SEASONAL POPULATION FLUCTUATION OF WHITE-THROATED SWIFTS AT ROOST SITES IN SOUTHERN CALIFORNIA

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ABSTRACT: In southern California, White-throated Swift (*Aeronautes saxatalis*) roosts contain many more individuals during the winter months than during the breeding season. Dates of the high and low counts at these roosts fluctuate from site to site and from year to year. Evidence suggests that some individuals remain and nest at or near the roost; whether others migrate north to breeding areas remains unknown.

The White-throated Swift (*Aeronautes saxatalis*) is widespread in much of western North America, where its bold patterning, loud vocalizations, and aerial habits make it easily detected and identified. It occurs year round in southern California as well as from central California, central Arizona, southern New Mexico, and southwestern Texas south to Oaxaca, Mexico (AOU 1998). It is a breeding summer resident only northward along the Pacific coast to northern California and inland to eastern Oregon, southern interior British Columbia, and southern Alberta (AOU 1998, Ryan and Collins 2000). Little detailed information about White-throated Swift migration (Hughes 1998, Ryan and Collins 2000) is available. The species is absent from the more northerly parts of its range for many months, in British Columbia, for example, from mid August to early April (Campbell et al. 1990, Goward et al. 1995).

Grinnell and Miller (1944) and Small (1994) suggested that in California the White-throated Swift is more common and widespread in summer. Garrett and Dunn (1981) stated that in southern California, "this species appears more irregularly and in lesser numbers in most areas in winter, although large concentrations may still be found in some coastal and desert areas."

White-throated Swifts nest and roost in narrow horizontal or vertical cracks and crevices in rocky cliffs (including sea cliffs) and rock quarries (Hanna 1909, 1917, Bent 1940, Anderson 1943). They also adopt man-made structures such as buildings (Yocum 1966, Collins and Johnson 1982), freeway overpasses, and bridges (Ryan and Collins 2000). Little is known, however, about their specific requirements for roost sites or nest sites.

In this study we examine seasonal fluctuations in the populations of White-throated Swifts at roost sites in southern California by describing the attendance of swifts at three year-round roosts and making comparisons between breeding and winter periods.

STUDY AREA AND METHODS

As part of a broader study of swift behavior from late February 1994 to March 1995 (Ryan 1996), Ryan studied swifts at two locations in Orange

County: Santiago Oaks Regional Park and Caspers Wilderness Park from December 1993 to March 1995 (Ryan 1996). Observations at these two inland sites were augmented by those made by Collins at a coastal site in the city of Rancho Palos Verdes (Palos Verdes), Los Angeles County, from November 1968 to September 1973. Ryan and Collins (2003, this issue) detail the study sites and data collection further.

During each month of our study, we visited each site in the morning and evening when swifts exited and entered their nightly roosts. In the evening, we began observations at least two hours before the expected entry time, and terminated them 15 minutes after the last swift entered the roost. The following morning, we began observation one hour before the expected exit time and ended 30 minutes to two hours after the last swift exited the roost. We determined when the last swift exited using the previous evening's total count. Data presented are the mean population counts at each roost in each month. We grouped our monthly mean roost counts into two seasons, winter and breeding. Winter counts were made between 1 November and 15 March, breeding-season counts between 1 April and 1 August. We used a Mann–Whitney *U* test to compare counts by season for each site and present the standard error of the mean (SEM) as a measure of variability.

RESULTS

At all three sites the populations of White-throated Swifts fluctuated in a similar manner, although the exact timing of the fluctuations differed from roost to roost (Table 1). These roosts hosted the most swifts during the fall and winter, decreased throughout the spring, and reached their lowest numbers in summer. At Palos Verdes the population peaked from November to January, at Caspers Park from August to February, and at Santiago Oaks

Table 1 Mean Numbers of White-throated Swifts Roosting at Santiago Oaks and Caspers Park, 1993–95, and at Palos Verdes, 1968–72[a]

Month	Santiago Oaks	Caspers Park	Palos Verdes
January	7 (1)[b]	No data	122.4 ± 19.3 (8)
February	40.0 ± 0.0 (2)	147 (1)[b]	76.6 ± 15.1 (7)
March	46.3 ± 3.6 (9)	No data	55.0 ± 8.5 (3)
April	28.2 ± 2.7 (6)	30 (1)[b]	13.8 ± 1.5 (4)
May	22 (1)[b]	17 (1)[b]	13.5 ± 1.9 (4)
June	8.3 ± 2.0 (3)	19.0 ± 2.0 (2)	10 (1)[b]
July	2.3 ± 0.3 (3)	29.5 ± 0.5 (2)	34.0 ± 2.7 (3)
August	4.5 ± 1.6 (4)	129.0 ± 0.0 (2)	94.5 ± 20.2 (4)
September	5 (1)[b]	189.0 ± 33.4 (3)	89.7 ± 13.4 (3)
October	13.5 ± 0.5 (4)	144.0 ± 0.0 (2)	104.5 ± 67.5(2)
November	37.0 ± 3.1 (5)	No data	150.5 ± 19.1 (4)
December	31.5 ± 18.5 (2)	120 (1)[b]	131.5 ± 18.3 (10)

[a]Data presented are means ± standard errors. The number of counts is given in parentheses.

[b]When only one count was made the number represents a count, not a mean.

from November to March. Populations reached their lowest levels at Palos Verdes from April to July, at Caspers Park from May to June, and at Santiago Oaks from June to September.

We analyzed the results statistically comparing numbers in winter to numbers in the breeding season. At Santiago Oaks the wintering population averaged 36.1 ± 3.4 individuals while the breeding-season population averaged 19.5 ± 2.5 individuals ($t = 3.92$, df = 30, $P = 0.0005$). At Palos Verdes the wintering population averaged 112.8 ± 6.9 individuals while the breeding season population averaged 21.6 ± 3.8 individuals ($t = 11.6$, df = 83, $P < 0.0001$). We were unable to analyze variation at Caspers Park in the same way because we lacked sufficient winter observations there; the trend, however, was similar, with an average of 79.3 ± 27.9 ($n = 4$) individuals in winter and 30.3 ± 4.9 ($n = 8$) individuals during the breeding season.

DISCUSSION

These data demonstrate that in southern California roosts of the White-throated Swift host more birds during winter than during the breeding season. There is some variation in the timing of peak high and low numbers at different sites and in different years. Congregating in large winter roosts may be due to a preference for some traditional roost sites situated in advantageous locations perhaps providing a milder microclimate, increased exposure to solar radiation, and/or close proximity to good foraging. Additionally, many bodies in a small confined space may improve an individual's ability to maintain warmth and survive the colder winter weather (Bartholomew et al. 1957, Pickwell 1937). Because in winter these swifts congregate in higher numbers in fewer roosts, disturbance or destruction of winter roosts could affect more individuals and be more damaging to the species than disturbance or destruction of the more widely spaced nesting sites.

In spring, White-throated Swifts disperse from these large winter communal roosts. Throughout their range they nest semicolonially, mostly in groups of two to eight pairs (Ryan and Collins 2000). As temperatures increase, much of the dispersal leading up to the breeding season may be local, as the constraint of maintaining body temperature during periods of limited prey availability lessens. Observations at Palos Verdes of pairs of swifts nesting in smaller openings elsewhere on the same cliff face as the winter roost support this possibility. Furthermore, observations elsewhere in California suggest that the birds reoccupy nesting sites in March and April.

Some component of southern California's wintering population, however, may migrate north. As yet there are no recoveries of banded birds to support this, although to date few White-throated Swifts have been banded (171 individuals) and even fewer have been recaptured. All recaptures have been at or near the location where the bird was banded (Collins 1971, 1973, unpubl.). Greater effort in banding and recapturing these swifts would help differentiate between local dispersal and migration. Small radio transmitters for tracking movements and an examination of the ratios of stable hydrogen isotopes in feathers could also be employed in such a study (Chamberlain et al. 1997, Hobson and Wassenaar 1997).

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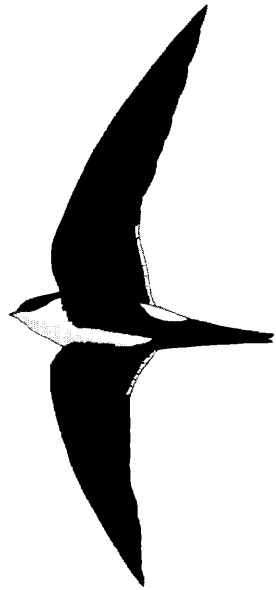

White-throated Swift

Sketch by George C. West