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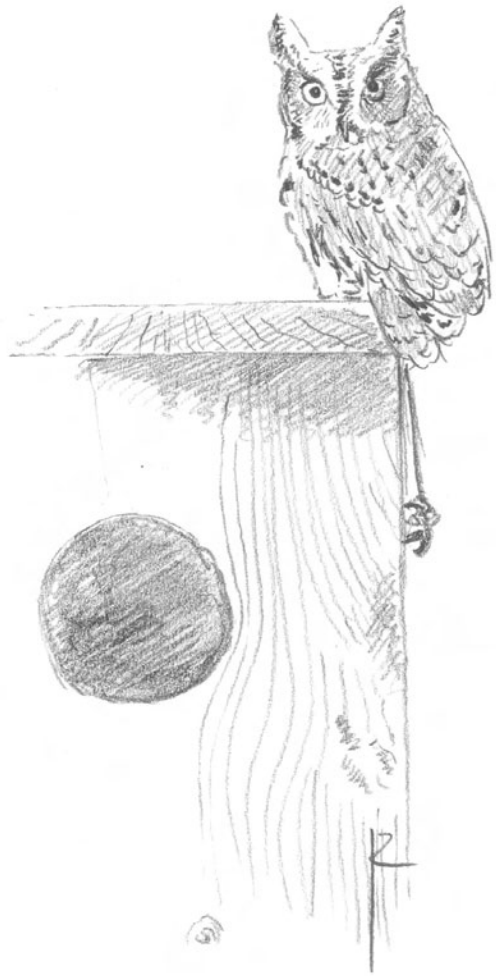
Breeding and population density of the Eastern Screech Owl *Megascops asio* at the northern periphery of its range

Christian Artuso[1]



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Random-stratified spring nocturnal surveys using tape playback were conducted for Eastern Screech Owls *Megascops asio* from 2004 through 2007 in Winnipeg, Manitoba, Canada, at the northern periphery of its range. Surveys were stratified by (1) human density, (2) riparian vs. non-riparian habitat, and 3) the presence or absence of suburban greenspace. A total of 120 transects (each 1.75 km long) were surveyed, with 55 Eastern Screech Owls detected. Eastern Screech Owl densities peaked in moderate to high-density suburban areas (>20 persons/ha), where 36 (66%) detections occurred, and were lowest in wildlands (<1 pair/ha), where no detections occurred. Fifty-one (93%) Eastern Screech Owls were detected in riparian areas. Only 20 (36%) Eastern Screech Owls were detected in suburban greenspaces. In 4 years I located a total of 46 successful Eastern Screech Owl nests, 6 failed nests, and 37 territories with non-breeding owls. Excluding repeat cavity uses, a total of 61 nest sites and territory centres were located, of which 38 (62.3%) were in natural cavities, 21 (34.4%) in nest boxes, and 2 (3.3%) at sites where cavity choice was undetermined. Fledging dates ranged from 28 May – 3 July (mean 15 June, SE 1.4) over the 4-year period. Eastern Screech Owls were closely tied to riparian habitat, and showed larger average brood sizes and earlier average fledging dates in moderate and high-density suburban areas than in low-density suburban and rural areas.

Key words: Eastern Screech Owl, *Megascops asio maxwelliae*, playback, survey, gradient, habitat, human density, range periphery, population density

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INTRODUCTION

The range of the Eastern Screech Owl *Megascops asio*, hereafter EASO, covers most of eastern USA, extending from approximately 22°N in northeast Mexico to 50°N in Manitoba and southeastern Saskatchewan, Canada (Gehlbach 1995), and occasionally as far as 52°N (Walley & Clyde 1996). In the predominantly tropical insectivorous genus *Megascops*, EASO and the Western Screech-Owl *M. kennicotti* are the only representatives to occur at such high latitudes (König *et al.* 1999). Gehlbach (1994b) demonstrated significant differences between a suburban and a rural population of EASO in Texas in terms of fecundity and survivorship. However, Ellison (1980) found that EASO in Massachusetts avoided urban areas in proportion to their availability. This suggests that there may be a positive correlation between the density or breeding success of EASO and human-altered landscape, but that this relationship may be non-linear or may be mitigated by broad geographical variables. In this study I examined the patterns of population density and breeding biology at the northern periphery of the species' range and asked whether these patterns differ from more southerly populations. More specifically, I investigated correlations between EASO density and breeding and human density, riparian vs. non-riparian habitat, and the presence or absence of greenspace.

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METHODS

Random stratified surveys for EASO were conducted each spring from 2004 through 2007. The study area was defined as a circle with a radius of 40 km from the centre of Winnipeg (49°53'N, 97°09'E), which encompasses the city limits and also areas outside the city with lower human densities. The study area was randomly stratified by three variables as indicated in Table 1. Human density was calculated from 2001 census data for Winnipeg subdivisions and surrounding rural districts (Statistics Canada 2004) and census tracts were classified roughly following Marzluff *et al.* (2001). For the purposes of classification, riparian areas were defined as within 500 m of a river or permanently flowing watercourse, based on observations in the study area which suggest this to be the average radius from the nest of a breeding territory. In the study area, riparian areas are dominated by White Elm *Ulmus americana*, Green Ash *Fraxinus pennsylvanica*, Manitoba Maple *Acer negundo*, and Bur Oak *Quercus macrocarpa*, as well as Eastern Cottonwood *Populus deltoides*, Basswood *Tilia americana* and to a lesser extent Peachleaf Willow *Salix amygdaloides*. Many planted native and exotic species also occur throughout the study area, in particular conifers such as White Spruce *Picea glauca*, Eastern White Cedar *Thuja occidentalis* and the non-native Colorado Blue Spruce *Picea pungens*. Greenspace was defined as parks, cemeteries, golf courses, and green corridors such as riparian buffer strips as well as naturally occurring uninhabited copses.

Since the wild lands category is not divided by the variable of immediate surrounding (wild land is by definition greenspace), there were 18 categories. Six areas corresponding to each category were selected at random, except for the wildlands riparian and wildlands non-riparian categories, for which 12 areas were selected to ensure equal coverage of all levels of human density, resulting in 120 survey transects. Each transect was surveyed twice in a random order in two consecutive springs, half in 2004 and 2005 and the remaining areas in 2006 and 2007. Surveys were conducted in the peak local calling period of late February to April.

Random stratified surveys used tape-recorded song, arguably the most effective means of locating owls (Johnson *et al.* 1981, Lynch & Smith 1984). The timing of the survey, the use of playback, and repetition of each transect was designed to reduce the likelihood of false negative bias, i.e. that a positive detection indicates presence, whereas a zero detection does not necessarily indicate absence (Tyre *et al.* 2003). Each survey consisted of eight listening stations separated by 250 m, following a random direction from the randomly selected start point. Care was taken to ensure the transect remained within the human population and habitat categories being surveyed (where necessary, a second and, rarely, a third random direction were selected at critical junctures). At each station, 2 minutes of listening were followed by playing a recording of four EASO monotonic trill calls, each separated by 17 seconds (average pause between trill calls calculated from local males) and then 5 minutes of listening. The number of EASO detected was then recorded as being seen and/or heard either before and/or after playback. Surveys were only conducted on relatively calm nights (wind <20 km/h) from 30 minutes after sunset to one hour before sunrise.

The distance to the nearest permanent watercourse and the percent greenspace within a radius of 100 m were calculated for each survey point using a combination of estimation at the site and calculations in GIS Arcview. These were then averaged for each transect, providing numerical variables enabling a comparison of averages for transects where EASO was or was not detected. A general linear model (GLM) was used in the Statistical Analysis System (SAS) software to analyze correlations between the density of EASO detected and human density, riparian habitat, greenspace and the presence of Great Horned Owls *Bubo virginianus*, hereafter GHOW, which were also recorded on survey

Table 1. Stratification of the study area by habitat categories.

Human density	Broad habitat	Immediate surroundings
Wildlands (<1 person/ha)	Riparian	Greenspace / park area
Rural (1–10 p/ha)	Non-riparian	Neighbourhood
Suburban low-density (10–20 p/ha)		
Suburban moderate-density (20–30 p/ha)		
Suburban high-density and urban (>30 p/ha)		

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transects despite the fact that their calls were not broadcast. A single interaction term of human density × riparian was also included to test for mitigating effects. The GLM was first tested with a year variable (2004/05 vs. 2006/07); however, because this showed no significant effects, nor did it affect the significance of other variables, it was removed from the final analysis. On most transects, zero, one or two EASO were detected (averaging either 0, 0.5, 1, or 1.5 over the 2 years) and only one transect had three and one transect four owls (both averaging to 2.5 over the 2 years). Therefore, after examination of the n-scores plot and quantile-quantile plot, I used the square root transformation of the average number of EASO detected per transect as the response variable, providing a near normal distribution, enabling the GLM analysis, and increasing the *r*-square value of the model.

Following spring surveys, roost and cavity searches were conducted around all EASO detection points. Repeat visits to these areas were made to listen for spontaneous calling for a more accurate picture of territorial boundaries. Daytime roost and cavity searches further narrowed the search, especially as nests were typically within 100 m of a males' regular roost site after late March. Nests were then located by observing activity around potential cavities, in particular at dusk and dawn, when females typically exit the cavity briefly (Gehlbach 1995). Nests were then monitored every 4–7 days (every second day close to expected fledging) to determine breeding phenology and brood size; however, nest cavities were only inspected where possible after all young had fledged to minimize disturbance. Failed nests were those where unhatched or damaged eggs were found and no chicks fledged.

RESULTS

Population density

In the 4 years of this study a total of 55 EASO were detected on 29 (24%) transects (Table 2). EASO were detected in 12 of the 18 survey categories. The most productive categories were suburban low-density riparian neighbourhood, suburban low-density riparian greenspace, suburban moderate-density riparian greenspace and suburban high-density riparian greenspace, each with detections on four of the six transects. EASO densities peaked in moderate to high-density suburban areas where 36 (66%) detections occurred and were lowest in wildlands where no detections occurred (Fig. 1). Fifty-one (93%) EASO were detected in riparian

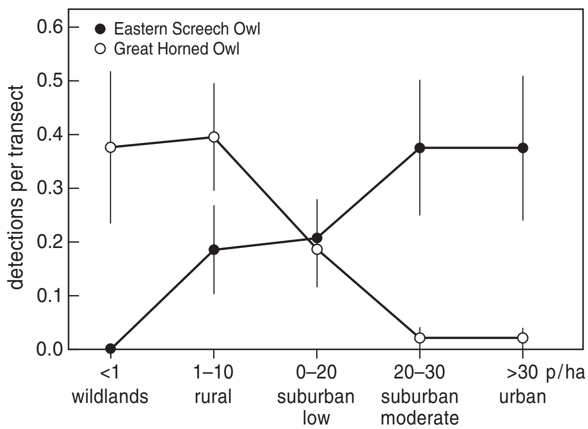

Figure 1. Detections (means ± SE) per transect of Eastern Screech Owl and Great Horned Owl by human density category, Winnipeg, Manitoba, 2004–07. P/ha = number of persons per hectare.

Table 2. Eastern Screech Owl (EASO) detections on the random stratified surveys by habitat category, Winnipeg, Manitoba, 2004–07. The number of transects are indicated in parentheses.

Category	No. EASO	No. transects with detections	% Detections
Wildlands (24)	0	0	0
Rural (24)	9	5	20.8
Suburban low-density (24)	10	8	33.3
Suburban moderate-density (24)	18	8	33.3
Suburban high-density and Urban (24)	18	8	33.3
Riparian (60)	51	25	41.7
Non-riparian (60)	4	4	6.7
Greenspace (72)	20	13	18.1
Neighbourhood (48)	35	12	25
All (120)	**55**	**29**	**24.2**

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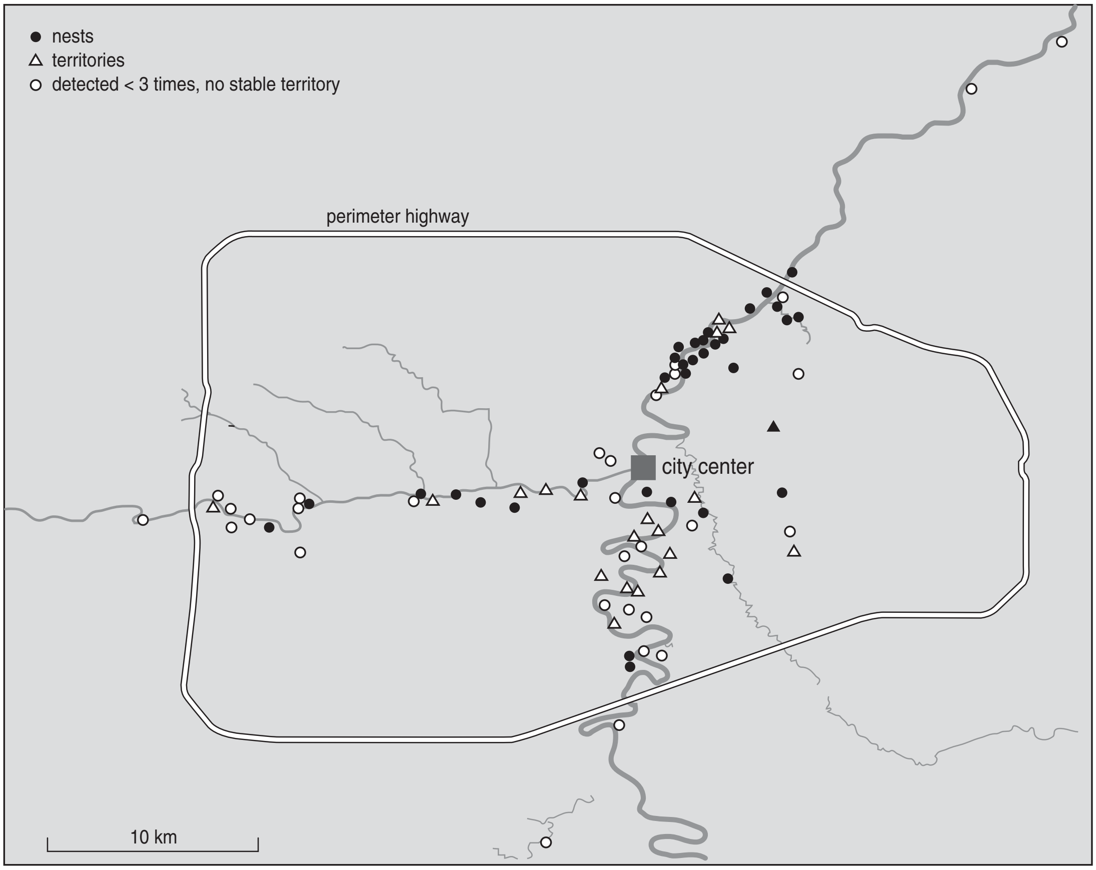

Figure 2. Locations of Eastern Screech Owl nests, territories, and sites where birds were detected fewer than 3 times and did not form a stable territory, Winnipeg, Manitoba, 2004–07. The Perimeter Highway around Winnipeg and major rivers and large permanent creeks are shown. The city centre is indicated.

areas. The strong riparian preference was also evident when sightings were mapped (Fig. 2). The difference between the greenspace and neighbourhood categories was much less pronounced, with detections on six of the 10 greenspace categories and five of the eight neighbourhood categories (18.1% and 25% of transects surveyed in these categories, respectively). Only 20 (36%) EASO were detected in suburban or urban greenspace.

In addition to EASO, GHOW (48), Northern Saw-whet Owl (14), Long-eared Owl (3), and Barred Owl (1) were also detected. GHOW showed the reverse detection pattern to EASO, peaking in wildlands and rural areas where 37 (77%) detections occurred and being lowest in moderate to high-density suburban areas where two (4%) of detections occurred (Fig. 1). Thirty-four (71%) GHOWs were detected in riparian areas. Only eight (17%) GHOWs were detected in suburban or urban greenspace (Table 3).

The GLM model (Table 4) found the riparian category to be highly significant and the human density categorical variable to be significant. The greenspace variable was not significant. Four orthogonal contrasts were used to examine significant differences between the five levels of the human density variable. The wildlands category was significantly different from all other categories ($F_{1,112} = 17.84$, $P < 0.001$) and the rural and suburban low-density categories were significantly different from suburban moderate-density and suburban high-density and urban ($F_{1,112} = 4.25$, $P = 0.04$). The rural category did not differ significantly from the suburban low-density category and the suburban moderate-density category did not differ significantly from the suburban high-density and urban category. Least squares means tests (Table 5) produced a similar result with wildlands being significantly different from all other categories. Duncan's multiple range test grouped wildlands and rural together against all other categories.

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Table 3. Great Horned Owl (GHOW) detections on the random stratified surveys by habitat category, Winnipeg, Manitoba, 2004–07. The number of transects are indicated in parentheses.

Category	No. EASO	No. transects with detections	% Detections
Wildlands (24)	18	8	33.3
Rural (24)	19	11	45.8
Suburban low-density (24)	9	6	25
Suburban moderate-density (24)	1	1	4.2
Suburban high-density and Urban (24)	1	1	4.2
Riparian (60)	34	18	30
Non-riparian (60)	14	9	15
Greenspace (72)	40	6	29.2
Neighbourhood (48)	8	21	12.5
All (120)	**48**	**27**	**22.5**

Table 4. Comparing sites with or without Eastern Screech Owl. Effects of variables are tested by a General Linear Model (GLM).

Variable	Mean ± SE EASO present	Mean ± SE EASO absent	*F*-value	*P*
Distance water *Rip* (m)	311.3 ± 110.8	2246.4 ± 412.1	30.66	<0.0001
Human density *HD* (p/ha)	25.8 ± 3.58	15.42 ± 1.82	3.84	0.01
Greenspace *GN*	58 ± 6.0	60 ± 5.0	3.01	0.09
GHOW (per transect)	0.12 ± 0.05	0.23 ± 0.05	2.25	0.14
Rip × *HD*			2.2	0.07

GLM: square root average detection EASO = Riparian vs. non-riparian (*Rip*) + Human density category (*HD*) + greenspace vs. neighbourhood (*GN*) + average detections of GHOW (*GHOW*) + *Rip* x *HD* ($F_{11,119}$ = 5.46, P < 0.0001, R^2 = 0.36).

Table 5. Results of a least squares means test for differences among human density categories in Eastern Screech Owl presence. Given are *P*-values for pairwise comparisons.

Category	Suburban moderate-density	Suburban low-density	Rural	Wildlands
Suburban high-density and Urban	0.337	0.0555	0.0593	0.0087
Suburban moderate-density		0.3076	0.3163	0.0011
Suburban low-density			0.9828	<0.0001
Rural				<0.0001

Breeding

In the 4 years of this study I located a total of 46 successful Eastern Screech Owl nests, 6 failed nests, and 37 stable territories (where a pair was active but did not breed or where one or more cavities was advertised by an unpaired male over a period greater than 6 weeks) (Table 6). Only sites where unhatched eggs or remains were found were treated as failed nests. It is possible that some seemingly territorial pairs attempted nesting at an undetected site or that unhatched eggs were removed before I inspected potential cavities. Therefore, the brood size per nesting effort may be lower than reported here. It is also possible that some of the later nests were renesting efforts, although I found no evidence of renesting and later brood sizes differed little from earlier broods, e.g. nests where first

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fledging occurred before 22 June averaged 4.3 fledglings per nesting effort vs. 4.1 in broods where first fledging occurred after 22 June.

Excluding repeat cavity uses, a total of 61 nest sites and territory centres were located, of which 38 (62.3%) were in natural cavities, 21 (34.4%) in nesting boxes for Wood Duck *Aix sponsa*, and two (3.3%) at sites where cavity choice was undetermined. Human density around used territories ranged from 0.24–98.68 p/ha (mean ± SE: 26.01 ± 2.01 p/ha), with 41 nests (67%) found in moderate to high-density suburban areas, 12 (20%) in low-density suburban areas and 8 nests (13%) in wildlands and rural areas. Percentage greenspace in a radius of 100 m around a used cavity ranged from 0.6–75% (16.87 ± 2.38%), with 29 nests (48%) centred in a greenspace and 32 nests (52%) centred in residential areas. Distance from used cavity to nearest permanent watercourse ranged at 4.6–3477 m (255.25 ± 69.09 m), although only eight sites (13%) (of which only three were successful nests) were >500 m from a permanent watercourse.

The average brood size per nesting effort showed an incremental increase through the human density categories, with highest success in high-density sub-

Table 6. Breeding parameters (average ± SE and range) of Eastern Screech Owl by year (2004–07), Winnipeg, Manitoba.

	n[a]	Brood size, successful only[b]	Brood size per nesting attempt[c]	Fledging
2004	12/2/5	4.88 ± 0.39 3–6	3.90 ± 0.72 3–6	12 June ± 3.49 28 May – 28 Jun
2005	10/2/13	4.10 ± 0.18 3–6	3.40 ± 0.48 2–6	15 June ± 2.44 3 June – 30 June
2006	14/0/9	3.57 ± 0.25 2–5	3.57 ± 0.25 2–5	17 June ± 2.98 2 June – 3 July
2007	10/2/5	4.60 ± 0.37 3–6	3.83 ± 0.60 1–6	16 June ± 3.37 2 June – 3 July
All years	**46/6/37**	**4.19 ± 0.16** **2–6**	**3.67 ± 0.25** **2–6**	**15 June ± 1.38** **28 May – 3 July**

[a]Successful nests/failed nests/territories. The number of territories includes unpaired males advertising cavities and pairs that were not known to have eggs. These were not included when calculating averages.
[b]At least one chick fledged.
[c]The brood size of failed nests is taken as zero for calculation purposes.

Table 7. Breeding parameters (average ± SE) of Eastern Screech Owl by habitat category.

Category	n[a]	Brood size, successful only[b]	Brood size per nesting attempt[c]	Fledging
Rural and Wildlands[d]	9	3.88 ± 0.44	3.44 ± 0.58	20 June ± 1.86
Suburban low-density	12	3.89 ± 0.31	3.50 ± 0.48	15 June ± 1.7
Suburban moderate-density	23	4.47 ± 0.21	3.62 ± 0.43	14 June ± 3.08
Suburban high-density	8	4.25 ± 0.49	4.25 ± 0.49	17 June ± 1.8
Riparian	46	4.16 ± 0.17	3.76 ± 0.25	15 June ± 1.42
Non-riparian	6	4.50 ± 2.00	3.00 ± 2.45	27 June ± 1.5
Greenspace	29	4.12 ± 0.22	3.81 ± 0.29	14 June ± 1.69
Neighbourhood	23	4.29 ± 0.25	3.48 ± 0.43	18 June ± 2.41
All	**52**	**4.19 ± 0.16**	**3.67 ± 0.25**	**15 June ± 1.38**

[a]The sample sizes given are for the data set overall; however, in a few cases either the exact fledging date or the exact number of fledglings was not known and these are excluded from the relevant calculations.
[b]At least one chick fledged.
[c]The brood size of failed nests is taken as zero for calculation purposes.
[d]Only one nest was found in the wildlands category hence its lumping with the rural category.

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urban areas and the lowest success in the combined rural and wildlands categories (Table 7), although the difference was not statistically significant. Average fledging dates did not significantly differ between categories.

Predation at the nesting stage was minimal in the study area, damaged eggs being found on only one occasion, probably by Raccoon *Procyon lotor*. One clutch of five eggs was removed by a female Wood Duck (Artuso 2007). No evidence of chick mortality was found when cavities were inspected post fledging.

Comparing breeding among locations

A comparison of breeding in other areas as documented in other studies is provided in Table 8. The average brood per nesting effort in Manitoba in rural areas and wildlands was 3.44 ± 0.58, compared to 3.72 ± 0.28 in suburban areas. These average brood sizes support the trend of increasing clutch size with increasing latitude observed by Murray (1976). There remain two caveats, however, with any comparison, viz. brood sizes could differ from clutch sizes and the fact that most long-term studies have been based exclusively on nest boxes, which are easily inspected and monitored (van Camp & Henny 1975, Gehlbach 1994b). In this study, larger broods of successful nests occurred in nest boxes (4.47 ± 0.26) than in cavities (4.0 ± 0.21), although the difference was not significant (2-tailed *t*-test, $t = 1.29$, $df = 39$, $P = 0.21$). The difference was 3.8 ± 0.43 vs. 3.57 ± 0.3 per nesting effort. Production in Texas did not differ between natural cavities and nest boxes (Gehlbach 1994a); however, the number and size of cavities could differ between the two regions.

DISCUSSION

In the study area, EASO show a strong preference for riparian areas both in terms of survey detections and in number of nest sites located. This was also suggested by Kelso (1944) in New York. In the study area, the tallest trees are typically found in the riparian zone. Taller trees of suburban habitats are preferentially selected by some raptors, e.g. GHOW (Smith *et al.* 1999) and may have positive effects on population density, e.g. Cooper's Hawk *Accipiter cooperii* (Boal & Mannan 1998). EASO appears less dependent on riparian habitat further south towards the core of the species' range, and utilize a wide variety of forest and woodland types (Gehlbach 1995).

EASO utilize moderate to high-density suburban areas significantly more than rural areas and have slightly larger broods in areas above 20 p/ha. EASO density may peak above 20 p/ha; however the 120 transects of this survey proved insufficient to adequately assess this pattern (Fig. 1). The suburban moderate-density category was where the majority of nesting efforts were located (44%) as compared to only 15% in the suburban high-density category, provides further evidence of this, as does the distribution pattern evident in Fig. 2, which shows clusters of territories in suburban areas along the major rivers and comparatively few territories close to the city centre.

This study found only marginally significant differences in EASO's use of greenspace as opposed to residential areas, suggesting a high tolerance for human activity. EASO's small size and highly nocturnal habits mean that even when breeding in high-density sub-

Table 8. Breeding parameters of Eastern Screech Owl from five different locations. Given are averages (if available) and range in parentheses.

Location	*n*	Clutch size	Brood size successful nests only	Average brood per nesting effort	Fledging dates	Source
Manitoba	52	(1–6)	4.19 (2–6)	3.72 suburban[a] 3.44 rural[a]	15 Jun (28 May – 3 July)	this study
Ontario	58	3.83 (1–6)	(1–6)	-	(19 May – 5 July)[b]	Peck & James (1983)
Michigan	13	4 (3–5)	(3–5)	2.6	1 June (13 May – 19 June)	Craighead & Craighead (1956)
Ohio	440	4.43 (2–6)	3.8 (2–7)	2.55	31 May (1 May – 20 June)[b]	VanCamp & Henny (1975)
Texas	97	3.8 (2–6)	3.29 (2–6)	1.9 suburban 1.0 rural	18–21 May (11 Feb – 15 June)[c]	Gehlbach (1994b)

[a]To aid comparison, data is given for suburban nests (human density >10 p/ha) and rural (human density ≤ 10 p/ha).
[b]The exact range and average fledging dates were not provided so these are approximations based on comments in the source.
[c]Dates are for first nests only, differences in averages being between suburban and rural sites. The latest fledging date for a renesting effort in Texas was July 24.

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urban areas, interactions with humans may be minimal. Conversely, all 10 GHOW nests located in the study area in the same period were situated in rural or suburban greenspace, in particular in or on the edge of golf courses that were seldom visited by humans at night. Only one EASO nest was located at the edge of a golf course. The small open lawns of residential neighbourhoods with large trees may be more suitable to EASO, while larger open spaces are more readily exploited by GHOW. The GHOW is a moderately disturbance-adapted species (Bosakowski & Smith 1997) and the fact that peak densities were recorded in the rural category is indicative of this. When transects were separated by year, GHOW were found on only five transects (12%) where EASO were detected, suggesting that their presence may deter EASO; however the average detection rate of GHOW was not statistically significant in the GLM analysis (Table 4). This may be because of the fact that GHOW calls were not broadcast and detection rates thus not accurately reflective of population densities.

Although this study found differences between suburban and rural breeding pairs in terms of brood size and fledging dates, these were not significant due to small sample sizes in the rural category. High-density suburban areas show the highest average brood size per nesting effort and rural pairs the lowest; however, lifetime production, as opposed to brood size, would be a better indicator of biologically significant differences. Of the 61 cavities, no more than 42% of those available (not within the territory of another owl, clogged by squirrel activity or otherwise damaged) were used in any given year, suggesting an unsaturated population. No nest site was used successfully in all 4 years of the study and only one cavity produced young in 3 out of 4 years. Six sites were used successfully in 2 years, 31 nest sites produced successful broods only once, and 23 nest sites never produced young, of which 15 (65%) were held by unpaired males. The reasons why EASO abandoned cavities and/or territories are not clear; however, in four cases (of 39) abandonment coincided with the appearance of a larger owl species moving into the area. GHOW breeding appeared to cause EASO to vacate three territories and in one case the presence of a Barred Owl in the early spring coincided with the abandonment of a territory after 2 years of successful breeding. Some unpaired males may have abandoned territories after failing to attract females or replacement partners (9 cases) and increased human disturbance such as construction activity or tree-felling close to a former nest site may have resulted in four cases of abandonment. In at least three cases, territories where breeding did not occur between 2004 and 2007 were sites of previous breeding according to local residents.

The differences between suburban and rural broods at the northern periphery of the range in Manitoba was less pronounced than in the southern part of the range in Texas (Table 8); however this may be an artefact of the gradient approach of this study vs. the comparison of different study sites in Texas and different definitions of 'rural' vs. 'suburban' areas, e.g. Gehlbach's (1994) suburban study sites had only 4 p/ha and 5 p/ha, vs. <1 p/ha in the rural site. In Manitoba, rural and wildlands nests fledged on average 5 days later than suburban nests (20 June ± 1.86 vs. 15 June ± 1.64). This result is similar to the 6-day difference between first egg laying/hatching in suburban and rural sites in Texas (Gehlbach 1994b); however, the difference was not statistically significant (two-tailed t-test, $t = 1.3$, $df = 37$, $P = 0.2$). Although the Winnipeg population may fledge more young per nesting effort than southern populations, winter mortality could be much higher, especially considering EASO's limited tolerance to cold (Mosher & Henny 1976). Therefore, although EASO may have a stronger preference for riparian habitat at the northern range limit, the differences between suburban/urban and rural breeding areas at the northern periphery appear very similar to more southerly populations.

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SAMENVATTING

Gedurende de jaren 2004–07 werd het voorkomen van de Schreeuwuil *Megascops asio* geïnventariseerd in het Canadese Winnipeg langs de noordelijke rand van het verspreidingsgebied. De te inventariseren gebieden werden gestratificeerd naar de menselijke bevolkingsdichtheid, de aan- of afwezigheid van waterlopen en de aan- of afwezigheid van parken. In totaal werden 120 transecten van 1,75 km onderzocht. Hierin werden 55 Schreeuwuilen aangetroffen. Dichtheden waren het hoogst in gebieden met een menselijke bevolkingsdichtheid van >20 personen per ha (vallend in de klasse van gemiddeld tot hoog): 36 (66%) van de uilen werden in dit habitat aangetroffen. In onbewoonde gebieden (<1 persoon per ha) werden geen uilen gevonden. Eenenvijftig uilen (93%) werden aangetroffen in de buurt van waterlopen en 20 (36%) in parken. In de vier onderzoeksjaren werden 46 succesvolle nesten gevonden, terwijl er zes mislukten. Daarnaast waren er 37 territoria zonder dat de uilen tot broeden kwamen. Nesten waren gelegen in natuurlijke holtes (38 of 62%) of in nestkasten (21 of 34%); in twee gevallen (3%) kon niet worden uitgemaakt waar de uilen precies zaten. Jonge uilen vlogen uit tussen 28 mei en 3 juli, met een gemiddelde van 15 juni (SE 1,4). Schreeuwuilen die in gebieden met meer dan 20 personen per ha broedden, hadden meer jongen en begonnen eerder met broeden dan uilen in gebieden met een lage bevolkingsdichtheid en in landelijk gebied.

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