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Observations on nesting Swainson's Hawks in Illinois, 2002-2004

with comments on their conservation and future

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Swainson's Hawks (*Buteo swainsoni*) have a wide breeding distribution in North America with the main range extending north to Alaska and south to Mexico; west to California, and east to Minnesota, Kansas and Iowa (Johnsgard 1990). Extraordinary to this main pattern is the small isolated enclave in northern Illinois—the only regular breeding location east of the Mississippi River, and some 565 km (350 miles) from the main area.

Although there are isolated breeding records for Illinois in 1875, 1900, 1947 and 1958, (Bohlen 1989 and Kleen et al. 2004), it was not until 1973 that a population of five nesting pairs was discovered in Kane County (Keir and Wilde 1976). In 1983, Joe Milosevich found four nests in the same area (Bohlen 1989). This population has persisted until present (see Breeding Season Reports in *Meadowlark*), but no detailed survey has been conducted since 1983.

In 2002 we decided to conduct fieldwork in Kane and McHenry counties to determine the number of pairs in Illinois and their breeding success. Fieldwork began 12 July 2002. We made 10 visits to the area (see definition below) ending 28

September. In 2003, we made 15 visits between 18 April and 7 September. In 2004, we made sixteen visits between 24 April and 19 September.

We searched an area of 95 km² (37 square miles) that consisted of rolling hills dominated by a mixed agriculture of cornfields, soy beans, hayfields and pasture, as well as some dairy and horse farms. The townships of Marengo in McHenry County and Hampshire, Starks and Huntley in Kane County bound the area we searched. This area is shown in the Swainson's Hawk map for the *Illinois Breeding Bird Atlas* (Kleen et al. 2004). Hedgerows and small woodlots border the farm fields and provide nest sites; however, this area is rapidly changing with housing developments taking up ever-increasing acreage, and land-for-sale signs springing up everywhere.

Our method of fieldwork consisted of driving along all the roads in our study area between 9 a.m. and 5 p.m. We concentrated on looking for soaring birds and stopped at numerous vantage points to scan the sky, although road conditions made it impossible to stop at all suitable sites. We found it impractical to look for perched Swainson's Hawks, as these birds can be well hidden. In suitable weather, Swainson's Hawks spend a great deal of time

soaring and can be observed up to a mile away. Even if we could not immediately identify a distant soaring hawk, it eventually gave away some clues that helped clinch identification. Compared with Red-tailed Hawks (*Buteo jamaicensis*), Swainson's Hawks have long narrow wings and hold their wings in a distinct dihedral position. They rock and teeter like a Turkey Vulture (*Cathartes aura*).

Within close range the distinctive plumage differences of the Swainson's Hawk can be observed. Intermediate or dark morph Swainson's Hawks are much more difficult to identify. These are much rarer than light phases throughout North America; however, one of the fledged young from a northeastern Illinois nest we found in 2004 was in an intermediate or dark phase plumage. This juvenile was quite different from all the others we had seen. It had dark underwings and body (the wing coverts were slightly paler than the flight feathers) and the tail was dark with contrasting pale undertail coverts. The plumage was very similar to the juvenile dark morph photograph SH13 in Wheeler and Clark, 1995.

When we found a soaring Swainson's Hawk we followed it as it quartered the sky, going a mile to the east, turning, going a mile to the south, to the north, turning and so

Swainson's Hawk drawing by Brian K. Willis.

Meadowlark

on. This flight behavior sometimes continued for over an hour and often the hawk would drift away. We would take a compass bearing, and using the DeLorme map, would get in the car and follow it. Eventually these sightings built up a pattern that narrowed down the location of a nest. For example, from an initial sighting of a soaring Swainson's Hawk it took us five more visits over 14 days until a nest site was located 4.5 km (2.8 miles) away.

Between 2002 and 2004 we found six nest sites (Table I). Three of the same sites were occupied for three years, two of the same sites for two years, and one site we found only in 2004 (which could have been active earlier, but was just recently found).

Table 1 shows that no site was able to rear young in each year, although four sites reared two or more young over the three-year period. Each year the total of young raised to flying remained about the same – between three and four young birds. Losses were usually due to unknown causes, but in at least two cases in 2003, nests were abandoned after severe

storms, and in two other cases in 2003 the losses involved predators, presumably Great Horned Owls (*Bubo virginianus*). In one case all that remained of two nestlings was a clump of feathers on the ground below the nest. In the other, the body of a well-grown nestling was found below the nest with the head and chest muscles missing. Great Horned Owls are major competitors for nest sites with Swainson's Hawks (Dunkle 1977). After early season failures, Swainson's Hawks will re-nest, and two instances in 2003 showed one re-nest about 300

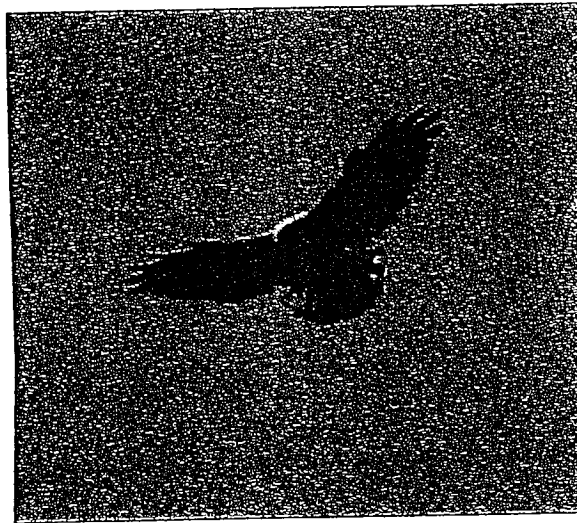
m (330 yards) farther along the hedgerow from the original site, while the other re-nest was some 2.41 km (1.5 miles) away.

Arrival and Departure

The majority of Swainson's Hawks winter on the pampas of Argentina, with only small numbers wintering in other parts of South and Central America (England, et al., 1997). A few winter in central California (Herzog, 1996) and southern Florida (Stevenson and Anderson, 1994). Satellite tracking by the Raptor Center at the

University of Minnesota shows that Swainson's Hawks leave the Argentina wintering grounds about mid-March to travel the 9,600 km (6,000 miles) journey back to North America (www.raptor.cvm.umn.edu). Arrival dates vary by region, and in Illinois we observed our first birds 18 April 2003 and 24 April 2004. These Swainson's Hawks began pair formation and nest building almost immediately.

The birds leave in August and September with the latest observation 21 September in 2002, 7 September in



Swainson's Hawk near Huntley Mall, Kane County. 31 May 2005. Photo by Arlene Koziol.

Table I: Swainson's Hawk nest sites and productivity for Kane and McHenry counties, Illinois, 2002-04.

SITE NAME	COUNTY	2002	2003	2004	TOTAL YOUNG FLEDGED/SITE
Huntley Mall	Kane	1 adult hunting	1 fledged from re-nest	Pair nested, no young seen	1
Starks	Kane	2 young fledged	2 young predated in nest	No birds	2
Hampshire	Kane	1 young fledged	2 young fledged	Pair present, no nest located	3
Getty Road	McHenry	No birds seen	Pair failed, re-nested and failed again	Pair present, no nest located	0
Harmony	McHenry	No birds seen	No birds seen	2 young fledged	2
Coral	McHenry	1 young fledged	1 young predated in nest	1 young fledged	2
TOTAL:		4	3	3	10
YOUNG FLEDGED/YEAR		4	3	3	10

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 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 95 km² (37 square miles) we found five pairs of Swainson's Hawks in 2003 and 2004, a density of 0.053 pairs/km². 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/km² in Washington State (Bechard, 1980), to 0.10 pairs/km² 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-

son's Hawk dived and screamed at them with talons extended for more than 30 minutes. The Red-tailed Hawks ignored him and eventually the Swainson's Hawk gave up. We soon found that this Swainson's Hawk had a nest 100 m (110 yards) away with a newly fledged young.

Hunting. Swainson's Hawks spend a considerable amount of time soaring, often at great altitude. While their soaring serves other purposes, such as advertising the occupancy of a territory and looking for potential enemies, it is also their main hunting method. Swainson's Hawks will often hang in the wind and hover as Red-tailed Hawks do to scan the ground below. When prey is sighted the hawks descend, often checking and continuing to hover until the strike is launched, and then the bird plummets to the ground with talons outstretched.

A variation of this hunting method can be seen when the hayfields are cut. Swainson's Hawks will fly low over hayfields that are being cut and follow a tractor to pounce on small mammals that are flushed. After the hayfields have been cut, it is possible to see Swainson's Hawks land in the hayfield and stalk prey on foot. We watched a pair of adult hawks for 90 minutes stalking prey in this manner. The hawks sat still for a long time and then suddenly raised their wings and ran with legs outstretched to catch prey, presumably an insect. Interestingly, two juveniles were perched in nearby trees but did not join in with the parents. Johnson et al. (1987) recorded similar ground feeding by Swainson's Hawks in Idaho, and pellet analysis showed grasshoppers to be the main prey item.

Swainson's Hawks readily feed on flying insects, too. Throughout our fieldwork we recorded numerous instances between June and August of both adult and juvenile hawks catching insects on the wing in the manner of a Mississippi Kite (*Ictinia mississippiensis*). Swainson's Hawks fly up or dip down to

take an insect with the talons and then eat the prey while flying. In late summer in Kane and McHenry counties, there are large numbers of dragonflies on the wing. Dragonflies have been shown to be an important food for wintering Swainson's Hawks in Argentina (Jaramillo 1993, Rudolph and Fisher 1993). Only very occasionally have we observed Swainson's Hawks adopt the perch and scan technique employed commonly by Red-tailed Hawks and other *buteos*.

The importance of insects in the diet of Illinois Swainson's Hawks is unknown at this time. Mammalian prey is certainly important and we have observed male hawks bringing unidentified small mammals to females incubating eggs or guarding nestlings. A variety of vertebrate prey has been recorded as important for Swainson's Hawks diets, such as gophers (*Thomomys talpoides*), ground squirrels (*Spermophilus richardsonii* and *S. tridecemlineatus*), rats, mice, voles and occasionally, birds and reptiles (Bent 1937, Bechard 1983, Gilmer and Stewart 1984, Johnsgard 1990).

The Future

The Swainson's Hawk is on the Illinois Endangered Species List B. See <http://dnr.state.il.us/espb/date-list.htm>. Their breeding grounds in Kane and McHenry counties have been listed as a top site for Audubon's Illinois Important Bird Areas program (<http://www.habitatproject.org>).

There is grave concern over the future of Swainson's Hawks in Kane and McHenry counties of Illinois. Recent articles in the Chicago Tribune (Wronski, 2003) and Chicago Wilderness (Spencer 2004) give details of plans to develop this region over the next few years, estimating the population of Hampshire to expand from 3,800 to 52,000. If this development goes unchecked and does not leave significant areas for Swainson's Hawks to hunt and nest undisturbed, these hawks could be lost from Illinois.

Due to population declines caused by habitat destruction, reduction in its main prey species and pesticide use, Swainson's Hawk has recently been put on the Audubon Society Watchlist as a species of national conservation concern (<http://audubon2.org/web-app/watchlist/viewSpecies.jsp?id=199>).

The population in Central Valley, California has been threatened by development for many years (Estep and Theresa 1992). In fact, California has remaining only 10% of its historic Swainson's Hawk population. To mitigate the conflict between urban expansion and the needs of endangered species, it has been proposed that a Regional Conservation Plan be implemented in Central Valley, California to achieve long-term protection for a significant number of breeding Swainson's Hawks, as well as allowing for controlled urban expansion. The Swainson's Hawk Technical Advisory Committee in Central Valley, California has developed a management plan to ensure the survival of the Swainson's Hawk that includes ensuring the availability of suitable nesting and foraging habitat, and maintenance of foraging habitat suitable for hawks. These include alfalfa, fallow fields, pasture and row crops. (Estep and Theresa 1992, Berry et al. 1998, Smallwood 1995.)

It would appear that Illinois has similar choices to make to those in California's Central Valley. If we want endangered species such as Swainson's Hawks to survive in Illinois, then conservation of sufficient foraging habitat such as hayfields, pasture and row crops is essential.

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