

# BC Nightjar Survey 2015 Annual Report

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The BC Nightjar Survey is a program under non-profit organization, WildResearch. WildResearch's mission is to build, train, and educate a community that contributes to conservation science.



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Environment  
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Funding for community and capacity building in 2015 was provided by BC Nature, the BC Naturalists' Foundation, and MEC.



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*The BC Nightjar Survey is made possible by the dedicated  
Citizen Scientists who generously donate their time to survey for and  
report on these cryptic birds.*

*Thank you to all BC Nightjar Survey volunteers!*

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## Executive Summary

WildResearch's BC Nightjar Survey is a citizen science program that conducts nocturnal roadside surveys for two highly understudied species of conservation concern, the Common Nighthawk and the Common Poorwill. Both species belong to the nightjar family, which is a group of cryptic migratory birds that forage for flying insects at night. Both species are understudied because their nocturnal habits preclude their detection during other survey programs like the Breeding Bird Survey. Data that are available for nightjars indicate that their populations are in decline, and the Common Nighthawk has been federally listed as Threatened under Canada's *Species at Risk Act* due to these perceived declines. The Common Poorwill has been assessed as Data Deficient by the Committee on the Status of Endangered Species in Canada (COSEWIC) because sufficient surveys have not been completed. Citizen science surveys are an ideal way to study nightjars and contribute to their conservation because they can efficiently collect reliable data over a large geographic extent.

Following a highly successful program expansion in 2014, the number of routes surveyed and volunteers that participated in 2015 was even greater than the previous year. Over 70% of volunteers from 2014 returned to survey nightjar routes in 2015. In total, 125 volunteers helped to survey 166 routes, including six in Alberta and five in Saskatchewan as part of a trial season in both those provinces. New routes were also added in more northern areas of BC, and volunteer capacity was increased in many areas of the province. In addition, several keen volunteers offered to survey 18 routes twice for an assessment of whether multiple surveys increase nightjar detection.

In addition to citizen science surveys, the focus of the BC Nightjar Survey in 2015 was on building community and capacity. Over 50 volunteers attended one of six orientation sessions across the province to learn about BC Nightjar Surveys and nightjar conservation. We received funding for and are in the process of building an online Nightjar Atlas that will increase our volunteer management capacity and streamline the volunteer process. We also collected acoustic data to further study nightjar survey methods, and have worked with citizen science volunteers and students to analyze those data. We continued to build new and existing collaborative relationships with other non-profit and governmental organizations. Finally, we uploaded 2010-2014 BC Nightjar Survey data on the NatureCounts portal so that the data collected for free by citizen scientists are freely available.

As a result of our successful community and capacity building, and the incredible support from the citizen scientist community in BC and beyond, we are thrilled to announce that the BC Nightjar Survey will become the WildResearch Nightjar Survey and expand to five new provinces and territories for the 2016 survey season. We look forward to continuing to build relationships with citizen scientists and collaborators, and contributing to nightjar conservation in North America.

## 1. BACKGROUND

### 1.1. Family Caprimulgidae: Nightjars

Nightjars are a family of cryptic birds that forage for flying insects at night. Due to their feeding habits, nightjars belong to a larger guild of birds called the aerial insectivores. Many of these species are highly migratory, spending their winters as far south as Argentina. These beautiful birds have long pointed wings for flight, and are highly camouflaged because they roost during the day and nest on the ground. In British Columbia (BC), there are two species of nightjars: the Common Nighthawk (*Chordeiles minor*) and the Common Poorwill (*Phalaenoptilus nuttallii*). The Common Nighthawk is found across BC during the breeding season and is “crepuscular”, foraging on the wing at dawn and dusk. In contrast, the Common Poorwill is found only in southern BC and forages by flying up from a perch or the ground at night.



*A Common Nighthawk roosts on a rocky bluff. Photo credit: Dwayne Gaschermann.*

### 1.2. Why Survey Nightjars?

Relatively little is known about the population trends of nightjars due to their nocturnal habits and cryptic nature; however, steep population declines of other aerial insectivore species have been detected across North America. Although nightjar species are often missed by other bird survey programs, available data indicate that many nightjar populations in Canada are also in decline. The Common Nighthawk is federally listed as Threatened under Canada’s *Species at Risk Act* due to these perceived declines. The Common Poorwill has been assessed as Data Deficient by COSEWIC because sufficient surveys have not been completed.



Nocturnal roadside citizen science surveys are an ideal method to study nightjars in BC and contribute to conservation. The nocturnal nature of these birds requires that survey stations must be accessible for surveyor safety. Travelling by car allows surveyors to travel quickly between stations that are far enough apart to ensure that birds are not counted twice. Citizen science surveyors allow for survey coverage of large geographic areas, which is important because the Common Nighthawk, in particular, is found all across British Columbia. Data collected by citizen scientists during nocturnal roadside surveys will allow for analyses of detectability, species ranges, habitat preferences, occupancy, and population trends of these otherwise cryptic birds. Lastly, citizen scientists contribute invaluable local knowledge to the project including incidental nightjar reports and information about route accessibility and local habitat.



*A Common Poorwill roosts at night. Photo credit: Alan Burger.*

### 1.3. Program Objectives

The goal of the BC Nightjar survey is to contribute to the conservation and recovery of nightjars in BC. Two objectives have been identified for each nightjar species:

#### 1.3.1. Common Nighthawk

- Collect baseline data for Common Nighthawk populations in BC.
- Determine the types of landscapes in BC that are important for conserving Common Nighthawk populations.

#### 1.3.2. Common Poorwill

- Collect baseline data for Common Poorwill populations in BC.
- Determine the species range of the Common Poorwill in BC.

### 1.4. Program Background

The BC Nightjar Survey was restricted to south central BC from 2010 to 2013 and expanded to the rest of the province in 2014. The first four years of the BC Nightjar Survey were conducted in the Okanagan region in order to target an area where both nightjar species are abundant. Surveys collected from 2010 to 2013 followed a standardized survey protocol designed by the Nightjar Survey Network in the United States. In 2014, the surveys were expanded to survey for the Common Nighthawk across their range in BC. Also in 2014, the BC Nightjar Survey protocol was revised to ensure each nightjar species is surveyed for at the optimal time of day and year. Improvements involved creating separate protocols to reflect the two species varying ranges and life histories. Surveys across BC continued in 2015, with several trial surveys also conducted in Alberta and Saskatchewan.

## 2. BC NIGHTJAR SURVEY METHODS

### 2.1. Survey Protocol

Roadside surveys, beginning at dusk, are used to survey BC's two nightjar species. Each survey route is a series of survey stations along a public road, which are spaced at least 1.6 km apart. At each survey station, a six-minute passive point count is conducted with an unlimited radius. In other words, the citizen scientist listens quietly for six minutes and records each nightjar detected. Information on wind speed, cloud cover, cars passing, and moon visibility is also collected at each survey station. Each route is sampled once a year. In 2015, surveys were conducted between June 15 and July 15.

For further details, please visit the WildResearch website for copies of the BC Nightjar Survey protocols:

<http://wildresearch.ca/resources/nightjar-survey/>



### **2.1.1. Two-Species Zone**

The Two-Species Zone is the area of BC in which both Common Nighthawks and Common Poorwills may occur. In the Two-Species Zone, each survey route consists of six survey stations. During a survey, the surveyor conducts a roadside point count at each survey station, starting 30 minutes before local sunset to target Common nighthawks. At 30 minutes after local sunset, the same six stations are surveyed in the reverse direction to target Common Poorwills. In 2015, surveyors were strongly recommended to conduct their surveys between June 24 and July 18, within one week of the full moon when Common Poorwills call most frequently.

### **2.1.2. One-Species Zone**

The One-Species Zone is the area of BC where only the Common Nighthawk occurs. In the One-Species Zone, each survey route consists of ten survey stations. Each of the ten survey stations is surveyed only once starting at 30 minutes before local sunset.

## **2.2. Survey Locations**

As the BC Nightjar Survey developed between 2010 and 2014, the method used to select survey route locations varied. The vast majority of routes were selected in 2014 using a stratified random selection process, and the remaining routes were placed subjectively based on volunteer availability. Stratified random selection was conducted using aerial photography in a geographic information system (GIS). Routes were selected within several priority regions in order to assign routes across a gradient of human disturbance. Routes began at points that were randomly placed on a map of roads within each priority region. Routes within heavily forested areas were omitted because nightjars require some open area for suitable habitat. The remaining routes were selected in 2010 were subjectively placed based on Common Poorwill occurrence.

Survey station locations were determined by citizen scientists in order to ensure that each survey station was located in a safe location to pull over. In general, locations were determined on the ground using a car odometer to ensure that stations were at least 1.6 km apart. The location of each station was recorded using a handheld GPS receiver so that the same location could be surveyed again in subsequent years.

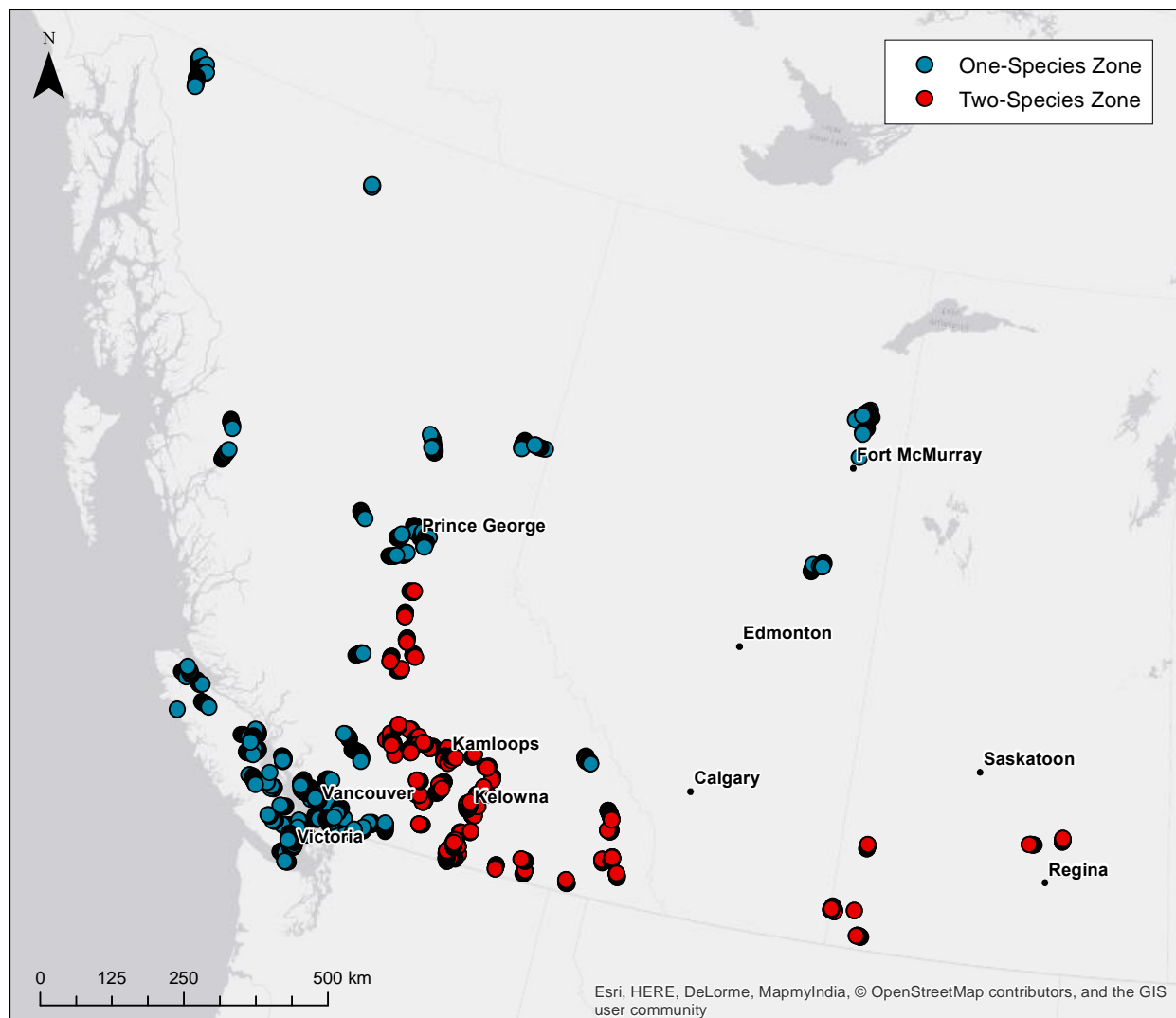
## **3. SUMMARY OF 2015**

The 2015 BC Nightjar Survey season was highly successful, with many returning volunteers and even more surveys completed than 2014. Particular focus was paid to community building in 2015. In particular, over 50 volunteers joined us for orientation sessions in Richmond, Victoria, Oliver, Kelowna, Kamloops, and Prince George. Survey protocols remained largely the same as in 2014, with several minor adjustments following analyses reported in the 2014 Annual Report. In particular, we restricted the survey period to June 15 – July 15, and added a recommendation to conduct surveys in the Two-Species Zone within one week of the full moon when Common Poorwills are most likely to vocalize.

Below is a basic summary of the volunteer effort and results of surveys from each of the survey zones as well as Survey Route & Citizen Scientist Spotlight Articles.

### 3.1. Volunteer Effort

In 2015, citizen scientists surveyed and submitted data for 154 routes (74 in the Two-Species zone and 80 in the One-Species Zone; Figure 1; Table 1). Surveys were completed by a total of 125 volunteers in BC, as well as a few test surveys in Alberta and Saskatchewan. In total, volunteers contributed over 360 survey hours in addition to time required to reconnaissance routes and complete data entry.



**Figure 1.** Nightjar Survey stations surveyed in 2015.

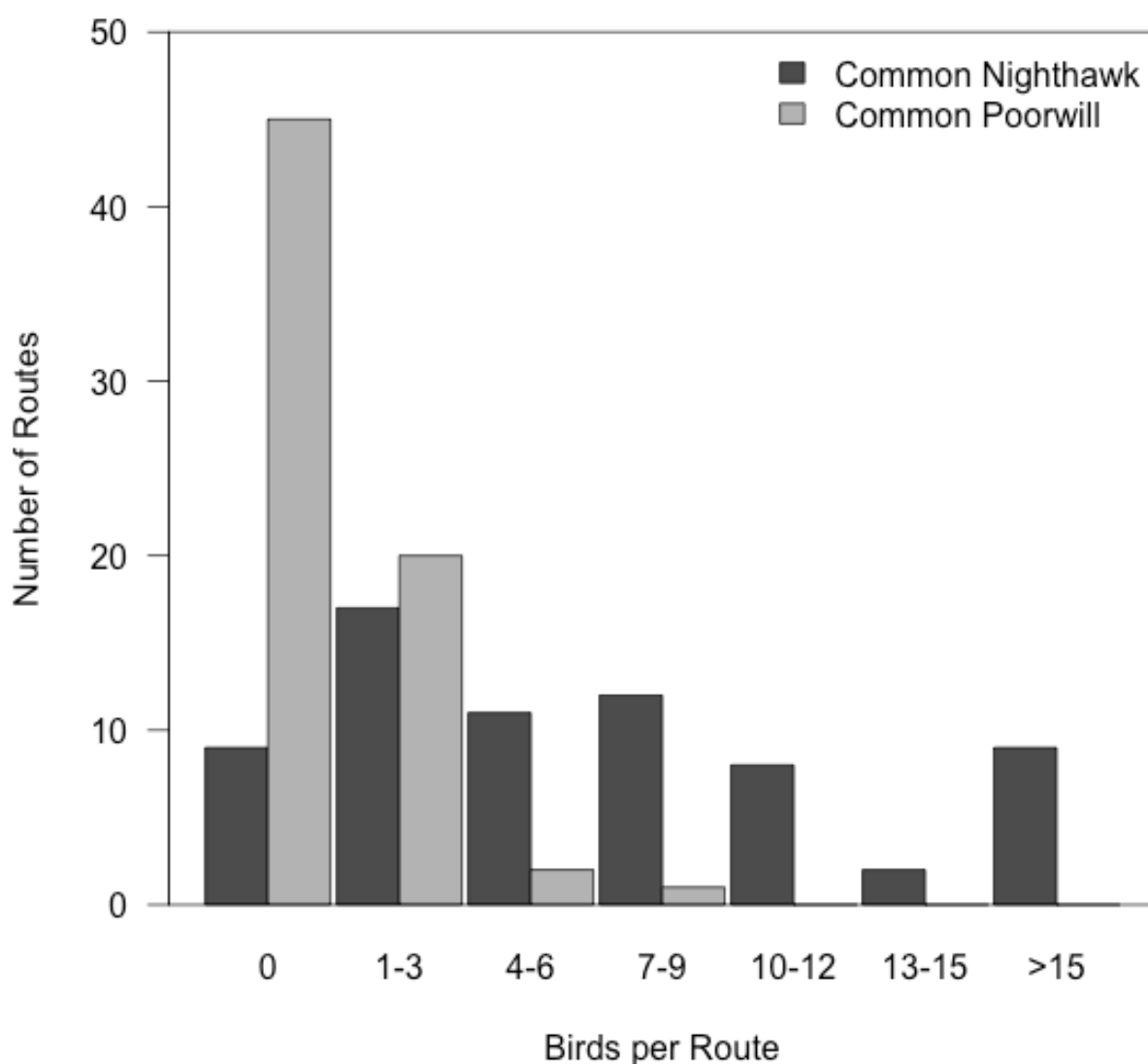
The number of routes surveyed in 2015 was similar to the number surveyed in 2014; however, surveys in 2015 also included 6 trial surveys in Alberta and 5 in southern Saskatchewan (Figure 1). Approximately 70% of 2014 BC Nightjar Survey volunteers returned to survey in 2015.

**Table 1.** Number of BC Nightjar Survey routes completed in BC per year since 2010.

	2010	2011	2012	2013	2014	2015	Total
Two-Species Zone	3	3	16	28	83	74	207
One-Species Zone	0	0	0	1	58	80	139
Total	3	3	16	29	141	154	346

### 3.2. Two-Species Zone

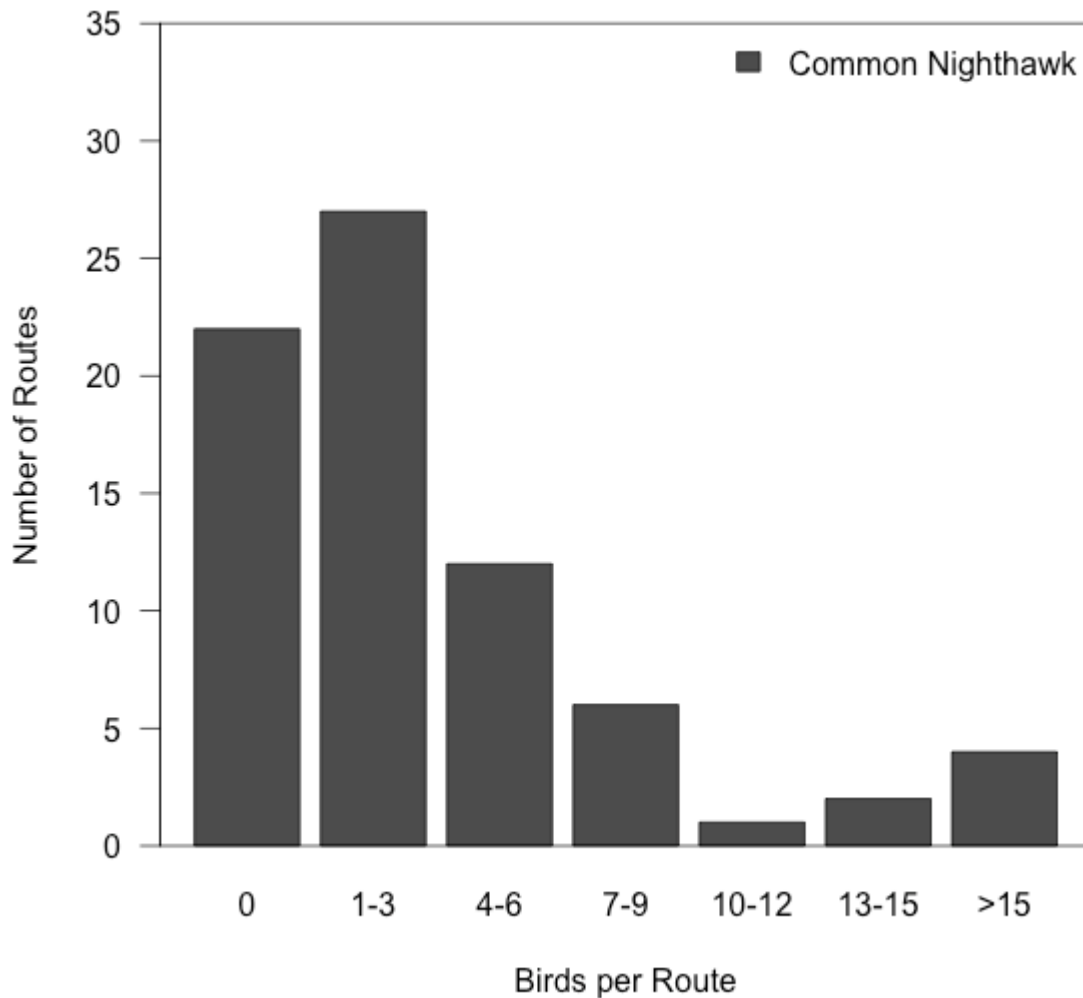
Common Nighthawks were detected at 63 of the 74 Two-Species Zone routes surveyed in 2015 (85%), for a total of 586 Common Nighthawks detected in the Two-Species Zone (Figure 2). Common Poorwills were detected at 25 of the 74 routes surveyed in 2015 (34%). In total, 79 Common Poorwills were detected during the surveys in the Two-Species Zone.



**Figure 2.** Number of nightjars detected on routes surveyed in the Two-species Zone.

### 3.3. One-Species Zone

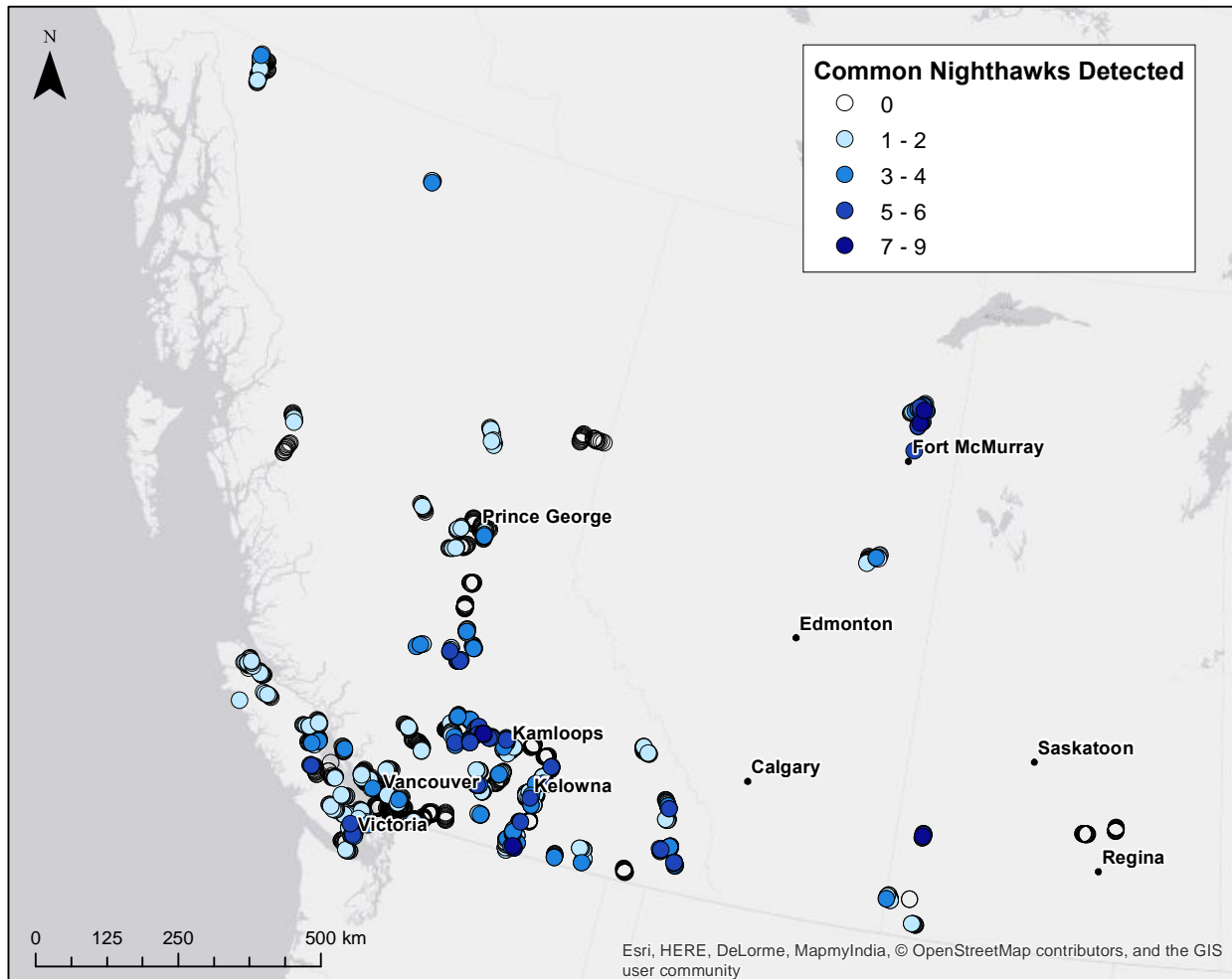
Common Nighthawks were detected at 58 of the 80 routes surveyed in the One-Species Zone (73%), for a total of 410 Common Nighthawks in the One-Species Zone (Figure 3). On average there were 11 Common Nighthawks per route and detection per route ranged from 0 to 43 birds per route.



**Figure 3.** Number of Common Nighthawks detected on routes surveyed in the One-species Zone.

### 3.4. Common Nighthawk Hotspots

Common nighthawks were detected in all regions surveyed in 2015 (Figure 4). Relatively high abundances were detected along routes in northern Alberta, near the Thompson River east of Kamloops, south of Kelowna, and on southeast Vancouver Island. The fewest Common Nighthawks were found around Prince George and Vancouver.

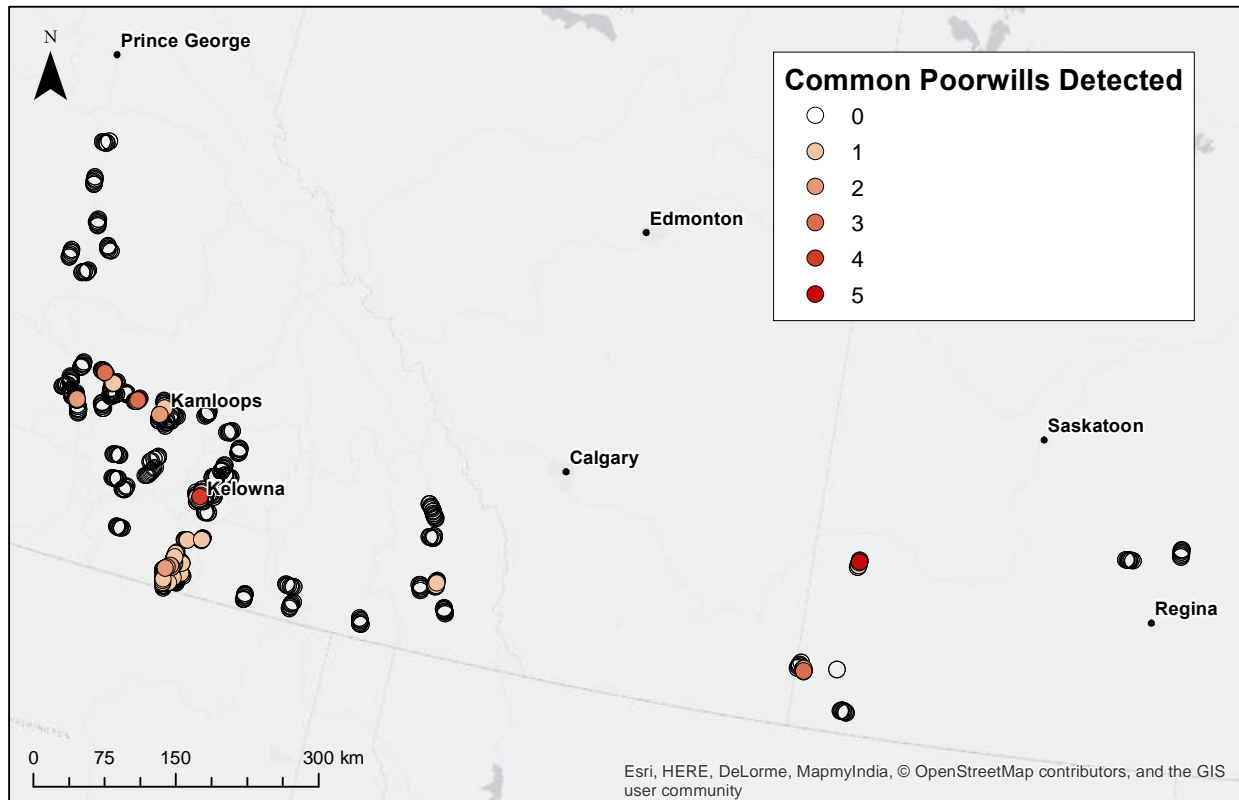


**Figure 4.** Abundance of Common Nighthawks detected on routes surveyed in 2015.



### 3.5. Common Poorwill Range

In 2015, Common Poorwills were detected with particularly high abundances in Kelowna and the Cache Creek area east of Kamloops (Figure 5). Common Poorwills were also detected at many survey stations in south Okanagan south of Kelowna. Unlike in 2014, Common Poorwills were also detected in the Kelowna area this year. Thanks to trial surveys in 2015, Common Poorwills were also detected in the Cypress Hills and Great Sand Hills areas in southwestern Saskatchewan.



**Figure 5.** Abundance of Common Poorwills detected on routes surveyed in 2015.

### 3.6. Route Spotlight: Haywood Farmer Road

*By Azim Shariff, 2015 BC Nightjar Survey Biologist*

Travelling around central BC is a pretty fantastic way to spend a summer. The coolest part about my experience as the 2015 BC Nightjar Survey Biologist was getting to see the variation across BC's many ecosystems. I went from the mixed-wood forests in MacKenzie and Prince George to the hot and dry central Cariboo region to the temperate rainforest around Pemberton, and it was amazing to be able to see so much.

In the mixed-wood forests of Mackenzie, while I was out placing autonomous recording units (ARUs) and wading through devils's club (*Oplopanax horridus*; a very spiny plant), I remember looking down at my leg at one point (I was wearing pants, of course, not shorts) and counting 15 mosquitoes. I just shook my head and continued on.



*Azim also censused the mosquitos on his leg while surveying for nightjars near Mackenzie.*

Temperatures were near 40°C in Cache Creek and Ashcroft during the especially hot and dry summer this year. In this arid environment, I found a few cool-looking plants around that I rarely get to see, living on the coast.



*Prickly pear cactus (Opuntia fragilis) is a cactus species found in southcentral BC.*



During my 2015 field season, there were many routes that stood out because of the beauty of the area or the overwhelming nocturnal bird and bat abundance.



*Azim found this meadow of wildflowers after hiking to the top of a rocky ledge.*

But I would have to say that one of the most stunning routes I surveyed was the Haywood Farmer Road route just southwest of Kamloops Lake between Kamloops and Cache Creek. This was the first time I had seen a large flock of foraging Common Nighthawks and also where I detected the most Common Poorwills of all the survey routes that I completed. I surveyed this route just after current and former WildResearch Presidents Christine Rock and Paul Levesque joined me for surveys in Cache Creek.



*Haywood Farmer Road route southwest of Kamloops Lake*

About half way through the Haywood Farmer Road survey route, there was a flock of 20-25 (my best actual count was 24) Common Nighthawks flying and swooping over the water. To see a bird of conservation concern in such high numbers was quite impressive, and seeing them flying so low over the water was fantastic. Trying not to get distracted too much by the flock and still track the other individuals I was hearing who weren't part of the flock, I watched the nighthawks fly and feed, as they made the occasional wing boom.

I heard the Common Poorwills on the way back and around the middle of the survey. It was cool to hear three individuals at once, since a lot of my time was spent in the One-species Zone and I didn't get a chance to hear many poorwills. Unfortunately, I didn't get to see any up close, but there's always next year!



After the very exciting central region of BC, I came back to more familiar settings in Pemberton, where I had a chance to see some different wildlife as well in the mossy forests near my survey routes.



*A mule deer spotted in the forest around Pemberton.*

Overall, there are more awesome things I saw than I can put in here, but those were the most memorable moments that I wanted to shine a spotlight on.

### **3.7. Citizen Scientist Spotlight: Doug Wilson**

*By Doug Wilson, BC Nightjar Survey Citizen Scientist*

Nighthawks play prominently in my memories of birds over some 40 years of birding across BC, both recreationally and professionally. Now retired, I worked 36 years in the Ministry of Environment, Fish and Wildlife Branch (F&W), and latterly the Ministry of Forests, Lands and Natural Resource Operations – and you can imagine it took a while to get that right! My particular emphasis during those years was birds, such as waterfowl (Canada Geese, Snow Geese, Black Brant) and raptors (eagles, hawks, falcons, owls), especially when I worked in the Vancouver area. But because F&W was always notoriously short-staffed, I got involved with large mammals as well, such as mountain goats, deer, moose, caribou and elk in Prince George, where I transferred in 1991. I always maintained an interest in birds, though, and became “the bird guy” in both locations. That being said, I always defer to the “real” birders of central and northern BC, the ones who can identify summer shorebirds at a glance, or can tell one flycatcher or warbler from another by song, and not have to re-learn those songs every spring! Common Nighthawks, however, have always been easily identifiable, even for me, and memorable.



*Biologist Doug “the Bird Guy” Wilson holding a male American Kestrel.*

One of my earliest memories of nighthawks was of commonly hearing them above downtown Vancouver and the West End. I had dropped out of university, much to the dismay of my parents, and moved to Vancouver from Edmonton in 1969. I didn’t achieve my undergrad degree until 24 years later from SFU, and now our 20-year-old son is attending SFU – shades of his father! And Elly Knight, the Program Manager for the WildResearch Nightjar Survey, turns out to be the daughter of a guy I worked with in Vancouver back in 1976, and then at F&W for several years. Ain’t life strange!

Others remember the common sound of Common Nighthawks in those early days too. Jack Bowling, one of our local esteemed birders, also remembers the sound of nighthawks, peenting and booming over Vancouver in the 1970’s before the advent of tarred rooftops, which presumably made nesting problematic for them. It was very common to hear and see them in those days on warm summer evenings. A friend of mine from those heady days, Bob Little, who also worked for F&W also remembers the unmistakable and frequent “peents” of nighthawks above downtown Vancouver and the West End, and the gradual diminution of them as the years went on.

In 1970, the sound of nighthawks followed me when I moved up the coast to Powell River, to a cabin on a lake in town. I lived in a house between Vancouver and a farm up on Bute Inlet (these were the hippie days, after all...). I vividly recall one evening when I climbed to the top of a hill overlooking the town and the MacBlo pulp mill and watching the nighthawks swooping and booming all around me, in the dozens. It was a fabulous sight, and sound. A few years later, I had occasion to visit Ross Lake, which the Skagit River flows into. I



remember standing there, looking down Ross Lake towards the US, while dozens of nighthawks swooped and dove around us, at dusk on a summer day. Then there was the time we were on Texada Island, across the strait from Powell River, where we found ourselves collecting biological data on an extended antlerless deer hunting season, instituted because the deer had become pests on the island. We were driving along some road, again at dusk, when we came across a “bird lump” on the road. I got out to see what it was, and got a good look at a roosting nighthawk, just before it came to its senses and flew off to join its fellows above.



*A male Common Nighthawk roosts on a fence post. Photo credit: Nick Parayko.*

In the spring of 1991, my wife and I moved to Prince George. Before I really knew any of the local birders or the Naturalists’ Club, I found myself at Spruceland Shopping Centre, looking east across Highway 97, and there were 40 or 50 nighthawks wheeling and swooping, presumably gathered to fly south, or maybe just exploiting some late insect hatch. Every year thereafter I’d watch and listen for them around June 1<sup>st</sup>, after everything else had arrived for that breeding season. And every year I’d hear them, and see several wheeling and peenting as I walked the dog throughout the summer, or strolled through the nearby

gravel pit with baby Nicholas on my back. As the years went on, I saw fewer and fewer, and heard them more and more sporadically, and later in the summer. Then, in 2013, I heard and saw none in my neighbourhood, and again in 2014. Mind you, as the dog and I grew older and gimpier together, I walked him less, but still, nighthawks are loud, and pretty obvious on a summer's eve, especially with a vent or window open to catch the breeze.

Sometime around 2010, perhaps a year or two earlier, a co-worker and myself found ourselves back at Highway 97 just south of the town of Bear Lake, about 50 miles north of Prince George. Again, it was late August or early September, and there, to the west of the junction we close to the Crooked River, were 10 or 12 nighthawks, wheeling and swooping above us. That was the last flock of nighthawks I have seen; we got 1 on our "official" WildResearch Nightjar Survey route just north of Prince George last year. This year, I've heard one two nights in a row on my street, and in a reconnaissance of my route this June 15<sup>th</sup>, three were seen overhead at an afternoon "tailgate" meeting before the survey proper. No nighthawks were seen during the survey itself.

There's something magical about nighthawks, the sounds they make, the heights they achieve in the sky, their aberrant timing compared to every other spring migrant. We seem to be losing them, and within my own, brief lifetime. This is not something we should countenance; we need to do everything we can to maintain them, if only as a shadow of their former presence.

## **4. DETECTABILITY & PROTOCOL ASSESSMENT**

### **4.1. Multiple Surveys**

#### **4.1.1. Background**

In 2015, several keen BC Nightjar Survey citizen scientists offered to survey their routes twice within the survey period (June 15 – July 15). We conducted a comparison of the number of nightjars detected on one versus two surveys in order to determine whether a second survey of the same route during the same survey season would yield further useful information (i.e., more nightjar detections). Five routes in the Two-species Zone and 13 routes in the One-species Zone were surveyed twice for the comparison.

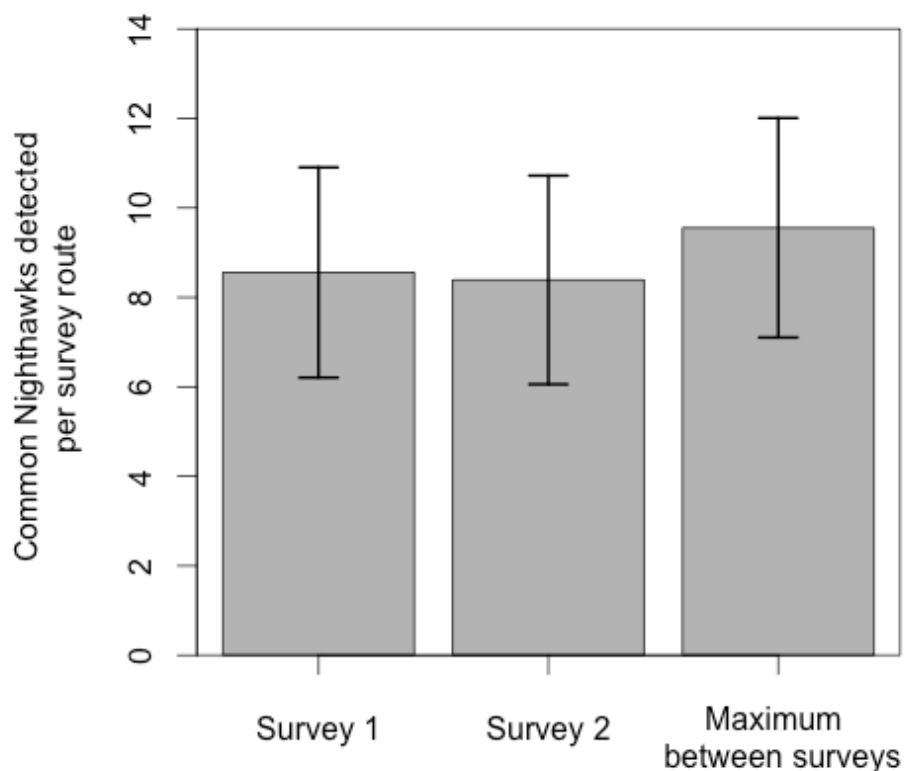
#### **4.1.2. Statistical Methods**

We compared the number of Common Nighthawks detected during the first and second surveys to the maximum number of nighthawks detected, both at the station level and the route level. We made comparisons using Kruskal-Wallis tests, and used a post-hoc Nemenyi test to examine the differences between groups at the station level. For routes in the Two-Species Zone, we used the maximum number of Common Nighthawks detected during the survey.

Common Poorwills were only detected in 1 of the 5 routes in the Two-species Zone that were surveyed more than once; therefore, we did not complete a statistical comparison for this species.

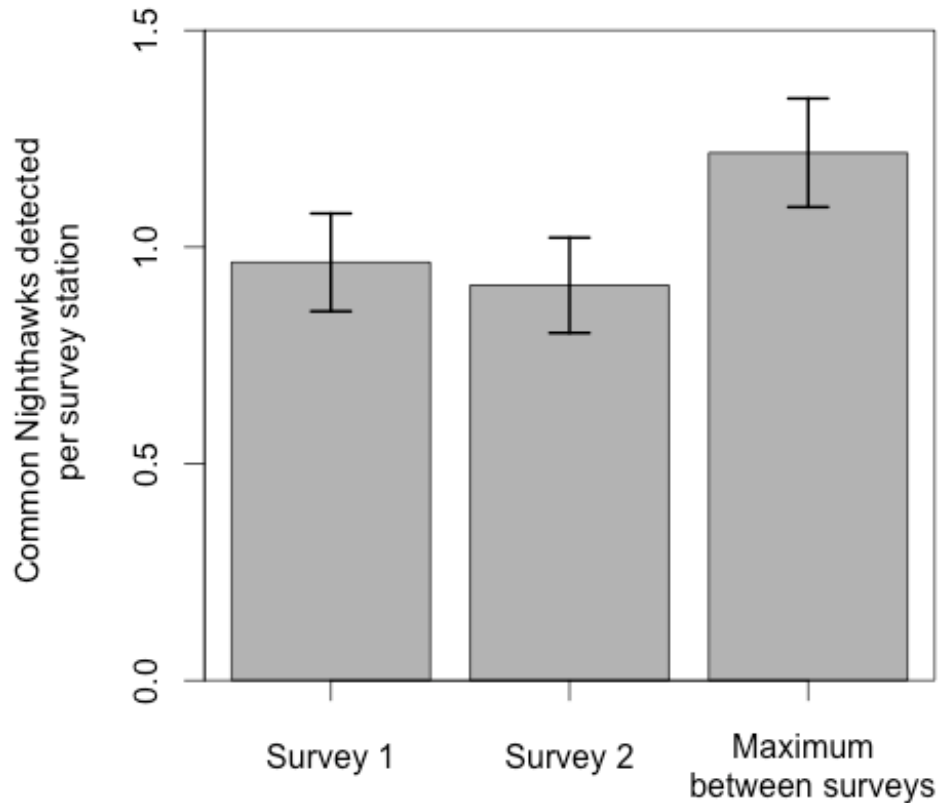
#### 4.1.3. Results

Common Nighthawks were detected at all 18 routes on both surveys. The mean numbers of Common Nighthawks detected between the first and second surveys were similar, and did not differ significantly from the maximum detected between the two surveys ( $H_2 = 0.48$ ,  $P = 0.79$ ; Figure 6).



**Figure 6.** Number of Common Nighthawks detected per survey route at repeated surveys. Error bars represent standard errors.

Common Nighthawks were detected at 76 of the 170 survey stations (45%) during the first survey and 68 of the survey stations (40%) during the second survey. Between the two surveys, Common Nighthawks were detected at 90 survey stations overall (53%). The difference between the two surveys and the maximum nighthawks detected was marginally insignificant ( $H_2 = 5.38$ ,  $P = 0.07$ ; Figure 7). Future analyses of this dataset in an occupancy framework will help us to understand how much a second survey would increase Common Nighthawk detection.



**Figure 7.** Number of Common Nighthawks detected per survey station at repeated surveys. Error bars represent standard errors.

Common Poorwills were only detected on one of the five repeat-survey routes in the Two-Species Zone. On that route, they were detected at two stations during the first survey on 29 June 2015, but were detected at only one station during the second survey on 5 July 2015. In addition, fewer individuals were detected at that station during the second survey (1 vs 3).

## 4.2. Lunar Phase & Visibility

### 4.2.1. Background

The most substantial change to BC Nightjar Survey protocols in 2015 was a strong recommendation for surveyors in the Two-Species Zone to be conduct their surveys within one week of the full moon. This change was made because results of the 2014 Annual Report and previous studies indicated that Common Poorwills are more detectable during this period. We reassessed these recommendations here to ensure protocols are optimized.

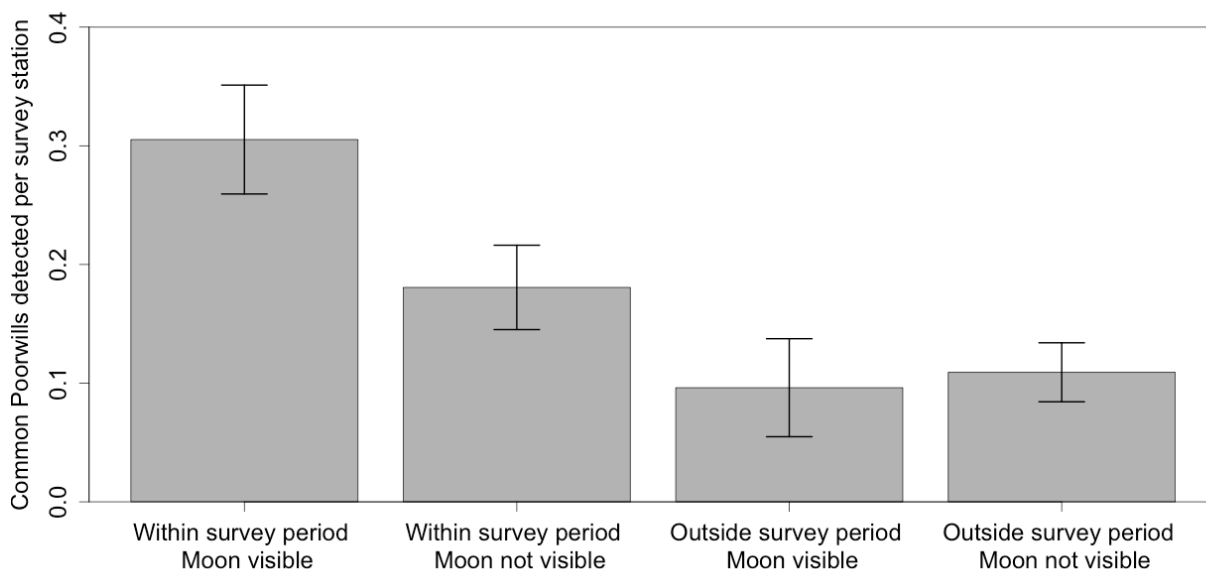
### 4.2.2. Statistical Methods

We compared the number of Common Poorwills detected at each station within the recommended lunar period (i.e. one week of the full moon) to the number of Common Poorwills detected outside the recommended period using nonparametric Wilcoxon signed-rank tests. We also compared the number of Common Poorwills detected when the moon was visible to the number detected when the moon was not visible. All data from surveys

starting 30 minutes after sunset in the Two-Species Zone from 2014 and 2015 were included in the analyses ( $n = 889$ ).

#### 4.2.3. Results

Approximately twice as many Common Poorwills were detected at each survey station within the recommended lunar survey period than outside of it ( $W = 591310.5$   $P < 0.001$ ; Figure 8). In addition, there was an approximately 75% increase in the number of Common Poorwills detected at each survey station when the moon was visible by the citizen scientist observer than when the moon was not visible ( $W = 6441$ ,  $P < 0.001$ ).



**Figure 8.** Number of Common Poorwills detected per survey station in the Two-Species Zone on surveys starting 30 minutes after sunset. Error bars represent standard errors.

## 5. OTHER ACCOMPLISHMENTS IN 2015

### 5.1. Data Hosted on NatureCounts

We are thrilled to announce that WildResearch's BC Nightjar Survey data are now available on Bird Studies Canada's NatureCounts data portal. We believe that the data collected for free by citizen scientists should also be freely available for research and monitoring analyses. Data from the 2010-2014 seasons are currently available, and the 2015 data will be posted as soon as the data are ready for upload. Visit NatureCounts to learn more or to access the data!

<http://www.bsc-eoc.org/birdmon/default/datasets.jsp?code=WRNIGHTJAR>



## 5.2. Community Building

Funding for BC Nightjar Survey community building in 2015 was generously provided by BC Nature and the BC Naturalists' Foundation.

### 5.2.1. Orientation Sessions

We increased the number of orientation sessions in BC from two in 2014 to six in 2015 and provided a session in each major municipality where we have substantial citizen scientist support. In total, over 50 volunteers joined us for orientation sessions in Richmond, Victoria, Oliver, Kelowna, Kamloops, and Prince George. In addition to the regular protocol review and trial surveys, we added a focus on nightjar biology and conservation in 2015 to share and discuss our study species with volunteers.



*Citizen scientists spot a Common Nighthawk during an orientation session.*

### 5.2.2. Nightjar News

In March of February 2015, we launched a bi-monthly e-newsletter to keep the nightjar community up to date on BC Nightjar Survey program news, conservation highlights, and research from across the world. The newsletter now goes out to several hundred citizen scientists and professional biologists across Canada and the US! Sign up to receive the Nightjar News at <http://eepurl.com/bj1PgH> if you're not already on the mailing list.

### 5.2.3. Nightjar Survey Stickers

To let all our 2015 citizen scientists know how much we value their contributions, we produced waterproof stickers with our snazzy new logo and sent one to each volunteer with a thank-you note. Thanks again for all your contributions!



*A volunteer shows off her new WildResearch Nightjar Survey sticker.*

### **5.3. Autonomous Recording Unit (ARU) Surveys**

Thanks to funding from TD Friends of the Environment Foundation, the James L. Baillie Memorial Fund, and Environment Canada, WildResearch was able to collect autonomous recording unit (ARU) data across central BC to answer questions about nightjar detectability. ARUs collect acoustic data on a pre-determined schedule and can be used to study wildlife via their acoustic behaviour over longer periods of time than using human observers. Similar data was also collected by the University of Alberta Bioacoustic Unit in northern Alberta under a new partnership.

#### **5.3.1. Roadside Surveys**

ARUs were deployed at BC Nightjar Survey stations at the side of the road and in paired habitat approximately 300 m away to study whether there is a bias in the number of nightjars detected by roadside surveys. Roadside survey ARU data are currently being analyzed by an undergraduate student at the University of Alberta as an independent research project.

#### **5.3.2. Citizen Science – ARU Surveys**

Citizen science surveys by human observers were also recorded by ARUs in 2015 in order to assess various methods for surveying nightjars. A comparison of methods will help researchers integrate the BC Nightjar Survey data set with other datasets in order to complete large-scale

analyses for conservation purposes. The citizen science ARU data set is currently being listened to by WildResearch volunteers.

### **5.3.3. Training Volunteers to Analyze Spectrograms**

Collection of ARU data has also provided the opportunity for WildResearch members and volunteers to learn skills in bioacoustic analysis, which is becoming popular in wildlife ecology. In 2015, eleven volunteers received remote training in reading spectrograms and processing ARU data using protocols developed in collaboration with the Bioacoustic Unit at the University of Alberta.

## **6. FUTURE PLANS**

### **6.1. Plans for 2016**

#### **6.1.1. Multi-Region Expansion**

We are very excited to announce that the BC Nightjar Survey will be undergoing a major expansion to five additional provinces and territories for the 2016 field season! The incredible response from our membership and the community in BC over the last few years has encouraged us to expand the program. Nightjars are a highly understudied group of species of conservation concern, and baseline data collected by programs like the WildResearch Nightjar Survey is imperative for conservation efforts across Canada. In addition, the WildResearch Nightjar Survey will expand existing training opportunities in nocturnal survey methods to other areas of Canada and engage a larger audience in nightjar conservation.

The WildResearch Nightjar Survey is scheduled to expand beyond British Columbia to Alberta, Saskatchewan, Yukon Territory, the Northwest Territories, and New Brunswick. Each province or territory will be run by a coordinator who is a nightjar expert and naturalist in that region.

In order to accommodate the expansion, the program is being renamed from the “BC Nightjar Survey” to the “WildResearch Nightjar Survey”. All subsequent reports and communications about the program following this 2015 Annual Report will refer to the WildResearch Nightjar Survey.

#### **6.1.2. Nightjar Atlas**

WildResearch has initiated construction of an online Nightjar Atlas in collaboration with the Community Mapping Network and thanks to funding provided by MEC. The Nightjar Atlas will provide an online portal for data-entry, automate the route sign-up process, store all BC Nightjar Survey data, and provide geospatial display of some of the data. The atlas will streamline the process for volunteers and reduce the workload for coordinators, who also contribute to the program on a volunteer basis. Building the Nightjar Atlas has directly facilitated the multi-region expansion described above, and we are excited to launch the atlas for the 2016 survey season!

## 6.2. Long-term Plans

### 6.2.1. General

In the long-term, we will continue working towards the research objectives for both nightjar species, and will define research objectives for the Eastern Whip-poor-will in Saskatchewan. WildResearch has been working with Environment Canada and other stakeholders on nightjar survey methods, and looks forward to contributing to the recovery of the Common Nighthawk in Canada. We will continue to encourage the use of our data by students and researchers across Canada. As we collect more data and conduct formal statistical analyses, we plan to publish our findings in scientific journals to share our knowledge with stakeholders and the public.

### 6.2.2. Route Assessment & Objectives

After three years of nightjar surveys, survey routes will be reassessed to transition the program from habitat objectives to long-term monitoring objectives. Routes that have never contained a nightjar detection will be removed from the regular list of available routes to a “zero” route list. These zero routes will be surveyed once every five years to ensure monitoring is capable of documenting range expansions. Reassessment of survey routes for BC will begin in 2017, and in 2020 for other regions.

