PHENOLOGY OF THREE RAPTOR SPECIES IN CENTRAL ALBERTA BASED ON NEST BANDING RECORDS

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The Great Horned Owl, Red-tailed Hawk and Swainson's Hawk are sympatric in the central Alberta study area[19] and frequently use the same nest structures. Breeding Red-tailed Hawks prefer the Aspen Parkland and Mixedwood zones with pasturelands, but may occasionally nest in wooded areas on the prairies,[1,11,22] while Swainson's Hawks are found in more developed agricultural areas dominated by cropland. Great Horned Owls, found in both habitats,[22] nest early and take over stick nests built by hawks in Balsam Poplar (*Populus balsamifera*) and Trembling Aspen (*Populus tremuloides*) and, less frequently, in maple (*Acer sp.*), willow (*Salix sp.*), and White Spruce (*Picea glauca*).

Volunteers have been banding birds of prey since the 1960s in Alberta. In 1988, a volunteer raptor nest card program was initiated by Alberta Sustainable Resource Development (ASRD) to enable banders and researchers to collect information on nest locations of birds of prey. The program was not maintained after the mid-90s, however some banders continued to fill out nest cards. These nest cards were stored at ASRD and Beaverhill Bird Observatory until funding became available to analyze these long-term data sets.

The objectives of the current study, which was conducted by Beaverhill Bird Observatory in 2003, were to: 1) enter into a computerized database all backlogged data that have been collected since the mid-1990s, 2) establish a full time volunteer-based raptor nest card program, so that members of the public can report raptor nests and participate in banding, and 3) analyze data on the phenology of nesting of various raptor species. The goal was also to make the raptor nest card compatible with the Prairie Nest Record card habitat codes (developed by the Canadian Wildlife Service, the Federation of Alberta Naturalists, and Bird Studies Canada in 2003). This paper focuses on the timing of nesting of the Great Horned Owl, Red-tailed Hawk, and Swainson's Hawk in central Alberta, based on banding data collected between 1991 and 2003, as records before 1991 did not contain information on age of nestlings banded.

Methods

The study area, defined by the data set of nests included in this paper, is centred on Edmonton, Alberta. The area (latitudes 52.5° to 54.1°, longitudes 110.5° to 116.2°) encompasses about 60 000 km^2. The habitat for most nests was predominantly Aspen Parkland, but some nests were located along the southern edge of the boreal, and northern edge of the prairie, ecoregions. Volunteer banders located nests by driving roads in the winter and early spring searching for stick nests. Nests were also found by looking for pairs of birds on territory in the spring. Landowners would also contact banders if they found a nest on their land. Nest cards were filled out by banders for occupied nests, and contain information on the species using the nest, nest type (stick, cavity, man-made), nest height, nest habitat, and banding data including an estimate of the age (in days) of the young at banding.[8,12,16,18] All data were entered into Microsoft Excel for analysis.

Table 1. Estimated days for incubation and fledging of Great Horned Owl, Red-tailed Hawk, and Swainson's Hawk based on literature, and used for this study.

Species	Incubation	Fledging	Incubation and Fledging Days Used this Study
Great Horned Owl	26-35 days [3] 30-37 days [10]	45 days [2]	Incubation–35 days Fledging–45 days
Red-tailed Hawk	30-35 days [3] 28 to 32 days [16,23] 34 to 35 [18]	45-46 days [3] 43-48 days [13] 42 days [5]	Incubation–35 days Fledging–46 days
Swainson's Hawk	28, 34 to 35 days [7] 28 days [8,20]	42-45 days [3] 38-46 days [7] 42 days [20]	Incubation–35 days Fledging–45 days

The estimated time of hatching was calculated by using the date of banding and subtracting the age of the oldest nestling estimated at the time of banding. For example, for young Great Horned Owls estimated to be 30-33 days 15 May, the hatch date would be 15 May minus 33 days or 12 April. The laying date was estimated by using the estimated hatch date and subtracting the number of days required for incubation, and the fledging date was calculated by using the hatch date and adding the average number of days required for fledging based on literature (Table 1). The times required for incubation and fledging were taken to be the highest number of days reported in the literature, since there is little information specific to Alberta.

Results and Discussion

Great Horned Owl

There were 358 Great Horned Owl nest records collected from 1991 to 2003. In our study, the earliest estimated date for egg laying was 28 January and the latest was 11 May, with a mean laying date of 7 March (Figure 1). The mean estimated hatching date was 11 April (range of 4 March to 15 June) and the mean estimated fledging date was 26 May (range of 18 April to 30 July).

Great Horned Owls are very early nesters, even in northern latitudes, with egg laying and incubation underway well before the snow disappears. The earliest known egg laying record is December 15 from Montana (D. Holt, pers. comm.). One of the latest records was 19 March from the northern United States. [5] In Saskatchewan, the latest eggs laid were on 12 May,[12] similar to our study.

Red-tailed Hawk

A total of 295 Red-tailed Hawk nest records were collected from 1991 to 2003. In our study, the earliest estimated egg laying

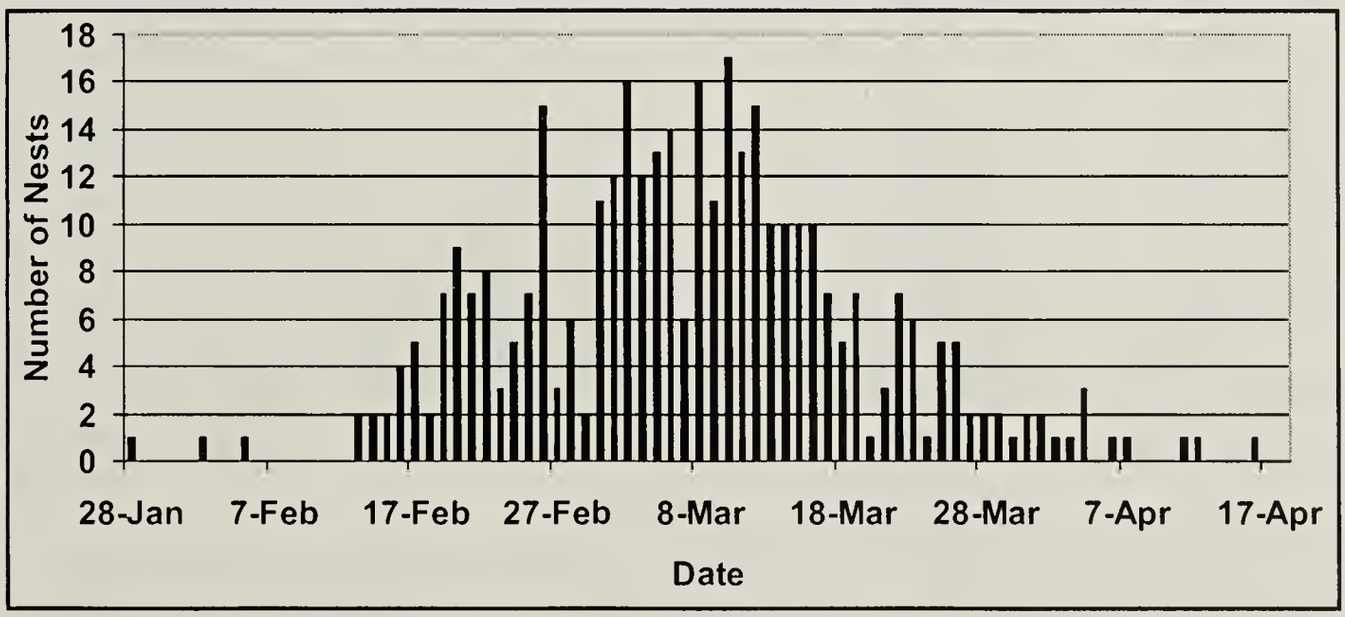

Figure 1. Estimated laying dates of the Great Horned Owl in central Alberta.

date was 6 April and the latest was 27 May (mean 24 April) (Figure 2). The mean estimated hatching date was 29 May (range of 11 May to 1 July) and the mean estimated fledging date was 14 July (range of 26 June to 16 August).

(1966) observed Red-tailed Hawks between 4-17 July that were about 4-5 weeks old.

Swainson's Hawk

There were 231 Swainson's Hawk nest records collected from 1991 to 2003. In our

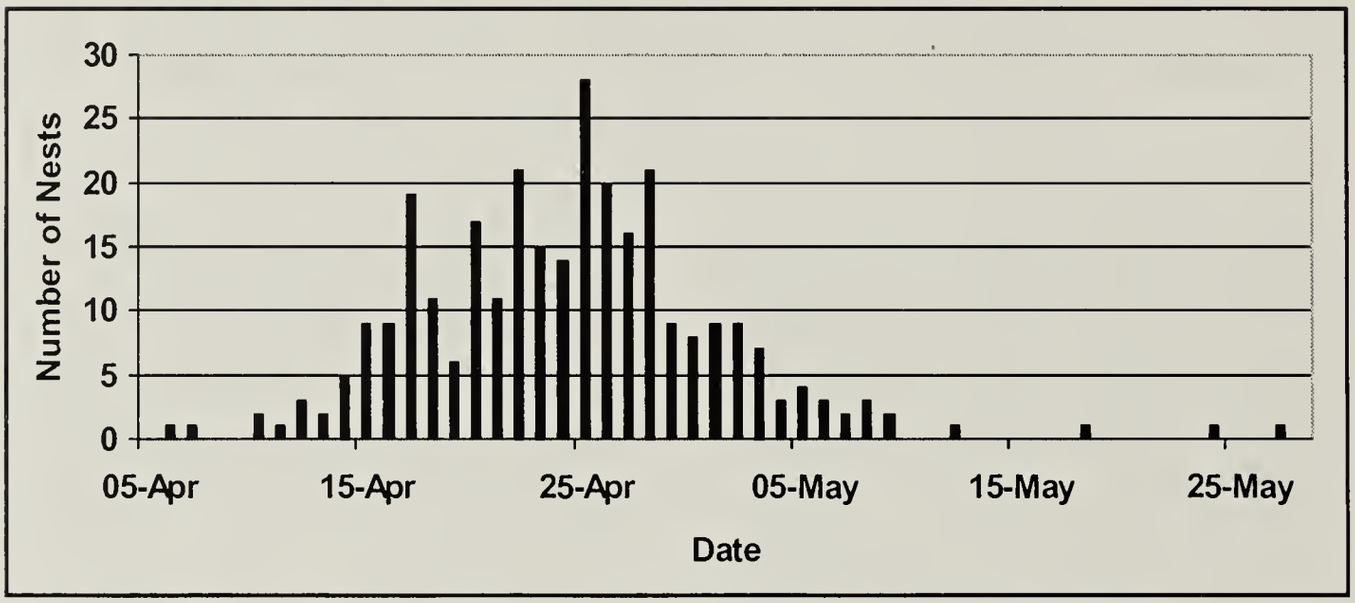

Figure 2. Estimated laying dates of the Red-tailed Hawk in central Alberta.

The estimated laying dates for Red-tailed Hawk have ranged from 5 April to 6 May in Montana [13] and incubating females have been reported from late April through the end of May in Saskatchewan.[9] In Alberta, another study found eggs hatching between 1 June and 16 June.[14] Nests found in our study show a similar range of dates. On 5 June, four downy young Red-tails were observed in a nest along the Rosebud River in southern Alberta,[17] and Meslow and Keith

study, the earliest estimated egg laying date was 6 May and the latest was 15 June (mean 23 May). The mean estimated hatching date was 27 June (range of 10 June to 20 July). The mean estimated fledging date was 11 August (range of 26 July to 3 September) (Figure 3).

Schmutz *et al.* reported that the average hatching date for Swainson's Hawks in southeastern Alberta was near the end of

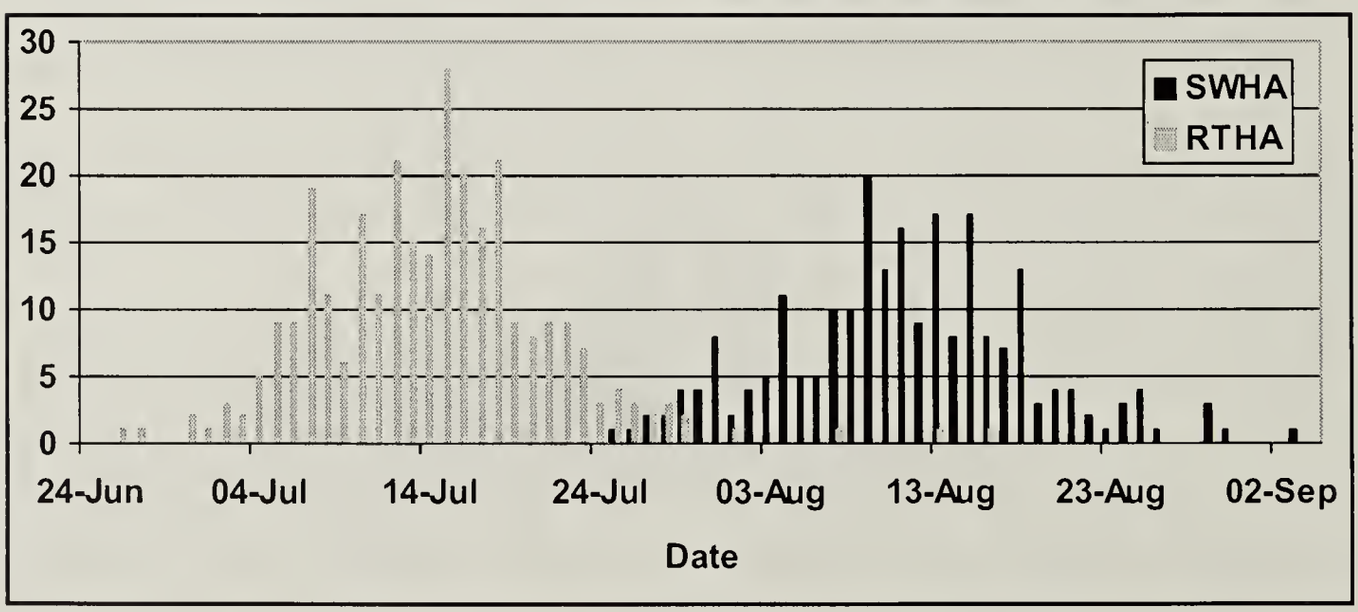

Figure 3. Estimated fledge dates of Red-tailed Hawk and Swainson's Hawk nestlings in central Alberta.

June, and in Wyoming eggs hatched between 16 May and 3 July.[5] The mean hatch date of 23 May in this study is quite similar. Schmutz *et al.* found the fledgling period in southeastern Alberta to be mid-June to late August. The mean fledging date found in my study is similar, and also shows the wide variation in fledging dates.

On average, fledging of young Swainson's Hawks occurred 28 days later than Red-tailed Hawks and 76 days later than Great Horned Owls. The range of dates for the breeding season from laying to fledging was highest for the Great Horned Owl (184 days), followed by the Red-tailed Hawk (132 days), followed by the Swainson's Hawk (120 days) over the 13 years.

Young Red-tailed Hawk with a band on its leg, July 1, 2003 Lisa Priestley

Conclusions

Protecting nesting raptors is one of the best ways to ensure populations remain stable. Nests of Great Horned Owls need to be protected from excessive disturbance from the beginning of March through to the end of May. Red-tailed Hawk nests should be protected from mid-April to the end of July, and Swainson's Hawk nests from early May to the end of August.

Raptors (owls, hawks, eagles, etc.) are excellent indicators of the health of the environment.[4] Data on primary demographic parameters (productivity and survivorship) are needed to determine the factors responsible for the population declines in birds and to identify conservation and management actions to reverse the declines.[1,6] Tracking nesting raptors such as the sympatric Great Horned Owl, Red-tailed Hawk, and Swainson's Hawk, allows managers to monitor phenology and productivity, and any changes in these over time. Future analyses of the nest card data collected by volunteers will look at these parameters.

Having volunteers collect the information can reduce the costs of this work. Meeting with landowners and bringing them out to see the young hawks and owls, can give landowners a sense of pride in the raptors they have on their land. An increase in public knowledge of raptors and their importance can result when the landowner shares the information they have learned with others.

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