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Winter Movements of Common Redpolls and Pine Siskins Within and Between Winters

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ABSTRACT

To examine distances traveled outside of the breeding season (October through April) and between winters for irruptive Common Redpolls (*Carduelis flammea*) and Pine Siskins (*Carduelis pinus*), I analyzed all of the re-encounter data from 1926 through 2003 for these two species from the U.S.G.S. Bird Banding Laboratory. Within winters, mean distance between banding location and re-encounter location was about 120 km for both species, although in exceptional Pine Siskins the distance was more than 1000 km. For re-encounters of winter-banded birds captured in subsequent winters, mean distance between Common Redpoll banding location and re-encounter station was 690.2 km, significantly less than the mean distance of 867.4 km for Pine Siskins. Month of re-encounter had a significant effect on distance traveled for Common Redpolls but not Pine Siskins.

INTRODUCTION

The Common Redpoll (*Carduelis flammea*) and Pine Siskin (*Carduelis pinus*) are two species in a suite of cardueline finches commonly referred to as northern finches. These finches are well known for their irruptive behavior, moving farther southward during the winter in some years (Bock and Lepthien 1976, Larson and Bock 1986, Koenig 2001, Schlegel et al. 2002). Although both species eat a variety of seeds, Common Redpolls depend strongly on birch and alder seeds (Knox and Lowther 2000) and Pine Siskins primarily use seeds from a variety of conifers with small cones (Dawson 1997). During mast years of these tree species, redpolls and siskins may spend the entire year on their breeding grounds. During years of poor seed production, particularly after a mast year, these species disperse southward (Wilson 1999, Koenig and Knops 2001).

Patterns of irruptions are well documented by Christmas Count data, Project FeederWatch and records of local ornithological and birding societies (Hochachka et al. 1999). Common Redpoll irruptions seem to follow a biennial cycle (Kennard 1976; although see Erskine and McManus 2003), while Pine Siskin irruptions are much less predictable. Thus, patterns of population movements of these vagile species are well known. However, the behavior of individual birds is poorly known. Using re-encounter data of banded birds from the Bird Banding Laboratory of the United States Geological Survey, I describe the patterns of movement within and between non-breeding seasons of these two irruptive finches. For purposes of this paper, distance refers to the distance traveled by birds banded in the winter to another site either during that same winter or in subsequent winters.

The band re-encounter data have some inherent limitations due to variable banding effort over time and uneven distribution of banding stations throughout North America. Comparisons between the two species must be made cautiously because the wintering and breeding range of the two species differ (Dawson 1997, Knox and Lowther 2000).

MATERIALS AND METHODS

This study is based on all of the re-encounter data for Common Redpoll and Pine Siskin in the Bird Banding Laboratory from 1926 through 2003. The complete datasets include 717 re-encounters for Common Redpoll and 2,276 re-encounters for Pine Siskin. Because this study focuses on winter

movements, I restricted the analysis to birds banded and re-encountered between October and April. Both species begin irruptions in October. The earliest nesting occurs in the middle of April for Pine Siskin (Dawson 1997) and May for Common Redpoll (Knox and Lowther 2000).

For movements within one winter (birds banded no earlier than October and re-encountered during that same winter), I found 291 records for Common Redpolls re-encountered at another banding station. The 208 re-encounters during a winter at the original banding site were not used in the analysis. For Pine Siskin, 833 re-encounters were available (excluding the 478 re-encounters at the original banding site).

For movements between winters, 185 re-encounter records were available for Common Redpoll and 314 for Pine Siskin. I included re-encounters at the original banding station for this between-year analysis (73 for Common Redpoll and 25 for Pine Siskin). For Common Redpoll, all of the re-encounters were south of the breeding range and thus significant movement would have occurred between banding and re-encounter. Most Pine Siskin re-encounters were similarly south of the breeding range. Even within the breeding range, Pine Siskins re-encountered at the same station in different years would have likely traveled extensively between banding and re-encounter because of their nomadic nature (Dawson 1997).

I used a Great Distance Calculator (http://www.gb3pi.org.uk/great.html) to determine the distance in km between banding site and re-encounter site. Anticipating that birds banded or re-encountered early in the winter might not have moved as far south as birds banded or re-encountered later in a subsequent winter, I tested for this possible bias by performing a two-way ANOVA, testing the effect of banding month and re-encounter month for both species. I also used one-way ANOVA to test the effect of number of years between banding and re-encounter on the distance moved between banding site and re-encounter site. The statistical analyses were performed with SPSS (Statistical Package for the Social Sciences), Version 11.2.

RESULTS

As indicated in Figure 1, Pine Siskins and Common Redpolls showed similar patterns of distance moved within winters (125 km and 119 km, respectively). For re-encounters away from the banding site, 84% of Common Redpolls and 86% of Pine Siskins were less than 200 km distant. For the relatively few instances of movement within a winter of more than 1000 km, Pine Siskins seem to be more vagile than Common Redpolls.

Figure 2 presents distances moved between winters for both species. ANOVA indicated that the interval between banding and re-encounter was not significant for Common Redpoll ($F_{5,177}$ = 1.057, p = 0.386) or Pine Siskin ($F_{5,268}$ = 0.941, p = 0.455). For Common Redpoll, a two-way ANOVA indicated that re-encounter month had a significant effect ($F_{6,159}$ = 2.701, P = 0.016) but not banding month ($F_{4,159}$ = 0.568, P = 0.686) nor the interaction of the two main effects ($F_{13, 244}$ = 0.392, P = 0.971). The mean distance moved between winters was 690 km. Table 1 breaks the distances down by re-encounter month. The evident pattern is that birds re-encountered later in the winter show greater movement.

Table 1. Distance moved (± standard deviation) between winters as a function of re-encounter date for Common Redpoll. Sample size is also given.

Re-ecounter Month	Mean (± SD)	N
October	191 (246.1)	2
November	21 (62.7)	9
December	66 (245.5)	24
January	408 (672.4)	13
February	600 (840.4)	32
March	863 (1229.9)	67
April	1163 (1546.5)	36

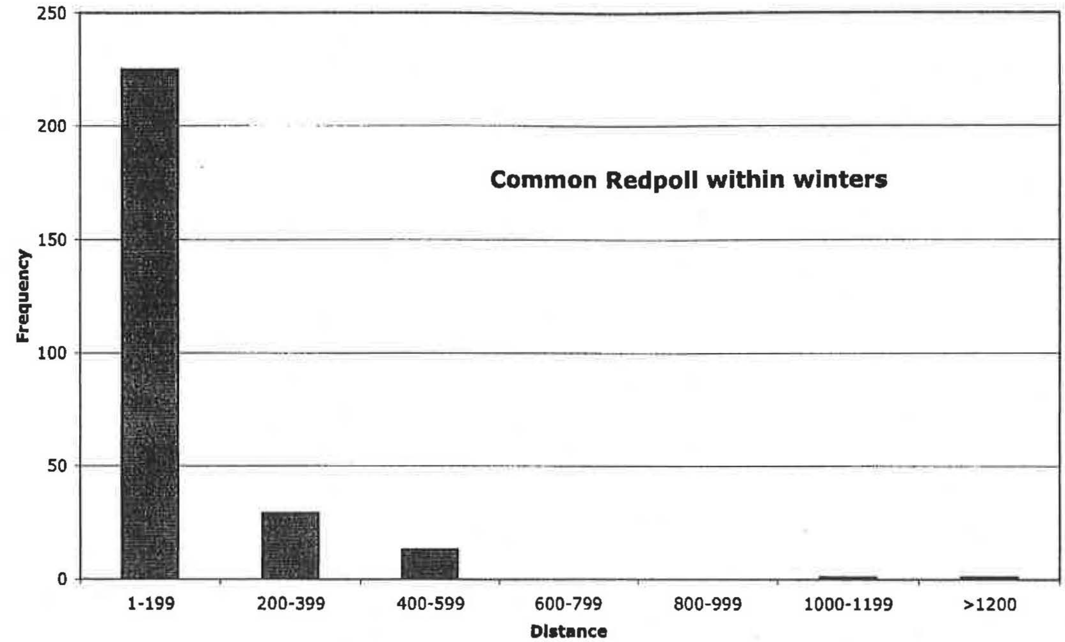
For Pine Siskin, the two-way ANOVA indicated that banding month ($F_{6,244}$= 1.219, P = 0.293), re-encounter month ($F_{7,244}$ = 2.096, P = 0.054) and the interaction of these two main effects ($F_{24,244}$ = 1.384, P = 0.115) were not significant. The mean distance moved between winters was 867.4 km.

The average distance moved between winters was significantly greater for Pine Siskin than for Common Redpoll (Student t-test, $t_{493} = 1.986$, $P = 0.048$). However, inspection of Figure 2 indicates that for the exceptional cases where distances exceed 1500 km, Common Redpolls show a greater tendency to wander broadly.

DISCUSSION

This paper represents the first comprehensive analysis of winter movements for Pine Siskins and a significant extension of Troy's (1979) analysis of winter movement of Common Redpolls. Troy (1979) based his analysis on just 106 re-encounters. Within a winter, i ndividuals of both

Fig 1. Frequency histogram of distances (km) traveled by Common Redpolls and Pine Siskins re-encountered in the same winter (October-April) in which the birds were banded.



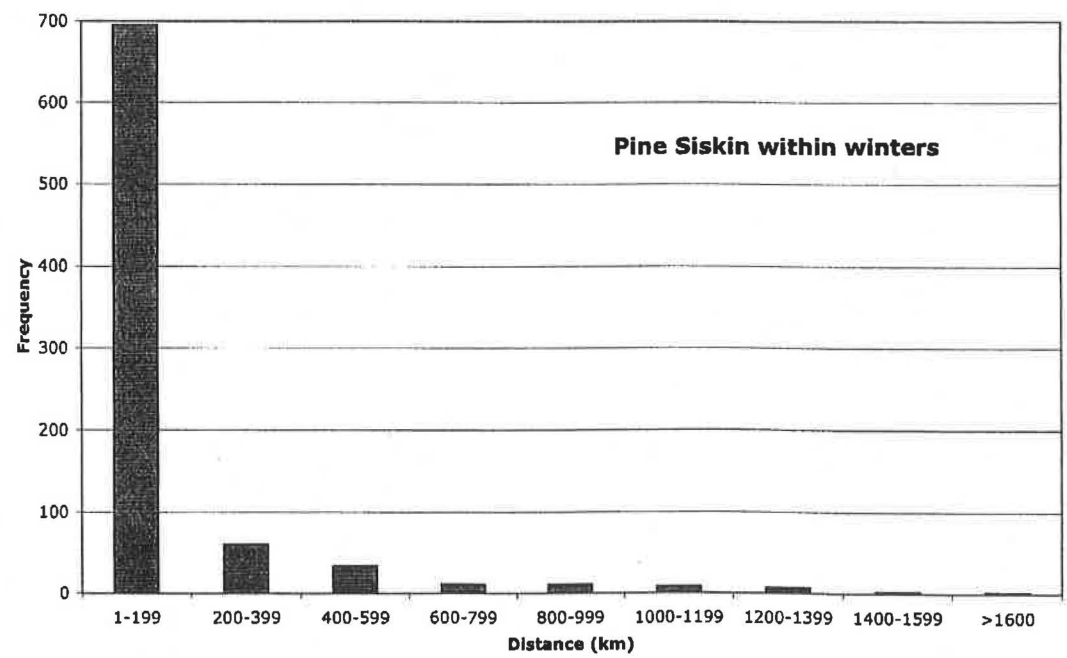
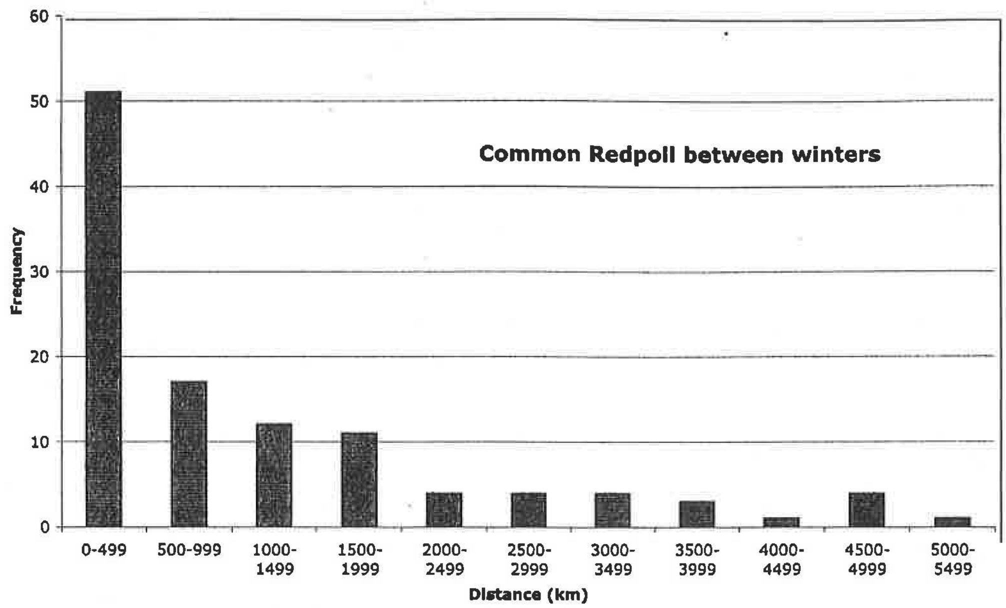
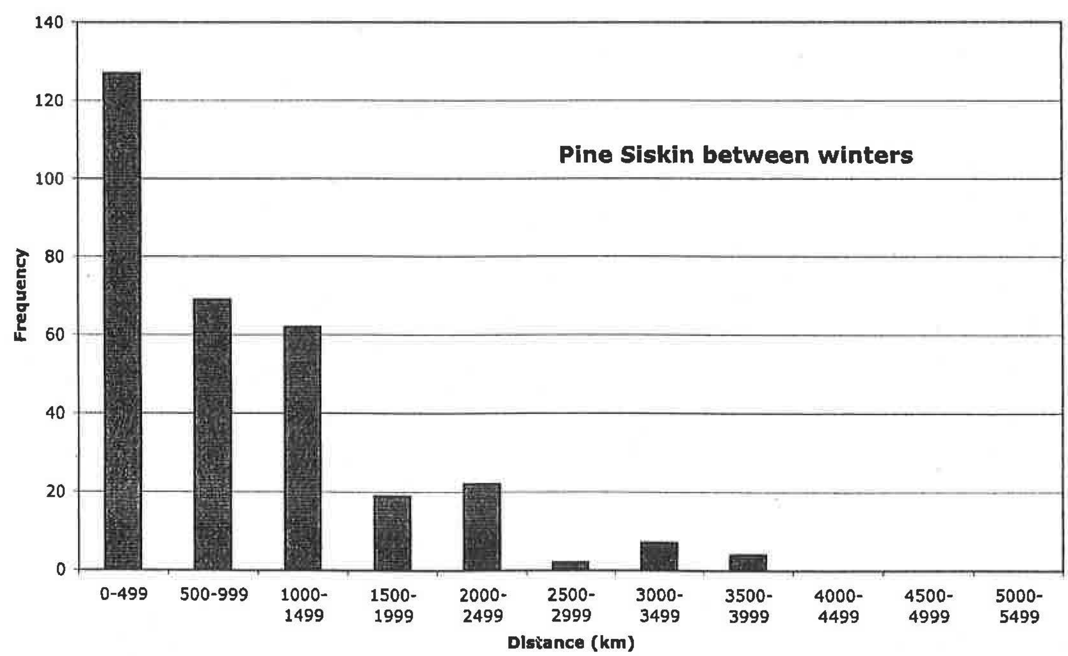


Fig 2. Frequency histogram of distances (km) traveled by Common Redpolls and Pine Siskins banded during the winter (October-April) and re-encountered in a subsequent winter.





species tend to remain close to the original banding site, although a few cases of extraordinary distances traveled do occur.

Comparing re-encounter location to band location between winters indicates a tendency of Pine Siskins to winter further afield than Common Redpolls. Nevertheless, the most extraordinary records are for Common Redpolls.

A particularly useful set of records comes from a single banding station in upstate New York. Nine Pine Siskins banded there during the major irruption of 1989-1990 were re-encountered in subsequent winters, with distances ranging between 13 km and 3,470 km (Yunick 1997). The mean distance traveled for these nine birds was 904.8 km, similar to the grand mean from this study of 867.4 km traveled between winters.

Distance traveled was not related to the interval between banding and re-encounter. For instance, the distance moved by a bird re-encountered six years after banding was not greater than a bird re-encountered during the winter subsequent to banding. The percentage of re-encounters at the original banding site differs strikingly for the two species between years. For Common Redpoll, 73 of the 199 re-encounters (37%) in winters subsequent to banding occurred at the original banding site. For Pine Siskins, only 25 of the 319 re-encounters (8%) occurred at the banding site in a subsequent years. Although both species clearly wander widely, these data suggest a more pronounced tendency for Common Redpolls to return relatively near wintering areas used in previous irruptions. In other words, Pine Siskins seem more nomadic. Interestingly, Yunick (1983) found no evidence of winter site fidelity between winters in Schenectady, NY, for Common Redpoll, Pine Siskin, Evening Grosbeak (*Coccothraustes vespertinus*) and Purple Finch (*Carpodacus purpureus*).

The two species showed a difference in the effect of month of re-encounter. For Pine Siskins, re-encounter month did not have a significant effect. However, for Common Redpoll, birds re-encountered later in the winter showed significantly greater between-winter distance moved than birds re-encountered early in the winter. The data suggest that Pine Siskins reach their wintering grounds early in the winter and tend to remain there, while Common Redpolls continue moving southward as the winter proceeds. Support for this hypothesis comes from the within-winter data. For the 32 cases for Common Redpoll in which within-winter distance traveled exceeded 1500 km, 25 re-encounters were made in March (15 cases) and April (10 cases).

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Molt Strategies in Alaskan Arctic Warblers

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ABSTRACT

While banding Arctic Warblers (*Phylloscopus borealis*) in western Alaska, I found a more extensive replacement pattern in the tertial feathers than what the literature suggests. I banded a total of 34 Arctic Warblers with symmetric molt in the tertial feathers, 11 of which were actively replacing three tertials on at least one wing. I posed the molt question to Peter Pyle, who made preliminary examinations on adult Arctic Warbler specimens from Alaska and found that the tertials were noticeably more worn than other secondary flight feathers. These observations indicate that a complete prealternate molt does not occur in this species as previously reported. Instead, it appears that adult Alaskan Arctic Warblers go through a complete molt in the fall that is suspended during migration. I suggest a revised molt and plumage terminology for Arctic Warbler, and I suggest work on the winter grounds to determine whether or not a partial prealternate molt occurs.

INTRODUCTION

Arctic Warbler (*Phylloscopus borealis*) is a predominantly Old World species with a limited breeding range in western Alaska (subspecies *P. b. kennicotti*; Lowther 2001). Very little is known about subspecies *P. b. kennicotti* and published descriptions of molt patterns draw from European sources (Cramp 1992; Svensson 1992) that describe the Palearctic subspecies *P. b. borealis* (Pyle 1997; Lowther 2001).

In particular, Pyle (1997) and Lowther (2001) infer that adult Arctic Warblers undergo a partial prebasic molt on the summer grounds that can include up to two tertial feathers (s8 and s9), and a complete prealternate molt on the winter grounds. However, in 2007 I banded several Arctic Warblers that were replacing all three tertial feathers (s7, s8, and s9). (The tertials are referred to as s7-s9, although some refer to these feathers as secondary feathers, hence "s" 7-9). According to Humphrey and Parkes (1959), prebasic molts are typically complete and prealternate molts are typically partial, and thus the current descriptions of molt in Arctic Warblers may be terminologically incorrect and need revision.