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Site Fidelity of the Evening Grosbeak on an Adirondack Breeding Ground

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ABSTRACT

The return rates of Evening Grosbeaks (*Coccothraustes vespertina*) banded at an Adirondack Mountain breeding area in New York state over a 30-year period, 1970-1999, were determined. Adult male return rates were 7.9-9.2 percent, females 6.1-7.7 percent; while none of 44 immatures returned. During two consecutive years of increased abundance in 1989 and 1990, the return rates rose to as high as 15.2 percent in males and 16.7 percent in females. The sampled adult population was made up of mostly after-second-year birds (86.5 percent of the males and 90.4 percent of the females), and males exceeded females (54.6 percent male among breeding adults, 56.8 percent among immatures, and 63.2 percent among return captures). The oldest breeding Evening Grosbeaks encountered were an eight-year-old male and a female nearly 11 years old.

INTRODUCTION

The Evening Grosbeak (*Coccothraustes vespertina*) in the early 20th century was primarily a resident of western North America. In Canada the species extended its range eastward as a breeding bird by 1920 in Ontario, and by 1966 it was breeding as far east as Cape Breton Island, Nova Scotia (Godfrey 1966). In New York state prior to the 1890s the Evening Grosbeak was considered to be a vagrant from the West (Bull 1974), first reported in winter 1875 in Essex County (Coues 1879). Its first summer occurrence in the Adirondack Mountains of northern New York was documented in 1942 in Essex and St. Lawrence counties; breeding was documented on 3 August 1946 at Bay Pond, Franklin County (Beehler 1978, Peterson 1988), and in 1947 at Saranac Lake (Bull 1974, Shaub 1954). In 1953, breeding was reported at 11 new areas, with four

more in 1962 outside of the Adirondack Mountains, and at 50 sites statewide by 1971 (Bull 1974). Details on the species' 1940s and 1950s summer appearances in the Adirondacks are given by Shaub and Shaub (1953) and Shaub (1954).

This 1940s-1950s range expansion of the Evening Grosbeak into the northeastern United States and Canada received considerable attention from banders who documented regional sight records and banding results (e.g. Parks 1952; Mason and Shaub 1952; M. B. Shaub 1956, 1959, 1960, 1963; Downs 1956, 1958; and B. M. Shaub 1958). It also brought to light the saga about hundreds of grosbeak shootings in Rimouski County, Quebec, for the purpose of collecting their bands (B. M. Shaub 1960; Parks and Parks 1963a, 1963b; and Parks 1963, 1964, 1965).

The species was first reported breeding at Jenny Lake near Corinth in northern Saratoga County, New York (within the Adirondack State Park), in 1963 when 25 bob-tailed young and several adults appeared on 9 July at Guy Bartlett's feeder (Bartlett 1963, Wickham 1963) and at other nearby feeders (Stone 1963).

I established a feeding/banding station at Jenny Lake in 1970 and have operated it year-round since 1972. Evening Grosbeaks have bred intermittently at Jenny Lake, affording me an opportunity to assess their breeding site fidelity.

Winter site philopatry of Evening Grosbeaks has been reported by Balph and Lindahl (1978) at Logan, Utah. They obtained a return rate (by visual observation of color bands) the following winter at two feeders 3.8 km apart of 14 percent (24 percent for males and eight percent for females based on bandings of 36 males and 71 females during December 1976-March 1977). They also cited return data from eastern United States locations: less than one percent in the East based on a personal communication from J. M. Sheppard; less than five percent on combined returns and recoveries of 3914 grosbeaks banded between

1923 and 1929 in northern Michigan (Magee 1939); and 2.2 percent of 1657 bandings in Connecticut in the 1940s (Parks 1951). At my home banding station at Schenectady, New York (50 km south of Jenny Lake), there were no returns recorded from 2637 Evening Grosbeaks banded over 18 years, including 704 wintering individuals banded prior to 10 April and 1933 migrants banded thereafter through May (Yunick 1983).

Here I report return rates on 473 Evening Grosbeaks banded during the breeding season at a breeding site and on 129 banded at the same site during the non-breeding season.

METHODS

The banding site (coordinates 431-0735) was at a summer cottage in a forest clearing about 380 m elevation atop the southeastern foothills of the Adirondack State Park. The area was farmed in the 19th century but reverted in the 20th century to mature hardwoods such as maple (*Acer* spp.), oak (*Quercus* spp.), and beech (*Fagus* spp.), and conifers consisting mostly of white pine (*Pinus strobus*) and eastern hemlock (*Tsuga canadensis*) with only nominal spruce (*Picea* spp.) in what is now a second-growth transition life zone.

In the first years of the operation, 1970-1972, my feeding regime varied slightly until a routine was established which was then practiced continuously to present. This consisted of supplying three feeders with sunflower seed and putting a mist net at each to capture birds using the feeders. During the winter period, October to April, a feeder design was used which required passage through a 1½ x 2-in (38 x 51 mm) wire mesh cage to access the seed dispensed from a weather-proof seed reservoir above the cage. This design conserved seed in favor of smaller wintering species; and only a few Evening Grosbeaks, if present during the winter, obtained seed by clinging to the outside of the wire cage. I visited these feeders once every six to 15 days on average to erect nets, band birds, and restock feeders.

During April to September, I replaced those restricted-access feeders with another design consisting of a weather-proof seed reservoir which dispensed seed to an open tray at which all species

could feed. Both feeder designs had seed reservoirs of sufficient size to assure continuous daily seed availability. In April, May, and September, I operated nets at these feeders on weekends at one- to three-week intervals; and in late June, July, and August, I lived at this location and operated nets two or three times a week.

Evening Grosbeaks visited these feeders primarily during spring migration and the breeding season. I mist netted them, banded them with U. S. Fish & Wildlife Service bands, and determined age and sex by plumage characteristics (Pyle 1997). Wing covert color contrast separated second-year (SY) from after-second-year (ASY) females, while this characteristic and/or tertial markings or lack thereof separated SY and ASY males. Newly fledged juveniles were recognized by their dingy plumage and bill color, and juvenal males were recognized by white tertials and inner secondaries which in females were mixed black, white, and gray.

In order to separate breeding birds from passing migrants in May and June, I examined adults for external breeding characteristics: a brood patch (BP) in females, and a cloacal protuberance (CP) in males. The brood patch, once developed, remained on the female throughout the summer until prebasic molt, allowing easy confirmation of a female's breeding status. The male cloacal protuberance is poorly developed in this species and disappears shortly after egg laying in May and June, so I assumed that any adult male caught between June and August was a local breeder whether or not it had a cloacal protuberance. Additionally, some of the males seen (more commonly than females) feeding newly fledged young at the feeders were captured, confirming their breeding status.

The capture data were segregated temporally based on these characteristics to establish which birds were breeders on which to base return-rate calculations. Comparisons were then made on return rates by age and sex class for the following breeding scenarios:

Breeding Scenario No. 1 - All birds banded all years, in the May-August period. This includes an unknown number of still-passing migrants in May among birds already breeding locally.

Breeding Scenario No. 2 - All birds banded in the May-August period for only those years when HY birds were also banded.

Breeding Scenario No. 3 - All birds banded all years, in the June-August period (to exclude possible migrants) as well as any May bandings of birds in confirmed breeding condition.

Breeding Scenario No. 4 - Scenario No. 3 restricted to only those years when HY birds were also banded.

Breeding Scenario No. 5 - Scenario No. 3 restricted to the year 1989.

Breeding Scenario No. 6 - Scenario No. 3 restricted to the year 1990.

RESULTS AND DISCUSSION

I banded 602 Evening Grosbeaks in 25 of the 30 years from 1970 to 1999. This included 129 in the non-breeding season in 18 of the 30 years and 473 in the May-August period in 17 of the 30 years from which I derived 19 return captures.

Newly fledged HY birds (n=44) were captured in nine of these years.

The capture data are summarized in Tables 1-3. Table 1 presents captures in the May-August period (Breeding Scenario No. 1). May was designated as the start of the breeding season (though migrants were still passing) based on the appearance of birds in breeding condition. The first occurrence of a female with a brood patch was on 2 May; first male with a cloacal protuberance, 6 May; and female with egg in oviduct, 28 May. Bull (1974) reported egg dates of 19 May-4 June in New York, nestling dates of 31 May-17 June, and fledgling dates of 15 June-5 September. My first capture dates for fledglings varied annually from 3 July to 18 August; last capture dates for grosbeaks of any age or sex varied annually from 19 July-30 August.

Table 1. Evening Grosbeaks banded at Jenny Lake, near Corinth, NY, 1970-1999 during the May-August breeding season (Breeding Scenario No. 1).

Year	Number Banded by Age/Sex Class									
	AHY M	SY M	ASY M	TOTAL	AHY F	SY F	ASY F	TOTAL	HY M	HY F
1971	4			4	6			6	8	3
1972	2			2	1	1		2	2	
1973		9	21	30		4	7	11		
1974			1	1						
1982		11	21	32		19	20	39		
1983			1	1			1	1		
1989		2	33	35		2	16	18		1
1990		10	34	44		7	34	41	8	5
1991		3	9	12		1	12	13	2	2
1992		1	31	32		1	15	16		1
1993			3	3		1	4	5		
1994			15	15			11	11		
1995		1	7	8		2	8	10		
1996			1	1						
1997		1	3	4			1	1	1	
1998		1	1	2			1	1	2	3
1999		6	10	16		2	10	12	2	4
TOTAL	6	45	191	242	7	40	140	187	25	19

Table 2. Evening Grosbeaks banded at Jenny Lake, near Corinth, NY, 1970-1999 during the June-August breeding season, including May bandings of birds in breeding condition (Breeding Scenario No. 3).

Year	Number Banded by Age/Sex Class									
	AHY M	SY M	ASY M	TOTAL	AHY F	SY F	ASY F	TOTAL	HY M	HY F
1971	4			4	6			6	8	3
1972	2			2	1			1	2	
1983			1	1			1	1		
1989		2	31	33		2	16	18		1
1990		8	24	32		5	30	35	8	5
1991		3	9	12		1	12	13	2	2
1992		1	29	30		1	15	16		1
1993			3	3		1	4	5		
1994			10	10			8	8		
1995			7	7		1	8	9		
1997		1	3	4			1	1	1	
1998		1	1	2			1	1	2	3
1999		3	4	7			8	8	2	4
TOTAL	6	19	122	147	7	11	104	122	25	19

Table 3. Evening Grosbeaks banded at Jenny Lake, near Corinth, NY, 1970-1999 during the non-breeding season, September-April.

Year	Number Banded by Age/Sex Class							
	AHY M	SY M	ASY M	TOTAL	AHY F	SY F	ASY F	TOTAL
1972	7			7	5	2(1)		7
1973	1	3	4	8				
1975	4			4				
1978		1		1				
1979		4	1	5		1	1	2
1980		6	12	18		1	4	5
1981							1	1
1982		6	16	22			2	2
1983		1	4	5			2	2
1984		2	1	3		1		1
1986			1	1			1	1
1988			1	1				
1990			2	2				
1992			2	2		1	1	2
1995		1	1	2			1	1
1996		5	3	8		6	4	10
1998			1	1				
1999			3	3			2	2
TOTAL	12	29	52	93	5	12	19	36

(1) The two SY F listed for 1972 are HY F.

Capture data for Breeding Scenario No. 3 are presented in Table 2. Table 3 represents the capture data for the non-breeding season, September through April. None of these 129 birds was ever recaptured in a subsequent season.

Return data for birds banded in the breeding season are summarized in Table 4 for six breeding scenarios, including the two years 1989 and 1990 when Evening Grosbeaks were the most abundant in the 30-year period (33 percent of the adults and 32 percent of the HYs, respectively, were caught in those two years).

Table 5 presents information on the timing of return captures following the year of banding. An ASY M banded on 16 June 1990 and recaptured on 4 August 1995 and 5 July 1996 was at least eight years-one month old at the time of last capture.

Only one older breeding individual was encountered: a female with a brood patch on 29 May 1972 which had been banded on 11 April 1962 at Milford, Ontario, making her at least ten years-11 months old.

Return Rates - Breeding Scenarios Nos. 2-4 in Table 4 are in relatively consistent agreement portraying breeding male return rates of 7.9-9.2 percent, and 6.1-7.7 percent for breeding females.

Table 4. Return rates through 1999 for Evening Grosbeaks banded at Jenny Lake, near Corinth, NY, 1970-1998, during the breeding season representing several Breeding Scenarios described in Methods.

Breeding Senario	Return Rate, %, by Age/Sex Class							
	SY M	ASY M	All Ad. M	HY M	SY F	ASY F	All Ad. F	HY F
No. 1 - All bandings, all years, May - August	5.1	4.4	4.9	0.0	0.0	3.9	4.0	0.0
No. 2 - All bandings, only for years when HY's were banded, May - August	11.8	7.3	8.1	0.0	0.0	6.4	7.3	0.0
No. 3 - All bandings, all years, June - August and May birds in breeding condition.	12.5	6.8	7.9	0.0	0.0	5.2	6.1	0.0
No. 4 - Same as No. 3, but only for years when HY's were banded.	12.5	8.2	9.2	0.0	0.0	6.7	7.7	0.0
No. 5 - Same as No. 3, but only for 1989.	0.0	15.2	15.2	0.0	0.0	16.7	16.7	0.0
No. 6 - Same as No. 3, but only for 1990.	0.0	9.4	9.4	0.0	0.0	5.7	5.7	0.0

Table 5. Return intervals through 1999 for Evening Grosbeaks banded at Jenny Lake, near Corinth, NY, 1970-1998.

Age/Sex Class	Number of Returns Years Following Banding						
	1	2	3	4	5	6	TOTAL
SY M	1			1			2
ASY M	5	1	1		2	1	10
ASY F	4	2	1				7
TOTAL	10	3	2	1	2	1	19

No significance should be placed in the appearance that SY M rates exceed ASY M rates, and ASY F rates exceed those of SY Fs, because in both cases the SY sample sizes are small. None of 44 banded immatures returned. Similarly, none of 81 immature Rose-breasted Grosbeaks (*Pheucticus ludovicianus*), an annually breeding Neotropical migrant banded at this location, returned (Yunick 1996).

Breeding Scenarios Nos. 5 and 6 show that when Evening Grosbeaks appeared more abundantly in two consecutive years, the return rate for breeding adults increased to as high as 15.2-16.7 percent, approximately double the overall average, but less than that of the Rose-breasted Grosbeak which bred annually. The latter returned at a rate of 21.3 percent (29.0 percent for males, 13.5 percent for females) at this location during 1971-1994 (Yunick 1996).

The Evening Grosbeak results for any of the scenarios described in Table 4 are in stark contrast

to Parks and Parks' Canadian experience at 39-Mile Camp on the Patapedia River in Rimouski County, Quebec. They encountered no returns in June 1963 from 500 June 1962 bandings (Parks and Parks 1963a, Parks 1963). Parks (1964, 1965) attributed the 1963 decline (only five grosbeaks banded) at 39-Mile Camp to aerial spraying in 1962 which eradicated the spruce bud worm as a potential food source for grosbeaks in the 1963 breeding season. Due to a scarcity of Evening Grosbeaks at this location in 1963 and 1964, they established an alternate banding site at Astle, New Brunswick. Here they encountered only one return (0.05 percent) from 2113 bandings in the 1965-1970 period (Parks 1966; Parks and Parks 1967, 1968, 1969, 1970, 1971).

It is possible that in this Canadian spruce environment, Evening Grosbeaks were opportunistic feeders on a variable spruce bud worm population and, therefore, wandered to breed relative to the abundance of spruce bud worm larvae. The Adirondack transition forest at Jenny Lake may not present that kind of opportunity, thus creating breeding site fidelity among some individuals.

The Shaubs banded Evening Grosbeaks at a Saranac Lake, New York, Adirondack breeding site in July-August 1950-1952 (Shaub and Shaub 1953). They banded five adults and eight juveniles in 1950, two adults and five juveniles in 1951, and 54 adults and 11 juveniles in 1952. They recaptured in 1952 one banded adult female of the seven previously banded (14.3 percent).

In Vermont during June-July 1956, Downs (1958) recaptured three previously banded adults from 19 (11.1 percent return rate to a breeding area) which she had apparently banded in June-August 1954 and 1955, but full details are lacking (Downs 1956). She also banded 77 juveniles in 1954-1955, but it is not clear if any of the 1956 returns came from this juvenile cohort.

The variation at Jenny Lake in the annual return rate and capture pattern illustrated in Tables 1, 2 and 3 is, nevertheless, in keeping with the species' nomadic character. Bock and Lepthien (1976) demonstrated the irruptive migratory behavior of Evening Grosbeaks. While the Jenny Lake capture pattern was variable in the 1970s and early 1980s, there is an indication of repetitive annual appearance since 1989; however, the abundance of newly fledged banded HY birds is intermittent and invariably low. Another irruptive species at this site, the Pine Siskin (*Carduelis pinus*), breeds in some years, but not in others. In breeding years, bandings of adults outnumbered those of fledged young by 292 to 136 during the May-August period, 1972-1999. Shortly after fledging, the species dispersed and abandoned the site, precluding the opportunity to band more HY birds. None of these breeding season bandings has been recaptured subsequently at the site. The only two returns to date have been of a male banded 1 April 1988, recaptured in May, then as a return two years later in January and also February and March. Another male banded 1 April 1990 returned two years later in April and May (Yunick, unpub. data).

The Purple Finch (*Carpodacus purpureus*), which is the most abundantly banded breeder at this site (over 10,000 banded, and in each of the 30 years), behaves similarly in some years by abandoning the site by late July or August. This species' return rates average approximately 19 percent for adults and nine percent for juveniles (Yunick, unpub. data).

The nomadic behavior of the Evening Grosbeak is further exemplified by some of its band re-encounters. Bartlett (pers. comm.) found a window-killed male at his Jenny Lake feeder at the peak of the breeding season on 17 June 1967. The bird had been banded on 28 March 1966 in Grand Rapids, Michigan, about 930 km (580 mi) west. A

breeding female (with BP) captured at Jenny Lake on 17 July 1971 had been banded on 27 April 1969 at Richfield, Ohio (660 km [410 mi] SW), while a breeding male (with CP) captured on 20 May 1973 had wintered in the eastern United States, banded on 21 April 1973 at Cumberland, Maryland (551 km [390 mi] SW).

Among birds banded at Jenny Lake, a migrant banded on 4 April 1982 was 440 km (275 mi) NE at Charlesbourg, Quebec, the following winter on 23 February 1983. A 6 May 1973 migrant was also NE on 13 April 1974 at Matane, Quebec (940 km, 550 mi). A breeding female banded on 26 May 1990 with a developing BP was re-encountered in northern New Hampshire on 25 March 1993 (180 km [110 mi] NE).

Age and Sex Ratios - The age and sex ratios of the grosbeaks that I banded were highly skewed toward ASY over SY, and less so for male over female. Using Breeding Scenario No. 3 in Table 2, 86.5 percent of the breeding males were ASY, and 90.4 percent of the females were ASY. In the non-breeding season (Table 3) males were 64.2 percent ASY, and females 61.3 percent ASY.

The breeding adults were 54.6 percent male, while HYs were 56.8 percent male, and return captures in Table 5 were 63.2 percent male. At Saranac Lake in 1950-1952, Shaub and Shaub (1953) found 57.4 percent males among adults (n=61) and 41.7 percent males among juveniles (n=24); while Downs (1958) in Vermont had 40.0 percent males among adults (n=30) and 49.5 percent among juveniles (n=93).

At the Rimouski, Quebec, breeding site in June 1962, Parks and Parks (1963a) found 78.0 percent males among the birds they banded (n=500), while among banded birds shot in the area in 1958-1961 (1963b) they found 59.1 percent males (n=257); and in the same area in 1959, B. M. Shaub (1960) reported 56.4 percent males (n=94). Most of these results indicate an adult breeding male ratio of about 55-60 percent. This differs substantially from Parks and Parks' experience (1971) over six years in June on a New Brunswick breeding ground where the male ratio varied annually from 76.5 to 95.6 percent, and averaged 91.1 percent (n=2113) among the birds they banded. The reason(s) for

this apparent geographical variation in sex ratio during the breeding season is not known.

While the breeding season adult male ratio at Jenny Lake was 54.6 percent, it rose to 72.1 percent in the non-breeding season (Table 3). At a distant western location at Logan, Utah, Balph and Balph (1976) found predominantly females among birds they trapped, with some degree of seasonal variation. They found 72.2 percent female in March (n=54), 58.2 percent in April (n=55) and 56.1 percent in May (n=207). The following winter, December 1976 to March 1977, Balph and Lindahl (1978), also at Logan, captured 66.4 percent females (n=107). The reason(s) for this apparent east-west geographical variation in winter sex ratio is not known, though trapping versus mist netting as a method of capture may be a factor. It was noted on more than several occasions that the alarm calls of a bird in a net, particularly if from a female, attracted males, leading to their capture. Thus, the capture of a female could cause the capture of several males, skewing the sex ratio toward males.

In summary, the breeding site return rate at this Adirondack site over 30 years (six to nine percent overall, 15-16 percent in the 1989-1990 years of abundance) was similar to the 14.3-percent rate found over three years by Shaub and Shaub (1953) at another Adirondack site at Saranac Lake in the early 1950s, and the 11.1-percent rate found in Vermont by Downs (1958) over two years. These northeastern United States rates contrast, however, with rates ascertained in eastern Canadian spruce forest where Evening Grosbeaks relied on variable spruce bud worm populations as a food source. The findings of the Parks in Quebec showed no recaptures from 500 grosbeaks banded the prior year (Parks and Parks 1963a, Parks 1963); and in New Brunswick only a 0.05-percent return on 2113 grosbeaks banded over a six-year period (Parks 1966; Parks and Parks 1967, 1968, 1969, 1970, 1971).

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