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Breeding Birds of Mature Woodlands of Point Pelee National Park Prior to Infestation by Emerald Ash Borer, *Agrilus planipennis*

HOLLY D. DODDS[1] and GARD W. OTIS

School of Environmental Sciences, University of Guelph, Guelph, Ontario N1G 2W1 Canada
[1]Current address: Department of Pathobiology, Ontario Veterinary College, University of Guelph, Guelph, Ontario N1G 2W1 Canada; e-mail: hdodds@uoguelph.ca

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The Emerald Ash Borer (EAB) is a wood-boring beetle native to Asia that now infests and kills ash trees (*Fraxinus* spp.) in North America. Many ecological communities will be dramatically altered by the mortality of ash trees caused by this invasive insect. The EAB recently colonized Point Pelee National Park of Canada in extreme southwestern Ontario, Canada, a site famous for its unusual plant and animal diversity as well as its extraordinary bird migrations. We conducted a census of breeding birds in two ash-rich mature forests at Point Pelee in order to obtain baseline data on the breeding bird communities prior to changes in forest communities that are likely to be caused by the EAB. Here we report the results of the bird census and review possible changes to the breeding bird fauna of Point Pelee that may result from ash tree mortality and the associated disruption of forest communities.

Key Words: Bird fauna, Point Pelee National Park of Canada, Emerald Ash Borer, *Agrilus planipennis, Fraxinus* spp., ash trees, invasive beetles, Blue Ash, *Fraxinus quadrangulata*.

Point Pelee, the southernmost region of mainland Canada, is an elongated peninsula that juts into Lake Erie. Point Pelee National Park of Canada (PPNP) is composed of marshes, forests, beaches and fields bordered to the north by a highly fragmented agricultural landscape (Smits et al. 2005). The combination of its southerly location and the moderating influence of the lake provides Point Pelee with the warmest mean temperatures, mildest winters, and longest frost-free period in Ontario (McLachlan and Bazely 2001). As a result, the flora and fauna of the park are more similar to those of the American Midwest and the Carolinas than to the rest of Canada. Because of its unique biological characteristics within Canada, PPNP was the first Canadian park established for its biological significance (Crow and Smith 2007).

Carolinian forests constitute an uncommon and fragmented Canadian habitat restricted primarily to sites near the northern shore of Lake Erie (National Parks Service 1972*). They are home to many species characteristic of the Carolinian life zone (National Parks Service 1972*) which covers just 0.25% of Canada's landmass yet contains the highest biological diversity and largest number of rare plant and animal species in the country (McLachlan and Bazely 2002). The forests of Point Pelee are unique within Canada, even compared to other Carolinian forests. They are dominated by three species: Northern Hackberry (*Celtis occidentalis*), Black Walnut (*Juglans nigra*), and Red/Green Ash (*Fraxinus pennsylvanica*). Other common species include Sugar Maple (*Acer saccharum*), several species of oaks (*Quercus* spp.), Basswood (*Tilia americana*), Eastern Redcedar (*Juniper virginiana*), Shagbark Hickory (*Carya ovata*), and Northern Spicebush (*Lindera benzoin*) (Parks Canada 2009*). Approximately 9% of the trees at PPNP are ashes (Koh and Spangler 2004*): Red/Green Ash, White Ash (*Fraxinus americana*), Black Ash (*Fraxinus nigra*), and Blue Ash (*Fraxinus quadrangulata*), a COSEWIC species of "special concern" in Canada. Ashes are most common in moist interior forests and in the upper beach zone, particularly on the western side of the peninsula.

Point Pelee National Park is of great scientific value because of its unique ecological communities, the unusual geological formation of the point itself, and the intense spring migration, during which large numbers of water birds, shorebirds and passerines transit the park *en route* to their summer nesting grounds. The exceptional bird traffic is due to the park's location: Point Pelee is the first land many migrants encounter after flying north across Lake Erie (Smits 2005). The bird migration attracts thousands of birders annually, and these birders contribute significantly to the economy of the region (Hvenegaard et al. 1989).

The Emerald Ash Borer (EAB), *Agrilus planipennis* (Coleoptera: Buprestidae), is a wood-boring beetle that feeds on ash trees (*Fraxinus* spp.). Native to Asia, it was discovered in southeastern Michigan and neighboring Ontario in 2002 (McCullough and Siegart 2007). The extensive tunneling of EAB larvae under the bark kills most ash trees that become infested, from pre-reproductive trees ≤5 cm in diameter to mature trees >90 cm in diameter (OMNR 2009*). Ash trees are among the most common trees in deciduous forests of the northeastern USA and eastern Canada; they are also widely planted as shade trees in urban areas (Sinclair and Griffiths 1994; Poland and McCullough 2006). Ash seeds are reported to be important sources of food for foraging wildlife such as Wild Turkeys (*Meleagris gallopavo*), squirrels, small rodents, quail and various songbirds (Ostfeld et al. 1997; Hulme 1998; MacGowan 2003*).

Despite quarantines and restrictions on the movement of firewood, timber, and nursery trees, the EAB continues to expand its range. By 2009 it had been recorded as far north as Sault Ste. Marie and as far east as Ottawa and Montreal in Canada (CFIA 2009*) and had been detected in 13 states of the USA (USDA 2009*). The EAB has been responsible for the deaths of more than 50 million ash trees in both urban and forested areas in eastern North America (Poland and McCullough 2006; McCullough and Siegart 2007; NYSDEC 2008*).

Invasive forest pests that kill their host trees can change bird communities. A recent example explored in the northeastern United States is the Hemlock Woolly Adelgid (*Adelges tsugae*), which has eliminated Eastern Hemlock (*Tsuga canadensis*) trees from much of the eastern United States over the past 20 years. Hemlock-dwelling species, e.g., Black-throated Green Warbler (*Dendroica virens*), Blackburnian Warbler (*Dendroica fusca*), Blue-headed Vireo (*Vireo solitarius*), and Acadian Flycatcher (*Empidonax virescens*), have declined in abundance, whereas species that inhabit deciduous forests, e.g., Eastern Wood-Pewee, Great Crested Flycatcher, Red-eyed Vireo, and Wood Thrush, or more fragmented forests, e.g., Brown-headed Cowbird, Tufted Titmouse (*Baeolophus bicolor*) and White-breasted Nuthatch (*Sitta carolinensis*), have benefited from the loss of hemlock trees (Tingley et al. 2002; Ross et al. 2004; Becker et al. 2008) (scientific names of species recorded at PPNP are given in Table 1). In another study of high-elevation Red Spruce (*Picea rubens*)/Fraser Fir (*Abies fraseri*) forests in the Appalachian Mountains, the loss of conifers caused by the introduced Balsam Woolly Adelgid (*Adelges piceae*), subsequent windthrow, and air pollution changed avian communities in much the same way as fire or logging would (Rabenold et al. 1998).

Because the EAB has only recently been recognized as a pest in North America, there have been few studies on its effects on natural tree communities (Smith et al. 2006; Gandhi et al. 2008; Rebek et al. 2008) and none quantifying the effects on birds. The biological and economic importance of birds to PPNP led us to select it as a study site to quantify the effects of the EAB on breeding bird communities. To understand these effects, baseline studies of breeding bird populations at PPNP prior to the infestation of ash trees by EAB are required. Here we report on the results of censuses conducted in 2006 and 2007 in moist interior forests of PPNP using spot-mapping techniques and review the changes in the bird fauna that may occur as the majority of ash trees at Point Pelee die within the next five years.

Methods

Description of Plots

Two census plots were established in the southern part of PPNP. They were chosen based on high populations of ash trees (Red/Green Ash) and nearly complete canopy cover. The two plots differed in size and shape as a result of physical and biotic features. They were large enough to include most individual territories of the species we expected to observe. The North Plot (northwest corner: NAD83 Zone 17, 41.9295305, —82.51374015), in Tilden Woods, was divided into 15 quadrats (40 m × 40 m) (Figure 1). It was the smaller of the two plots at 200 m × 120 m (2.40 ha). The South Plot (northwest corner: NAD83 Zone 17, 41.93659544, —82.51175531), located in the western segment of the Woodland Nature Trail, measured ~320 m × ~120 m (3.84 ha). The South Plot was divided into 24 quadrats (~40 m × ~40 m) that varied slightly in size and shape on the eastern and western edges due to the presence of the Eastern Redcedar savannah habitat to the east and the road to the point to the west (Figure 2).

The North and South Plots contained 93 and 202 ash trees with trunk diameters ≥10 cm, respectively. For each tree, we recorded its location (via Garmin eTrex Legend® HCx GPS, to an accuracy of ± 3 m), diameter at breast height (dbh), and crown radius (by measuring from the edge of the crown to the trunk with a Mastercraft S7-4564-0 rangefinder). Crown radii and trunk locations were entered into ArcGIS 9.0, and the buffer feature was used to calculate the approximate area of each ash canopy. We estimated the mean percentage of ash cover in each plot by overlaying a 1 cm × 1 cm clear grid sheet on the plot map, estimating the proportion of each square covered by the crowns of ash trees, and then averaging the percentage of ash crown cover over all squares. The mean (+ SD) diameter of the trunks of ash trees in the North Plot was 26.5 ± 1.65 cm, and their crowns covered approximately 18% of the plot. The ash trees in the South Plot were more mature, larger on average (mean diameter 41.1 ± 1.33 cm), and covered more (38%) of the canopy area.

Plot grid points were flagged with pink plastic tape to ensure they would be visible in the dense undergrowth. Walking routes followed previously existing

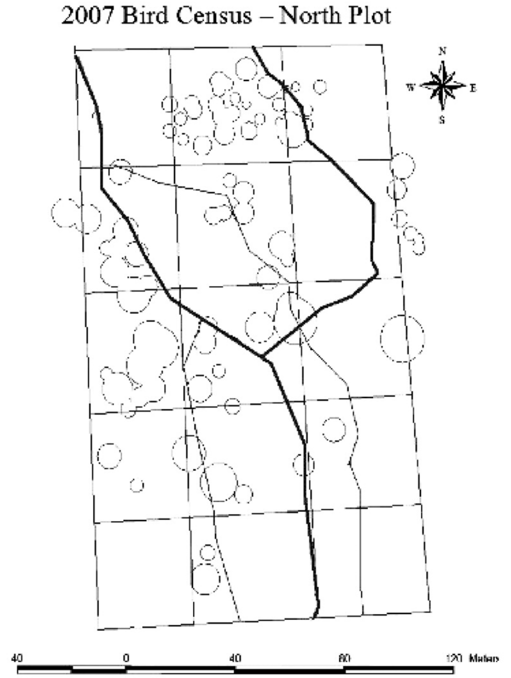

FIGURE 1. North Plot grid system, showing park trails (heavy line), footpaths (thin line) and ash tree crowns.

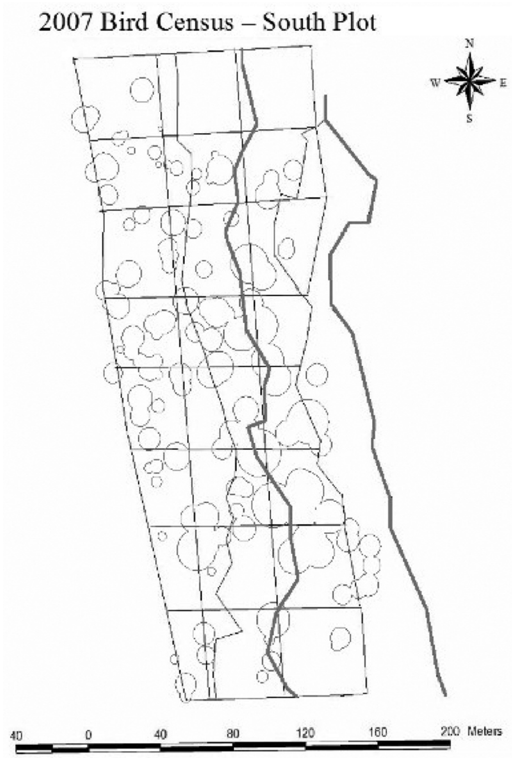

FIGURE 2. South Plot grid system showing park trails, footpaths and ash tree crowns.

woodland trails maintained by the park, where possible, and temporary foot-trails that we created. Trail maps were created using the handheld GPS unit and the computer program ArcGIS 9.0; these maps facilitated the localization of bird encounters. No point in the plot was ever more than 50 m from the observer's daily route**,** as recommended by Bibby et al. (2000). This permitted complete coverage of the plots.

Territory Mapping Methods

With the exception of plot size, our system of mapping bird territories followed the guidelines outlined for bird census techniques by Bibby et al. (2000). Because we selected sites with numerous ash trees, the plots were constrained in size by the distribution of the ash trees as well as by the road to the point and the Eastern Redcedar savannah habitat, with the result that our plots were smaller than the minimum plot size recommended by Bibby et al. (2000). We recorded the location and activity of all birds encountered during multiple visits to each plot. Generally, the records for each species allowed us to visualize distinct territories. Mapping simultaneously singing males and aggressive encounters was especially important in clarifying territorial boundaries. Registrations recorded just outside of plot boundaries were also considered in territory size evaluations.

It was important that our methods be standardized to allow for comparisons with future censuses. Standardization among our censuses was achieved by having one person (HDD) conduct all fieldwork throughout the study. Interpretation of the results obtained during each field season followed the rules initially set out by the International Bird Census Committee (Marchant 1983*) As long as these same methods are followed in future censuses, it will be possible to quantify changes in the breeding bird fauna.

Times and Routes

Too many visits lead to mapping confusion; too few result in insufficient data to create reliable maps. We restricted our visits to the month of June, when birds exhibit the most territorial and nesting activity and the number of migrants is at a minimum. The British Trust for Ornithology's Common Bird Census has adopted ten visits over the entire breeding season as a standard (Marchant 1983*). We made eight visits to each plot during the month of June.

Only one plot was censused per day. We avoided the hour before and the hour after sunrise because bird activity then was too intense to be recorded accurately. The observer maintained a slow pace when traversing the plots in order to increase the chances of detecting resident birds. Each census visit was completed in a single block of time between 0700 and 1100h on alternate weekdays. During these visits we used standard

TABLE 1. Coding used on field maps to record bird registrations, common and scientific names of all species observed in both plots, and codes for the bird species we observed (Bibby 2000).

Red	American Redstart	*Setophaga ruticilla*
R	American Robin	*Turdus migratorius*
BO	Baltimore Oriole	*Icterus galbula*
BCU	Black-billed Cuckoo	*Coccyzus erythropthalmus*
CH	Black-capped Chickadee	*Poecile atricapillus*
BJ	Blue Jay	*Cyanocitta cristata*
COW	Brown-headed Cowbird	*Molothrus ater*
CW	Carolina Wren	*Thryothorus ludovicianus*
G	Common Grackle	*Quiscalus quiscula*
CY	Common Yellowthroat	*Geothlypis trichas*
DW	Downy Woodpecker	*Picoides pubescens*
TOW	Eastern Towhee	*Pipilo erythopthalmus*
PW	Eastern Wood-Pewee	*Contopus virens*
GC	Great Crested Flycatcher	*Myiarchus crinitus*
Cat	Gray Catbird	*Dumetella carolinensis*
HW	House Wren	*Troglodytes aedon*
IB	Indigo Bunting	*Passerina cyanea*
MD	Mourning Dove	*Zenaida macroura*
CA	Northern Cardinal	*Cardinalis cardinalis*
NF	Northern Flicker	*Colaptes auratus*
OO	Orchard Oriole	*Icterus spurius*
OV	Ovenbird	*Seiurus aurocapilla*
RB	Red-bellied Woodpecker	*Melanerpes carolinus*
RV	Red-eyed Vireo	*Vireo olivaceus*
RW	Red-winged Blackbird	*Agelaius phoeniceus*
RG/GR	Rose-breasted Grosbeak	*Pheucticus ludovicianus*
TV	Turkey Vulture	*Cathartes aura*
V	Veery	*Cartharus fuscescens*
WF	Willow Flycatcher	*Empidonax traillii*
WT	Wood Thrush	*Hylocichla mustelina*
YW	Yellow Warbler	*Dendroica petechia*
YCU	Yellow-billed Cuckoo	*Coccyzus americanus*

symbols to represent the different types of interactions that occur between conspecifics (Bibby et al. 2000). Each species was assigned a code to enable rapid recording of all birds encountered (Table 1).

Creation of territory maps

Birds were identified by both sight and sound. We distinguished between bird songs (males singing on territories) and calls (contact or alarm vocalizations by males or females). Locations of vocalizing birds, birds moving between points, and interactions between individuals were plotted. After each daily census, data were transferred onto separate maps for each bird species. The final map for each species had observations combined from all visits, with the date and nature of each observation noted.

Analysis of data

Standard rules of territory identification and analysis (Bibby et al. 2000) were followed. Simultaneous sightings or vocalizations of two males of the same species had to be assigned to different individuals. Any active nest automatically confirmed the existence of a territory; subsequent registrations of a parent bird that flew to or from its nest further defined its territorial boundary. A minimum of 10 days between first and last registration of a male in a particular region was also required to designate a territory. If a male was observed singing or displaying in a region for fewer than 10 days, we identified him as a migrant or non-territorial male and no territory was assigned (Bibby et al. 2000).

We estimated numbers of potentially breeding males of three non-territorial species. For Brown-headed Cowbirds, we averaged the number of male birds recorded each day over the eight observation days. We followed this same method for Red-winged Blackbirds observed in our plots, but we believe they only foraged and did not nest within the forest plots. Common Grackles presented two difficulties: they were difficult to identify by sex in the dense understory and their young had probably fledged by June (Cadman et al. 2007). For them, we present the average total number of individuals observed.

We used the Shannon index (Krebs 1989) to analyze diversity of territorial birds for each plot in each of the two years. This index is affected both by the number of territorial species (i.e., species richness) and the evenness of their abundance.

TABLE 2. Total number of bird territories located in the North and South Plots in 2006 and 2007, by species. See text for comments on three non-territorial species.

Species	North Plot 2006	North Plot 2007	South Plot 2006	South Plot 2007
American Robin	11	10	21	34
Baltimore Oriole	5	8	49	33
Black-capped Chickadee	1	1	1	0
Blue Jay	5	4	6	4
Common Yellowthroat	3	2	0	1
Downy Woodpecker	4	4	8	5
Eastern Wood-Pewee	6	3	18	14
Great Crested Flycatcher	4	2	5	7
Gray Catbird	1	0	2	0
House Wren	1	1	2	1
Mourning Dove	1	0	3	0
Northern Cardinal	2	1	3	3
Rose-breasted Grosbeak	1	1	4	5
Wood Thrush	2	1	1	0
Yellow-billed Cuckoo	2	3	3	3
Yellow Warbler	7	12	28	35
Indigo Bunting	1	0	0	0
Carolina Wren	0	0	1	4
Eastern Towhee	0	0	0	2

Results

All bird species observed in the study plots at Point Pelee National Park are listed in Table 1, along with their mapping codes.

North Plot

We recorded 22 species in the North Plot in 2006. Of these 22 species, there were sufficient registrations to establish a total of 57 territories (23.7 territories/ha) for 17 species (Table 2). Of the five species for which we could not establish territories, three are non-territorial: Common Grackle, Brown-headed Cowbird, and Red-winged Blackbird. The mean (± SD) numbers of birds of these three species were as follows: Common Grackle, 6.1 ± 1.8 total individuals observed (range l–15, ~2.5 birds/ha); Brown-headed Cowbird, 1.1 ± 0.3 males (range 1–2, 0.5 males/ha); and Red-winged Blackbird, 2.0 ± 1.5 males (range 0–12, 0.8 males/ha). Although all three of these species were observed regularly, we cannot be certain that they were breeding within our plots. The other two species, Black-billed Cuckoo and the Carolina Wren, had insufficient registrations to allow territories to be designated within the plot.

Twenty-three species were recorded in the North Plot in 2007. There were sufficient registrations to establish territory maps for 14 species (Table 2), with a combined total of 53 territories (22.1 territories/ha). Nine species had indefinable territories, three of which were the same non-territorial species as in 2006 (mean ± SD): Common Grackle, 10.4 ± 4.8 total individuals observed (range 2–43, ~4.3 individuals/ha); Brown-headed Cowbird, 3.6 ± 0.8 males (range 0–7, 1.5 males/ha); and Red-winged Blackbird, 2.3 ± 1.2 males (range 0–10, 1.0 males/ha). The remaining six species —Common Yellowthroat, Eastern Towhee, Gray Catbird, Mourning Dove, Ovenbird and Black-billed Cuckoo—had insufficient registrations to allow territories to be determined.

South Plot

In 2006 we recorded 21 species in the South Plot. We estimated that there was a total of 155 territories (40.4 territories/ha) for 16 species (Table 2). Of the five species for which we could not establish territories, we estimate the following numbers for the two non-territorial species (mean ± SD): Common Grackle, 21.9 ± 2.4 total individuals observed (range 11–33, ~5.7 individuals/ha); and Brown-headed Cowbird, 1.4 ± 0.5 males (range 0–3, 0.4 males/ha). The remaining three, Common Yellowthroat, Indigo Bunting and Turkey Vulture, had insufficient registrations to allow their territories to be defined.

In 2007, we recorded 28 species in the South Plot. We defined a total of 151 territories for 14 species (39.3 territories/ha) (Table 2). Fourteen species had indefinable territories: the Common Grackle, Brown-headed Cowbird and Red-winged Blackbird were non-territorial, and there were too few records to determine territories for 11 species: American Redstart, Black-billed Cuckoo, Gray Catbird, Mourning Dove, Northern Flicker, Orchard Oriole, Ovenbird, Red-bellied Woodpecker, Red-eyed Vireo, Turkey Vulture and Wood Thrush. Numbers (mean ± SD) for the non-territorial species were as follows: Common Grackle, 34.1 ± 4.5 total individuals observed (range 16–56, ~ 8.8 birds/ha); Brown-headed Cowbird, 5.6 ± 0.9 males (range 1–8, 1.5 males/ha); and Red-winged Blackbird, 2.1 ± 0.8 males (range 0–7, 0.6 males/ha).

The Shannon diversity indices for breeding birds at the two sites over the two years ranged between 2.07 and 2.54 (Table 3). The North Plot had slightly

TABLE 3. Summary of the number of territorial species of birds recorded in the ash-rich forest plots at Point Pelee National Park. The Shannon-Wiener (S-W) indices for each plot-year are presented. See text for discussion of three non-territorial species.

Plot	Year	Number of species	Number of territories	Density of territories	S-W index
North	2006	17	57	23.7/ha	2.54
	2007	14	53	22.1/ha	2.27
South	2006	16	155	40.4.ha	2.4
	2007	15	151	39.3/ha	2.07

higher values of the index than the South Plot in both years of the study.

Discussion

We quantified the breeding birds of two mature moist forests at Point Pelee that have a moderate proportion of mature Red/Green Ash trees in order to be able to assess future effects of the EAB on the avian communities of these forests. We recorded 14–17 territorial breeding bird species plus three additional non-territorial breeding bird species, two of which we believe reproduced within our plots. There were few differences in species recorded between plots and years (Table 2). Three territorial species were by far the most common in both plots over both years: American Robin, Baltimore Oriole, and Yellow Warbler. Together they comprised 54–65% of the breeding birds in the plots. Interestingly, they are all species commonly associated with more open habitats. For unknown reasons, Baltimore Orioles were extremely abundant in the South Plot in 2006 (12.5 territories/ha); their density there in 2007 was considerably lower (8.6/ha). Fewer male Baltimore Orioles were recorded in the North Plot in 2006 and 2007 (2.1/ha and 3.3/ha, respectively). The South Plot had 70% (2006) and 78% (2007) higher density of bird territories, perhaps because it was a more mature forest with larger trees.

The relatively small size of the plots resulted in some stochastic differences among the less common species recorded (e.g., Indigo Bunting, Eastern Towhee, Common Yellowthroat, Gray Catbird, Mourning Dove). Additionally, some differences in species and relative abundances may be related to habitat differences between the plots. For example, Carolina Wrens consistently inhabited the South Plot and surrounding forest but were infrequently recorded in the North Plot; the North Plot had higher densities of American Robins than the South Plot.

Although the South Plot had approximately 75% more territories/ha in each year of study, the North Plot had higher evenness of species abundance, which led to higher values in the Shannon index in each year than in the South Plot (Table 3). The composition of the breeding bird communities in each site differed relatively little between years. Our censuses provide a solid baseline from which to assess the changes that may occur as ash trees are killed off by the Emerald Ash Borer.

We were unable to use the census technique to estimate the density of the three non-territorial species of birds. However, by calculating the average number of each of those species recorded daily across the study period in each plot, we estimated the approximate density of these three species. Common Grackles were observed both alone and in groups. They often forage and move in groups throughout the summer, making it impossible to single out pairs (Sibley 2001). We believe they nested within both plots, but no nests were located. This could be attributed to Common Grackles fledging as early as mid-April in southern Ontario (Cadman et al. 2007). Early fledging of young and the difficulty of determining sex of birds in moving flocks further complicated estimation of breeding pairs. Because of these problems, we chose to report the mean number of Common Grackles observed without attempting to differentiate males, females, and immatures.

Brown-headed Cowbirds are promiscuous, non-territorial, and wide-ranging. During the breeding season, Brown-headed Cowbirds can be observed alone, in pairs, or in groups (Alsop 2001). Females undoubtedly laid eggs in the nests of birds breeding in our plots but that was not confirmed.

The Red-winged Blackbirds in this study were observed individually, paired and in flocks as they foraged. There was no indication that they nested in either plot.

Emerald Ash Borers were not detected in the park until the summer of 2007, when the first three dead ash trees killed by EAB were found. From initial colonization of an ash tree, it generally takes EAB ~3 years to kill a tree, but the first 1–3 years of infestation often go undetected (Poland and McCullough 2006). Therefore, it is likely that EAB had arrived at PPNP by 2004. A quick survey in 2007 documented Red/Green Ash trees infested with EAB over much of the upper beach habitat of Point Pelee (G. Otis, unpublished data). However, at the time of this study (2006 and 2007), there was no evidence that the EAB was present in our bird study plots. By February 2010, nearly all the ashes in the North Plot (50/50 trees checked) were riddled with EAB galleries and were dead. Approximately 20% (11/50 trees checked) of ash trees in the

South Plot had EAB exit holes near ground level and a few had been killed by EAB (G. Otis, unpublished data). With approximately 9% of all trees at Point Pelee being ashes (Koh and Spangler 2004*) and 20–40% of the trees in some habitats (e.g., the plots in this study) being Red/Green Ashes, the EAB threatens to alter habitats there substantially over the coming years.

Given the rate of spread of the EAB observed elsewhere and the extreme susceptibility of Red/Green Ash trees to EAB (Anulewicz et al. 2007; Anulewicz et al. 2008; Rebek et al. 2008), we anticipate that most of the ash trees in our bird census plots will be dead or heavily infested by 2011. Once an ash tree dies, it takes only 1–3 years for the tree to fall (OMNR 2009*), creating gaps in the forest canopy. The resulting changes in forest structure and reduction in the number of living trees providing food for birds should be associated with a general decrease in the abundance of most of the forest-breeding bird species we documented in this study. Those species that require relatively large tracts of forest, e.g., the Wood Thrush (Evans et al. 2008), may be eliminated, especially in the South Plot, where approximately 40% of the crown cover should be lost. There may be an increase in species that occur in southwestern Ontario in patchy woodland with brushy clearings: Song Sparrow (*Melospiza melodia*), Yellow-breasted Chat (*Icteria virens*), White-breasted Nuthatch, Indigo Bunting, House Wren, Carolina Wren, and White-eyed Vireo (*Vireo griseus*) (Cadman et al. 2007). Other species that may benefit temporarily from the arrival of EAB are the woodpeckers that are known to feed on EAB larvae (Lindell et al. 2008). While Downy Woodpeckers are common in the park, they may increase in numbers with the increased food supply and then decline as the total number of trees is reduced. Red-headed Woodpeckers (*Melanerpes erythrocephalus*), Red-bellied Woodpeckers, and Hairy Woodpeckers (*Picoides villosus*) may move in to feed on abundant EAB larvae. The woodpeckers in turn create nest holes that later serve as nesting sites for a number of species of cavity-nesting birds (Sibley 2001; Cadman et al. 2007). The loss of ash seeds may reduce the food supply of some species of birds, such as the Northern Cardinal (Stapanian et al. 1994), Wood Duck (*Aix sponsa*) (Schaefer et al. 2003*), and Wild Turkey (Schroeder 1985; Dickson 1992), that breed in the park. The utilization by native bird species of ash trees as a source of food (both insects and seeds), as nest sites, and as components of the habitats required for nesting remain largely unquantified. The unfortunate arrival of the Emerald Ash Borer in Point Pelee National Park will provide an opportunity for some of these predictions to be tested by means of censuses of breeding birds at various intervals after the ash trees in these plots have died.

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