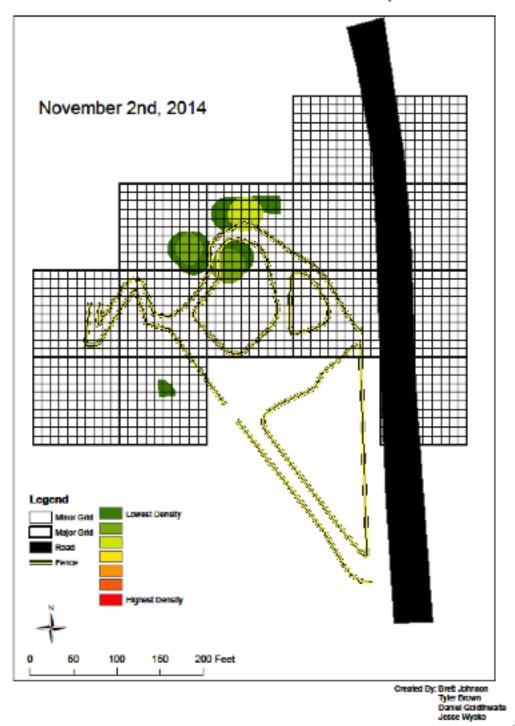
Nicole Durtschi Jessica Copeland Hannah Brown Taylor Steele Jasmid Rodriguez Brandi Bergreen Emily Dektar

Thank you again, everyone. This project would not have been possible without all of your help!

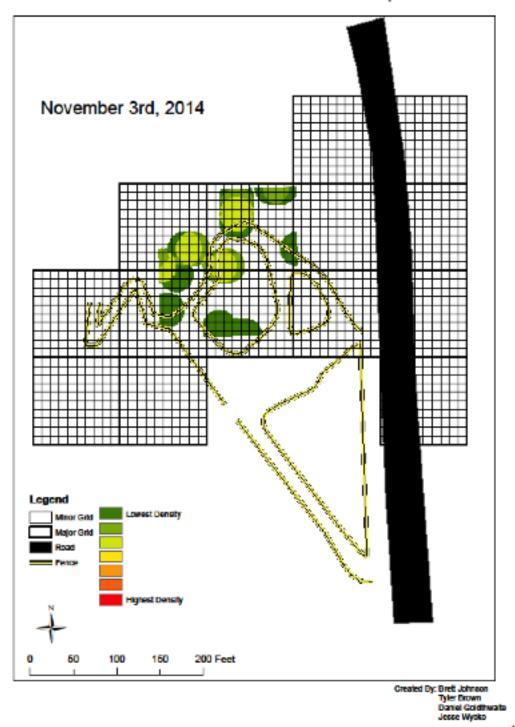
Appendix A



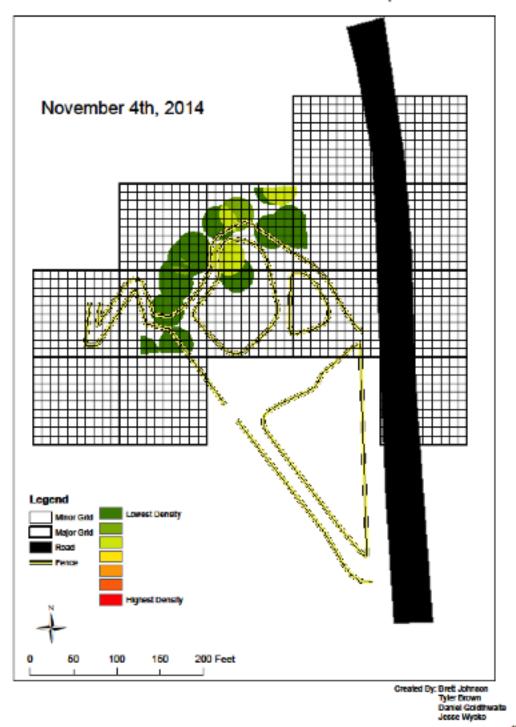
November 2014 - Pismo Monarch Grove Population Density



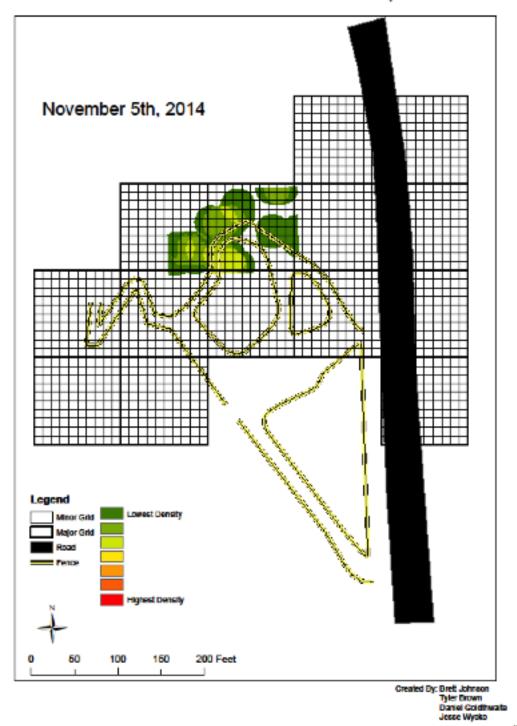
November 2014 - Pismo Monarch Grove Population Density



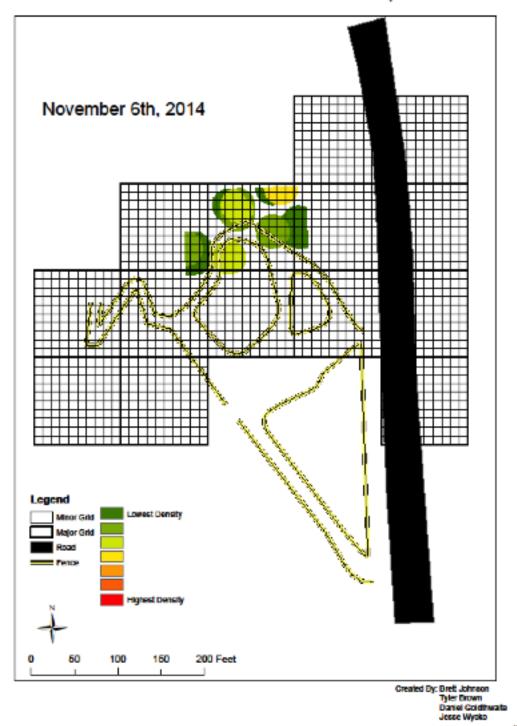
November 2014 - Pismo Monarch Grove Population Density



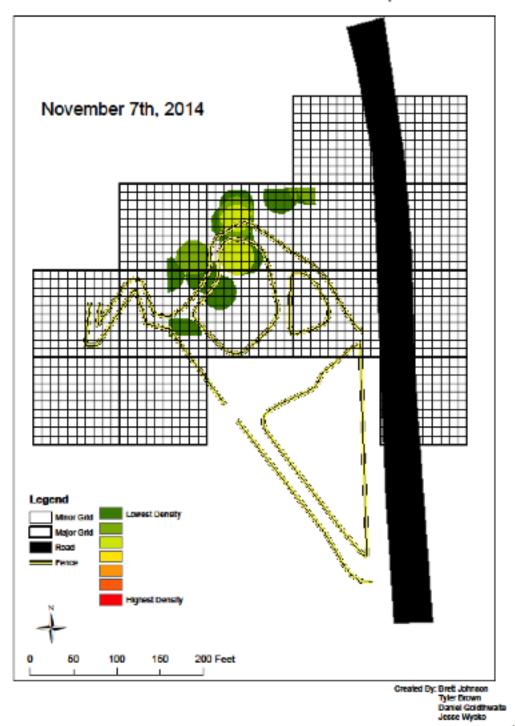
November 2014 - Pismo Monarch Grove Population Density



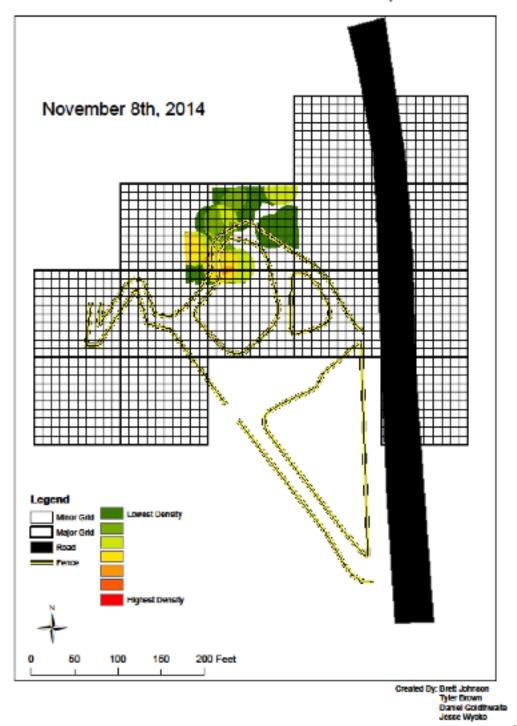
November 2014 - Pismo Monarch Grove Population Density



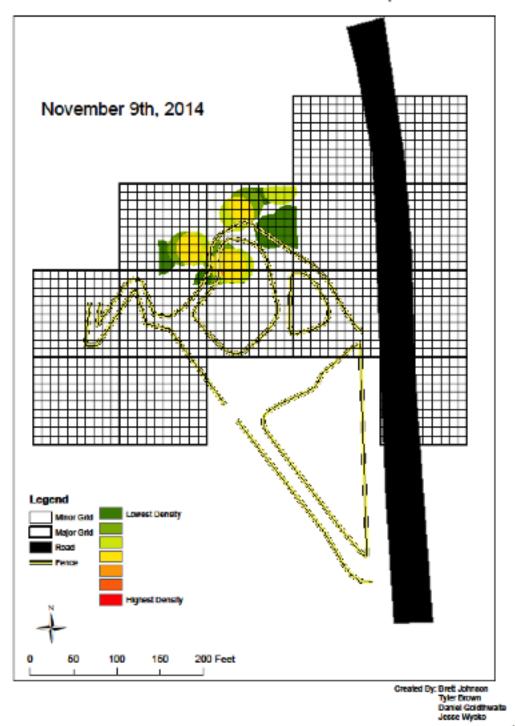
November 2014 - Pismo Monarch Grove Population Density



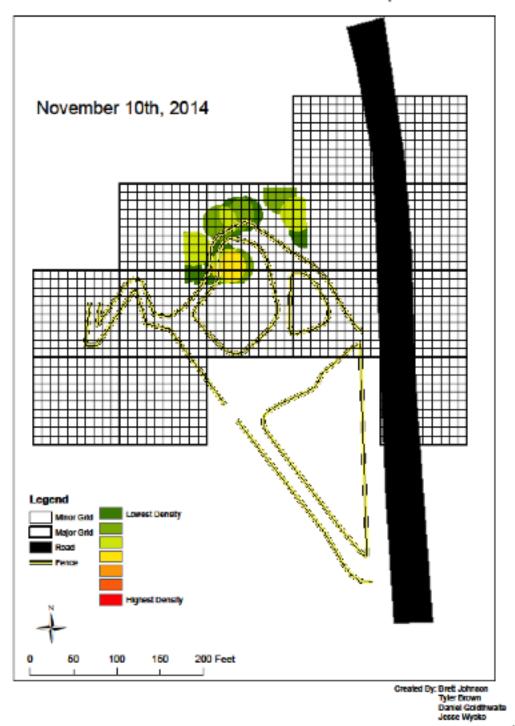
November 2014 - Pismo Monarch Grove Population Density



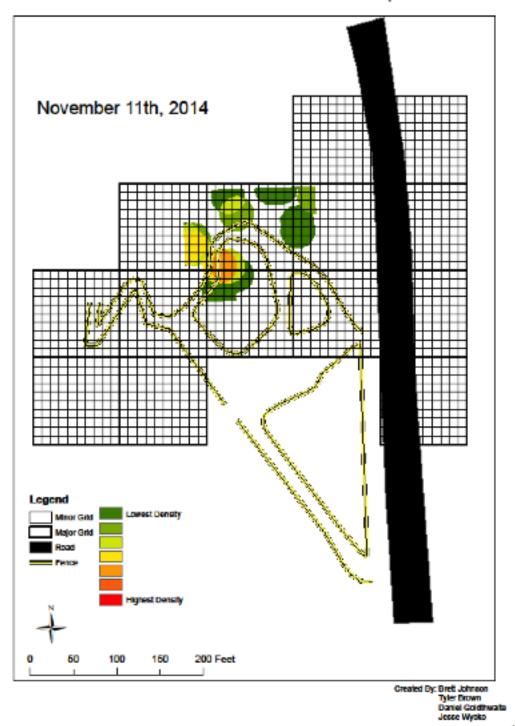
November 2014 - Pismo Monarch Grove Population Density



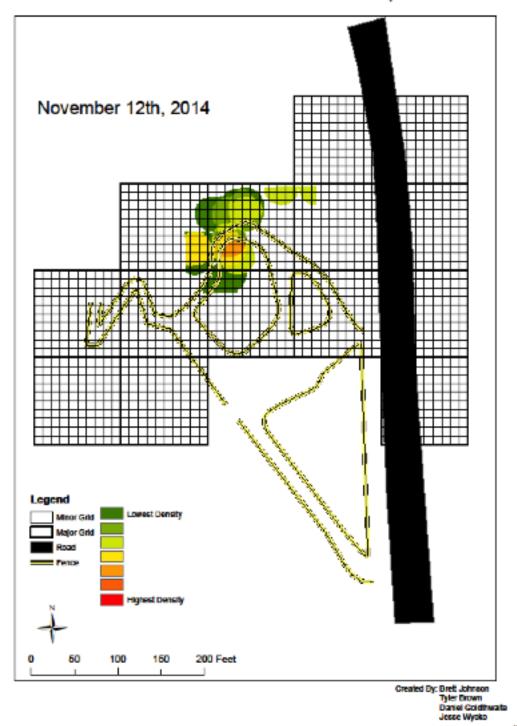
November 2014 - Pismo Monarch Grove Population Density



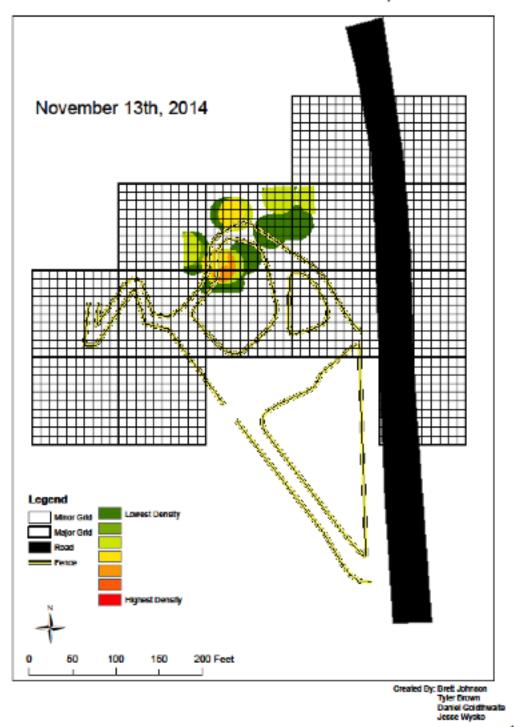
November 2014 - Pismo Monarch Grove Population Density



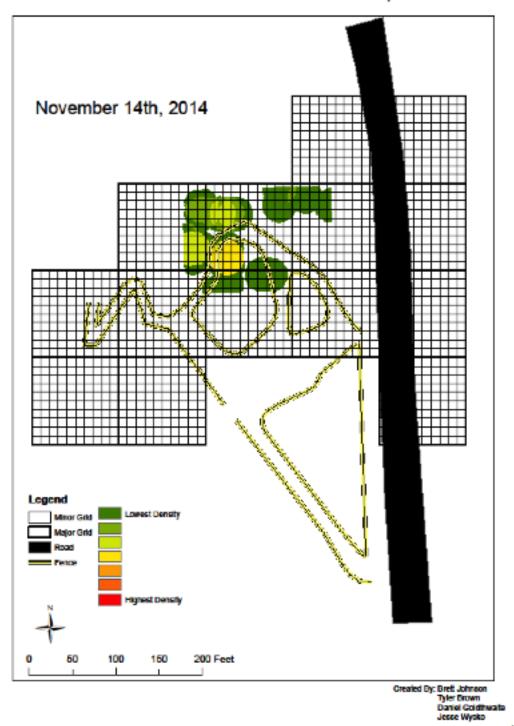
November 2014 - Pismo Monarch Grove Population Density



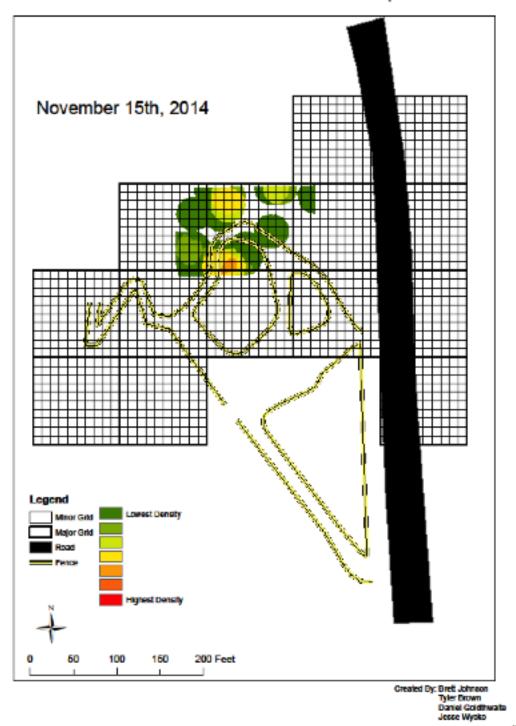
November 2014 - Pismo Monarch Grove Population Density



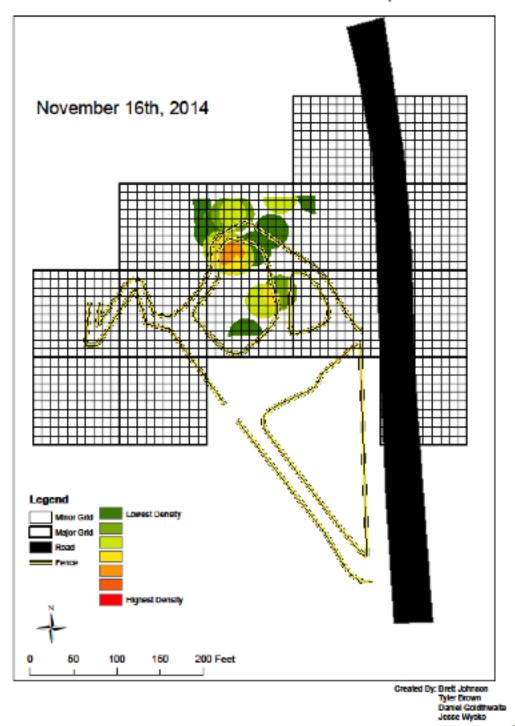
November 2014 - Pismo Monarch Grove Population Density



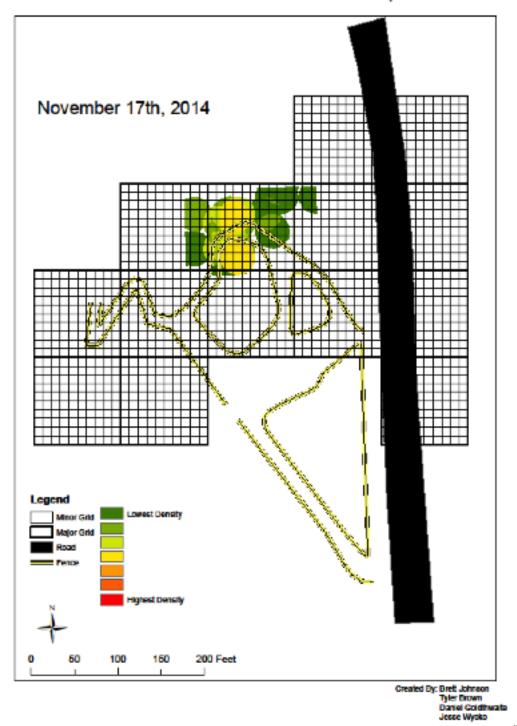
November 2014 - Pismo Monarch Grove Population Density



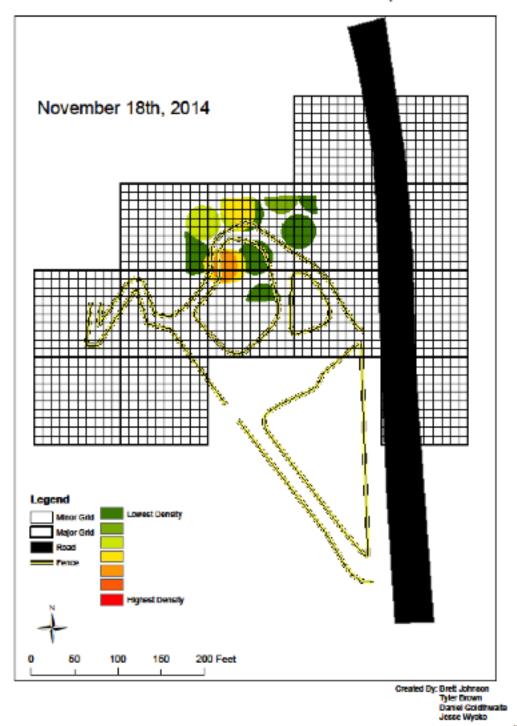
November 2014 - Pismo Monarch Grove Population Density



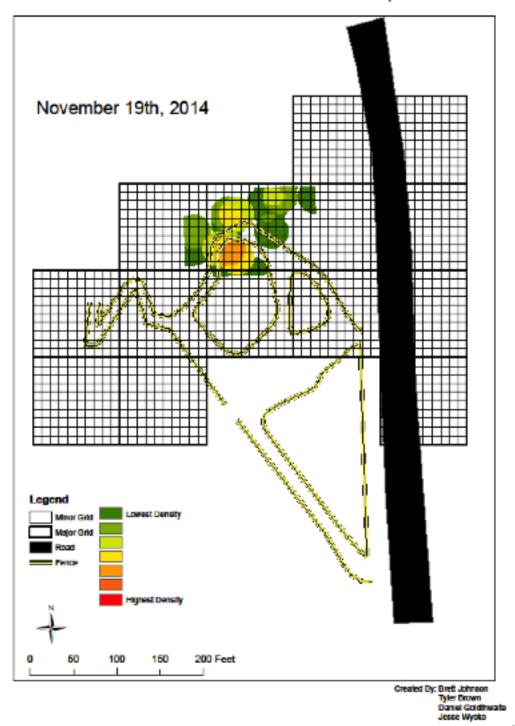
November 2014 - Pismo Monarch Grove Population Density



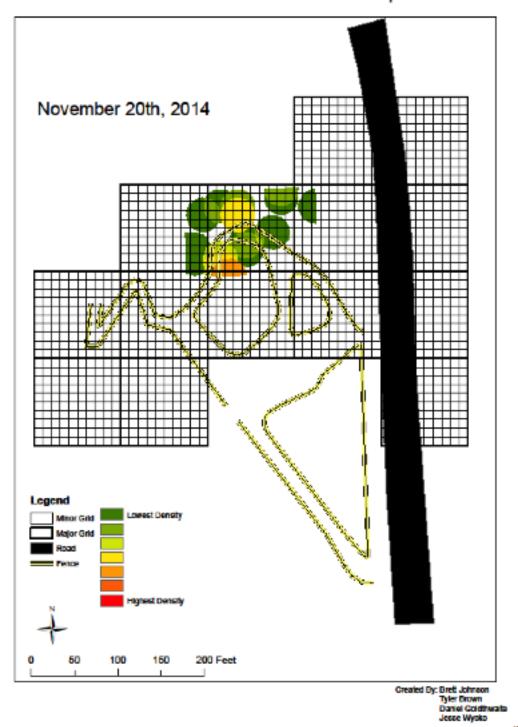
November 2014 - Pismo Monarch Grove Population Density



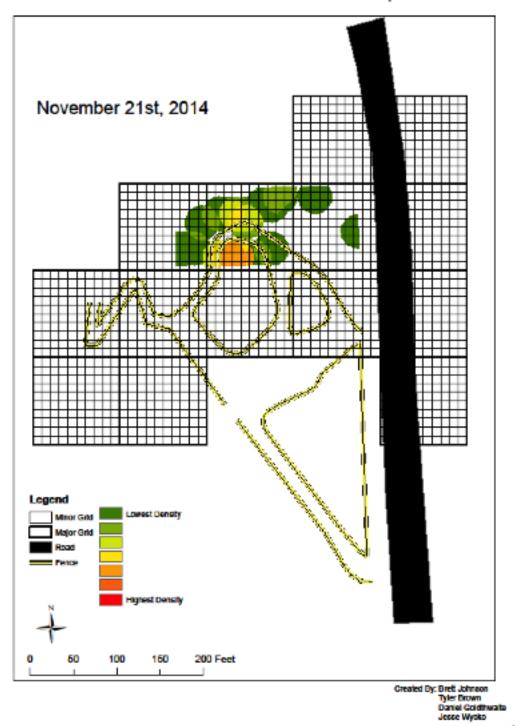
November 2014 - Pismo Monarch Grove Population Density



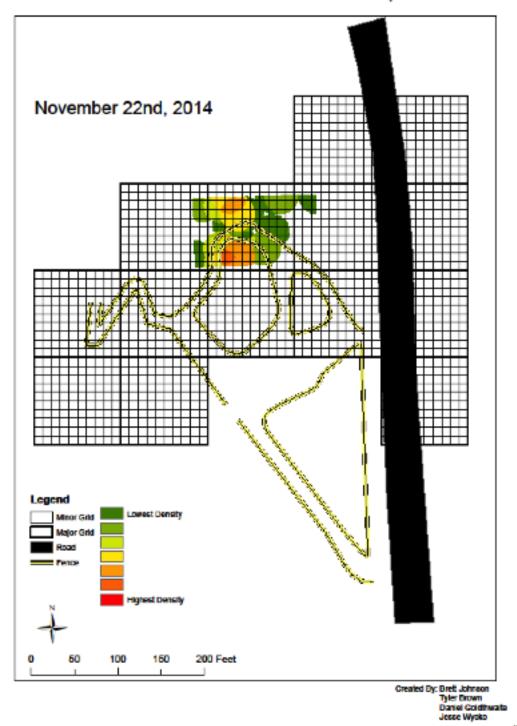
November 2014 - Pismo Monarch Grove Population Density



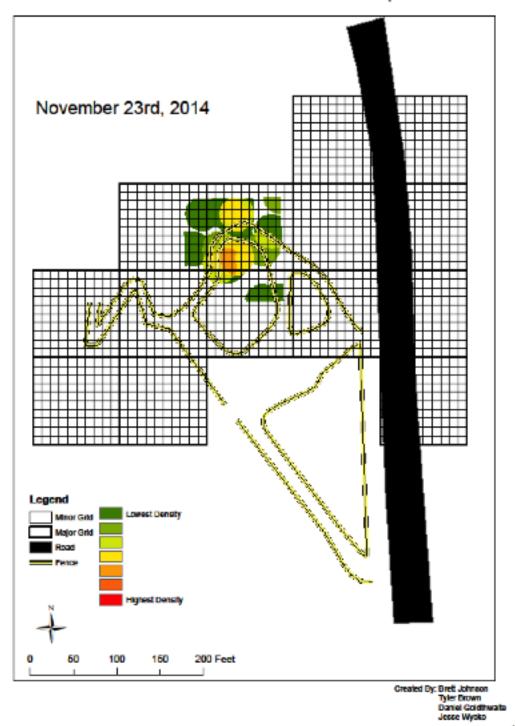
November 2014 - Pismo Monarch Grove Population Density



November 2014 - Pismo Monarch Grove Population Density



November 2014 - Pismo Monarch Grove Population Density



November 2014 - Pismo Monarch Grove Population Density

Appendix B

Over-wintering Monarch Butterfly Project Monarch Count Data Sheet

ount Time Span loud/Fog Cover				omi Copat Time () e onei; mode) da		
mp (*C)			Wind	(Beautient) 3	Wind directle	n
(in Site) # Monarchs	Zone	Cell	Tree #	Tree Species	Cluster Height	Clstr Height
Clustered 12	(ex: A)	(01: a2)	dia	6	(top) (m)	(bottom) (m)
45		14 A 11		Ene	85m 35m	3.00
15	P	11	763	E.	3500	3.40
22	D	12	163	Ene.		3.8-
45	0	h2	103	Ev.	4.0	4.1
15	0	h1	163	he	Gitte	4.200
55	0	11	763	the .	4. 44	400
36	0	11	763	Euc	4.20	4.0-
24	0	63	569	Ene	9.8m	9.70
200	0	44	170	S.	10.5	9.8-
48	0	14	570	Enc	10.2	18
32	0	34	570	Enc	0.11	10.5
18	0	44	\$70	En	10.5	id.y
11	D	34	570	Enc	10.5	10.4
Ч١	Ø	au	\$ 70	Enc	5.1	19.5
140	0	au-	170	En	11.0	10.6
otal in Cluster	196	(ire	ciude cour	nt from most pg)	Total # Treese	
Loners: 144 ' Sumers: Fliers: 1744 Grounders (li	-14	the the pr	HL HH	pt	each (y	wery butterfly of pe that you see how the site.
Frand Total:		(SUR 4	nj ali eluque	med ballocfiles pla	s domeno, suomeno, fili	ers, ele.j
Mating Mona			-			
Dead Monarc						8
Other Notes:		Ron la	the states	Ren 1	duriante 8:3 hundi, netrovity' From Friday in	S T

260	0	Cell (9x: 92)	Tree #		Cluster Height (b:p) (m)	Clstr Height (bottom) (m)
28		64	The	Ene	10.1	9.8
	a	64	170	E.	10.7	10,0
20	0	24	770	Ene	10.0	9.9
	0	-4	170	Ene	10.0	9.8
65	C	:8	191	Gun	6.8	6.8
14	C	18	781	Ene	6.8	6.7
40	C	18	711	Ene-	7.4	7.3
15	6	1	T81	En.	7.5	7.4
18	C	- 8	781	Ene	7. 2.	7.1
γ^{j}	G	:8	581	Enc	7.7	7.0
30	C	:9	181	Ene.	6.8	6.7
110	E	18	194	En	8.1	79
80		68	794	En	7.8	7.7
12	C	n8	194	Enc	7.8	7.7
10	0	610	TIO	Gyp.	8.0	7.6
35	0	610	TION	Cyp	8.2	8.0
12	0	6.0	T100	Cre	8.2	\$.1
18	0	610	7(80	Charles State	8.4	8.3
330	0	09	7100	Cha	12.0	11.6
210	0	e9	SOIT	Cip	12.2	11.7
45	D	69	T 100	Sino	12.2	12.0
95	0	29	7100	GP -	14.3	13-1
22-	I	25	THZ.	Enc.	12.2	11.9
16	7	95	THA	Eine	12,0	11.9

Cloud/Pog Cover	0 %	Precipit	ntion (circle	stal Count Time (1 1 one): (nong) di (Beaufort) L	nizzle rain	00
# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clatr Height (bottom) (m)
12.0	D	:2	563	En.	6.5	6.3
65	0	.2	163	Eve	6.6	6.5
30	D	1	463	Eur	7.0	6.9
22	0	h2	163	E.c.	10	7.0
16	D	62	163	free	6.3	6.8
12	0	62	563	Ere	6.5	65
3	D	hi -	163	En	6.8	6.8
45	D	h2 ×	163	Ene	7.0	68
32	D	23	-159	Ene	10.2	- 10.
55	0	64	T70	Ene	9224 9.2	9.0
70	0	24	170	Ene	10.3	9.5
45	0	24	170	Enc	10.5	10.3
22	D	er.	170	Enc	10.3	10.3
60	0	м	170	Ene	10.5	10.3
16	D	eu	710	Ene.	10.9	10.8
7	0	64	170	hu	\$ 10.8	10.5
Total in Cluste	rs:	(in	nctude cou	nt from next pg)	Total # Trees:	
# Loners: TH	ITIL TH	H in				
# Summers: No.	14				each (every butterfly c ype that you see ghout the site.
# Grounders (li	ive):					
Grand Total:		(30.00	of all clust	ered butterflies pla	иг іскога, ліжнест, р	ters, etc.)

(i) any ty, could and the

Other Notes:

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree#	Tree Species	(top) (m)	Cistr Height (bettom) (m)
350	0	24	170	Ene	11.0	1218
90	D	14	170	Ere.	H.2	11.0
55	0	64	-110	Ene .	11.5	11.6
450	0	£4	170	En	12.0	- dia -
130	0	24	To	E.	11.5	11.2
18	D	6.4	-T 10	E.c.	11.6	11.6
28	0	en et	110	Ene	10.3	16.8
20	0	and CH	TO	Ene	9.2	912
60	0	A CH	TTO	En	1.5	9.1
45	0	64	170	Ene de	7.4	9, 4
115	Ð	CH .	TD	- Ener	6.8	9.4
120	0	64	570	En	10.0	9.5
55	0	сH	170	Ene	9.8	9.7
10	D.	- 64	570	Ene	10.1	10.1
38	Ø	64	170	Ene O	10.3	10.1
38	Û	64	-170	En	4.4	9.6
22	0	64	770	£ .	10.0	10.0
325	0	dq	TIOD	Cyp	16.0 4	15.0
2-50	D.	010	-1100	Cyc	12.0	11.0
50	0	00	THE	ala	13.5	13.0
300	D	010	TIR	Gas	13.8	13,0
65	0	00	TIN	Surger and	17.9	12.6
15	D	610	T100	8.0	13.2	15.0
80	C	18	191	and .	8.1	8.0
25	- C .	19	781	Ene	10	8.0
30	C	14	181	En	7.9	74
50	c	1.8	781	En	9.2	9.0
频5	C	1:1	781	En	10.5	10,4
130	C	.9	181	Eur .	8.0	1.2
60	. C	1	716	E.c.	8.8	86
110	6	8	18	Ene.	11.0	10.0
175	C	h8	591	En	8.4	7.0
200	C	1.5	-14	Enc	9.3	92
150	14	125	T192	E.	100	85
lease add any o G D	counts on I	his page to ES	the intal Tft2.	ially on the prest	uns page. 13.0	1200

thes delleni Billeni Philose

ų,

Ē.

Count Time Span Cloud/Fog Cover Temp (*C) 11.2	16 30	Precipi	tation (circl	eone): (eone) d		an ethicid
519 ⁴ # Menarchs Clustered	Zone (cx: A)		Tree ff		Cluster Height (top) (m)	Clatr Height
52	E	33	13	CHC	17. P	31. 9
24	8.	28	TH	EUC	1.5	
l lo	E	68	TE	euc.	11.5	11.0
13	E	90	THY	EUC.	11.5	1.0
51	e	23	Th	Cu o	12	1.5
03	Ð	15	163	euc	19.2	19.5
57	D.	1.5	170	2UC	19.00	19.5
52-	D	d5	T 74	246	17.5	17.2
70	D	14	TUS	-529	19.5	19.2
125	D	i1.	Tiro	eur	16.0	11.7
230	0	hI	143	euc	18.5	18.0
1FT	- P	h1	163	Car	12.0	11.8
15	D	h1	T\$3	モリン	1.6 %	11.9
2.85	D	d4	110	енс	(¹), 0	14.0
120	P	d4	170	CHO	15.0	2.41
145	σ	94	770	CUC	14.0	13.5
Total in Cluster		្រែ	iciaide enge	nt from nast pgj	Total A Trees:	
# Loners: Thy # Sunners: # Fliers: 111 # Grounders (1)	Litt IL	H JUH			each g	wery hatterfly a pe that you see hout the site.
Grand Total:		(รมมาย	of all chusic	rod butterflier pla	a louers, somers, fl	iera, etc.)
# Mating Mona	relis:					

# Monarchs Clustered	Zone (cu: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (Top) (m)	Clstr Height (bottem) (m)
20	P	d5	510	EUC	13,8	12.5
42	D	24	T70	enc	160155	426 15.5
22	D	14	T70	luc	160	15.5
76	P	04	170	enc	16.5	15.5
25	D	del	570	euc	3.5	7.0
217	Ď	04	770	euc	6.5	5.5
193	D	d4	770	enc.	7.5	15
66	D	03	770	enc	6065	6.0
29	D	d3.	170	enc	6.5	60
27	D	d3	770	enc	7.0	6.5
132	Ď	23	T70	eus	8.5	7.0
115	D	d2	170	enc	1.5	7.0
224	P	dz	TID	enc	\$.5	7.0
124	D	d2	TTD	euc	3.5	9.0
•		•				
	1	nin mana bu	des mand a	ally on the press	anac Isawa	

3

È

Count Time Space	6:30	to 'i	itter Th	sal Coupt Time ()	Min) 11	
Cloud Fog Cover_	10 65	Precipi	ration (circle	(non): (non) d	rizzle ruin	
Temp (°C) 7	Wind (m(*)	Wind	(Beaufart)	Wind direction	m
5.1						
# Monarchs Clustered	Zone (ca: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (buttom) (m)
30	3	e.8	17168	\$	10 1.0	- 64
白城市 1-1		a O	139	t	9.P	6.19
-1.9	- 5	11	17.6.2	2	7.2	1.1
ti	1	15	1867	ŧ	7.2	7.0
25	T	65	7150	5	1.1.5	7.)
11	1	5.4	\$150	\$	<u>.</u> H	ి.క
	3	- 64	1 150	£	2.5	3.4
47	T	11	1100	÷	ų. 4	9.8
45	3	- Jan -	TKO	6	2.3	8.4
424	1	17	T 150	÷ .	9.0	3.8
-17	2	51	1160	5	9.0	5.9
. 16	1	57	1150	7	49-1- 9,0	162 5
31	J .	1	TISO	5	13.6	12.5
43	H.	85	1134	5	0.2	
1 2	Ц.	15	4.58	£	120	11.6
28	计卷	- £5	1.48	12	17. P	- 65
Total in Cluster	K:	(ii	ichide crito	n from next pg)	Total # Trees:	
# Loners:			-		Tally a	very busterfly o
# Summerst						pe that you see
# Fliers: THA		111			through	hout the site.
# Grounders (liv	e)s			11 - 0 - 1		
Grand Total:		654eWe	of all obtain	rea butterflies pla	n kovers, reevers, fil	era, eiu.)
4 Mating Monar	rchs:					and the states

· · ·	Clustered	Zonc (ex: A)	Cell (ex: a2)	Trec #	Tree Species	Cluster Height (top) (m)	Clstr Height
	0	3	14	T158	Ê	-12 10.0	(bottom) (m)
	12	. H	42	7212	£	Min	5.9
	104	는 관		1222	ē	5,2	5.0
_	131	θ	91	1212	3.	5.2	510
	150	6	240	T89	£	53	5.7
	м	c.	610	089	6	5. 5	5.7
-	26	6	210	159	f	6.3	10.4
	- 21	5	e10	742	É	5. 6.1	6.4
č.,_	243	1	840	าร์ร	É	2.1 S.	6-3
-	15	E	610	111	ţ	- L.)	6.0
_	- F	C	210	159	£	1.5	
L	1944 - C	6	40	549	2	11.0	1
_	12	¢.	e10	181	ç	11.0	1
	-2.4	6	0.10	139	£	16-0	. 15
-	á,5	0	110	559	٤	- 1	9
	40	C	210	761	É.	II.	0
	50	C.	015	189	ç	11	i)
-	io	C	610	759	2	11 1	- 11
	15	C	E10	589	Ē	11	- 11
	25	C	e10	189	É	1	11
_	R.	8	C/Q	1.24	2	11	11
	ី១		010	TON	6	17	u.
	40	C	-12	799	F	11	11
-	2.4	C	- ta	129	E	- 11	11
_	55	C	10	115	Ē	17 - 17 - 1°	į.
	- 42	C	10	T89	r i	11	D
-		G	110	149	Ś	12 1	i. ή .
-	43	é	40	739	F	11	12.0
-	38	C	10	189	ę	- 11	yî.
_	47	C	}la -	585	6	1	1
1	2.8	0	610	5%9	ć	h	- <u>1</u>
-	1:0	~		T91	9	9.4	9.7
-	70	C -	ing	191	_6	9.3	9.3
	137		16	19:	12. Ny vis the presion	9.5	S. 4

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Heigh (bottom) (n
200	D	\$10	$d_{i,i}(\theta)$	C	1.5	7.0
200	D	612	1700	- C	7.5	7.3
80	\$	610	1100	C	7.6	7 - 8
568	p	£10	TILO	C	7.6	0.5
129	9	610	1100	(763	7), 6
110	8	610	1150	6	·].8	177
400	Þ	618	1.100	- C	13	12.5
245 200	C.	- 9	新大学	£	7.2	7.0
ზ	c	- 1.8	TTI	E	7.3	7.2
15	C -	÷4	12)	£	9.1	5.9
9.0	6	1.5	181	Č.	- 9 - 5	y. n
ke	e.,	14	- 131	٤	120	7.8
320	с	2.5	151	É	11.0	128
160	C	1.3	191	Ę	7.7	1.6
55	C .	1.5	161	f:	q 7.	¥.1
35	- r	$-i\gamma$	191	E		7.0
Name with any c						

K Enter Ent.

DATE 11/4/14 SITE NAME PIDEO
* Observers 24 Observer name(s) Grett, Tessin, Emily, Nicole
Count Time Span 4 305 to 8730 Total Count Time (Min) 120
Cloud/Fog Cover_10_% Precipitation (circle one): (none) drizzle min
Temp (*C) 48°F Wind (m/s) Wind (Beaufort) 1. Wind direction

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (iop) (m)	(buttorn) (m)
100	E	B6	131	Eucalyphs	3	13 超出
65	E	86	T34	Eve.	33	1 均力
35	E	Be	734	Eck	13	1
26	E	36	731	Eur	13	11
23	ε	BG	T39	Eve.	13	V W
95	E	A6	139	Ene	14	14
63	E	A6	T39	Ene.	14	ાબ
75	E	NL	139	Eve	14	14
20	9	35	138	Ene	10	10
23	0	26	T34	Ene	8	3
60	\mathcal{D}	46	536	Ene	3	8
32	0	hb	136	Ene	રે	8
40	D	hó	130	Enc.	8	8
28	D	46	7.36	Ere	9	9
24	p	h6	T 36	Enc	9	9
425	Ð	11	19	EVC	む フ	6
Total in Cluste	ins.:	ςī,	schule cou	nt from next pg)	Total # Trees:	
# Loners: 114	THE THE	HL MAL MA	(nr)	1141 (30)		every butterfly of type that you see
# Fliers: NHL		(x 39)			throu	ighout the site.
Grand Totpl:		(35,85	of all einer	ared havzerftizs ple	n Tuners, samners, j	fiers, etc.)
# Mating Mon	archs:					and a state of the state
# Dead Monar	ehs: [
Other Nutes:	1	- yeter	they be	Hom Lowing	ണ	

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	True Species	Cluster Height (top) (m)	Clstr Height (bottom) (m
300	D	11	TL3	Brc.	10	9
425	Þ	11	TG3	Eve	Р	8
75	5	11	763	Euc.	11	ă
200	Þ	11	T63	EVE	8	8
130	D	h1	763	Eix.	9	8
60	D	h1	163	EIK.	8	8
\$50	Ď	C9	1700	Cypress	١g	16
150	Đ	69	TICO		17	16
125	D	61	TIOD	Crip		13
23	D	64	T100	448	13	13
575	Þ	69	1700	Cup	13	12
150	IA	di	5102		12	
18 25	D		170	Cyp		4
900	5	d4 d4	T70	e_×	12	1
	P	A	7.70	euc.	h h	h
300	P	65	769	PUL		21
	P	15	769	Eye	21	21
30		15		tue		8.19
100	2		769	euc	2.0	
90	2	65	170	eut	<u>n</u>	10-11
90	1) 9	55	T70	luc .	μ	h
2K	D D	65	770	euc	o	10
70		65	170	Por.	16	10
- 55	Ð	61	770	fuc	1/	4
1.30	6	18	T81	Euc	á	ž.
\$3	C	19	TRL	Eur	8	
	С.	18	TBI	Euc	. 9	9
30	C.	H 9	+94	Euc	12	12
60	<u> </u>	H٩	Tay	Ene	3-	13
70	6	Ha	794	Euc	13	13
130	ы	62	72:22	Euc	\$7	7
22	H H	62	T 1.12	Ene	.7.	7
70	14	GI	Film	Ene	10	10
7,50	4	GI	Filen	Ene	12	12
80	4	45	7134	ere	12	12
			the total i	ally on the previ		-
50	Н	69	7196	Euce .	ે છે	5
27	Ы	C10	T194	Gec.	7	7

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Over-wintering Monarch Butterfly Project Monarch Count Data Sheet

DATE 11/5/14	SITE NAME	Pisno Beach	
	erver name(s) Ty	ler, Brandi, Theyle	/
Count Time Span (a: 15			95
Cloud/Fog Cover	% Precipitation (c	circle one) mone> drizzle	rain
Temp (°C) 16.1 Win	d (m/s) <u>+</u> 3 W	vind (Beaufort)	Wind direction

 (emb/	-	 ***

100	
Or m	-
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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster H (top) (-
307	E	a1	T39	É	13	
40	E	ab	T37	E.	12	12m
35	D	h6	T34	E	[*	100
140	D	hb	134	E	n	IIM
170	D	11	T63	٤	12	12 m
200	P	11	163	E	4	8m
25	P	h1	163	E	- 8	8M
156	D	h1	763	£	15	15M
96	D	h1	163	E	13	13m
200	D	h1	T63	E	11	llm
270	D	23	T70	E	(0	10~
65	Q	13	T70	£	14	14m
75	D	d4	170	Ē	61	Ilm
375	D	c5	570	Ē	11	10m
380	P	65	170	E	լ1	10m
215	0	65	T70	E	10	10 m
Total in Cluster	rs:	(la	iciude cou	nt from next pg)	Total # T	rees:
#Loners: TH	1 JULY 1	KL THLI	¥4			
# Sunners:						Tally every butterfly a each type that you see
# Fliers: 1%	L THE TH	J LY TH				throughout the site.
# Grounders (li	ive): Ø					
Grand Total:	,	(sum	of all cluste	ered butterflies plu	a lowers and	ners fliers etc.)

# Mating Monarchs:	¢	
# Dead Monarchs:	ø	
Other Notes:		×

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
100	D	45	170	E		Ilm
290	C	18	T81	E	٩	8m
45	C	19	T81	E		8m
50	C	j8	T81	£		1 Day
155	C	19	T81	E		10m
210	C	18	781	E		12m
320	C	h8	TGI	F	13	12m
75	C	#8	791	P		IUm
125	C	98	791	P		100
105	4	61	T89	٤		14m
90	14	fi	T89	٤		10m
390	T D	19 69 95 1	TPUTIO	0 C	4	3m
47	11	051	T24	С	9	9m
77	5	do	124	C	10	10m
135	Þ	43+	T24	C	10	10m
260	J	\$4 09	T26	С	U	10 m
42	T	dH1	T26	C	11	Ilm
60	Ŧ	AL	724	C	11	11m
60	1	644	T26	C.	12	12m
250	1	109 010	T24	C	12	12m
25	1	15	TP6	C	12	12m
70	5	95	TEb	C	12	12m
30	Þ	AS	724	C	12	12m
400	J	103	T26	C.	14	13m
30	5	54 910	724	C	9	9m
37	51	C4 T	Thu	C	8	3m
10	1 1	FAT	144		6	3m

Please add any counts on this page to the total tally on the previous page.

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DATE 11/6/14 SITE NAME Pismo	
# Observers 3 Observer name(s) Bret, Emily Wicole	
Count Time Span 6:20 to 8:00 Total Count Time (Min) 100	
Cloud/Fog Cover_()% Precipitation (circle one): (none drizzle rain	
Temp (°C) 3.5 Wind (m/s) 3.5 Wind (Beaufort) Wind direction	16

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster H (top) (Clstr Height (bottom) (m)
.55,55 (55)	E	66	T40	Eve	9		٩
22,25 (24)	-	66	740	Ene	10		10
20, 10 (25)		66	T40	Ene	10		10
10,13 (12)	E	a.6	740	Ene	6	1.1	6
24,30(27)		90	740	Ene	6		6
20,22 (21)	E	46	140	Ene	6	12.1	6
40,50 (45)	E	96	740	Ene	11		11
60,70 (65)	E	a5	138	Ene	8		8
75,80 (71)	0	46	134	Ene	9		9
120, 170 (145)		h6	734	Ene	10		lo
12, 22 (22)	D	h6	734	Ene	10		10
24,25 (25)	D	h6	T34	Ene	10		10
100,105 (103)	D	hie	T34	EVI	10		10
50,55 (53)	D	h6	T34	Eu	10		10
30,80 (50)	D	h6	734	Erc	A		11
11,19 (11)	Þ	46	T34	En	12		12
Total in Cluster	'S:			nt from next pg)	Total # T	rees:	
# Loners:-W	111 04-441						
# Sunners: Hit							very butterfly of
# Fliers: THL #			pe that you see hout the site.				
# Grounders (li						ou oug	and the piec.
Grand Total:		(5600	of all cluste	cred butterflies plu	s loners, sun	mers, fli	ers, etc.)
# Mating Mona	rehs:	1 (Mal	he and	No. and Second			
		110.00	e na par	wing candition)			

# Mating Monarchs:	(Male has poor wing condition)
# Dead Monarchs:	
Other Notes:	

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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
5005 (MO(55)	P	hb	134	EUL	11	lı
45,46 (45)	D	h6	T34	EVE	11	1)
100,100 (100)	D	46	734	EVC	12	12
675,600 (635)	ρ	11	T63	Ene	\$7	6
50,60 (55)	0	i1	T63	Ene	6	6
80,110 (95)	٥	11	T63	En	6	6
70,60 (75)	D	i1	T63	luc	7	46
65,65 (65)	٥	41	+63	Ene	496	76
260,300 (20)	0	i1	T63	Ene	N	10
1000, 1100 (1050)	D	:1	T63	Ene	13	10
400,450 (425)	D	11	T63	Ere	1)	9
92,80 (88)	₽	dy	T70	Eve	36	5
(15)	H	h2	5h	Ene	6	6
40,130 (160)	D	1000	T70	Eve	\$7	45
(250)	С	48	TAN ZZZ	5.	1)	10
(125)	С	48	THE	Ene	12	10
(275)	C	48	TARL		13	11
400,450 (425)	P	dy	T70	ELC	10	9
(35)	C	19	TSI	Ene	7	7
(300)	C	:8	TEI	E.	12	11
420,550 (485)	õ	23	T70	Ene	12	10
(15)	C	18	T81	the	8	8
52 \$ 600 (575)	p	d3	770	Eve	н	ю
200,250 (240)	Þ	14	769	Eve	19	19
70,90 (80)	Ø	du	769	Gu	19	19
600, 700 (650)	1000	C9	TIO	Cyp	10	1
400,450 (425)	D	C1	7100	Cyp	11	10
270,350 (300)	Þ	(9	7100	lyp	[]	h
220,250(233)	D	69	Doo	Cyp	13	13
325,7100(33)	D	69	Tito	Cyp	\$17	16
200, 300 (200)	0	63	770	Enc	12	li

Please add any counts on this page to the total tally on the previous page.

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DATE 11/1/14 SITE NAME P.S.	
# Observers Z Observer name(s) Tyler, Jesmid, Jessie, Randi	
Count Time Span 6 20 to 7:35 Total Count Time (Min) 75	
Cloud/Fog Cover_50% % Precipitation (circle one): none drizzle rain	
Temp (°C) 4.7 Wind (m/s) 0.1 Wind (Beaufort) Wind direction	

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)		Clstr Height (bottom) (m)
350 415	E	01	T5565	É	15		14
270	Ĩ	(1	丁野ら	Z	14	1	14
300	Ĕ	C1	TAZLO	Ē	1	1	9
Z10	2	12	T63	and the second se	I	7	12
115	D.	12	765	Ē	11		0
255	D	12	745	£	ר		7
265	D	du	170	F	æ 8		128
230	D	45	T70	E	T D		10
160	D.	25	170	E	君の		五日
162 225	D	15	170	E	· · · · · · · · · · · · · · · · · · ·		9
100	· D	05	769	E	15		15
285	D	d4	T69	£	2510		10
100	D	d4	T69	ε	1	/	11
31	P	d 3	T69	E			11
45	D	d 3	769	E	11		n
135	C.	19	183	E	7		7
Total in Cluster	s:	(in	clude com	t from next pg)	Total # T	rees:	
# Loners:							~~, ~ · ·
# Sunners:			very butterfly of				
# Fliers: 111			pe that you see hout the site.				
# Grounders (liv	re):						
Grand Total:		(sum	of all cluste	red butterflies plu	s loners, sur	mers, fli	ers, etc.)
# Mating Monas	rehs:						

# Mating Monarchs:			
# Dead Monarchs:			· · ·
Other Notes:	11000		28

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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
700 c i9 173 E 410 48.9 150 H h8 714 E 15 14 75 H h9 794 E 14 14 176 H 98 794 E 13 13 75 H 98 794 E 13 13 175 </th <th>115</th> <th>C</th> <th>;9</th> <th>T83</th> <th>ć</th> <th>9</th> <th></th>	115	C	;9	T83	ć	9	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	700	C	19	183	ε	\$10	#9
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		H	h8	T94	E	15	14
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					E		
75 H 98 794 E /3 /3	170	H			E	13	13
Image: state stat				T94	E		
Image: state stat	1						
Image: state stat					2		
Image: state stat							
Image: state stat							
Image: state stat							
Image: state stat		-					
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		-					

Please add any counts on this page to the total tally on the previous page.

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Over-wintering Monarch Butterfly Project **Monarch Count Data Sheet**

# Observers	Observer	name(s)			
Count Time Span	6:20	to 735	_ Total Count Tim	e (Min)_	
Cloud/Fog Cover	%	Precipitation (circle one): none	drizzle	rain

Monarchs Cell Tree Species Cluster Height Clstr Height Zone Tree # Clustered (bottom) (m) (ex: A) (ex: a2) (top) (m) d9 450 D T100 16 16 D d٦ 1100 2 200 16 16 d9 1100 13 250 13 D 9 49 T100 10 200 D C 19 9 750 D T100 10 30 5100 8 0 C 29 8 199 90 63 £ 1 D 10m ningk Tin Following 20 199 E I 63 12 12 120 H T89 6 £1 17 11 50 189 -7 :1 t 4 (include count from next pg) Total # Trees: **Total in Clusters:** # Loners: Tally every butterfly of # Sunners: each type that you see # Fliers: 111 throughout the site. # Grounders (live): \ Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.)

# Mating Monarchs:	
# Dead Monarchs:	-
Other Notes:	

100 tag 54100 1.077-()-7740

ObserversObs	server name(s) But, Harret, Jesse , Panel
	to 5:00 Total Count Time (Min)
loud/Fog Cover_las	<u> </u>

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster (top)		Clstr Height (bottom) (m)
260 / 300	I	A2	1-97	E	12	-	.12
130 / 160	I	62	1-97	E	22	_	22
10/70	T	62	T-97	E	27	1	22
9.190	p	C10	1-100	C	10	·	1.0
104/105	P	C-10	T-100	С	10	2	10
240 2600	P	6-10	THUN	C	j.	2	11
900 / 1050	0	12-9	T=100	C			10
1250/1300	0	a-10	T-114	C	2	1	20
1000/950	D	b-5	7=70	E	13		43 12
100/160	0	9-5	1590	E	13		13
350 320	C	1-8	1-81	E	9		9
1200/ 1600	C	1-8	T-81	E	14		12
350/300	C	1-3	T-81	E	8		8
300/ 190	C	h-8	5-94	E	12		12
475/500	C	h-8	F- 14	E	11		11
210/190	C	h-5	T-94	£	E.		10
Total in Cluster	18:	(în	clude cou	nt from next pg)	Total #1	rees:	
#Loners: 2	0						
# Sunners:							very butterfly of
# Fliers: 3							pe that you see hout the site.
# Grounders (li	ve):						
Grand Total:		(sum	of all chuste	red butterflies plu	a loners, su	nners fli	ers. etc.)

# Mating Monarchs:	
# Dead Monarchs:	
Other Notes:	

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Over-wintering Monarch Butterfly Project Monarch Count Data Sheet

DATE 11 8/14 # Observers 4	Observe	r name(s)	Brett,	Hannah ,	Jusse	Dand	
Count Time Span	6:20m	to Sm	To	tal Count Ti	me (Min)	Kan 80	
loud/Fog Cover_	100 %	Precipitatio	on (circle	one): (none	drizzle	rain	
Temp (°C) 13.1		0		(Beaufort)	-	Wind direction	1

Height (m)	Clstr Height (bottom) (m)
-	9
-	10
	7
	7
	7
	7
	11
	11
	14
	10
	10
	8
	# 11
	10
	7
	7
rees:	
	very butterfly of
	pe that you see hout the site.
nners, fli	iers, etc.)
	uners, fli

# Mating Monarchs:		
# Dead Monarchs:		
Other Notes:	Pany Finling not working . Gog?	

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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
(24 20,20 (V)	0	11	T63	Ene	8	\$
350,300(30)	0	62	T69	Ene	24	23
100, 130 (45)	0	61	169	he	23	23
28, 35 (32)	0	e2	T69	E.	n	11
10,90(100)	Q	23	T70	Ere	11	ľ
85,66(75)	0	d2	770	Ere	10	10
15,100(117)	ã	23	570	Ene Ene	10	10
200,150 (11)	D	24	10	En	11	11
40,55/38)	C	64	570	Eve	9	9
\$0,00(55)	С	Shio	Salen	Ene	7	7
	-					
				4		
			1.1			
		-	1			
			100		1.	
						1.1
						1.1.1.1.1.1.1
				2		

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Please add any counts on this page to the total tally on the previous page.

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DATE 11-9-14 SITE NAME Pizma	ast.
# Observers 4 Observer name(s) Daned, Hennah, Nicola, Emily-	
Cloud/Fog Cover 104 % Precipitation (circle one): none drizzle rain Temp (°C) 12, 2 Wind (m/s) 0.7 Wind (Beaufort) Wind direction	F

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster (top)		Clstr Height (bottom) (m)
300 270	T	AZ	T99	E	12		12
110/140	I	12	194	E	13		13
184 (170	I	CZ	199	E	22		22
90 /70	T	C2	T99	€	22		22
60 50	I	C2	199	E	22		22
100 / 90	0	CIN	Tim	C	10		10
400/ 1500	0	CIO	Tite	C	12		a d
550 / 500	0	69	TICO	C	u		10
6251650	0	By	Ties	C	и		10
600/1500	0	dio	Ties	c	21		Za
190/210	0	du	Tia	C	ZI		Zo
200 / 160	6	h-8	Tay	E	10		10
500 1550	C	h-3	T94	E	11		11
350 / 350	C	h-8	T94	E	12		12
300/250	C	1-7	T81	E	8		8
254 290	C	1-9	T81	E	5		9
Total in Cluster	rs:	(în		nt from next pg)	Total # 1	frees:	
# Loners:							1.
# Sunners:							very butterfly of
# Fliers: {							pe that you see hout the site.
# Grounders (li	ve):					- and and	the same
Grand Total:		(sum	of all cluste	red butterflies plu	s loners, su	nners, flie	ers, elc.)
# Mating Mona	rchs:			-			
# Dead Monarc	hs:						

Other Notes:

# Monarchs Cluştered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
400 1200	6	1-70	T-81	E	12	12
80 170	C	e-9	T-92	E	9	9
45.1500	p	8-4	T-69	E	Lo	20
		-				
	-	-				
		-			2 (7-tF)	
		-		2		
	-					1
			-			
			1.1.1			
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			1.1.1	-		
					1.8	
	-					
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			and the			
				1012		
					-	
100 Ph 2		-				
	-		1			
	-	-				-
	-					
				tally on the prev		

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Cloud/Fog Cover_ Temp (°C) 12.2	00 %	Precipit	tation (circl		rizzle rai	n d directic	2.
# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster (top)		Clstr Height (bottom) (m)
5,55 (55)	E	ab	740	EVC	9		9
4930 (35)	E	ab	THO	Ex	4		4
28,35 (2)	E	a6	T40	ER	4		4
10,20 (18)	E AL	a6	740	Eve	4		4
1,15 (3)	E	06	740	Eve	4		4
52,50 (50	E	-150	139	EVC	5		5
45,54 (50)	E		739	the -	10	2	ю
15, 16 (18)	D	h6	T34	Eic	7	100	7
20,00 \$ (05)	D	46	734	Ge	8		8
100,425 (412)	D	11	763	Ere	12		11
2.0, 10 (28)	D	12	763	Eve	13	-	12
85,120 (102)	D	11	763	Ere	6		6
28,40 (34)	D	11	763	Eu	6	-	6
140,100 (145)	Þ	11	T63	EL	8		7
10,20 (110)	D	12	T63	Eve	8		7
129.10 (135)	D	11	T63	Eve	. 8		7
Total in Cluster	80			nt from next pg)	Total # 1	Trees:	
# Loners: NIN.	HH HHL	1					
# Sunners:							very butterfly og pe that you see
# Fliers:/							
# Grounders (liv	re): [in oug	hout the site.
Grand Total:		(sum	of all clust	ered butterflies plu	s loners, su	nners, fli	ers, etc.)
# Mating Mona	rchs:			1		_	
# Dead Monarel	hs:						

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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
80,80 (80)	D	11	T63	Eur	6	6
150,200 (175)	D	12	T63	Eve	н	b
16,16 (16)	D	Ag1	T63	Eve	8	8
60,85 (72)	Þ	e3	T70	Erc	h	10
140,115 (127)	D	e3	170	Eve	11	11
30,3010 (35)	D	23	169	Ere	(1	11
10,120(120)	D	27	770	Euc	10	10
(00) 00,00	D	e3	170	Euc	13	R
(071) 001,00	D	3	770	ELC	13	13
10,110 (105)	Ď	e3	T70	Eĸ	13	13
10,170 (165)	Þ	e3	T70'	tu	14	13
45,50 (17)	Þ	e3	T70	Eve	14	14
18,16 (17)	D	23	T70	Eve	14	14
125145(135)	D	e3	770	EVC	14	14
45,50 (47)	D	23	T70	EVC	14	14
10,10 (10)	D	24	T70	ELC	ю	10
25,32 (28)	D	d4	T70	Eve	9	9
35,40 (37)	Þ	dy	770	EUC	9	9
90,120 (105)	D	24	T70	Evc	- 11	< 11 1
7075 (72)	D	14	T70	Eve	0	11
60,50 (59)	D	14	770	ELC	12	12
180,170 (175)	D	24	770	Eve	10	9
230,240 (235)	D	24	T70	ELC	10	9
80,80 (80)	D	24	T70	Eve	10	9
175,100(177)	D	d4	T69	Eve	20	20
35,50 (43)	D	dy	T69	Euc	1	17
						1.0000
			-			
		-				

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	DATE 1-10	- 14	STTE NAN	E O	5 ma			
	# Observers 3			0	LE	60	1.	
	Count Time Span	6:35	er manie(s)	Uam	otal Count Time (N			
	Cloud/Fog Cover_							
	Temp (°C) 14.4			-			• d directio	n E
	(c) <u></u>	F	(0.5) <u>17 - 0</u>	_	(Dealiter)		u uncon	
	# Monarchs Clustered	Zone (cs: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster (top)		Clstr Height (bottom) (m)
	245 240	T	A2	1-99	E	12		12
	140 / 165	T	CZ	T-99	€	22		22
	75/75	I	CL	T-99	E	22		22
	65 165	I	c2	2.99	E	22		22
	58 165	D	Cio	T-100	С	12		И
1600/175		D	CHO	FLOO	C	12		И
	600/600	\mathcal{D}	69	T-100	C	12		H.
	700 700	-D	64 010	T-100	c	21		20
-	190 /190	D	4-10	T-100	C	21		20
	220/230	C	1-3	1-21	E			\$
	570/ 450	C	i-7	1-81	E	1046	3	12
	240/230	C	1-8	T-31	E	٩		8
204	11- 11-200	C	h.3	F91	E	12		iZ
	350 1 280	C.	h-8	T-gu	E	μ		μ
	120/120	C	h-1	T-94	E	10		ia
	20 120	C	h-10	1-91	E	8		9
	Total in Cluster	8:	(14	ichide cou	nt from next pg)	Total #1	rees:	
	#Loners: 3						Tally e	very butterfly of
	# Sunners:	2						pe that you see
	# Fliers: +						throug	hout the site.
	# Grounders (liv	ve):					L	
	Grand Total:		(sum	of all church	ered butter/lies plu	s loners, su	nners, fli	ers, elc.)
	# Mating Mona	rehs:						
	# Dead Monare	hs:						
	Other Notes:				a an sa sa sa			

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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree#	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
600 / 850	D	6-5	7.70	E	10	10
350 / 320	D	E-4	T-70	Ē	11	и
25. 1 750	0	d-4	T-61	E	22	22
304 1300	P	C-5	1-69	E	22	22
350 / 400	0	1-1	1.63	E	12	12
35- 1350	0	1-2	T-63	E	μ	11
350 / 320	D	1-2	T.63	6	8	7
450 / 500	E	4-4	1-42	E	9	3 4
121 / 134	E	6-4	5-42	E	16	16
501450	G	q.4	T-42	G	16	16
250 / 200	E	6.4	1.42	E	21	21
60 / 60	E	6.6	T-40	E	8	8
40/50	E	6-6	T-40	E	12	12
1	£	6-6	E46	£	10	
· · · ·					1 A.S.	
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			1.1.1			
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DATE 11/11/14 # Observers # 24	Diserver name(s)	triche Nide to	AT
Count Time Span 6:1		Total Count Time	
	_% Precipitatio	n (circle one): 000	frizzle rain
Temp ("C) 186 V	Vind (m/s) _0	Wind (Beaufort) O	Wind direction

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster I (top)		Clstr Height (bottom) (m)
45,48 (47)	C	.7	781	Eve	7		7
160,170 (165)	C	17	TXI	Eve	7		7
10,120 (110)			T81	Eve	9		9
5,55 (93)	C	17	181	Eve	8		8
0,120 (16)	C	17	T81	Eve	10		10
10,00 (95)	C	:7	781	Eve	(ð		10
10,135 (173)	C	17	181	Eve	10		10
70,190 (10)	and the second se		781	Eve	10		10
340,370 (355)	C	17	781	Eve	11		10
5,00 (92)	C	18	781	Ex	11		11
19,49 (425)	C	18	T81	Ex	11		10
15,65 (35)	C	18	181	Eur	10		10
5/10 (102)	C	18	781	Euc	lo		10
50,60 (95)	C	18	781	Eve	10		10
10,115 (112)	C	18	781	Eve	9		9
55,55 (55)	C	15	781	EVE	8		8
Total in Cluster	81	(îi	nclude cou	nt from next pg)	Total # 7	rees:	
# Loners: NUM							Sector States
# Sunners:							very butterfly of
# Fliers: HA				20			pe that you see hout the site.
# Grounders (li	ve):						
Grand Total:		(sum	of all chust	ered butterflies plu	s loners, su	nners, fli	ers, etc.)

# Mating Monarchs:	
# Dead Monarchs:	
Other Notes:	

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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
55,160 (158)	C	18	Tap	Eve	9	8
10,46 (43)	C	18	780	Ere	8	8
90,160 (195)	C	15	781	Eve	8	8
10,175 (128)	C	18	781	Eve	8	7
190, MO (190)	C	is	781	Eve	7	6
15,45 (45)	C	18	T81	Eu	6	6
0,60 (55)	C	18	781	Euc	7	7
5,75 (69)	C	18	T81	Eve	6	6
15,70 (47)	C	18	781	Eve	6	6
6,75 (70)	C	18	T81	EVE	7	7
50,170 (160)	C	h7	199	Eve	11	11
160, 175 (168)	C	h7	T94	Eve	11	11
10,10 (15)	C	h7	Tqy	EVE	4	b
10,80 (75)	C	17	T94	EVE	(D	9
0,200 (190)	C	48	T94	Ex	9	9
69,175 (168)	C	48	T94	EVE	9	9
55,60 (57)	C	MB	794	Eve	9	9
15,120 (112)	C	48	794	Ere	9	9
10,60 (70)	C	hr	794	EUC	Ø	10
\$9,40 (35)	C	18	794	Eve	8	8
0,70 (55)	C	48	T94	Eve	8	8
5,50 (47)	C	hB	T94	Eve	8	8
55,70 (63)	C	hŝ	794	Eve	9	9
	1					

and to the total talks on the measurer more

# Observers 4 Observer name(s) Bretty Emily, Atreotey	Tessica
Count Time Span 6:21 to 7:46 Total Count Time (Min)	
Cloud/Fog Cover 80 % Precipitation (circle one): Core drizzle	rain
Temp (°C) 18. 6 Wind (m/s) 0 Wind (Beaufort) 0	Wind direction

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster H (top) (Clstr Height (bottom) (m)
2000, 1500 (1750)	0	610	TW	C	200	10	9
180,200(190)	D	510	TWO	C	10		10
150,160 (155)	0	blo	TOO	c	11		n
500,600 (550)	۵	612	TWO	C	14		13
200,220 (40)	D	610	Two	C	13		13
40,00 (50)	AI	d1	TIDO	C	8		8
250, 300 (275)	0	610	TIDO	C	12		12
200, 250 (225)	0	c10	TIDO	C	22		22
1500, 1600(155	0	clo	100	C	22		21
200,100 (190)	0	610	Theo	c	21		21
200,150 (175)	0	610	TIDO	C	20		20
125,15 (150)	T	64	T99	E	9		9
50,70 (60)	Ē	96	140	E	9		9
60,75 (67)	É	a6	140	E	7		7
40,45 (43)	E	65	139	Ē	8		8
1000 600,700/650	E	c2	150	E	7		7
Total in Cluster			nclude cou	nt from next pg)	Total # To	rees:	
# Loners: 114.54 # Sunners: 111 # Fliers: 111	11					each ty	very butterfly of pe that you see hout the site.
# Grounders (liv	ve):						
Grand Total:		(sum	of all cluste	ered butterflies plu	s loners, sun	ners, fli	ers, etc.)
# Mating Mona	rehs:						
# Dead Monarel	hs:						-
Other Notes:							

Solial yell 1 873 897 7740

Solid army tog: IO: A\$\$533 1 (520)- 861-0646

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
120,100(110)	E	c1	TS9	E	7	1
(100)	E	CI	TSq	Ê	1.1	16
(100)	E	CI	TS9	£	11	10
(80)	E	CI	T5 9	Б	11	10
(250)	# D	11	T63	E .	87	7
(150)	P	.11	T63	E		7
(80)	D	ī1	T63	E	\$7	7
300,300(205)	0	12	T69	The	23	23
150, 170 (16)	D	C2	T69	E	23	23
50,00 (50)	D	h1	T69	E	24	24
250,250 (200)	D	dy	T70	E	12	12
400, 300 (5-5)	0	24	T70	E	10	10
200, 150 (19)	D	dy	570	E	10	10
30,40(35)	۵	du	170	E	10	10
200	I	63	199	Ê	10	10
100	I	63	T94	E	12	12
					-	
	-					

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DATE 11/12/14 SITE NAME Pismo Bach
Observers 3 Observer name(s) Tyler Brand: Jase
Count Time Span 6:30 to 7:45 Total Count Time (Min) 75
Cloud/Fog Cover_ 30 % Precipitation (circle one): age drizzle / rain
Temp (°C) 15.3 Wind (m/s) 0.0 Wind (Beaufort) Wind direction

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster H (top) (r		Clstr Height (bottom) (m)
260/240	I	63	T99	E	10~	\	10m
150/130	1	c1	T99	E	19-		14
75/75	I	c 2	799	É	20		20
140/130	1	:01	T100	с	10		10
2500/2300	D	68	1100	C	9		8
340/320	V	27	T100	C	9		9
950/725	D	07	TIDO	С	10		9
1700 1900	D	09	T/00	<	17		16
50/80 E		62	T59	E	9		1
520/470	6	c1	156	Ē	9	1	1
100/760	E	22	156	E		1	16
240/300	É	e1	TSL	£	2.	2	21
550/474	0	12	T63	É	16		15
700/700	D	11	T63	E.	15		14
400/300	D	:1	TL3	E.			10
450/450	D	03	769	E	20		20
Total in Cluster	s:	(în	chude cou	nt from next pg)	Total # Tr	*E65:	1
# Loners: ++++	- ++++ +	HI HH	+ 30				
# Sunners:							ry butterfly of
# Fliers: IN	1						e that you see nut the site.
# Grounders (liv	ve):			1		and a state of the	
Grand Total:		(51000	of all chuse	red butterflies plu	s loners, sum	nera flier	v. etc.)

# Mating Monarchs:	
# Dead Monarchs:	
Other Notes:	

Orange Tag A0265 Phone: (320)-Yellow tag: 54215; Phone: 1-877-897-7740

# Monarchs	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
Clustered 150/145	D	64	Tbg	Ĕ	70	20
175/600	D	e4	570	E	11	10
375/350	D	24	170	E	9	9
350/325	D	63	170	ť	9	9
450/480	σ	64	770	E	9	9
100/75	D	04	TTO	E	9	9
100/150	Ĺ	:8	181	E	4	9
160/1300	C	;8 ;8	T81	E	12	10
320/340	C	19	T81	É	8	8
370/380	C	:9	791	F	11	U
410/380	C	18	191	.1	9	9
170 1190		48	791	E	9	9
250 1240	C	18	791	C	12	12
1201 100	C	48	791	E	10	10
ine field						
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	-	-				
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# Observers 3	Observer name	(s) Brett, Mask, Emily	1	
Count Time Span	6:36 to 8	:05 Total Count Tim	e (Min) 弊 91	
Cloud/Fog Cover	100 % Preci	ipitation (circle one): hons	drizzle rain	

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# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster H (top) (Clstr Height (bottom) (m)
10,45 (92)	E	a5	740	En	9		9
76,37 (36)	E	a5	T40	Eve	6		6
5,45 (45)	D	15	178	ELC	7		7
50,60 (55)	D	h6	134	Ere	6		6
320 (18)	D	hó	T34	Eve	6		6
120,150/125)	E	62	150	E	6		6
90, 120 (105)	E	c2	150	E	9		9
35,55(45)	E	62	150	E	8		8
140, 175 (168)	E	62	150	E	9		9
7.40,250 (245)	E	12	150	E	9		9
150, 150 (650)	D	12	T63	E	9		16
650,500 (575)	D	11	763	euc	8		8
600,100 (850)	D	i2	163	eve	9	·	10
100, 1200 (1600)	D	14	T70	ex	10		13
(831) 005,70	D	14	T70	616	l.		11
550, 500 (425)	0	14	170	eve	10)	10
Total in Cluster	s:	(1)	nclude cou	nt from next pg)	Total # T	rees:	
# Loners: +							
# Sunners: W							very butterfly of
# Fliers: 444 []]							pe that you see yout the site.
# Grounders (liv	(e):						
Grand Total:		(sum	of all chust	ered butterflies plu	s loners, sur	mers. fli	ers. etc.)

# Mating Monarchs:		
# Dead Monarchs:		
Other Notes:	Very light drivele ~ Jan	

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07angc A 0480

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
450,600 (525)	D	14	T69	Euc	21	21
175,200 (182)	p	04	769	EVE	21	21
90,120 (105)	D	e9	1108	Cyp	12	12
35, 50 (42)	D	e9	7108	Cyp	И	11
10,80 (75)	D	29	7108	Cyp	12	11
2000, 2300 (2150)	D	612	T100	6	12	N
200, 250 (240)	0	610	T100	Ê	12	12
350, 450 (400)	D	610	TIDO	C	12	12
700, 650 (675)	0	610	TIOD	C	14	14
1040, 1400 (1220)		40	TICO	С	21	20
220, 260 (240)		CID	T100	C	20	20
60, 60 (70)	I	c1	TID	C	10	10
110,150 (130)	C	18	T81	EVE	8	8
79,80 (75)	C	18	781	Eur	9	9
200,200 (22.5)	C	18	781	Eve	12	10
215,250 (232)	C	19	T81	Ere	8	8
130,160 (145)	C	19	781	Eve	9	8
19175 (168)	C	19	78	Eu	n	10
350,420 (370)	C	48	799	Eur	11	10
240,220 (230)	C	hß	T94	Ene	9	9
270, 320(295)	C	68	T94	Ene	٩	8
175,200 (192)	6	48	794	an	13	13
(08) 08,05	I	02	T11	EVC	22	22
210,220 (220	T	63	799	EUR	R	12
	-	-	-			
	-		-			
	-		-			
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	-	-	-	-		
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Please add any counts on this page to the total taily on the previous page.

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	14 SITE NAME		
		Tyler, Brandi, Ja	
		Total Count Time (Mi	
Cloud/Fog Cover	60 % Precipitati	ion (circle one) fone) driz	zle rain
Temp (°C) 15.2	LWind (m/s)	Wind (Beaufort)	Wind direction

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Hei (top) (m	
275/240	I	41	1109	PFE	20	20
100/125	I	91	TIUS	E	to	20
150/190	D	+10	T100	Ċ	10	10
1400/1250	D	62	TIDD	C	11	10
850/700	D	69	TIDO	C	13	12
30/450	D	c7	TIDD	C	11	11
1700/1750	D	69	T100	C	18	17
160/120	I	63	T99	E	10	ID
120/90	I	12	199	٤	18	18
120/135	I	62	Tag	E	16	16
190/200	C	18	T91	E	11	11
320/350	C	18	191	E	9	9
225/225	C	:8	T91	E	12	12
80/15	С	18	151	E	8	8
550/500	C	18	T81	E	12	1/
125/100	С	19	T81	E	4	8
Total in Cluster	8:	(ii	iclude cou	nt from next pg)	Total # Tre	es:
# Loners:						
# Sunners:						ally every butterfly of
# Fliers:						ich type that you see roughout the site.
# Grounders (liv	ve):			1.0		
Grand Total:		(5109	of all chust	ered butterflies pla	s loners, summe	ers, fliers, etc.)

# Mating Monarchs:	
# Dead Monarchs:	
Other Notes:	

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# Monarchs	Zone	Cell	Tree #	Tree Species	Cluster Height (top) (m)	Cistr Height (bottom) (m)
Clustered	(ex: A)	(ex: a2) h7	191	E	S	9
120/140	c		176	C	17	17
275/325		34	176	C	17	17
350/400	C	33	The	c	14	14
250/275	С	14	110	E	8	8
225/250	D	24	T	E	18	18
350/275	0	64		E	18	18
400/350	D	64	169		15	15
150/130	D	64	769	E	11	11
350/475	D	94	110	-	- 4	- "
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	-	-	-			-
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		-	-	-		
		_				

# Observers 4	Observer name(s)		_
Count Time Span	to	Total Count Time (Min)	
Cloud/Fog Cover	% Precipitat	tion (circle one): none drizzle rain	

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# Monarchs Clustered	Zone (ex; A)	Cell (ex: a2)	Tree #	Tree Species	Cluster 1 (top)		Clstr Height (bottom) (m)
300	E	82	T49?	E	7		7
\$ 100	E	82	T49?	E	20		20
.350	P	11	T63	E	8		\$7
150	E	23	738	E	24	7	27
1 50	D	13	169	E	27		27
Total in Cluste	rs:	(ir	nchude cou	nt from next pg)	Total # T	rees:	
# Loners:							
# Sunners:							very butterfly of
# Fliers:							pe that you see yout the site.
# Grounders (li	ive):						
Grand Total:		(sum	of all cluste	red butterflies plu	s loners, su	mers, flie	ers, etc.)

# Mating Monarchs:	
# Dead Monarchs:	
Other Notes:	

· A0259

DATE 11/15/14 SITE NAME A3MO
Observers 4 Observer name(s) Brett, Henry, Type, David
Count Time Span 624/00 to 8 am Total Count Time (Min) 80
Cloud/Fog Cover 0 % Precipitation (circle one): fone) drizzle rain
Temp (℃) 13.3 Wind (m/s) 0.2 Wind (Beaufort) Wind direction NE

# Monarchs	Zone	Cell	Tree #	Tree Species	Cluster		Clstr Height
Clustered	(ex: A)	(ex: a2)			(top)	(m)	(bottom) (m)
618 16	D	16	T34	E	9		9
35,25(30)	0	hi	134	E	0		10
no,no (no)	P	h6	T34	E	10		6
\$00, 308 (375)	L .	<2	T30	Ē	8		7
30,30 (30)	E	C2	150	E	10		10
350, 380 (369	P	1	183.	E	8		7
600,600(603)	P -	il	T63	E	9		D
580, 400(39)	2	41	T63	E	B		8
110, 120(15	Þ	h	T 63	E	7		7
800, 1900 (183)	D	63	T70	E	13		11
10,96 (3)	Ð	84	T70	E	9		9
850 900 (875)	2	62	169	E	20		19
340, 400 (370)	D	51	T69	E	21		20
70, 100 (85)	D	4	789	E	20		20
200,200 (200)	ζ	- 14	176	C	17		16
100, 120 (110)	<	- 14	176	C	18		B
Total in Cluster	8:	(i)	nclude cou	nt from next pg)	Total #]	Frees:	
# Loners: ***	ANT ATT						
# Sunners: SA							very butterfly o
# Fliers: \							pe that you see yout the site.
# Grounders (liv	(e): \						
the second s			6 11 1	ered butterflies plu			

# Mating Monarchs:	
# Dead Monarchs:	1
Other Notes:	

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	onarchs	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
	100 (90)	(ex. A)	14	176	6	19	19
	50 (50)	7	14	176	C	19	11
-	30 (30)	C	14	176	C	19	19
	70 (60)	0	68	T108	C	13	13
	400(370)	D	29	T108	C	11	ti .
	1800 (1550)	0	510	Tbo	C	11	9
20	200 (225)	0	69	T100	C	11	10
750	850 (200)		610	100	C	13	12
1500	, 1500 (1850)	D	G.10	TIO	C	18	16
	500(200)	I	11	7600	C	11	10 q
310.	250(285)	C		-181	E	13	10
10.1	10 (105)	C	;8 ;9	-131	E	7	6
	50 (50)	C	18	581	Ē	6	6
	66 (6)	I	910	Sallen	E	6	6
120.	(00) 04	C		793	E	8	8
	200(190)	C	98	793	E	10	9
100.	80 (00)	C	18	T93	E	9	9
-							
							-
				1			
				1			

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DATE 1/16/14 # Observers 2		nomo(a) EU	The A l'eda		
					7.0
			Total Count Tim		
Cloud/Fog Cover	10 %	Precipitation	(circle one): none	drizzle	rain

Endenal

	# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster (top)		Clstr Height (bottom) (m)
Grange	380, 420 (400)	I	13	7218	Eve	7		7
ASHER ASHER	(950,470 (105)	I	13	T218	Eve	8		7
APH8P	200,240 (220)	I.	.97	T218	Ere	7		7
	380, 400 (390)	I	94	T218	Eve	8		8
	140,200 (195)	I	94	7211	Eve	9		9
	(50 190 (750)	I	94	TZIT	Eve	10		8
	130,130 (120)	I	94	TUK	En	1		6
	170,250 (210)	I	94 13	TID9	Eur	17		17
· .	580,690 (630)	D	12	T63	BUC	8		8
	60,700 (69)	¢	12	T63	Euc	/୭		9
	360,460 (40)	Ð	iz	763	Euc	0		9
	\$20,40 (335)	D	i2	763	En	8		7
	300,360 (930)	Ø	12	763	Ere	6		6
	120,120 (120)	Ď	Иb	T34	EVE	0		Þ
	10,000 (25)	p.	h6	734	Eu	10		/0
yellans . tag	100,100 (-110)	E	c2	749	Eve	6		6
tag	Total in Cluster	8:	(in	iciude cou	nt from next pg)	Total #7	frees:	
	# Loners: // //							
	# Sunners:							very butterfly of pe that you see
	# Fliers: 1/1118.4					S		hout the site.
	# Grounders (liv	re): /						
	Grand Total:		(sum	of all cluste	red butterflies plu	s loners, su	uners, fil	ers, etc.)
	# Mating Mona	rchs:						
	# Dead Monare	hst						

Other Notes:

Entral

# Observers 4	Observer name	(s) Ouniel, 1	hank	
		13% Total Cour		
Cloud/Fog Cover_	0 % Preci	pitation (circle one):	none drizzle rain	

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Hei (top) (m)	
1000/1200	ρ	<9	Tico	С	10	9
400/450	Q	69	TIGO	C	11	10
1254/300	D	68	Tion	c	0	5
750/750	0	(7	Tiro	C	10	9
525/550	0	68	Tico	C	17	16
700/650	0	Cq	TIGO	E	17	t6
1750/1500	0	CA	TION	C	17	16
250/250	0	14	170	E	11	10
950 900	D	14	T70	E	11	1.
700/650	0	C4	T69	E	21	20
400/350	Ø	65	T69	E	21	20
200/150	Ø	46	TGS	E	21	20
400/480	C	13	T76	C	20	19
254/250	0	F-8	1103	c	11	10
15. / 130	I	2-5	T169	E	10	٩
Total in Cluster	180	(ir	nclude cou	nt from next pg)	Total # Tree	es:
# Loners: 18	5					
# Sunners:						ally every butterfly of the type that you see
# Fliers: 20						roughout the site.
# Grounders (li	ve):					
Grand Total:		(sam	of all cluste	ered butterflies plu	s loners, sunne	rs, fliers, etc.)
# Mating Mona	rchs:					
# Dead Monarc	hs:	1				
Other Notes:		1				

	-			otal Count Time (I		
Cloud/Fog Cover_		-				N
Temp (°C) 48°F		m/s)	Wind	(Beautort)	Wind direction	00_11
# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Heigh (bottom) (m
425/425	0	hb	134	6	11	11
270/250	£	12	156	E	9	٩
900/840	0	24	170	E	20	19
375/425	D	64	170	E	19	19
300/350	0	64	770	E	20	20
225/225	0	65	T10	E	20	20
450/400	0	55	170	Ę	20	20
375/375	2	15	170	Fe	19	19
325/300	2	64	T69	E	11	ri
650/100	2	14	769	E	12	11
700/650	0	25	T69	2	12	11
300/10	D	05	T69	Æ	12	12
200/200	D	(5	Tbg	F	11	11
195/175	D	64	170	£	16	16
150/175	I	c1	TIDO	C	9	9
1000/1000	7	68	1100	C	11	9
Total in Clusters				at from next pg)	Total # Trees:	
# Loners: THA	LNUT	+++ +++	11			
# Sunners:						very butterfly o pe that you see
# Fliers:						hout the site.
# Grounders (liv	e)c					
Grand Total:		(sum	of all cluste	red butterflies plu	s loners, sunners, fli	ers, etc.)
# Mating Monar	chs:					
# Dead Monarch	IS:					
Other Notes:						

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Monarchs	Zone	Cell	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
Clustered	(ex: A)	(ex: a2)	T100	C	11	11
350 /400	D	08	TIDO	~	12	1.0
300/30	D	10	TIDO	0	17	16
440/420	P	28		C	18	17
1206/130		29	TIDO	C	15	17
1350 1400	D	19	TNO	C	14	14
350/400	C	14	T76	C	16	17
300/30	C	14	TTL	C		12
320/270	C	18	181	E	12	
250/180	C	hð	194	E	12	12
320/ 260	0	11	163	E	8	8
150/150	D	hL	T63	. Fe	10	10
200/175	2	12	763	E	11	1)
20/250	Ð	94	138	E	24	24

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Count Time Span to Total Count Time (Min) Cloud/Fog Cover 30 % Precipitation (circle one): Gase drizzle rain Temp (°C) Wind (m/s) Wind (Beaufort) Wind direction	DATE 1/1	Observ	er name(s)	Brett,	Ling, Jossia,	Nide	
					A		
Temp (°C) <u>so^{°F}</u> Wind (m/s) <u></u> Wind (Beaufort) <u></u> Wind direction	Cloud/Fog Cover	30 %					
	Temp (°C) 50	F Wind (m/s)_0_	Wind	(Beaufort) ()	Wind direction	n
	Temp (-C)_SO	- wind (i				_	
Clustered (ex; A) (ex; a2) (top) (m) (bottom)	# Monarchs	Zone	Cell		Tree Species		

Clustered	(ex: A)	(ex: a2)			(top) (m)	(bottom) (m)
(all) 41,04	C	h8	794	E	11		11
80, 15(78)	C	48	T94	E	10		10
10,70 (70)	C	48	194	E	10		12
50,60 (55)	C	;9	T81	E	10		10
40,40 (40)	6	: 9	T81	E	11		11
600,700 (650)	C	15	T16	C	16		16
250,350 (30)	6	15	T76	C	17		17
150,200(15)	4	15	176	C.	18		18
180,200 (190)	C	5	T76	6	19		11
75, 95 (85)	6	15	176	C	19		19
125,135 (130)	C	15	776	C	16		16
2000, 2200(240)	0	610	T100	ç	12		11
(100) 000 (1000)	D	610	T100	C	13		12
100, 1200 (1100)	0	610	T100	C	13		13
4200, 450(435	00	40	TIO	C	19		17
1 175, 150	60 B	59	TIP	C	11		11
Total in Cluster	rs:	(1	nclude cour	at from next pg)	Total # T	rees:	
# Loners: THLY # Sunners: # Fliers:		*****	THF HFT	HL HL HL		each ty	very butterfly of pe that you see hout the site.
# Grounders (li	ve):						
Grand Total:		(sum	of all chuste	red butterflies plu	s loners, su	nners, fli	ers, etc.)
# Mating Mona	rchs:						
# Dead Monard	ths:						
Other Notes:							

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# Monarchs	Zone	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
Clustered	(ex: A)	(CA	Tind	C	13	13
70,75(73)	ρ	F9	TIO	L		
		-				
			-			
		-	-			
			-			
		-				
		-	-			
	-	-	-			
	-	-	+			
			-	+		
	-		-			
	-	+	+			
			+			
	+	+	-			
	-	+	-	-		
	-	+	-			
	-	-	-			
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DATE 11/18/A		SITE NA	Part Part				
Count Time Span	(:w	ver name(s	33	emily	5		
Cloud/Fog Cover	30 %	IO _/·.	intian (aire)	otal Count Time (Min) _/		
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50°F		(1105)	wind	(beautort)	W	nd directio	
# Monarchs	Zone	Cell	Tree #	Tree Species	Cluster	Height	Clstr Heigh
	(ex: A)			-			(bottom) (m
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	0		_		12		12
1.1.4 2111	-			Eve			19
the second se	.=	(in	clude coun	t from next pg)	Total # 1	rees:	
mai							
							ery butterfly of e that you see
	a). #						out the site.
NAMES OF TAXABLE PARTY.	9:1						
Grand Total:		(same o	y all cluster	red butterflies plus	loners, su	uners, flier	s, etc.)
# Mating Monarc	chs:						
# Mating Monarch # Dead Monarch							
	# Observers _ Z Count Time Span Cloud/Fog Cover Temp (°C)	# Observers <u>Z</u> Obser Count Time Span <u>6:42</u> Cloud/Fog Cover <u>30</u> % Temp (°C) <u></u> Wind 50 ?F Wonarchs Zone (ex: A) <i>BO</i> (<i>B</i>)(<i>T</i> 0) <i>I</i> 725,30 (23) <i>E</i> <i>BO</i> (<i>T</i> 0) <i>D</i> <i>Costered</i> (ex: A) <i>BO</i> (<i>B</i>)(<i>T</i> 0) <i>D</i> <i>Costered</i> (ex: A) <i>BO</i> (<i>T</i> 0) <i>D</i> <i>Costered</i> (<i>IS</i>) <i>D</i> <i>Costered</i> (<i>IS</i>) <i>D</i> <i>BO</i> (<i>IS</i>) <i>D</i> <i>Costered</i> (<i>IS</i>) <i>D</i> <i>BO</i> (<i>IS</i>) <i>D</i> <i>D</i> <i>BO</i> (<i>IS</i>) <i>D</i> <i>D</i> <i>BO</i> (<i>IS</i>) <i>D</i> <i>D</i> <i>SO</i> (<i>IS</i>) <i>D</i> <i>SO</i> (<i>IS</i>) <i>SO</i>	DATE $\frac{ / 8 4 }{ 0 100}$ SITE NAL # Observers <u>2</u> Observer name(: Count Time Span <u>6:42</u> to <u>7</u> : Cloud/Fog Cover <u>30</u> % Precipi Temp (°C) <u>80</u> Wind (m/s) <u>0</u> 50 ^T $\frac{ Monarchs 200 0 100}{ 0 100} 100 100 100 100 100 100$	DATE $\frac{11}{18} \frac{19}{14}$ SITE NAME $\frac{19}{120}$ # Observers 2 Observer name(s) $\frac{16}{120}$ Count Time Span 6.92 to 7.73 T Cloud/Fog Cover 30 % Precipitation (circl Temp (°C) 30 Wind (m/s) 0 Wind 50% $\frac{10}{50\%}$ 1 34 12.15 25,30 (28) E $a.6$ $73.910,120$ (15) D 24 $13.910,120$ (15) D 24 $13.910,120$ (15) D 24 $13.910,120$ (15) D 12 $16.310,120$ (15) D 12 $16.310,120$ (150) D 12 $16.310,160$ (150) D 12 $16.310,160$ (150) D 44 $170230,300$ (265) D 44 $170230,300$ (265) D 44 $170230,300$ (265) D 44 $17010,120$ (1650) D 43 $169Total in Clusters: (Include count# Loners: [N] [# Sunners:# Fliers:# Fliers:$	DATE $\frac{ / 8 /H}{ S H}$ SITE NAME $\frac{ S S }{ S S S S S S S S S S S S S $	# Observers \underline{Z} Observer name(s) $\underline{M'alt}$, $\underline{Ent}/\underline{N}$ Count Time Span <u>6:42</u> to <u>7:33</u> Total Count Time (Min) <u>5</u>] Cloud/Fog Cover <u>30</u> % Precipitation (circle one) none drizzle ra Temp (°C) <u>Wind (m/s)</u> <u>0</u> Wind (Beaufort) <u>0</u> Wind <u>SOF</u> <u>Wind (m/s)</u> <u>0</u> Wind (Beaufort) <u>0</u> Wind <u>SOF</u> <u>Wind (m/s)</u> <u>0</u> Wind (Beaufort) <u>0</u> Wind <u>SOF</u> <u>Wind (m/s)</u> <u>1</u> <u>9</u> 4 <u>TZ15</u> <u>Evc</u> 12 <u>75,30</u> (23) <u>E</u> <u>a.6</u> <u>T39</u> <u>Evc</u> 9 <u>10,170</u> (15) <u>D</u> <u>947</u> <u>T39</u> <u>Evc</u> 9 <u>10,170</u> (15) <u>D</u> <u>947</u> <u>T39</u> <u>Evc</u> 9 <u>10,50</u> (70) <u>D</u> <u>241</u> <u>T39</u> <u>Evc</u> 10 <u>65,85</u> (75) <u>D</u> <u>641</u> <u>T39</u> <u>Evc</u> 10 <u>12,50</u> (28) <u>D</u> <u>241</u> <u>T39</u> <u>Evc</u> 11 <u>25,70</u> (28) <u>D</u> <u>241</u> <u>T39</u> <u>Evc</u> 11 <u>25,70</u> (28) <u>D</u> <u>241</u> <u>T39</u> <u>Evc</u> 11 <u>25,70</u> (28) <u>D</u> <u>241</u> <u>T39</u> <u>Evc</u> 7 <u>10,560</u> (150) <u>D</u> <u>12</u> <u>T63</u> <u>Evc</u> 7 <u>10,560</u> (150) <u>D</u> <u>494</u> <u>T70</u> <u>Evc</u> 8 <u>10,170</u> (<u>155)</u> <u>D</u> <u>494</u> <u>T70</u> <u>Evc</u> 8 <u>10,170</u> (<u>155)</u> <u>D</u> <u>494</u> <u>T70</u> <u>Evc</u> 10 <u>230,370</u> (265) <u>D</u> <u>43</u> <u>T69</u> <u>Evc</u> 22 <u>550,600</u> (575) <u>D</u> <u>43</u> <u>T69</u> <u>Evc</u> 22 <u>Total in Clusters:</u> (<i>Include count from next pg</i>) <u>Total #T</u> # Loners: [N[] # Sunners: # Fliers: # Grounders (live): [$\begin{array}{c c c c c c c c c c c c c c c c c c c $

# Monarchs Clustered	Zone (ex: A)	Cell (ex; a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m
100,40 (405)	D	dz	769	EUL	19	18
320,360 (240)	D	13	169	Eu	20	20
160,700 (180)	D	\$3	769	Eve	20	20
270, 300 (265)	D	d3	769	Euc	19	19
cro, to (ar)	-		101			
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DATE 11/ 19/14 SITE NAME	in a
# Observers Z Observer name(s) Ty /	er, Brands
Count Time Span 6: 45 to 7:32	
Cloud/Fog Cover_95_% Precipitation (cire	cle one) trizzle rain
Temp (°C) 12.7 Wind (m/s) 0.00 Win	d (Beaufort) Wind direction

# Monarchs Clustered	Zonc (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
250 /230	С	h9	T94	E	11	11
220/190	L C	:8	T81	é	11	11
475/400	Þ	612	T100	С	10	10
2000/1750	D	h y	7100	C	17	10
1450/ 1300	ΰ	ø	TIDD	с	11	ю
4000/3800	D	69	T100	<	12	16
600/675	C	ib	176	5	2617	16
475/450	D	15	T69	٤	18	18
300/350	D	64 (4	T69	Ē	17	17
125/100	D	84 4	129	E	Б	15
250/225	D	C4	170	P	9	9
1000/1050	D	24	TTO	E	17	10
405 /425	D	dч	170	E	9	8
550/250	D	.12	T63	Æ	12	11
150 /200	ア	h1	T63	Ê	10	10
326/2516	9	11	163	E	8	9
Total in Cluster	¥:	(în	chude cou	nt from next pg)	Total # Trees:	
# Loners:						
# Sunners:						very butterfly of
#Fliers: /						pe that you see hout the site.
# Grounders (liv	re):					
Grand Total:		(sum	of all cluste	rod butterflies plu	s loners, sunners, fli	ers, etc.)
# Mating Mona	rehs:					
# Dead Monard	hs:					

Other Notes:

# Monarchs	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
Clustered 275/215	(ex: A)	(2	T50	£		9
	D	46	134	E	9	
	Þ	h3	T38	£	23	23
200/150	D		Tbg	É	23	23
125/150	I	93 71	TIOS	ć	11	11
400/350	T	+1	110			
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	# Observers Count Time Span	6:45er	to 7:	50 T	otal Count Time ()	Min) 65			
# Monarchs Zone Cell Tree # Tree Species Cluster Height (top) (m) Clst Height (bottom) (m) 120,110 120 D h6 124 Eve 8 8 120,1150 (175) D h6 734 Eve 10 9 120,1150 (175) D h6 734 Eve 10 9 120,110 (195) D h6 734 Eve 10 9 120,110 (195) D h6 734 Eve 10 9 120,110 (195) D h6 734 Eve 11 11 120,110 E C3 T44 Eve 11 11 120,110 E C3 T44 Eve 10 10 120,110 D i.1 T63 Eve 10 10 120,120 D A4 T70 Eve 10 10 120,120 <th>Cloud/Fog Cover_</th> <th>100 %</th> <th>Precipit</th> <th>tation (circle</th> <th>e one): fone di</th> <th>rizzle rain</th> <th></th> <th></th>	Cloud/Fog Cover_	100 %	Precipit	tation (circle	e one): fone di	rizzle rain			
Clustered (ex: A) (ex: a2) (top) (m) (bottom) (m) $120, 110$ 120 D $h6$ 124 Evc 8 8 $120, 150$ (75) D $h6$ 734 Evc $R0$ 9 $120, 150$ (75) D $h6$ 734 Evc $I0$ 9 $120, 150$ (12) D $h6$ 734 Evc $I0$ 9 $40, 50$ 12 D $h6$ 734 Euc $I1$ $I1$ $40, 50$ (13) E $C3$ $T44$ Euc $I1$ $I1$ $320, 490$ O $i1$ $T63$ Euc $I0$ $I0$ $320, 490$ O $i2$ 765 Euc $I0$ $I0$ $320, 490$ O $i2$ 765 Euc $I0$ $I0$ $I0$ $320, 550$ D $A3$ $T69$ Euc	Temp (°C)	Wind (r	m/s) <u>0,2</u>	Wind	(Beaufort)	Win	d directio	n N	
I20, Ipo (120) D h6 TSH Evc 8 8 $I20, Ipo (120)$ D h6 TSH Evc 10 9 $I20, Ipo (120)$ D h6 TSH Evc 10 9 $I20, Ipo (120)$ D h6 TSH Evc 10 9 $I20, Ipo (120)$ D h6 TSH Evc 10 9 9 $I20, Ipo (120)$ D h6 TSH Evc 11 11 11 $I40, Ipo (140)$ D h6 TSH Evc 10 9 9 $I20, Ipo (140)$ D h6 TSH Evc 11 11 11 $I40, Ipo (140)$ D i.1 T63 Evc 10 10 10 $I40, Ipo (140)$ D i.1 T63 Evc 10 10 11 $I40, Ipo (140)$ D d.4 T70 Evc 10 10 11 $I40, Ipo (145)$ D d.3 T69 Evc 10 10				Tree #	Tree Species				
100, 100 110 1000 100 100	120,10 (120)	D	h6	734	Eve		-	-	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		D	h6	734	Ex				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	180,210 (195)	D	h6	T34	EUL			9	
45,50 (43) D $h6$ 1344 Euc 11 11 11 320 350 (245) E $c3$ $T49$ Euc 7 7 $410, 500$ (440) D $i1$ $T63$ Euc 11 11 11 $410, 500$ (155) D $i1$ $T63$ Euc 10 10 $329, 480$ (90) D $i2$ 763 Euc 10 10 $329, 480$ (90) D $i2$ 763 Euc 10 10 $150, 510$ (155) D $i4$ $T70$ Euc 10 10 $150, 510$ (245) D $d3$ $T69$ Euc 10 10 $150, 510$ (245) D $d3$ $T69$ Euc 10 10 11 11 $150, 510$ (246) D $b3$ $T69$ Euc 120 120 120 120 120 120 120 120 120 120 120 120 120 120 <	\$0,60(10)	D	h6	T39	he -	9		9	
\$20, 350 (26) F. C3 T49 Cm. S F \$120, 500 (460) D i1 T63 Eac. 7 7 \$20, 500 (460) D i2 T63 Eac. 10 10 \$20, 500 (460) D i2 T63 Eac. 10 10 \$20, 500 (155) D i4 T70 Eac. 10 10 \$20, 260 (2650) D d44 T70 Eac. 11 11 \$20, 260 (2650) D d44 T70 Eac. 11 11 \$20, 260 (2650) D d3 T69 Eac. 10 20 \$21, 2, 560 (2650) D d3 T69 Eac. 10 20 \$24, 2, 260 (2460) D b3 T69 Eac. 10 10 \$24, 2, 260 (2460) D b3 T69 Eac. 17 17 \$24, 2, 260 (240) C 14 T.16 Cap. 17 17 \$240, 240 (240) C 14 T.16 Cap.	45.50 (48)	0		134		li.		[1	
410.50 (440) 0 i1 763 Enc. 11 11 180.460 (50) 0 i2 763 Enc. 10 10 160.50 (155) 0 i1 763 Enc. 10 10 180.460 (50) 0 i1 763 Enc. 10 10 180.460 (55) 0 i1 770 Enc. 10 10 180.460 (265) 0 d44 770 Enc. 11 11 180.460 (265) 0 d44 770 Enc. 10 10 150.510 (265) 0 d3 T69 Enc. 10 20 140.240 (265) 0 d3 T69 Enc. 20 20 140.240 (265) 0 b3 T69 Enc. 10 19 19 140.240 (266) 0 b3 T69 Enc. 17 17 17 17 17 17 17 17 17 17 19 19 19 19 14 10		E	63	T49	En			5	
389,460 (yh) 0 i 2 T63 Enc. 11 11 1(0,150) (155) 0 i 2 T63 Enc. 10 10 2560 (2658) 0 d 4 T70 Enc. 12 11 189,460 (160) 0 d 4 T70 Enc. 11 11 189,460 (160) 0 d 4 T70 Enc. 11 11 189,460 (160) 0 d 4 T70 Enc. 11 11 199,460 (160) 0 d 3 T69 Enc. 10 20 322,580 (250) 0 d 3 T69 Enc. 20 20 240,240 (240) 0 b 3 T69 Enc. 19 19 240,240 (240) 0 b 3 T69 Enc. 19 19 240,240 (240) 0 b 3 T69 Enc. 17 17 Total in Clusters: (include count from next pg) Total # Trees: Tally every butterfly of each type that you see throughout the site. # Sunners: # Sum of all clu			;1	T63	Ere	٦		7	
1/40, 2660 (265) D d4 T70 Enc. 11 11 1/60, 260 (160) D d4 T70 Enc. 11 11 1/50, 520 (265) D d3 T69 Enc. 20 20 3/20, 550 (360) D d3 T69 Enc. 20 20 3/20, 550 (360) D d3 T69 Enc. 20 20 2/40, 240 (240) D b3 T69 Enc. 20 20 2/40, 240 (240) D b3 T69 Enc. 19 19 2/60, 240 (240) D b3 T69 Enc. 19 19 2/60, 240 (240) C 194 T76 Cap. 17 17 Total in Clusters: (include count from next pg) Total # Trees: # Loners: # Loners: # Loners: # Loners: # acc.			12	763	Ene	11		11	
1/40, 2660 (265) D d4 T70 Enc. 11 11 1/60, 260 (160) D d4 T70 Enc. 11 11 1/50, 520 (265) D d3 T69 Enc. 20 20 3/20, 550 (360) D d3 T69 Enc. 20 20 3/20, 550 (360) D d3 T69 Enc. 20 20 2/40, 240 (240) D b3 T69 Enc. 20 20 2/40, 240 (240) D b3 T69 Enc. 19 19 2/60, 240 (240) D b3 T69 Enc. 19 19 2/60, 240 (240) C 194 T76 Cap. 17 17 Total in Clusters: (include count from next pg) Total # Trees: # Loners: # Loners: # Loners: # Loners: # acc.	160,150/155)	D	1	T63	Ere	10		10	
150,200 (160) D d4 T70 Enc. 11 11 250,320 (265) D d3 T69 Enc. 20 20 320,350 (350) D d3 T69 Enc. 20 20 240,240 (266) D b3 T69 Enc. 20 20 240,240 (266) D b3 T69 Enc. 20 20 240,240 (266) D b3 T69 Enc. 19 19 240,240 (266) D b3 T69 Enc. 17 17 Total in Clusters: (include count from next pg) Total # Trees: # Loners: # Loners: # Loners: # Counders (live): 1 Tally every butterfly oper end you see throughout the site. # Grounders (live): 1 Grand Total: (sum of all clustered butterflies plus loners, sumers, fl		00	dy	T70		12		11	
250 (2.65) D d3 T69 Cu 20 20 320,350 (310) D b3 T69 Cu 20 20 240,240 (240) D b3 T69 Cu 20 20 240,240 (240) D b3 T69 Cu 20 20 240,240 (240) D b3 T69 Cu 19 19 240,240 (240) C 14 T76 Cup 17 17 Total in Clusters: (include count from next pg) Total # Trees: # Tally every butterfly oge cach type that you see throughout the site. # Sunners: # Sum of all clustered butterflies plus loners, summers, fliers, etc.) # # Grounders (live): 1 (sum of all clustered butterflies plus loners, summers, fliers, etc.) # # Mating Monarchs: # # Dead Monarchs:			dy	170	Enc	h		11	
32.3.56 (350) 0 33 TA Enc. 20 20 240240 (200) 0 53 T69 Enc. 20 20 400,300 (360) 0 53 T69 Enc. 19 19 260,200 (240) C 14 T76 Cop 17 17 Total in Clusters: (include count from next pg) Total # Trees: # Tally every butterfly of each type that you see throughout the site. # Loners: # # Fliers: // Tally every butterfly of each type that you see throughout the site. # Grounders (live): Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # Pead Monarchs: #	250,320 (2.45)	D	ds	T69	Enc	20		20	
140240 (200) 0 b3 T69 Cuc 20 20 400,300 (300) 0 b3 T69 Cuc) 19 19 260,220 (240) C J4 T76 Cup 17 17 Total in Clusters: (include count from next pg) Total # Trees: # # Loners: (include count from next pg) Total # Trees: # # Sunners: # Fliers: // Tally every butterfly of each type that you see throughout the site. # Fliers: // Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # # Dead Monarchs: #	372,360 (350)	0	83	TA	E.			20	
4100,346 (340) 0 b.3 7.69 6.c.) 19 19 2.60,226 (240) C 19 7.76 Cop 17 17 Total in Clusters: (include count from next pg) Total # Trees: # # Loners: # Loners: Tally every butterfly of each type that you see throughout the site. # Fliers: // Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # # Dead Monarchs:	240,240 (240)	D	P3	769	Ene	20		20	
Total in Clusters: (include count from next pg) Total # Trees: # Loners: # # Sunners: Tally every butterfly of each type that you see throughout the site. # Fliers: // Grounders (live): 1 Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # # Dead Monarchs:		0	63	T69	En)	19		19	
Total in Clusters: (include count from next pg) Total # Trees: # Loners: # # Sunners: Tally every butterfly of each type that you see throughout the site. # Fliers: // Grounders (live): 1 Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # # Dead Monarchs:	260,220 (240)	L	14	776	Cup	17		17	
# Sunners: Tally every butterfly of each type that you see # Fliers: // each type that you see # Grounders (live): and Total: Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: and the second secon	Total in Cluster	8:	(în	clude cou		Total # 1	rees:		
# Fliers: each type that you see # Fliers: each type that you see throughout the site. # Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # Dead Monarchs:	# Loners:								
# Filers: [] throughout the site. # Grounders (live): [Grand Total: (sum of all clustered butterflies plus loners, summers, fliers, etc.) # Mating Monarchs: # Dead Monarchs:	# Sunners:						each type that you see		
# Grounders (live): [Grand Total: (sum of all clustered butterflies plus loners, sunners, fliers, etc.) # Mating Monarchs: # Dead Monarchs:	# Fliers: /				+				
# Mating Monarchs: # Dead Monarchs:	# Grounders (liv	ve): [
# Dead Monarchs:	Grand Total:	,	(sum	of all cluste	red butterflies plu	s loners, su	nners, flie	rs, etc.)	
	# Mating Mona	rchs:							
Other Notes: Of Grage Los	# Dead Monarci	hs:							
	Other Notes:	0	range 1	64					

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	tr Height ttom) (m)		Cluster Height (top) (m)	Tree Species	Tree #	Cell (ex: a2)	Zone (ex: A)	# Monarchs Clustered
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50,40(45) C i9 T81 Enc 8 120,90(105) C i8 T81 Enc 12 11 100,120(100) C i8 T81 Enc 12 11 320,320(545) C h8 T94 Enc 11 2445 C h9 T92 air 13	18			6.0		14	C	
50/10(45) C i9 T81 Enc 8 110,90(105) C i8 T81 Enc 112 11 100,120(100) C i8 T81 Enc 112 11 320,330(545) C h8 T94 Enc 111 1 2445 C h9 T92 air 15	12		12	Gup		28	0	
50,40(45) C i9 T81 Enc 8 120,90(105) C i8 T81 Enc 12 11 100,120(100) C i8 T81 Enc 12 11 320,320(545) C h8 T94 Enc 11 2445 C h9 T92 air 13	10			Gas				240,40 (270)
50,40(45) C i9 T81 Enc 8 120,90(105) C i8 T81 Enc 12 11 100,120(100) C i8 T81 Enc 12 11 320,320(545) C h8 T94 Enc 11 2445 C h9 T92 air 13		10		Gap		01		10.75/69)
50,40(45) C i9 T81 Enc 8 120,90(105) C i8 T81 Enc 12 11 100,120(100) C i8 T81 Enc 12 11 320,320(545) C h8 T94 Enc 11 2445 C h9 T92 air 13	9	0	10	Gip	TICO	610	D	1500 1800 (1 150)
SO, HQ(HS) C i 9 T81 Enc 8 120, 90 (105) C i 1 T81 Enc 10 100, 120 (100) C i 8 T81 Enc 12 1 320, 520 (545) C h 8 T94 Enc 11 1	10	10	11	CIP	7100	610	D	650,680/645)
SO, HQ(HS) C i 9 T81 Enc 8 120, 90 (105) C i 1 T81 Enc 10 100, 120 (100) C i 8 T81 Enc 12 1 320, 520 (545) C h 8 T94 Enc 11 1	11	1	12	Cyp	T100	69	0	1200, 1400 (1300)
SO, HQ(HS) C i 9 T81 Enc 8 120, 90 (105) C i 1 T81 Enc 10 100, 120 (100) C i 8 T81 Enc 12 1 320, 520 (545) C h 8 T94 Enc 11 1	19	19	20	Cyp	T100	c1	I	5000 550 (5250)
SO, HQ(HS) C i 9 T81 Enc 8 120, 90 (105) C i 1 T81 Enc 10 100, 120 (100) C i 8 T81 Enc 12 1 320, 520 (545) C h 8 T94 Enc 11 1	20	20	20	En	TIO9	e7	D	
120,90(105) C 19 T81 Eve 12 11 100,120(100) C 18 T81 Eve 12 11 320,330(345) C 168 T94 Eve 11 2445 C 169 T92 air 13 	8	2	8	Ene	781	:9	C	50,40(45)
100,120(110) C 18 T81 Eve 12 11 32.0,338 (345) C h8 T94 Eve 11 1 2.4.45 C h9 T92 air 13	10	lo	- 10		TOI		C	120,90(105)
320,317 (345) C h8 TAM En 11 1	2	12	12	Eve	and the second se	18		100,120(110)
	0	0	11	En	794	h8	C	320,310 (345)
	#	1	-13	hir	T42	h9-	C	2 birts
						-		

Date: 11/21/14 Site: Pizmo Lount time spin: 6:45 to 7:27 Novel tog ever: 10% Precip: None 125 Tomp: 11.0% Wind: O. Im/s 5003 Pitter 0 251/051 -141 150 1900 1.63 350 490 1.9. 24 492 500 145 133.7 12 12 3000 400 125 120 100 8 100 400 2.13 2002200 143 5 ONO . 85 /100 525 1250 139 53/ 9 41 187 08/02 50/30 187 00/20 1.7 75 \001 02/00 594 179 2.50 / 300 211 2,6 160 /100

# Monarchs	Zone	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
Clustered	(ex: A)	(ex: a2)	TIDD	.C	10	10m
100/100	D	the second s	T100	C	11	JD
100/2000	P	11	Tion	C	.12	. 4
100/80	D	69		Ç	12	12
460/500	D	C1	TIDO	C.	14	14
750/900	D	69	TIDD	C	- 16.	15
5000/4500	P	19		c	11	IJ
75/75	Ð	640,9		6	9	9
170/150	P	F1	TIOS		IP.	11
850 1800	D	25	17449	E		10
350/450	Þ	25	124	6	10	9
250/200	0	ey	FLA-	E	9	
150/200	D	da	464	E		9
450/500	D	dy	m+Da	٤	15	18
250/200	1	dH	11770	8	16	16
180/200	D	64	170	E	111	19
250/350	D	64	TLQ	E	15	15
300/300	0	35	176	۷.	16	16
320/300	0	35	776	٤	15	15
300/400	D	12	T63	E	11	1)
120/100	P	h2	TL3	La la	ю	10
400/400	D	12	163	E	8	5
200/200	D	43	139	E	23	23
80 /100	D	93	169	F	23	23
200/250	-	62	150	\$	\$	8
200/150	E	h4	134	E	/D	10
10/80	C	18	TSI	E	n	12
50/70		18	T\$1	\$	10	/>
20/20	C	18	751	1	ĩ	r
100/75		45	TSH	E	13	11
	c	ns	194	E	10	10
60/50	-		T94	F	10	10
50/50	0	31	1109	Ē	20	20
250/300	the second se				18	15
150/100	D	39	110	-	10	

IJ

Other Notes:

DATE 11/12/19	SITE NAME	_
	Observer name(s) Marindil, Brett, Jear, Daniel	
	5:45 to 8:05 Total Count Time (Min) SO MAN	
Cloud/Fog Cover	% Precipitation (circle one): sone drizzle rain	
Temp (°C) V	Wind (m/s) 0.2 Wind (Beaufort) Wind direction NE	

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Heig (top) (m)	ht Clstr Height (bottom) (m)
508.50 (50)	0	NL	734	E	0	16
50,60 (55)	ũ	h6		1	10	10
6,70 (65)	Û	u			11	11
70,90 (80)	D	LL			12	Li
45,40/43)	ь	U.	1	- 1 - 5A	tt	1
50,10 (55)	0	14	124		10	la
60,70(65)	O	64	T.]0		9	9
90,90 (90)	Ð	64	1		9	4
26, 30 (20)	6	64			6	٦
120,140 (130)	4	dy			٩	9
310,350 (330)	D	dH	1		c/ ·	lo
2600, 2100 (2750)	Þ	d4			12	0
300, 320 (310)	D	65	1		11	10
130,140 (135)	D	63	170		16	16
700,300 (150)	Ο	62	T69		19	18
26, 15 (18)	D	c2	TEG	*	18	18
Total in Cluster	180	(îr	iclude cou	nt from next pg)	Total # Trees	12
# Loners:						
# Sunners:						ly every butterfly of h type that you see
# Fliers: /						oughout the site.
# Grounders (li	ve): /					-
Grand Total:		(sum	of all clust	ered butterflies plu	s loners, sunner:	s, fibers, etc.)
# Mating Mona	rchs:					
# Dead Monarc	hs:					

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
200,250 (225)	D	02	T69	E	18	17
40,12 (135)	D	43	169		19	19
700,00(750)	0	63	T69		1.)	zD
500,600 (550)	D	62	T69		21	21
30,30 (190)	Û	12	10		7	6
390,400 (395)	0	12	T63		2	9
150, 157 (53)	0	42	T63		8	9
80 105 (90)	E	C2	799		7	7
120,120 (120)	0	h2	T38		25	25
			-			
	-					
	-					
		-				
	-		-			
	-					
		-				

7

Please add any counts on this page to the total tally on the previous page.

# Observers	Observer name(s) Daniel Hunneh, (Seatt Jesse
Count Time Span 🥧	:45 to Stoo Total Count Time (Min)	in
Cloud/Fog Cover	% Precipitation (circle one): none drizz)	e rain

	# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster H (top) (t	
425	450/400	0	C-16	Tin	C	10	8
265	295/250	Q	6-9	Tipa	C	15	13
14/50	1404 1500	0	6-10	Tioo	C	11	9.5
383	390 375	P	6-8	Tiao	C	10	10
250	2751225	D	6-8	TID	C	10	10
000	\$50 / 1050	0	6-8	Tigo	C	ĺΥ	14
95	110 / 80	D	6-8	5100	6	13	Z
435	4201450	D	4-9	TIGO	C	14	15
700	6501750	P	a-9	1744	C	17	16
800	800 300	V	d-9	TTuy	c	17	17
455	450/460	D	1-9	Tim	c	17	17
4250	4040 4500	0	0-9	Trice	C	18	16
104	110/97	0	9-8	T-108	C	11.5	11.5
450	454/450	D	9-8	T-108	C	12	1
130	150 /120	0	9-8	T-108	C	14	11
510	520 1500	Ì	01-7	T-109	E	21	Z a
	Total in Cluster	st .	(în	clude cour	nt from next pg)	Total # Tr	'965:
	#Loners: 15						
	# Sunners:						Tally every butterfly of
	# Fliers: A						each type that you see throughout the site.
	# Grounders (liv	e): -					0
	Grand Total:		(sum	of all chuste	red butterflies plu	s loners, sum	nors, filors, etc.)
	# Mating Monar	rehs:					
	# Dead Monarch	15;					

Other Notes:

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
120/105	0	1-7	T-109	F	20	10
175/150	C.	1-9	T-81	E	12	n
250 /300	C	1-3	T-76	ć	1816	16
70/60	C	:-3	1-76	c	16	16
220/750	C	1-3	T-76	С	17	17
65175	C	1-3	T-76	C	19	18
		0				
	· · · · ·					
2						-
					-	
	-					
		-				
					and the second	

ver name(s) Errily, Nicole, Daviel, Hannuh	Observers 7 Observe
to 7:35 Total Count Time (Min) 50	
Precipitation (circle one): none drizzle rain	loud/Fog Cover 20 %
	loud/Fog Cover_20 %

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster He (top) (m	
9,90 (50)	I	14	728	the	6	6
160, 10 (175)	I	94	7218	Eve	5	7
HO, 160 (150)	D	16	T34	EUC	ю	10
10,90 (90)	Ю	h6	734	Ere	10	- 1
(05) 0500	Þ	h6	134	Ere	12	11
300,750 (725)	D	12	763	Eve	7	6.5
200,240 (230)	P	12	763	ELK	9	9
50,400 (375)	P	12	763	Eve	10	9
0/20 (100)	E	0	The	Eve	8	8
220,260 (240)	D	dy	769	ELL	20	20
240,200 (260)	D	19	769	ELC	19	19
180,200 (190)	D	84	769	EUL	20	20
250,280 (260)	P	14	769	Eve	20	20
KO,120 (110)	D	14	769	Eve	19	19
140,160 (150)	D	des	170	Eve	10	10
10,111 (105)	- D	64	170	Ex	9	9
Total in Cluster	rs:	(ii	nclude cou	int from next pg)	Total # Tr	ees:
# Loners:						
# Sunners:						fally every butterfly of each type that you see
# Fliers: TH-						hroughout the site.
# Grounders (li	ve):					
Grand Total:		(зыт	of all clust	tered butterflies pli	us loners, sum	ers, fliers, etc.)
# Mating Mona	rehs:					
# Dead Monarc	hs:					

Other Notes:

# Monarchs Clustered	Zone (ex: A)	Cell (ex: a2)	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
60,90 (75)	A	04	T70	Euc	15	15
500,600 (590)	D	14	170	Euc	12	1D
450,460 (455)	Ø	dy	770	Eve	R	10
280,340 (30)	Ð	dy	770	Eve	9	9
320,350 (335)	C	j4	T76	Eve Eve Cyp	18	17
	_					
		-				
_					-	
			-			

# Monarchs	Zone	Cell	Tree #	Tree Species	Cluster Height (top) (m)	Clstr Height (bottom) (m)
Clustered	(ex: A)	(ex: a2)	1.11	6	10	8
550/600	R	CIO	T-105	C	15	13
150/4170	0	6-9	T-100		H	9.5
905/1660	0	6-10	T-100	C		10
300 1346	D	6-2	T-104		10	10
\$14/740	0	6-3	T-100	c	10	15
320/280	0	d-9	T-100	C	16	15
450/500	0	9-9	F100	C	16	16
600 / 550	0	d-9	T-106	C	16	-
200 1.1200	0	d-9	T-100	C	18	17
1150/ 500	0	d-9	T-104	C	18	11
15. / 120	0	9-8	T-158	C	12	
	18	0-8	T-109	C	1)	10
	0	8-8	T-108	C	IN IN	10
	i	1-7	T-109	E	21	20
1	1	d-7	T-109	E	21	10
224/200	C	h-8	T-93	E	10	9
240/210	_	1-8	T-81	E	12	12
130/110	E	1-1	1-1-			
	+	-	-			
				-		
			-			
	-					
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	_	_				-
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			-			
				al tally on the p	Enviour name	

1/

Appendix C

	А	В	С	D	E	F
1	Date	MonarchCount	TreeNum	TreeSpecies	Height	ZoneCell
2	11/1/2014	12	T63	E	3	D-i-1
3	11/1/2014	45	T63	E	3	D-i-1
4	11/1/2014	15	T63	E	3	D-i-1
5	11/1/2014	22	T63	E	4	D-h-1
6	11/1/2014	45	T63	E	4	D-h-1
7	11/1/2014	15	T63	E	4	D-h-1
8	11/1/2014	55	T63	E	4	D-h-1
9	11/1/2014	36	T63	E	4	D-h-1
10	11/1/2014	28	T69	E	10	D-e-3