

DELMARVA PENINSULA FOX SQUIRREL STUDY  
EGYPT ROAD BLOCK  
NOVEMBER & DECEMBER 1982/MARCH 1983

A Delmarva fox squirrel survey was conducted in November and December 1982 in the 52 acre woodland block adjacent to Egypt Road, an area considered to be prime habitat for the squirrels. The mark-recapture method was used and the survey was conducted as it was in 1980. The 1980 population estimate was 27, with a standard error of  $\pm 4$ . This year the calculated estimate was very high at 70; however, the standard error was also high at  $\pm 34$ , due to the low number of recaptures. Although there was clearly an increase in the population, there was some doubt that it was as high as 70, since there has been no habitat manipulation in this block in the past six years that would influence the population size. There was only a two week interval between the two trapping periods and the traps were prebaited only once prior to being set, so the squirrels' first or second experience with the trap turned out to be a painful one (for those that had not been marked in previous years). If they made such a correlation, they may well have avoided the traps. This would result in a low number of recaptures, which would in turn throw the population estimate off. (This did not appear to be a problem in the 1980 survey, however.)

To eliminate the bias that may have been caused by toe clipping the squirrels, and hopefully any other variables, it was decided to run the survey again in March using the squirrels marked in the November and December trapping periods as the marked population, and making March the census period. The traps were prebaited beginning Tuesday, March 15, and trapping commenced Tuesday, March 22. After two days of trapping (Tuesday and Wednesday), a total of fifteen squirrels were captured. Of these, twelve were new squirrels (for this year's survey - some had been captured in previous years) and only three were recaptures. This was sufficient to tell us that our earlier estimate was probably closer to being correct than had been thought. A total of forty

Rpt #4

different squirrels were captured during the two two-week periods in the fall and the two days in March. Due to the large number of new captures in the two days in March, it is assumed that, had trapping continued for a full week or more, new ones would continue to turn up and the proportion of unmarked to marked would remain high. Given this, along with a known minimum of forty squirrels in the block, the population estimate of seventy was assumed to be reasonably correct, and trapping was ceased to prevent causing any unnecessary stress on the squirrels, as their nesting season was beginning.

Twice as many juveniles were captured in the fall of 1982 (36% of captures = 10) as compared to 1980 (22% of captures = 5), while the number of adults captured remained the same, an indication that good production is at least partly responsible for the population increase. Increased production could be an indication of improved habitat conditions or possibly cyclical fluctuations in the fox squirrel population. Although such fluctuations have been documented among gray squirrels, they have not been reported in Delmarva fox squirrels. As a result of this survey and general field observation, the refuge population estimate was increased from 450 to \_\_\_\_\_.

Note: A considerable amount of cutting on pine cones was noted in this block and in the Spicer tract in March, further indication of large populations.

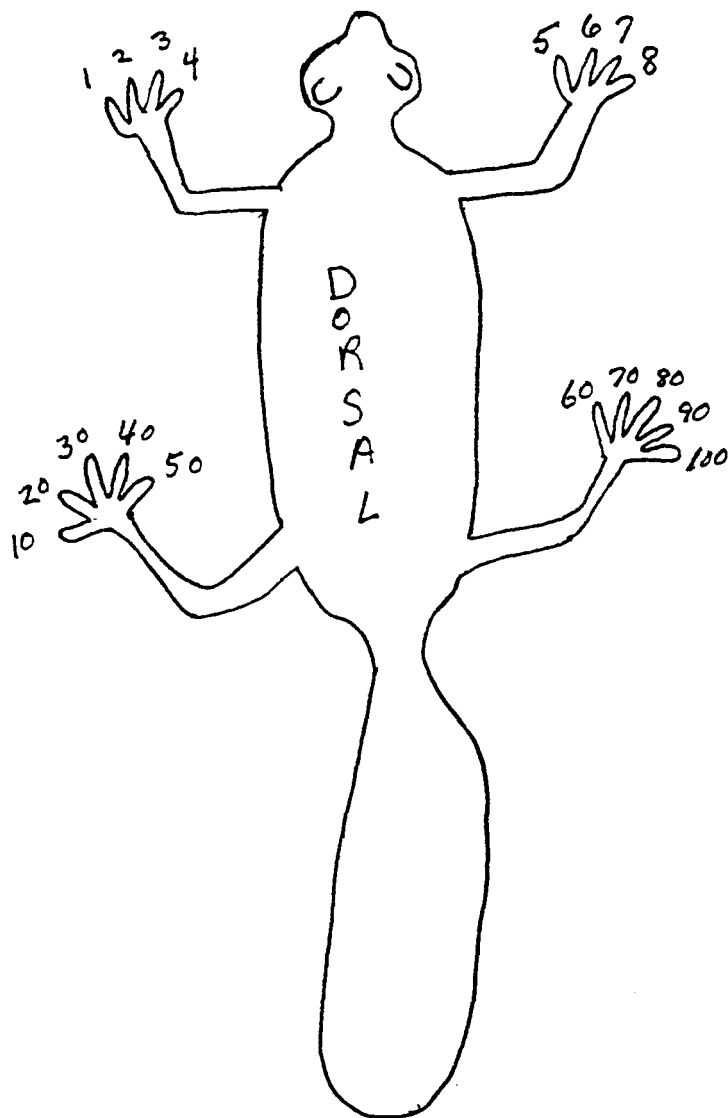
#### Recommendations:

1. An alternate method of marking squirrels for identification of individuals should be found to avoid the pain association that may come with toe clipping. Also, unless permanent marking is needed in the future for special studies, there appears to be no need to remove toes.

2. In future surveys, prebaiting should begin about a week before trapping, especially if toe clipping is to be used.

3. To gather squirrel population data that can more easily be applied to the refuge population as a whole, a survey should be run in at least one other area of the refuge where the habitat is less than optimum for this species and perhaps more representative.

TOE CLIP SCHEME



1982 DELMARVA FOX SQUIRREL SURVEY - EGYPT ROAD

Rpt #4

Page 1 of 5

	11/08/82	11/09/82	11/10/82	11/11/82	11/12/82
L1 - P1					
L1 - P2					A ♀ #63
L2 - P1					
L2 - P2		A ♀ #60	A ♂ #61		
L3 - P1		J ♂ #57	Gray ♀ (2)		
L3 - P2				Tripped	
L3 - P3				Raccoon	
L4 - P1					
L4 - P2					
L4 - P3	A ♀ #33			Tripped	
L4 - P4					
L4 - P5			Corn gone		
L4 - P6					
L5 - P1					
L5 - P2		DFS escape (J ♀)			
L5 - P3					Raccoon
L5 - P4					
L5 - P5					
L5 - P6				Corn gone	
L5 - P7	A ♂ #56	A ♀ #33 (r)	Gray ♂ (1)		
L5 - P8	DFS escape (J ♀)		Raccoon		
L6 - P1		Raccoon			
L6 - P2					
L6 - P3					
L6 - P4					A ♀ #62
L6 - P5					
L6 - P6			A ♂ #43		
L7 - P1	Corn gone		Raccoon		
L7 - P2					

## 1982 DELMARVA FOX SQUIRREL SURVEY - EGYPT ROAD

Page 2 of 5

	11/15/82	11/16/82	11/17/82	11/18/82	11/19/82
L1 - P1		J ♀ #71			
L1 - P2		A ♂ #70			
L2 - P1				A ♂ #15	
L2 - P2					
L3 - P1		A ♀ #32			
L3 - P2					
L3 - P3	A ♂ #60 (r)	A ♀ #68 (small)			
L4 - P1					
L4 - P2					
L4 - P3					
L4 - P4			Tripped		
L4 - P5				Gray ♀ (4)	A ♀ #33 (r)
L4 - P6	J ♀ #65				J ♂ #74
L5 - P1					
L5 - P2					
L5 - P3		J ♀ #66			
L5 - P4					
L5 - P5		A ♀ #33 (r)			Opossum
L5 - P6					
L5 - P7					
L5 - P8		A ♀ #67			
L6 - P1					
L6 - P2					
L6 - P3					Tripped
L6 - P4					
L6 - P5			J ♀ #72		
L6 - P6	A ♂ #64				
L7 - P1			A ♀ #28	Gray ♀ (3)	A ♀ #73
L7 - P2					Gray ♂ (5)

## 1982 DELMARVA FOX SQUIRREL SURVEY - EGYPT ROAD

Page 3 of 5

	12/06/82	12/07/82	12/08/82	12/09/82	12/10/82
L1 - P1		A ♂ #12			
L1 - P2			A ♀ #63 (R)		
L2 - P1					
L2 - P2		J ♂ #75			
L3 - P1					
L3 - P2					
L3 - P3					
L4 - P1					
L4 - P2					
L4 - P3	Corn gone	#33 (R)			
L4 - P4					A ♀ #33 (r)
L4 - P5					
L4 - P6					
L5 - P1					
L5 - P2			Gray (N <sub>2</sub> )		
L5 - P3					
L5 - P4		Gray (R <sub>1</sub> )	Gray (N <sub>3</sub> )		
L5 - P5					
L5 - P6		Tripped			
L5 - P7					
L5 - P8					
L6 - P1			Gray (N <sub>1</sub> )		
L6 - P2	Flipped (deer)				
L6 - P3			A ♂ #5		
L6 - P4					
L6 - P5					
L6 - P6					
L7 - P1	Gray (R <sub>3</sub> )				J ♀ N <sub>1</sub> (tail clip)
L7 - P2		Gray (r <sub>3</sub> )		J ♂ #76	DFS - escape
				died overnight	

## 1982 DELMARVA FOX SQUIRREL SURVEY - EGYPT ROAD

Page 4 of 5

	12/13/82	12/14/82	12/15/82	12/16/82	12/17/82
L1 - P1					J♂ N <sub>2</sub> died/shock
L1 - P2					
L2 - P1					
L2 - P2					
L3 - P1					
L3 - P2				#75 (r)	
L3 - P3					
L4 - P1					
L4 - P2					
L4 - P3					
L4 - P4					Gray (r)
L4 - P5					
L4 - P6					
L5 - P1					
L5 - P2		Tripped			
L5 - P3					
L5 - P4		#33 (r)		Gray (r)	
L5 - P5					
L5 - P6			DFS escape	#33 (r)	
L5 - P7					
L5 - P8					Corn eaten-rodents
L6 - P1					
L6 - P2					
L6 - P3					
L6 - P4					
L6 - P5			A (?) #26		#56 (R)
L6 - P6					
L7 - P1					
L7 - P2					



## 1982-83 DELMARVA FOX SQUIRREL SURVEY - EGYPT ROAD

\* = new in 1982-83 survey / TC = tail clip

Page 5 of 5

	03/22/83	03/23/83	
L1 - P1			
L1 - P2		* ♀ - #1 (?)	May have just been missing toenail. Looked like juvenile.
L2 - P1			
L2 - P2			
L3 - P1	*A ♀ #44		Weather cold; days 30-40's, windy; nights 30's
L3 - P2		*A ♂ #58	
L3 - P3			
L4 - P1	*J ♂ TC		
L4 - P2		*A ♂ TC	
L4 - P3	J ♀ #66 (R)	Gray	
L4 - P4			
L4 - P5			
L4 - P6	* ♀ white spot	A ♀ #32 (R)	
L5 - P1			
L5 - P2	Gray	Bait gone	
L5 - P3	*A ♀ TC		Did not fully recover from drugging after $\pm 1\frac{1}{2}$ hours; did not find later.
L5 - P4			
L5 - P5		Tripped	
L5 - P6		Tripped	
L5 - P7	*A ♂ TC		
L5 - P8			
L6 - P1			
L6 - P2	*A ♀ TC		
L6 - P3	*A ♂ #11		
L6 - P4	*A ♂ #6	*J ♀ TC	
L6 - P5		Corn gone	
L6 - P6	A ♂ #5 (R)	Corn gone	
L7 - P1			
L7 - P2	Gray		

TOTALS

12 New Squirrels  
3 Recaptures  
(during 1982-3 trapping period)

1982 DELMARVA FOX SQUIRREL STUDY

$$N = \frac{Tn}{t}$$

T = number premarked  
n = total December  
t = premarked December

$$\text{DFS} = \frac{21(10)}{3} = \frac{210}{3} = 70 \text{ DFS}$$

$$\text{Gray} = \frac{5(5)}{2} = \frac{25}{2} = 12.5 = 13 \text{ Gray}$$

$$\begin{aligned} \text{Standard Error} &= \sqrt{\frac{T^2 n(n-t)}{t^3}} \\ &= \sqrt{\frac{(21)^2 10(10-3)}{(3)^3}} \\ &= \sqrt{\frac{(441)(10)(7)}{27}} \\ &= \sqrt{\frac{30,870}{27}} \\ &= \sqrt{1,143} \\ &= 33.8 = 34 \end{aligned}$$

T = number marked precensus  
n = total trapped census  
t = number marked census

T = 21  
n = 10  
t = 3

$$N = 70 \pm 34 = 36 \rightarrow 104$$

$$\begin{aligned} 1980 \text{ Standard Error} &= \sqrt{\frac{T^2 n(n-t)}{t^3}} \\ &= \sqrt{\frac{(20)^2 12(12-9)}{(9)^3}} \\ &= \sqrt{\frac{(400)(12)(3)}{729}} \\ &= \sqrt{\frac{14,400}{729}} \\ &= \sqrt{19.75} \\ &= 4.45 = 4 \end{aligned}$$

T = 20  
n = 12  
t = 9

$$N = 27 \pm 4 = 23 \rightarrow 31$$

SUMMARY OF 1982 CENSUS

November

21 DFS:

8 Adult Female > 15 adult  
7 Adult Male >  
5 Juvenile Female > 6 juvenile  
1 Juvenile Male >

5 Gray

December

7 DFS New:

1 Adult unknown > 3 adult  
2 Adult Male >  
1 Juvenile Female > 4 juvenile  
3 Juvenile Male >

3 DFS Recapture

3 Gray New

2 Gray Recapture

COMPARISON OF ADULTS TO JUVENILES (1980, 1982)

<u>1980</u>	<u>1982</u>
Total = 23	Total = 28
18 Adults	18 Adults
5 Juveniles	10 Juveniles
22% Juveniles	36% Juveniles

Twice as many juveniles captured in 1982 as in 1980.