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Geographical Distribution of Re-encountered Pine Siskins Captured in Eastern New York 1964-1997

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ABSTRACT

I examined the banding locations of 37 previously banded Pine Siskins (*Carduelis pinus*) recaptured near Schenectady, NY; and the locations of 27 siskin re-encounters from among 9137 Pine Siskins banded near Schenectady in the 1964-1997 period, excluding 1989-1990. All but one of the 37 retraps (97%) were birds banded south and southwest of Schenectady either along or east of the Appalachian Mountain range at distances up to 1110 km during the same irruption flight. One retrap had been banded more than a year prior to recapture, 150 km southeast of Schenectady.

Fourteen of the 27 re-encountered Pine Siskins banded near Schenectady were encountered beyond 50 km at 12 locations. These locations were generally in a southwest-northeast orientation in the eastern United States and Canada with five of them up to 1110 km to the southwest and six up to 630 km north and 820 km northeast. One siskin was recovered 990 km to the northwest. Twenty of the 27 re-encounters (74 percent) occurred within the same irruptive flight, four a year later, and three were two years later.

Average rate of northward movement in April and May both for birds moving from southerly locations to Schenectady, as well as for siskins banded in Schenectady moving farther north was 14.4 km/day. During the peak of spring migration in mid-April to late-May, the average was 18.8 km/day, with a maximum individual rate of 36.1 km/day for a siskin recaptured at Schenectady, and 25.0 km/day farther north for a siskin banded at Schenectady.

INTRODUCTION

I previously reported on the geographical distribution of re-encountered Pine Siskins banded or recaptured near Schenectady, NY, during the 1989-1990 irruption (Yunick 1997). That irruption appeared unique in that it involved some siskins that either came from or went to distant western locations. Here I present data on additional siskin captures, all of eastern origin, at the same Schenectady banding locations for the 1964-1997 period, excluding 1989-1990.

Differences in the timing of appearance, numbers of siskins banded, and geographical origin of recaptured siskins varied from irruption to irruption suggesting that no one pattern of distribution characterizes the way this species irrupts from northern forests. Rates of northward spring movement were estimated from some of the data.

METHODS

As previously described (Yunick 1997), Pine Siskins were captured at three feeder locations in the Schenectady, NY, area: 1) my backyard feeder at Schenectady; 2) my Jenny Lake feeder near Corinth, Saratoga County, NY (55 km north of Schenectady); and 3) Thomas Palmer's feeder near Amsterdam, Montgomery County, NY (28 km west of Schenectady).

Prior to 1988, incomplete skull pneumatization was used to recognize hatching-year (HY) birds in October-December, and juvenal plumage to recognize newly fledged juveniles in May-July. Starting in 1987, rectrix shape and/or covert contrast was used to separate age classes through the entire year (Yunick 1995). Males were identified in the breeding season by the presence of a cloacal protuberance, and females by a brood patch.

Recapture data supplied by the Bird Banding Laboratory were used to locate capture and recapture sites on maps to measure straight-line distances between these sites. These distances were used to estimate, where appropriate, the average rates of travel between sites by dividing those distances by the number of elapsed days for siskins twice captured within the same irruption.

The rates of occurrence of re-encounters, foreign retraps, and repeat captures were compared for four major invasions occurring in 1971-1972, 1975-1976, 1987-1988 and 1989-1990 by dividing the total number of each of those capture classes by the number of siskins banded in the respective invasion. A similar composite comparison was made for each of the three banding locations.

RESULTS

Table 1 summarizes in two parts the capture and recapture data on Pine Siskins banded in the Schenectady area which were re-encountered within the same invasion (upper part), or in a subsequent invasion (lower part). All bandings are identified by a letter B and a two-digit number for convenient reference. Figure 1 is a map of the eastern United States and Canada depicting these data.

Table 2 summarizes re-encounters (represented by the letters RE and a double-digit number) in the Schenectady area of Pine Siskins banded elsewhere. All re-encounters, except RE-26, occurred during the same invasion as the one of banding. They occurred at my yard feeder, except for RE-12 reported by the finder in Scotia, NY (7 km west of my yard feeder), and RE-16 captured and released by me at Jenny Lake. Figure 2 shows the geographic distribution of the original capture locations in Table 2.

Table 3 represents an analysis of the data from Tables 1 and 2 showing distances between capture locations, elapsed times, and estimated average rates of travel. They are derived from the banding of 9137 Pine Siskins in the 1964-1997 period, excluding 1989-1990, as follows: 8352 at my Schenectady feeder 1964-1997, 670 at Jenny Lake 1972-1997, and 115 near Amsterdam 1988-1997.

The upper portion of Table 4 summarizes dates, numbers banded, and rates of recapture from four major Pine Siskin invasions using data from only my Schenectady feeder. The lower portion summarizes the same information for all three banding locations for all years 1964-1997.

DISCUSSION

Siskins Banded at Schenectady - Information in Table 1 and Figure 1 show both a southerly (five locations) and northerly (seven locations) distribution, generally oriented southwest-northeast, for re-encountered Pine Siskins banded near Schenectady. All re-encounters occurred in the eastern United States and Canada differing from those previously reported (Yunick 1997) for the 1989-1990 invasion, wherein some birds went to or came from distant western locations, illustrating a uniqueness to that 1989-1990 invasion. Brewer et al. (2000) depict a similar southwest-northeast orientation of capture-recapture sites for the majority of siskins banded in eastern Canada, 1921-1995, while Ontario encounters show greater east-west distribution and western Canadian encounters an even greater east-west orientation between capture sites.

Excluding local re-encounters (within 50 km) of the Schenectady birds, there was an equal number ($n=7$) re-encountered in the same invasion as in a subsequent invasion, not unlike 1989-1990 when four were re-encountered in the same invasion, and five subsequently. In Figure 1 there is a nearly equal distribution of same-invasion re-encounters to the south ($n=3$) as to the north ($n=4$); however, for those siskins re-encountered in a subsequent invasion more occurred to the north ($n=5$) than south ($n=2$).

Tables 1 and 4 also illustrate that other differences exist from invasion to invasion. The major invasions of 1971-1972, 1975-1976, 1987-1988 and 1989-1990 summarized in Table 4 show variations in first capture dates of as early as 8 Nov to as late as 13 Feb, but closely spaced termination dates between 16-25 May. Invasions that appeared early, as in 1971-1972 and 1975-1976, produced higher percentages of re-encounters, foreign retraps and repeat captures.

Table 1. Pine Siskins Banded at or near Schenectady, NY, and Re-encountered in the Same Irruption.

Band-ing	Date Banded	Age / Sex ¹	Re-enc. Location	Re-enc. Date	Status ²	Dist., km	Direc-tion	Elap. Days	Rate km/Day
B-01	22 Jan 72	AHY U	Schenectady NY	-- Feb 72	No Information	1	SE	-	-
B-02	29 Apr 72	AHY U	Plainfield VT	7 May 72	Cap. - Rel.	200	NE	8	25.0
B-03	1 Jan 74	AHY U	Schenectady NY	15 Jan 74	Found Dead	5	E	14	
B-04	27 Nov 75	HY U	Pine Bush NY	2 Apr 76	Cap. - Rel.	9	S	126	
B-05	27 Nov 75	HY U	Ballston Lake NY	7 Apr 76	Read by Telescope	11	N	131	
B-06	29 Nov 75	U U	Pine Bush NY	2 Apr 76	Cap. - Rel.	9	S	124	
B-07	29 Nov 75	HY U	Glenville NY	27 Mar 76	Found Dead	5	NW	118	
B-08	25 Dec 75	HY U	Averill Park NY	7 Mar 76	Cap. - Rel.	40	SE	72	
B-09	27 Dec 75	U U	Pine Bush NY	20 Feb 76	Cap. - Rel.	9	S	5.5	
B-10	4 Jan 76	AHY U	Pine Bush NY	26 Mar 76	Cap. - Rel.	9	S	81	
B-11	15 Jan 76	AHY U	Pine Bush NY	21 Mar 76	Cap. - Rel.	9	S	65	
B-12	5 Mar 76	AHY U	Scotia NY	5 Mar 76	Struck Object	7	ENE	0	
B-13	10 May 78	AHY U	Arvida PQ	8 Jun 78	Dead on Highway	630	NNE	29	21.7
B-14	11 May 82	AHY U	Timmons ON	18 Jul 82	Found Dead	990	NW	68	14.6
B-15	22 Nov 86	HY U	Charlesbourg PQ	15 May 87	Cap. - Rel.	485	NNE	173	
B-16	22 Nov 86	HY U	Honesdale PA	25 May 87	Found Dead	170	SW	123	
B-17	22 Nov 86	AHY U	Palmerton PA	22 Feb 87	Found Dead	255	SW	92	
B-18	3 Jan 87	SW U	Schenectady NY	8 Feb 87	Hit Window	1	SE	36	
B-19	11 Jan 87	SY U	Cornwall NY	20 May 87	Eaten by Hawk	150	S	129	
B-20	31 Jan 87	ASY U	Schenectady NY	22 Mar 87	Found Dead	2	ENE	50	

Pine Siskins Banded at Schenectady, NY, Re-encountered in a Subsequent Irruption

B-21	28 Apr 72	AHY U	Cherokee NC	12 Apr 73	Found Dead	1110	SW		
B-22	30 Apr 72	AHY U	Mt. Desert ME	1 May 74	Cap. - Rel.	470	ENE		
B-23	6 May 72	AHY U	Halifax NS	5 Jan 73	Struck Object	820	ENE		
B-24	29 Nov 75	HY U	Plainfield VT	22 Apr 77	Cap. - Rel.	200	NE		
B-25	14 May 81	AHY U	State College PA	1 May 82	Cap. - Rel.	390	SW		
B-26	15 Nov 86	HY U	Charlesbourg PQ	23 Apr 89	Cap. - Rel.	485	NNE		
B-27	3 May 88	ASY U	Coldbrook NS	6 Jul 90	Cap. - Rel.	770	ENE		

¹ Age/sex abbreviations are: AHY=after-hatching-year; ASY=after-second-year; HY=hatching-year; U=unknown.

² Cap.-Rel. = captured and released.

Fig. 1. Re-encounter locations of Pine Siskins originally banded near Schenectady, New York, 1964-1997 (excluding 1989-1990) as listed in Table 1. Circles represent birds banded and re-encountered in the same invasion; triangles represent birds banded and re-encountered in invasions at least a year apart. The numbers at each location correspond to the B number in Table 1. Short-distance re-encounters near Schenectady, under 50 km, are excluded.

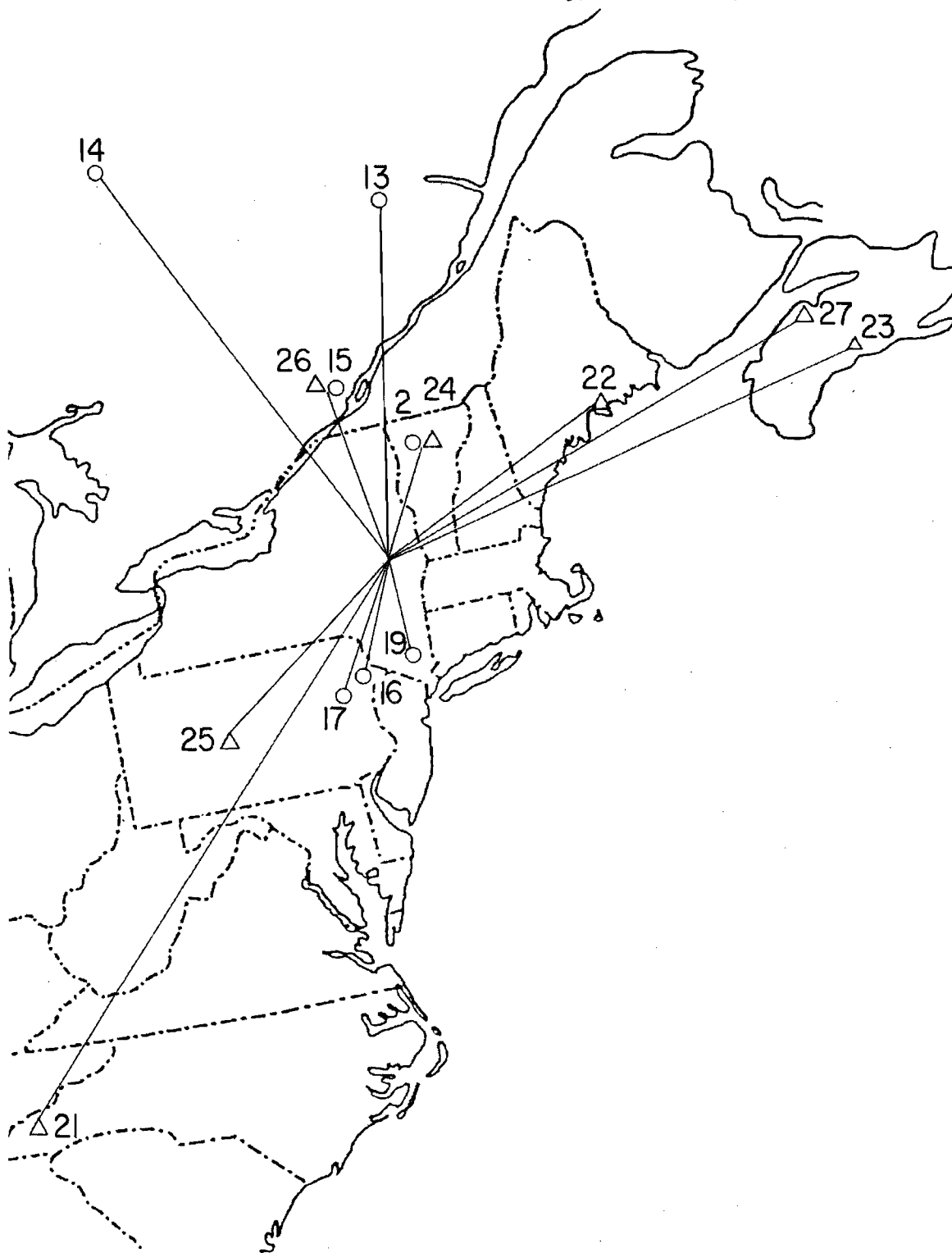


Table 2. Pine Siskins Retrapped at or near Schenectady, NY, from Other Banding Locations.

Re-en-counter	Date Re-trapped	Age / Sex ¹	Banding Location	Date Banded	Age / Sex	Bander ²	Dist., km	Direction	Elap. Days	Rate km/day
RE-01	25 Apr 72	AHY U	State College PA	12 Jan 72	AHY U	Condee	390	NE	103	3.8
RE-02	26 Apr 72	AHY U	Philadelphia PA	17 Feb 72	AHY U	Pepper	325	NNE	68	4.8
RE-03	28 Apr 72	AHY U	Binghamton NY	27 Jan 72	AHY U	Marsi	180	NE	91	2.0
RE-04	28 Apr 72	AHY U	Ramsey NJ	20 Mar 72	AHY U	Dater	210	N	39	5.4
RE-05	28 Apr 72	AHY U	White Plains NY	21 Mar 72	AHY U	Meleny	200	N	38	5.3
RE-06	28 Apr 72	AHY U	Ramsey NJ	7 Apr 72	AHY U	Dater	210	N	21	10.0
RE-07	28 Apr 72	AHY U	Ramsey NJ	10 Apr 72	AHY U	Dater	210	N	18	11.7
RE-08	29 Apr 72	AHY U	Ramsey NJ	16 Mar 72	AHY U	Dater	210	N	44	4.8
RE-09	1 May 72	AHY U	Mendham NJ	14 Apr 72	AHY U	Rosche	230	NNE	17	13.5
RE-10	6 May 72	AHY U	Ramsey NJ	17 Apr 72	AHY U	Dater	210	N	19	11.1
RE-11	8 May 72	AHY U	Towson MD	7 Feb 72	AHY U	Lubbert	435	NE	90	4.8
RE-12	12 May 72	AHY U	Reidsville NC	26 Feb 72	AHY M	Noonan	920	NE	75	12.3
RE-13	12 May 72	AHY U	Ramsey NJ	27 Apr 72	AHY U	Dater	210	N	15	14.0
RE-14	13 May 72	AHY U	Linwood NJ	28 Mar 72	AHY M	Savell	385	N	46	8.4
RE-15	17 May 72	AHY U	Philadelphia PA	8 May 72	AHY U	Pepper	325	NNE	9	36.1
RE-16	29 May 72	AHY F	State College PA	21 Mar 72	AHY U	Wood	390	NE	69	5.7
RE-17	8 Apr 74	AHY U	Woodstock NY	23 Mar 74	AHY U	Rifenburg	90	NNE	16	9.6
RE-18	12 May 74	AHY U	Levittown PA	22 Apr 74	U U	Neuman	300	NNE	20	15.0
RE-19	17 Apr 76	AHY U	Schenectady NY	30 Mar 76	ASY M	Schroeder	(9)	N	(18)	(local)
RE-20	25 Apr 76	AHY F	Schenectady NY	15 Apr 76	AHY U	Schroeder	(9)	N	(10)	(local)
RE-21	27 Apr 76	AHY U	Tunkhannock PA	1 Feb 76	AHY U	Daniels	215	NE	85	2.5
RE-22	8 May 76	AHY U	Schenectady NY	21 Mar 76	AHY U	Schroeder	(9)	N	(48)	(local)
RE-23	2 May 78	AHY U	Claymont DE	3 Mar 78	AHY U	Conway	355	NNE	60	5.9
RE-24	3 May 78	AHY U	Carpenterville NJ	3 Jan 78	AHY U	Mutchler	255	NNE	120	2.1
RE-25	15 May 78	AHY U	Whiting NJ	30 Jan 78	AHY U	Pharo	310	N	105	3.0
RE-26	30 Apr 81	AHY U	Hartford CT	20 Feb 78	AHY U	Parks ³	(150)	NW	(-)	(-)
RE-27	8 May 81	AHY U	Endicott NY	25 Feb 81	AHY U	Curran	190	NE	72	2.6
RE-28	5 May 82	AHY U	Grimville PA	6 Mar 82	AHY U	Ruhe	260	NNE	60	4.3
RE-29	8 May 82	AHY M	Ft. Meade MD	4 Apr 82	AHY U	Klimkiewicz	470	NE	34	13.8
RE-30	10 May 82	AHY F	State College PA	28 Mar 82	AHY U	Bordner	390	NE	43	9.1
RE-31	10 May 82	AHY U	Hutton MD	1 Apr 82	AHY F	Pope	600	NE	39	15.4
RE-32	12 May 82	AHY U	Baltimore MD	14 Mar 82	AHY U	Barber	445	NE	49	7.5
RE-33	13 May 82	AHY U	Elkins WV	7 Mar 82	AHY U	Oliver	650	NE	67	9.7
RE-34	17 May 82	AHY U	Ft. Meade MD	27 Feb 82	AHY U	Klimkiewicz	470	NE	79	5.9
RE-35	1 May 88	SY F	Woodstock NY	26 Feb 88	AHY U	Rifenburg	90	NNE	62	1.5
RE-36	3 May 88	ASY U	Ft. Meade MD	1 Apr 88	AHY U	Klimkiewicz	470	NE	32	14.7
RE-37	12 May 88	SY U	Brevard NC	31 Dec 87	AHY U	Weston	1110	NE	132	8.4

¹ Age/sex abbreviations are: AHY=after-hatching-year; ASY=after-second-year; F=female; SY=second-year; U=unknown

² Bander's full name appears in acknowledgment.

³ Not recaptured same year.

Fig. 2 Original banding locations of Pine Siskins recaptured near Schenectady, New York, 1964-1997 (excluding 1989-1990) as listed in Table 2. A solid line represents a bird banded and recaptured within the same invasion, while a dashed line represents banding and recapture separated by at least a year. The numbers at each location correspond to the RE number in Table 2. Some locations (RE-04 for instance) were the source of more than one banding (RE-06, 07, 08, 10 and 13) and are designated only by the earliest RE number.

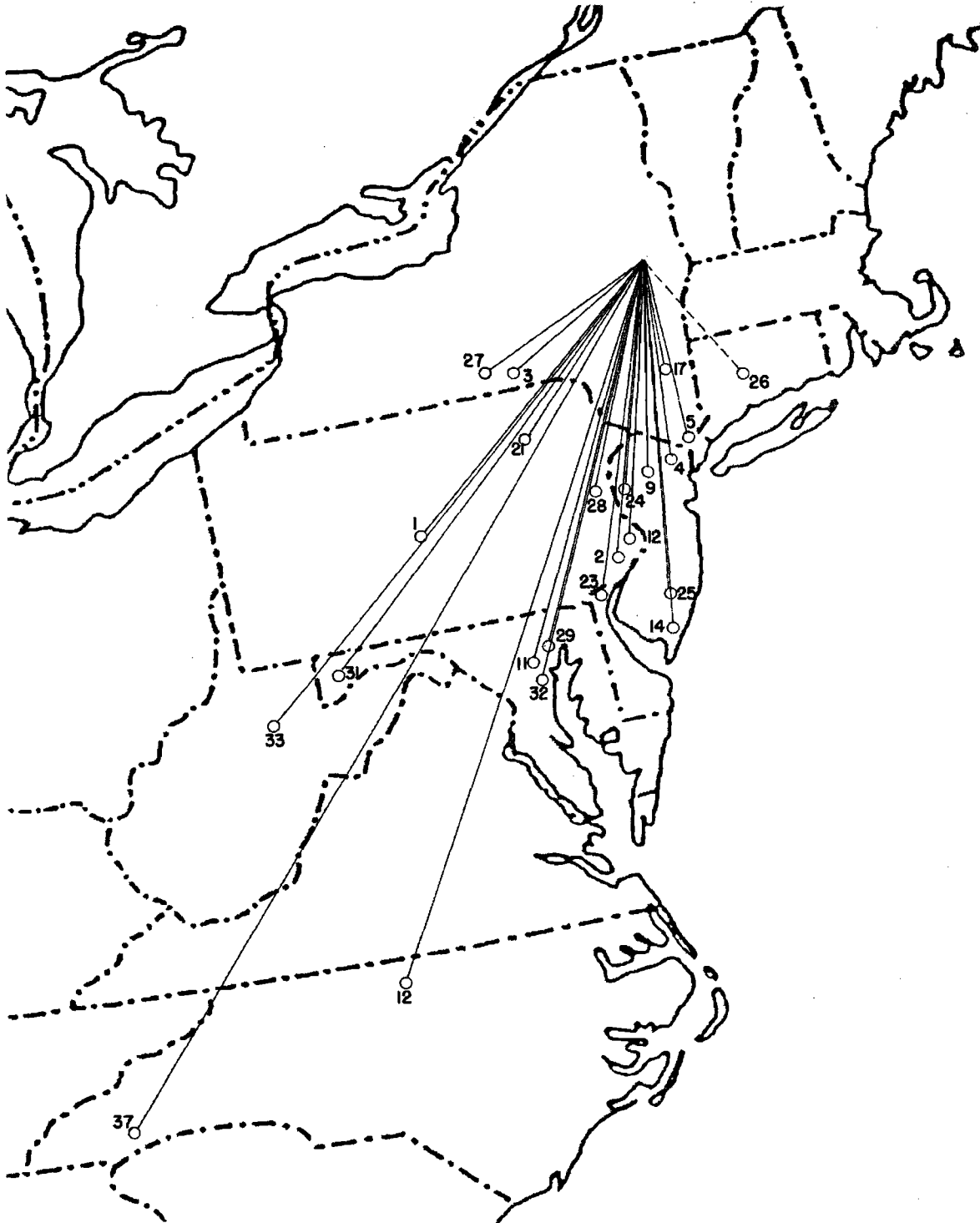


Table 3. Distances and Elapsed Times of Pine Siskins Recaptured at Schenectady, NY, during 1964-1997, excluding 1989-1990.

		Distance, km		Elapsed Days		Estimated Rate, km/day	
Banding and Re-encounter Status	Size, n	Range	Ave.	Range	Ave.	Range	Ave.
1) Banded Schenectady Area, Re-enc. Same Irruption							
a) All Bandings in Table 1 Included ¹	19	1-990	158	0-173	79	-	-
b) Non-local Re-encounters (B-02, 13-17, 19)	7	150-990	411	8-173	89	-	-
c) Apr-May Only (B-02, 13, 14)	3	200-990	607	8-68	35	14.6-25.0	17.3
2) Banded Schenectady Area, Re-enc. Subsequent Irruption (B-21-27)							
	7	200-1110	606	-	-	-	-
3) Re-enc. Schenectady Area Within Same Irruption							
a) All Table 2 except RE-19, 20, 22, 26	33	90-1110	355	9-132	56	1.5-36.1	6.3
b) Apr-May Only, Excluding Locals	10	210-600	324	9-39	22	10.0-36.1	14.4
¹ Table 1 shows 20 such bandings, but B-01 lacks information for inclusion here.							

Table 4. Banding and Recapture Data on Pine Siskins Captured at my Schenectady Feeder during Four Major Irruptions; and 1964-1997 Totals for Three Schenectady Area Locations.

Irruption Year	Banding Dates		Total Banded	Re-encounters		Foreign Retraps		Repeat Captures	
	First	Last		Number	%	Number	%	Number	%
1971-1972	13 Dec	21 May	1268	5	0.39	14	1.10	382	30.1
1975-1976	8 Nov	16 May	1263	10	0.79	4	0.32	510	40.4
1987-1988	13 Feb	19 May	3154	1	0.03	3	0.10	816	25.9
1989-1990	3 Feb	25 May	3360	6	0.18	3	0.09	446	13.5
Total 1964-1997:									
Schenectady	25 Oct	25 May	11,712	33	0.28	39	0.33	2763	23.6
Jenny Lake	3 Aug	24 Jul	1073	3	0.28	1	0.09	238	22.2
Amsterdam	19 Feb	30 Apr	397	0	0.0	1	0.25	12	3.0
Grand Total	3 Aug	24 Jul	13,182	36	0.27	41	0.31	3013	22.9

The repeat captures are an indication of the degree to which siskins remained in the area of banding implying that they wintered in the area. This wintering behavior is illustrated in Table 1 by B-04 through B-11, banded Nov 1975 to Jan 1976 and locally re-encountered from Feb through Apr 1976. The repeat recapture rate, 40.4%, is the highest of these four irrutions.

By contrast, when Pine Siskins appeared in 1986-1987 (B-15 through B-20 in Table 1), three November bandings were re-encountered out of the area, but none locally; and two of the three Jan.-Mar. 2003

January bandings were recovered locally as wintering birds. In the two later invasions of 1987-1988 and 1989-1990, the recapture percentages were lower, suggesting that more of these birds were transient, rather than wintering. The 1989-1990 invasion which contained re-encounters of western origin appeared to be the most transient based on the lowest repeat recapture percentage, 13.5, in Table 4. The overall re-encounter rate for the 13,182 siskins banded 1964-1997 was 0.27%, compared to 0.18% for 54,925 siskins banded in Canada, 1955-1995 (Brewer et al. 2000).

Siskins Retrapped at Schenectady - Information in Table 2 and Figure 2 also supports the conclusion that the 1989-1990 invasion (Yunick 1997) was unique; and that invasions vary from one to another with regard to timing, location and abundance. Figure 2 shows that 97% of the foreign-banded siskins retrapped at Schenectady (n=37) were retrapped within the same irruption. This contrasts with the 1989-1990 irruption where only 74% were re-encountered in the same irruption. All of the banding locations in Figure 2 are either along or east of the Appalachian Mountains in a southerly direction, the farthest at 1110 km; and none is from a far western location as was the case in 1989-1990.

The 1971-1972 irruption produced a record 16 retraps at Schenectady (Table 2), originating primarily (75%) from wintering or migrating locations in New Jersey and Pennsylvania at distances of 210-390 km (average, 275 km). Others came from New York, Maryland, and North Carolina at distances of 180-920 km (average for all 16, 315 km). These data suggest there was a large wintering population in the New York, New Jersey, and Pennsylvania area in 1971-1972. Half of these 1971-1972 northward passing migrants were captured in April, and half in May. There was a memorable, constant surge of Pine Siskins passing through the Schenectady area in late April to mid-May. On the morning of 28 Apr 1972, in just 2.5 hours (from 0500 to 0730) before leaving for work, I captured 125 siskins and 23 birds of other species. Among the siskins were 99 unbanded, 21 repeats, and five foreign-banded siskins, three of which were from a single New Jersey location—an unforgettable morning of banding.

The invasion of 1981-1982, while modest at Schenectady with only 638 siskins banded, produced the second highest total (n=7) of foreign-banded retraps. Compared to the recaptures in 1972, these birds were of a more distantly southern origin, coming from Maryland (mostly), Pennsylvania, and West Virginia at distances of 260-650 km (average, 470 km vs. 275 km in 1971-1972). All were retrapped in the latter part of the migration in May.

The 1986-1987 invasion was also modest with 779 siskins banded, from which seven were re-

encountered elsewhere (B-15 to B-20, and B-26 in Table 1), but not a single foreign-banded siskin was retrapped at Schenectady. A year later, the 1987-1988 invasion produced the second highest banding total (n=3154), but only three foreign retraps (RE-35 to RE-37). Thus, there appeared to be no correlation of numbers of foreign retraps with numbers of siskins banded.

Estimated Rate of Northward Movement - From some of the 27 re-encounters (Table 1) and 37 retraps (Table 2) it is possible to estimate the rate of northward movement in the spring. Siskins banded at Schenectady (excluding local captures) were recaptured eight to 173 days following banding (average, 89), while birds banded elsewhere were retrapped at Schenectady nine to 132 days later (average, 56). Since not all of these birds were engaged in migration (some were wintering) at the time of capture or recapture, it was necessary to restrict recapture data to the peak migration period in April and May for calculation purposes.

Three Pine Siskins banded at Schenectady (B-02, 13, 14) and ten recaptured at Schenectady (RE-06, 07, 09, 10, 13, 15, 18, 29, 31, 36) fell into that category. The averages and ranges of distances, elapsed times and estimated rates are shown in Table 3. The retraps (n=10) moving northward to Schenectady averaged 14.4 km/day between capture points, while the birds banded at Schenectady (n=3) then going further north averaged 17.3 km/day. When three similar bandings from the 1989-1990 invasion are combined with the latter (n=6), that average changes from 17.3 km/day to 14.4 km/day, matching that of birds banded at southerly locations coming to Schenectady.

If the analysis is further restricted to using both capture and recapture dates falling only in the peak migration period from mid-April to early June (B-02, 13 and RE-10, 13, 15, 18), the average estimated rate is 18.8 km/day. When the shortest elapsed time between captures is used as a criterion (B-02 of eight days and RE-15 of nine days), it illustrates that some individuals progressed northward at even faster rates of 25.0 and 36.1 km/day, respectively. When captured at Schenectady on 17 May, RE-15 was only four days away from the

latest capture date of 21 May for that invasion, representing the very last of the northward migration. The bird banded at Schenectady, B-02, was captured at the peak of the northward passage through Schenectady on 29 Apr.

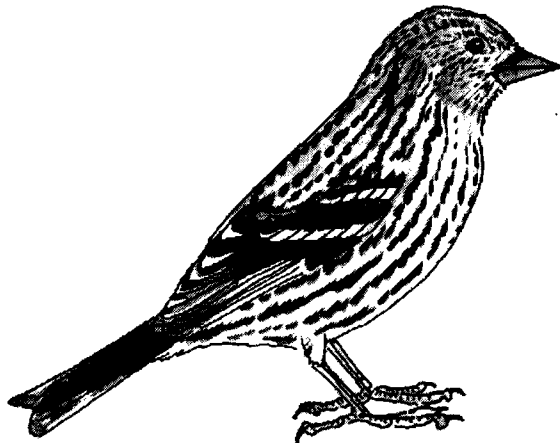
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Pine Siskin
by George West