

2003 and 19 September in 2004. These dates are later than the 3 September date given by Bohlen, 1989. Arrival on the wintering grounds of Argentina is mid-November as shown by satellite-tracked birds from the University of Minnesota. At present, the precise wintering grounds of the Illinois population remain unknown.

### Nest Sites

We have observed seven nests in the following trees: Box Elder (*Acer negundo*) (3), Bur Oak (*Quercus macrocarpa*) (2), White Oak (*Quercus alba*) (1), and Willow (*Salix spp.*) (1). The Box Elder and Willow nests were situated low in the tree about 4.6-7.6 m (15-25 feet) high. The Bur Oak and White Oak nests were about 15 m (50 feet) high. These heights are approximate, as we did not climb up to any of the nests. The nest trees were in hedgerows (5) or small woodlots (2).

### Productivity

The earliest and latest dates we initially observed fledged young were 24 July 2004 and 7 September 2003, respectively. The mean date for young to be seen out of the nest was 8 August (13 August if the re-nest of 2003 is included). Over the three-year study, a total of 10 flying young were observed from 11 pairs of Swainson's Hawks known to have nested (Table 1). This means that at minimum, the productivity was 0.909 young/pair or a total of 3.33 young fledged/year.

In 2003 and 2004 we started observations early enough to cover the entire nesting cycle. We documented that out of seven nesting attempts from five pairs in 2003, only two nests were successful (28.6%), rearing a total of three young (average 0.43 young/nest attempt). In 2004 two nesting attempts out of three were successful (67%), rearing three young (average 1.00 young/nest attempt). This result is the same productivity reported for Kane County Swainson's Hawks in 1973 (Keir and

Wilde, 1976), when five pairs produced five fledged young, and similar to Swainson's Hawks in southeast Washington State and North Dakota, which fledged 1.11 and 1.55 young/nest, respectively (Bechard 1983 and Gilmer and Stewart 1984).

### Nest Density and Dispersion

Searching the study area of 952 km (37 square miles) we found five pairs of Swainson's Hawks in 2003 and 2004Ca density of 0.053 pairs/km<sup>2</sup>. This nest density is similar to North Dakota (Gilmer and Stewart 1984). In other studies Swainson's Hawks nesting density varied from as low as .0009 pairs/km<sup>2</sup> in Washington State (Bechard, 1980), to 0.10 pairs/km<sup>2</sup> in Utah (Bosakowski, et al., 1996). Home ranges for breeding Swainson's Hawks vary according to habitat and food supply. Bechard (1982) recorded an average home range of 886 ha (range 602-1,282 ha), Fitzner (1977) 980ha (both Washington State), and Estep (1989) 2760 ha (California).

Individual hawks may forage at great distances from the nest. The farthest distances from the nest we found hawks foraging were 5.71 km. (3.57 miles), with two other occasions over 4 km. (2.5 miles). In California, Estep (1989) noted that Swainson's Hawks expanded their foraging range as crops matured to up to 16 km (9.9 miles) from the nest, and Babcock (1995) recorded birds traveling up to 22.5 km (14 miles) from the nest.

In 2003 we found five Swainson's Hawks nests not counting re-nests. We plotted the distribution of nests on a map, measured the distance between each nest, and calculated the mean nearest neighbor distance to be 5.25 km (3.26 miles). If we discount the extreme value between two of the sites, the remaining three nearest-neighbor distances were 2.8 km (1.74 miles) apart, similar to values found in North Dakota of 2.3 km. (1.4 miles) (Gil-

mer and Stewart 1984) and Utah, 1.74 km (1.08 miles) (Bosakowski et al. 1996).

### Behavior

Throughout the three years of fieldwork we observed the behavior of Swainson's Hawks. These observations are summarized with regard to displaying, agonistic behavior and hunting methods.

**Displaying.** We saw male Swainson's Hawks displaying on a number of occasions, often displaying very high in the air, but also at treetop height. A typical display involves the male flying up and then diving down, and repeating this pattern three times in succession. These displays can be observed well into August when the pair has fledged young.

**Agonistic Behavior.** Swainson's Hawks arrive on the breeding grounds in Illinois around mid-April, long after Red-tailed Hawks have claimed their territories and built their nests. In a study of breeding Red-tailed Hawks and Swainson's Hawks in north-central Oregon, Janes (1994) found that the late arrival of Swainson's Hawks led to competition for territory between the two species. He recorded partial territory loss by Red-tailed Hawks to Swainson's Hawks in about one-third of the thirty-three territories studied in Oregon. Janes noted that territory loss occurred within one to three days after the arrival of Swainson's Hawks, and that Swainson's Hawks were the aggressors 82% of the time in site-specific encounters. Janes (1994) speculated that Swainson's Hawks were able to displace Red-tailed Hawks due to their ability to gain a higher position more rapidly and initiate an attack.

In Illinois we noted a few instances of agonistic behavior between Red-tailed Hawks and Swainson's Hawks, but less than we anticipated. The most aggressive encounter we observed was between a male Swainson's Hawk and a pair of perched adult Red-tailed Hawks high in a large pylon. The Swain-