

FLIGHT DISTANCES FROM NESTS AND BEHAVIOURS OF THE OLIVE-SIDED

FLYCATCHER (*Contopus cooperi*)

By

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A CAUTION TO THE READER

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ABSTRACT

The Olive-sided Flycatcher is a migratory species currently facing a dramatic population decline. The species is listed as threatened in Canada under the Species at Risk Act. The purpose of this study was to describe the relationship between flight distances from active nests and behaviour of the Olive-sided Flycatcher. Four of the eight male birds in observed nesting pairs in a recently burned and logged region of the Northwest Territories, Canada, were found to follow a pattern of foraging, preening and other behaviours most often 0 m to 49 m away from the nest. Singing was most often observed 100+ m away from the nest. Males of the other four pairs each deviated from the pattern in a specific way. Habitat influenced the pattern, as birds inhabiting open or burned areas did not travel as far from the nest as birds in dense forest. With limited research conducted on the species, any information relating to habitat, nesting behaviour and behaviour in general is important.

Keywords: Behaviour, Northwest Territories, Olive-sided Flycatcher, Species at Risk

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INTRODUCTION

Birds exhibit a variety of different behaviours, especially during breeding season, when nests are being constructed and territories defended. Once a male attracts a female and nest building begins, the male will oftentimes still engage in regular behaviours within the defended territory. As a nest is constructed by the male and female and then occupied by a female, there may be restrictions imposed on the male not to fly too far away, leaving a female alone on a nest to defend off predators and competitors. Therefore, a paired male bird possibly will not travel long distances from a soon-to-be active or active nest.

The Olive-sided Flycatcher, *Contopus cooperi*, is a migratory species breeding across the Canadian boreal forest and south along the west coast to California, wintering in South America. Due to loss of wintering and breeding habitat and the conversion of natural forest into managed forest, the Olive-sided Flycatcher population is decreasing quickly and is ranked as threatened with extinction in an appendix to the Canadian Species at Risk Act (SARA; Government of Ontario, 2012). The Olive-sided Flycatcher produces a very loud and memorable song which resembles “QUICK, Three Beers,”. The song of the Olive-sided Flycatcher is usually repeatedly sung at a preferred perch. Snags sticking out in open spaces or above the tree line are the primary perches of the Olive-sided Flycatcher. They forage from a preferred snag by using a technique called hawking (Verbeek 1974). Hawking is a common foraging technique found within the family Tyrannidae, specifically the genus *Contopus*, also in the Western Wood-pewee (*Contopus sordidulus*; de Mendonca-Lima et al. 2014). Hawking describes how a bird

flies out from a perch and captures a flying insect before returning to the same perch. In addition to hawking in a tree canopy, Olive-sided Flycatchers also forage near the ground and capture insects on the forest floor (Hagelin et al. 2015). Olive-sided Flycatchers most often forage for flying insects in the Hymenoptera order, comprised of species of wasp, bee, and flying ants, as well as species of dragonfly and damselfly in the Odonata order (Altman et al. 2012).

Olive-sided Flycatchers have been documented to have territory sizes as large as 45 ha, while most remain approximately 10 to 20 ha (Altman et al. 2012). Defending a large territory often allows a greater abundance and diversification of resources. The cost to collect resources or defend the boundary and outskirts of the territory is that a bird flies farther distances away from the nest. The greater the flight distance from the nest, the greater the possibility of the nest being attacked and destroyed (Bailey 2016). Olive-sided Flycatchers have very strong site fidelity for previously successful sites, as individuals have been documented returning to the same breeding location for six years straight (Wright 1997). Since site fidelity is strong in the Olive-sided Flycatcher, an individual may already know where optimal perch locations are once returning to a nest site. If the male bird can spend less time searching for locations to perform behaviours such as foraging, preening, singing, or calling, then more time can be spent guarding and defending the nest.

The objective of this study is to document the relationship between Olive-sided Flycatcher behaviours and flight distances from active or soon-to-be active nests, with the hypothesis that distance from a nest and behaviour will hold a relationship. The behaviours studied can be classified as singing, calling, preening, foraging, collecting

nest building materials, perching and displaying. It is predicted that most behaviours, such as foraging and preening will occur within proximity to the nesting site.

Behaviours that deal with defending a nest or territory, such as singing or aggressive behaviours, are suspected to occur most commonly away from the nesting area, to either distract or keep predators and competitors away from the territory or nesting site. While the female is on the nest, the male Olive-sided Flycatcher may travel further than expected to engage in specific behaviours such as foraging, or possibly travel quicker due to previous knowledge of destinations. Likely, birds inhabiting more densely forested areas will travel longer distances from the nest than birds inhabiting more open habitats. In preferred open or burned areas, the Olive-sided Flycatcher may not need to travel as far to exhibit territorial behaviours or to collect food or nest resources.

LITERATURE REVIEW

Status of the Olive-sided Flycatcher

The online resource provided by COSEWIC presents several important details about the Olive-sided Flycatcher, including the species status (threatened) in Canada, factors leading to population decline. This source specifically presents information on the species population occurring in Canada (Committee on the Status of Endangered Wildlife in Canada 2007). Biological information and provincial status is also documented by the Government of Ontario (2012).

Flight Distances during Nesting

When male birds travel longer distances to gather nest building items such as twigs, they are more often chosen by a female to be a breeding partner (Bailey 2016). Shorter flight distances to gather nesting material or food requires less energy than what is expended in longer distance flights. The proportion of sightings within specific distances from a bird's natural roost can determine why some individuals travel longer distances (Goldenberg et al. 2016). Olive-sided Flycatchers travel large distances away from the nest to sing within their territory. Male birds with an active nest will travel up to 700 m away from the nest to sing. However, this conclusion comes from study of only six individuals (Wright, 1997).

Variation in flight distance from the nest between sexes of the Western Woodpecker have been more extensively studied (Fogg et al. 2012). In the Western Woodpecker, a taxonomically similar species to the Olive-sided Flycatcher, also found within the *Contopus* genus, females and males fly similar distances from the nest when

engaged in foraging, 23 m for females and 25 m for males (Fogg et al. 2012). Dense vegetation can affect the Western Wood-pewee's ability to locate and capture prey. In open or less dense vegetative areas, Western Wood-pewees are able to locate prey significantly easier. Olive-sided Flycatchers may have to fly greater distances to locate and capture prey when dense vegetation is present; the opposite would occur at open or less dense vegetative sites. Flight distance from a nest within an open area is expected to decrease as more available snags and uncluttered foraging areas become available.

Breeding Behaviour

Site fidelity is very important to understanding why the Olive-sided Flycatcher may travel long or short distances to forage or engage in other behaviours. In a California study (Altman et al. 2012), two of three adults returned to the exact territory they visited the previous year. Within Alaska, males have been found to return to territories five to six years after being banded at the same location. Since Olive-sided Flycatchers have very strong site fidelity in the breeding season, there is a strong possibility that individuals returning to a nest site already know where the greatest abundance of prey is located or the best singing perches occur; therefore, they may travel long distances to locate a specific resource (Altman et al. 2012).

Foraging

Foraging behaviour in species belonging to the family Tyrannidae is generally similar. Like the species *Phylloscartes ventralis*, Olive-sided Flycatchers have been observed foraging in similar ways throughout their range (de Mendonca-Lima et al. 2014). Olive-sided Flycatchers have also been observed foraging on the ground (Hagelin

et al. 2015). New burn areas have a reduced amount of available prey for insectivorous species such as the Olive-sided Flycatcher, meaning longer travel distance is required to locate prey (George et al. 2003). Approximately two years after a burn, Olive-sided Flycatcher foraging rate increases as flying insect abundance increases. The abundance of flying insects in burn sites makes for an optimal breeding site.

METHODS

Study Species

The Olive-sided Flycatcher (*Contopus cooperi*) is the species of focus throughout this study. Olive-sided Flycatchers are easily identified by their large size, broadly streaked sides, pure white on centre chest and belly, as well a large stout bill. Olive-coloured streaking on the sides makes the bird appear that it has a vest on. The bird is often sighted perched on top of a dead tree or snag where it will sing its distinctive song. Other birds belonging to the *Contopus* genus can appear very similar, such as the Western Wood-pewee, but can be distinguished based upon close observation by noting the size of the bird, and how prominent the vest or streaking appears on the bird. Olive-sided Flycatchers are generally found perched higher in the tops of trees compared to most other flycatchers, which stay low to mid-level.

Study Area

Surveys were completed approximately 0.5 m to 1.5 km from Northwest Territories Highways 1 and 3 into either Jack Pine (*Pinus banksiana*) and/or Black Spruce (*Picea mariana*) dominated forest, between the towns of Fort Providence and Bechoko. These sites were a mix of open or burned areas, as well fairly dense forested areas. Figure 2 shows the locations of nesting birds 1 to 5; this area is more forested and has fewer clearings and burned areas relative to the remainder of the study area. Figure 3 shows the locations of nesting birds 6 to 10, illustrating an abundance of clearings and burned areas near the nests. Survey sites were generally mixed forest with the dominating species co-occurring with Trembling Aspen (*Populus tremuloides*), Balsam

Poplar (*P. balsamifera*), White Birch (*Betula papyrifera*) and White Spruce (*Picea glauca*).

Data Collection

Surveys that were a duration of at least 1 hour were carried out on 10 individual male birds from June 1st to July 8th, 2016 once every 2 – 3 days. Surveys were completed between 3:00 am to 10:00 am because this includes the time frame when Olive-sided Flycatchers are the most active; between half an hour before sunrise and 6 hours after sunrise (Wright, 1997). Within a survey, an Olive-sided Flycatcher individual or pair was located by listening for the song or call of the bird. Once observers were acquainted with the territories, after 2-3 surveys, it became possible to find an individual by noting where this bird liked to perch and navigating to that specific area. Geographic coordinates to mark an individual bird's location were collected using a handheld GPS device, marking a point every 5 minutes, and behavioural traits observed were recorded. Distances away from the road, perching, foraging and nesting sites were also recorded during the 1-hour surveys.

This study can be broken down into two questions, first being how far the Olive-sided Flycatcher travels from an active nest, and second being what specific behaviours are performed at specific distances. Olive-sided Flycatcher flight distances from ten active nests (Northwest Territories) were monitored and surveyed. Behaviours such as foraging, collecting nest building materials, perching, singing and pipping were observed and documented. The main activities were categorized and tabulated into three distance categories from the nest; tables were explored using the Chi-square statistic to detect deviations from the null hypothesis of no association between behaviour and

distance from the nest. Additional Chi-square statistics were calculated from tables separating behaviour counts by individual bird, to explore the null hypothesis that all birds conformed to the overall behaviour observed in the study population. All crosstabulations and calculations of Chi-square were done in IBM Statistical Package SPSS (Statistical package for the Social Sciences, version 21).



Figure 1. Olive-sided Flycatcher carrying nesting material. Photo by Lucas Short.



Figure 2. Nest locations for birds 1 to 5.

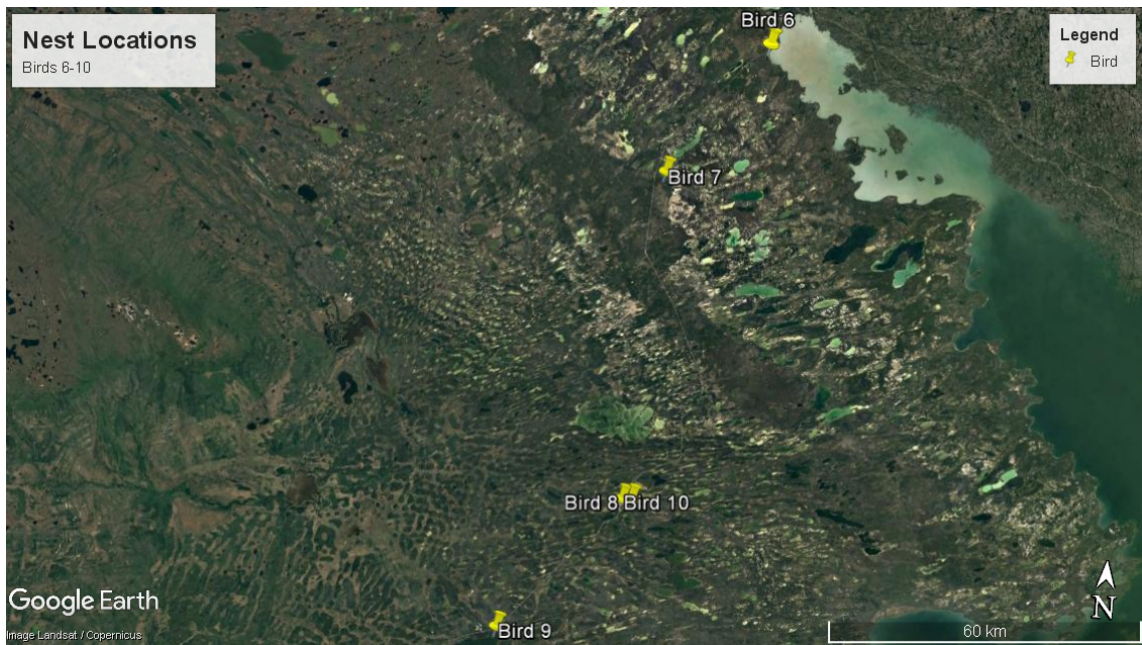


Figure 3. Nest locations of birds 6 to 10.

RESULTS

Behaviours were categorized into foraging, preening, singing and others, which included calling, displaying and attacking (Table 1). Foraging was observed as expected according to the number of observations at increasing distances from the nest (Tables 1, 2). Other behaviours, including preening, calling, displaying, and attacking, occurred more often than expected near the nest (<50 m away), while singing was more frequent than expected further from the nest, at distances 100 m or greater. Overall, the null hypothesis of no association between behaviour and distance from the nest was rejected (Chi-square = 993, $p < 0.001$).

Table 1. Observed counts of behaviours of the Olive-sided Flycatcher at three distance bins from the nest.

Distance (m)	Foraging	Preening	Singing	Other
0-49	76	100	109	119
50-99	39	57	68	50
100+	78	65	174	58

Table 2. Expected counts of behaviours of the olive-sided flycatcher at three distance bins from the nest.

Distance (m)	Foraging	Preening	Singing	Other
0-49	78.5	92.4	90.3	142.8
50-99	41.6	48.9	47.8	75.6
100+	72.9	85.7	83.8	132.6

Birds 1, 3, 4, 5 and 8 did not follow this overall pattern, while birds 2, 6, 7, 9 and 10 were consistent with the pattern in Table 1 (Table 3). The birds that deviated from the overall pattern did so in their own individually specific way. Not all birds deviating from the pattern share the same deviating variables. For example, birds 1 and 3 both were observed most often foraging in the closest distance category (0-49 m from the nest), whereas birds 4, 5, and 8, were observed foraging most often 100+ m away from the nest. Bird 4 was the only bird to have the greatest deviation in the “other” behaviour category, as it was the only bird observed most often 50 m to 700 m away from the nest.

Table 3. Chi-squared statistics comparing counts of behaviour for each individual to observed counts of all birds.

Bird	Chi-square	p - value
1	82	.000
2	81	.903
3	122	.033
4	121	.031
5	128	.000
6	82	.127
7	97	.191
8	125	.000
9	37	.320
10	88	.063

Table 4. Observed counts of behaviours in birds deviating from the pattern exhibited by all birds at specific distances from the nest.

Bird	Distance (m)	Foraging	Preening	Singing	Other
1	0-49	12	1	5	5
	50-99	4	14	8	8
	100+	2	11	11	1
3	0-49	17	38	20	7
	50-99	5	5	0	3
	100+	7	5	9	6
4	0-49	2	5	8	5
	50-99	5	6	7	7
	100+	8	14	48	6
5	0-49	9	17	16	22
	50-99	1	1	1	5
	100+	32	5	14	5
8	0-49	5	7	5	22
	50-99	5	6	5	5
	100+	9	5	36	15

All other birds were observed exhibiting “other” behaviour with highest frequencies within the closest distance category to the nest. Birds 3 and 5 differed from all others, as their observed frequencies for singing were greatest closest to the nest (0-49 m). Birds 1 and 4 spent most of their time preening 100+ m away from the nest, while the rest preened more often 0-49 m away from the nest.

Table 5. Observed counts of behaviours in birds conforming to the pattern exhibited by all birds at specific distances from the nest.

Bird	Distance (m)	Foraging	Preening	Singing	Other
2	0-49	6	11	13	10
	50-99	5	5	7	5
	100+	2	5	5	7
6	0-49	6	5	18	15
	50-99	0	4	5	0
	100+	5	5	11	8
7	0-49	5	4	5	5
	50-99	7	5	10	6
	100+	13	7	27	3
9	0-49	9	6	8	10
	50-99	6	5	6	5
	100+	0	5	5	2
10	0-49	5	6	11	18
	50-99	1	6	19	6
	100+	0	3	8	5

DISCUSSION

In observations of the Olive-sided Flycatcher at this study area, singing was predicted and found to occur most often 100+ m away from the nest, whereas non-territorial behaviours occurred more often within 0-49 m of the nest. It was also predicted and shown that breeding birds occurred more often than expected at closer distances to the nest. Birds occupying open areas such as bogs or burn sites differed in behaviour from birds inhabiting more densely forested areas with greater canopy. Combining and testing individual Olive-sided Flycatcher data allowed for more patterns to be established for the subset of birds studied. Most birds were observed foraging, preening, and acting aggressive closer to the nest, following the expected frequencies of total observations at these distances.

Foraging closer to the nest can allow for the parents to optimally collect food and return to the nest quickly (Bailey 2016). This strategy allows the parents to conserve energy, and saving energy cost allows the parents to forage and feed their young more often. Olive-sided Flycatchers generally lay clutches of two to five eggs, meaning that the young must be constantly fed to limit nestling mortality. Traveling large distances away from the nest for food can impact nest success (Fogg et al. 2012). Less risk is associated with shorter travel distances, as predators and other disturbances near the nest can be identified by the adult bird. Olive-sided Flycatchers were observed preening on dead or dying snags near the nest, where the bird can watch or lookout over the nest. Consequently, birds have nothing to gain from traveling long distances from the nest to preen unless they were pushed away from a nest by a predator or other disturbance (Wright 1997).

Olive-sided Flycatchers inhabit large territories that they will defend from intruding males of the same species (Wright 1997). The “other” behavioural category observed in this study consisted of calling (pipping), attacking, and displaying, which are all part of aggressive behaviour. Aggressive behaviour is expected to occur around the nest. When predators entered an Olive-sided Flycatcher territory and got close to the nest, the birds instantly became territorial, exhibiting aggressive behaviour to warn off or defend the nest. Singing was the only behaviour observed to occur most often 100+ m from the nest. Birds sing for many reasons, with two main reasons being to find a mate for reproduction and to defend a territory or nesting site. Olive-sided Flycatchers flew large distances from the nest and sing from large snags or the tops of trees. If the bird was singing from closer distances to the nest, the song of the bird would not travel sufficiently or possibly attract rival males to the nest. Singing can also deter predators from the nest and can be very important for sustaining a successfully nest and brood (Altman et al. 2012; Wright 1997).

Analyzing habitat conditions within the study area territories revealed that site characteristics might influence the distance a bird travels from a nest. The birds found to deviate from the overall pattern described above generally inhabited more densely forested territories with fewer clearings from bogs, silt ponds and burns. Olive-sided Flycatchers prefer habitat consisting of open areas with standing dead snags (Fogg et al. 2012). Without these habitat conditions, the birds cannot behave optimally; for example, if the area is too densely forested behaviour such as foraging can be restricted. If a nest is situated in a more densely forested area, the adult birds would have to travel further and random distances to find preferred habitat, where resources (prey or nesting

material) can be collected. Territorial defence behaviours such as singing would be done best only beyond the forest cover. Densely forested areas can trap the bird's voice from traveling longer distances. More obstacles present in densely forested areas interfere with a flycatcher's ability to forage in the air, forcing it to fly greater distances to an obstacle-free location. The birds in this study that followed the pattern of typical behaviours inhabited territories with greater abundance of clearings or open areas. These birds generally nested near or within previously burned sites.

CONCLUSION

The Olive-sided Flycatchers studied were found to be diverse in their behaviours. Nevertheless, an overall pattern was discovered that showed more sightings occurred within the closest distance category (0-49 m) to the nest, even though the furthest category had a larger range of distances. These sightings corresponded with preening and other behaviours. Singing was an exception, as most birds were found to sing in the farthest distance category (100+ m). Overall, as Olive-sided Flycatchers are at risk, with limited research conducted on the species, any information relating to their habitat, nesting behaviour and behaviour in general is increasingly important.

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