

**Monitoring of the Threatened  
Delta Green Ground Beetle at the  
East Wilcox Ranch (Solano County, CA)  
in 2008**

**Submitted By:**

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**Submitted To:**

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**Report Date:**

February 2009

## INTRODUCTION

The Solano Land Trust has implemented a four-year program to monitor special-status species associated with the vernal pool and Valley Grassland habitats that occur at its East Wilcox Ranch. This ranch covers 1,342 acres and is located east of Travis Air Force Base within a region of Solano County that is referred to as the Jepson Prairie.

This report describes the findings of the second year of monitoring for the Delta Green Ground Beetle (DGGB), a federally-listed threatened species that is known to occur at the East Wilcox Ranch. Arnold (2007) presented background information on the DGGB, an assessment of the playa pool habitat suitability at East Wilcox Ranch, and other information about the site. The 2008 monitoring focused on presence-absence surveys of the DGGB at the ranch.

## STUDY METHODS

### Presence-Absence Surveys.

Presence-absence surveys for the DGGB were conducted at the 18 playas at Eastern Wilcox Ranch (#1 - #18 in Figure 1) and at 6 playas at the Jepson Prairie Preserve (#49 - #54 in Figure 2). The “squat and stare” survey technique, as described in Arnold (2007), was used to sample for DGGB adults. Surveys were conducted on five dates in February and March, 2008.

## RESULTS AND DISCUSSION

### Presence-Absence Surveys.

Twelve DGGB adults were observed at eight playas on East Wilcox Ranch in the spring of 2008 (Table 1) between February 15 and March 15. Four adults were observed at playa #1 and two adults at playa #11, while single adults were observed at playas #4, #5, #8, #13, #14, and #18 (Figure 3). Table 1 provides information on weather conditions for each DGGB observation and the number of “squat and stare” survey stations at each playa pool on every survey date.

Six playas at the Jepson Prairie Preserve were also monitored for the DGGB in 2008. Four adult beetles were observed at playa #50, but no adults were observed at the other five playas. Seven of the playas at East Wilcox Ranch where DGGB were observed in 2008 also had beetle observations in 2007. Playa #18 was a new location in 2008, while no DGGBs were observed at playas #6 or #9 where observations had occurred in 2007.

In 2008 the first DGGB adults were observed at playas #1 and #50 (Figures 1 and 2), on February 15<sup>th</sup>, while the last adult was observed on March 8<sup>th</sup>. No DGGB adults were observed during a visit on March 15<sup>th</sup>, in part due to cool daytime temperatures. However, since little rain had fallen after early January, the Collembola prey items of the DGGB were uncommon by March 8<sup>th</sup> so the adult activity season may have been somewhat abbreviated in 2008.

Table 2 compares DGGB survey findings for the years 2002, 2007 and 2008 using the playa identifiers as illustrated in Figure 1. The 2002 DGGB surveys were conducted by Larry



Serpa. With the limited numbers of DGGB adults that have been observed, some year-to-year variation is apparent, but may be due to the small sample sizes rather than any real fluctuations in beetle population numbers. For example, DGGB adults were found at playas #11, #13, and #14 in all three survey years, and playas #1, #4, #5, #8, and #18 in two of the three years. Beetles were found at playas #2, #6, #9, #12, and #16 in only one of the three survey years. No beetle observations have occurred in any of the three years at playas #3, #7, #10, #15, and #17. Results for the 2009 and 2010 DGGB surveys will be added once those surveys have been completed.

### **Population Size.**

One of the original goals of the DGGB monitoring efforts was to estimate population numbers of the beetle. Unfortunately, DGGB observations in 2008 were too limited in their occurrence and abundance at East Wilcox Ranch to achieve the minimum sample sizes necessary to reliably estimate population numbers using any statistically-based methods. Statisticians generally recommend a minimum sample size of 30 observations to obtain reliable estimates of population parameters and for detection of differences in results between years, pools, etc.

If a population estimate is still desired, I suggest that the Solano Land Trust scale back the survey effort in 2009 so more sampling time can be spent at a subset of the 18 playas of East Wilcox Ranch. Unfortunately the funds available for this monitoring effort are quite minimal compared to the amount of time that is necessary to find greater numbers of the beetle. Also, findings of the 2007 and 2008 surveys indicate that the beetle occurs at most of the playas at East Wilcox Ranch, so time spent sampling at the Jepson Prairie Preserve might be better spent at the ranch.

## **ACKNOWLEDGEMENTS**

I thank Ben Wallace, Conservation Project Manager at the Solano Land Trust, for sponsoring this study. I also thank Solano County for allowing me to use its color aerial photography. This work was conducted under US Fish & Wildlife Service permit #797233 issued to Richard Arnold.

## **REFERENCES CITED**

Arnold, R.A. 2007. Monitoring of the Threatened Delta Green Ground Beetle at the East Wilcox Ranch (Solano County, CA). Report prepared for the Solano Land Trust.

**Table 1. DGGB Observations at Wilcox Ranch and Jepson Prairie in 2008**

<b>Playa Pool ID #</b>	<b>Survey Date</b>	<b>Number of DGGB Observed</b>	<b>Number of Survey Stations</b>	<b>Air Temp °F</b>	<b>Wind Speed mph</b>
1	Feb. 15	1	5	58	3
2	Feb. 15	0	5	58	3
3	Feb. 15	0	5	58	3
4	Feb. 15	0	5	58	3
5	Feb. 15	0	5	59	3
6	Feb. 15	0	5	59	3
7	Feb. 15	0	5	59	6
8	Feb. 15	0	5	59	4
9	Feb. 15	0	5	59	3
10	Feb. 15	0	5	60	5
11	Feb. 15	0	5	60	5
12	Feb. 15	0	5	60	3
13	Feb. 15	0	5	60	4
14	Feb. 15	0	5	61	3
15	Feb. 15	0	5	61	3
16	Feb. 15	0	5	61	4
17	Feb. 15	0	5	61	4
18	Feb. 15	0	5	61	4
54	Feb. 15	0	10	62	3
50	Feb. 15	1	10	64	4
1	Feb. 27	0	10	60	3
2	Feb. 27	0	10	61	3
15	Feb. 27	0	10	62	2
16	Feb. 27	0	10	63	3
17	Feb. 27	0	10	64	2
18	Feb. 27	0	20	65	4
54	Feb. 27	0	20	65	2
50	Feb. 27	1	15	65	2

<b>Playa Pool ID #</b>	<b>Survey Date</b>	<b>Number of DGGB Observed</b>	<b>Number of Survey Stations</b>	<b>Air Temp °F</b>	<b>Wind Speed mph</b>
53	Feb. 27	0	10	67	4
52	Feb. 27	0	10	68	3
51	Feb. 27	0	10	67	3
49	Feb. 27	0	10	67	3
1	Feb. 29	1	20	59	8
2	Feb. 29	0	5	59	7
3	Feb. 29	0	5	60	7
4	Feb. 29	0	5	60	8
5	Feb. 29	1	5	60	7
6	Feb. 29	0	15	61	8
7	Feb. 29	0	5	61	4
8	Feb. 29	1	5	62	4
9	Feb. 29	0	5	62	4
10	Feb. 29	0	5	63	4
11	Feb. 29	1	5	63	5
12	Feb. 29	0	5	63	4
13	Feb. 29	0	5	63	4
14	Feb. 29	0	5	63	5
54	Feb. 29	0	20	63	4
50	Feb. 29	1	15	63	5
18	March 8	1	15	60	3
17	March 8	0	5	60	3
16	March 8	0	5	61	3
15	March 8	0	5	61	3
1	March 8	1	10	63	5
2	March 8	0	15	63	5
3	March 8	0	5	63	5
4	March 8	1	10	64	4
5	March 8	0	10	64	3
6	March 8	0	10	64	4

<b>Playa Pool ID #</b>	<b>Survey Date</b>	<b>Number of DGGB Observed</b>	<b>Number of Survey Stations</b>	<b>Air Temp °F</b>	<b>Wind Speed mph</b>
7	March 8	0	5	65	5
8	March 8	0	5	65	5
9	March 8	0	10	66	6
10	March 8	0	10	66	6
11	March 8	1	10	67	4
12	March 8	0	5	68	6
13	March 8	1	15	68	6
14	March 8	1	15	69	6
50	March 8	1	15	69	7
54	March 8	0	10	69	5
1	March 15	0	10	55	4
2	March 15	0	5	55	4
3	March 15	0	5	55	4
4	March 15	0	5	55	4
5	March 15	0	5	56	3
6	March 15	0	5	56	5
7	March 15	0	5	56	4
8	March 15	0	5	56	4
9	March 15	0	5	56	3
10	March 15	0	5	56	6
11	March 15	0	5	56	5
12	March 15	0	5	57	6
13	March 15	0	5	57	6
14	March 15	0	5	57	6
15	March 15	0	5	57	8
16	March 15	0	5	57	5
17	March 15	0	5	57	5
18	March 15	0	5	57	6
50	March 15	0	10	57	6
49	March 15	0	5	57	6

<b>Playa Pool ID #</b>	<b>Survey Date</b>	<b>Number of DGGB Observed</b>	<b>Number of Survey Stations</b>	<b>Air Temp °F</b>	<b>Wind Speed mph</b>
51	March 15	0	5	57	6
52	March 15	0	5	57	5
53	March 15	0	5	57	5
54	March 15	0	5	57	7

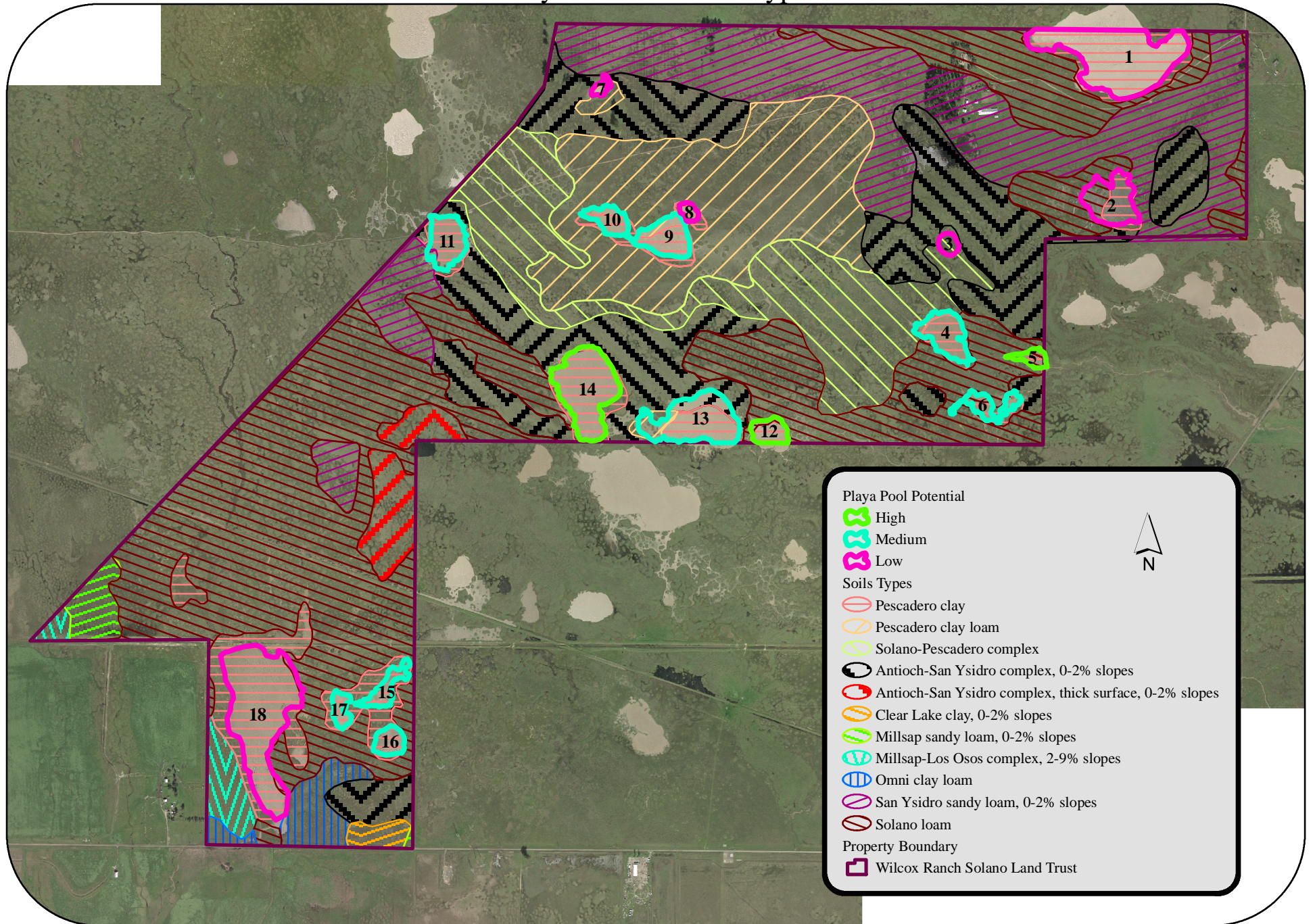
**Table 2. Summary of DGGB Observations at East Wilcox Ranch (2002, and 2007 – 2010)**

Playa Pool Id	Summary of DGGB Observations (+ or -) at 18 Wilcox Ranch Playas				
	Serpa 2002	Arnold 2007	Arnold 2008	2009	2010
1	-	+	+		
2	+	-	-		
3	-	-	-		
4	-	+	+		
5	-	+	+		
6	-	+	-		
7	-	-	-		
8	-	+	+		
9	-	+	-		
10	-	-	-		
11	+	+	+		
12	+	-	-		
13	+	+	+		
14	+	+	+		
15	-	-	-		
16	+	-	-		
17	-	-	-		
18	+	-	+		

**Note: + = present and - = absent.**



Figure 1: Delta Green Ground Beetle Study at Wilcox Ranch Solano Land Trust  
Playa Pools and Soil Types



0 1,250 2,500 5,000 Feet

September 19, 2007  
Entomological Consulting Services, Ltd.



Figure 2. - DGGB Jepson Study Area: Pools 50 - 54

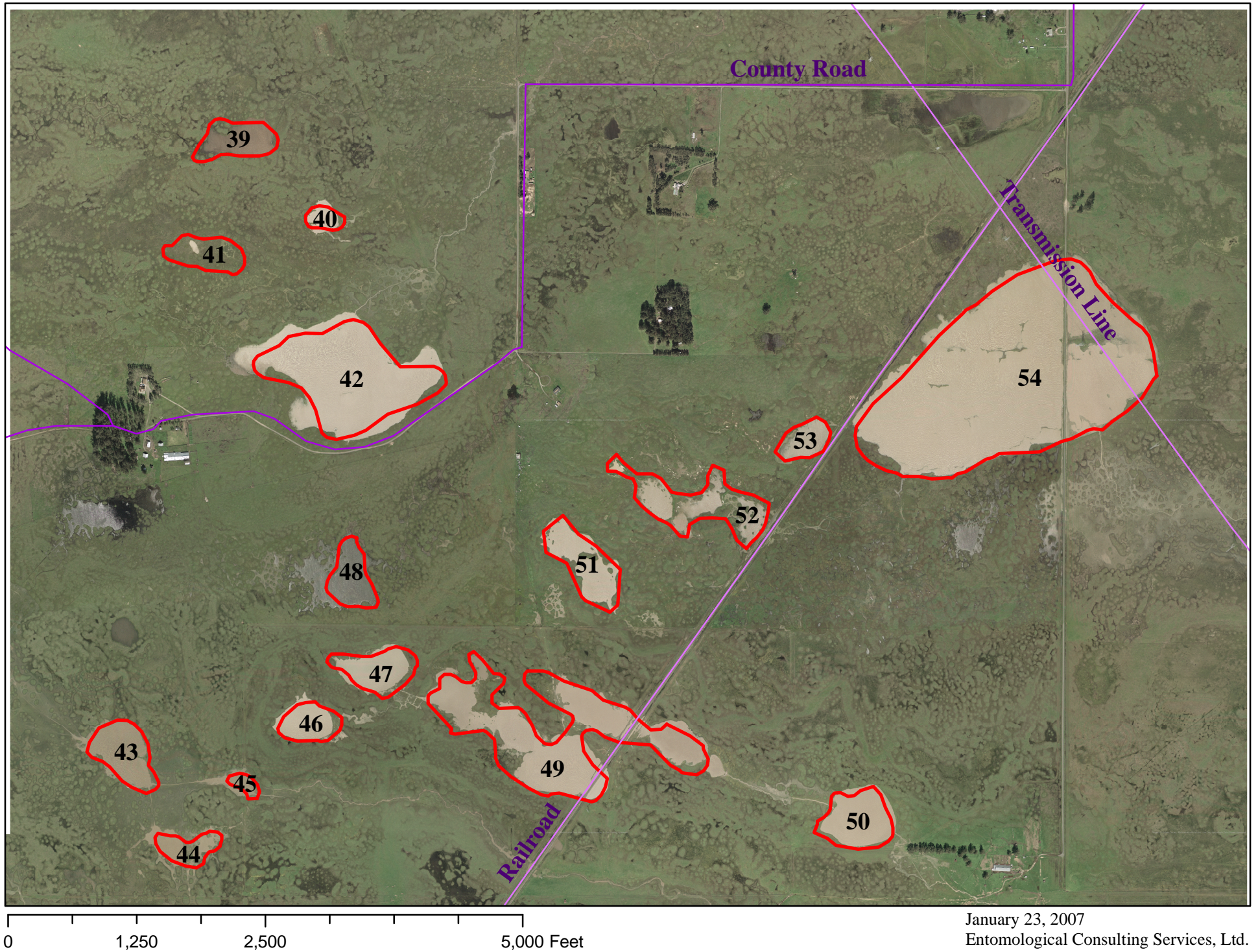




Figure 3: Delta Green Ground Beetle Study at Wilcox Ranch Solano Land Trust  
Playa Pools, Habitat Types and 2008 DGGB Observations

